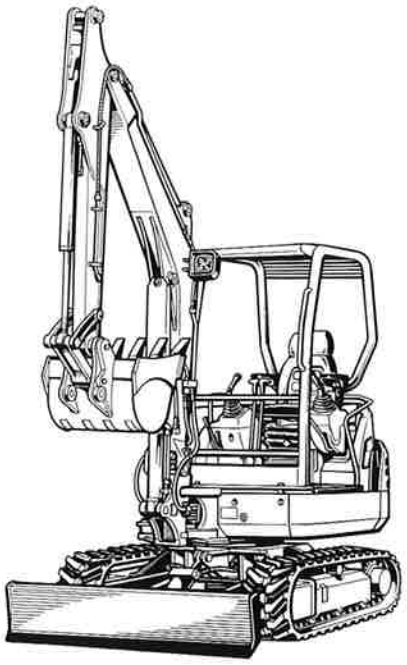
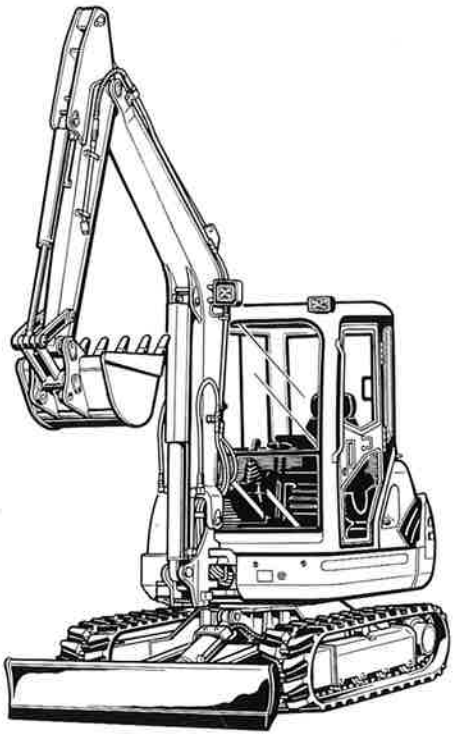
OPERATOR'S MANUAL

KUBOTA EXCAVATORS

MODELS KX 91-3 121-3 161-3 · U 35



L-4733



L-4783

READ AND SAVE THIS MANUAL

Kubota

CONTENTS

⚠ SAFE OPERATION 1

DEALER SERVICE 1

TECHNICAL DATA 2

DESCRIPTION OF MACHINE PARTS 4

INSTRUMENT PANEL AND CONTROL ELEMENTS 5

CHECKS BEFORE START 7
- DAILY CHECKS 7
- CAB TYPE MACHINES 7
  - Wiper/Washer Switch(CAB type only) 7
  - Interior Lamp(CAB type only) 7
  - Heater Switch(CAB type without air conditioner) 8
  - Cigarette Lighter(CAB type without air conditioner) 9
  - Opening/Closing of CAB Door(CAB type only) 10
  - Opening/Closing of Front CAB Window(CAB type only) 10
  - Working Light Switch 11
  - Emergency Hammer(CAB type only) 11
- AIR CONDITIONER 11
  - Air Flow 11
  - Air Control Vent 12
  - Control Panel 13
  - Operation 13

OPERATION OF THE ENGINE 14
- STARTING THE ENGINE 14
  - Checkpoints after Starting the Engine 15
- STARTING THE ENGINE UNDER COLD CONDITIONS 16
- STOPPING THE ENGINE 16
  - Emergency Engine Stop Knob 17
  - Stop Lever for Fuel Solenoid 17
- STARTING WITH AN AUXILIARY BATTERY 18
  - Observe Following Guidelines when Starting with an Auxiliary Battery 18

EXCAVATOR OPERATION 19
- RUNNING-IN OF THE NEW EXCAVATOR 19
  - Do not Work with Full Revolutions or Full Loads during the First 50 Working Hours 19
  - Oil Change in the Run-in Stage 19
  - Seat Belt 19
- STARTING 19
  - Operator's Seat 19
  - Lock Lever 20
  - Working Light Switch 20
- CONTROL OBSERVATIONS DURING OPERATION 21
  - Stop the Engine immediately if: 21
  - Warning Lamp 21
- DRIVING 21

Drive Levers(Right,Left)....22
Drive Speed Pedal....23
TURNS....23
Pivot Turn....24
Spin Turn....24
UP AND DOWNHILL DRIVING....25
OPERATION OF THE DOZER....25
TWO PATTERN SELECTION SYSTEM(TPSS)....26
Pattern Change....26
OPERATION OF THE BOOM....27
OPERATION OF THE ARM....27
OPERATION OF THE BUCKET....28
UNIT SWING AND BOOM SWING OPERATION....28
Unit Swing Operation....28
Boom Swing Operation....28
SERVICE PORT OPERATION....29
ANGLE BLADE OPERATION....30
AUTO IDLE (AI) OPERATION....31
Important Information on Excavator Operation....31
TRANSPORTING THE EXCAVATOR ON A VEHICLE....32
LIFTING OF THE EXCAVATOR....34
MAINTENANCE....37
MAINTENANCE INTERVALS....37
OPENING AND CLOSING OF PARTS....40
Opening and Closing of the Fuel Tank Cap....40
Opening/Closing of the Engine Hood....40
Opening/Closing of the Side Hood....40
Where to store the Tool and the Grease Gun....41
Where to keep Operators Manual....42
DAILY CHECKS....42
Checking Coolant Level....42
Checking Fuel Level....43
Checking Engine Oil Level....44
Checking Hydraulic Oil Level....44
Lubrication Points....45
Checking Radiator and Oil Cooler....46
Checking Washer Liquid(only for CAB type)....47
Checking and Cleaning Engine and Electrical Wiring....47
Washing Whole Machine....47
REGULAR CHECKS AND MAINTENANCE WORK....48
EVERY 50 SERVICE HOURS....48
Draining Fuel Tank....48
Draining Fuel Filter....48
Battery....48
Battery Charging....50
Greasing Swing Bearing Teeth....50
EVERY 200 SERVICE HOURS....50
Checking Fan Belt Tension....50
Checking Radiator Hoses and Clamps....51

Inspection and Cleaning Air Filter Element....52
Air Filter Maintenance....52
Greasing Swing Bearing....53
Checking Fuel Line and Intake Air Line....53
AIR CONDITIONER(EVERY 200 SERVICE HOURS)....53
Cleaning Inner Air Filter....53
Cleaning Fresh Air Filter....54
Checking Air-Conditioner Condenser....55
Checking Air-Conditioner Belt Tension....55
EVERY 250 SERVICE HOURS....55
Changing Engine Oil(First Engine Oil Change after 50 Service Hours)....55
Replacing Engine Oil Filter....56
EVERY 400 SERVICE HOURS....56
Replacing Fuel Filter element....56
EVERY 500 SERVICE HOURS....57
Replacing Engine Oil Filter....57
Drive unit Oil Change(First Oil Change of the 100 hours)....57
Replacing Hydraulic Return Filter Element(first replacement after 250 service hours)....58
EVERY 1000 SERVICE HOURS....58
Hydraulic Oil Check for Machines with Hydraulic Breakers....58
Hydraulic Oil Change(Including Replacing Suction Filter in Hydraulic Tank)....59
Replacing Hydraulic Pilot Filter Element....60
EVERY 1000 SERVICE HOURS OR ONCE A YEAR....60
Replacing Air Filter Element....60
EVERY 1500 SERVICE HOURS....61
Checking Fuel Injection Nozzle(Injection Pressure)....61
EVERY 2000 SERVICE HOURS....61
Changing Front Idler and Track Roller Oil....61
Checking Alternator and Starter Motor....61
EVERY 3000 SERVICE HOURS....61
Checking Injection Pump....61
ANNUAL SERVICE....61
Electrical Wiring and Fuses....61
Checking Air-Conditioner Pipes and Hoses....61
BIENNIAL SERVICING....61
Replacing of Radiator Hoses....61
Replacing Air-Conditioner Pipes and Hoses....62
Changing Radiator Coolant....62
Replacing Fuel Hose....64
Replacing Intake Air line....64
SERVICING AS REQUIRED....64
Checking Amount of Refrigerant (gas)....64
OTHER ADJUSTMENTS AND REPLACEMENTS....66
PURGING FUEL SYSTEM....66
ADJUSTMENT OF CRAWLERS....66
Rubber Crawlers....66
Special Information when Using Rubber Crawlers....67
Steel Crawlers....67
FUSES....68
Replacing Fuses....68
Fuse Capacities and Circuits....68

Auxiliary Electric 69
Slow Blow Fuse 69

TROUBLESHOOTING 70

OPERATION UNDER COLD WEATHER CONDITIONS 72
PREPARATION FOR OPERATION IN COLD WEATHER 72
PROCEDURE AFTER DONE WORK 72

LONG STORAGE 73

RECOMMENDED OILS 75

APPENDICES 76
MAIN DIMENSIONS 76

LIFTING CAPACITY 78

SAFE OPERATION

The best insurance against accidents is to abide by the safety regulations.

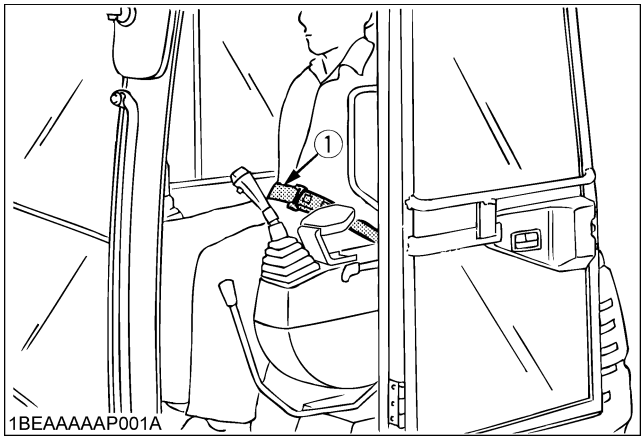
Read and understand this manual carefully before operating the excavator.

Every user, however experienced, should carefully read and understand this manual and those of the attachments and accessories before taking the excavator into operation. The owner is obliged to inform the operators of these instructions in detail.

Keep this manual in the pocket under the seat.

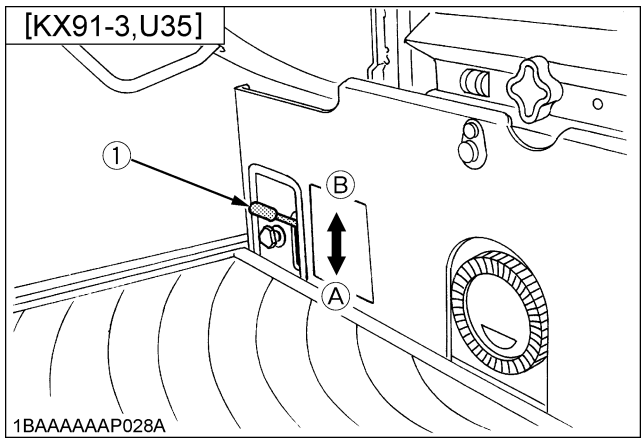
1. BEFORE OPERATION

1. Make yourself acquainted with the excavator and be aware of its limits. Read the operating instructions carefully before starting the excavator.
2. Obey the danger, warning and caution labels on the machine.
3. For your safety, ROPS/FOPS (Roll-Over Protective Structures, Falling Objects Protective Structures.) with a seat belt is installed by KUBOTA. Always use the seat belt when the machine is equipped with a ROPS/FOPS.
   Do not modify structural members of ROPS by welding, drilling, bending, grinding or cutting, as this may weaken the structure. If any component is damaged, replace it. Do not attempt repairs. If ROPS is loosened or removed for any reason, make sure all parts are reinstalled correctly. Tighten mounting bolts to proper torque.
4. The seat belt must be inspected regularly and replaced if damaged.

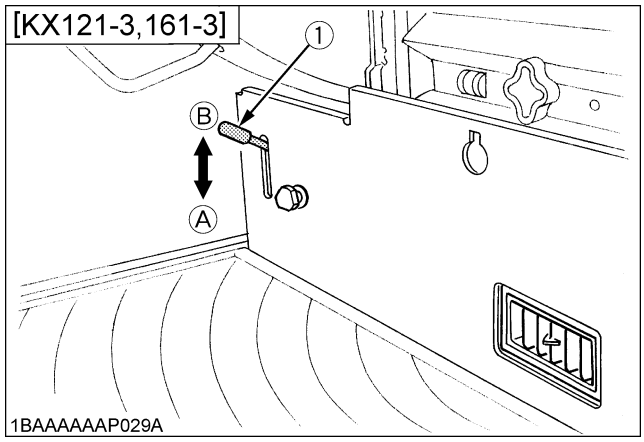


(1) Seat belt

5. Study control lever pattern A and pattern B. Then choose the one which is most familiar. Familiarize yourself with the pattern selected by operation slowly at low engine speed.



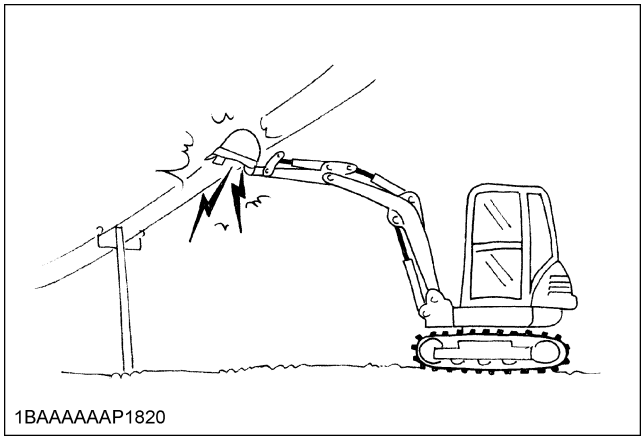
(1) Pattern selector lever (Two Pattern Selection System: TPSS)



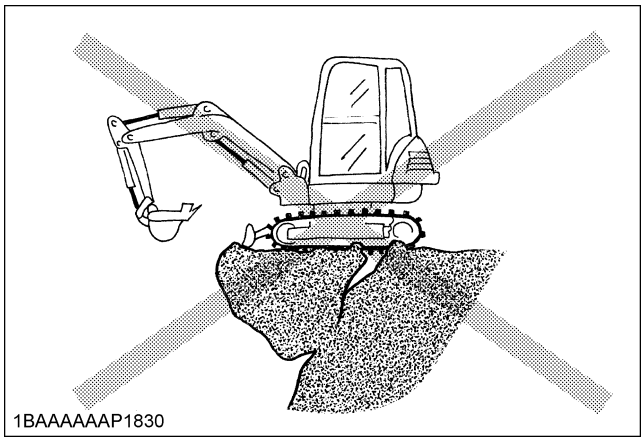
(1) Pattern selector lever (Two Pattern Selection System: TPSS)

6. Do not operate the excavator while under the influence of alcohol, medication, controlled substances or while fatigued.

7. Check the surroundings carefully before using the excavator or when attachments are being attached.
- Pay attention to the overhead clearance with electric wires.

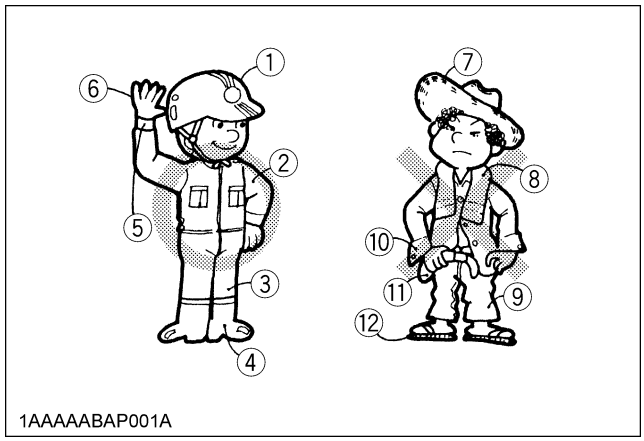

1BAAAAAAP1820

- Check for pipes and buried cables before digging.
- Check for hidden holes, hindrances, soft underground, and overhangs.


1BAAAAAAP1830

- During excavator use, do not allow any persons within the working range.

8. Do not allow other persons to use the machine before having informed him on the exact operation and work instructions, and be assured that the operator's manual has been read and completely.
9. Do not wear baggy, torn or too large clothing when working with the excavator. Clothing can get caught in rotating parts or control elements which can cause accidents or injuries. Wear adequate safety clothing, e.g. safety helmet, safety shoes, eye protection, ear protection, working gloves, etc., as necessary and as prescribed by law or statutes.



1AAAAABAP001A

(1) Helmet
(2) Clothing fit for work
(3) Tight seams
(4) Good grip footwear
(5) Well fitting cuffs
(6) Working gloves
(7) Straw hat
(8) Towel
(9) Baggy trousers
(10) Loose cuffs of the shirt
(11) Baggy shirt
(12) Rubber sandals

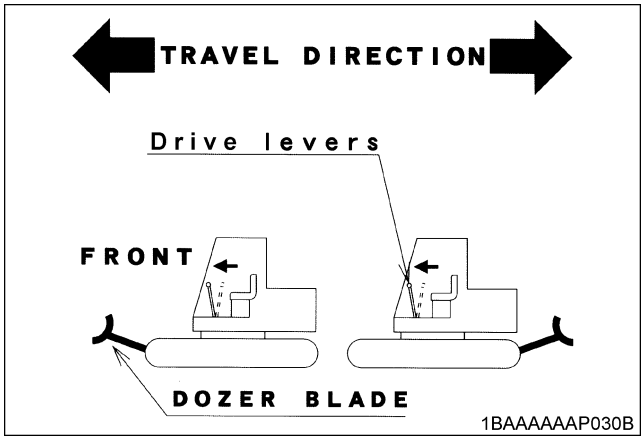
10. Do not allow passengers to ride on any part of the excavator at anytime. The operator must remain in the excavator seat during operation.
11. Check mechanical parts for correct adjustments and wear. Replace worn or damaged parts immediately. Check nuts and bolts regularly for correct torque. (for details see "Care and Maintenance").
12. Keep your excavator clean. Heavy soiling, grease, dust and grass can cause fire accidents or injuries.
13. Use only KUBOTA authorized attachments.
14. Before starting the excavator, be absolutely sure that the excavator has been filled with fuel, lubricated, greased and undergone all necessary maintenance.
15. Do not modify the excavator, otherwise it could lead to unforeseen safety problems.

2. STARTING OF THE EXCAVATOR

1. Get into and out of the machine safely. Always face the machine. Always use handrails and available steps and keep yourself well balanced. Do not hold any of the control levers and switches. Do not jump on or off the machine, whether stationary or in motion.
2. Start and control the excavator only from the operator's seat. The driver should not lean out of his seat when the engine is running.
3. Before starting the engine, make sure that lock levers are in position "Lock" and all control levers and pedals are in their neutral positions and the seat belt is fastened correctly.
4. Do not start engine by shorting across starter terminals or bypassing the safety start switch. The machine may start and move unexpectably if normal starting circuitry is bypassed.

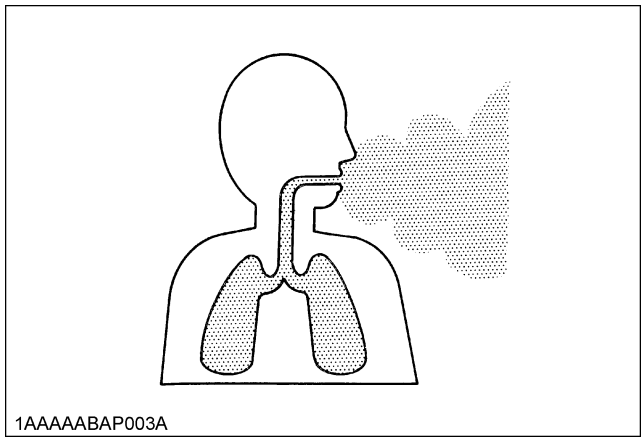
1BAAAAAAP1790

5. Make sure that the dozer blade is in front of you. (The dozer must be raised.) If the levers are activated with the dozer blade at the rear, the tracks will move in the opposite direction of the drive levers.



1BAAAAAAP030B

6. Do not operate or idle engine in a non-ventilated area. Carbon monoxide gas is colorless, odorless, and deadly.


1AAAAABAP003A

7. Keep all safety equipment and covers in place. Replace damaged or missing safety devices.
8. Precautions against tipping over. Keep away from steep slopes and embankments. Do not swing the bucket downhill. Lower the dozer during digging. Keep the bucket as low as possible while driving uphill. Turn slowly on slopes (at reduced speed). Do not place the excavator near the edges of trenches and banks, as the earth can give away due to the weight of the excavator.
9. Watch out at all times for the area to which the excavator is being moved.
   Pay attention to any hindrances.

◆ Safety for children

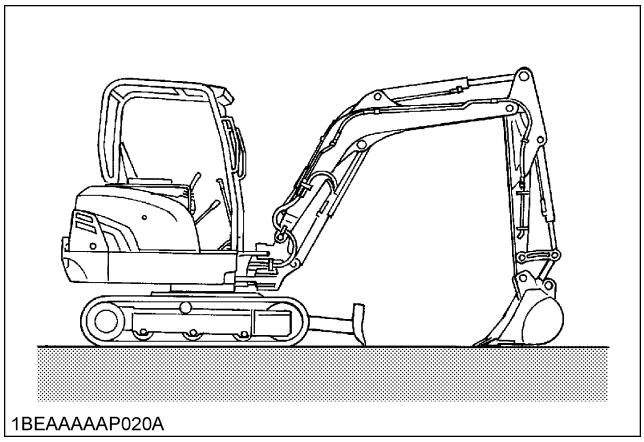
Tragedy can occur if the operator is not alert to the presence of children. Children generally are attached to machines and the work they do.

1. Never assume that children will remain where you last saw them.
2. Keep children out of the work area and under the watchful eye of another responsible adult.
3. Be alert and shut your machine down if children enter the work area.
4. Never carry children on your machine. There is no safe place for them to ride. They may fall off and be run over or interfere with your control of the machine.
5. Never allow children to operate the machine even under adult supervision.
6. Never allow children to play on the machine or on the attachments.
7. Use extra caution when backing up. Look behind and down to make sure the area clear before moving.
8. When parking your machine, if at all possible, park on a firm, flat and level surface; if not, park across a slope. Lower the bucket and dozer to the ground, remove the key place the control lock levers in the locked position from the ignition and lock the cab door (if equipped), before you leave.

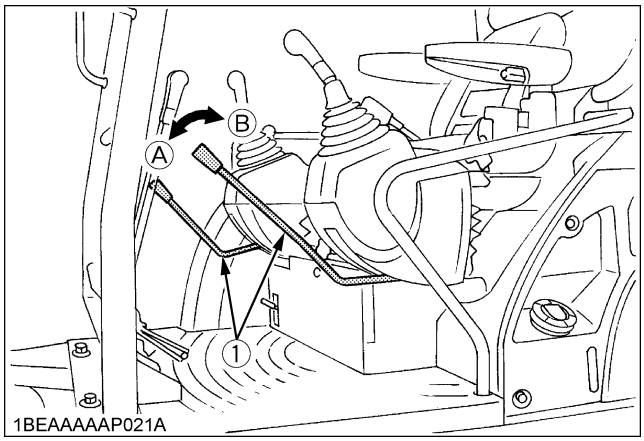
3. AFTER OPERATION

Before leaving the machine,

- Park the excavator on a firm, flat and level surface.
- Lower the attachments and the dozer blade to the ground.
- Stop the engine.
- Lock all control levers.
- Remove the key.



1BEAAAAAP020A

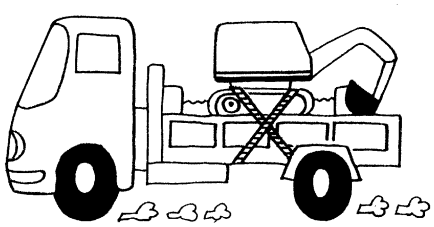


1BEAAAAAP021A

(1) Lock lever for control lever (A) "Unlock"
(B) "Lock"

4. SAFE LOADING AND TRANSPORT OF THE EXCAVATOR

1. Observe all regulations concerning the transport of excavators on public roads.
2. Use adequately long and robust ramps when loading on the machine. (for details see "TRANSPORTING THE EXCAVATOR ON A VEHICLE")
3. Do not change the running direction and to avoid a tipping over, do not try to swing the attachment crosswise to the loading ramps.
4. Lower the attachment on the loading bed and release the pressure from the hydraulic system.
   Block the crawlers with blocks and tie down the excavator. After loading the excavator on the vehicle, securely tie down the undercarriage of the excavator using suitable chains, tensioners and approved methods.



1AAABANAP032A

5. Avoid abrupt braking of the vehicle when the excavator loaded. Sudden braking cause the excavator move and may cause a serious accident.
6. If the excavator is to tow another machine, make sure the load is smaller than the strength of the hook, tow chain or cable.

Max. drawbar pull at coupling hook	70450 N (15840 lbs,7183 kgf)
Max. vertical load at coupling hook	7210 N (1621 lbs,735 kgf)

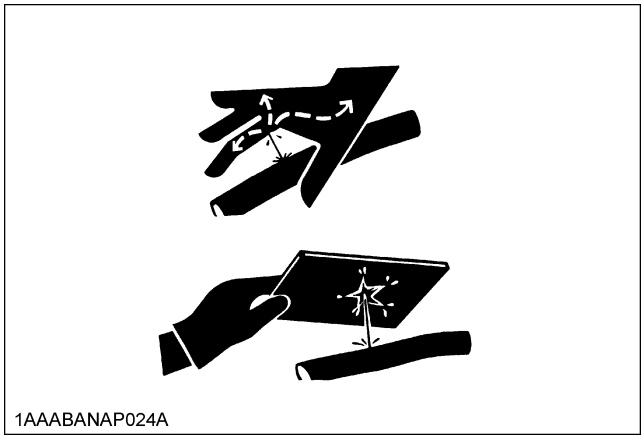
7. Do not use hooks on the roof of canopy and CAB for lifting the excavator.

5. MAINTENANCE

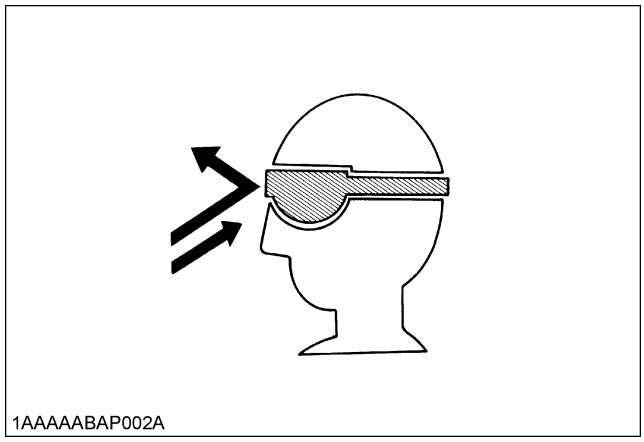
Before doing maintenance work on the excavator, place the machine on even solid ground completely, lower the attachments to the ground, stop the engine and remove the key. When dismantling hydraulic parts, make sure that the hydraulic oil has cooled down sufficiently to avoid burns.

Start maintenance work carefully, e.g. loosen plug slowly so that oil will not squirt out.

1. Before doing work on the engine, the exhaust system, the radiator and the hydraulics, let the excavator cool down sufficiently.
2. Turn off the engine at all times when filling with fuel. Avoid spilling and over-filling of fuel.
3. Smoking is prohibited while refueling or handling the battery! Keep sparks and fire away from the fuel tank and battery. Flammable gases escape from the battery, especially during charging.
4. Do not use or charge the refillable type battery if the fluid level is below the LOWER (lower limit level) mark. Otherwise, the battery component parts may be prematurely deteriorated, which may shorten the battery's service life or cause an explosion. Check the fluid level regularly and add distilled water as required so that the fluid level is between the UPPER and LOWER levels.
5. Read and follow the directions "STARTING WITH AN AUXILIARY BATTERY" in "OPERATION OF THE ENGINE", when starting with an auxiliary battery.
6. Keep a first-aid box and a fire extinguisher at hand at all times.
7. Do not open the radiator cap before the radiator has cooled down sufficiently
   First loosen the cap to the first stop and allow the system enough time to release the remaining pressure. Then loosen the cap completely.
8. To avoid short-circuiting the battery, always remove the ground cable first and attach the plus cable first.
9. Leaking hydraulic fluid has enough pressure to penetrate the skin and cause serious injuries. Leakages from pin holes can be totally invisible. Do not use hands for checking for leaks. Always use a piece of wood or cardboard. It is strongly recommended to use a face mask or eye protection.
   Should injuries occur with leaking hydraulic fluid, contact a doctor immediately. This fluid can cause gangrene or serious allergic reactions.


1AAABANAP024A

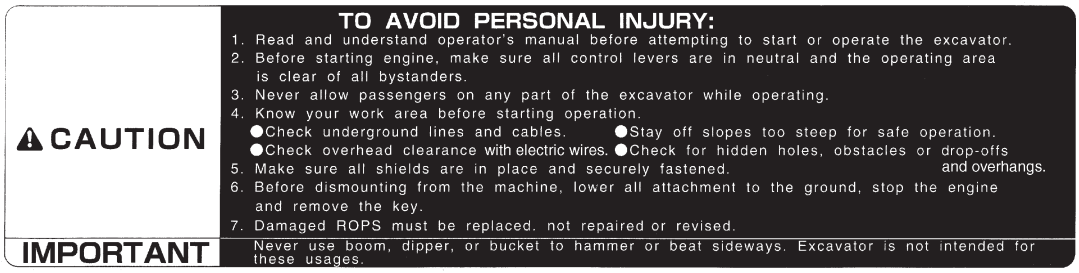
10. To avoid environmental damage from acid and heavy metals, do not throw the battery away.
11. Observe all laws and regulations concerning the disposal of used oil, coolants, solvents, hydraulic fluids, battery acids and batteries.
12. To avoid fire, do not heat the hydraulic components (tanks, pipes, hoses, cylinders) before they have been drained and washed.
13. Use a face mask or eye protection to protect the eyes and respiratory system against dust and other foreign particles.


1AAAAABAP002A

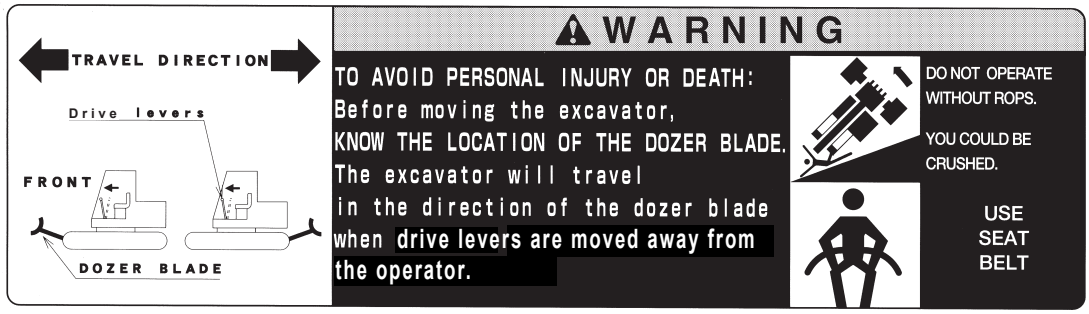
14. Securely support excavator with stands or suitable blocking before working underneath. For your safety, do not work under any hydraulically supported devices. They can settle, suddenly leak down, or be accidentally lowered.
15. Do not dismantle the spring of the crawler tensioner. If dismantling is necessary, contact your KUBOTA dealer where the machine was purchased, or competent service shop. The assembly must be done according to the work shop manual of KUBOTA (W.S.M.) for the product involved.
16. KUBOTA uses no parts which are lined with asbestos. Do not use these kind of parts even if they are available and can be installed.

6. DANGER, WARNING AND CAUTION LABELS

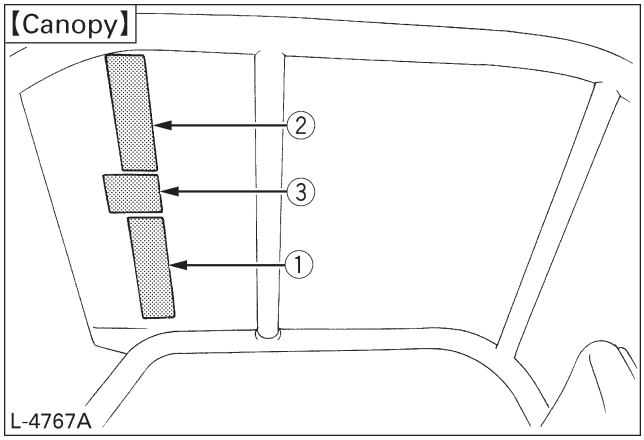
(1) Code No. RC418-5728-4

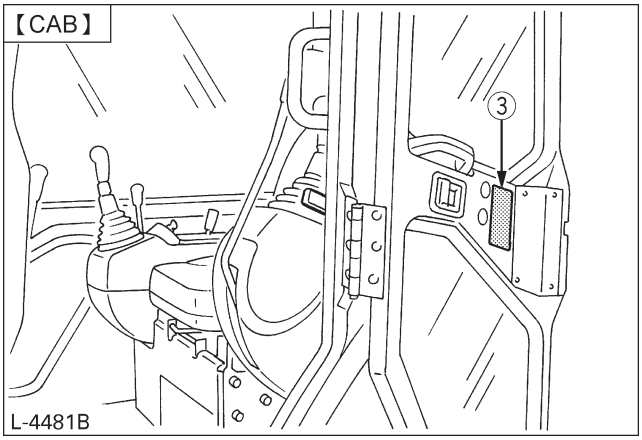


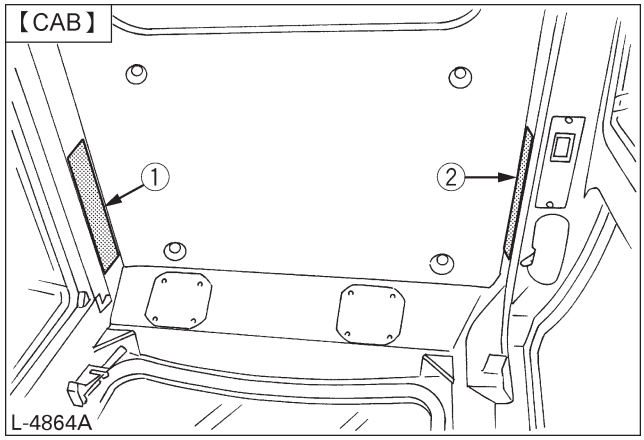
(2) Code No. RC418-5727-4



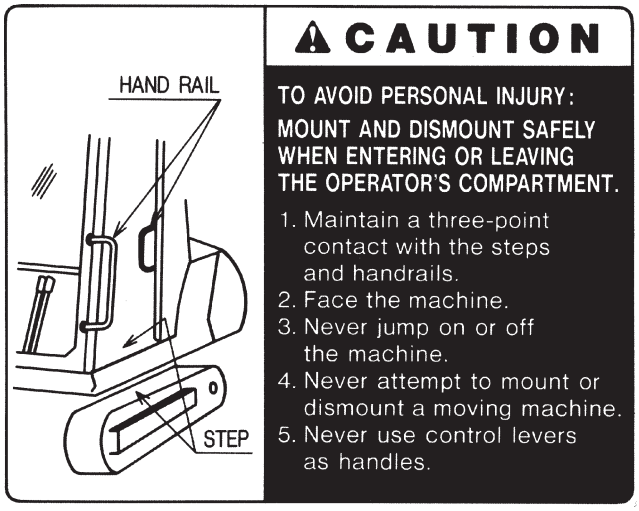
(3) Code No. RC418-5733-2



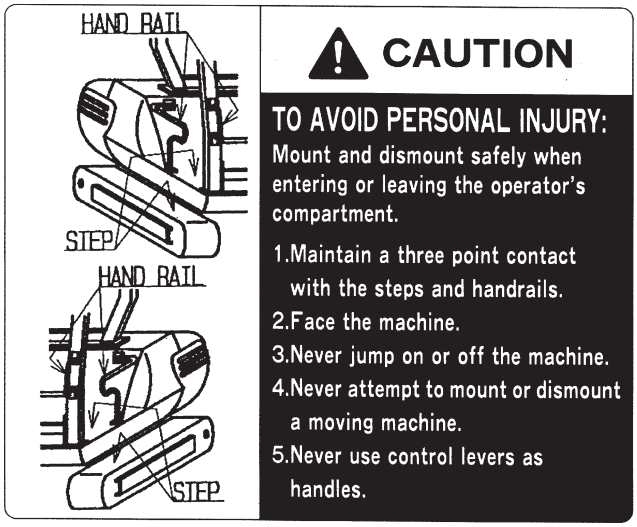




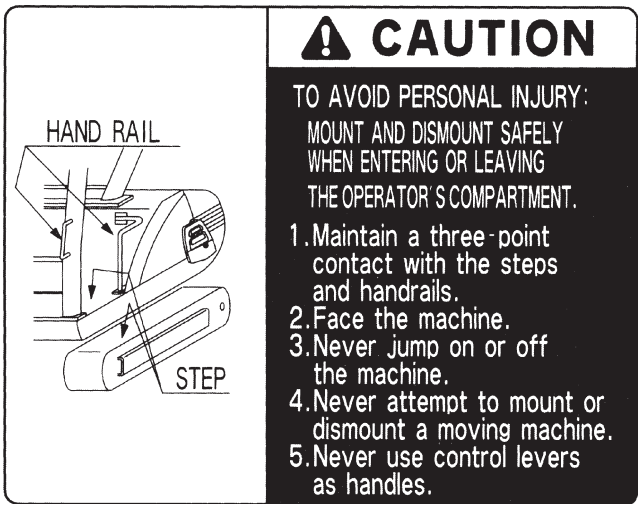
(1) Code No. RC108-5765-2[CAB]



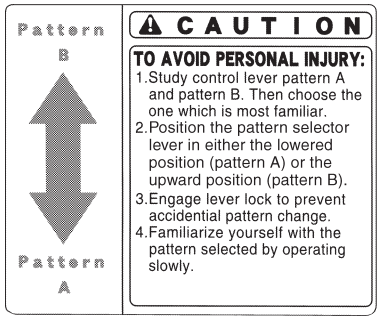
(1) Code No. RB208-5762-1 [KX91-3 Canopy]



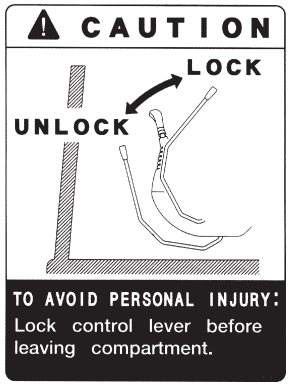
(1) Code No. RD118-5763-1 [KX121-3·161-3·U35 Canopy]



(2) Code No. RC418-5732-2



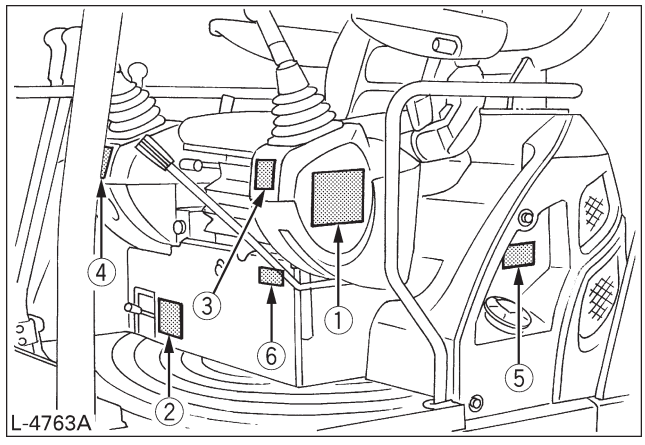
(3) Code No. RC418-5753-1
(4) Code No. RC418-5753-1 [Canopy]



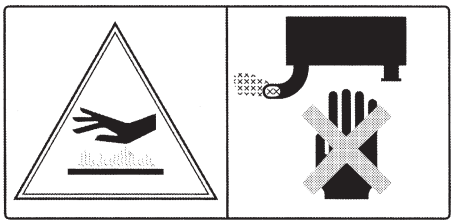
(5) Code No. R2401-5736-1

Diesel fuel only No fire

(6) Code No. RC718-5736-1 [U35]



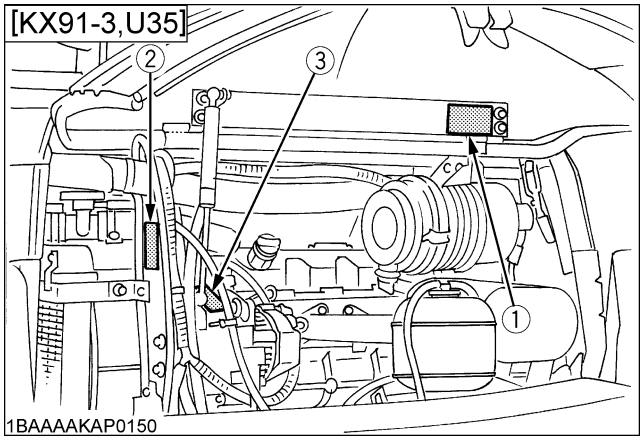
(1) Code No. RC418-5738-1 [KX91-3·U35]
Do not touch hot parts
such as exhaust etc.

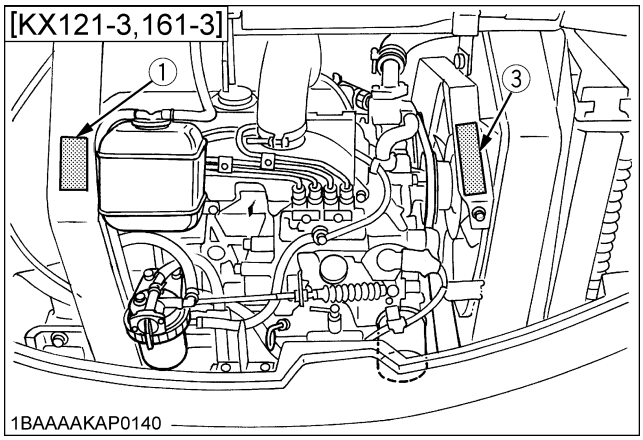


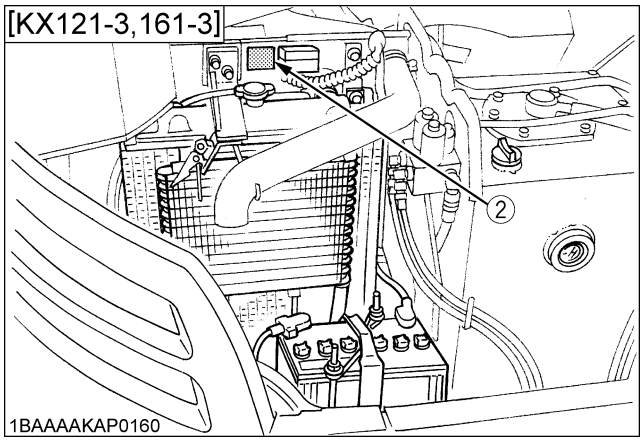
(2) Code No. RC108-5754-1

(3) Code No. RC418-5737-2 [KX91-3·U35]
Code No. TA040-4957-1 [KX121-3·161-3]
Keep away from fan and fan belt.

(1) Code No. TA040-4958-1 [KX121-3·161-3]
Do not touch hot parts
such as exhaust etc.

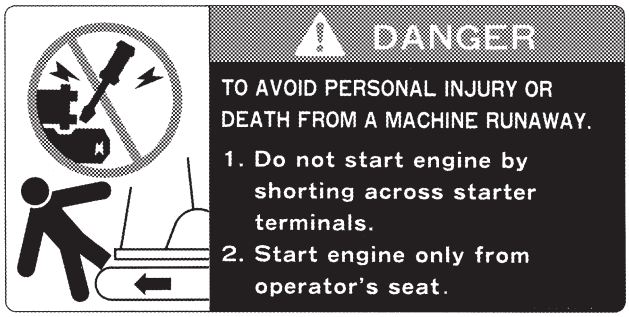






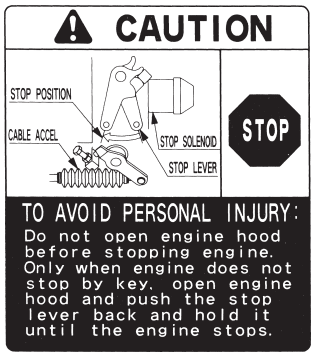
(1) Code No. RC418-5725-1
Do not allow any persons within the working range.

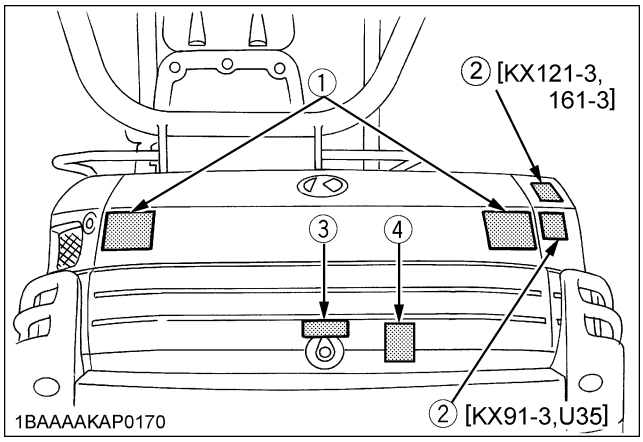
(2) Code No. RC108-5718-1



(3) Code No. RC108-5714-1 [KX91-3·U35]

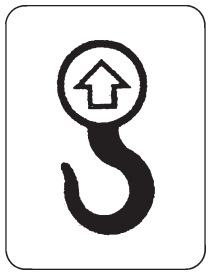
(4) Code No. RD118-5737-1 [KX121-3·161-3]



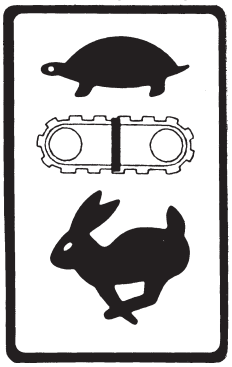


(1)Code No.68328-5735-1 [Both sides]

(2)Code No.RC108-5796-1
[Both sides]

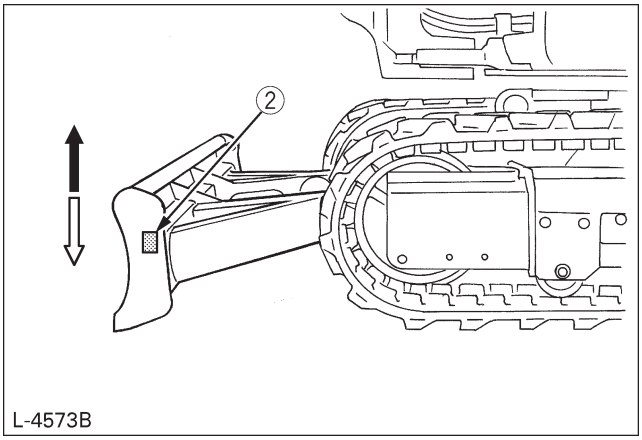


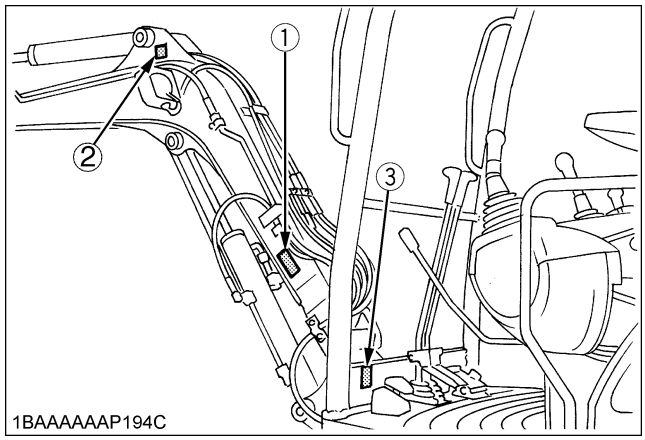
(3)Code No.RC108-5768-1
Drive speed pedal

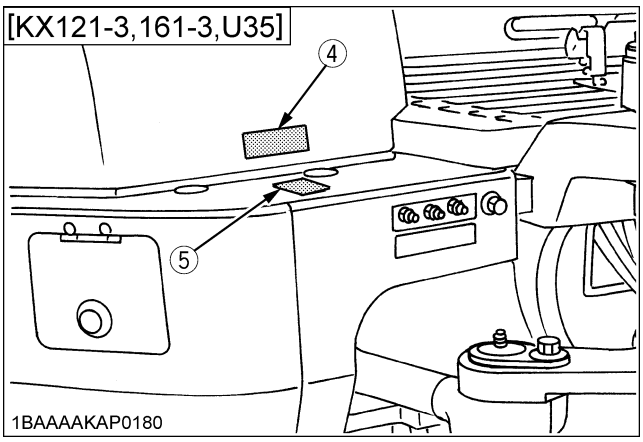


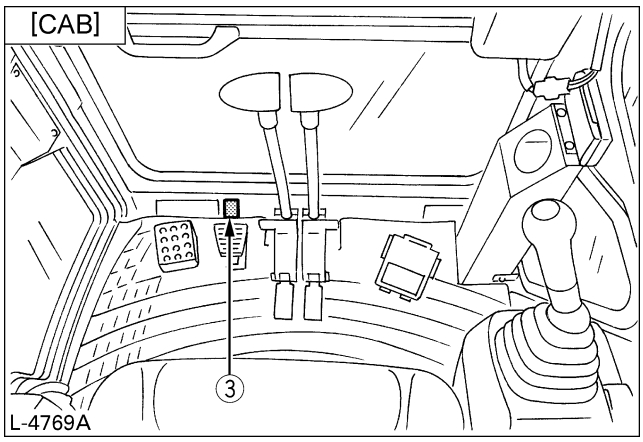
(4)Code No.RD118-5764-1 [KX121-3·161-3·U35 Canopy]

(5)Code No.RD118-5765-1 [KX121-3·161-3·U35]







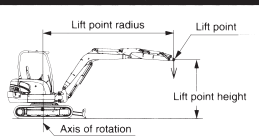


(1) Part No. RC418-5747-2 [KX91-3]

⚠ WARNING

TO AVOID PERSONAL INJURY OR DEATH:

- Do not move raised load over people.
- It is forbidden to lift loads greater than those values mentioned in the lifting capacity tables.
- The values mentioned in the table are valid only on even, hard grounds. When lifting on soft ground, the machine can tilt over due to the fact that the load is concentrated only on one side of the machine.
- The table values are calculated at the end of the arm without the bucket. In order to find the allowable loads for machines with bucket, the bucket weight must be subtracted from the values in the table.



1. The lifting capacities are based on ISO10567 and do not exceed 75% of the static tilt load of the machine or 87% of the hydraulic lifting capacity of the machine.
2. The strokes are as follows.
   1) The load point corresponds to the front bolt part of the arm.
   2) The machine positions are (i) over-front (Blade down). (ii) over-front (Blade up), and (iii) over-side.
   3) The operating cylinder is the boom cylinder.
3. The bucket of the excavator, the hook, the sling and other lifting accessories are taken into consideration for the loads.

LIFT POINT HEIGHT (ft)		LIFTING CAPACITY OVER-FRONT BLADE DOWN Unit=1000 lbs. LIFT POINT RADIUS(ft)				LIFTING CAPACITY OVER-FRONT BLADE UP Unit=1000 lbs. LIFT POINT RADIUS(ft)				LIFTING CAPACITY OVER-SIDE Unit=1000 lbs. LIFT POINT RADIUS(ft)			
		MIN	8	12	MAX	MIN	8	12	MAX	MIN	8	12	MAX
	10			1.26				1.26				1.26	
	8			1.30				1.30				1.30	
	6		1.78	1.42	1.36		1.78	1.42	1.12		1.78	1.30	1.03
	4		2.42	1.58	1.43		2.42	1.39	1.10		2.29	1.27	1.01
	2		2.95	1.74	1.50		2.44	1.35	1.08		2.18	1.23	0.99
GL	0		3.22	1.84	1.53		2.36	1.32	1.06		2.11	1.20	0.97
	-2	3.50	3.23	1.86		3.50	2.33	1.30		3.50	2.08	1.18	
	-4	5.02	3.03	1.71		5.02	2.33	1.30		5.02	2.07	1.18	
	-6	6.34	2.56			6.34	2.35			6.34	2.10		

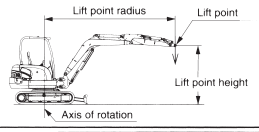
Machine with ROPS canopy and rubber crawler, without bucket

(1) Part No. RD118-5747-2 [KX121-3]

⚠ WARNING

TO AVOID PERSONAL INJURY OR DEATH:

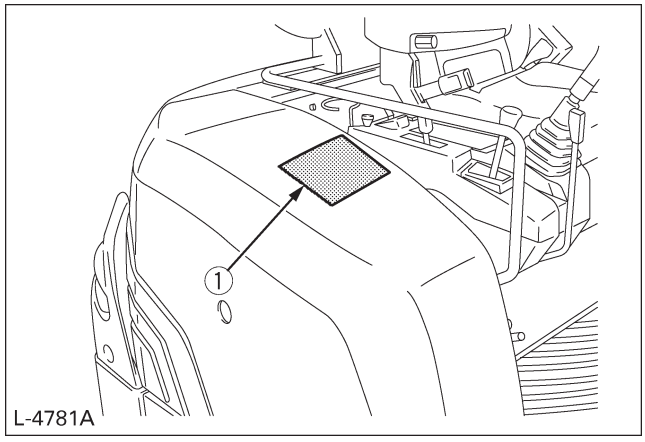
- Do not move raised load over people.
- It is forbidden to lift loads greater than those values mentioned in the lifting capacity tables.
- The values mentioned in the table are valid only on even, hard grounds. When lifting on soft ground, the machine can tilt over due to the fact that the load is concentrated only on one side of the machine.
- The table values are calculated at the end of the arm without the bucket. In order to find the allowable loads for machines with bucket, the bucket weight must be subtracted from the values in the table.



1. The lifting capacities are based on ISO10567 and do not exceed 75% of the static tilt load of the machine or 87% of the hydraulic lifting capacity of the machine.
2. The strokes are as follows.
   1) The load point corresponds to the front bolt part of the arm.
   2) The machine positions are (i) over-front (Blade down). (ii) over-front (Blade up), and (iii) over-side.
   3) The operating cylinder is the boom cylinder.
3. The bucket of the excavator, the hook, the sling and other lifting accessories are taken into consideration for the loads.

LIFT POINT HEIGHT (ft)		LIFTING CAPACITY OVER-FRONT BLADE DOWN Unit=1000 lbs. LIFT POINT RADIUS (ft)				LIFTING CAPACITY OVER-FRONT BLADE UP Unit=1000 lbs. LIFT POINT RADIUS (ft)				LIFTING CAPACITY OVER-SIDE Unit=1000 lbs. LIFT POINT RADIUS (ft)			
		MIN	8	12	MAX	MIN	8	12	MAX	MIN	8	12	MAX
	12			1.82				1.82				1.82	
	10			1.82	1.88			1.82	1.64			1.82	1.49
	8			1.96	1.91			1.96	1.64			1.88	1.49
	6		3.09	2.19	2.01		3.09	2.03	1.61		3.09	1.83	1.46
	4		4.03	2.44	2.15		3.58	1.98	1.58		3.15	1.78	1.43
	2		4.66	2.67	2.27		3.44	1.93	1.55		3.02	1.73	1.41
GL	0		4.89	2.81	2.34		3.37	1.89	1.53		2.96	1.70	1.38
	-2	3.09	4.82	2.84	2.30	3.09	3.35	1.87	1.52	3.09	2.93	1.68	1.37
	-4	3.00	4.51	2.68		3.00	3.35	1.86		3.00	2.94	1.67	
	-6	6.47	3.90			6.47	3.38			6.47	2.97		
	-8		2.75				2.75				2.75		

Machine with ROPS canopy and rubber crawler, without bucket

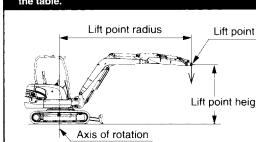


(1) Part No. RD518-5747-2 [KX161-3]

⚠ WARNING

TO AVOID PERSONAL INJURY OR DEATH:

- Do not move raised load over people.
- It is forbidden to lift loads greater than those values mentioned in the lifting capacity tables.
- The values mentioned in the table are valid only on even, hard grounds. When lifting on soft ground, the machine can tilt over due to the fact that the load is concentrated only on one side of the machine.
- The table values are calculated at the end of the arm without the bucket. In order to find the allowable loads for machines with bucket, the bucket weight must be subtracted from the values in the table.



1. The lifting capacities are based on ISO10567 and do not exceed 75% of the static tilt load of the machine or 87% of the hydraulic lifting capacity of the machine.
2. The strokes are as follows.
   1) The load point corresponds to the front bolt part of the arm.
   2) The machine positions are (i) over-front (Blade down). (ii) over-front (Blade up), and (iii) over-side.
   3) The operating cylinder is the boom cylinder.
3. The bucket of the excavator, the hook, the sling and other lifting accessories are taken into consideration for the loads.

LIFT POINT HEIGHT (ft)		LIFTING CAPACITY OVER-FRONT BLADE DOWN Unit=1000 lbs. LIFT POINT RADIUS (ft)				LIFTING CAPACITY OVER-FRONT BLADE UP Unit=1000 lbs. LIFT POINT RADIUS (ft)				LIFTING CAPACITY OVER-SIDE Unit=1000 lbs. LIFT POINT RADIUS (ft)			
		MIN	8	12	MAX	MIN	8	12	MAX	MIN	8	12	MAX
	12												
	10			1.92	1.95			1.92	1.72			1.92	1.51
	8			2.20	2.00			2.20	1.70			2.20	1.49
	6		4.29	2.59	2.11		4.29	2.59	1.67		4.29	2.29	1.47
	4			2.99	2.24			2.54	1.64			2.20	1.43
	2		3.87	3.33	2.35		3.87	2.46	1.61		3.79	2.12	1.40
GL	0		4.70	3.53	2.42		4.51	2.40	1.58		3.73	2.06	1.38
	-2	3.42	6.24	3.59	2.39	3.42	4.50	2.36	1.57	3.42	3.72	2.03	1.37
	-4	4.89	6.04	3.47		4.89	4.52	2.36		4.89	3.74	2.03	
	-6	6.60	5.33	3.12		6.60	4.57	2.37		6.60	3.78	2.04	
	-8		4.19				4.19				3.86		

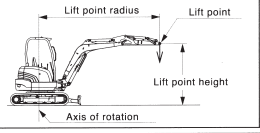
Machine with ROPS canopy and rubber crawler, without bucket

(1) Part No. RC718-5747-1 [U35]

⚠ WARNING

TO AVOID PERSONAL INJURY OR DEATH:

- Do not move raised load over people.
- It is forbidden to lift loads greater than those values mentioned in the lifting capacity tables.
- The values mentioned in the table are valid only on even, hard grounds. When lifting on soft ground, the machine can tilt over due to the fact that the load is concentrated only on one side of the machine.
- The table values are calculated at the end of the arm without the bucket. In order to find the allowable loads for machines with bucket, the buchet weight must be subtracted from the values in the table.



1. The lifting capacities are based on ISO 10567 and do not exceed 75% of the static tilt load of the machine or 87% of the hydraulic lifting capacity of the machine.
2. The strokes are as follows.
   1) The load point corresponds to the front bolt part of the arm.
   2) The machine positions are (i) over-front (Blade down), (ii) over-front (Blade up), and (iii) over-side.
   3) The operating cylinder is the boom cylinder.
3. The bucket of the excavator, the hook, the sling and other lifting accessories are taken into consideration for the loads.

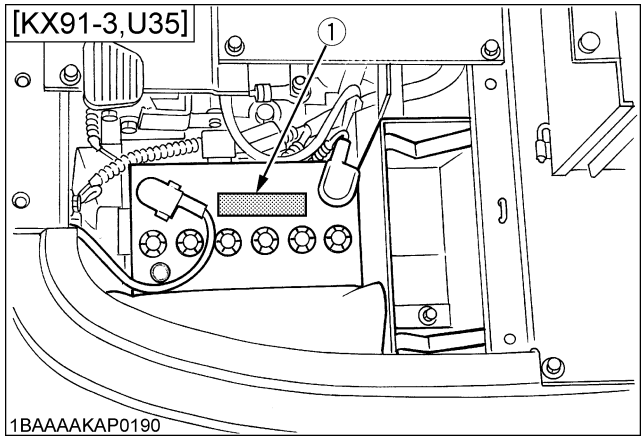
LIFT POINT HEIGHT (ft)		LIFTING CAPACITY OVER-FRONT BLADE DOWN Unit=1000 lbs. LIFT POINT RADIUS (ft)				LIFTING CAPACITY OVER-FRONT BLADE UP Unit=1000 lbs. LIFT POINT RADIUS (ft)				LIFTING CAPACITY OVER-SIDE Unit=1000 lbs. LIFT POINT RADIUS (ft)			
		MIN	8	12	MAX	MIN	8	12	MAX	MIN	8	12	MAX
	10			1.50				1.50				1.45	
	8		1.57	1.49			1.57	1.49			1.57	1.44	
	6	3.00	2.13	1.61		3.00	2.13	1.50		3.00	2.13	1.42	
	4		2.79	1.76	1.58		2.71	1.47	1.16		2.52	1.39	1.10
	2		3.28	1.91	1.63		2.61	1.43	1.14		2.42	1.35	1.08
GL	0	3.73	3.46	1.99		3.73	2.55	1.41		3.73	2.37	1.33	
	-2	3.93	3.40	1.96		3.93	2.53	1.39		3.93	2.34	1.31	
	-4	3.79	3.10			3.79	2.53			3.79	2.35		
	-6	5.68	2.47			5.68	2.47			5.68	2.37		

Machine with ROPS canopy and rubber crawler, without bucket

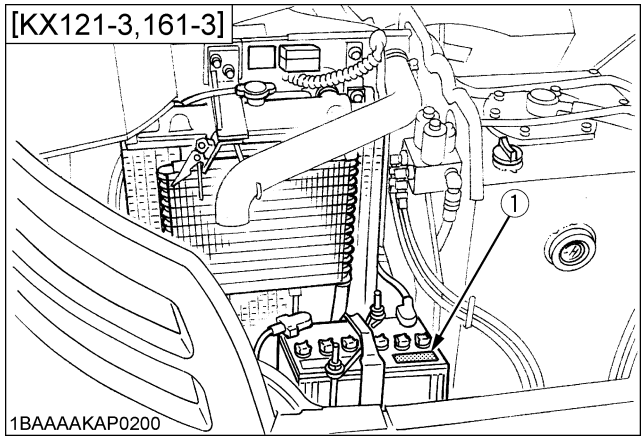
(1) Part No. 6C040-5559-1

DANGER EXPLOSIVE GASES
Cigarettes, flames or sparks could cause battery to explode. Always shield eyes and face from battery. Do not charge or use booster cables or adjust post connections without proper instruction and training.
KEEP VENT CAPS TIGHT AND LEVEL
POISON CAUSES SEVERE BURNS
Contains sulfuric acid. Avoid contact with skin, eyes or clothing. In event of accident flush with water and call a physician immediately.
KEEP OUT OF REACH OF CHILDREN

[KX91-3,U35]



[KX121-3,161-3]



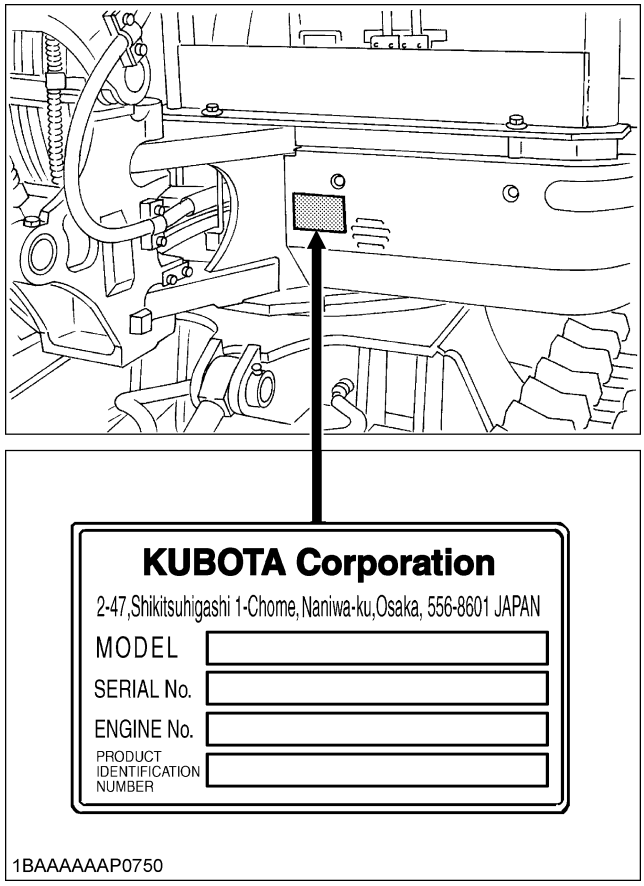
7. CARE OF DANGER, WARNING AND CAUTION LABELS

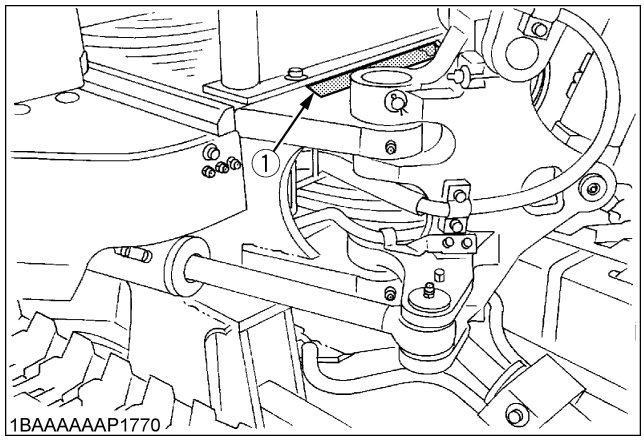
1. Keep danger, warning and caution labels, clean and free from obstructing material.
2. Clean danger, warning and caution labels with soap and water, dry with a soft cloth.
3. Replace damaged or missing danger, warning and caution labels with new labels from your KUBOTA dealer.
4. If a component with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

DEALER SERVICE

Your KUBOTA dealer is always ready to help so that your excavator offers the best performance. After having carefully read these instruction, you will realize that much of the routine maintenance can be done by yourself. Your KUBOTA dealer is responsible for servicing and the delivery of spare parts. When ordering spare parts from your KUBOTA dealer, always mention the serial number of the excavator and the engine.
Note these numbers right away in the supplied lines.

	Model	Serial No.
Excavator		
Engine		
Dealer's name (To be filled in through the owner)		





(1) Serial No.

TECHNICAL DATA

			KUBOTA EXCAVATOR									
Model name			KX91-3		KX121-3				KX161-3		U35	
Type			Canopy	CAB	Canopy	CAB	Angle Blade Type		Canopy	CAB	Canopy	CAB
							Canopy	CAB				
Operating weight (including operator's)		kg(lbs.)	3225 (7110)	3325 (7330)	3950 (8710)	4015 (8853)	4120 (9083)	4185 (9226)	5065 (11165)	5140 (11330)	3640 (8025)	3750 (8265)
Engine	Type		Water cooled 4 cycle diesel engine with 3 cylinder		Water cooled 4 cycle diesel engine with 4 cylinder						Water cooled 4 cycle diesel engine with 3 cylinder	
	Model name		KUBOTA D1503-M-EBH-2 *D1503-M-E2BH-2		KUBOTA V2203-M-EBH-2(No air conditioner type) V2203-M-EBH-3(Air conditioner type) *V2203-M-E2BH-2 *V2203-M-E2BH-3						KUBOTA D1503-M-EBH-2 *D1503-M-E2BH-2	
	Total displacement cc(cu.in)		1499(91.4)		2197(134.1)						1499(91.4)	
	Engine power SAE gross	kW(Hp)	20.9(27.9)		30.7(42)						20.9(27.9)	
	Rated speed	rpm	2300		2250						2300	
Performance	Unit swing speed	rpm	9.4						9.3		8.9	
	Travel speed Fast	km/h(mph)	4.8(3.0)		5.0(3.1)				4.4(2.7)		4.6(2.9)	
	Travel speed Slow	km/h(mph)	3.1(1.9)		2.7(1.7)				2.5(1.6)		3.0(1.9)	
	Ground pressure (With operator)	kPa (kgf/cm^2) [psi]	31.8 (0.32) [4.61]	32.8 (0.33) [4.75]	29.4 (0.30) [4.26]	30.4 (0.31) [4.41]	30.4 (0.31) [4.41]	31.4 (0.32) [4.55]	28.9 (0.29) [4.12]	29.3 (0.30) [4.26]	32.7 (0.33) [4.7]	33.7 (0.34) [4.8]
	Climbing angle	%(deg)	*36 (20)									
	Angle in case of crossing slope	%(deg)	*27 (15)									
Dozer	Width X Height	mm(in.)	1550 X 335 (61.0 X 13.2)		1700 X 350 (66.9 X 13.8)				1960 X 360 (77.2 X 14.2)		1700 X 335 (66.9 X 13.2)	
	Max swing angle Left	deg	-		-		25	25	-		-	
	Max swing angle Right	deg	-		-		25	25	-		-	
Boom swing angle	Left	rad(deg)	1.40 (80)								1.22 (70)	
	Right	rad(deg)	0.87 (50)									
Pressure connection for attachments	Max.displacement (Theoretical)	L(US gal)/ min	41.4(10.9)		60.0(15.9)				65.0(17.2)		39.1(10.3)	
	Max. pressure	Mpa (kgf/cm^2) [psi]	23.5 (240) [3410]		24.5 (250) [3550]				23.5 (240) [3410]		24.5 (250) [3550]	
Fuel tank capacity		L(US gal)	45(11.9)		64(16.9)						40(10.6)	

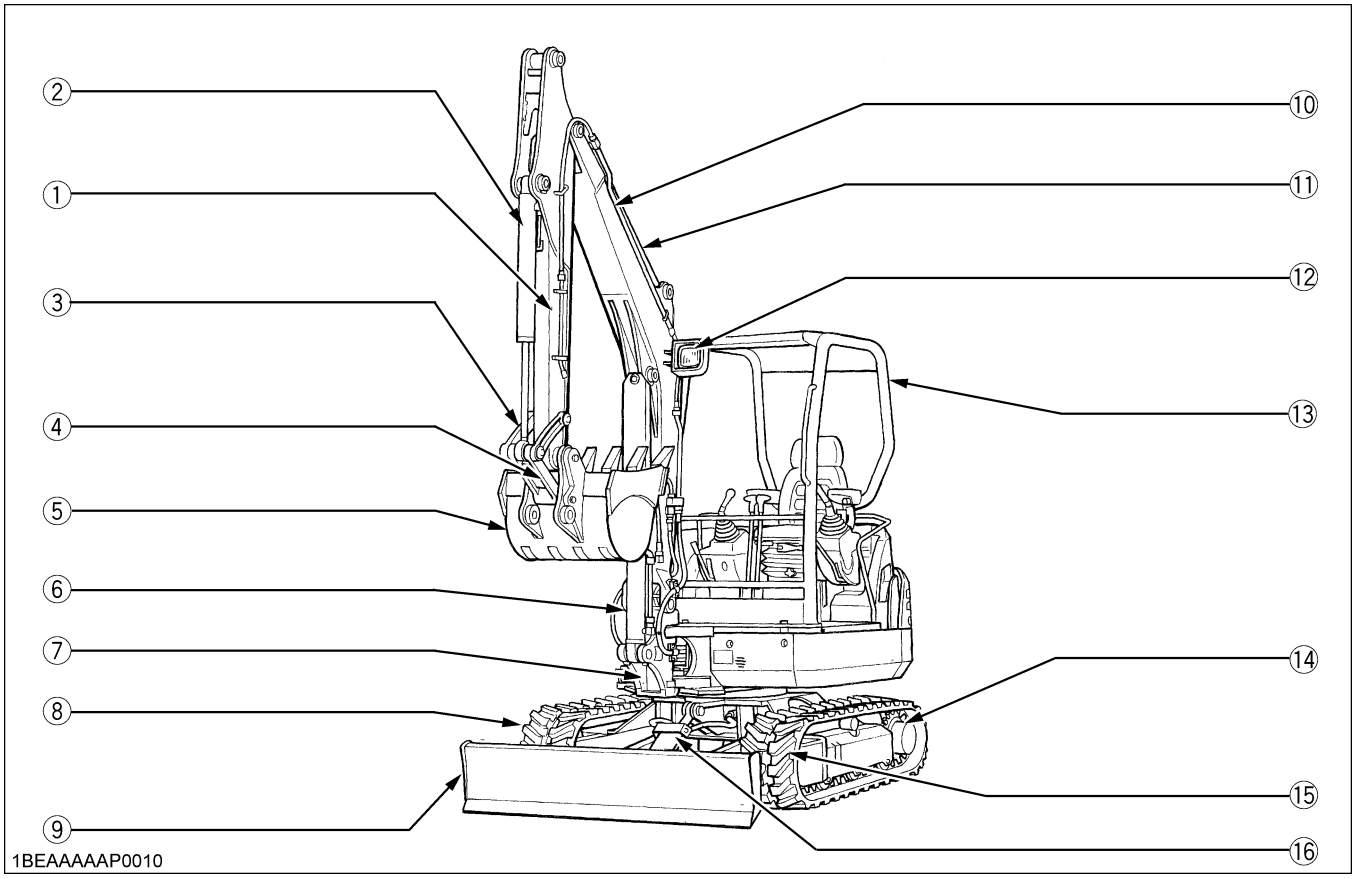
NOTE :

- Above dimensions are based on the machine with rubber trucks.
- 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.
* "Tier2" will be installed on the engines of the machines from the January 2004 production lot.

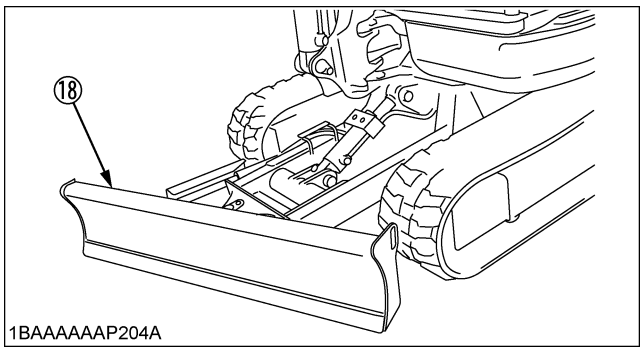
KX91-3	# / 20878 ~
KX121-3	# / 21815 ~
KX161-3	# / 20662 ~
U35	# / 20464 ~

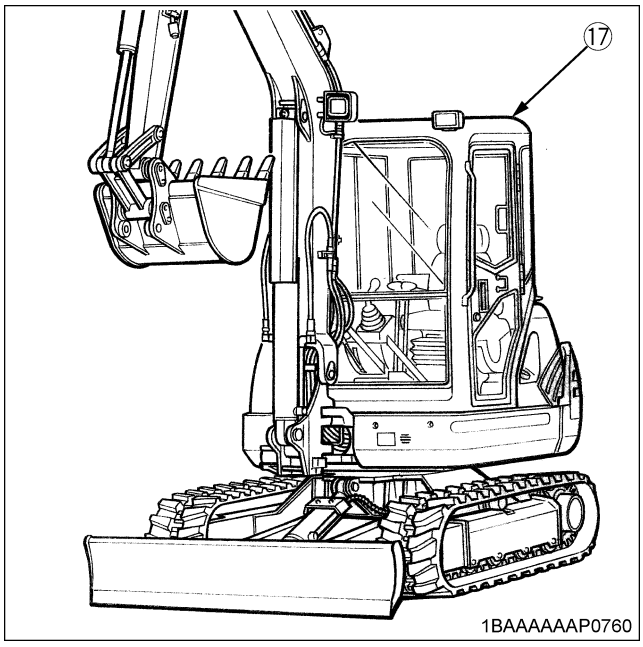
DESCRIPTION OF MACHINE PARTS



DEPICTED CONTENTS

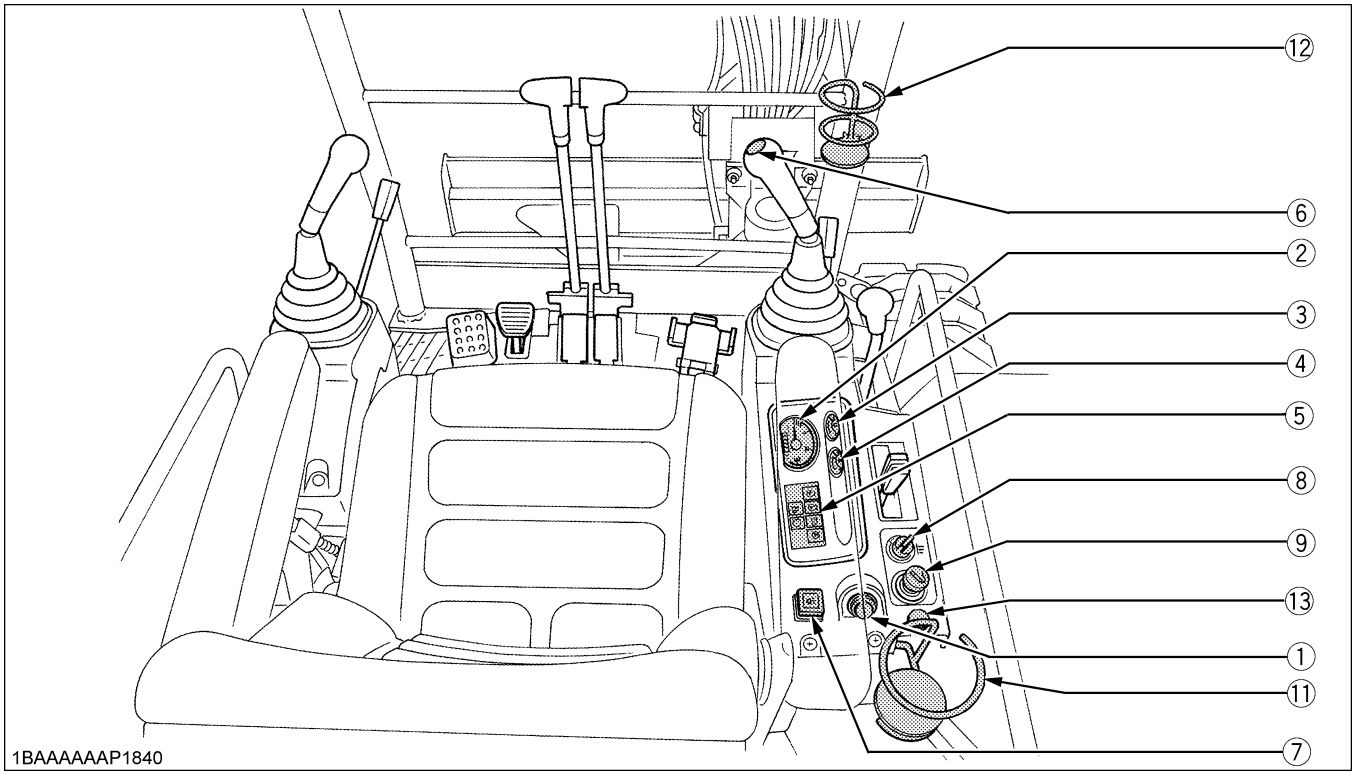
(1) Arm
(2) Bucket cylinder
(3) Bucket link 2 and 3
(4) Bucket link 1
(5) Bucket
(6) Boom cylinder
(7) Swing bracket
(8) Crawler
(9) Dozer blade
(10) Boom
(11) Arm cylinder
(12) Working light
(13) Canopy
(14) Drive sprocket
(15) Front idler
(16) Dozer cylinder
(17) Cabin
(18) Angle blade [KX121-3]

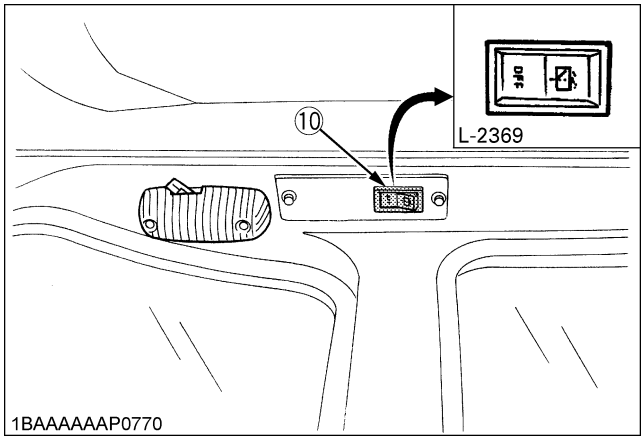




INSTRUMENT PANEL AND CONTROL ELEMENTS

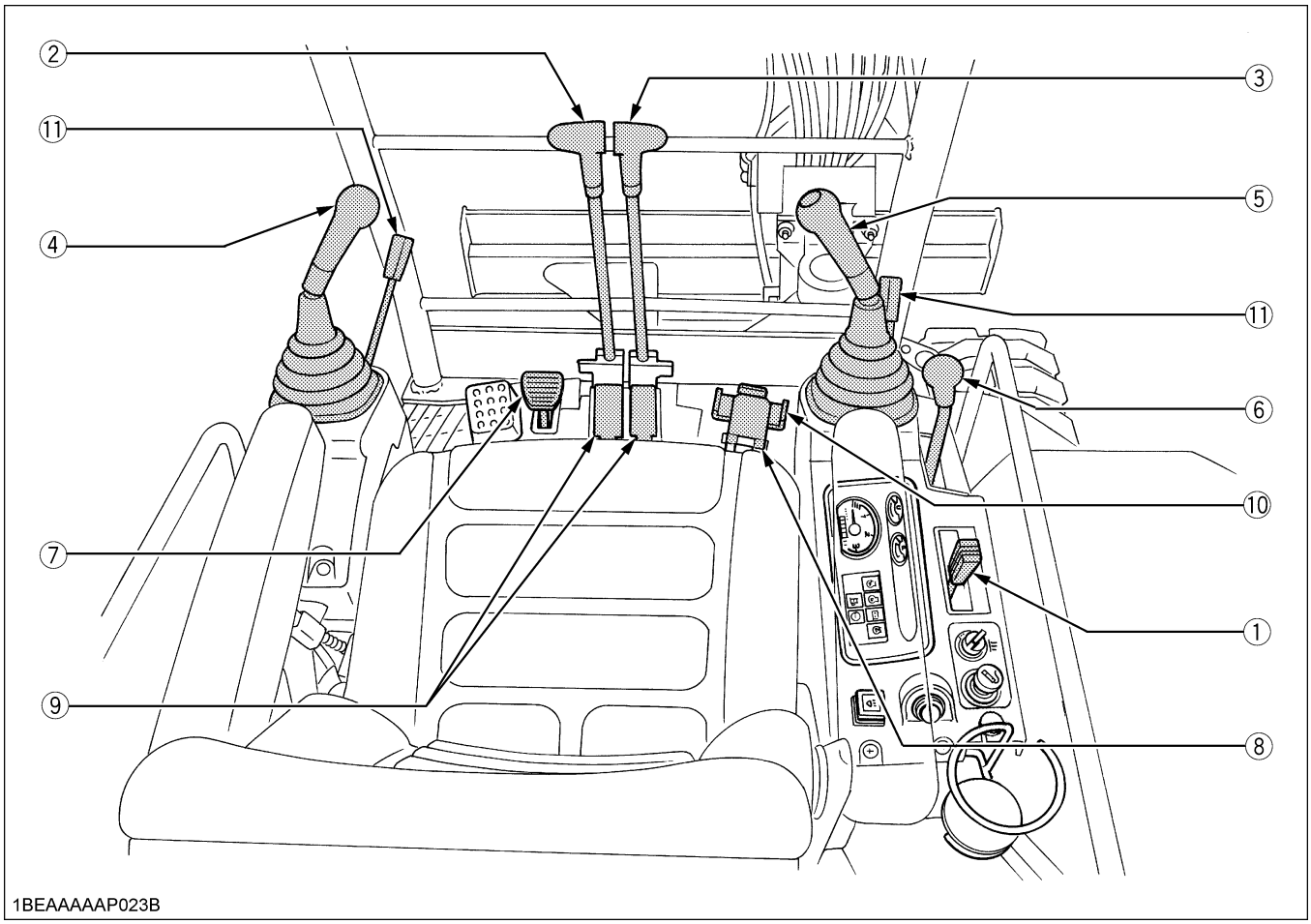
■ Instrument Panel, Switches





DEPICTED CONTENTS
(1) Starter switch
(2) Hour meter
(3) Coolant temperature indicator
(4) Fuel meter
(5) Malfunction indicator (Quick Diagnosis)
(6) Horn switch
(7) Working Light switch
(8) Heater switch (CAB type only)
(9) Cigarette lighter (CAB type only)
(10) Wiper / Washer switch (CAB type only)
(11) Cup holder [KX91-3]
(12) Cup holder [KX121-3,161-3,U35]
(13) Emergency engine stop knob [KX91-3,U35]

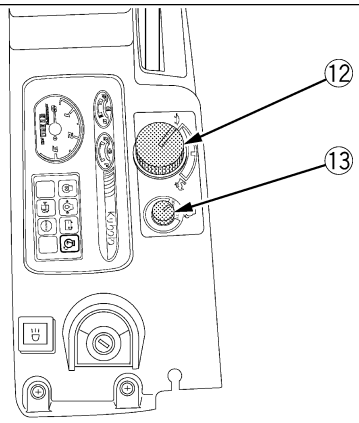
■ Control Pedals and Levers



1BEAAAAAP023B

DEPICTED CONTENTS
(1) Throttle lever [KX91-3,121-3,U35]
(2) Drive lever (left)
(3) Drive lever (right)
(4) Control lever for front attachments (left)
(5) Control lever for front attachments (right)
(6) Control lever for dozer
(7) Travel speed pedal
(8) Control pedal for optional hydraulics
(9) Drive pedal
(10) Activating pedal for boom swing
(11) Lock lever*
(12) Throttle potentiometer [KX161-3]
(13) Switch for Auto idle control [KX161-3]

[KX161-3]



1BAAAAAAP199A

IMPORTANT :
* When the lock lever pulled up prevents inadvertent machine movement.

CHECKS BEFORE START

DAILY CHECKS

In order to avoid damage, it is important to check the condition of the excavator before starting.

CAUTION

To avoid personal injury:

- **Do maintenance work on the excavator only on even ground with the engine off and the lock lever in the "Lock" position.**

Checks

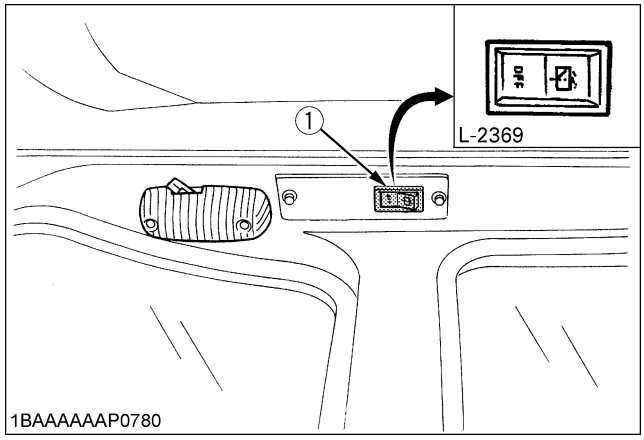
Go around the excavator and check for visual damage and wear.
Check coolant level. (See regular checkpoints in the chapter on maintenance.)
Check fuel level.
Check engine oil level.
Check hydraulic fluid level.
Check air filter for clogging.
Check all control lamps, indicators, tachometer and hour meter.
Check the light system.
Check the seat belt and the ROPS/FOPS safety device.
Check the condition of the safety and warning labels.
(See "DANGER, WARNING AND CAUTION LABELS" in "SAFE OPERATION" .)

CAB TYPE MACHINES

■Wiper/Washer Switch(CAB type only)

Turn the starter switch to position "RUN" and push the switch for the wiper and washer system; the wiper will begin to move. A further push on the switch will activate the washer system.

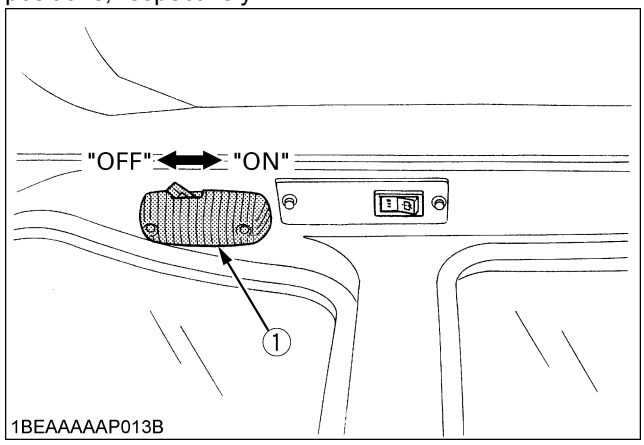
- Do not activate the switch if the tank for the cleaning fluid is empty; the pump can be damaged.
- This can also be the case if the wiper is moved on a dry window. In this case, make sure that cleaning fluid is applied to the pane before activating the wiper.
- In frosty conditions, make sure that the wiper blade is not frozen to the glass before switching-on. The motor can be damaged if the wiper system is used under such conditions.



(1) Wiper switch

■Interior Lamp(CAB type only)

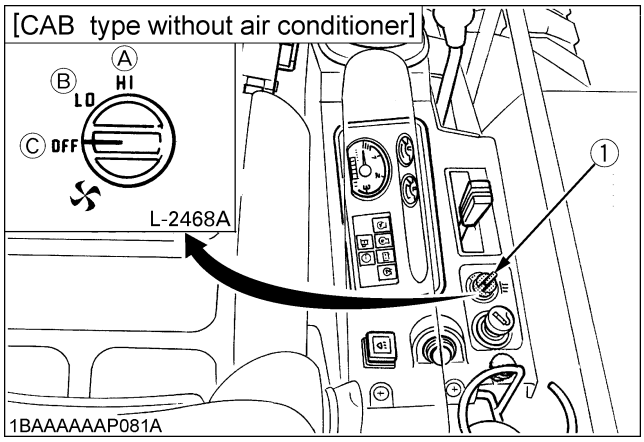
To turn on the interior lamp, set the starter switch to the "RUN" and then the interior lamp switch to the "ON" positions, respectively.



(1) Interior lamp

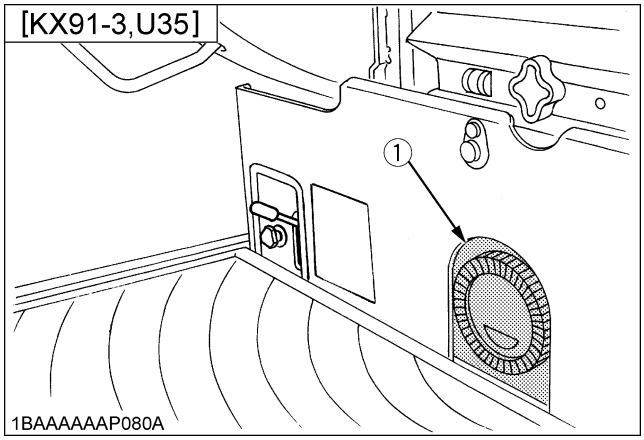
■Heater Switch(CAB type without air conditioner)

Turn the starter switch to position "RUN" and turn the heater switch clockwise, the heater fan will be activated and the CAB will start to warm up. The heater has two positions - "Low" and "High" -.

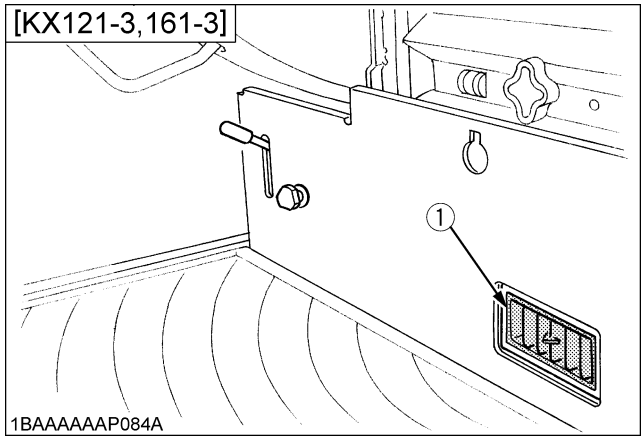


(1) Heater switch

(A) Pos. "High"
(B) Pos. "Low"
(C) Pos. "Off"



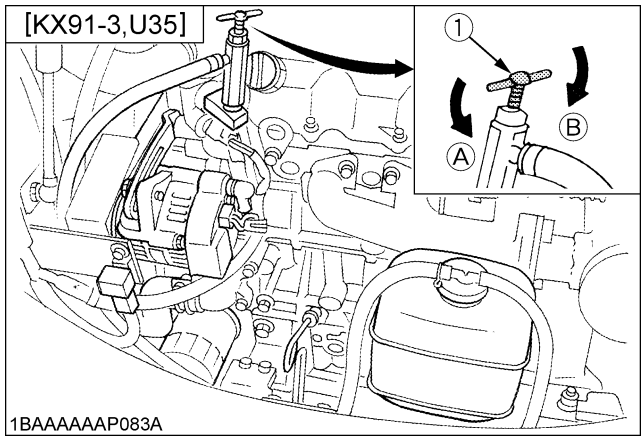
(1) Heater outlet



(1) Heater outlet

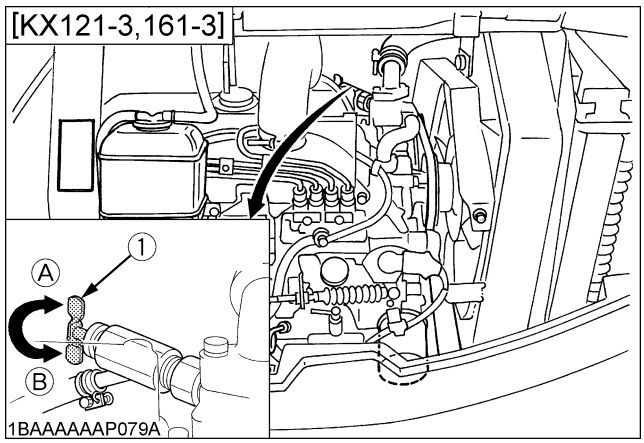
IMPORTANT :

- During the summer, turn the heater valve clockwise to close the valve.



(1) Heater valve

(A) Open
(B) Close

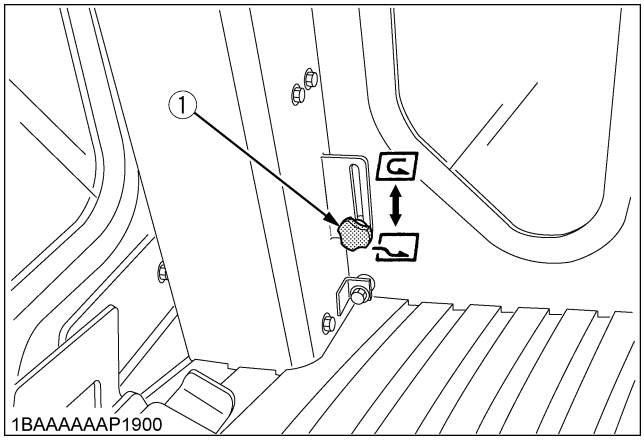


(1) Heater valve

(A) Open
(B) Close

◆ **Recirculation / Fresh Air Selection knob**

- FRESH AIR: Set the knob to the position, and fresh air will flow into the CAB. This is helpful when you work in a dusty conditions or if the glass windows get foggy.
- RECIRCULATION: Set the knob to the position, and the in-CAB air will be recirculated.This is useful for heating the CAB quickly or keeping it extra warm.



(1) Recirculation/ fresh air selection knob
"FRESH AIR"
"RECIRCULATION"

NOTE :

- When heating, do not keep the knob at the "RECIRCULATION" position for a long time. The windshield easily gets foggy.
- While working in a dusty conditions, keep the knob at the "FRESH AIR" position. This increases the pressure in the CAB, which helps prevent dust from coming into the CAB.

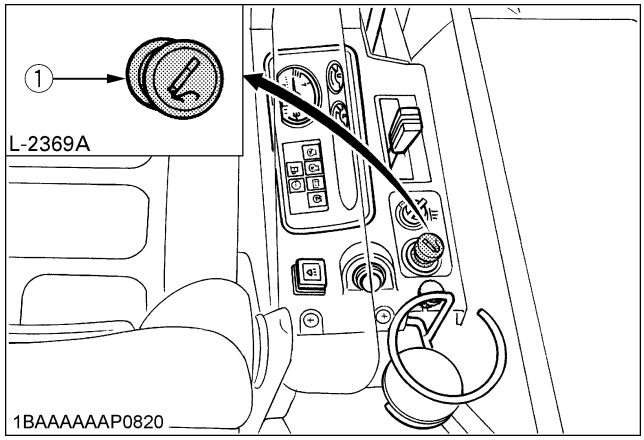
■Cigarette Lighter(CAB type without air conditioner)

CAUTION

To avoid personal injury:

- **Do not keep the cigarette lighter pressed down to prevent overheating.**

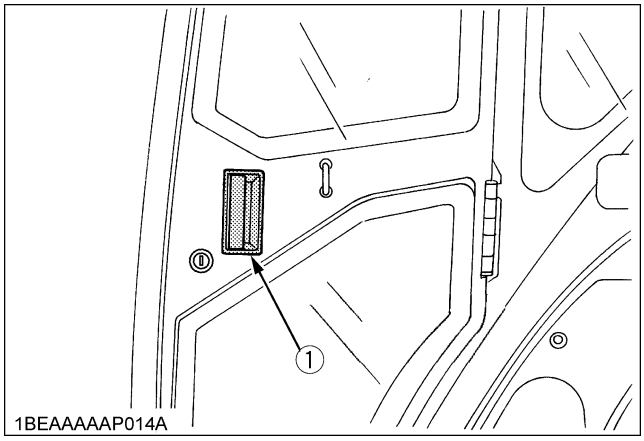
Press in the cigarette lighter when the starter switch is in position "RUN", and wait until it pops out by itself.



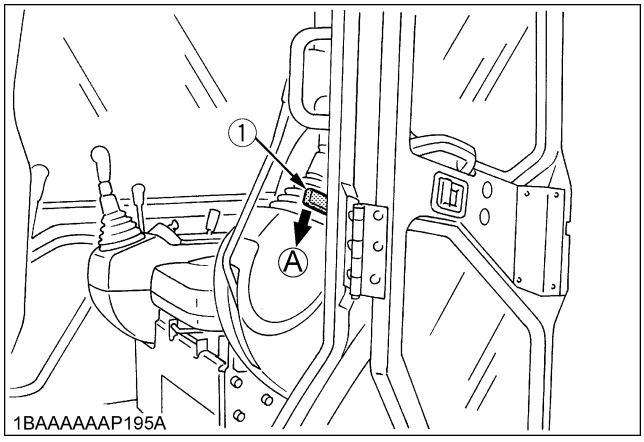
(1) Cigarette lighter

■Opening/Closing of CAB Door(CAB type only)

1. Unlock the CAB door and pull the knob. Open the CAB door fully until fixed into place.
2. To close the CAB door, push the release lever down and close the door.



(1) Door knob



(1) Release lever (A) Down

3. When leaving the excavator, always lock the door.

■Opening/Closing of Front CAB Window(CAB type only)

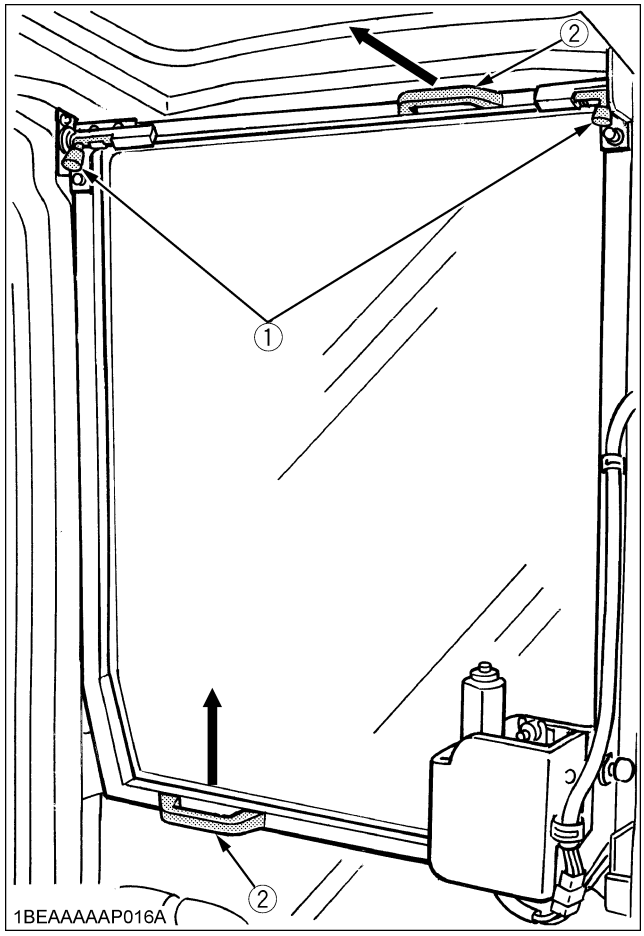
⚠ CAUTION

To avoid personal injury:

- **Keep hands and feet away from the area between front window and CAB frame. Otherwise the operator risks serious injuries by pinching or crushing.**
- **Other persons should stay away when opening the window.**

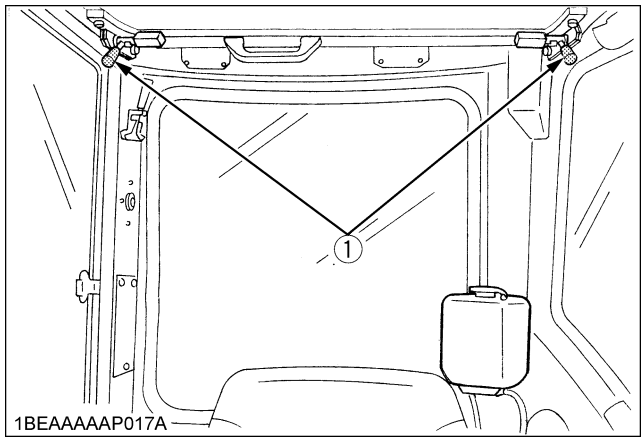
To open and close the front window, take the steps below.

1. Release the lock levers on the top of the front window.



(1) Lock levers (2) Grip

2. Hold the top and bottom grips tightly with both hands. Pull the top grip slightly upward and toward yourself to let the windshield slide inward.
3. Pull the windshield all the way to the rubber at the back of the CAB. Tighten up the lock levers.

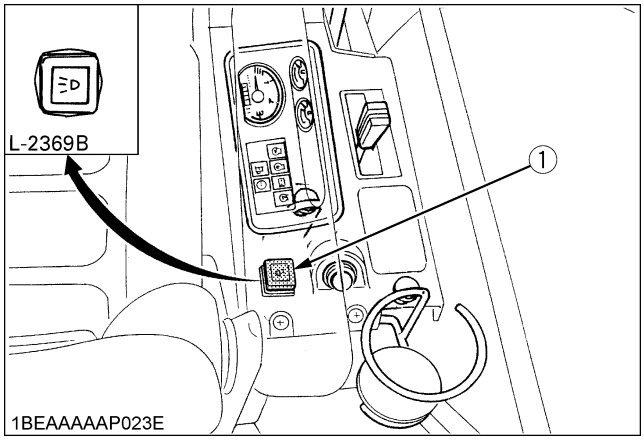


(1) Lock lever

4. To close the window, take the reverse steps 3, 2 and 1.

■Working Light Switch

To turn on the working light, set the starter switch to the "RUN" position and press the working light switch.



(1) Working light switch

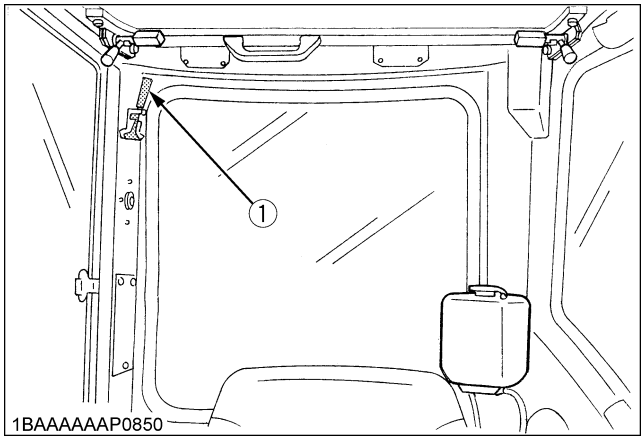
■Emergency Hammer(CAB type only)

CAUTION

To avoid personal injury:

- **When breaking the window pane, close your eyes and cover them with an arm.**

Emergency hammer is for breaking window pane to escape urgently away from excavator as a result of window rail lacking mechanism failure.

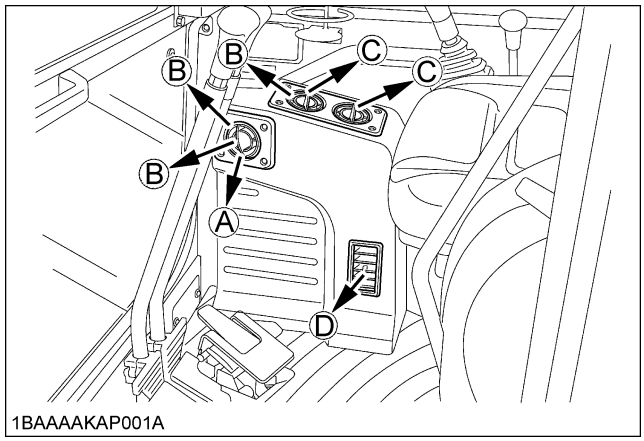


(1) Emergency hammer

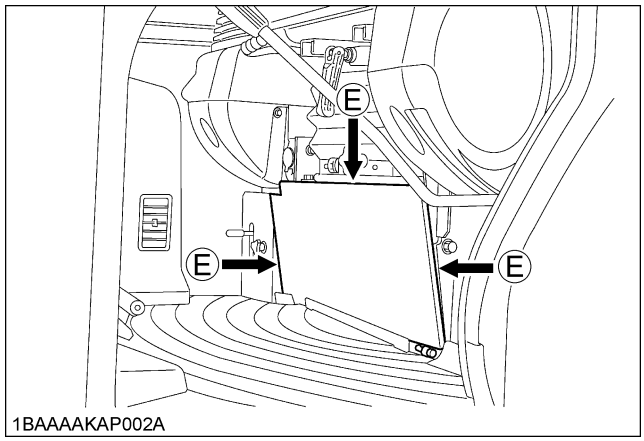
AIR CONDITIONER

■Air Flow

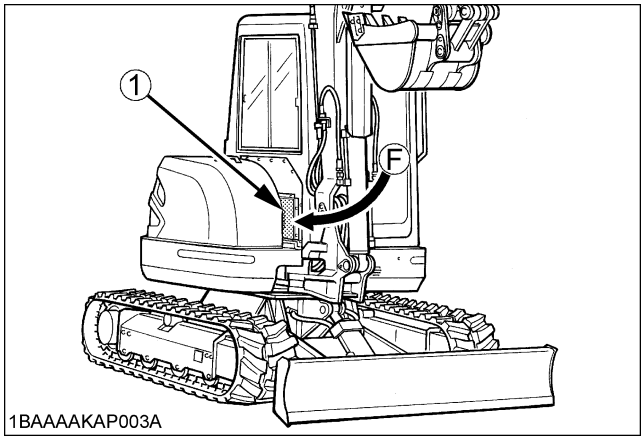
Air in the CAB and fresh air introduced into the CAB flow as shown in the figure. Adjust the 4 air outlet ports to obtain the desired condition.



(A) "DOOR WINDOW"
(B) "WIND SHIELD"
(C) "CHEST AREA"
(D) "FOOT AREA"



(E) "INNER AIR RECIRCULATION"



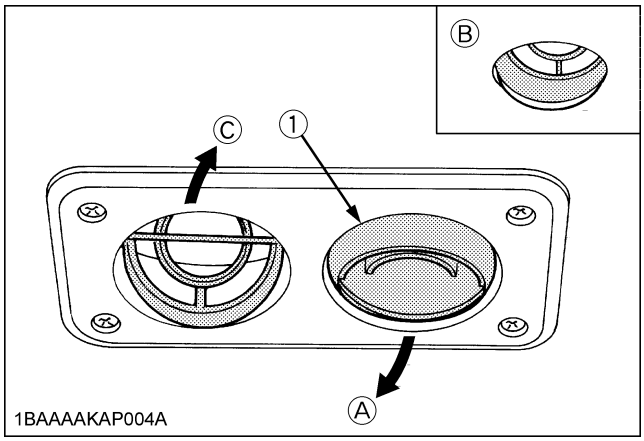
(1) Fresh air filter (F) "FRESH AIR INLET"

IMPORTANT :
- Do not allow water to enter the fresh air port while washing the excavator.

■Air Control Vent

◆ Front air outlet

The front air outlets can be independently adjusted as required. To defrost the windshield, rotate the outlets toward the windshield.

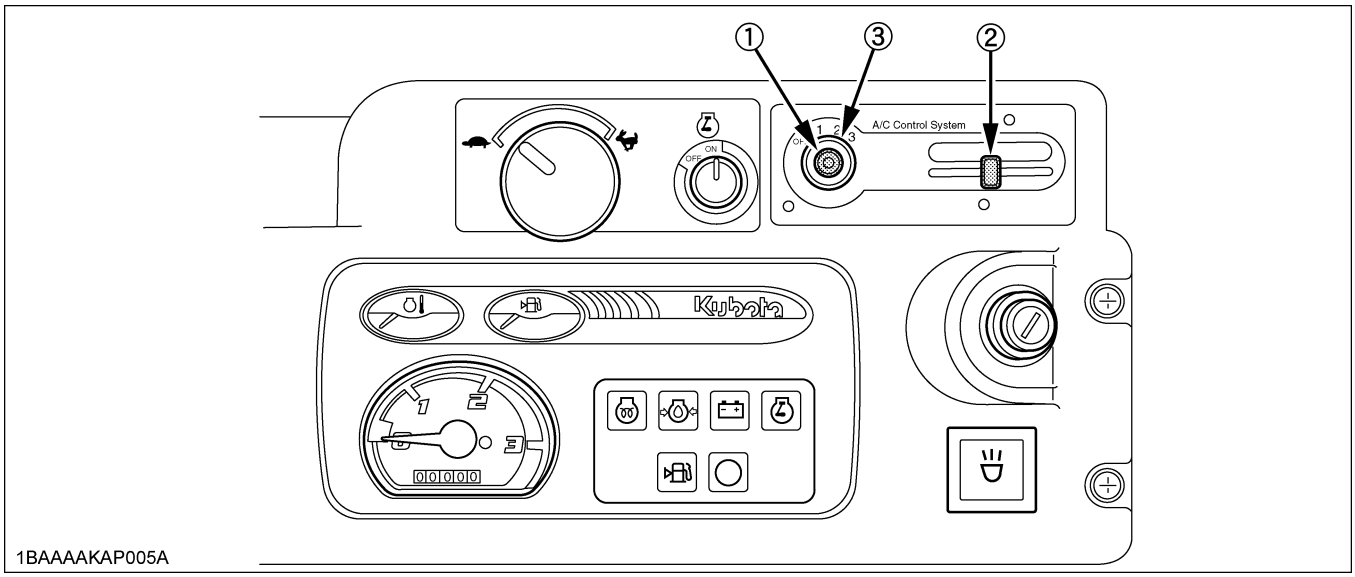


(1) Front air outlet (A) "WINDSHIELD"
(B) "CLOSED"
(C) "CHEST AREA"

⚠ CAUTION

To avoid personal injury;
- **Replace the water hoses every two years.**
- **Inspect daily.**
  Have the excavator repaired immediately if any of the following defects are discovered.
  (Such defects may cause burns or injury. They may also cause engine failure by serious damage.)
  - **Scratches, cracks or swelling in water hoses**
  - **Water leaks at joints or connecting points.**
  - **Missing or damaged water hose protective sleeve or grommet.**
  - **Loose mounting bolt, damaged bracket**
- **Do not touch the water hoses or the heater with your hand. You may get burned.**
- **If the window fails to defrost in extreme conditions or becomes cloudy when dehumidifying the CAB, remove moisture with soft cloth.**
- **Do not block all the air outlets of the air conditioner. A trouble may result.**

■Control Panel



(1) Air conditioner switch with indicator light
(2) Temperature control lever
(3) Blower switch

◆ Air Conditioner Switch with Indicator Light

Push this switch to activate the air conditioner. An indicator light will light up when the switch is set to "ON". Push switch again to turn air conditioner off, in which case the indicator light will be off.

◆ Temperature Control Lever

Set this lever at the desired position to obtain the desired air temperature. Move the lever to the right to obtain cooler air. Move it to the left to obtain warmer air.

◆ Blower Switch

Air volume can be changed in three steps. At the "3" position, the largest air volume is obtained.

■Operation

◆ Heating

1. Adjust the blower (1/2/3) switch and the temperature control lever to achieve the desired temperature level.

NOTE :

- In summer when the heater is not used, keep the temperature control lever at the "COOL" (rightmost) position. Otherwise, hot air will raise the temperature in the CAB.

◆ Dehumidifying-heating

1. Press and turn on the air-conditioner switch.
2. Turn on the blower (1/2/3) switch.
3. Adjust the temperature control lever to the "COOL" or an intermediate position to achieve the desired temperature level.

NOTE :

- Be sure to close the door while the air conditioner is ON.

◆ Cooling

1. Press and turn on the air-conditioner switch.
2. Turn on the blower (1/2/3) switch.
3. Adjust the temperature control lever to the "COOL" or an intermediate position to achieve the desired temperature level.

NOTE :

- Be sure to close the door while the air conditioner is ON.

◆ Defrosting or demisting

To defrost or demist the windshield, take the following steps.

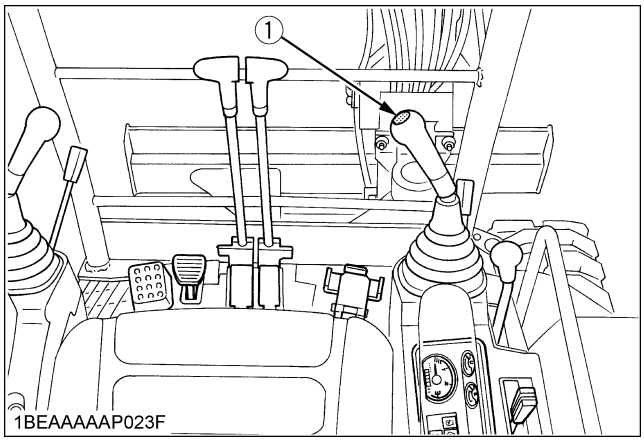
1. Open the front air outlet and direct it to the windshield.
2. Set the blower switch and the temperature control lever to the "3" and "WARM" (leftmost) positions, respectively.

OPERATION OF THE ENGINE

CAUTION

To avoid personal injury:

- **Read "SAFE OPERATION" at the beginning of this operator's manual.**
- **Obey the danger, warning and caution labels on the excavator.**
- **To avoid the danger of exhaust fume poisoning, do not operate the machine in a closed building without proper ventilation.**
- **Always start the engine from the operator's seat. Do not start the engine while standing next to the excavator. Before starting the engine, sound the horn to get the attention of persons standing nearby.**



(1) Horn switch

IMPORTANT :

- Do not use starting fluid or ether.
- In order not to overload the battery and starter, avoid start-ups of more than 10 sec.
- When engine dose not start in 10 sec., please wait 20 sec. or more, before attempting to restart.

STARTING THE ENGINE

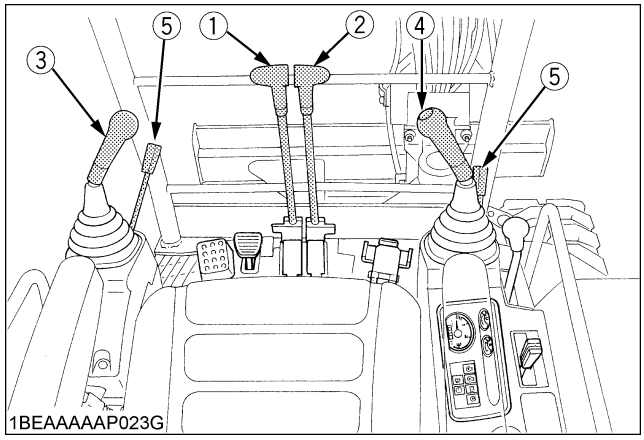
CAUTION

To avoid personal injury:

- **The operator should not depend solely on the warning lamps, but should always conduct the routine checks (see "MAINTENANCE").**

Start the engine in the following manner:

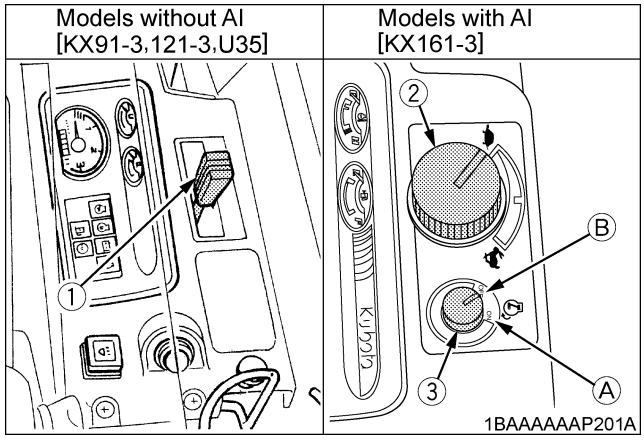
1. Before starting the engine, make sure that all control levers are in the neutral positions.



(1) Drive lever (left)
(2) Drive lever (right)
(3) Attachment control lever (left)
(4) Attachment control lever (right)
(5) Lock lever

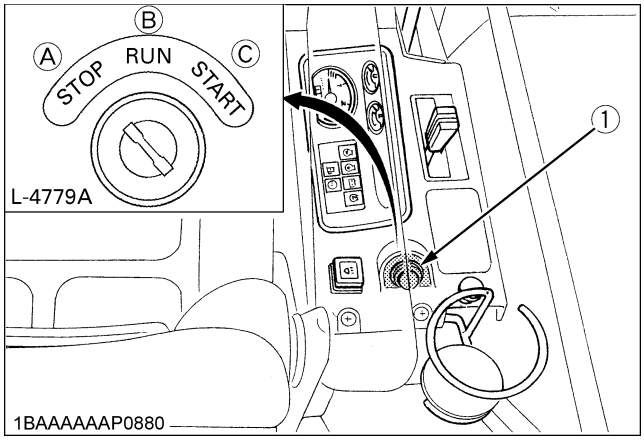
2. Pull the lock levers all the way back. (lock position)
3. **Models without Auto Idle (AI) [KX91-3,121-3,U35]**
   - Put the throttle lever towards .

   Models with Auto Idle (AI) [KX161-3]
   (See "AUTO IDLE (AI) OPERATION" in the Excavator operation)
   - Turn the potentiometer towards the symbol. The switch for Auto Idle control is in the OFF position.



(1) Throttle lever
(2) Throttle potentiometer
(3) Switch for Auto Idle control
(A) "ON"
(B) "OFF"

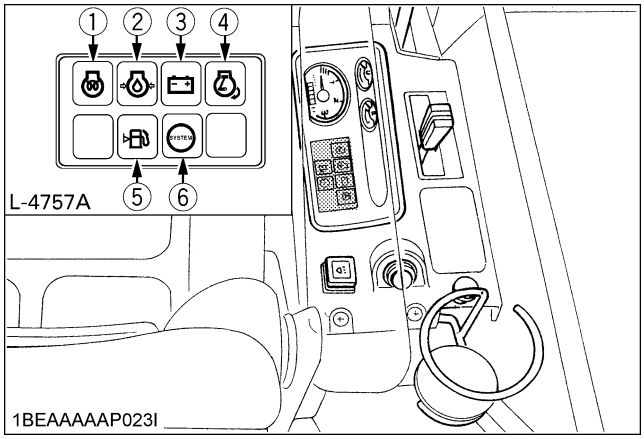
4. Insert the key into the starter switch and turn it to the position "RUN". The glow lamp indicator will light up while the engine is preheated and will go out automatically after preheating is finished.



(1) Starter switch
(A) "STOP"
(B) "RUN"
(C) "START"

5. Turn the key to the position "START" and release after the engine has started.
6. Check if all warning lamps have gone out. Should a warning lamp still be lit up, stop the engine then remove the key and check for the cause.

Malfunction Indicator (Quick Diagnosis)



(1) **Indicator Lamp "Glow"**
This lamp lights up when the starter switch is in position "RUN" and goes out after the engine has been sufficiently preheated.

(2) **Warning Lamp "Engine Oil Pressure"**
This lamp lights up when there is an abnormality in the engine oil circulation.
It lights up when the starter switch is in position "RUN" and goes out as soon as the engine starts running. Should the lamp light up while the engine is running, check the engine oil level.

(3) **Warning Lamp "Battery Charge"**
This lamp lights up when there is a malfunction in the charge system. The lamp lights up when the starter switch is in position "RUN" and goes out as soon as the engine starts.

(4) **"Auto Idle (AI)" Indicator Lamp**
This lamp is available only Auto idle (AI) model. [KX161-3]

(5) **Warning Lamp "Fuel Level too Low"**
This lamp lights up when the fuel level in the fuel tank is lower than in the following table.

KX91-3,U35	9.6 L(2.5 US gal)
KX121-3,161-3	13.0 L(3.4 US gal)

(6) **"System Lamp"**
This lamp indicates AI system condition for AI model. If this should happen during operation, consult your local KUBOTA Dealer. [KX161-3]

IMPORTANT :
- When the lock levers are in position "UNLOCK", the engine does not start.

■Checkpoints after Starting the Engine

After starting the engine, but before starting operation, check following points:

1. Put the throttle lever or the throttle potentiometer (AI) in position "🐢" and let the engine idle for approx. five minutes. This allows the engine lubricant to warm up and penetrate every part of the engine.
   Note:
   - This idling is usually called "Warm-up".
2. Once the engine has warmed up, check:
   - the warning lamp "Engine oil pressure" has gone out.
   - the warning lamp "Battery charge" goes out when engine speed is increased.
   - the color of the exhaust gas is normal and no abnormal noises or vibrations are heard or felt.
   - no fluid is leaking from pipes or hoses.

◆ **Should any following conditions be given, stop the engine immediately.**
- The engine revolution increases or decreases suddenly.
- Sudden abnormal noises are heard.
- Exhaust gas is black.
- Warning lamp for engine oil lights up during operation.

IMPORTANT :
- In these cases, the excavator must be checked and serviced according to directions of the KUBOTA dealer.

STARTING THE ENGINE UNDER COLD CONDITIONS

CAUTION

To avoid personal injury:
- **Make sure that the lock lever is in the lock position during warm up.**

Start the engine in the following manner;
1. Pull the lock levers all the way back (lock position).
2. Turn the starter switch to the position "RUN" (glow position) and keep until the indicator lamp has gone out.
3. Move the starter switch to the position "START"; the engine will catch on.
4. Release the starter switch after the engine has started; it will automatically return to the position "RUN ".

IMPORTANT :
- Let the engine warm up after start-up.
- Let the engine warm up after start-up for approx. 10 minutes under no load conditions. If the hydraulic fluid temperature is too low, the operations will be affected. Do not operate the excavator under full load before the engine is warmed up enough.

STOPPING THE ENGINE

WARNING

To avoid personal injury or death:
- **Do not keep the bucket or dozer in the lifted position, as a person could accidentally touch the levers and cause serious accidents.**

1. **After slowing the engine to idle, turn the key to "STOP".**
2. **Remove the key.**

■Emergency Engine Stop Knob

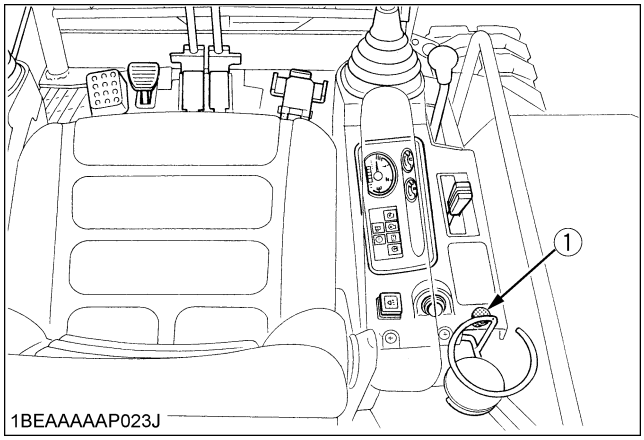
[KX91-3,U35]

CAUTION

To avoid personal injury:

- **Pull the engine stop knob back and hold it until the engine stops in case of emergency.**

The engine stops when the key is turned off. If the engine does not stop, pull the engine stop knob back and hold it until the engine stops. After the engine has stopped, be sure to push the engine stop knob back in, or the engine will not start next time.



(1) Emergency engine stop knob

NOTE :

- If the engine does not stop with the key, contact your KUBOTA dealer.

■Stop Lever for Fuel Solenoid

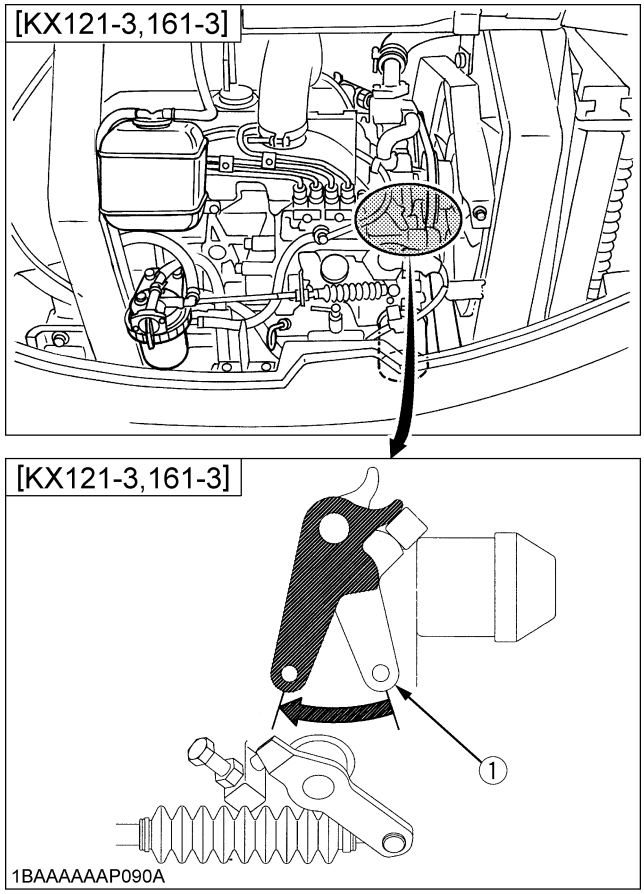
[KX121-3,161-3]

CAUTION

To avoid personal injury:

- **Keep hands away from rotating parts.**
- **Push the stop lever back and hold it until the engine stops in case of emergency.**

The engine stops when the key is turned off. If the engine does not stop, open the engine hood and push the stop lever back and hold it until the engine stops.



(1) Stop lever

STARTING WITH AN AUXILIARY BATTERY

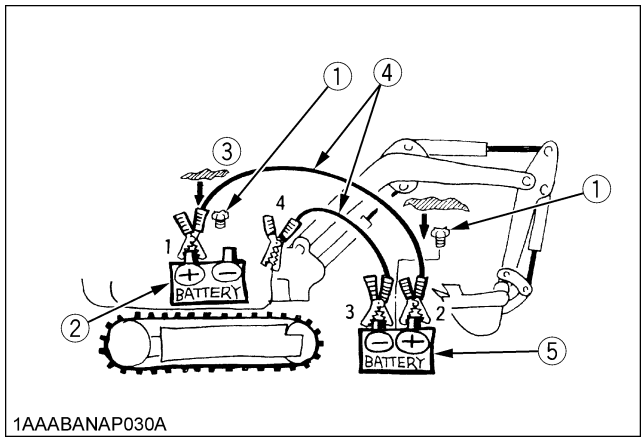
CAUTION

To avoid personal injury:

- **Battery gases can explode.**
  Do not smoke and keep sparks and flames away.
- **Do not start the engine with an auxiliary battery if excavator battery is frozen.**
  Do not connect the black negative bridge cable to the minus terminal of the excavator battery.

■Observe Following Guidelines when Starting with an Auxiliary Battery

1. Bring the helping machine with the same battery voltage as near as possible to the excavator.
   THE MACHINE MUST NOT COME IN CONTACT WITH EACH OTHER.
2. Bring the levers and pedal of both vehicles in the neutral position and put the lock lever in the "Lock" position.
3. Wear eye protection and rubber gloves.
4. Ensure the vent caps are securely in place (if equipped).
5. Cover the battery opening with a cloth. Make sure that the cloth does not touch the battery terminals.
6. Connect the terminal of the red jumper cable with the plus terminal of the empty battery and connect the other end of the cable to the plus terminal of the auxiliary battery.
7. Connect the black negative cable to the minus terminal of the auxiliary battery.
8. Connect the other end of the black cable (coming from the auxiliary battery) with the excavator frame as far away as possible from the empty battery.
9. Start the engine of the helping machine and let it run for a while. Start the excavator with the flat battery.
10. Disconnect the jumper cables in the opposite sequence (Steps 8, 7, 6).
11. Remove the cloth and replace the battery caps.



1AAABANAP030A

(1) Lay a damp rag over the vent caps
(2) Empty battery
(3) Put a cloth over the battery openings
(4) Jumper cables
(5) Auxiliary battery

IMPORTANT :

- This excavator has a negative earthed 12 Volt starting system.
- Only use the same voltage when using an auxiliary battery.
- Using a higher voltage will cause serious damage to the electrical system. When using an auxiliary battery, only the compatible (same) voltage is permissible.

EXCAVATOR OPERATION

RUNNING-IN OF THE NEW EXCAVATOR

The operation and care of the new excavator influences its life span. Your new excavator has been carefully checked and tested before leaving the factory. In spite of this, all movable components must run-in during the first 50 work hours. Do not work with full revolution and full loads during this period. It is most important to run-in your excavator properly in order to achieve its full performance and longevity. During the running-in, the following points should be adhered to in all cases.

■Do not Work with Full Revolutions or Full Loads during the First 50 Working Hours

- Let the engine warm up sufficiently in the cold season.
- Do not let the engine rev-up more than necessary.

■Oil Change in the Run-in Stage

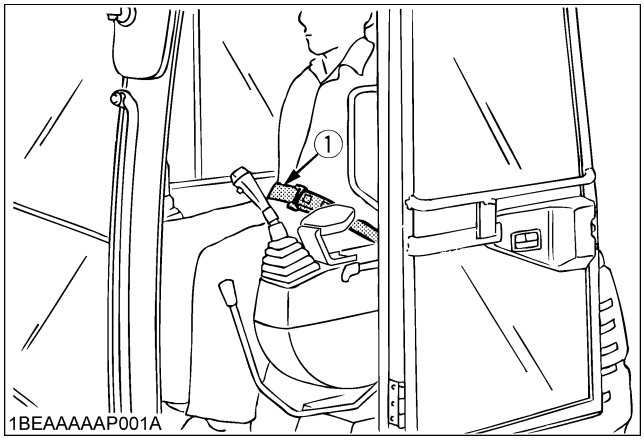
The lubrication oil plays a specially important role during the run-in phase of the excavator. The numerous movable parts are not yet run-in, so that many fine metal particles can develop and cause damage or shorten the lifetime of many components. Pay attention to the oil-change intervals and execute them sooner than later as necessary. See the subject "Care and Maintenance" for more details on the oil-change intervals.

■Seat Belt

WARNING

To avoid personal injury or death:

- **Always use the seat belt if a ROPS/FOPS protection construction is built in. Adjust the seat to the optimal position and buckle up.**



(1) Seat belt

STARTING

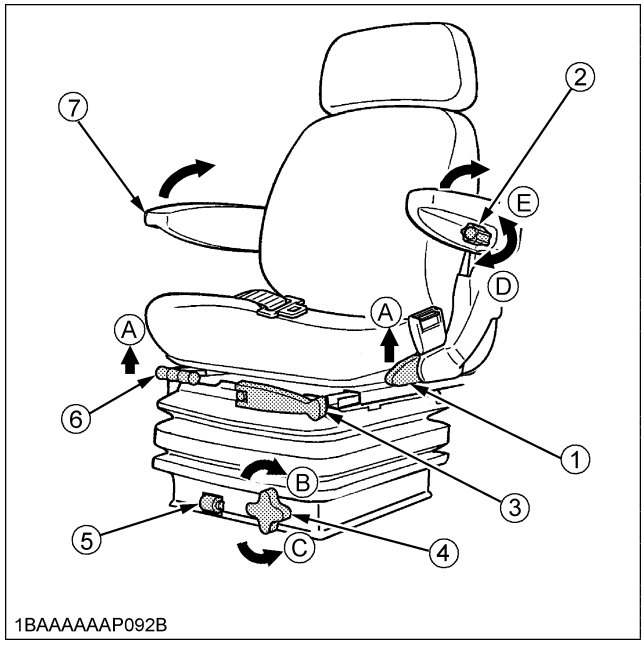
1. Adjusting the Operator's Position.

■Operator's Seat

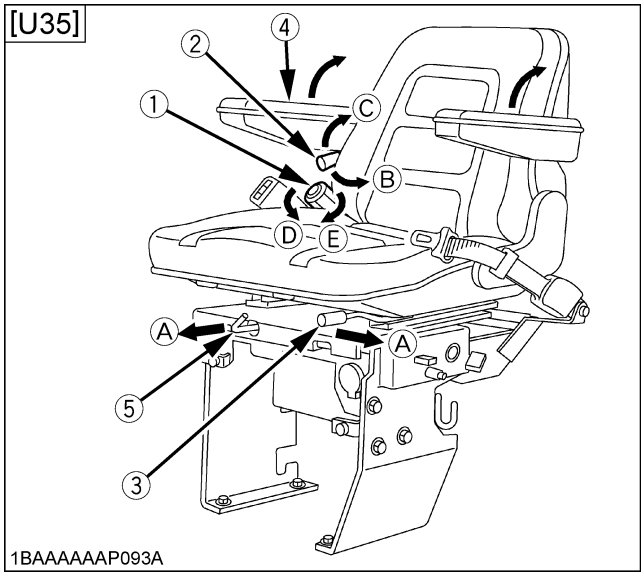
CAUTION

To avoid personal injury:

- **Make sure that the seat is completely secured after each adjustment.**
- **Do not allow any person other than the driver to ride on the excavator.**



(1) Backrest tilt adjust lever
(2) Arm rest angle adjust knob
(3) Weight adjust lever
(4) Height adjust knob
(5) Weight and height indicator
(6) Travel adjust lever
(7) Arm rest
(A) "UNLOCK"
(B) "TO INCREASE TENSION"
(C) "TO DECREASE TENSION"
(D) "TO INCREASE ANGLE"
(E) "TO DECREASE ANGLE"



(1) Backrest tilt adjust knob
(2) Weight adjust lever
(3) Travel adjust lever
(4) Arm rest
(5) Seat lock lever
(A) "UNLOCK"
(B) "TO INCREASE TENSION"
(C) "TO DECREASE TENSION"
(D) "TO INCREASE ANGLE"
(E) "TO DECREASE ANGLE"

◆ **Travel adjustment**
Pull the travel adjust lever and slide the seat backward or forward, as required. The seat will lock in position when the lever is released.

◆ **Weight adjustment**
Turn the weight adjust lever to achieve the optimum suspension setting.

◆ **Tilt adjustment**
Pull the backrest tilt adjust lever and move the backrest to the desired angle.

◆ **Height adjustment**
Pull up with your hands the seat pan in front of seat belt to the desired height of the three available positions.
Once it has reached the highest level, it will return to the lowest level.

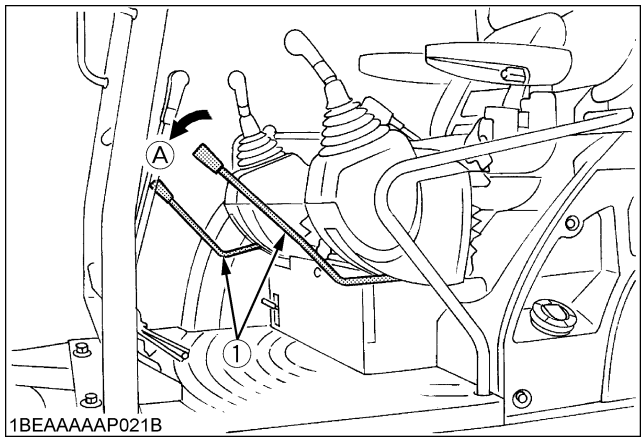
◆ **Arm rest**
Arm rest may be set at upright position if desired.

◆ **Arm rest angle adjustment**
Turn the arm rest angle adjust knob to the desired angle.

2. After starting the engine, bring the lock levers into the "Unlock" position to use drive lever or control lever for front attachments.

■Lock Lever

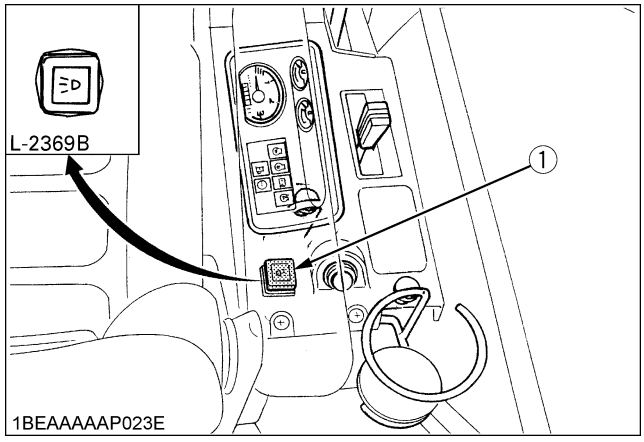
CAUTION
To avoid personal injury:
- **To avoid injuries, check safety aspects all around the excavator.**



(1) Lock levers
(A) "Unlock"

■Working Light Switch

When the starter switch is in position "RUN", the light(s) will be switched on by pressing the switch.



(1) Working light switch

◆ **Night operation**

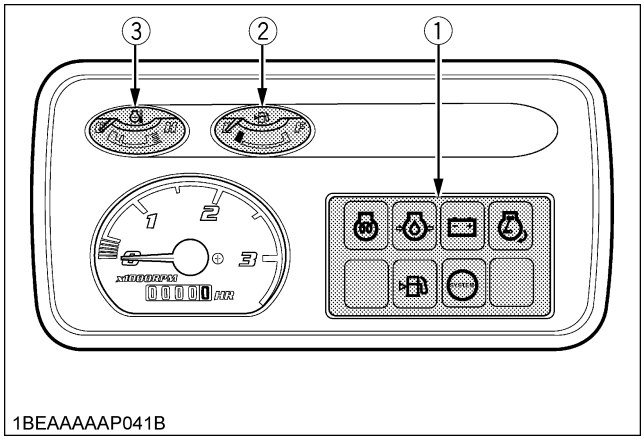
CAUTION
To avoid personal injury:
- **Visibility is reduced in darkness, therefore the working light alone may not be enough. In which case, prepare additional stationary artificial lighting, observe safety rules as well as special regulations for night work.**

CONTROL OBSERVATIONS DURING OPERATION

■Stop the Engine immediately if:

- Sudden increase or decrease in engine revolution occurs.
- Sudden abnormal noises occur.
- Exhaust gases turn suddenly very dark.

Make following control observations during operation to be sure that everything functions normally.



1BEAAAAAP041B

(1) Warning lamps
(2) Fuel indicator
(3) Water temperature

■Warning Lamp

Should a warning lamp light up during operation, stop the engine immediately and as described below, check for the cause. Do not use the excavator when a warning lamp is lit up. Explanation of warning lamp is described of "Malfunction Indicator (Quick Diagnosis)" under "STARTING THE ENGINE" in "OPERATION OF THE ENGINE".

Engine Oil Pressure

When the engine oil pressure sinks under the prescribed level, the warning lamp will light up in the instrument panel. Should this occur during operation, stop the engine immediately and check the engine oil level. (see "Check Engine Oil Level"44 under "DAILY CHECKS" in "MAINTENANCE").

Battery Charge

If the battery is not charged by the generator, the warning lamp will light up in the instrument panel. Should this occur during operation, check the charge system or contact your KUBOTA dealer.
(see "TROUBLESHOOTING") 70

NOTE :

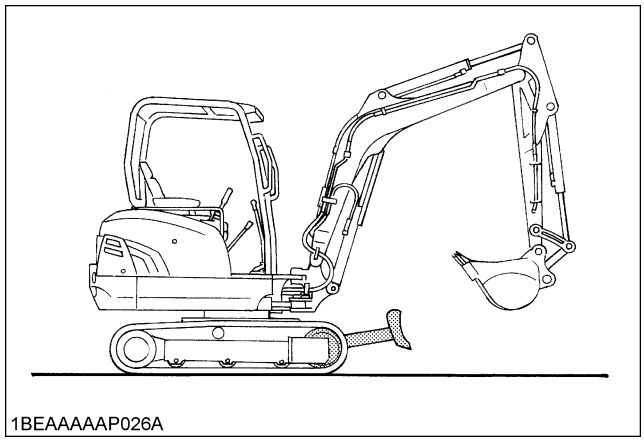
- Let your KUBOTA dealer inform you in detail concerning care and maintenance.

DRIVING

WARNING

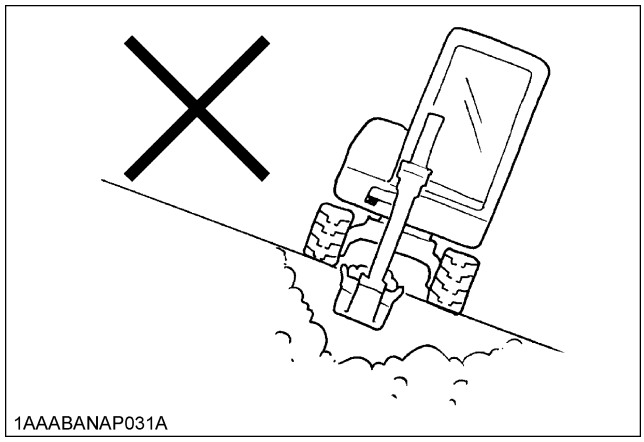
To avoid personal injury or death:

- **Before starting the engine, make sure that no other persons are in the excavator operating area.**
- **Before operating the excavator, check the crawler direction. (Track idler and dozer blade to the front of the excavator).**



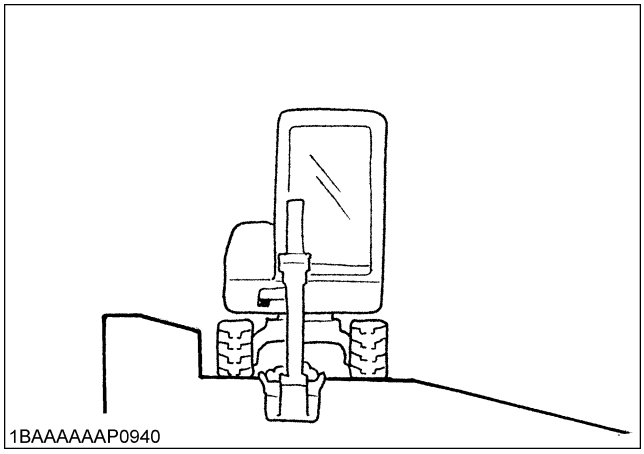
1BEAAAAAP026A

- **Use extra caution when traveling across a slope or working sideways on a slope.**

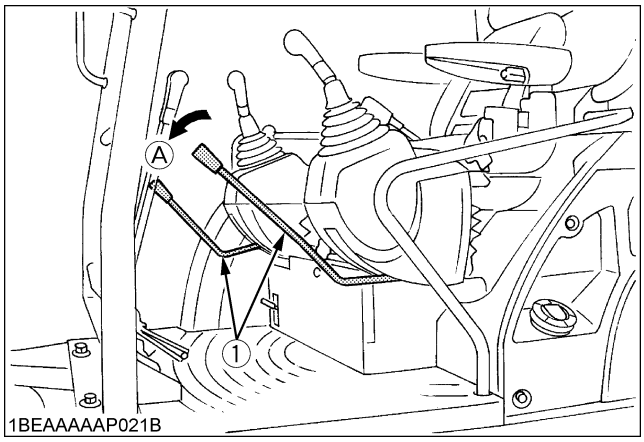


1AAABANAP031A

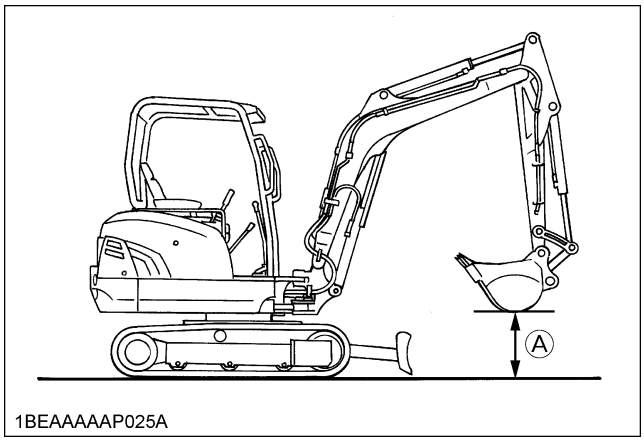
- **Recommended technique for working on a slope.**



1. Adjust the engine speed from idling to an intermediate speed.
2. Unlock the lock levers and pull in the bucket and hold the bucket about 20 to 40cm(8 to 16 in.) above the ground.

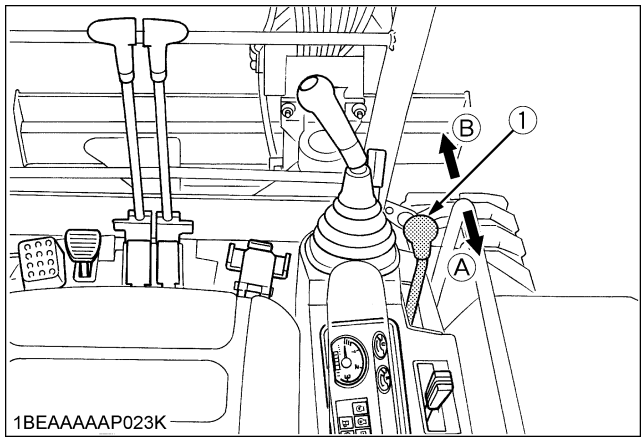


(1) Lock lever (A) "Unlock"



(A) 20 to 40 cm(8 to 16 in.)

3. Activate the dozer control lever to raise the dozer.



(1) Dozer control lever (A) "Raise"
(B) "Lower"

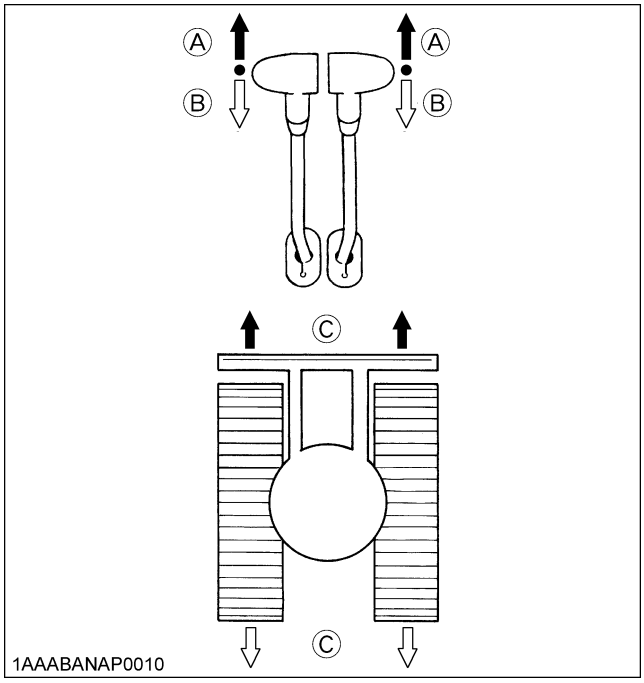
■Drive Levers(Right,Left)

WARNING

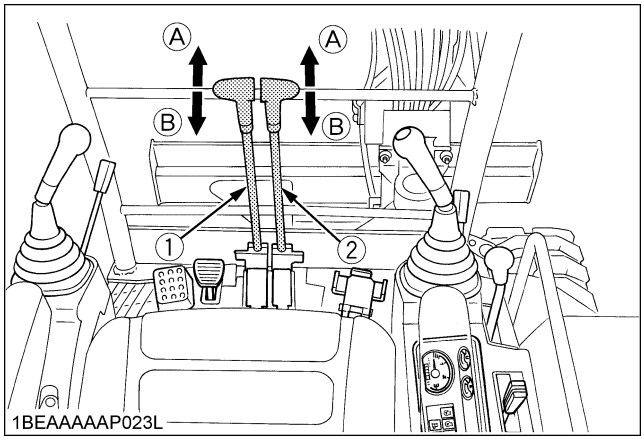
To avoid personal injury or death:

- **If the swing frame has been turn 180deg, i.e. the dozer in relation to the operator's seat is "behind", then the travel direction is opposite to the drive direction of the levers (when activating the drive lever forwards, the machine, in relation to the operator's seat, will move backwards).**

Pushing the drive lever forwards, moves the excavator forwards, and vice-versa. The front of the excavator is the side where the dozer is located; the drive sprocket is in the rear of the excavator.



(A) "Forward"
(B) "Backward"
(C) "Straight"



(1) Drive lever (left)
(2) Drive lever (right)
(A) "Forward"
(B) "Backward"

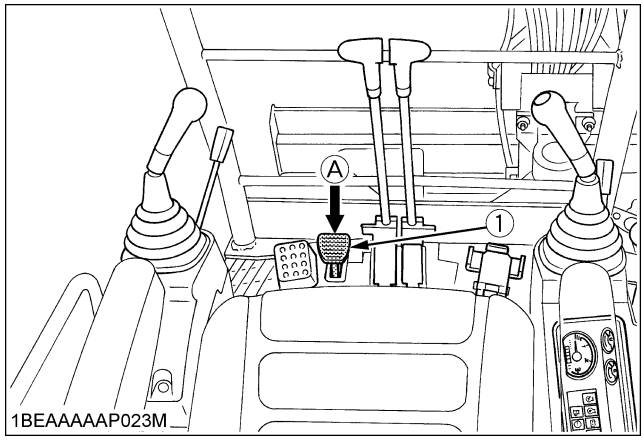
■Drive Speed Pedal

CAUTION

To avoid personal injury:

- **When activating the drive speed pedal, it must be pushed down completely.**

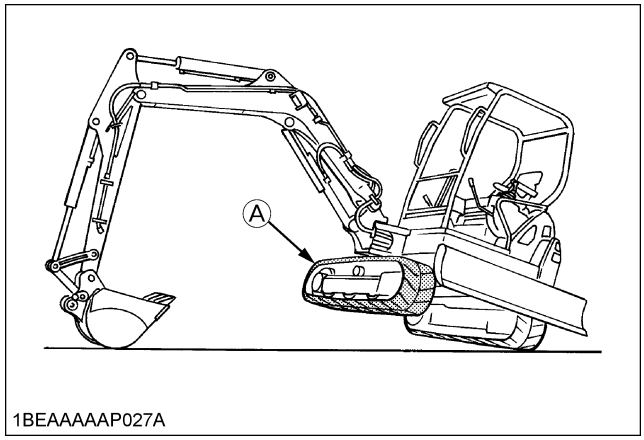
Drive speed will increase when pushing down this pedal.



(1) Drive speed pedal
(A) "To increase speed push down"

IMPORTANT :

- Do not activate the drive speed pedal when there is increased drive resistance (e.g. driving on inclinations or on uneven grounds).
- If the crawler are clogged with sand or gravel while working on soft ground, lift up one crawler with the help of the boom, arm and bucket and let the crawler rotate to remove the sand and gravel.



(A) "Rotate to remove sand and gravel"

DANGER

To avoid serious injury or death:

- **Do not work under the machine in this condition.**

TURNS

CAUTION

To avoid personal injury:

- **Do not change direction on steep slopes, or the excavator could tip over.**
- **Before changing direction, beware of persons in the working area.**

■Pivot Turn

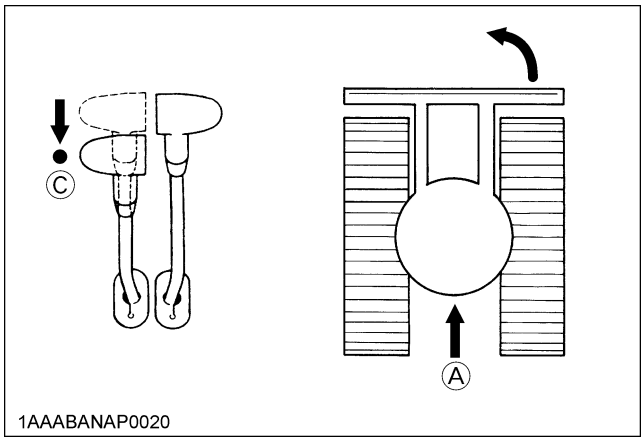
NOTE :

- Movement as illustrated is done with the dozer blade in front of the operator.

When the dozer blade is behind the operator, the steering direction is reversed.
(For example, push the drive levers forward; and the crawler, in relation to the operator's seat will move backward.)

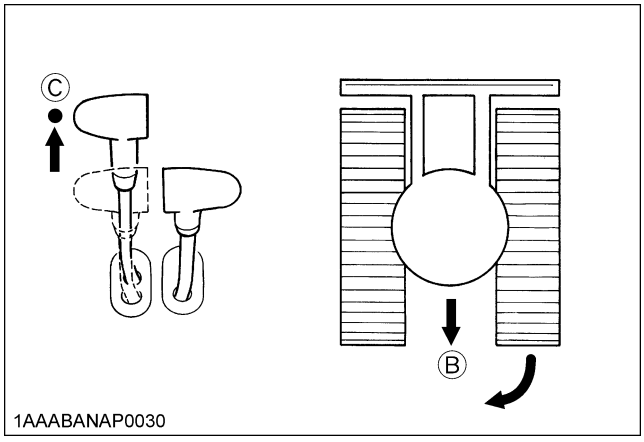
◆ Change of Direction while Travelling

1. While travelling forwards, bring the left drive lever into the neutral position;
   the excavator will turn to the left.



(A) "Travelling forward" (C) "Neutral position"

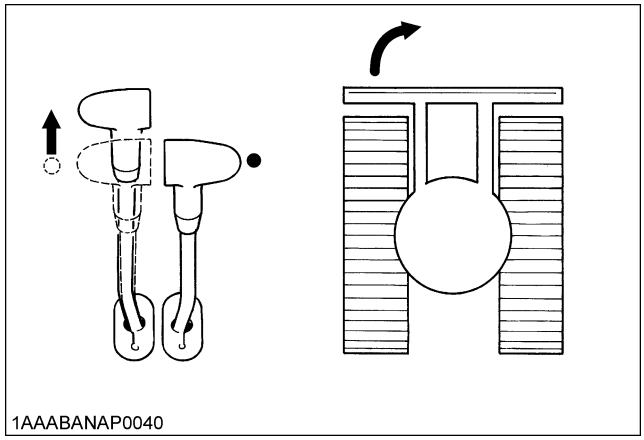
2. While travelling backwards, bring the left drive lever into the neutral position;
   the excavator will turn to the right.



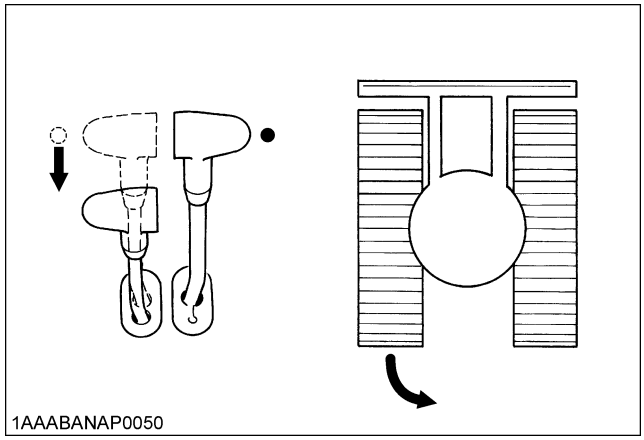
(B) "Travelling backward" (C) "Neutral position"

◆ Change of Direction while Stationary

1. Push the left drive lever forward;
   the excavator will turn to the right.

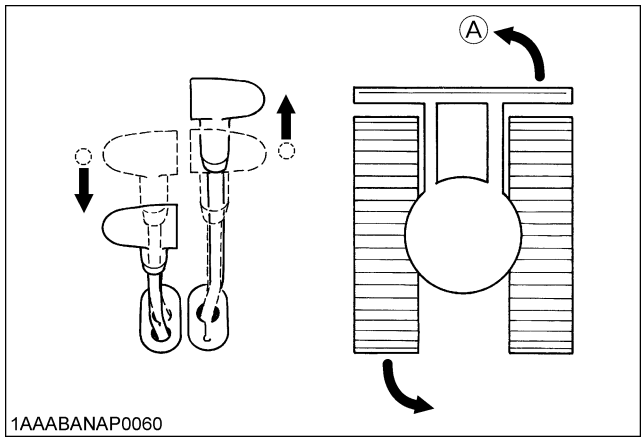


2. Pull the left drive lever backward;
   the excavator will turn to the left.

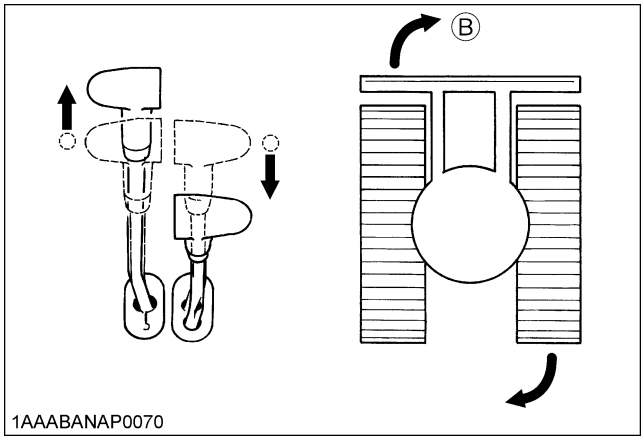


■Spin Turn

When both drive levers are activated in the opposite directions, both crawlers will rotate with the same speed but in opposite directions. Center of rotation is the centre of the excavator.



(A) "Left spin turn"



(B) "Right spin turn"

UP AND DOWNHILL DRIVING

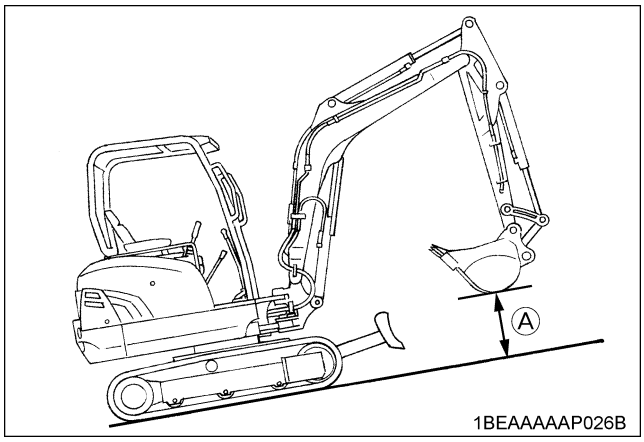
CAUTION

To avoid personal injury:

- **When traveling up or down a slope, use extra caution and follow instructions below.**

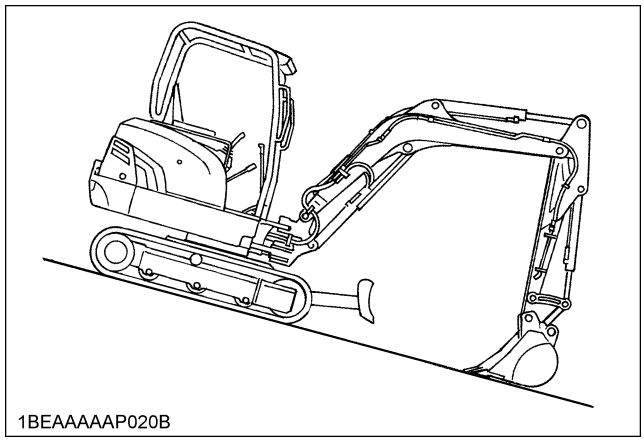
While traveling uphill, keep the lower edge of the bucket approx. 20 to 40cm(8 to 16 in.) above the ground. Although the KUBOTA excavator will not slip easily because of the crawlers, it is safer to let the bucket slide over the ground while traveling downhill. Always choose slow speed for uphill and downhill traveling.

[UPHILL TRAVELING]



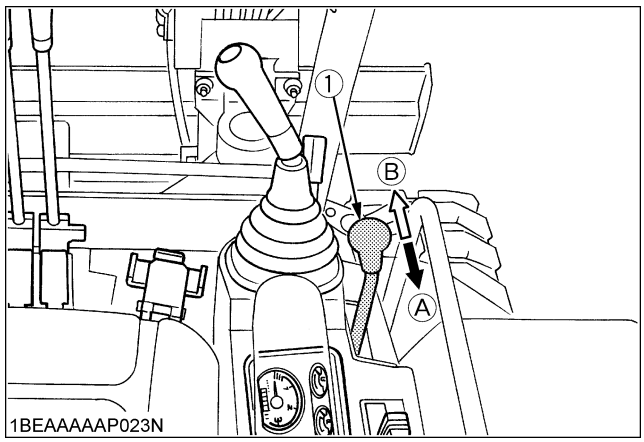
(A) 20 to 40 cm(8 to 16 in.)

[DOWNHILL TRAVELING]

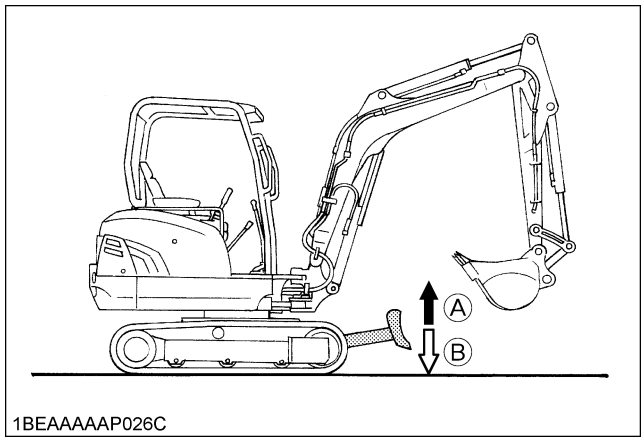


OPERATION OF THE DOZER

1. To raise the dozer, set Dozer and Crawler selection lever in position of Dozer and pull back the control lever. Pushing the control lever forwards, lowers the dozer.



(1) Dozer control lever (A) "Raise"
(B) "Lower"



(A) "Raise" (B) "Lower"

2. While undertaking earth moving work, control both drive levers with the left hand and the dozer control lever with the right hand.

TWO PATTERN SELECTION SYSTEM(TPSS)

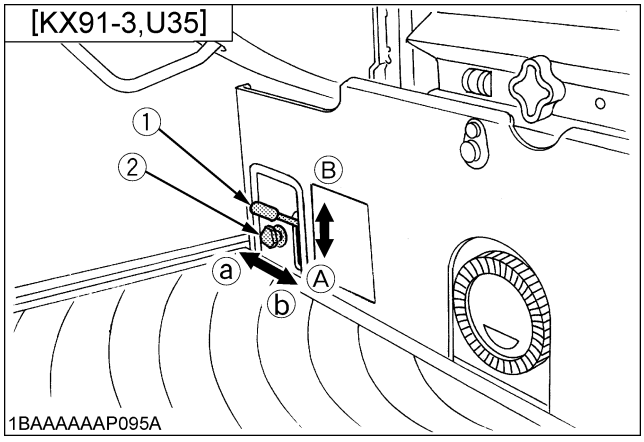
CAUTION

To avoid personal injury:

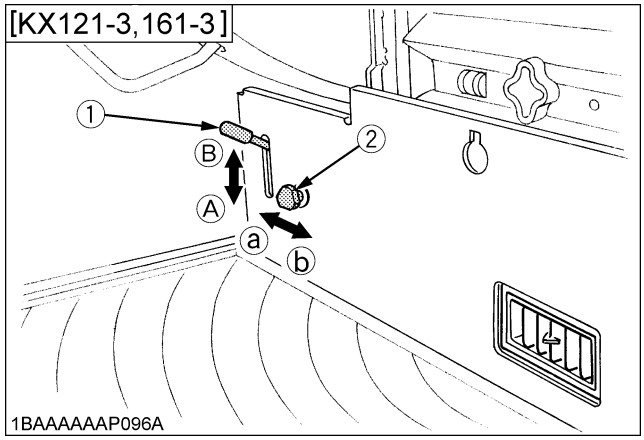
- **Study control lever pattern A and pattern B. Then choose the one which is most familiar**
- **Position the pattern selector lever (located on the right side of operator's seat) in either the full lowered position (pattern A) or the full upward position (pattern B).**
- **Engage the lever lock to prevent accidental pattern change.**
- **Familiarize yourself with the pattern selected by operating slowly.**

■Pattern Change

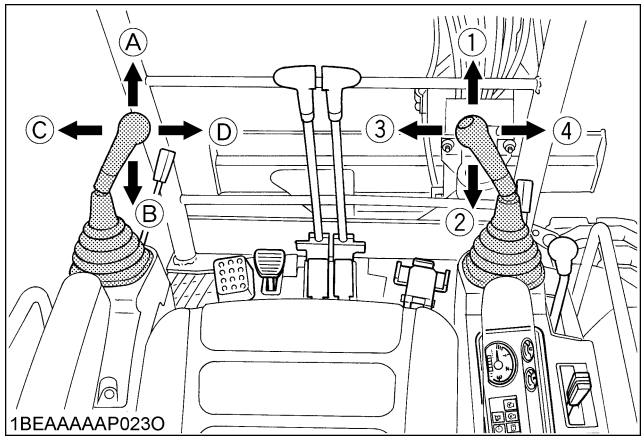
1. Loosen the lever lock knob and slide it to the direction (a), and position the pattern selector lever to the desired position.
2. Slide the lever lock knob to the direction (b) and tighten it.



(1) Pattern selector lever (Two Pattern Selection System: TPSS)
(2) Lever lock knob



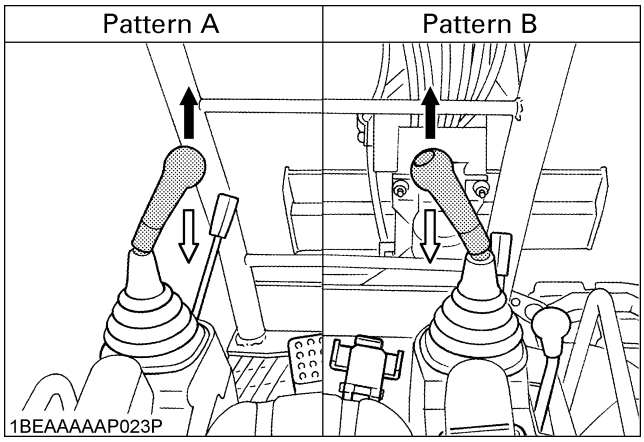
(1) Pattern selector lever (Two Pattern Selection System: TPSS)
(2) Lever lock knob

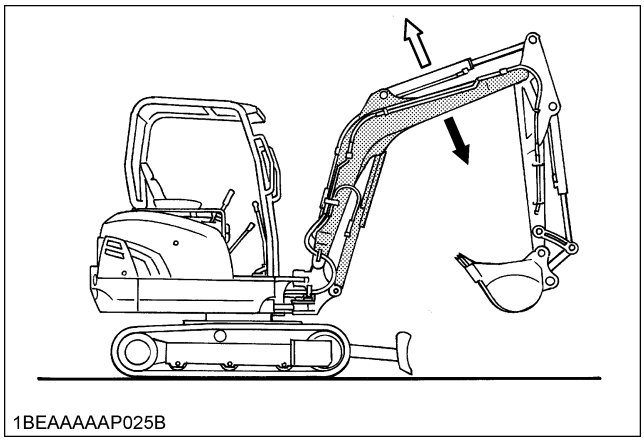


Lever Position		Pattern A	Pattern B
Attachment Control Lever (Left)	A	Boom down	Arm up
	B	Boom up	Arm crowd
	C	Swing left	Swing left
	D	Swing right	Swing right
Attachment Control Lever (Right)	1	Arm up	Boom down
	2	Arm crowd	Boom up
	3	Bucket crowd	Bucket crowd
	4	Bucket dump	Bucket dump

OPERATION OF THE BOOM

To raise the boom, pull the attachment control lever back. The boom is equipped with a cushion cylinder which helps preventing excavated material in the bucket from falling out. Low hydraulic oil temperature, (e.g. right after starting the engine in cold weather) the cushioning function will be effected for a short period of time (approx. 3 to 5 seconds). This condition results from the viscosity of the hydraulic oil and is not a sign of malfunction.
The cushion cylinder will operate normally as the oil warms up.





IMPORTANT :

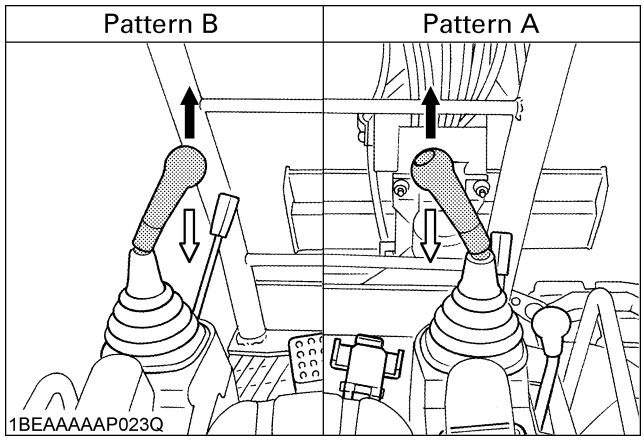
- When lowering the boom, make sure that it does not hit the dozer and that the bucket teeth do not touch the dozer.

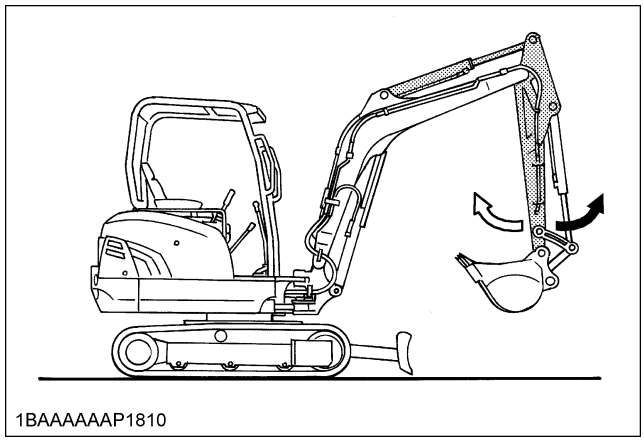
OPERATION OF THE ARM

Pull back the attachment control lever and the arm will be pulled in. To move the arm out, push the control lever towards the front.

NOTE :

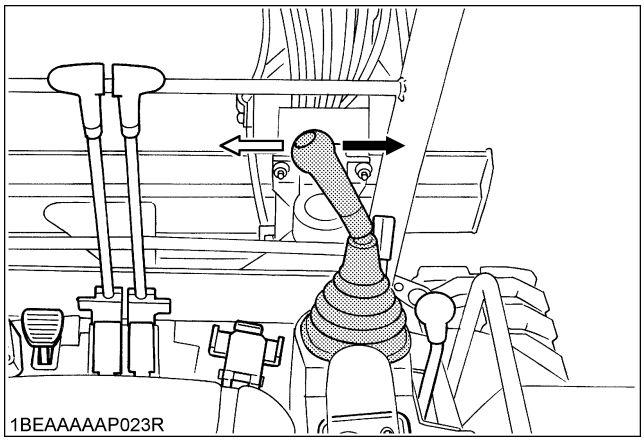
- When pulling in the arm, the movement may stop for a short moment when the arm is in its vertical position. This is caused be the fact that at this position the combined load for the arm and bucket moves the cylinder piston away from the hydraulic flow causing a short delay in the cylinder action, until the flow catches up with cylinder piston. This is a characteristic of the hydraulic system and is no sign of a malfunction.

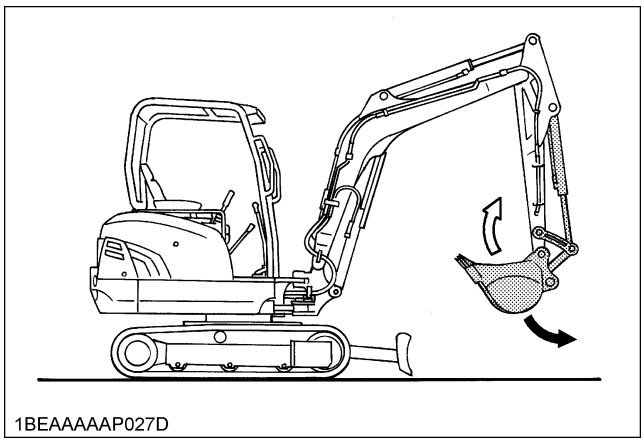




OPERATION OF THE BUCKET

To pull in the bucket, move the right attachment control lever from the neutral position towards the left. Moving the control lever towards the right pushes the bucket outwards and empties its contents.


1BEAAAAAP023R


1BEAAAAAP027D

UNIT SWING AND BOOM SWING OPERATION

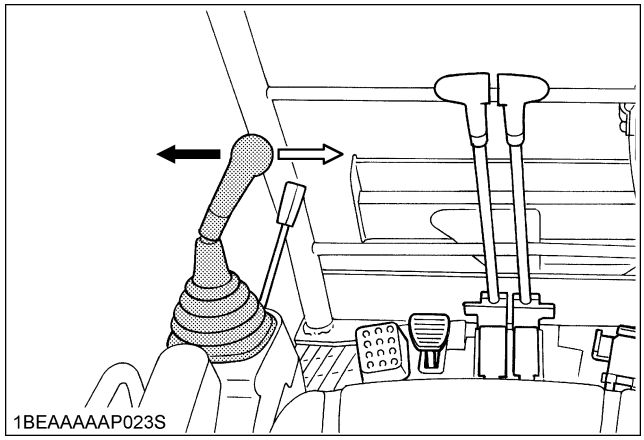
CAUTION

To avoid personal injury:

- **When working in groups, always let the others know what you are going to do before you do it.**
- **Keep others away from the machine working area.**
- **Be sure to lock the boom swing pedal when the boom swing function is not used.**

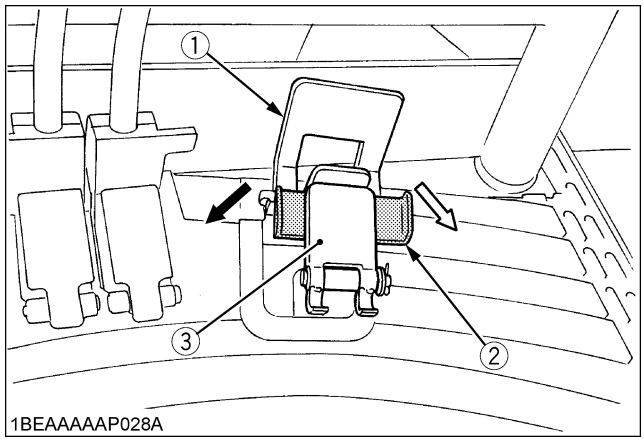
■Unit Swing Operation

1. Tilt the control lever to the left and the upper structure will turn to the left.
2. Tilt the control lever to the right and the upper structure will turn to the right.


1BEAAAAAP023S

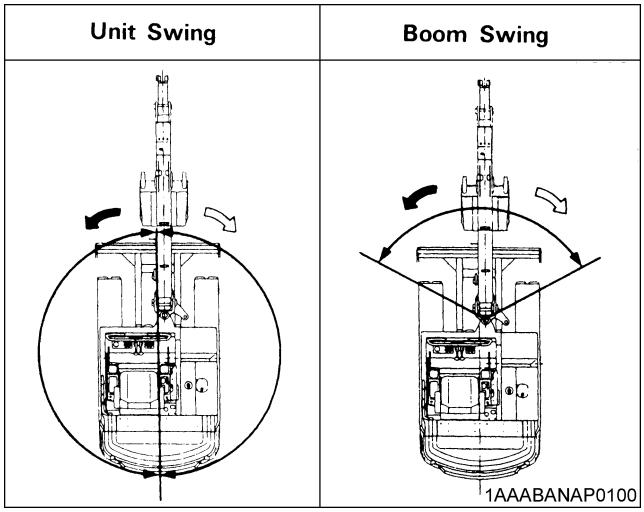
■Boom Swing Operation

1. Tilt the pedal lock forward to unlock the pedal.
2. Tilt the service port pedal forward to keep the pedal from moving to and fro.
3. Step on the left side of the pedal to swing the boom to the left.
4. Step on the right side of the pedal to swing the boom to the right.



1BEAAAAAP028A

(1) Pedal lock
(2) Boom swing operation pedal
(3) Service port pedal



IMPORTANT :

- Do not operate the left attachment control lever abruptly from the right to the left (or vice versa). Because the low of inertia cause high impact load on the swing gear and the swing motor, shortening the life of the excavator.

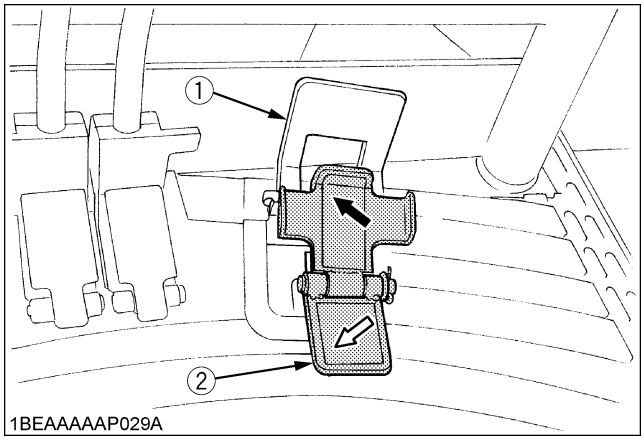
SERVICE PORT OPERATION

CAUTION

To avoid personal injury:

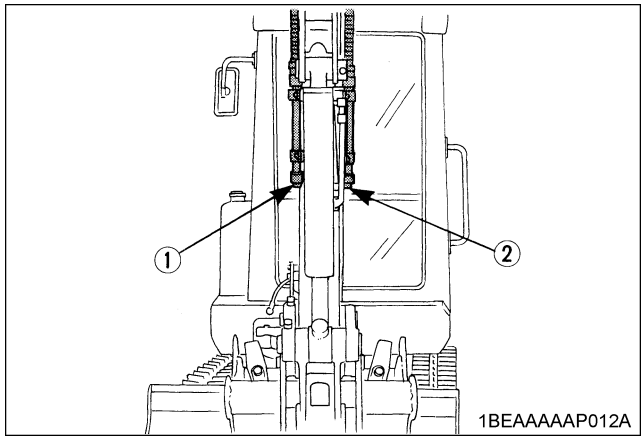
- **Tilt the service port pedal forward when the pedal is not used. Be sure to lock the pedal.**

This pedal is used to operate hydraulic attachment such as breakers.



(1) Pedal lock
(2) Service port pedal

- Push the front part of the pedal (⬇), send oil to the pipe (1).
- Push the back part of the pedal (⇩), send oil to the pipe (2).



Max. Flow Volume (Theoretical L(US gal)/min.)	KX91-3	41.4(10.9)
	KX121-3	60.0(15.9)
	KX161-3	65.0(17.2)
	U35	39.1(10.3)
Max. Pressure MPa (kgf/㎠) [psi]	KX91-3,161-3	23.5 (240)[3412]
	KX121-3,U35	24.5 (250)[3551]

IMPORTANT :

- When the service port is not used for a long period, dirt particles can settle in the lower part of the service port lines.
  When the plugs on the service port lines are removed to connect attachments, drain approx. 3.4oz(100 cc) of oil per side before making connections.
  Concerning the choice of a breaker, contact your dealer.

ANGLE BLADE OPERATION

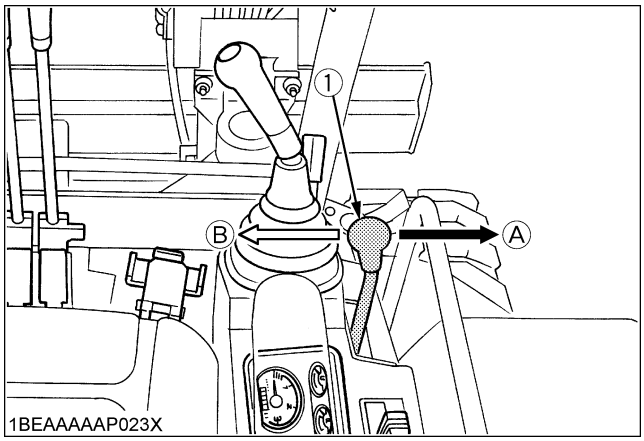
[KX121-3]

WARNING

To avoid personal injury or death:

- **Never jack up or lift the machine with the angle blade placed at an angle.**
  The machine will be ill balanced and may fall down.
  Before starting the job, position and keep the angle blade at the standard 0° marking (Refer to Figure (1)).

1. The dozer control lever doubles as the angle blade control lever. Move it to the right or left, and the angle dozer is placed at an angle.



(1) Control lever for dozer
(A)Turn the left
(B) Turn the right

2. For the right-hand angle setting, move the control lever in direction (A). The angle blade will be placed at an angle toward (A).
3. For the left-hand angle setting, move the control lever in direction (B). The angle blade will be placed at an angle toward (B).

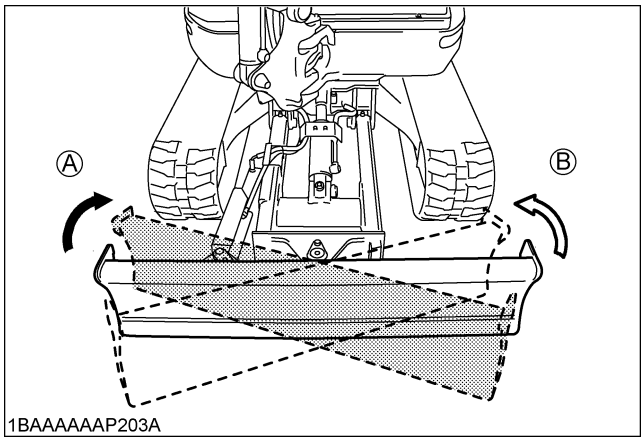
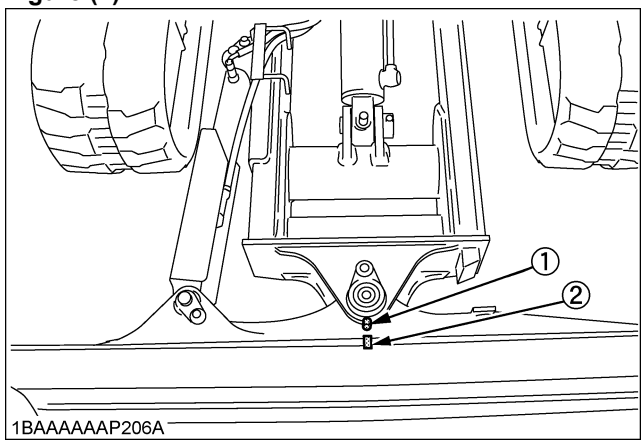


Figure (1)



(1) Mark (red)
(2) Mark (red)

AUTO IDLE (AI) OPERATION

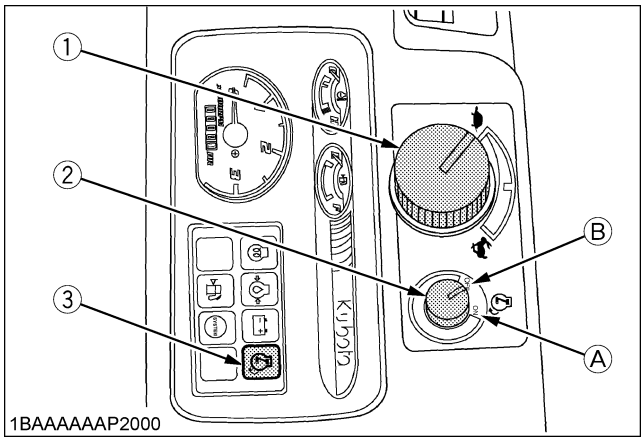
[KX161-3]

CAUTION

To avoid personal injury:

- **Before operating the control lever, check the Auto Idle Indicator Lamp.**
- **When operating in confined spaces or when loading onto a vehicle, turn the Auto Idle switch off (Light off). This is to prevent unwanted engine speed increases when control levers are activated.**
- **The Auto Idle control, when selected by a switch, provides the operator with a way to control engine speed without a Throttle Lever (Throttle Potentiometer), simply by not activating any control levers for about four seconds after stopping work, and then to simply restore a preset (by potentiometer) engine speed by activating any control lever to return to work.**
- **The purpose of system is to reduce fuel consumption, noise and operator fatigue.**

1. **Throttle Potentiometer**
   With this potentiometer the operator can adjust the engine speed when the Auto Idle control is activated.
2. **Switch for Auto Idle (AI) Control**
   With this switch the Auto Idle control is turned on or off. The Auto Idle control allows the engine speed to drop to the engine speed preselected with the potentiometer after about 4 seconds. If the control activated, the engine speed rises immediately to the preset rpm. If the Auto Idle is not activated the throttle potentiometer can be utilized to control engine speed similar way to a conventional throttle control lever.



(1) Throttle potentiometer
(2) Switch for Auto Idle control
(3) AI lamp
(A) "ON"
(B) "OFF"

IMPORTANT :

- It is possible that the Auto Idle may not function until hydraulic oil warms up in the cold weather. Therefore it is not recommended that the Auto Idle be activated until the machine is completely warmed up.

■Important Information on Excavator Operation

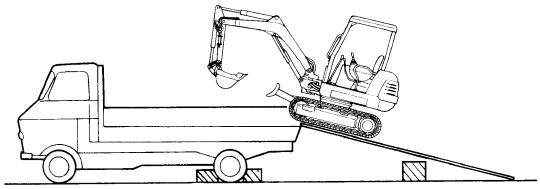
- Do not try to crush concrete or boulders using side swings with the bucket. Also do not use the bucket to move earth piles.
- Under all circumstances avoid the following operations:
  - Excavation using the gravitational impact of the machine.
  - Compacting of gravel or soil using the dropping action of the bucket.
  - Excavation using the traveling power of the machine.
- Do not try to drop or shake off soil adhering to the bucket in the manner given in the points below. This can cause damage to the machine.
  Adhering soil can be shaken off when the bucket is being emptied by moving the bucket out to the maximum stroke of the cylinder. Should this not suffice, swing out the arm as far as possible and operate the bucket back and forth.
- Do not hit the dozer with the boom cylinder!
  Make sure that the boom cylinder does not hit the dozer when doing deep excavation. If necessary swing around so that the dozer is in the back of the machine.
- Pay attention when pulling in the bucket!
  When pulling in the bucket (for driving or transportation) avoid hitting the dozer.
- Avoid collisions!
  When moving the excavator, pay attention that the dozer does not collide with obstructions such as boulders etc..
  Such collisions shorten the life span of the dozer and the cylinder substantially.
- Support the machine correctly!
  When stabilizing the machine with the dozer, lower the dozer to engage the full width to the ground.
- When working in water, make sure the plugs and cocks are closed.
  Only work in water where the level is below the line of the idler shoe.
- After work, clean the machine and lubricate all movable parts.
- Check oil for contamination and correct levels.

TRANSPORTING THE EXCAVATOR ON A VEHICLE

DANGER

To avoid personal injury or death:

- **No directional changes should be made when the excavator is on the ramp. Should a change of direction be necessary, drive off the ramp completely and make the turn.**
- **When driving forwards or backwards onto the vehicle, or when swinging the upper body, make sure that neither the CAB or the gates of the vehicle will be damaged.**



1AAABANAP0080

- **When the excavator reaches the point between the ramps and the bed, halt and then move very slowly until the excavator reaches the horizontal position.**
- **Move the excavator onto the vehicle only with the arm completely pulled in. Otherwise the CAB of the vehicle could be damaged when swinging around the upper body.**
- **Do not jack up the machine using its boom to load or unload the excavator from the vehicle. Doing this is dangerous.**
- **Make sure the ramp are of sufficient capacity and securely connected to the vehicle to safety support the machine throughout the loading / unloading operation.**

■ Transporting on a truck

WARNING

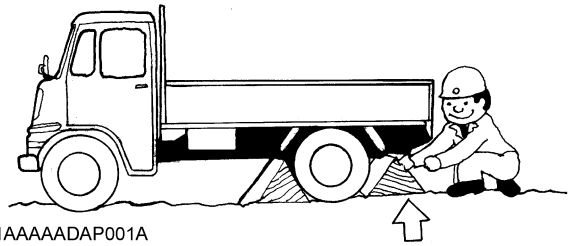
To avoid personal injury or death:

- **After loading the machine on the truck, lower the bucket and dozer onto the truck bed. Lock the swing frame with the swing lock pin.**

Prepare a platform to load or unload the excavator.

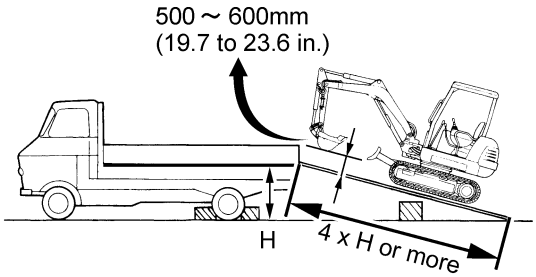
Take following steps when using ramps.

1. Apply the parking brakes of the vehicle, and block the drive wheels from both sides.



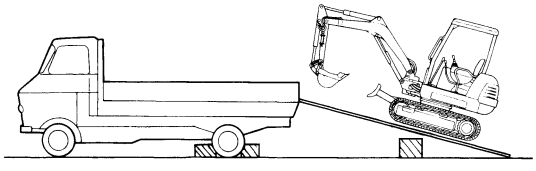
1AAAAADAP001A

2. Use fixing plates to secure the ramp properly. Connect the ramps directly with the bed.



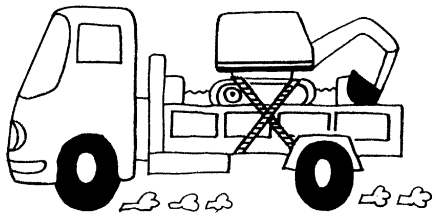
1BAAAAAAP185B

3. For additional safety, use blocks or struts under the ramps and the bed.



1BAAAAAAP1850

4. Completely align the ramps and the crawlers and then drive the excavator slowly up the ramps with the dozer in the front. After ensuring that the crawlers are completely on the bed, swing the upper body around to the back of the vehicle.
5. Block the crawlers and tie down the excavator with suitable chains and approved method (check appropriate state reguration).



1AAABANAP032A

6. Before unloading, raise the dozer and bucket from the bed.

LIFTING OF THE EXCAVATOR

DANGER

To avoid serious injury or death:

- **The correct instructions for safe handling are described here. Read these carefully before moving the machine. Make sure that the operating personnel read the operator's manual carefully.**

■ Basics when Lifting with Wires

1. The lifting and crane operation is to be undertaken according to the safe operation guidelines described.
2. As the accessories for lifting mentioned in this instruction are only given as reference, the standards concerning strength, control and other details are based on the respective applicable guidelines.

■ Safety Aspects when Lifting with Wires

Abide by following steps when lifting:

1. Do not lift loads that exceed the maximum load capacity of the crane.
2. Choose correct tackle suitable to the weight, size and form of the load.
3. First assess the center of gravity of the load, position the hook directly over the load and lift the load so that the center of gravity of the load lies as low as possible.
4. The steel wires must be fixed in the middle of the hook.
5. The load must be lifted vertically from the ground.
6. Do not enter the working area under suspended loads and do not move the load over people. The load must only be moved in an area where the equilibrium can be easily maintained.

■ Lifting Procedure for the Excavator

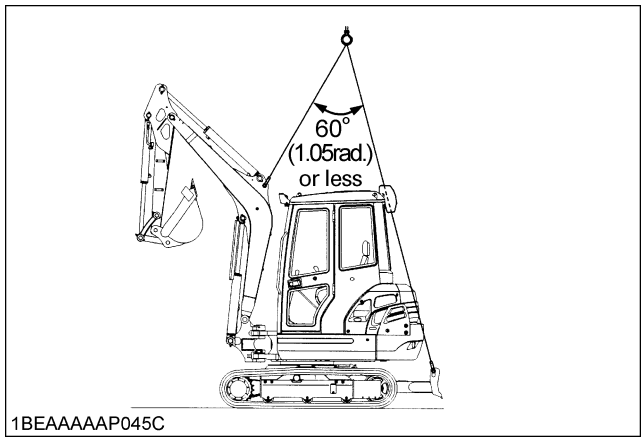
WARNING

To avoid personal injury or death:

- **Do not use the hooks on the roof of canopy and CAB for lifting the excavator.**
- **Never lift the machine with the angle blade placed at an angle.**

◆ General guidelines for lifting

1. Lifting position. (see illustration below)
   (1) Pull in the boom completely towards the CAB.
   (2) Pull in the arm completely.
   (3) Pull in the bucket completely.
   (4) Adjust the swing angle to the center. (to bring the boom in a position parallel to the machine frame)
   (5) Swing frame so that dozer blade is to the rear and frame is parallel with tracks.
   (6) Raise the dozer blade fully.
2. Attaching the steel wires.
   (1) Always hook the excavator at three points. (one on the boom and left and right of the dozer)
   (2) Always use a shackle on each lifting hole when attaching the wires.
   (3) Using cushioning material at all places where the wires contact the machine.
   (4) Keep the angle between the front and rear wires within 60° (1.05 rad.).



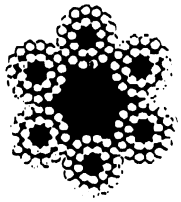
1BEAAAAAP045C

3. Tackle
   The weights of the excavators and the recommended tackle for lifting these loads are mentioned in the following table. Choose components having enough strength.

	KX91-3	KX121-3	KX161-3	U35
Excavator Weight*	3330kg (7345 lbs)	4150kg (9150 lbs)	5330kg (11750 lbs)	3750kg (8265 lbs)
Load / Wire	12560N (2827 lbs)	12054N (2712 lbs)	15500N (3487 lbs)	11174N (2512 lbs)
Minimum Wire Diameter (Safety factor=6)	14 mm(9/16) or more		16mm (5/8) or more	14mm (9/16) or more

*Excavator Weight: With CAB, steel crawlers, and long arm.

Steel wire: 6 x 24


1AAABANAP034A

4. Lifting
   (1) Lift slowly and safely
   (2) Do not enter the excavator area when lifting.
   (3) Lift the excavator horizontally. (Modify wire connections according to needs)

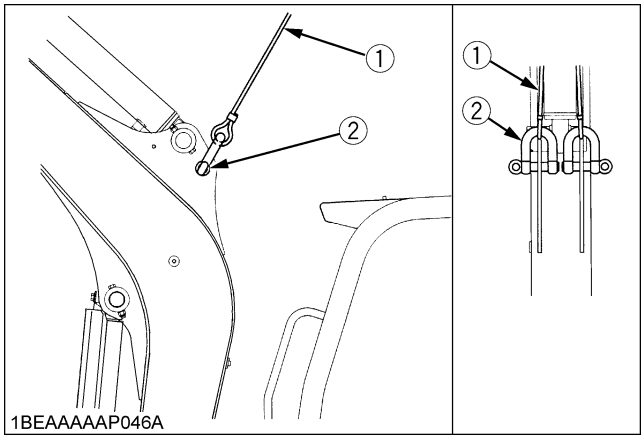
Maximum strength

for example : (JIS G 35 25) - "6 x24"

Diameter	zinc-plated	not zinc-plated
10 mm (3/8)	45.8 KN(10298 lbs)	49.3 KN(9668 lbs)
12.5 mm (1/2)	71.5 KN(16077 lbs)	77 KN(17313 lbs)
14 mm (9/16)	89.7 KN(20169 lbs)	96.6 KN(21720 lbs)
16 mm (5/8)	117 KN(26307 lbs)	126 KN(28331 lbs)
18 mm (45/64)	148 KN(33277 lbs)	160 KN(35975 lbs)

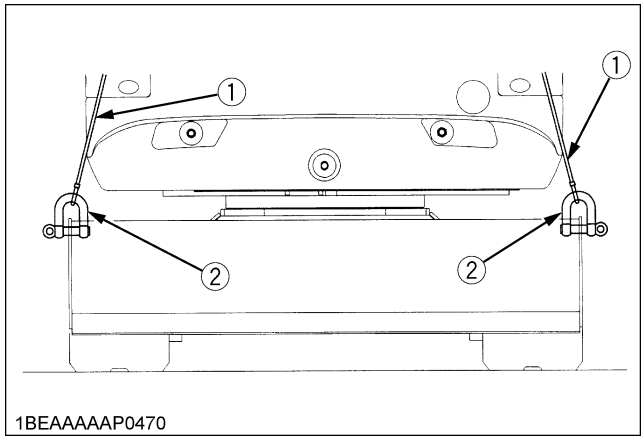
[KX91-3,U35]

1. Boom side
   Hook in the steel wire with a shackle into the lifting hole.



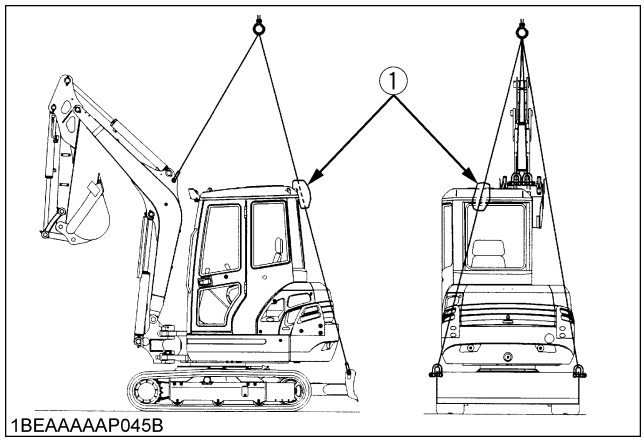
(1) Steel wire
(2) Shackle

2. Dozer side
   Hook in the steel wire with a shackle into the lifting hole around the CAB or canopy.



(1) Steel wire
(2) Shackle

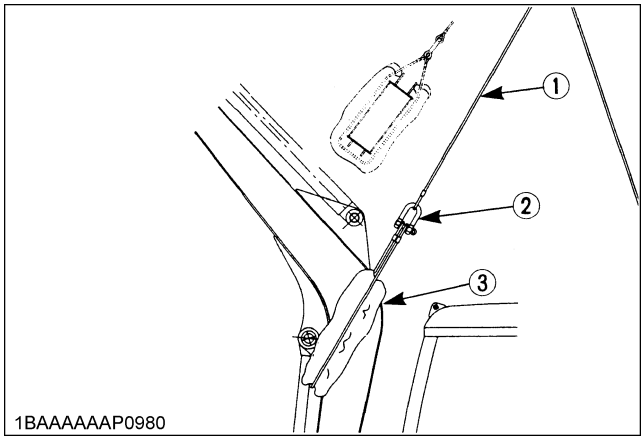
3. Lifting



(1) Cushioning material

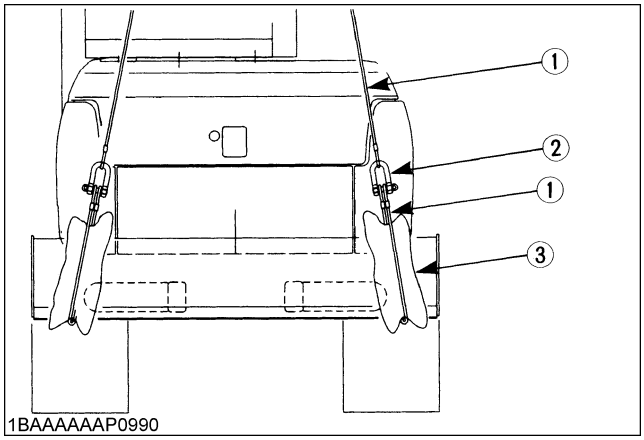
[KX121-3,161-3]

1. Boom side
   Join the steel wire with cushioning material around the edges of the boom.



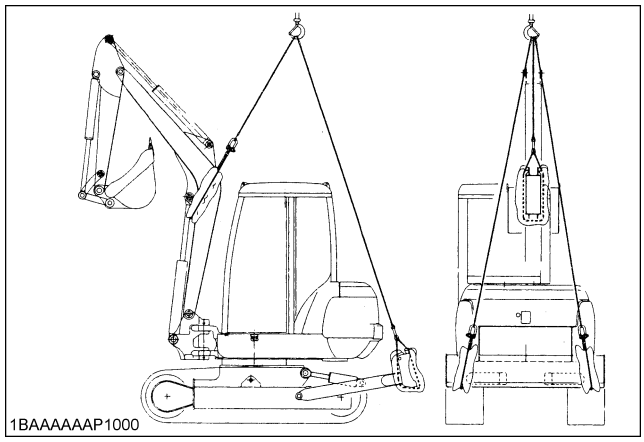
(1) Steel wire
(2) Shackle
(3) Cushioning material

2. Dozer side
   Join the steel wire with cushioning material around the edges of the dozer.



(1) Steel wire
(2) Shackle
(3) Cushioning material

3. Lifting



MAINTENANCE

MAINTENANCE INTERVALS

No.	Check points		Intervals	Hour meter indicator									Consequently	Ref. page		
				50	100	150	200	250	300	350	400	450				
1	Coolant		check	Daily check										42		
			change										every 2 years	62		
2	Fuel		check	Daily check										43		
3	Engine oil		check	Daily check										44		
			change	◉					○				every 250 hrs	55		
4	Hydraulic oil		check	Daily check										44		
			change										every 1000 hrs	58	*1	
5	Lubrication points		-	Daily check										45		
6	Radiator and oil cooler		check	Daily check										46		
7	Washer liquid (CAB type)		check	Daily check										47		
8	Engine and electrical wiring		check	Daily check									every year	47		
9	Fuel tank, Fuel filter		drain	○	○	○	○	○	○	○	○	○	every 50 hrs	48		
10	Battery condition		check	○	○	○	○	○	○	○	○	○	every 50 hrs	48		
11	Greasing swing bearing teeth		-	○	○	○	○	○	○	○	○	○	every 50 hrs	50		
12	Fan belt tension		adjust				○				○		every 200 hrs	50		
13	Radiator hoses and clamps		check				○				○		every 200 hrs	51		
			replace										every 2 years	61		
14	Air filter element	Outer element	clean				○				○		every 200 hrs	52	*2	@
			replace										every 1000 hrs	60	*2	
		Inner element	replace										every 1000 hrs	60	*2	
15	Greasing swing ball bearings		-				○				○		every 200 hrs	53		
16	Fuel filter element		replace								○		every 400 hrs	56		@
17	Engine oil filter	KX91-3,U35	replace	◉					○				every 250 hrs	56		
		KX121-3,161-3		◉									every 500 hrs	57		
18	Drive unit oil		change		◉								every 500 hrs	57		
19	Hydraulic return filter element		replace					◉					every 500 hrs	58		
20	Hydraulic suction filter element		replace										every 1000 hrs	59		
21	Filter in the pilot hydraulic system		replace										every 1000 hrs	60		
22	Fuel injection nozzle injection pressure		check										every 1500 hrs	61	*4	@
23	Front idler and track roller oil		change										every 2000 hrs	61		
24	Alternator and starter motor		check										every 2000 hrs	61		
25	Injection pump		check										every 3000 hrs	61	*4	@
26	Radiator system		rinse										every 2 years	62		
27	Fuel line and Intake air line		check				○				○		every 200 hrs	53		@
			replace										every 2 years	64	*3	

∗ 500 thru 1000 continued to the following table.

No.	Check points		Intervals	Hour meter indicator								Consequently	Ref. page		
				500	550	600	650	700	750	800	1000				
1	Coolant		check	Daily check									42		
			change									every 2 years	62		
2	Fuel		check	Daily check									43		
3	Engine oil		check	Daily check									44		
			change		○					○		every 250 hrs	55		
4	Hydraulic oil		check	Daily check									44		
			change								○	every 1000 hrs	58	*1	
5	Lubrication points		-	Daily check									45		
6	Radiator and oil cooler		check	Daily check									46		
7	Washer liquid (CAB type)		check	Daily check									47		
8	Engine and electrical wiring		check	Daily check								every year	47		
9	Fuel tank, Fuel filter		drain	○	○	○	○	○	○	○	○	every 50 hrs	48		
10	Battery condition		check	○	○	○	○	○	○	○	○	every 50 hrs	48		
11	Greasing swing bearing teeth		-	○	○	○	○	○	○	○	○	every 50 hrs	50		
12	Fan belt tension		adjust			○				○	○	every 200 hrs	50		
13	Radiator hoses and clamps		check			○				○	○	every 200 hrs	51		
			replace									every 2 years	61		
14	Air filter element	Outer element	clean			○				○	○	every 200 hrs	52	*2	@
			replace								○	every 1000 hrs	60	*2	
		Inner element	replace								○	every 1000 hrs	60	*2	
15	Greasing swing ball bearings		-			○				○	○	every 200 hrs	53		
16	Fuel filter element		replace							○		every 400 hrs	56		@
17	Engine oil filter	KX91-3,U35	replace		○					○		every 250 hrs	56		
		KX121-3,161-3			○							every 500 hrs	57		
18	Drive unit oil		change									every 500 hrs	57		
19	Hydraulic return filter element		replace						○			every 500 hrs	58		
20	Hydraulic section filter element		replace								○	every 1000 hrs	59		
21	Filter in the pilot hydraulic system		replace								○	every 1000 hrs	60		
22	Fuel injection nozzle injection pressure		check									every 1500 hrs	61	*4	@
23	Front idler and track roller oil		change									every 2000 hrs	61		
24	Alternator and starter motor		check									every 2000 hrs	61		
25	Injection pump		check									every 3000 hrs	61	*4	@
26	Radiator system		rinse									every 2 years	62		
27	Fuel line and Intake air line		check			○				○	○	every 200 hrs	53		@
			replace									every 2 years	64	*3	

No.	Items	Period	Indication on hour meter							Since then	Refer ence. page	
			50	100	150	200	250	300	350			
1	Inner air filter	clean				○				every 200 hrs	53	*2
		replace								every 1000 hrs	53	*2
2	Fresh air filter	clean				○				every 200 hrs	54	*2
		replace								every 1000 hrs	54	*2
3	Air conditioner condenser	clean				○				every 200 hrs	55	
4	Air conditioner drive belt	check				○				every 200 hrs	55	
5	Air conditioner pipes and hoses	check								every 1year	61	
		replace								every 2 years	62	
6	Refrigerant (gas)	check								service as required	64	

No.	Items	Period	Indication on hour meter							Since then	Refer ence. page	
			400	450	500	550	600	650	700			
1	Inner air filter	clean	○				○			every 200 hrs	53	*2
		replace								every 1000 hrs	53	*2
2	Fresh air filter	clean	○				○			every 200 hrs	54	*2
		replace								every 1000 hrs	54	*2
3	Air conditioner condenser	clean	○				○			every 200 hrs	55	
4	Air conditioner drive belt	check	○				○			every 200 hrs	55	
5	Air conditioner pipes and hoses	check								every 1 year	61	
		replace								every 2 years	62	
6	Refrigerant (gas)	check								service as required	64	

IMPORTANT :

◉ First operation

*1 When using a hydraulic breaker, change hydraulic oil and return filter according to the table on "Hydraulic Oil Change (Including Exchange of the Suction Filter in the Hydraulic Tank) under "EVERY 1000 SERVICE HOURS" in the chapter "REGULAR CHECKS AND MAINTENANCE WORK".

*2 Clean and replace the air filter more frequently if used under dusty conditions. By heavy soiling, replace the filter.

*3 Replace only if necessary.

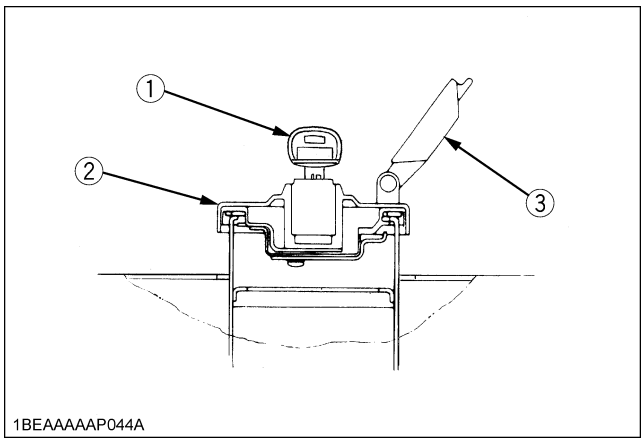
*4 Consult your local KUBOTA Dealer for this service.

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

OPENING AND CLOSING OF PARTS

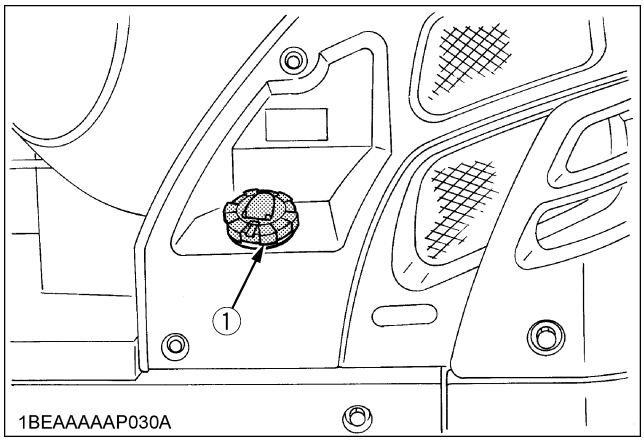
■Opening and Closing of the Fuel Tank Cap

1. Open the tank cap cover, insert the starter key and turn counterclockwise. Then turn the tank cap counterclockwise to open.



(1) Starter key
(2) Fuel tank cap
(3) Tank cap cover

2. To close the tank cap, turn clockwise and turn clockwise the starter key. Then close the tank cap cover.



(1) Fuel tank cap

■Opening/Closing of the Engine Hood

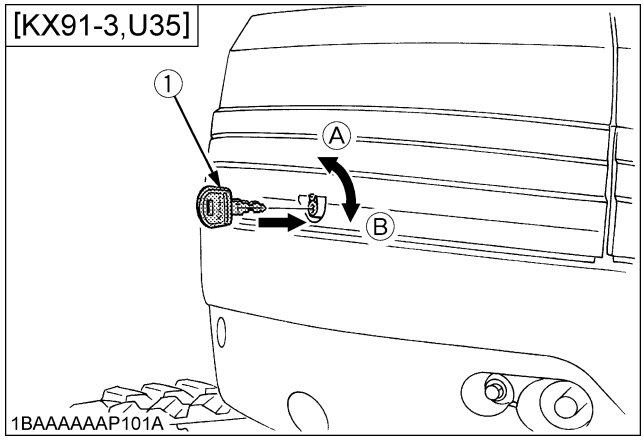
CAUTION

To avoid personal injury:

- **Do not open the engine hood with the engine running unless in an emergency.**
- **Do not touch the exhaust muffler or the exhaust pipe; serious burns can occur.**

[KX91-3,U35]

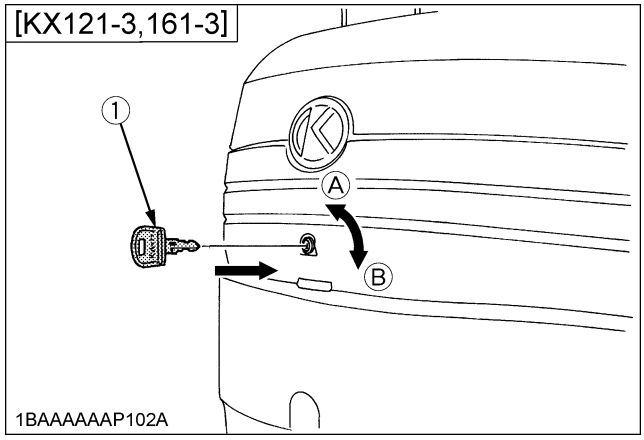
Insert the key into the key hole and turn it counterclockwise to open the hood. To close it, lower the bonnet and hold it down tightly. Turn the key clockwise to lock the hood.



(1) Key
(A) Unlock
(B) Lock

[KX121-3,161-3]

Insert the key into the key hole and turn it clockwise to unlock it. And press the button to open the hood. To close it, lower the hood and hold it down tightly. Turn the key counterclockwise to lock the hood.



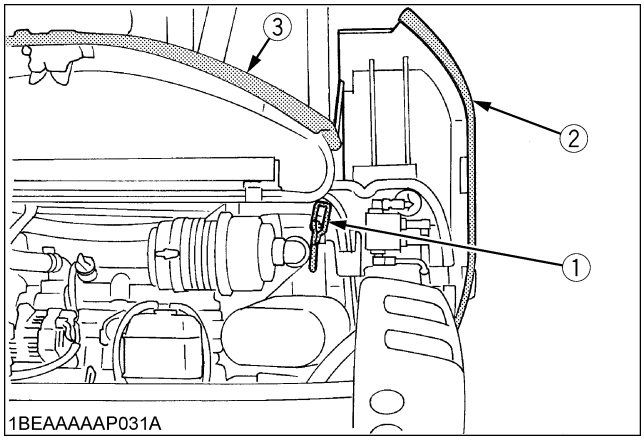
(1) Key
(A) Lock
(B) Unlock

■Opening/Closing of the Side Hood

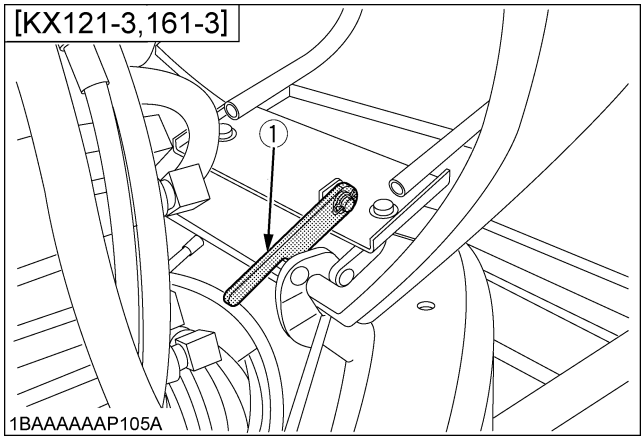
1. Raise the catch lever to unlock the side hood.
2. Push the side hood all the way forward, and it will be held by a restraint cable.
3. For closing pull the side hood all the way back, and pull down the catch lever to lock the side hood.

[KX121-3,161-3]

4. When closing, first lift the side hood and then release the catch hook.



(1) Catch lever (3) Rear Hood
(2) Side hood

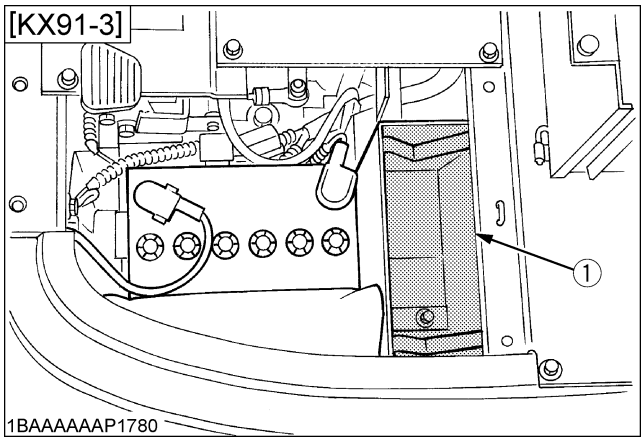


(1) Catch hook

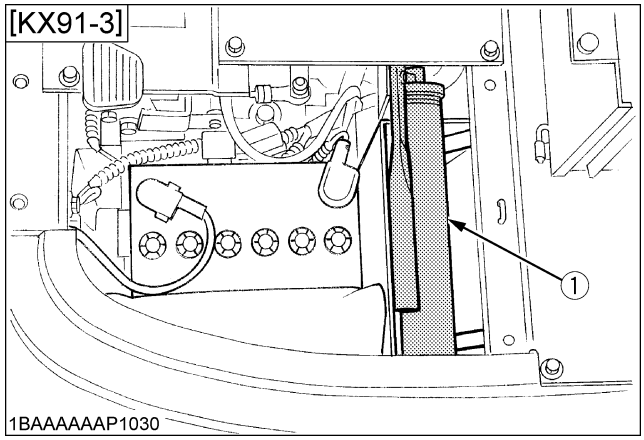
■Where to store the Tool and the Grease Gun

[KX91-3]

1. Remove the mat and the cover of left side step.
2. Store the tools or grease gun in the storage box.



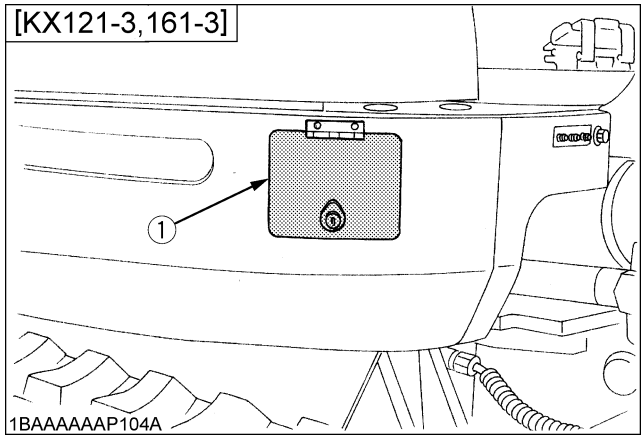
(1) Box for storage



(1) Grease gun (Option)

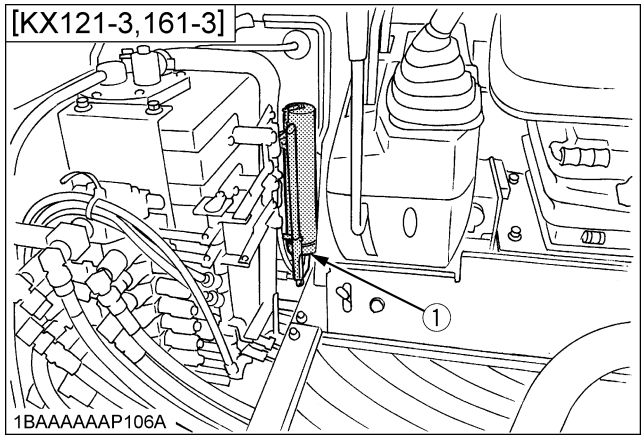
[KX121-3,161-3]

1. Insert the key into the key hole and turn it counterclockwise to open the cover.
2. Store the tools in the storage box.



(1) Box for storage

1. Open the engine hood and side hood.
2. Store grease gun.

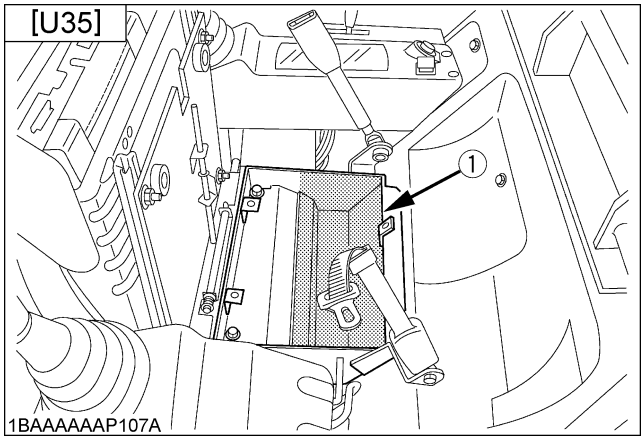


(1) Grease gun (Option)

Take note storage direction of greased gun in above illustration.

[U35]

1. Pull the seat lock lever and tilt over the seat forward.
2. Store the tools in the storage box.



(1) Tool box

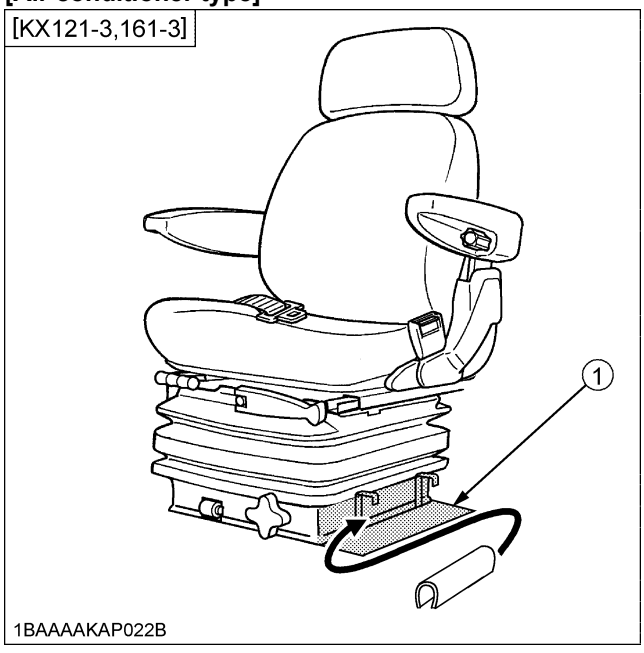
CAUTION

To avoid personal injury:

- **Stop the engine and remove the key before tilt over seat.**

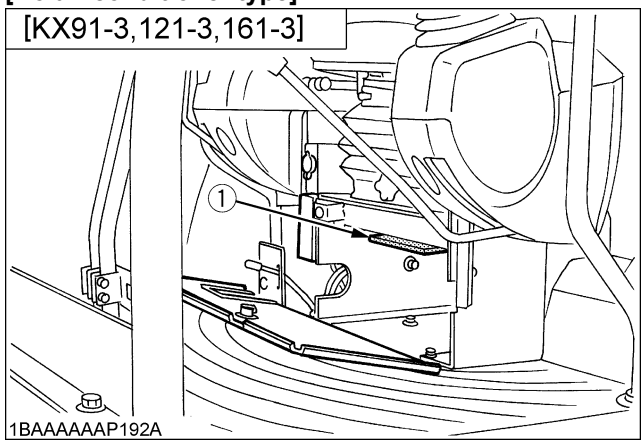
■Where to keep Operators Manual

[Air conditioner type]

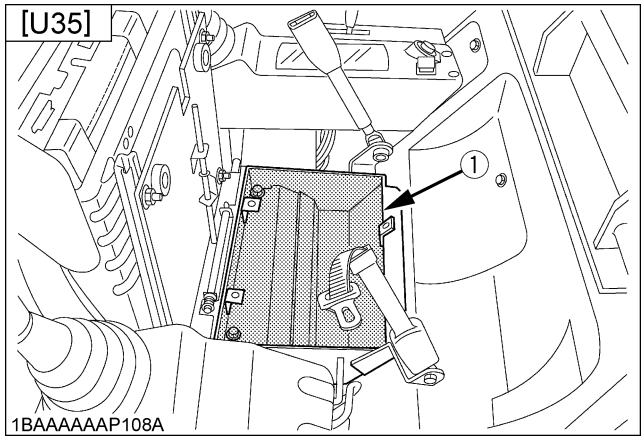


(1) Operator's manual storage

[No air conditioner type]



(1) Operator's manual storage



(1) Operator's manual storage

DAILY CHECKS

For your own safety and to assure the long life span of your machine, a careful check should be made before each operation.

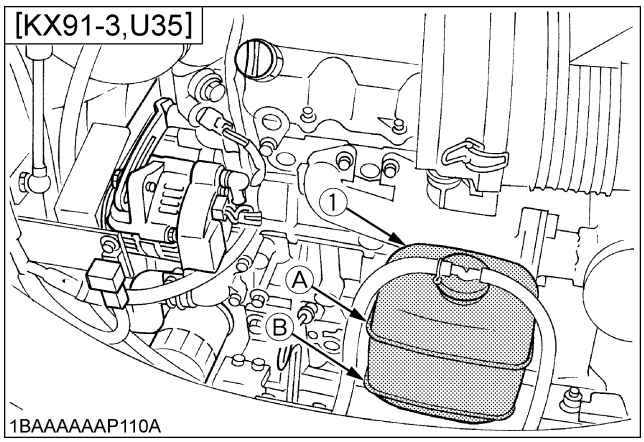
■Checking Coolant Level

CAUTION

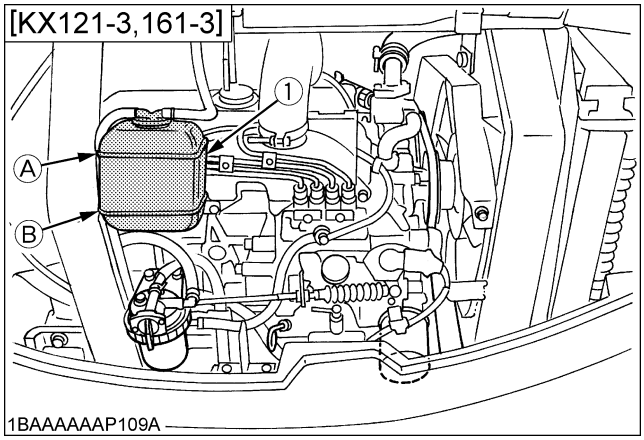
To avoid personal injury:

- **Move the excavator on even ground.**
- **Make sure that the engine is turned off.**
- **Do not open the radiator cap right after the engine has been stopped; Serious burns can occur from hot coolant escaping under pressure.**
- **Check the coolant level in the reserve tank only after the engine has cooled down.**
- **Remove the radiator cap only if absolutely necessary.**

1. Check to see that the coolant level is between the "FULL" and "LOW" marks of a reserve tank.
2. When the coolant level drops due to evaporation, add water only up to the full level.
   In case of leakage, add anti-freeze and water in the specified mixing ratio up to the full level.
   (See "Changing Radiator Coolant " in every 2 years maintenance.)



(1) Reserve tank (A) "FULL" (B) "LOW"



(1) Reserve tank (A) "FULL" (B) "LOW"

IMPORTANT :
- Do not fill the reserve tank over the "FULL" marking.
- Do not fill with dirty or salty water.

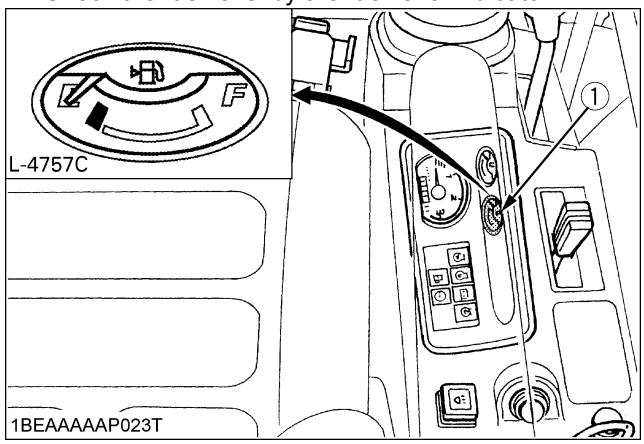
■Checking Fuel Level

CAUTION

To avoid personal injury:
- **Stop the engine and remove the key before fuelling.**
- **Do not smoke while fuelling.**

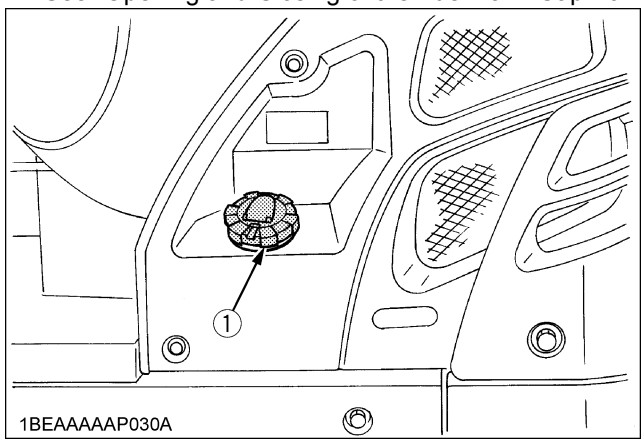
IMPORTANT :
- By temperatures over -5℃ (23℉), use No.2-D diesel fuel, while by temperatures under -5℃ (23℉), use No.1-D diesel fuel.
- Make sure that the fuel tank is not run empty. Air enters the fuel system, and must be purged before restarting.
- To prevent condensation (water) accumulations in the fuel tank, fill the fuel into the tank before parking overnight.
- Always fill up the fuel after a day's work.
- See "PURGING OF THE FUEL SYSTEM" in "OTHER ADJUSTMENTS AND REPLACEMENTS"

1. Check the fuel level by the fuel level indicator.



(1) Fuel level indicator

2. Open the tank cap with the starter key, and fill with fuel.
- See "Opening and Closing of the Fuel Tank Cap"40



(1) Fuel tank cap

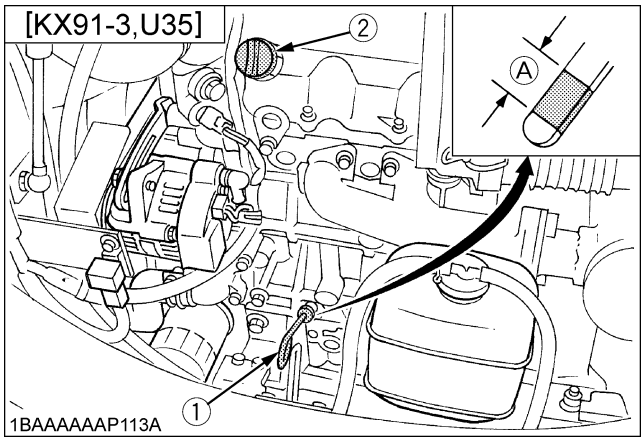
■Checking Engine Oil Level

CAUTION

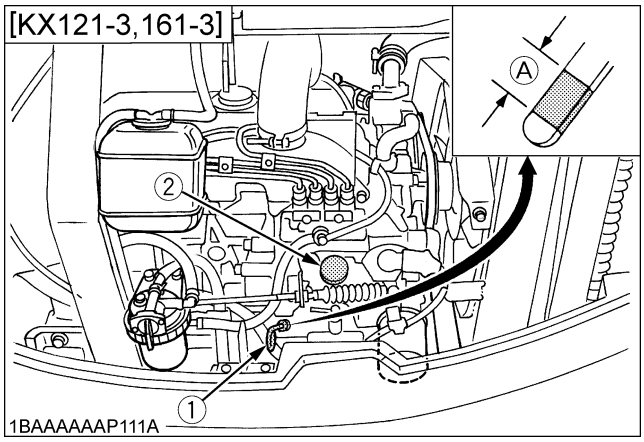
To avoid personal injury:

- **Stop the engine and remove the key before checking the oil level.**

Insert the oil gauge rod fully into the respective port opening, remove again and check the oil level; if necessary fill with oil. The machine must be on level ground when checking the oil level.



(1) Oil gauge rod
(2) Filling port
(A) Oil level is acceptable within this range.



(1) Oil gauge rod
(2) Filling port
(A) Oil level is acceptable within this range.

IMPORTANT :

- Use engine oil with the correct viscosity. (according the outside temperature)
- After stopping the engine and removing the key, wait five minutes and then check oil level. The excavator must be on level ground.

■Checking Hydraulic Oil Level

CAUTION

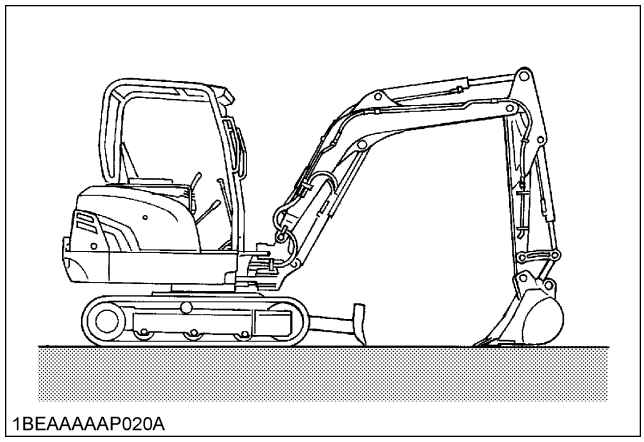
To avoid personal injury:

- **Stop the engine and remove the key before checking the oil level.**

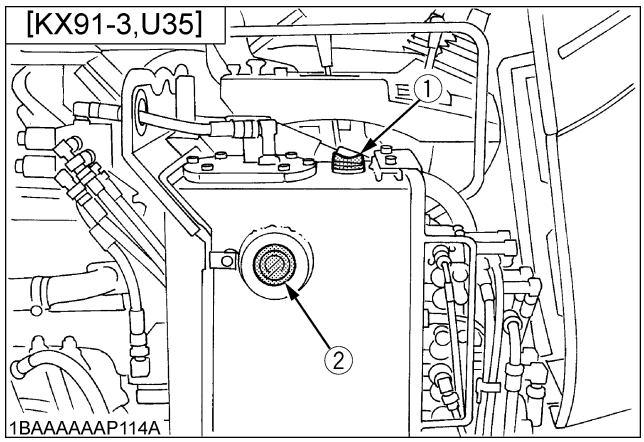
IMPORTANT :

- Before filling oil, wipe away all sand and dust from around the oil port. Make sure to use an identical type of hydraulic fluid.
- The excavator has been filled with hydraulic fluid before delivery. See "RECOMMENDED OILS". (Do not mix different makes.)

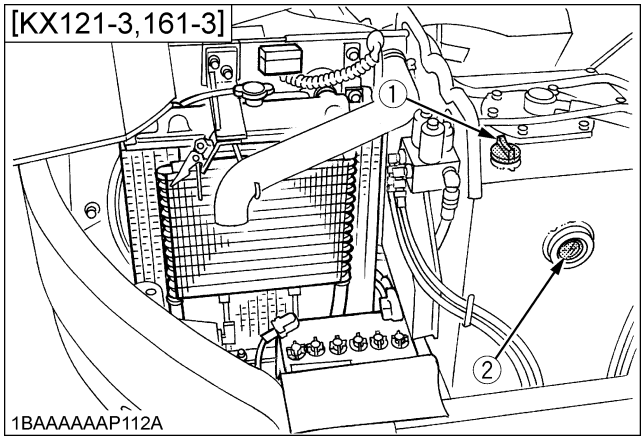
1. Park the excavator on a firm, flat and level surface. Lower the attachments and dozer blade to the ground and stop the engine.



2. Check the oil level as to whether it lies on the center of the gauge under normal temperature (10 to 30℃ (50 to 80℉)).
3. Enough oil is present if the oil level lies near the center of the gauge.
4. Should the oil level be too low, fill oil through the oil port before starting the engine. This step is important for the protection of the hydraulic system.



(1) Tank cap
(2) Gauge



(1) Tank cap (2) Gauge

■Lubrication Points

CAUTION

To avoid personal injury:

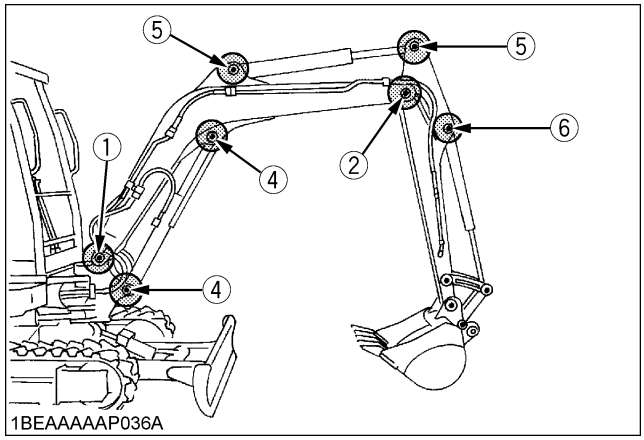
- **First lower all attachments to the ground then stop the engine and remove the key.**
- **While greasing, take caution not to step on the bucket teeth.**
- **When doing excavation work in water, generously grease the following points. After ending work, grease again.**

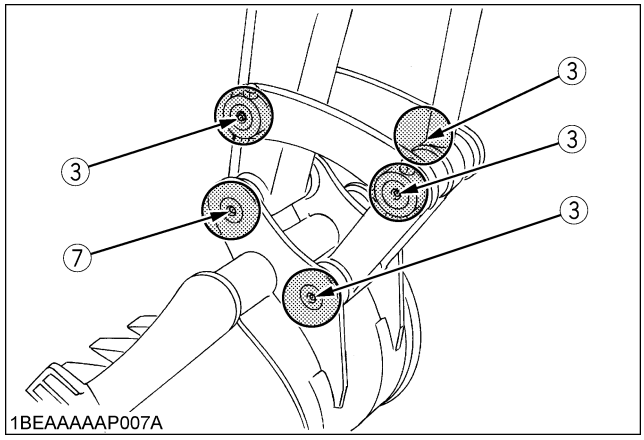
Grease the marked grease nipples shown by arrows in the illustration below.

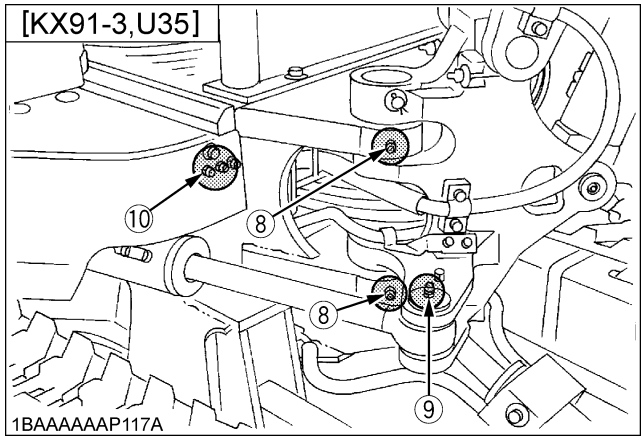
1.	Boom bottom linkage.....	1 place
2.	Arm bottom linkage.....	1 place
3.	Bucket link pin.....	4 places
4.	Boom cylinder boss.....	2 places
5.	Arm cylinder boss.....	2 places
6.	Bucket cylinder boss.....	1 place
7.	Fixing pin between arm and bucket.....	1 place
8.	Boom swing fulcrum.....	2 places
9.	Swing cylinder boss.....	1 place
10.	Swing cylinder pin.....	1 place
11.	Dozer cylinder boss.....	2 places
12.	Dozer linkage pin.....	2 places

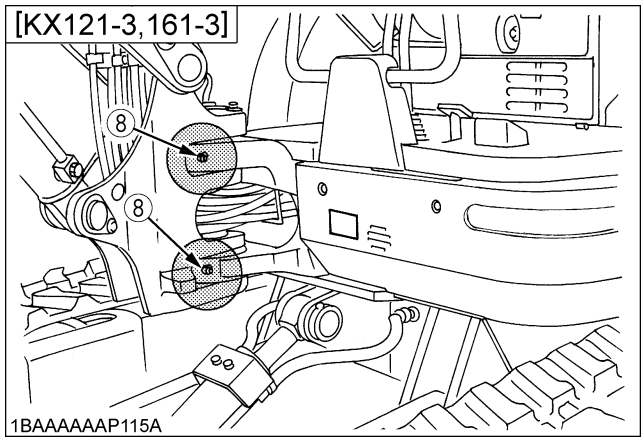
[KX121-3 Angle Blade]

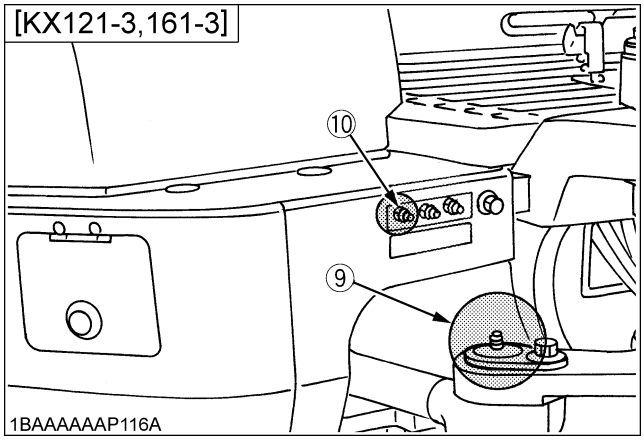
13.	Angle pin.....	1 place
14.	Angle cylinder boss.....	2 places

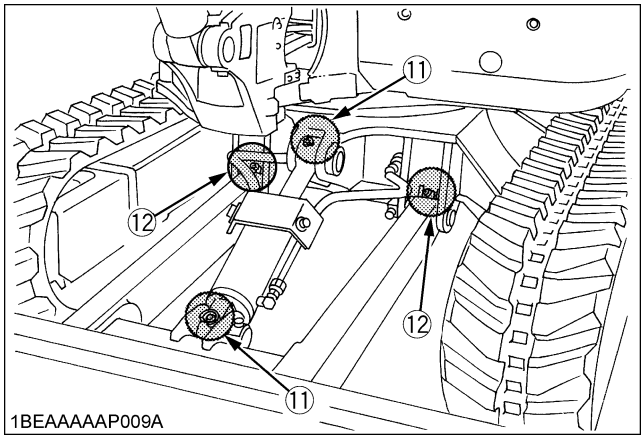


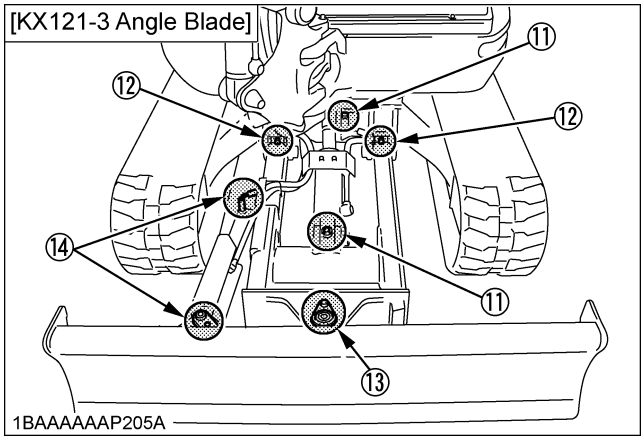












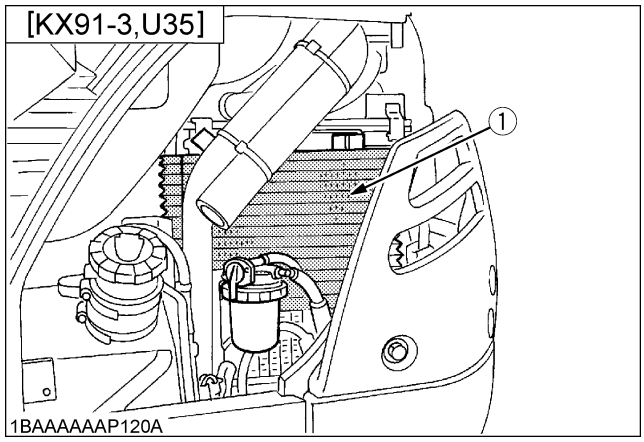
■Checking Radiator and Oil Cooler

CAUTION

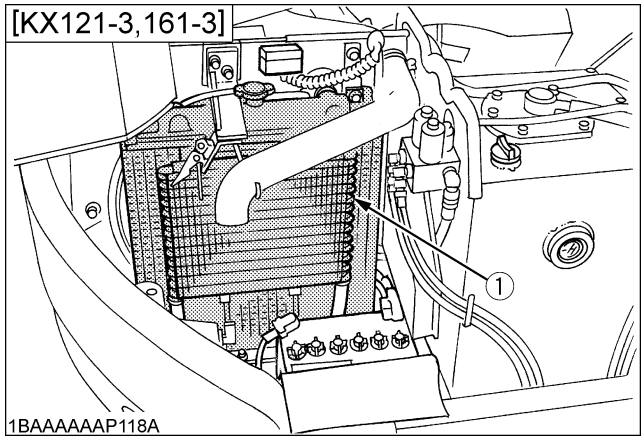
To avoid personal injury:

- **Always stop the engine and remove the key before checking the radiator.**
- **Wear eye protection when cleaning with compressed air.**

1. Check if the fins and ribs are clogged.
   If so clean with compressed air or steam.
2. Check the rubber hoses for damage and replace if cracked or old. Check if the hose clamps are tight enough.



(1) Radiator and oil cooler



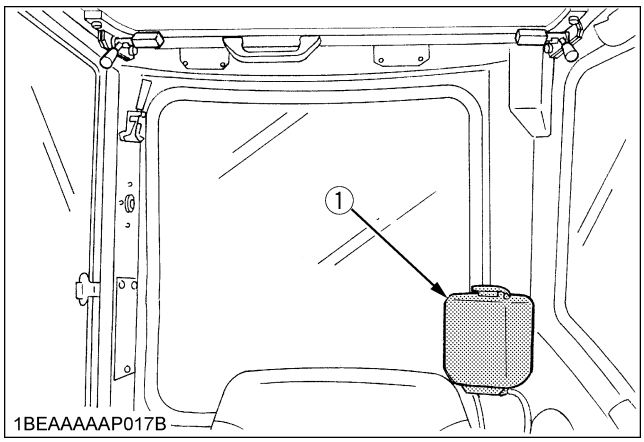
(1) Radiator and oil cooler

IMPORTANT :

- Radiator and oil cooler fins and ribs must be clean in order not to overheat the engine and allow free flow of air through the cooling elements.

■Checking Washer Liquid(only for CAB type)

If the windows washer is switched on with the washer liquid tank empty, the motor may be damaged. Always keep the tank filled.



(1) Washer liquid tank

■Checking and Cleaning Engine and Electrical Wiring

CAUTION

To avoid personal injury:

- **Always stop the engine and remove the key before cleaning the wiring, cables and engine.**

Before starting, check whether flammable substances have gathered on the battery, the cables and wiring, the muffler or on the engine. Remove thoroughly.
Check the electrical circuitry for disconnections, shorts or loose terminals.

■Washing Whole Machine

IMPORTANT :

- Do not wash the excavator with the engine running. Water could enter the air filter and damage the engine. Make sure that the air filter is kept dry.
- Remove the mat before washing the machine.

REGULAR CHECKS AND MAINTENANCE WORK

EVERY 50 SERVICE HOURS

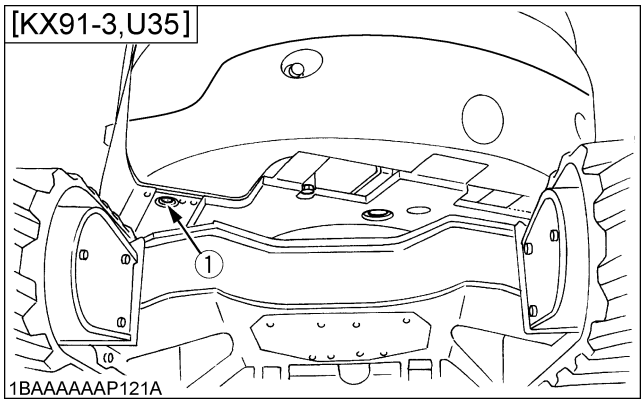
■Draining Fuel Tank

CAUTION

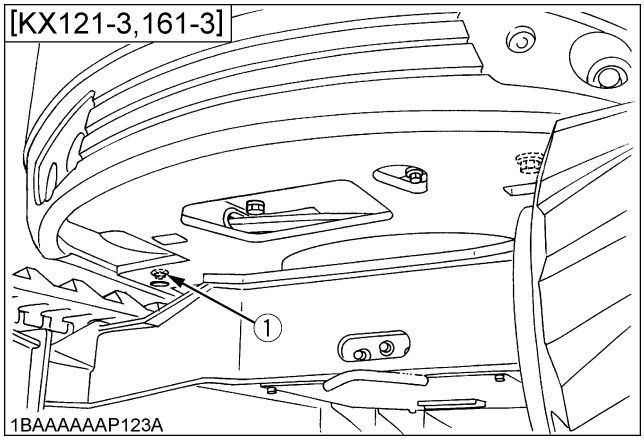
To avoid personal injury:

- **Before draining the fuel tank, be sure to stop the engine and remove the key.**
- **Do not smoke during inspection.**

1. Remove the drain plug on the underside of the body and drain water.
2. Re-tighten the drain plug.



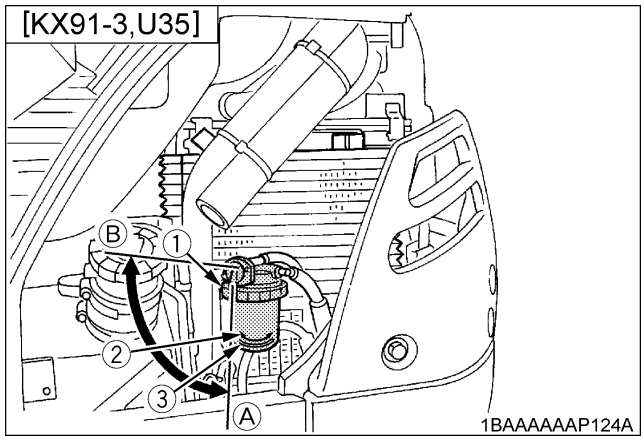
(1) Drain plug



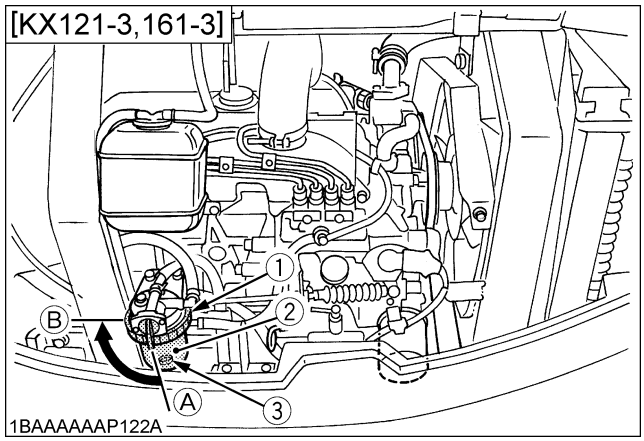
(1) Drain plug

■Draining Fuel Filter

1. Open the hood.
2. When the separated water is being drained, the red float moves upwards.
   When the float reaches the filter element, close the cock so that no fuel can run out. Now loosen the ring nut, and remove the cup and empty completely.
3. Clean carefully not to damage the filter element.
4. Finally, do not forget to open the cock and fix the left side cover.



(1) Ring nut (3) Float (A) "Open"
(2) Filter element (B) "Closed"



(1) Ring nut (3) Float (A) "Open"
(2) Filter element (B) "Closed"

■Battery

DANGER

To avoid the possibility of battery explosion:
For the refillable type battery, follow the instructions below.

- **Do not use or charge the refillable type battery if the fluid level is below the LOWER (lower limit level) mark. Otherwise, the battery component parts may prematurely deteriorate, which may shorten the battery's service life or cause an explosion. Check the fluid level regularly and add distilled water as required so that the fluid level is between the UPPER and LOWER levels.**

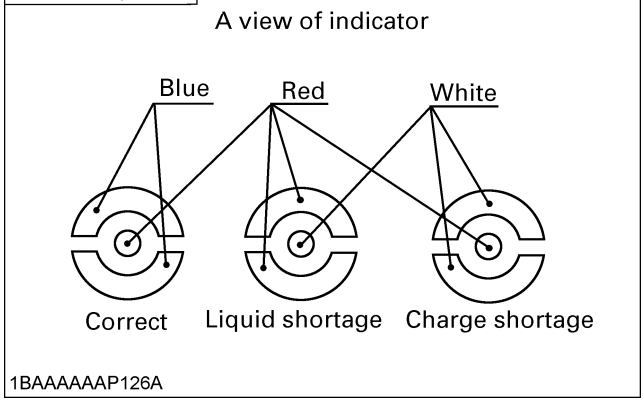
CAUTION

To avoid personal injury:

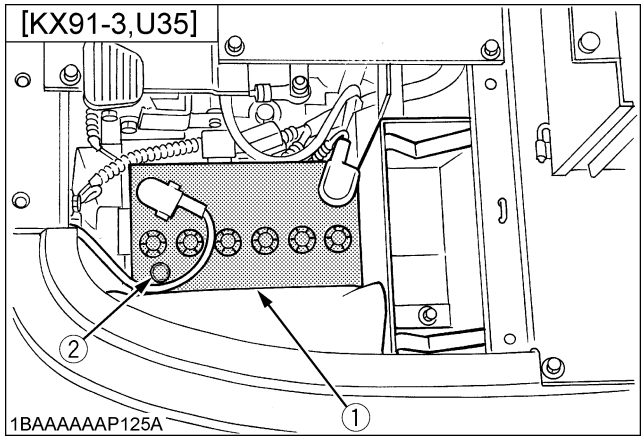
- **Never remove the vent caps while the engine is running.**
- **Keep electrolyte away from eyes, hands and clothes. If you are spattered with it, wash it away completely with water immediately and get medical attention.**
- **Wear eye protection and rubber gloves when working around the battery.**
- **Before inspection or dismounting the battery, be sure to turn of the engine and turn the starter switch to the "OFF" position.**
- **When removing the battery, always disconnect the negative ground cable first. When installing a battery, always connect the ground cable last. This prevents a possible explosion caused by sparks.**
- **Always wear eye protection when working with the battery.**

1. Remove the mat and cover of left side step, check the battery fluid level and add distilled water if necessary.
   [KX91-3,U35]
   Open the side hood, check the battery fluid level and add distilled water if necessary.
   [KX121-3,161-3]
2. If battery fluid be spilt, fill with sulfuric acid solution of the same concentration.
3. Clean the battery caps (ventilation holes) also.

[KX91-3,U35]

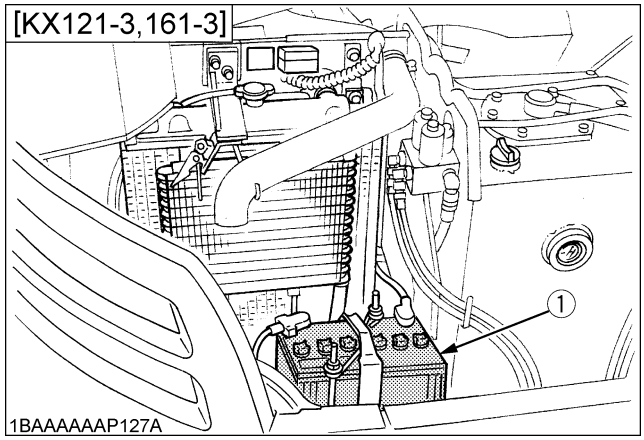


[KX91-3,U35]

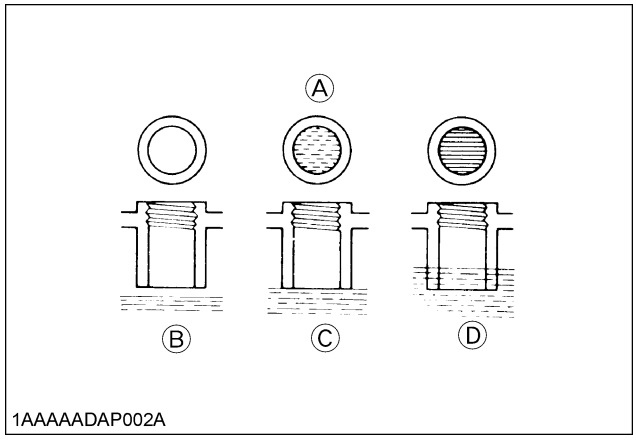


(1) Battery (2) Indicator [KX91-3,U35]

[KX121-3,161-3]



(1) Battery



(A) Battery fluid level (C) "Correct"
(B) "Too low" (D) "Too high"

■Battery Charging

CAUTION

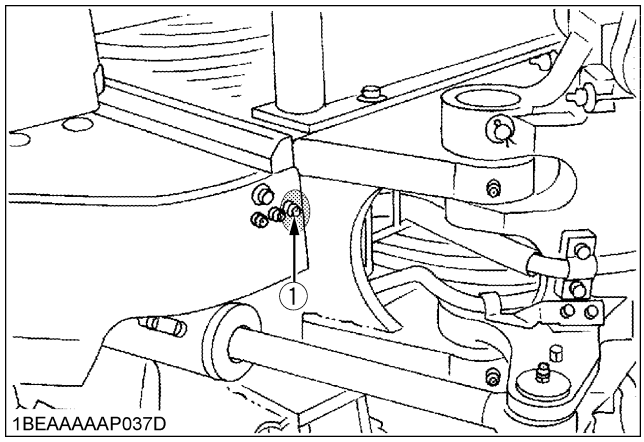
To avoid personal injury:

- **When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging the battery.**
- **When charging battery, make sure battery vent plugs are securely.**
- **When disconnecting the cable from the battery, start with the negative terminal first.**
  When connecting the cable to the battery, start with the positive terminal first.
- **Do not check battery charge by placing a metal object across the terminals.**
  Use a voltmeter or hydrometer.

1. Make sure each electrolyte level is to the bottom of vent wells. If necessary, add distilled water in a well-ventilated area.
2. The water in the electrolyte evaporates during recharging. Liquid shortage damages the battery. Excess liquid spillage damages the excavator.
3. To slow charge the battery, connect the battery positive terminal to the charge positive terminal and the negative to the negative, then recharge in the standard fashion.
4. A boost charge is only for emergencies. It will partially charge the battery at a high rate and in a short time.
   When using a boost-charged battery, it is necessary to recharge the battery as early as possible.
   Failure to do this will shorten the battery's service life.
5. When the specific gravity of electrolyte become between 1.27 and 1.29 charge has completed.
6. When exchanging an old battery into new one, use battery of equal specification.

■Greasing Swing Bearing Teeth

1. Fill with grease through the grease nipple (at the right end side).
2. Grease at each 90° (1.58 rad.) position of the swing frame.
3. Fill with approx. 50g of grease (approx. 20 to 30 pumps with the grease gun at each position).



(1) Grease nipple

EVERY 200 SERVICE HOURS

Do all 50-hour servicing at the same time.

■Checking Fan Belt Tension

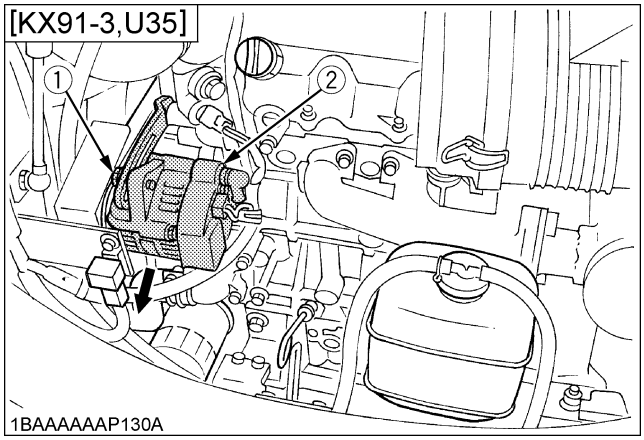
◆ **Check and adjustment of the fan belt tension**

CAUTION

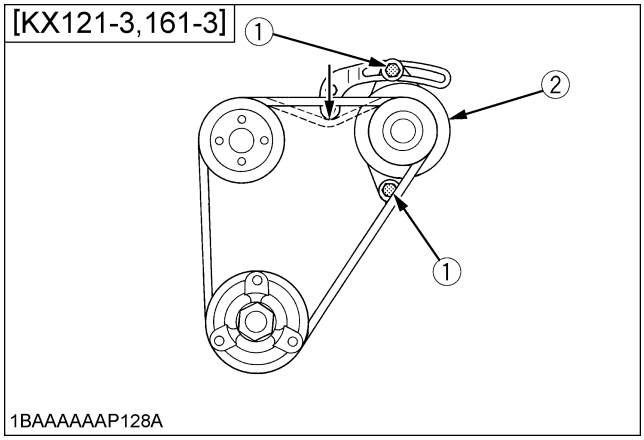
To avoid personal injury:

- **First stop the engine and remove the key.**
- **After servicing, make sure to replace the belt cover in its original position.**

1. Press the fan belt down in the middle, with a force of approx. 5kg(11 lbs.). The belt tension is correct if it deflects about 7mm(0.28 in). If otherwise, loosen bolt (1) shift the alternator (2) in the direction shown by the arrow.
2. Replace the fan belt if worn out, cracked or torn.



(1) Bolt
(2) Alternator



(1) Bolt
(2) Alternator

IMPORTANT :

- If the engine is run with a loose fan belt, the belt could slip and cause overheating of the engine or insufficient battery charging. Check fan belt tension regularly.
- Should the fan belt snap or jump off, the lamp for battery charge will light up. Stop the engine and remove the key immediately.

■Checking Radiator Hoses and Clamps

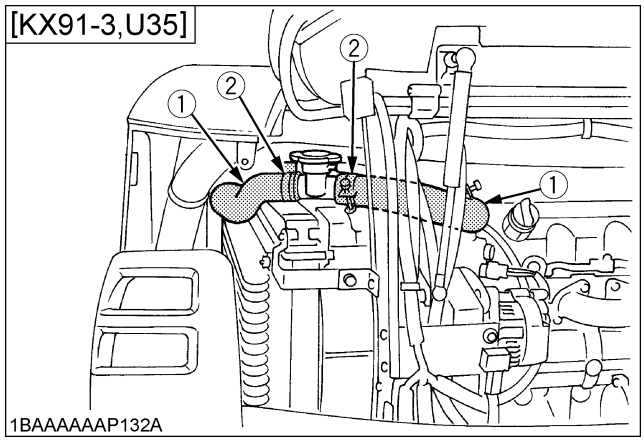
CAUTION

To avoid personal injury:

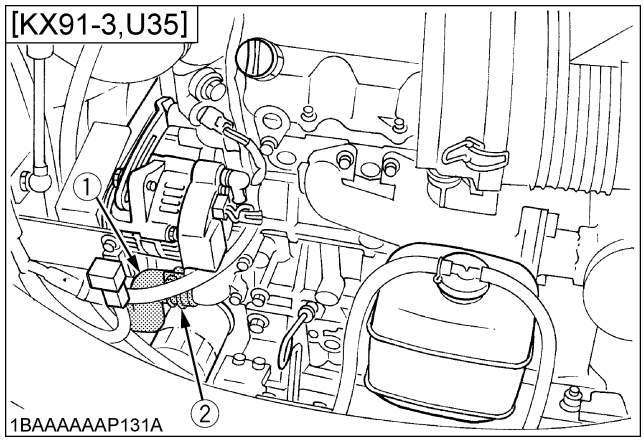
- **Wait long enough for the radiator coolant to cool down.**

Check the water hoses for proper connection. This check should be carried out every 200 hours or every 6 months, whichever comes first.

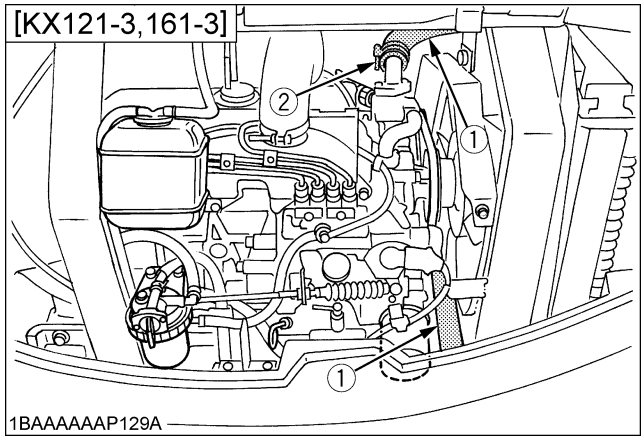
1. Should the hose clamps be loose or water leak, tighten the hose clamps properly.
2. Should the radiator hoses be swollen, aged or cracked, they must be replaced and the hose clamps tightened again properly.



(1) Radiator hoses (2) Hose clamps



(1) Radiator hoses (2) Hose clamps



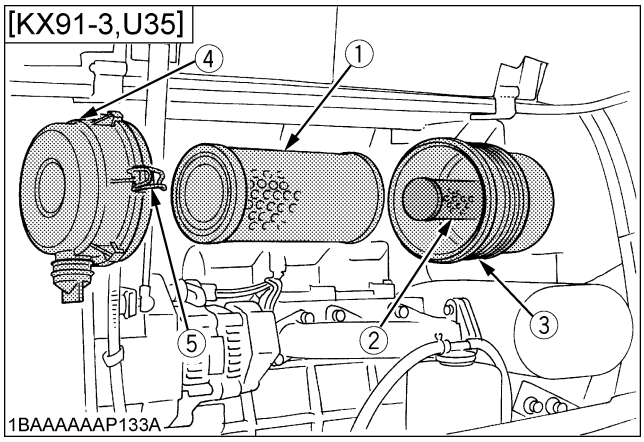
(1) Radiator hoses (2) Hose clamps

■Inspection and Cleaning Air Filter Element

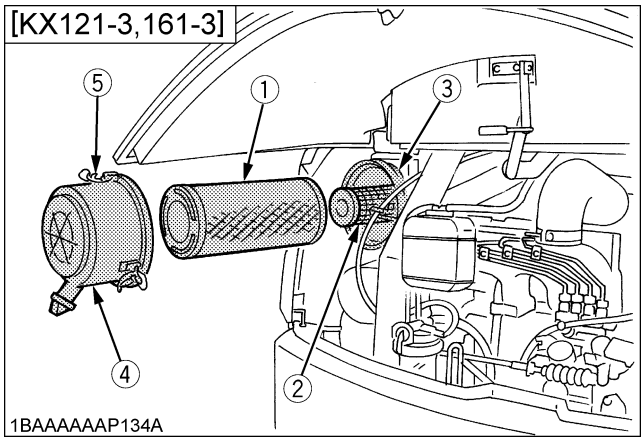
Open the engine cover and remove the dust cover. Take out only outer element, clean the element, case interior and reassemble. During reassembly, take care to install the dust cover with facing the TOP mark upwards. Do not remove the inner element (safety element).

IMPORTANT :

- Should the machine be used in extreme dusty areas, the air filter element must be inspected and cleaned more frequently than in the specified maintenance periods.
- The air filter has a dry element, keep free from oil.
- Do not run the engine without the air filter.



(1) Outer element
(2) Inner element (safety element)
(3) Case
(4) Dust cover
(5) Clamps



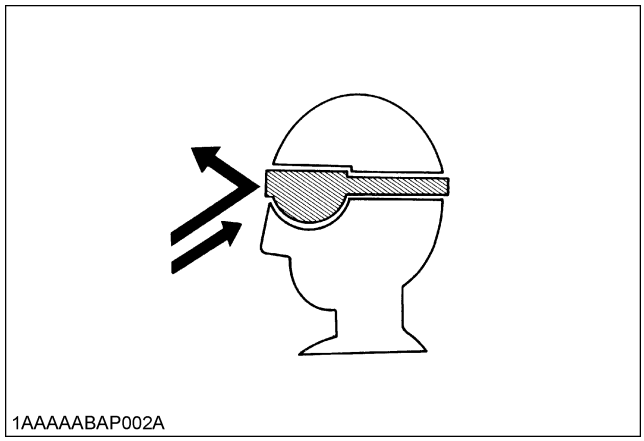
(1) Outer element
(2) Inner element (safety element)
(3) Case
(4) Dust cover
(5) Clamps

■Air Filter Maintenance

CAUTION

To avoid personal injury:

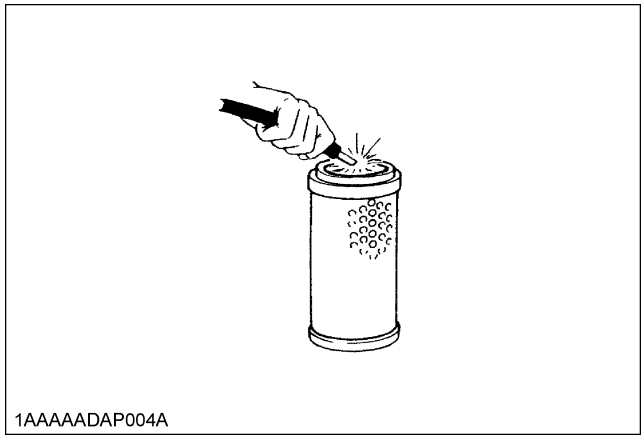
- **Wear eye protection.**



The quickest and safest method of maintenance is the exchange of the paper cartridge. Furthermore there are different methods of cleaning the cartridge.

◆ **Cleaning with compressed air**

Pressure of compressed air must be under 205kPa(2.1kgf/㎠, 30psi), and the cartridge should be blown clean from the inside to the outside until the dust deposits are noticeably reduced.

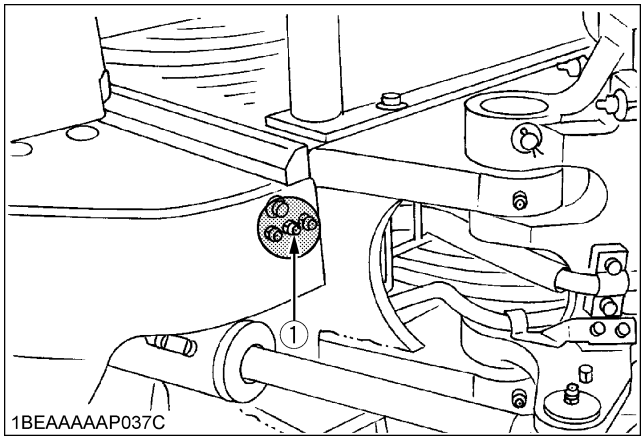


IMPORTANT :

- If the air suction is still inadequate, or the color of the exhaust gases is abnormal even after the cleaning, the air filter cartridge must be replaced.

■Greasing Swing Bearing

1. Fill with grease through the respective grease nipple.
2. Grease at each 90° (1.58 rad.) position of the swing frame.



(1) Grease nipple

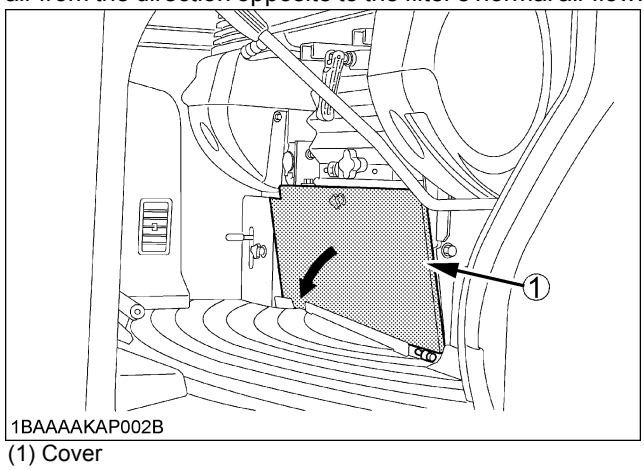
■Checking Fuel Line and Intake Air Line

1. Check to see that all lines and hose clamps are tightened and not damaged.
2. If hoses and clamps are found worn or damaged, replace or repair them at once.

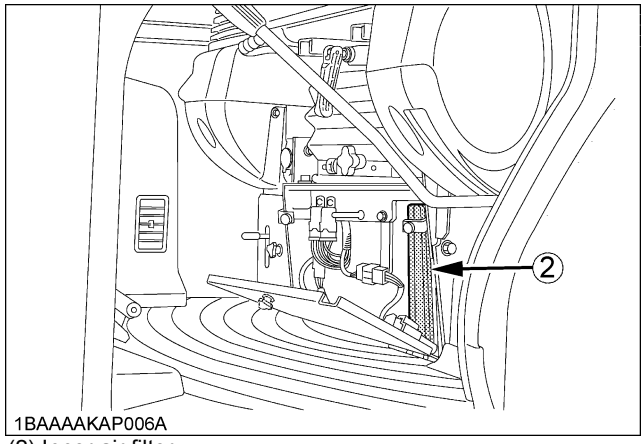
AIR CONDITIONER(EVERY 200 SERVICE HOURS)

■Cleaning Inner Air Filter

Open the cover and remove the inner air filter, and blow air from the direction opposite to the filter's normal air flow.



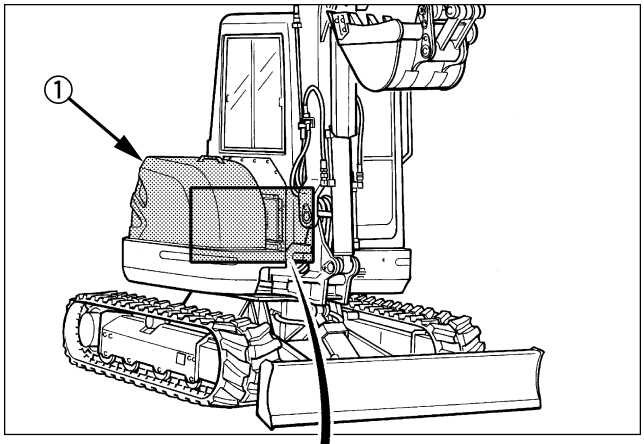
(1) Cover

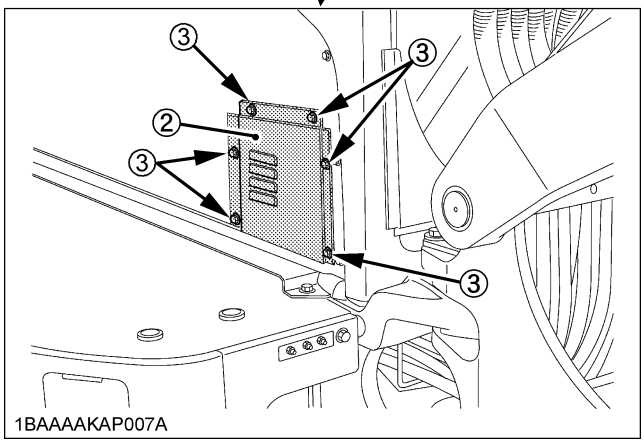


(2) Inner air filter

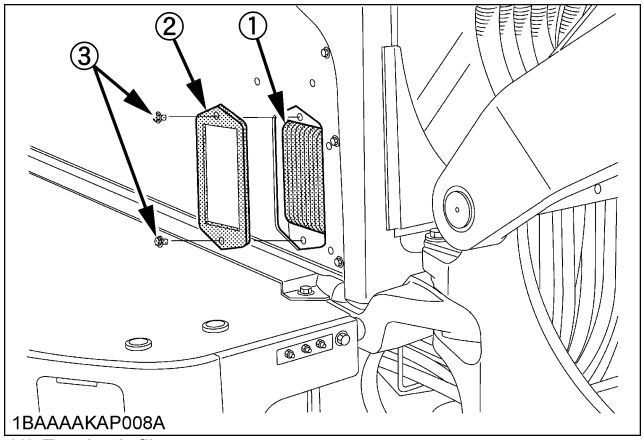
■Cleaning Fresh Air Filter

Remove the bonnet, and then remove the bolts and pull out filter.





(1) Bonnet
(2) Cover
(3) Bolt



(1) Fresh air filter
(2) Plate
(3) Bolt

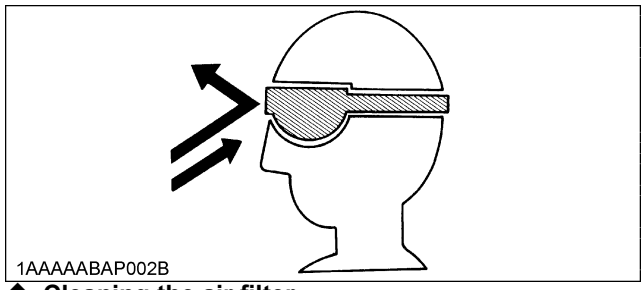
NOTE :

- Attach the filter, plate and cover as illustration.

CAUTION

To avoid personal injury:

- **Wear eye protection.**

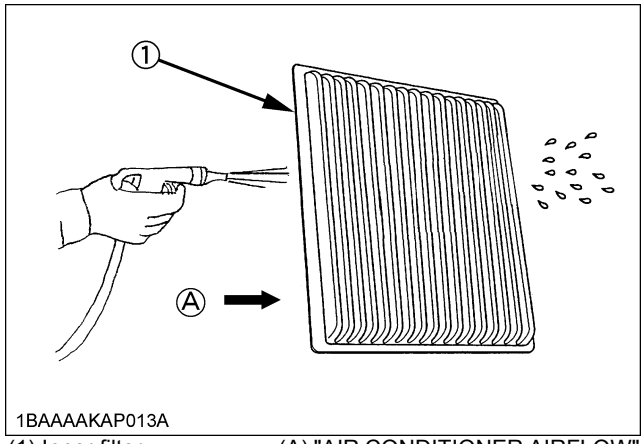


◆ **Cleaning the air filter**

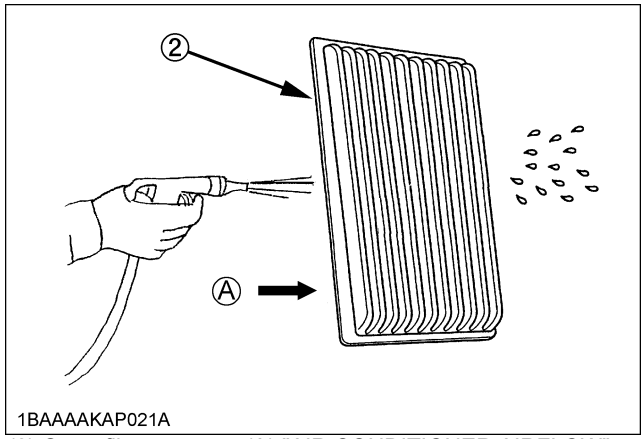
- Normal use
  Blow air from the opposite direction to the filter's normal air flow.

IMPORTANT :

- Do not hit the filter. If the filter becomes deformed, dust may enter into the air-conditioner, which may cause damage and malfunction.



(1) Inner filter (A) "AIR CONDITIONER AIRFLOW"



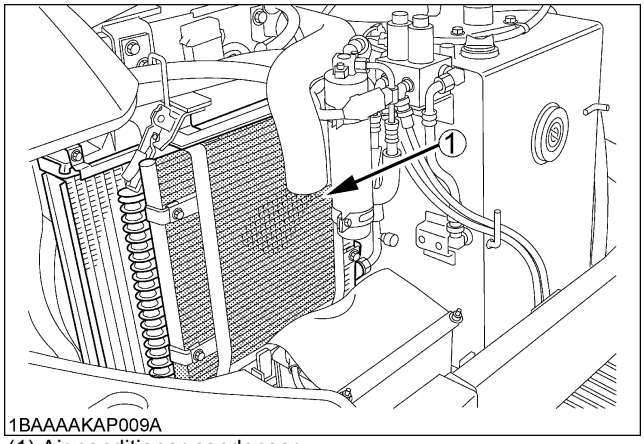
(2) Outer filter (A) "AIR CONDITIONER AIRFLOW"

NOTE :

- Pressure of compressed air must be under 205kPa(2.1kgf/㎠, 30psi).
- If the filter is very dirty, replace the air filter.

■Checking Air-Conditioner Condenser

Check air conditioner condenser to be sure it is clean from debris.



(1) Air conditioner condenser

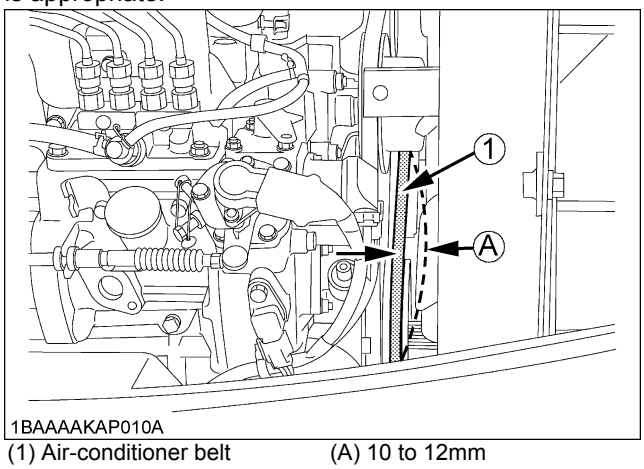
■Checking Air-Conditioner Belt Tension

CAUTION

To avoid personal injury:

- **First stop the engine and remove the key.**
- **After servicing, make sure to replace the belt cover in its original position.**

Push on the belt between the pulleys with a finger. A deflection of 12 to 15 mm(0.5 to 0.6 in.) under a 7 kg-f load is appropriate.



(1) Air-conditioner belt (A) 10 to 12mm

NOTE :

- If the air-conditioner belt is too loose, consult your local KUBOTA Dealer for this service

EVERY 250 SERVICE HOURS

Do all 50 hour servicing at the same time.

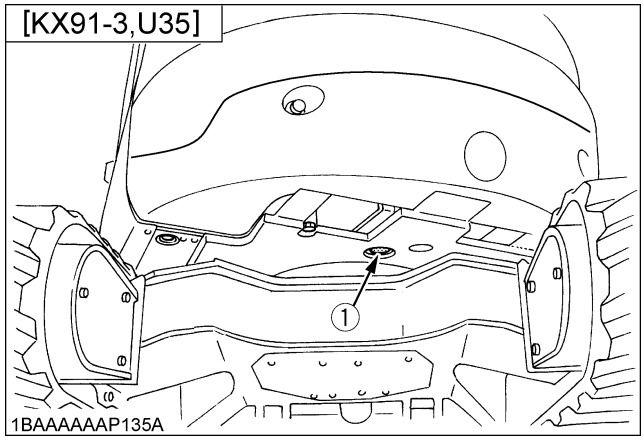
■Changing Engine Oil(First Engine Oil Change after 50 Service Hours)

CAUTION

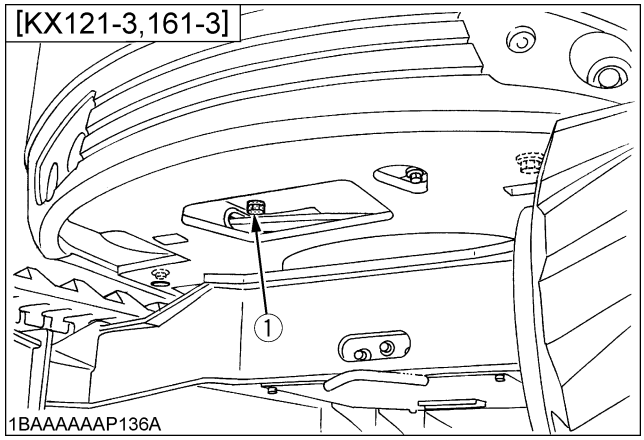
To avoid personal injury:

- **First stop the engine then remove the key and wait long enough for the oil to cool down.**

1. Remove the drain plug on the underside of the engine and drain all oil.
2. Re-tighten the drain plug.

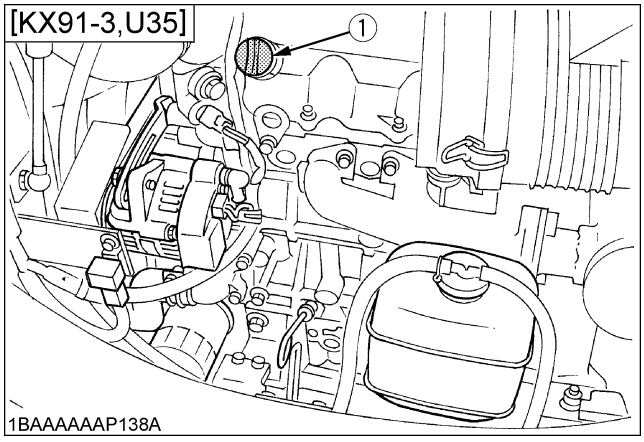


(1) Drain plug

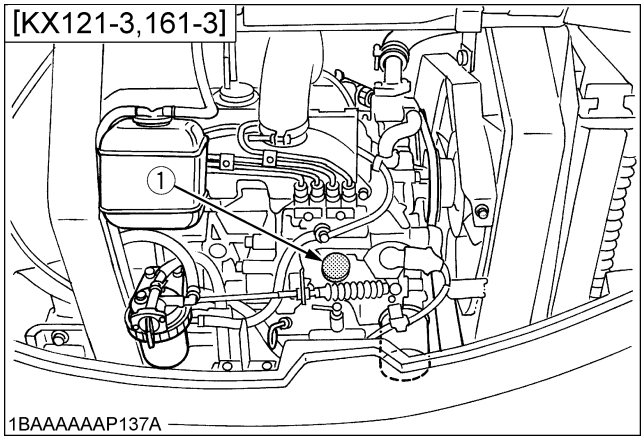


(1) Drain plug

3. Fill through the filling port up the specified level.



(1) Oil filling port



(1) Oil filling port

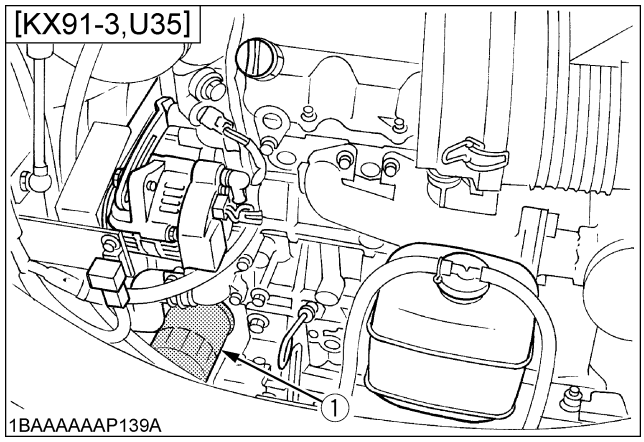
4. Let the engine idle for approx. 5 min. Check the engine oil level. To check the engine oil level, insert the dipstick completely into the respective port opening and pull out again. If the oil level lies between both markings, no oil must be added.

IMPORTANT :
- Regardless of the service hours, an engine oil change is due every six months.

■Replacing Engine Oil Filter

[KX91-3,U35]

1. Replace the oil filter cartridge at the same time as doing the engine oil change.
2. Remove the cartridge with the supplied filter wrench.



(1) Oil filter

3. Oil the O-ring of the new oil filter cartridge lightly. Then tighten the oil filter cartridge by hand.
4. Fill engine oil to the specified level.
5. Let the engine run for approx. 5 min. and make sure that the engine oil control lamp does not light up. Then stop the engine and remove the key.
6. The engine oil level is reduced by the amount of the filter capacity after the engine is started. It is necessary to add oil.

IMPORTANT :
- Always check the oil level after having exchanged the filter.

Engine oil volumes (with engine oil filter)	5.9L (1.56 US gal.)

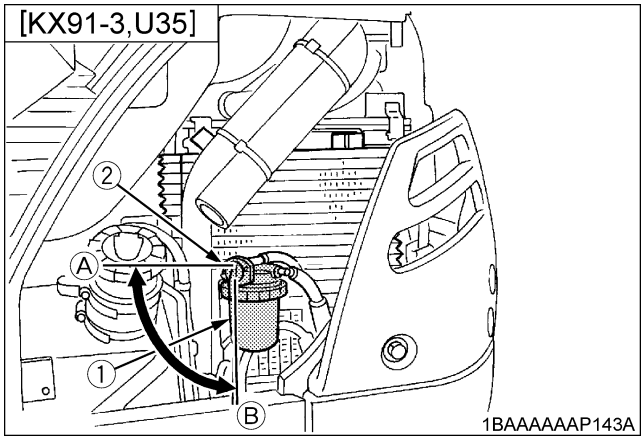
EVERY 400 SERVICE HOURS

■Replacing Fuel Filter element

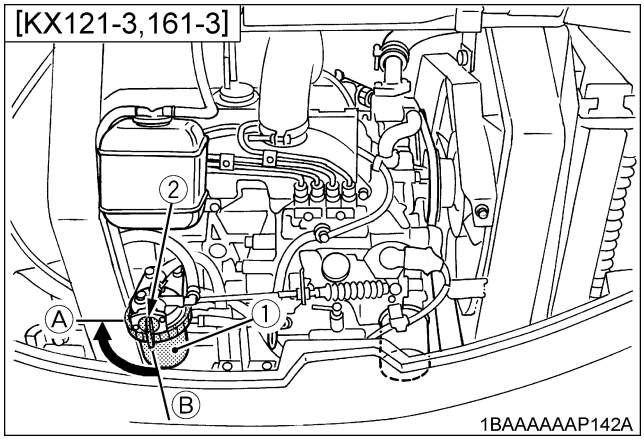
CAUTION

To avoid personal injury:
- **Keep fire away.**

1. Close the cock of the fuel filter. Remove the filter with the supplied filter wrench.
2. Apply a light film of fuel to the seal of the new filter and turn in tightly by hand.
3. Open the cock of the fuel filter again.



(1) Fuel filter
(2) Cock of fuel filter
(A) "Closed"
(B) "Open"



(1) Fuel filter
(2) Cock of fuel filter
(A) "Closed"
(B) "Open"

IMPORTANT :
- After exchange of the filter, the fuel system must purged of air.

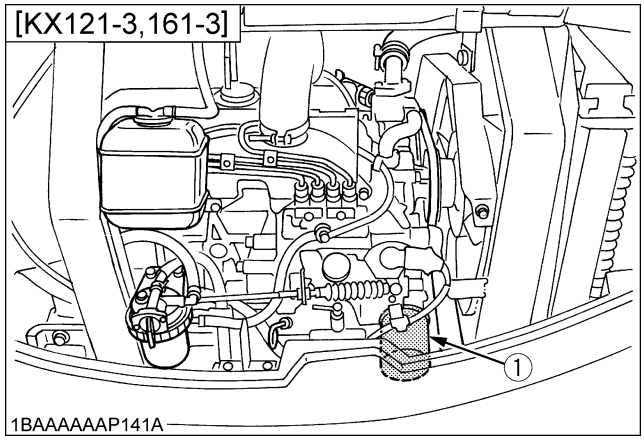
EVERY 500 SERVICE HOURS

Do all 50 and 250 hour servicing at the same time.

■Replacing Engine Oil Filter

[KX121-3,161-3]

1. Replace the oil filter cartridge at the same time as doing the engine oil change.
2. Remove the cartridge with the supplied filter wrench.



(1) Oil filter

3. Oil the O-ring of the new oil filter cartridge lightly. Then tighten the oil filter cartridge by hand.
4. Fill engine oil to the specified level.
5. Let the engine run for approx. 5 min. and make sure that the engine oil control lamp does not light up. Then stop the engine and remove the key.
6. The engine oil level is reduced by the amount of the filter capacity after the engine is started. It is necessary to add oil.

IMPORTANT :
- Always check the oil level after having exchanged the filter.

Engine oil volumes (with engine oil filter)	8.5L (2.25 US gal.)

■Drive unit Oil Change(First Oil Change of the 100 hours)

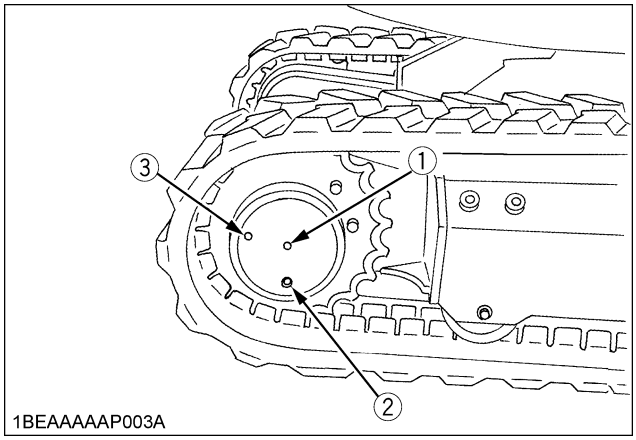
CAUTION

To avoid personal injury:
- **Lower attachments to the ground, stop the engine and remove the key before undertaking the oil change.**

1. Rotate the crawler so that the drain plug of the drive unit is in the bottom position.
2. Remove the drain plug to let the oil run out. Screw in and tighten the drain plug again and fill with gear oil through the oil check port.
3. Fill oil until it overflows out of the oil check port.

Oil change
- first oil change after 100 hrs
- then every 500 hrs
- or at least once a year

4. Use prescribed gear oil SAE 90.



(1) Oil check port
(2) Drain plug
(3) Oil filling port

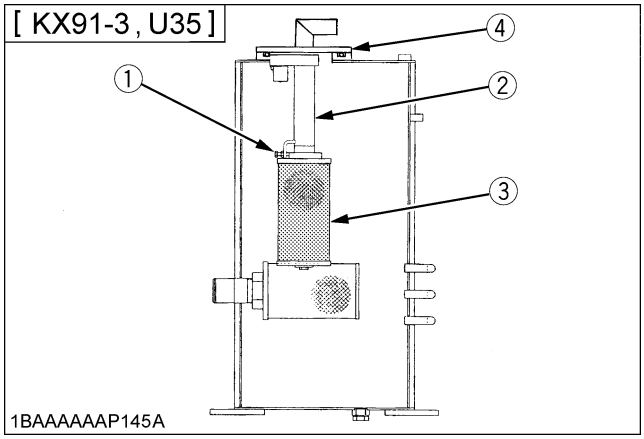
Gear oil volume	KX91-3 KX121-3 U35	approx. 0.5L (0.13 US gal.)
	KX161-3	approx. 0.9L (0.24 US gal.)

■Replacing Hydraulic Return Filter Element(first replacement after 250 service hours)

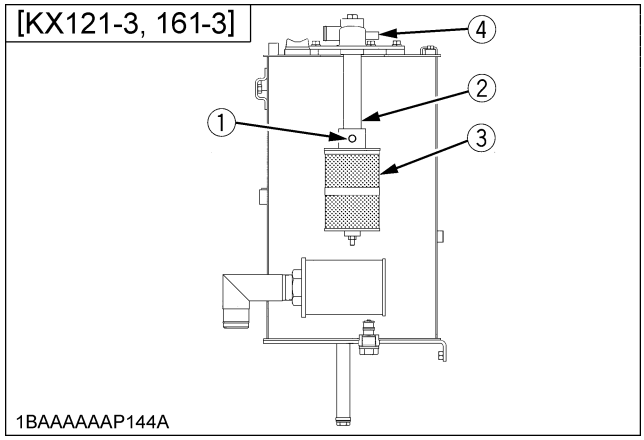
CAUTION

To avoid personal injury:

- **Remove the oil filter only after the oil in the hydraulic tank has cooled down.**



(1) Set bolt
(2) Filter support
(3) Return filter
(4) Cover



(1) Set bolt
(2) Filter support
(3) Return filter
(4) Cover

1. Remove the cover of the hydraulic tank.
2. Pull out the filter support by the top plate from the hydraulic tank.
3. Remove the return filter from the filter support with a fork wrench and exchange the filter.

IMPORTANT :

- Always check the oil level when replacing the filter.

EVERY 1000 SERVICE HOURS

Do all 50, 100, 200, 250 and 500 hour servicing at the same time.

■Hydraulic Oil Check for Machines with Hydraulic Breakers

The hydraulic oil change after 1000 operating hours in the operator's manual is based on the type of work done. Following inspection measures are valid when hydraulic breakers are used:

1. Changing and filling up of hydraulic oil
   (1) The hydraulic oil must be changed more often when breakers are used because the machine is subject to harder conditions than normal excavating work.
   (2) Use only the recommended oils mentioned in the operator's manual when changing or filling with oil.
   (3) When filling up oil, never mix oils of different makes.

2. Changing the return filter and oil
   (1) The filter must be changed more often because of contamination resulting from the frequent assembly and disassembly of the hoses.
   (2) Use the correct replacement filter.
   (3) Oil change according to operating hours.

		Hydraulic oil	Return Filter	Suction Filter
Normal excavator work		every 1000 Hrs.	500Hrs. (250Hrs. after first operation	1000 Hrs.
Breaker work portion	20%	evry 800 Hrs.	300 Hrs.	
	40%	evry 400 Hrs.		
	60%	evry 300 Hrs.	100 Hrs.	
	More than 80%	evry 200 Hrs.		

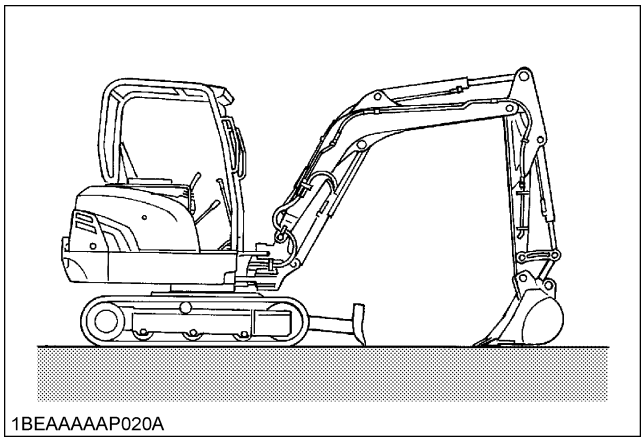
■Hydraulic Oil Change(Including Replacing Suction Filter in Hydraulic Tank)

CAUTION

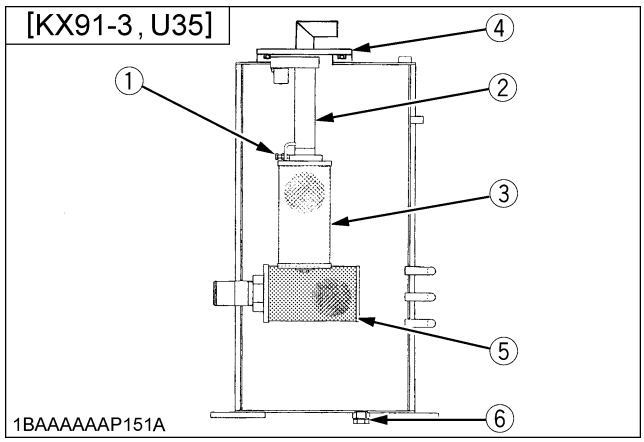
To avoid personal injury:

- **Wait long enough for the hydraulic fluid to cool down. Then begin with the change of the hydraulic fluid.**

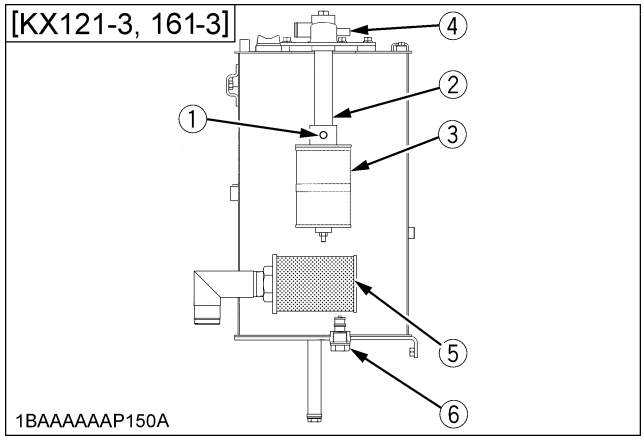
1. Park the excavator on a firm, flat and level surface. Lower the attachments and dozer blade to the ground and stop the engine.


1BEAAAAAP020A

2. Remove the drain plug on the underside of the hydraulic tank and drain the oil.



(1) Set bolt
(2) Filter support
(3) Return filter
(4) Cover
(5) Suction filter
(6) Drain plug



(1) Set bolt
(2) Filter support
(3) Return filter
(4) Cover
(5) Suction filter
(6) Drain plug with a magnet

3. Remove the cover of the hydraulic tank
4. With a fork wrench or similar, remove and replace the filter with new one.
5. Retighten the drain plug, and remove iron powder adhering to the magnet.
6. Fill oil through the oil filling opening on the top side of the tank.
7. Let the engine run for approx. 5 min. and check the oil level again.

IMPORTANT :
- Should dirt deposits be in the hydraulic tank, remove with the help of a clean cloth and light oil.

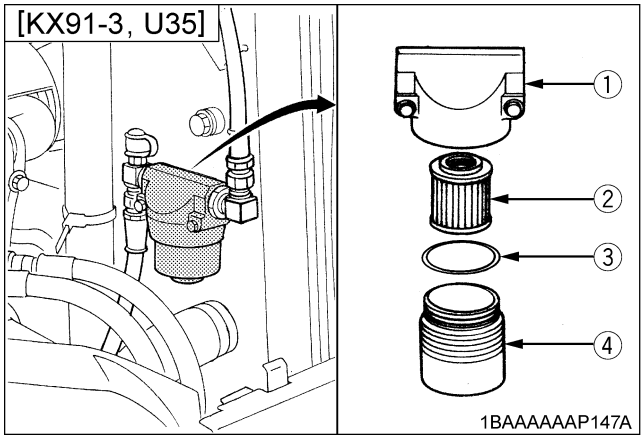
Hydraulic oil volumes	KX91-3 U35	55L (14.5 US gal.)
	KX121-3 KX161-3	75L (19.8 US gal.)

■Replacing Hydraulic Pilot Filter Element

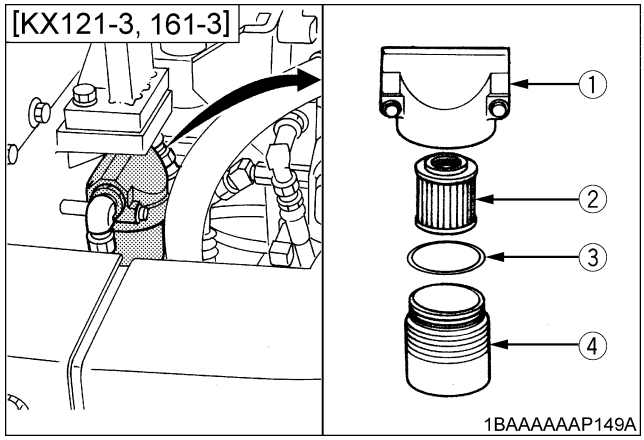
CAUTION

To avoid personal injury:
- **Before replacing the element, wait long enough for the hydraulic fluid to cool down.**

1. Remove the arch cover.
2. Remove the hydraulic oil tank cover.
3. Remove the pilot filter case from the head cover.
4. Wrench and pull out the element downward.
5. Replace the O-ring with a new one.
6. Apply a light coating of clean hydraulic oil to the O-ring and fit it to the case firmly. Be careful not to scratch the O-ring.
7. Install the case to the head cover firmly.
8. Let the engine run for approx. 3 minutes.
9. Check the oil level of hydraulic oil tank.



(1) Head cover
(2) Element
(3) O-ring
(4) Case

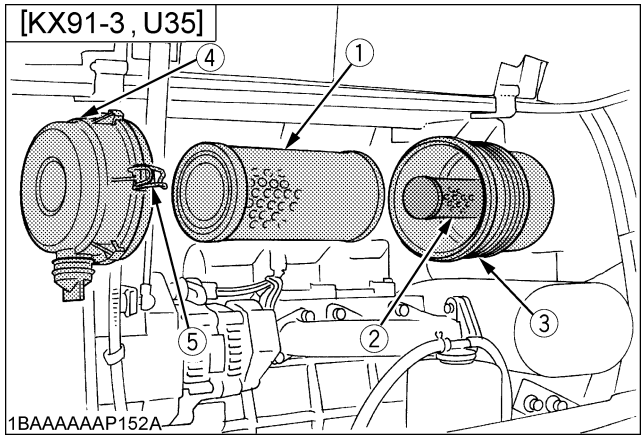


(1) Head cover
(2) Element
(3) O-ring
(4) Case

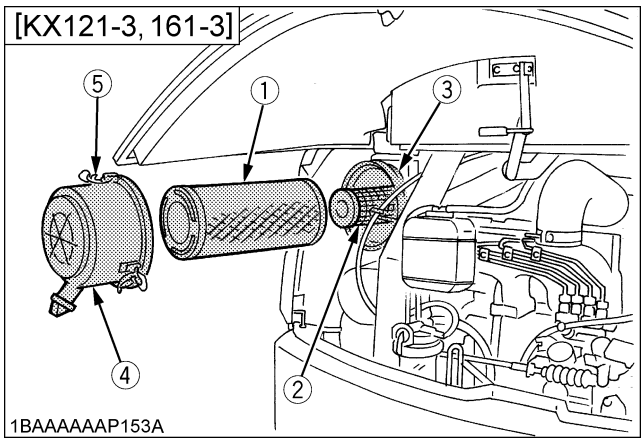
EVERY 1000 SERVICE HOURS OR ONCE A YEAR

■Replacing Air Filter Element

Open the engine cover and remove the dust cover.
Take out outer element and inner element (safety element).
Replace inner and outer element.
Installing the dust cover, be sure to its TOP mark (arrow) faces upwards.



(1) Outer element
(2) Inner element (Safety element)
(3) Case
(4) Dust cover
(5) Clamps



(1) Outer element
(2) Inner element (Safety element)
(3) Case
(4) Dust cover
(5) Clamps

IMPORTANT :
- Shorten the replacement period if using in a place exposed to lots of dust or sandy areas.

EVERY 1500 SERVICE HOURS

■Checking Fuel Injection Nozzle(Injection Pressure)

Consult your local KUBOTA Dealer for this service.

EVERY 2000 SERVICE HOURS

Do all 50, 200, 250, 500 and 1000 hour servicing at the same time.

■Changing Front Idler and Track Roller Oil

NOTE :
- Contact your KUBOTA dealer for details.

■Checking Alternator and Starter Motor

NOTE :
- Contact your KUBOTA dealer for details.

EVERY 3000 SERVICE HOURS

■Checking Injection Pump

Consult your local KUBOTA Dealer for this service.

ANNUAL SERVICE

■Electrical Wiring and Fuses

Check the terminals periodically for proper connections. Loose wiring or damaged cables can cause improper functioning of the electrical system-short circuiting, electrical leaks and other costly troubles could arise. Check wiring and replace damaged components immediately. If a fuse blows out soon after having been replaced, contact your nearest KUBOTA dealer. Do not use a fuse other than specified.

■Checking Air-Conditioner Pipes and Hoses

CAUTION

To avoid personal injury:
- **Do not touch the water hoses or the heater with your hand. You may get burned.**

1. Check to see that all lines and hose clamps are tight and not damaged.
2. If hoses and clamps are found worn or damaged, replace or repair them at once.

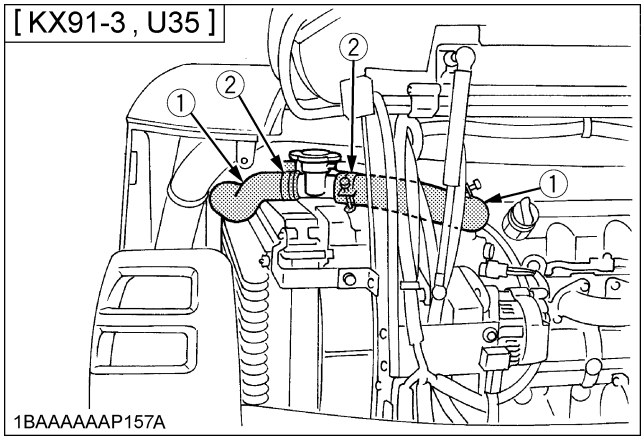
BIENNIAL SERVICING

CAUTION

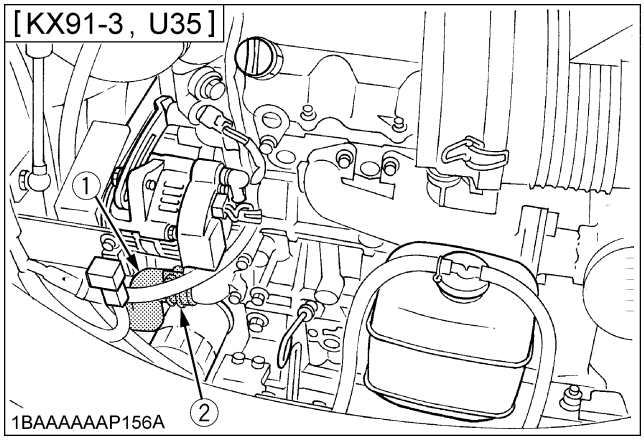
To avoid personal injury:
- **Do not loosen the radiator cap before the radiator has cooled down sufficiently. Then only loosen the cap and allow enough time for the pressure in the system to be released. Now remove the cap completely.**

■Replacing of Radiator Hoses

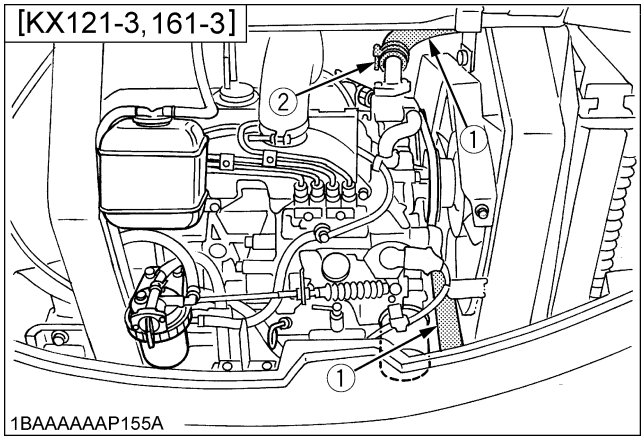
Replace radiator hoses and hose clamps every two years. If the hoses are swollen, hard or cracked, they must be replaced earlier.



(1) Radiator hoses
(2) Hose clamps



(1) Radiator hoses
(2) Hose clamps



(1) Radiator hoses
(2) Hose clamps

■Replacing Air-Conditioner Pipes and Hoses

CAUTION

To avoid personal injury:

- **Do not touch the water hoses or the heater with your hand. You may get burned.**

Replace air-conditioner pipes and hoses every two years. If the hoses or pipes are swollen, hard or cracked, they must be replaced earlier.

■Changing Radiator Coolant

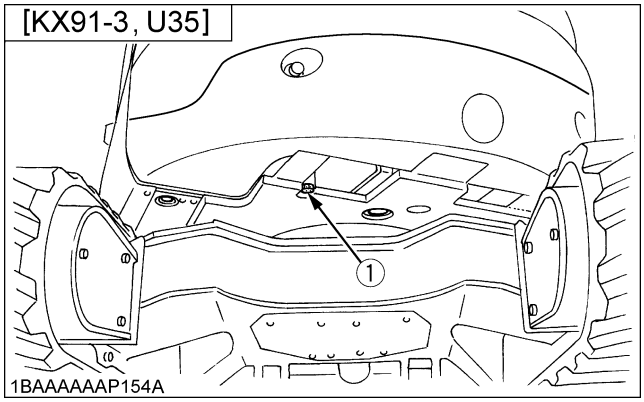
CAUTION

To avoid personal injury:

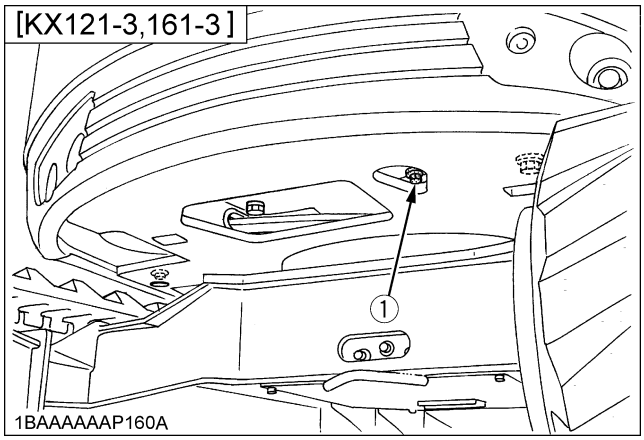
- **When using anti-freeze, put on some protection such as rubber gloves (Anti-freeze contains poison.).**
- **If anti-freeze has been swallowed, seek medical attention at once.**
- **When anti-freeze comes in contact with the skin or clothing, wash it off immediately.**
- **Do not mix different types of Anti-freeze. The mixture can produce chemical reaction causing harmful substances.**
- **Anti-freeze is extremely flammable and explosive under certain conditions. Keep fire and children away from anti-freeze.**
- **When draining fluids from the engine, place some container underneath the engine body.**
- **Do not pour waste onto the grounds, down a drain, or into any water source.**
- **Also, observe the relevant environmental protection regulations when disposing of anti-freeze.**
- **Anti-freeze if swallowed is poison to people, animals and birds.**

Stop the engine then remove the key and wait until it has cooled down completely.

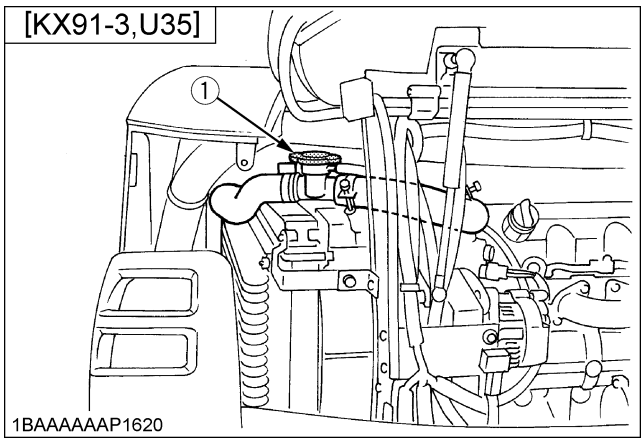
1. Open the drain plug on the bottom of the radiator and drain coolant completely, Should a reserve tank be equipped, disconnect the line from the tank floor and then open the drain cock.
2. To clean, rinse the radiator with water.
3. Close the drain plug and fill the radiator and the reserve tank with coolant fluid. Let the engine idle for about 5 min., cut the engine and remove the key then check the coolant level.
4. The machine has been shipped filled with 50% anti-freeze solution.



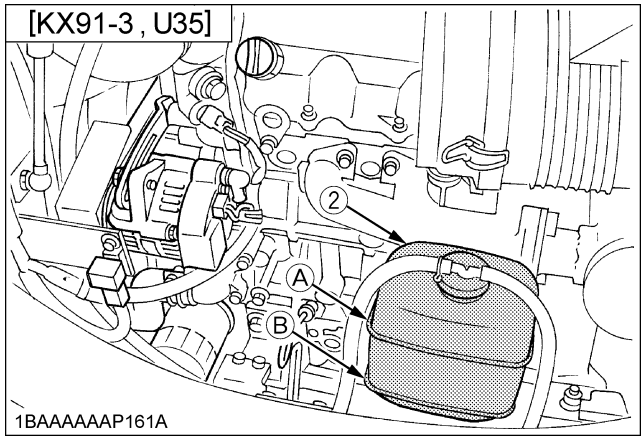
(1) Drain plug



(1) Drain plug

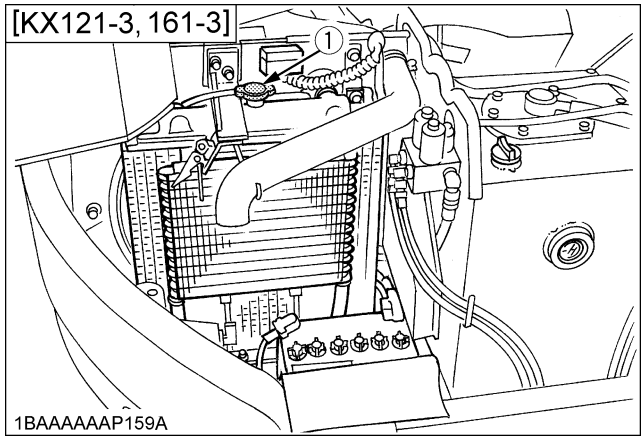


(1) Radiator cap

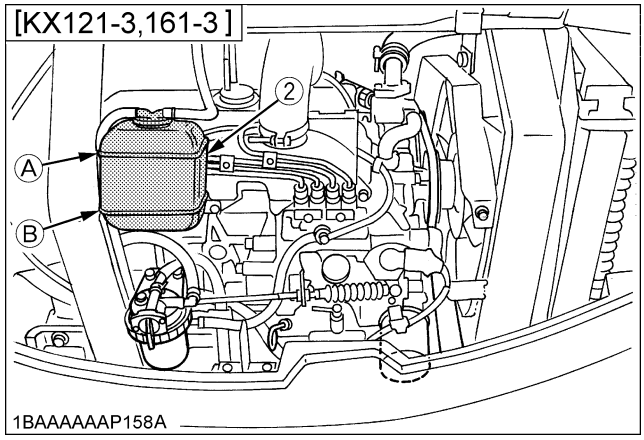


(2) Reserve tank

(A) Full
(B) Low



(1) Radiator cap



(2) Reserve tank

(A) Full
(B) Low

Radiator	KX91-3 U35	approx. 4.0L (1.1 US gal.)
	KX121-3 KX161-3	approx. 7.4L (1.96 US gal.)
Reserve tank	KX91-3 KX121-3 KX161-3 U35	approx. 1.6L (0.4 US gal.)

IMPORTANT :
- Do not operate the engine without coolant.
- To fill the radiator system and the reserve tank, use fresh water and anti-freeze fluid.
- When the anti-freeze is mixed with water, the anti-freeze mixing ratio must be less than 50%
- Tighten the radiator cap properly. If the cap is loosely or not properly fitted, overheating of the engine can result due to coolant fluid loss.

■Replacing Fuel Hose
Replace the hoses and clamps.
(See "Checking Fuel and Intake Air Line" every 200 hours maintenance.)

■Replacing Intake Air line
Replace the hoses and clamps, if necessary.
(See "Checking Fuel and Intake Air Line" every 200 hours maintenance.)

SERVICING AS REQUIRED
[Air conditioner type]

■Checking Amount of Refrigerant (gas)

WARNING

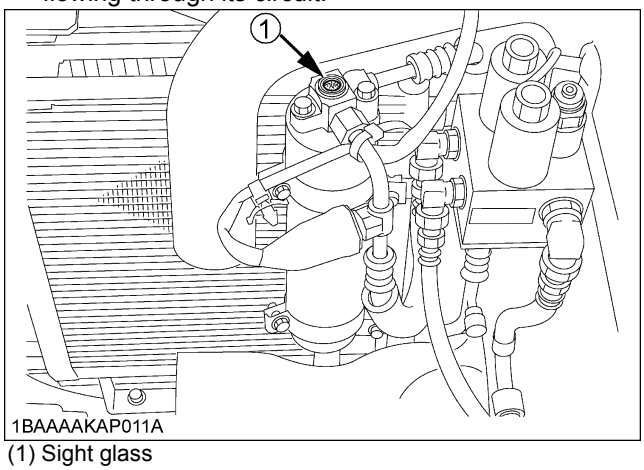
To avoid personal injury:
- **Liquid contact with eyes or skin may cause frostbite.**
- **In the event of a leakage, wear safety goggles. Escaping refrigerant can cause severe injuries to eyes.**
- **In contact with a flame, R134a refrigerant gives a toxic gas.**
- **Do not disconnect any part of the refrigeration circuit of the air conditioning system. Consult your local KUBOTA Dealer for assistance and service.**

A shortage of refrigerant impairs the air-conditioner performance. Check the following points. If it is indicated that the amount of refrigerant is extremely low, ask your dealer to inspect and charge.

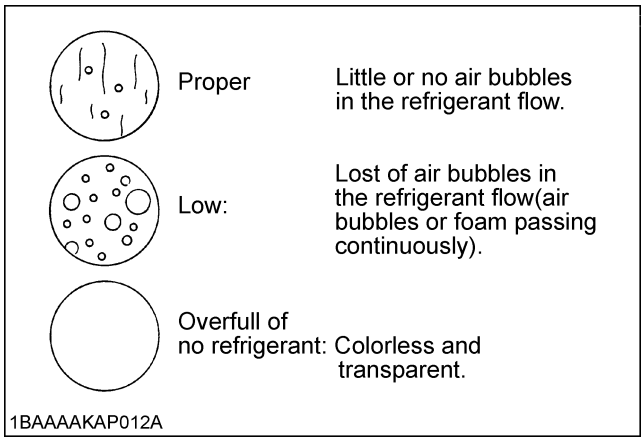
◆ **Checking procedure**

1. Run the air-conditioner in the following conditions.
   - Engine speed: About 1500 rpm
   - Temperature control lever: Maximum cooling position (rightmost)
   - Fan switch: Highest blow (3)
   - Air-conditioner switch: ON

2. Look into the sight glass to see if the refrigerant is flowing through its circuit.



(1) Sight glass



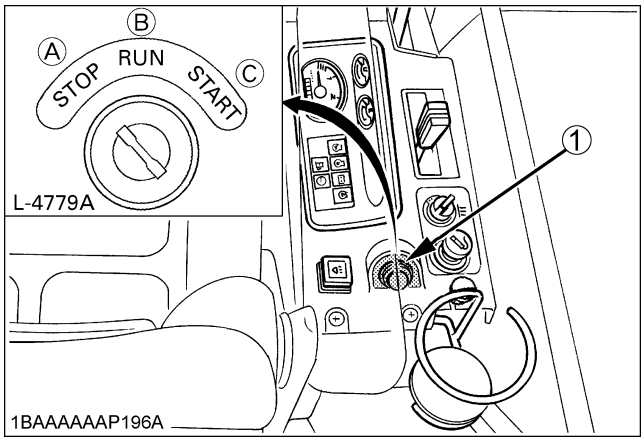
IMPORTANT :

- Charge only with R134a not R12 refrigerant (gas).

OTHER ADJUSTMENTS AND REPLACEMENTS

PURGING FUEL SYSTEM

1. Fill up the excavator with fuel.
2. Turn the starter key to the position "RUN".
3. The air in the fuel system will automatically be purged within one minute.



(1) Starter switch

(A) "STOP"
(B) "RUN"
(C) "START"

IMPORTANT :

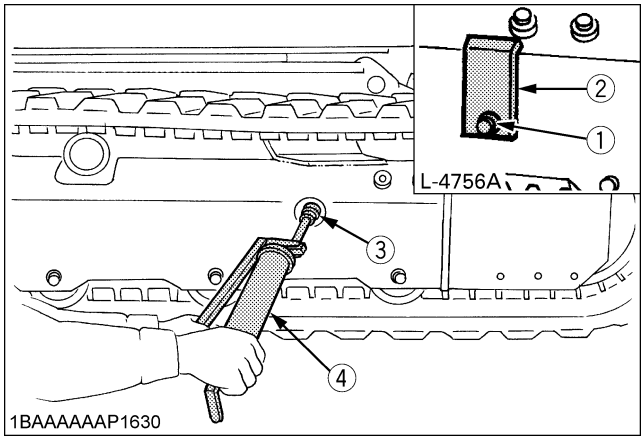
- If the purging was insufficient, the engine dies out right after starting. In this case repeat steps (2) to (3) again.

ADJUSTMENT OF CRAWLERS

■Rubber Crawlers

Tension the crawlers as specified:

1. Loosen the bolt (1) and remove the cover (2).
2. Apply grease (4) to the grease nipple (3).



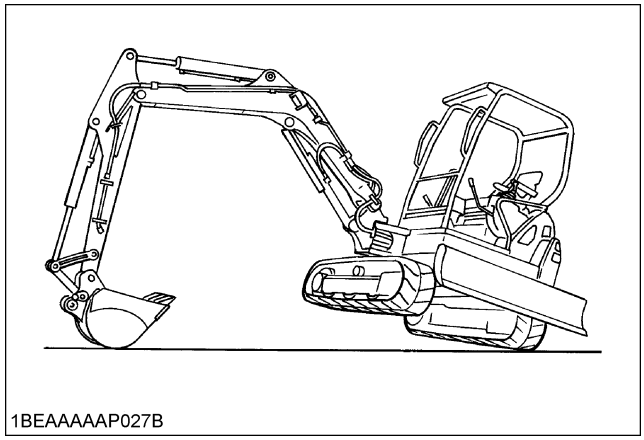
(1) Bolt
(2) Cover
(3) Grease nipple
(4) Grease gun (Option)

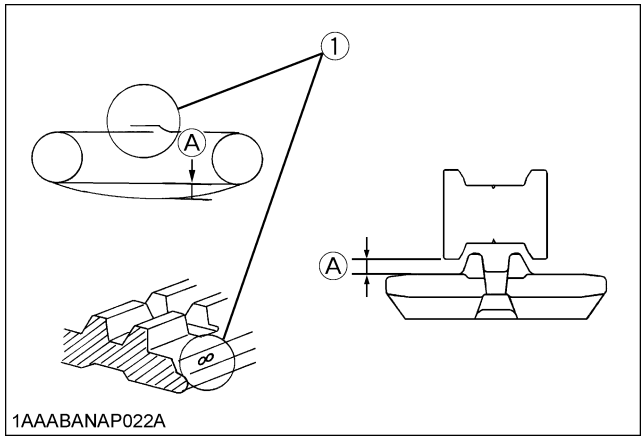
3. Tension the crawler in the lifted position, so that the distance "A" (clearance between the center track roller and the crawler surface of the crawler) is 10 to 15mm(0.4 to 0.6 in.) (see illustration) In this case, the crawler seam is positioned on the top center between the idler and the sprocket.

DANGER

To avoid serious injury or death:

- **Do not work under the machine in this condition.**
- **For your safety do not rely on hydraulically supported devices, they may leak down suddenly drop or be accidentally lowered.**





(1) Seam (Mark "∞")

(A)	10 to 15mm(0.4 to 0.6 in.)

IMPORTANT :

- Crawler seam
  The ends of the rubber crawler are joined with a seam. When adjusting the crawlers, the seam must be positioned on the top midway between the idler and the sprocket. By machines equipped with an upper roller, the seam mark should be positioned over the upper roller.
  If the seam is positioned incorrectly, the crawlers will be tensed to loosely, and a further readjustment will be necessary.
- Rotate the crawler after adjustment one to two times to check the tension. To loosen the rubber crawlers, follow the same method as for steel crawlers.

- Additionally following points are to be observed when adjusting rubber crawlers.
  (1) If the crawler slackens more than 25mm(1 in.), readjust them.
  (2) Check crawler tension 30 hours after initial use and readjust if necessary. Check and adjust thereafter every 50 service hours.

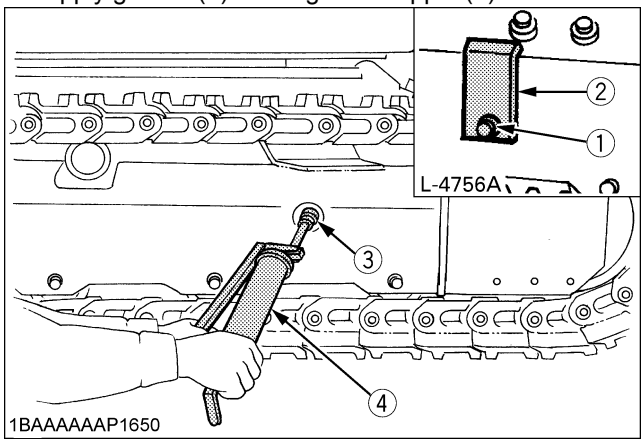
■Special Information when Using Rubber Crawlers

1. When turning, preferably make a slow swing turn. Avoid spin turns to lessen lug wear and entry of dirt.
2. The relief valve may be activated if too much dirt and sand clog the crawlers. In this case move the machine for a short distance straight backwards to let the earth and sand fall off, then a turn can be made.
3. Avoid using rubber crawler on riverbeds, stony underground, ferro-concrete and on iron plates. The rubber can be damaged as well as wear of the crawler increased.

■Steel Crawlers

◆ **Crawler shoe plate tension**

1. Loosen bolt (1) and remove the cover (2).
2. Apply grease (4) to the grease nipple (3).



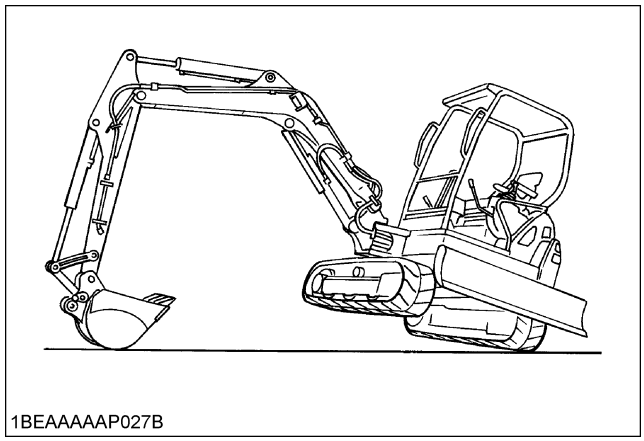
(1) Bolt
(2) Cover
(3) Grease nipple
(4) Grease gun (Option)

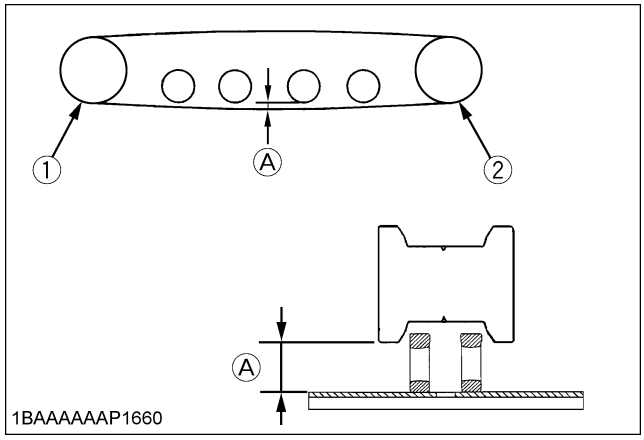
3. To check the crawler tension, the crawler must be lifted from the ground as shown. The crawler tension is correct if the clearance between the outer end of the track roller and the crawler interior surface corresponds to the dimension specified in the table below.

DANGER

To avoid serious injury or death:

- **Do not work under the machine in this condition, securely support with stands or suitable blocking.**
- **For your safety do not rely on hydraulically supported devices, they may leak down suddenly drop or be accidentally lowered.**





(1) Drive sprocket
(2) Idler

(A)	KX91-3 U35	75 to 80 mm (3.0 to 3.2 in.)
	KX121-3	85 to 90 mm (3.3 to 3.5 in.)
	KX161-3	80 to 85 mm (3.2 to 3.3 in.)

◆ **To loosen the crawlers, follow following procedure:**

CAUTION

To avoid personal injury:

- **Do not loosen the grease nipple completely or too quickly. Otherwise grease under high pressure in the tension cylinder could squirt out.**
- **Make sure that no obstacles, such as stones are caught in the crawler. Remove such obstacles before adjusting the crawler tension.**

1. Loosen the bolt of the cover and remove the cover.
2. Using a socket wrench, loosen the grease nipple a few turns.
3. When grease oozes out from the thread, rotate the crawler and loosen the crawler in the lifted position (see illustration).

After adjustment is completed:

Using the socket wrench, tighten the grease nipple.
Tightening torque must be between 1000 to 1100 kgf-cm(72.3 to 79.6 ft.lbs.).

IMPORTANT :

- If the crawlers are too tight, wear is increased.
- If the crawlers are too loose, the crawler shoes may collide with the sprocket, wear is increased.
  The crawler may dislocate or come off.
- Clean the crawler after every use.
- Should the crawler tension be heightened due to sticking mud, lift the crawler with the help of the boom, arm and bucket, idle the engine and remove mud from the crawler, especially from the openings of the link plate carefully.

FUSES

CAUTION

To avoid personal injury:

- **When changing fuse, stop the engine and turn the key in position "STOP"**

■Replacing Fuses

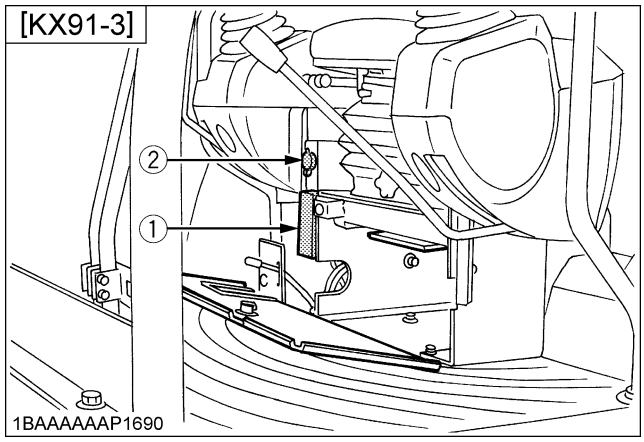
1. Remove the cover of the fuse box.
2. Replace the burnt out fuse with a fuse having the same capacity.

■Fuse Capacities and Circuits

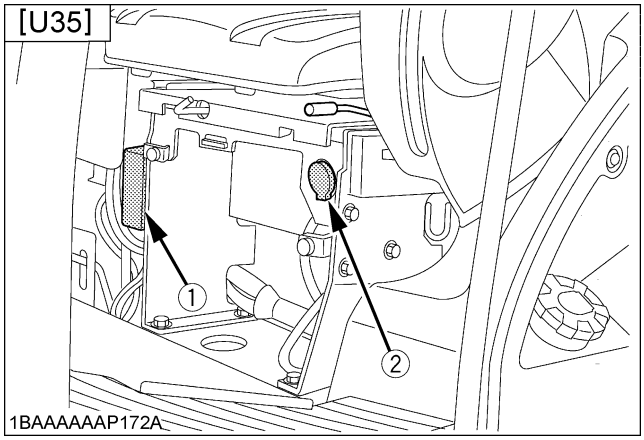
<table>
<tr><td colspan="2">5A Glow
10A Main (with AI)</td><td colspan="2">10A High speed</td></tr>
<tr><td>5A
Instrument Panel</td><td rowspan="8">Spare

5A

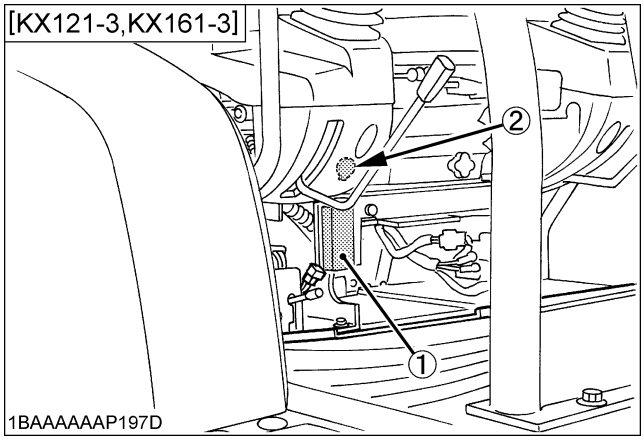
10A</td><td colspan="2">5A
Starter Protection Relay
(without AI,A/C)</td></tr>
<tr><td>5A Relay
5A Work Lamp
(with AI,A/C)</td><td colspan="2">5A Lever Lock</td></tr>
<tr><td></td><td colspan="2">10A Horn</td></tr>
<tr><td></td><td colspan="2">15A Auxiliary</td></tr>
<tr><td>15A Spare</td><td colspan="2">15A Cigarette Lighter</td></tr>
<tr><td>20A Spare</td><td colspan="2">10A Wiper / Washer</td></tr>
<tr><td>20A Blower Motor
(with A/C)</td><td colspan="2">10A Heater Fan
10A Compressor
(with A/C)</td></tr>
<tr><td colspan="2">15A AI Motor(with AI)</td><td colspan="2">5A Room Light</td></tr>
<tr><td colspan="2">5A AI Sub(with AI)</td><td colspan="2">20A Work Lamp</td></tr>
</table>



(1) Fuse box
(2) Auxiliary electric A [Canopy type only]



(1) Fuse box
(2) Auxiliary electric A [Canopy type only]



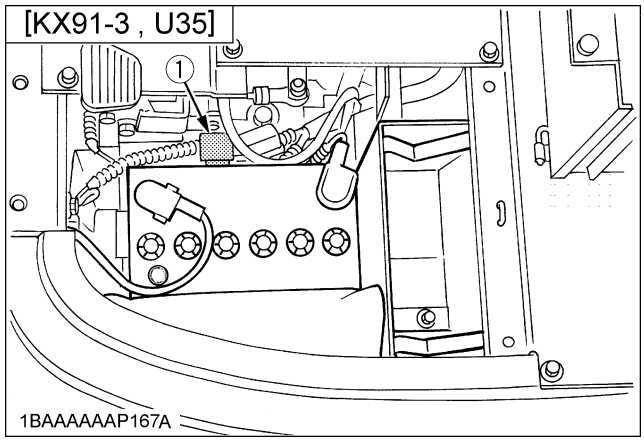
(1) Fuse box
(2) Auxiliary electric A [Canopy type, Air conditioner type only]

■Auxiliary Electric

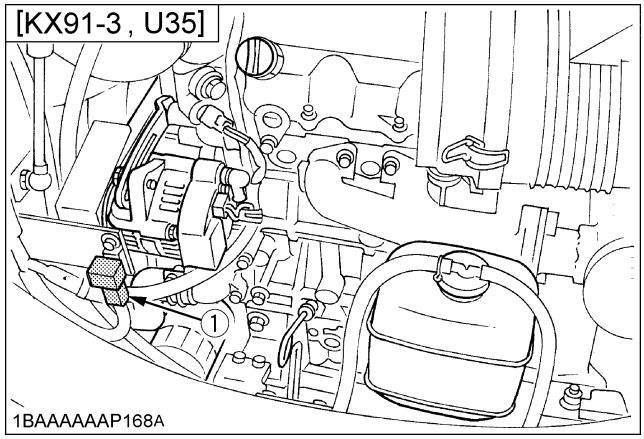
Max power is less than 110 W including the equipped light 55 W.

■Slow Blow Fuse

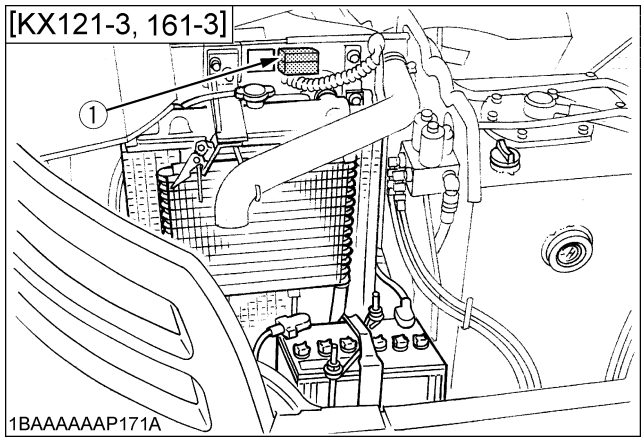
Slow blow fuse is provided to protect the electrical circuits. If the fusible link is blown, check the electrical circuits for trouble and then replace with a new compatible slow blow fuse.



(1) Slow blow fuse (50 A)



(1) Slow blow fuse (60 A)



(1) Slow blow fuse(50 A, 60 A)

TROUBLESHOOTING

If the mini-excavator does not show the desired performance, or when trouble arises, refer to the table below and undertake appropriate measures.

Trouble		Cause	Countermeasure
Engine	Starting difficulties	Lock levers in "UNLOCK" position	* Bring lock lever into "LOCK" position
		Fuel is too viscous	* Check fuel tank and filter * Remove impurities and water * If necessary, replace filter
		Air or water in the fuel system	* Remove water from the fuel tank * Check fuel pipe joint bolts and nuts for looseness * Purging of the fuel system (for fuel filter and injection pump see "PURGING OF THE FUEL SYSTEM" in the chapter "OTHER ADJUSTMENTS AND REPLACEMENTS".)
		Oil viscosity is too high that the engine runs sluggishly in winter	* Pour hot water over the radiator * Use oils of different viscosities depending on the ambient temperature. (Use SAE10W, SAE10W-30 or SAE10W-40)
		Battery is almost dead; insufficient compression	* Recharge battery
	Insufficient engine power	Low fuel level	* Check fuel and add if necessary
		Clogged air cleaner	* Clean the air filter element
	Engine suddenly stops	Low fuel level	* Check fuel and add if necessary * Purge the fuel system
	Abnormal exhaust gas colour	Poor fuel	* Use high quality fuel
		Too much engine oil	* Drain engine oil to prescribed oil level
	Water temperature in red zone (Overheating)	Defective seal of the water pump	* Replace
		Worn or torn fan belt	* Adjust or replace
		Thermostat is defect	* Replace
		Coolant level too low	* Fill to prescribed level
		Radiator grill or fins are clogged	* Clean
		Coolant is contaminated with rust from the cylinder head or crank case	* Replace coolant fluid and add anti-rust
		Defective radiator cap (Evaporation)	* Replace
		Corroded coolant pipes	* Clean
		Continuous operation under full load	* Reduce load
		Cylinder head gasket is damaged (Coolant loss)	* Replace
		Engine oil level too low	* Fill to prescribed level
		Maladjustment of fuel injection	* Readjust ignition timing
		Use of poor fuel	* Use prescribed fuel

Hydraulic System	Boom, arm, bucket, drive, swing and dozer power is too low	Hydraulic oil level too low	* Add oil
		Leakages of hoses and / or joints	*Replace hose or joint
	Swing motor and front attachment does not work	Lock lever in "LOCK" position	*Bring lock lever into "UNLOCK" position
Drive System	Deviation of drive direction	Blocked through stones	* Remove
		Crawler too loose or too tight	* Adjust accordingly
	Drive lever does not move	Lock lever in "LOCK" position	* Bring lock lever into "UNLOCK" position
AI	System indicator light flashes Models with AI	Fuse in fuse box defective	* Replace the fuse

OPERATION UNDER COLD WEATHER CONDITIONS

PREPARATION FOR OPERATION IN COLD WEATHER

1. Replace engine oil and hydraulic oil with those of viscosities suitable for cold weather.
2. In cold weather, battery power drops, and the battery fluid may freeze if the battery is not sufficiently charged. To prevent the battery fluid from freezing, be sure to keep the battery charged at least 75% or more of its capacity after operation. To ease next starting, it is recommended to keep the battery stored in closed or heated rooms. If the battery fluid level is too low, do not add after operation, but add with the engine running before the next operation.
3. Add anti-freeze to coolant in the radiator and reserve tank, if the ambient temperature is expected to drop below 0℃ (32℉). Mixing ratio of water and anti-freeze depends on the expected ambient temperature.

- Mixing ratio between water and anti-freeze

Ambient Temperature ℃ (℉)	-5 (+23)	-10 (+14)	-15 (+5)	-20 (-4)	-25 (-13)	-30 (-22)	-35 (-31)
Antifreeze %	30	30	30	35	40	45	50
Water %	70	70	70	65	60	55	50

IMPORTANT :

- Use permanent anti-freeze or long-life coolant.
- Drain the coolant completely and clean the radiator inside then fill with the water and anti-freeze mixture.
- As the anti-freeze also acts as an anti-corrosive, it is not necessary to add an additive to the water and anti-freeze mixture.
- See "Coolant check" under "DAILY CHECKS" in "MAINTENANCE" for radiator fill volumes.

PROCEDURE AFTER DONE WORK

Clean the excavator thoroughly after work and wipe dry. Otherwise mud and earth on the crawlers could freeze if the temperature drops below the 0℃ (32℉)mark. Operation of the excavator is then not possible. Store the excavator in a dry place; if not possible, store on wooden planks or on mats. If the excavator is kept on damp or muddy ground, the crawlers could freeze overnight. Operation of the excavator is then not possible. Furthermore the reduction gear may be damaged.

Additionally, the piston rods of the hydraulic cylinders must be rubbed dry. Otherwise severe damage could occur if dirty water seeps through the seals.

LONG STORAGE

CAUTION

To avoid personal injury:

- **Do not clean the excavator with the engine running.**
- **To avoid the danger of exhaust fume poisoning, do not operate the engine in a closed building without proper ventilation.**
- **When storing, remove the key from the starter switch to avoid unauthorized persons from operating the excavator and getting injured.**

■ **Should the Excavator be Stored for a Longer Period of Time, Observe Following Procedures:**

1. The whole excavator should be cleaned thoroughly and in all cases stored indoors. If the excavator has to be kept outdoors, lay out wooden planks on an even ground, place the excavator on the planks and cover completely.
2. Do an oil change and grease the excavator.
3. Heavily grease the visible section of the piston rods.
4. Remove the battery and store indoors.
5. If it is expected that the temperature will sink below the 0℃ (32℉)mark, add anti-freeze or drain coolant completely.

IMPORTANT :

- Wash the excavator after stopping the engine.
  If you wash the excavator while running the engine, splashing water gets into the air cleaner through its intake and cause engine damage.
  Careful, wash and do not splash water over the air cleaner while the engine is running.

■ **Observe Following Procedures when the Machine is to be Operated after Long Storage.**

1. Wipe off the grease from the hydraulic cylinder rods.
2. Turn on the engine and activate the attachments and the drive mechanisms without load in order to circulate the hydraulic oil. (If the machine is stored for longer than one month, undertake steps (1) and (2) once every month)

Periodic replacement of important component parts

To ensure safety in operation, you are strongly requested to inspect and service the machine at regular intervals. For added safety, ask your KUBOTA dealer to replace the following important component parts.

These parts are prone to degradation in material or subject to wear and tear with time. It is difficult to judge how much they have been affected at regular inspection. It is therefore necessary to replace them with new ones, whether wear is visible or not after a specified time of use.

If any of them is found worn even before the specified use, it must be repaired or replaced the same way as other parts.

If any of the hose clamps is found deformed or cracked, the hose clamp must also be replaced.

For the hydraulic hoses other than the ones to be replaced periodically, inspect them for the following points. If found unusual, tighten them up, replace them.

When replacing the hydraulic hoses, change their O rings and sealings with new ones.

For replacement of the important parts, contact your KUBOTA dealer.

- At the following periodic inspections, check the fuel hoses and hydraulic hoses as well.

Inspection Interval	Check points
Daily Checks	Oil leak at fuel and hydraulic hose connections and points
Every month	Oil leak at fuel and hydraulic hose connections and points Damages at fuel and hydraulic hose (cracks, chafing)
Every year	Oil leak at fuel and hydraulic hose connections and points Interference, deformation, degradation, twist and other damages (cracks, chafing) of fuel and hydraulic hoses

List of important component parts

No.	Component parts	Used place	Q'ty	Period
1	Fuel hose	Fuel tank - Fuel filter	1	Every 2 years or 4000 hours
		Fuel filter - Fuel pump	1	
		Fuel pump - Fuel nozzle	1	
		Fuel nozzle - Fuel tank	2	
2	Hydraulic hose (suction)	Tank - Pipe	1	
		Pipe - Main pump	1	
3	Hydraulic hose (delivery)	Main pump - Control valve	3	
		Main pump - Pilot filter	1	
		Pilot filter - Change valve	1	
4	Hydraulic hose (Boom cylinder)	Control valve - Adapter	2	
		Adapter - Boom cylinder	2	
5	Hydraulic hose (Arm cylinder)	Control valve - Pipe, Boom	2	
		Pipe, Boom - Arm cylinder	2	
6	Hydraulic hose (Bucket cylinder)	Control valve - Pipe, Boom	2	
		Pipe, Boom - Bucket cylinder	2	
7	Hydraulic hose (Swing cylinder)	Control valve - Swing cylinder	2	
8	Hydraulic hose (Dozer cylinder)	Control valve - Rotary joint	2	
		Rotary joint - Pipe	2	
		Pipe - Dozer cylinder	2	
9	Hydraulic hose (Service port)	Control valve - Pipe, Boom	2	
		Pipe, Boom - Pipe, Boom	2	
		Pipe, Boom - Pipe, Arm	2	
10	Hydraulic hose (Swivel motor)	Control valve - Swivel motor	2	

To prevent serious damage to the hydraulic system, use only a KUBOTA genuine hydraulic hose.

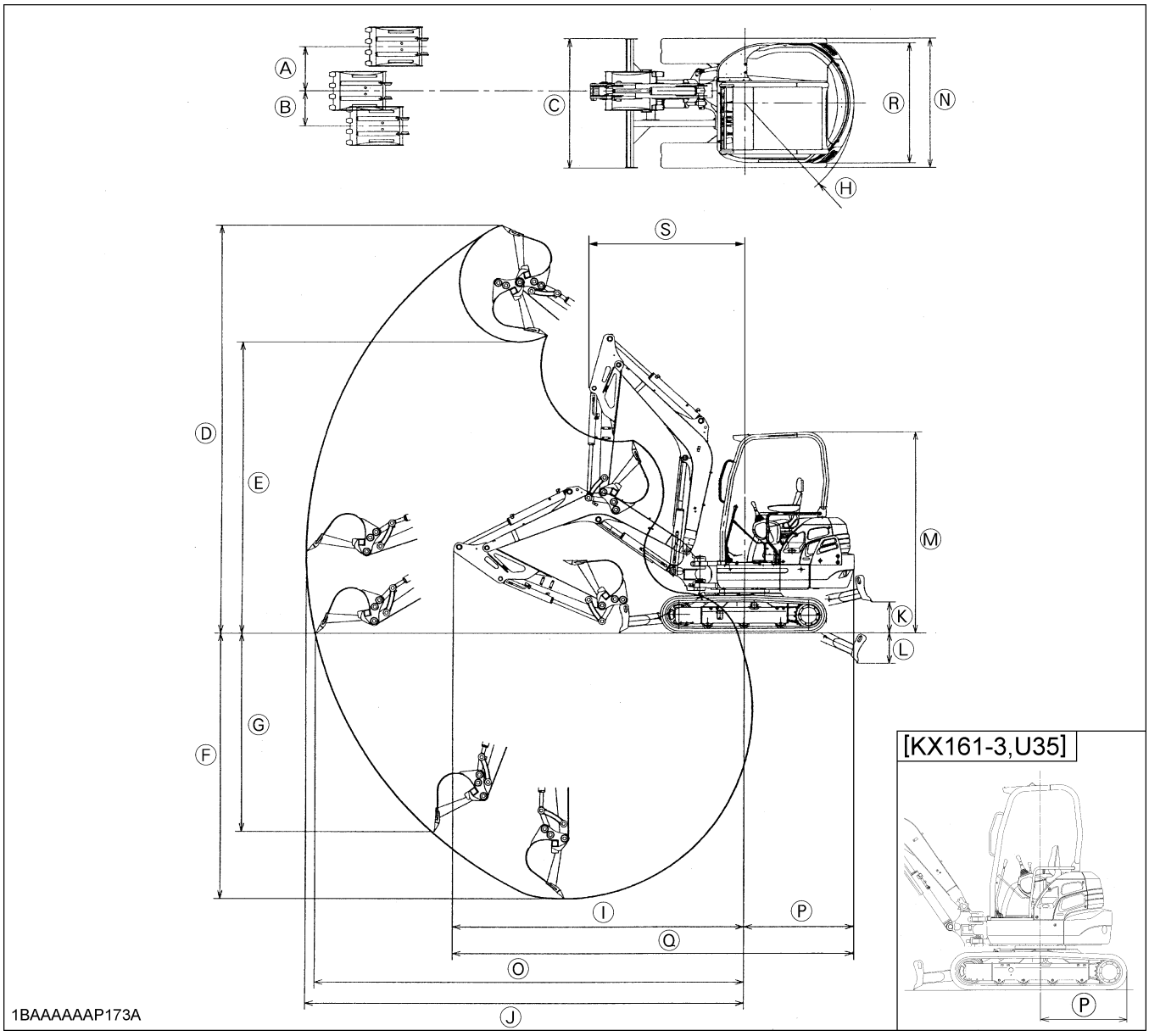
RECOMMENDED OILS

IMPORTANT :
1. Before delivery the hydraulic oil used was an ISO 46 viscosity grade.
2. Use engine oil API service classification CD, CE or CF.
3. Use SAE 90 (API, CLA/GL5) as drive unit oil for all seasons.

	Application	Viscosity	Shell	Mobil	Exxon	MIL-Standard
Engine oil	In winter or by low temperatures	SAE 10W	Shell Rotella T10W Shell Rimula 10W	Mobil Delvac 1310	XD-3 10W XD-3 Extra 10W	MIL-L-2104C MIL-L-2104D
		SAE 20W	Shell Rotella T20W-2 Shell Rimula 20W-2	Mobil Delvac 1320	XD-3 20W-20 XD-3 Extra 20W-20	
	In summer or by high ambient temperatures	SAE 30	Shell Rotella T30 Shell Rimula 30	Mobil Delvac 1330	XD-3 30 XD-3 Extra 30	
		SAE 40	Shell Rotella T40 Shell Rimula 40	Mobil Delvac 1340	XD-3 40 XD-3 Extra 40	
		SAE 50	Shell Rimula 50	Mobil Delvac 1350		
	All- Season engine oil	Multi-purpose	Shell Rotella T15W		XD-3 15W-40 XD-3 Extra 15W-40	
Gear oil	In winter or by low temperatures	SAE 75		Mobilube HD80W-90		MIL-L-2105C
			Shell Oil S8643			
		SAE 80		Mobilube HD80W-90		
			Shell Spirax HD80W			
	In summer or by high ambient temperatures	SAE 90		Mobilube 46		MIL-L-2105
			Shell Spirax HD90	Mobilube HD80W-90		MIL-L-2105C
		SAE 140		Mobilube HD85W-140		MIL-L-2105C
			Shell Spirax HD140	Mobilube HD80W-140		MIL-L-2105C
	All-weather gear oil	Multi-purpose	Shell Spirax HD80W Shell Spirax HD85W	Mobilube HD80W-90	GX80W-90	MIL-L-2105C
Hydraulic oil	In winter or by low temperatures	ISO 32	Shell Tellus T32	Mobil DTE-Oil 13	NUTO H32	
		ISO 46	Shell Tellus T46	Mobil DTE-Oil 15	NUTO H46	
	In summer or by high ambient temperatures	ISO 68	Shell Tellus T68	Mobil DTE-Oil 16	NUTO H68	
Grease			Shell Alvania EP2	Mobilux EP2	BEACON Q2	
Fuel			Light oil No. 2-D (ASTM D975)			
Fuel under –5℃ (+23℉)			Light oil No. 1-D (ASTM D975)			

APPENDICES

MAIN DIMENSIONS



With rubber crawler.

Dimensions in parentheses: CAB type models mm (in.)

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)
KX91-3	410 (16.1)	475 (18.7)	1550 (61.0)	4940 (194.5)	3530 (139.0)	3185 (125.4)	2390 (94.1)	1310 (51.6)	3485 (137.2)	5245 (206.5)	370 (14.6)	370 (14.6)	2440 (96.1)	1550 (61.0)	5135 (202.2)	1310 (51.6)	4795 (188.8)	1440 (56.7)	1900 (74.8)
KX121-3	475 (18.7)	450 (17.7)	1700 (66.9)	5420 (213.3)	3890 (153.1)	3505 (138.0)	2480 (97.6)	1300 (51.2)	3790 (149.2)	5600 (220.5)	400 (15.7)	405 (15.9)	2495 (98.2) [2480 (97.6)]	1700 (66.9)	5475 (215.6)	1300 (51.2)	5090 (200.4)	1690 (66.5)	2060 (81.1)
KX161-3	725 (28.5)	645 (25.4)	1960 (77.2)	5715 (225)	4155 (163.6)	3830 (150.8)	2585 (101.8)	1090 (42.9)	4450 (175.2)	6260 (246.5)	455 (17.9)	375 (14.8)	2540 (100)	1960 (77.2)	6130 (241.3)	1090 (42.9)	5540 (218.1)	1690 (66.5)	2420 (95.3)
U35	600 (23.6)	635 (25.0)	1700 (66.9)	4945 (194.7) [4720 (185.8)]	3525 (138.8) [3315 (130.5)]	3140 (123.6)	2230 (87.8)	850 (33.5)	3665 (144.3)	5260 (207.1)	370 (14.6)	370 (14.6)	2440 (96.1)	1700 (66.9)	5145 (202.6)	1030* (40.6)	4965 (195.5)	1440 (56.7)	2015 (79.3) [2145 (84.4)]

*until the end of the crawler

LIFTING CAPACITY

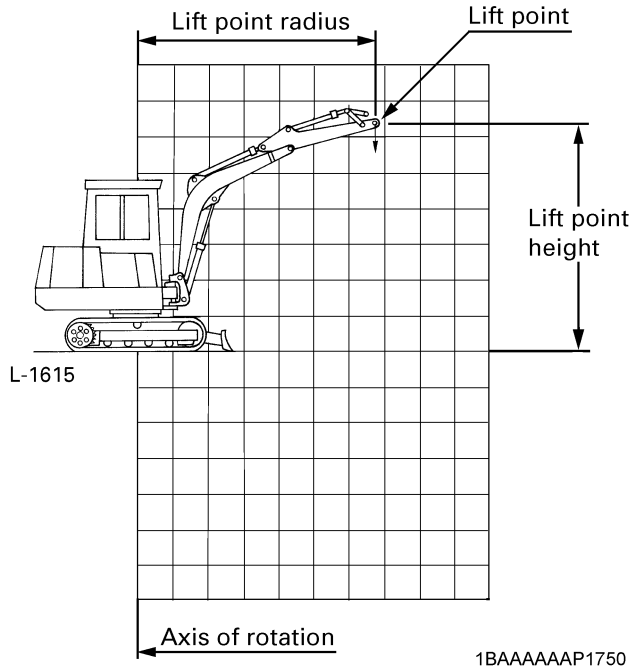
1. The lifting capacities are based on ISO 10567 and do not exceed 75% of the static tilt load of the machine or 87% of the hydraulic lifting capacity of the machine.
2. The strokes are as follows.
   (1) The load point corresponds to the front bolt part of the arm.
   (2) The machine positions are (i) over - front (Blade down), (ii) over - front (Blade up), and (iii) over - side.
   (3) The operating cylinder is the boom cylinder.
3. The bucket of the excavator, the hook, the sling and other lifting accessories are taken into consideration for the loads.

Machine conditions:
No bucket, all others according to the standard regulations.

WARNING

To avoid personal injury or death:

- **It is forbidden to lift loads greater than those values mentioned in the lifting capacity tables.**
- **The values mentioned in the table are valid only on even, hard grounds. When lifting on soft ground, the machine can tilt over due to the fact that the load is concentrated only on one side of the machine.**
- **The table values are calculated at the end of the arm without the bucket. In order to find the allowable loads for machines with bucket, the bucket weight must be subtracted from the values in the table.**
- **Never lift the machine with the angle blade placed at an angle.**



KX91-3 LONG ARM
RUBBER CRAWLER
ROPS CANOPY

LIFTING CAPACITY OVER-FRONT BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.42	1.36	
	4					2.42	1.86	1.58	1.43	
	2					2.95	2.14	1.74	1.50	
GL	0				3.75	3.22	2.33	1.84	1.53	
	-2			3.50	4.85	3.23	2.37	1.86		
	-4			5.02	4.40	3.03	2.25	1.71		
	-6			6.34	3.63	2.56	1.86			
	-8									
	-10									

LIFTING CAPACITY OVER-FRONT BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.42	1.12	
	4					2.42	1.82	1.39	1.10	
	2					2.44	1.76	1.35	1.08	
GL	0				3.75	2.36	1.71	1.32	1.06	
	-2			3.50	3.76	2.33	1.68	1.30		
	-4			5.02	3.77	2.33	1.67	1.30		
	-6			6.34	3.63	2.35	1.69			
	-8									
	-10									

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.30	1.03	
	4					2.29	1.65	1.27	1.01	
	2					2.18	1.59	1.23	0.99	
GL	0				3.26	2.11	1.54	1.20	0.97	
	-2			3.50	3.25	2.08	1.52	1.18		
	-4			5.02	3.26	2.07	1.51	1.18		
	-6			6.34	3.30	2.10	1.53			
	-8									
	-10									

KX91-3 LONG ARM
RUBBER CRAWLER
ROPS CABIN

LIFTING CAPACITY OVER-FRONT BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.42	1.36	
	4					2.42	1.86	1.58	1.43	
	2					2.95	2.14	1.74	1.50	
GL	0				3.75	3.22	2.33	1.84	1.53	
	-2			3.50	4.85	3.23	2.37	1.86		
	-4			5.02	4.40	3.03	2.25	1.71		
	-6			6.34	3.63	2.56	1.86			
	-8									
	-10									

LIFTING CAPACITY OVER-FRONT BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.42	1.18	
	4					2.42	1.86	1.46	1.16	
	2					2.57	1.85	1.42	1.14	
GL	0				3.75	2.50	1.80	1.39	1.12	
	-2			3.50	3.97	2.46	1.77	1.38		
	-4			5.02	3.98	2.46	1.77	1.37		
	-6			6.34	3.63	2.48	1.79			
	-8									
	-10									

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.37	1.08	
	4					2.40	1.74	1.33	1.06	
	2					2.29	1.67	1.30	1.04	
GL	0				3.44	2.22	1.63	1.27	1.03	
	-2			3.50	3.42	2.19	1.60	1.25		
	-4			5.02	3.44	2.19	1.59	1.25		
	-6			6.34	3.48	2.21	1.61			
	-8									
	-10									

KX91-3 LONG ARM
STEEL CRAWLER
ROPS CANOPY

LIFTING CAPACITY OVER-FRONT BLADE DOWN
Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.42	1.36	
	4					2.42	1.86	1.58	1.43	
	2					2.95	2.14	1.74	1.50	
GL	0				3.75	3.22	2.33	1.84	1.53	
	-2			3.50	4.85	3.23	2.37	1.86		
	-4			5.02	4.40	3.03	2.25	1.71		
	-6			6.34	3.63	2.56	1.86			
	-8									
	-10									

LIFTING CAPACITY OVER-FRONT BLADE UP
Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.42	1.13	
	4					2.42	1.85	1.41	1.11	
	2					2.47	1.78	1.37	1.09	
GL	0				3.75	2.40	1.73	1.34	1.08	
	-2			3.50	3.81	2.37	1.70	1.32		
	-4			5.02	3.83	2.36	1.70	1.32		
	-6			6.34	3.63	2.39	1.72			
	-8									
	-10									

LIFTING CAPACITY OVER-SIDE
Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.32	1.04	
	4					2.32	1.68	1.29	1.02	
	2					2.21	1.62	1.25	1.00	
GL	0				3.31	2.14	1.57	1.22	0.99	
	-2			3.50	3.30	2.11	1.54	1.20		
	-4			5.02	3.31	2.11	1.53	1.20		
	-6			6.34	3.35	2.13	1.55			
	-8									
	-10									

KX91-3 LONG ARM
STEEL CRAWLER
ROPS CABIN

LIFTING CAPACITY OVER-FRONT BLADE DOWN
Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.42	1.36	
	4					2.42	1.86	1.58	1.43	
	2					2.95	2.14	1.74	1.50	
GL	0				3.75	3.22	2.33	1.84	1.53	
	-2			3.50	4.85	3.23	2.37	1.86		
	-4			5.02	4.40	3.03	2.25	1.71		
	-6			6.34	3.63	2.56	1.86			
	-8									
	-10									

LIFTING CAPACITY OVER-FRONT BLADE UP
Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.42	1.20	
	4					2.42	1.86	1.48	1.18	
	2					2.60	1.88	1.44	1.16	
GL	0				3.75	2.53	1.83	1.41	1.14	
	-2			3.50	4.02	2.50	1.80	1.39		
	-4			5.02	4.03	2.49	1.79	1.39		
	-6			6.34	3.63	2.52	1.81			
	-8									
	-10									

LIFTING CAPACITY OVER-SIDE
Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.21			
	10							1.26		
	8						1.29	1.30		
	6					1.78	1.54	1.39	1.10	
	4					2.42	1.76	1.36	1.08	
	2					2.33	1.70	1.32	1.06	
GL	0				3.49	2.26	1.65	1.29	1.04	
	-2			3.50	3.48	2.23	1.63	1.27		
	-4			5.02	3.49	2.22	1.62	1.27		
	-6			6.34	3.53	2.24	1.64			
	-8									
	-10									

KX121-3 LONG ARM
RUBBER CRAWLER
ROPS CANOPY

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.88	
	8						2.06	1.96	1.91	
	6					3.09	2.49	2.19	2.01	
	4					4.03	2.96	2.44	2.15	
	2					4.66	3.35	2.67	2.27	
GL	0				2.78	4.89	3.56	2.81	2.34	
	-2			3.09	4.27	4.82	3.59	2.84	2.30	
	-4		3.00	4.60	6.15	4.51	3.42	2.68		
	-6			6.47	5.39	3.90	2.97			
	-8				3.76	2.75				
	-10									

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.64	
	8						2.06	1.96	1.64	
	6					3.09	2.49	2.03	1.61	
	4					3.58	2.57	1.98	1.58	
	2					3.44	2.49	1.93	1.55	
GL	0				2.78	3.37	2.43	1.89	1.53	
	-2			3.09	4.27	3.35	2.40	1.87	1.52	
	-4		3.00	4.60	5.52	3.35	2.40	1.86		
	-6			6.47	5.39	3.38	2.42			
	-8				3.76	2.75				
	-10									

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.49	
	8						2.06	1.88	1.49	
	6					3.09	2.39	1.83	1.46	
	4					3.15	2.30	1.78	1.43	
	2					3.02	2.22	1.73	1.41	
GL	0				2.78	2.96	2.17	1.70	1.38	
	-2			3.09	4.27	2.93	2.14	1.68	1.37	
	-4		3.00	4.60	4.67	2.94	2.14	1.67		
	-6			6.47	4.73	2.97	2.16			
	-8				3.76	2.75				
	-10									

KX121-3 LONG ARM
RUBBER CRAWLER
ROPS CABIN

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.88	
	8						2.06	1.96	1.91	
	6					3.09	2.49	2.19	2.01	
	4					4.03	2.96	2.44	2.15	
	2					4.66	3.35	2.67	2.27	
GL	0				2.78	4.89	3.56	2.81	2.34	
	-2			3.09	4.27	4.82	3.59	2.84	2.30	
	-4		3.00	4.60	6.15	4.51	3.42	2.68		
	-6			6.47	5.39	3.90	2.97			
	-8				3.76	2.75				
	-10									

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.68	
	8						2.06	1.96	1.68	
	6					3.09	2.49	2.08	1.65	
	4					3.67	2.63	2.02	1.62	
	2					3.53	2.55	1.97	1.59	
GL	0				2.78	3.46	2.49	1.94	1.57	
	-2			3.09	4.27	3.43	2.46	1.92	1.56	
	-4		3.00	4.60	5.66	3.44	2.46	1.91		
	-6			6.47	5.39	3.47	2.48			
	-8				3.76	2.75				
	-10									

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.53	
	8						2.06	1.92	1.52	
	6					3.09	2.44	1.88	1.50	
	4					3.23	2.35	1.82	1.47	
	2					3.09	2.27	1.78	1.44	
GL	0				2.78	3.03	2.22	1.74	1.42	
	-2			3.09	4.27	3.01	2.19	1.72	1.41	
	-4		3.00	4.60	4.78	3.01	2.19	1.72		
	-6			6.47	4.84	3.04	2.21			
	-8				3.76	2.75				
	-10									

KX121-3 LONG ARM
STEEL CRAWLER
ROPS CANOPY

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.88	
	8						2.06	1.96	1.91	
	6					3.09	2.49	2.19	2.01	
	4					4.03	2.96	2.44	2.15	
	2					4.66	3.35	2.67	2.27	
GL	0				2.78	4.89	3.56	2.81	2.34	
	-2			3.09	4.27	4.82	3.59	2.84	2.30	
	-4		3.00	4.60	6.15	4.51	3.42	2.68		
	-6			6.47	5.39	3.90	2.97			
	-8				3.76	2.75				
	-10									

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.70	
	8						2.06	1.96	1.69	
	6					3.09	2.49	2.10	1.67	
	4					3.70	2.66	2.04	1.64	
	2					3.56	2.57	1.99	1.61	
GL	0				2.78	3.49	2.52	1.96	1.59	
	-2			3.09	4.27	3.47	2.49	1.93	1.57	
	-4		3.00	4.60	5.71	3.47	2.49	1.93		
	-6			6.47	5.39	3.50	2.51			
	-8				3.76	2.75				
	-10									

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.66	
	8						2.06	1.96	1.65	
	6					3.09	2.49	2.04	1.63	
	4					3.56	2.57	1.99	1.60	
	2					3.42	2.49	1.94	1.57	
GL	0				2.78	3.35	2.44	1.90	1.55	
	-2			3.09	4.27	3.33	2.41	1.88	1.54	
	-4		3.00	4.60	5.38	3.33	2.41	1.88		
	-6			6.47	5.39	3.36	2.43			
	-8				3.76	2.75				
	-10									

KX121-3 LONG ARM
STEEL CRAWLER
ROPS CABIN

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.88	
	8						2.06	1.96	1.91	
	6					3.09	2.49	2.19	2.01	
	4					4.03	2.96	2.44	2.15	
	2					4.66	3.35	2.67	2.27	
GL	0				2.78	4.89	3.56	2.81	2.34	
	-2			3.09	4.27	4.82	3.59	2.84	2.30	
	-4		3.00	4.60	6.15	4.51	3.42	2.68		
	-6			6.47	5.39	3.90	2.97			
	-8				3.76	2.75				
	-10									

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.74	
	8						2.06	1.96	1.73	
	6					3.09	2.49	2.14	1.71	
	4					3.79	2.72	2.09	1.68	
	2					3.65	2.64	2.04	1.65	
GL	0				2.78	3.58	2.58	2.00	1.63	
	-2			3.09	4.27	3.55	2.55	1.98	1.61	
	-4		3.00	4.60	5.85	3.56	2.55	1.98		
	-6			6.47	5.39	3.59	2.57			
	-8				3.76	2.75				
	-10									

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	16									
	14						1.82			
	12							1.82		
	10							1.82	1.70	
	8						2.06	1.96	1.69	
	6					3.09	2.49	2.09	1.67	
	4					3.63	2.63	2.03	1.64	
	2					3.50	2.55	1.98	1.61	
GL	0				2.78	3.43	2.50	1.95	1.59	
	-2			3.09	4.27	3.41	2.47	1.93	1.57	
	-4		3.00	4.60	5.51	3.41	2.46	1.92		
	-6			6.47	5.39	3.44	2.48			
	-8				3.76	2.75				
	-10									

KX161-3 LONG ARM
RUBBER CRAWLER
ROPS CANOPY

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.92	1.95	
	8						2.41	2.20	2.07	2.00	
	6					4.29	3.12	2.59	2.29	2.11	
GL	4						3.85	2.99	2.52	2.24	
	2					3.87	4.39	3.33	2.73	2.35	
	0					4.70	4.65	3.53	2.86	2.42	
	-2			3.42	4.02	6.24	4.66	3.59	2.89	2.39	
	-4			4.89	5.82	6.04	4.46	3.47	2.78		
	-6			6.60	7.83	5.33	4.01	3.12	2.38		
	-8				5.93	4.19	3.17				
	-10										

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.92	1.72	
	8						2.41	2.20	2.07	1.70	
	6					4.29	3.12	2.59	2.07	1.67	
GL	4						3.35	2.54	2.01	1.64	
	2					3.87	3.22	2.46	1.96	1.61	
	0					4.51	3.14	2.40	1.92	1.58	
	-2			3.42	4.02	4.50	3.11	2.36	1.89	1.57	
	-4			4.89	5.82	4.52	3.11	2.36	1.89		
	-6			6.60	7.83	4.57	3.13	2.37	1.91		
	-8				5.93	4.19	3.17				
	-10										

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.89	1.51	
	8						2.41	2.20	1.86	1.49	
	6					4.29	3.02	2.29	1.81	1.47	
GL	4						2.86	2.20	1.75	1.43	
	2					3.79	2.74	2.12	1.70	1.40	
	0					3.73	2.67	2.06	1.66	1.38	
	-2			3.42	4.02	3.72	2.64	2.03	1.64	1.37	
	-4			4.89	5.82	3.74	2.64	2.03	1.64		
	-6			6.60	6.38	3.78	2.66	2.04	1.66		
	-8				5.93	3.86	2.72				
	-10										

KX161-3 LONG ARM
RUBBER CRAWLER
ROPS CAB

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.92	1.95	
	8						2.41	2.20	2.07	2.00	
	6					4.29	3.12	2.59	2.29	2.11	
GL	4						3.85	2.99	2.52	2.24	
	2					3.87	4.39	3.33	2.73	2.35	
	0					4.70	4.65	3.53	2.86	2.42	
	-2			3.42	4.02	6.24	4.66	3.59	2.89	2.39	
	-4			4.89	5.82	6.04	4.46	3.47	2.78		
	-6			6.60	7.83	5.33	4.01	3.12	2.38		
	-8				5.93	4.19	3.17				
	-10										

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.92	1.76	
	8						2.41	2.20	2.07	1.74	
	6					4.29	3.12	2.59	2.12	1.71	
GL	4						3.43	2.60	2.06	1.68	
	2					3.87	3.30	2.52	2.01	1.65	
	0					4.62	3.22	2.46	1.97	1.62	
	-2			3.42	4.02	4.61	3.19	2.42	1.94	1.61	
	-4			4.89	5.82	4.63	3.19	2.42	1.94		
	-6			6.60	7.83	4.68	3.21	2.43	1.96		
	-8				5.93	4.19	3.17				
	-10										

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.92	1.54	
	8						2.41	2.20	1.89	1.53	
	6					4.29	3.08	2.33	1.85	1.50	
GL	4						2.92	2.24	1.79	1.47	
	2					3.87	2.80	2.17	1.74	1.44	
	0					3.81	2.73	2.11	1.70	1.41	
	-2			3.42	4.02	3.80	2.70	2.08	1.68	1.40	
	-4			4.89	5.82	3.82	2.70	2.07	1.68		
	-6			6.60	6.51	3.86	2.72	2.09	1.70		
	-8				5.93	3.94	2.78				
	-10										

KX161-3 LONG ARM
STEEL CRAWLER
ROPS CANOPY

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.92	1.95	
	8						2.41	2.20	2.07	2.00	
	6					4.29	3.12	2.59	2.29	2.11	
GL	4						3.85	2.99	2.52	2.24	
	2					3.87	4.39	3.33	2.73	2.35	
	0					4.70	4.65	3.53	2.86	2.42	
	-2			3.42	4.02	6.24	4.66	3.59	2.89	2.39	
	-4			4.89	5.82	6.04	4.46	3.47	2.78		
	-6			6.60	7.83	5.33	4.01	3.12	2.38		
	-8				5.93	4.19	3.17				
	-10										

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.92	1.79	
	8						2.41	2.20	2.07	1.78	
	6					4.29	3.12	2.59	2.16	1.75	
GL	4						3.49	2.65	2.10	1.71	
	2					3.87	3.36	2.56	2.05	1.68	
	0					4.70	3.29	2.51	2.01	1.66	
	-2			3.42	4.02	4.70	3.25	2.47	1.98	1.65	
	-4			4.89	5.82	4.72	3.25	2.47	1.98		
	-6			6.60	7.83	4.77	3.28	2.48	2.00		
	-8				5.93	4.19	3.17				
	-10										

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.92	1.89	
	8						2.41	2.20	2.07	1.88	
	6					4.29	3.12	2.59	2.28	1.85	
GL	4						3.68	2.79	2.22	1.82	
	2					3.87	3.55	2.71	2.17	1.79	
	0					4.70	3.47	2.65	2.13	1.76	
	-2			3.42	4.02	4.95	3.44	2.62	2.10	1.75	
	-4			4.89	5.82	4.97	3.43	2.61	2.10		
	-6			6.60	7.83	5.01	3.46	2.63	2.12		
	-8				5.93	4.19	3.17				
	-10										

KX161-3 LONG ARM
STEEL CRAWLER
ROPS CAB

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.92	1.95	
	8						2.41	2.20	2.07	2.00	
	6					4.29	3.12	2.59	2.29	2.11	
GL	4						3.85	2.99	2.52	2.24	
	2					3.87	4.39	3.33	2.73	2.35	
	0					4.70	4.65	3.53	2.86	2.42	
	-2			3.42	4.02	6.24	4.66	3.59	2.89	2.39	
	-4			4.89	5.82	6.04	4.46	3.47	2.78		
	-6			6.60	7.83	5.33	4.01	3.12	2.38		
	-8				5.93	4.19	3.17				
	-10										

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.92	1.83	
	8						2.41	2.20	2.07	1.82	
	6					4.29	3.12	2.59	2.20	1.79	
GL	4						3.57	2.71	2.15	1.76	
	2					3.87	3.44	2.62	2.10	1.72	
	0					4.70	3.36	2.57	2.06	1.70	
	-2			3.42	4.02	4.81	3.33	2.53	2.03	1.69	
	-4			4.89	5.82	4.83	3.33	2.53	2.03		
	-6			6.60	7.83	4.88	3.35	2.54	2.05		
	-8				5.93	4.19	3.17				
	-10										

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)									
		0	2	4	6	8	10	12	14	16	18
	18										
	16										
	14										
	12								1.87		
	10							1.92	1.92	1.93	
	8						2.41	2.20	2.07	1.92	
	6					4.29	3.12	2.59	2.29	1.89	
GL	4						3.75	2.85	2.27	1.86	
	2					3.87	3.62	2.77	2.21	1.83	
	0					4.70	3.54	2.71	2.17	1.80	
	-2			3.42	4.02	5.06	3.51	2.68	2.15	1.79	
	-4			4.89	5.82	5.07	3.51	2.67	2.15		
	-6			6.60	7.83	5.12	3.53	2.69	2.17		
	-8				5.93	4.19	3.17				
	-10										

U35 STANDARD ARM
RUBBER CRAWLER
ROPS CANOPY

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.50		
	8					1.57	1.52	1.49		
	6				3.00	2.13	1.78	1.61		
	4					2.79	2.10	1.76	1.58	
	2					3.28	2.37	1.91	1.63	
GL	0				3.73	3.46	2.52	1.99		
	-2			3.93	4.96	3.40	2.52	1.96		
	-4		3.79	5.80	4.40	3.10	2.31			
	-6			5.68	3.46	2.47				
	-8									

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.50		
	8					1.57	1.52	1.49		
	6				3.00	2.13	1.78	1.50		
	4					2.71	1.92	1.47	1.16	
	2					2.61	1.87	1.43	1.14	
GL	0				3.73	2.55	1.83	1.41		
	-2			3.93	4.16	2.53	1.80	1.39		
	-4		3.79	5.80	4.18	2.53	1.80			
	-6			5.68	3.46	2.47				
	-8									

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.45		
	8					1.57	1.52	1.44		
	6				3.00	2.13	1.78	1.42		
	4					2.52	1.81	1.39	1.10	
	2					2.42	1.75	1.35	1.08	
GL	0				3.73	2.37	1.71	1.33		
	-2			3.93	3.76	2.34	1.69	1.31		
	-4		3.79	5.80	3.77	2.35	1.69			
	-6			5.68	3.46	2.37				
	-8									

U35 STANDARD ARM
RUBBER CRAWLER
ROPS CAB

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.50		
	8					1.57	1.52	1.49		
	6				3.00	2.13	1.78	1.61		
	4					2.79	2.10	1.76	1.58	
	2					3.28	2.37	1.91	1.63	
GL	0				3.73	3.46	2.52	1.99		
	-2			3.93	4.96	3.40	2.52	1.96		
	-4		3.79	5.80	4.40	3.10	2.31			
	-6			5.68	3.46	2.47				
	-8									

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.50		
	8					1.57	1.52	1.49		
	6				3.00	2.13	1.78	1.57		
	4					2.79	2.01	1.54	1.22	
	2					2.73	1.96	1.50	1.20	
GL	0				3.73	2.67	1.91	1.48		
	-2			3.93	4.36	2.65	1.89	1.46		
	-4		3.79	5.80	4.38	2.65	1.89			
	-6			5.68	3.46	2.47				
	-8									

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.50		
	8					1.57	1.52	1.49		
	6				3.00	2.13	1.78	1.48		
	4					2.63	1.89	1.45	1.15	
	2					2.53	1.83	1.42	1.14	
GL	0				3.73	2.48	1.79	1.39		
	-2			3.93	3.93	2.45	1.77	1.38		
	-4		3.79	5.80	3.95	2.46	1.77			
	-6			5.68	3.46	2.47				
	-8									

U35 STANDARD ARM
STEEL CRAWLER
ROPS CANOPY

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.50		
	8					1.57	1.52	1.49		
	6				3.00	2.13	1.78	1.61		
	4					2.79	2.10	1.76	1.58	
	2					3.28	2.37	1.91	1.63	
GL	0				3.73	3.46	2.52	1.99		
	-2			3.93	4.96	3.40	2.52	1.96		
	-4		3.79	5.80	4.40	3.10	2.31			
	-6			5.68	3.46	2.47				
	-8									

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.50		
	8					1.57	1.52	1.49		
	6				3.00	2.13	1.78	1.59		
	4					2.79	2.04	1.56	1.24	
	2					2.77	1.99	1.53	1.22	
GL	0				3.73	2.71	1.94	1.50		
	-2			3.93	4.43	2.69	1.92	1.48		
	-4		3.79	5.80	4.40	2.69	1.92			
	-6			5.68	3.46	2.47				
	-8									

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.50		
	8					1.57	1.52	1.49		
	6				3.00	2.13	1.78	1.50		
	4					2.66	1.91	1.47	1.17	
	2					2.56	1.86	1.44	1.15	
GL	0				3.73	2.51	1.82	1.41		
	-2			3.93	3.98	2.49	1.80	1.40		
	-4		3.79	5.80	4.00	2.49	1.80			
	-6			5.68	3.46	2.47				
	-8									

U35 STANDARD ARM
STEEL CRAWLER
ROPS CAB

LIFTING CAPACITY OVER-END BLADE DOWN

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.50		
	8					1.57	1.52	1.49		
	6				3.00	2.13	1.78	1.61		
	4					2.79	2.10	1.76	1.58	
	2					3.28	2.37	1.91	1.63	
GL	0				3.73	3.46	2.52	1.99		
	-2			3.93	4.96	3.40	2.52	1.96		
	-4		3.79	5.80	4.40	3.10	2.31			
	-6			5.68	3.46	2.47				
	-8									

LIFTING CAPACITY OVER-END BLADE UP

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.50		
	8					1.57	1.52	1.49		
	6				3.00	2.13	1.78	1.61		
	4					2.79	2.10	1.63	1.29	
	2					2.90	2.08	1.60	1.28	
GL	0				3.73	2.84	2.03	1.57		
	-2			3.93	4.63	2.82	2.01	1.55		
	-4		3.79	5.80	4.40	2.82	2.01			
	-6			5.68	3.46	2.47				
	-8									

LIFTING CAPACITY OVER-SIDE

Unit=1000 lb

LIFT POINT HEIGHT (ft)		LIFT POINT RADIUS (ft)								
		0	2	4	6	8	10	12	14	16
	14									
	12						1.48			
	10						1.39	1.50		
	8					1.57	1.52	1.49		
	6				3.00	2.13	1.78	1.56		
	4					2.77	2.00	1.53	1.22	
	2					2.67	1.94	1.50	1.21	
GL	0				3.73	2.62	1.90	1.47		
	-2			3.93	4.16	2.60	1.88	1.46		
	-4		3.79	5.80	4.17	2.60	1.88			
	-6			5.68	3.46	2.47				
	-8									

Kubota

U.S.A. : **KUBOTA TRACTOR CORPORATION**
3401 Del Amo Blvd., Torrance, CA 90503, U.S.A.
Telephone : (310)370-3370
Western Division : 6665 E. Hardaway Rd., Stockton, CA 95215
Telephone : (209)931-5051
Central Division : 14855 FAA Blvd., Fort Worth, TX 76155
Telephone : (817)571-0900
Northern Division : 2626 Port Road, Columbus, OH 43217
Telephone : (614)492-1100
Southeast Division : 1025 Northbrook Parkway, Suwanee, GA 30024
Telephone : (770)995-8855
Canada : **KUBOTA CANADA LTD.**
5900 14th Avenue, Markham, Ontario, L3S 4K4, Canada
Telephone : (905)294-7477
Richmond Distribution Center : 2620 Viscount Way, Richmond, B.C. V6V 1N1
Telephone : (604)270-9286
Drummondville Distribution Center : 5705 Place Kubota, Drummondville, Québec, J2B 6B4
Telephone : (819)478-7151
France : **KUBOTA EUROPE S.A.S**
19-25, Rue Jules Vercruysse, Z.I. BP88, 95101 Argenteuil Cedex, France
Telephone : (33)1-3426-3434
Italy : **KUBOTA EUROPE S.A.S Italy Branch**
Via Grandi, 29 20068 Peschiera Borrome (MI) Italy
Telephone : (39)02-51650377
Germany : **KUBOTA BAUMASCHINEN GmbH**
Steinhauser str, 100, 66482 Zweibrucken Rheinlandpfalz Germany
Telephone : (49)6332-4870100
U.K. : **KUBOTA (U.K.) LTD.**
Dormer Road, Thame, Oxfordshire, OX9 3UN, U.K.
Telephone : (44)1844-214500
Australia : **KUBOTA TRACTOR AUSTRALIA PTY LTD.**
100 Keilor Park Drive, Tullamarine, Victoria 3043 Australia
Telephone : (61)-3-9279-2000
Malaysia : **SIME KUBOTA SDN. BHD.**
No.3 Jalan Sepadu 25/123 Taman Perindustrian Axis,
Seksyen 25, 40400 Shah Alam, Selangor Darul Ehsan Malasia
Telephone : (60)3-736-1388
Philippines : **KUBOTA AGRO-INDUSTRIAL MACHINERY PHILIPPINES, INC.**
155 Panay Avenue, South Triangle Homes, 1103 Quezon City, Philippines
Telephone : (63)2-9201071
Taiwan : **SHIN TAIWAN AGRICULTURAL MACHINERY CO., LTD.**
16, Fengping 2nd Rd, Taliao Shiang Kaohsiung 83107, Taiwan R.O.C.
Telephone : (886)7-702-2333
Indonesia : **P.T. KUBOTA INDONESIA**
JALAN. Setyabudi 279, Semarang, Indonesia
Telephone : (62)-24-7472849
Thailand : **THE SIAM KUBOTA INDUSTRY CO., LTD.**
101/19-24 Navanakorn, Tambol Klongneung, Amphur Klongluang, Pathumtani 12120, Thailand
Telephone : (66)2-529-0363

Japan : **KUBOTA Corporation**
Farm & Industrial Machinery International Operations Headquarters
2-47, Shikitsuhigashi 1-chome, Naniwa-ku, Osaka, Japan 556-8601

KUBOTA Baumaschinen GmbH
Steinhauser Straße 100 6660 Zweibrücken, Federal Republic of Germany
Phone : 6332-4870
Telex : 45117KBMZW D
Facsimile : 6332-487101

English(U.S.A.)
Code No. RC418-8121-9

PRINTED IN JAPAN