WSM

WORKSHOP MANUAL
KUBOTA EXCAVATOR

KX61-3
KX71-3

SERVICE CHAPTER

Kubota

Code No.97899-61050

Record of Revisions

Symbol	Date	Main Revised Points & Corrective Measures	Person-in-charge
△1			
△2			
△3			
△4			

Note:
EU - version indicates the machines for European market such as KE, KUK and KBM.
PP - version indicates the machines for Pan-Pacific region, such as KTC, KCL and KTA.

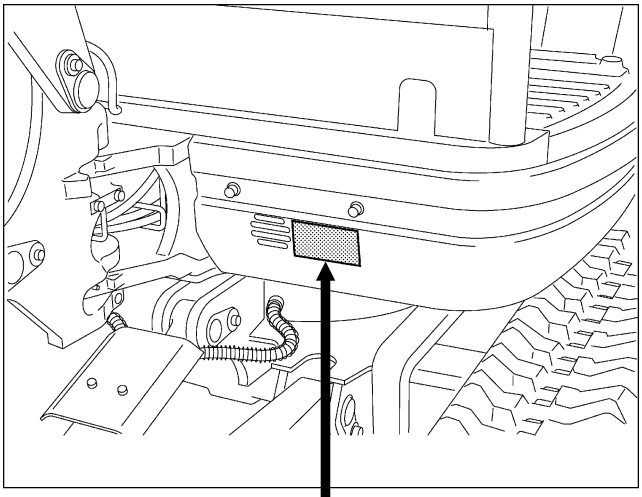
CONTENTS

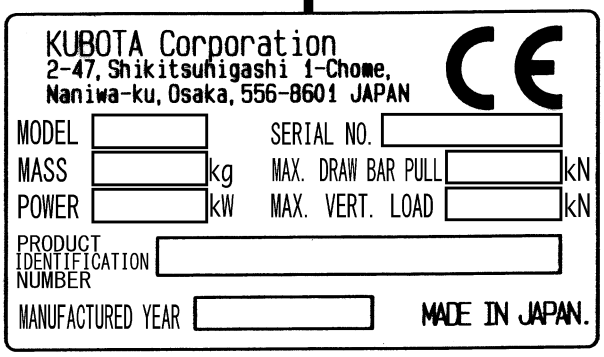
I General

A. Body and engine identification marks

If trouble should occur during use, or if servicing is necessary, contact the dealer who handles the machine. At that time please inform the machine model and engine type and serial numbers.

(1)Machine serial number & plate





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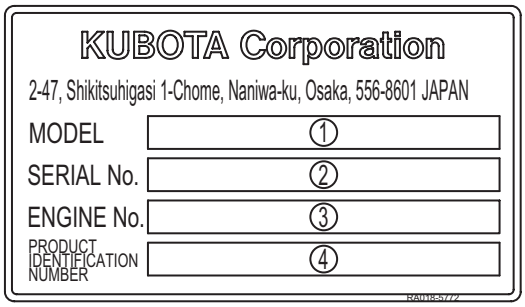
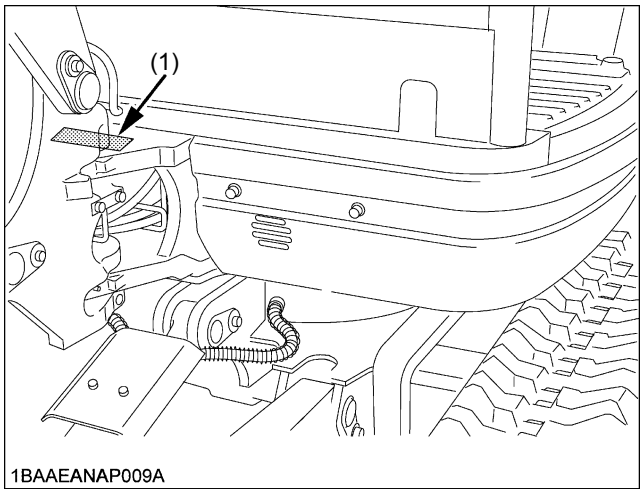
KTC, KCL, KTA version



Name plate : Code No. RA018-57721

No.	Items	Contents ; Example
①	Machine model	KX71-3
②	Serial No.	10001
③	Engine No.	
④	PRODUCT IDENTIFICATION No.	



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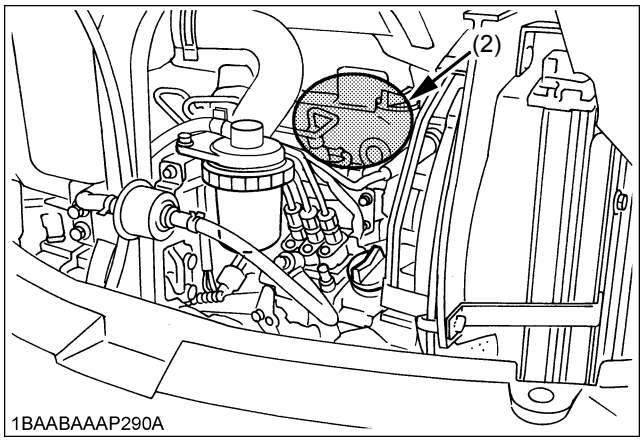
(1)Machine serial numbe



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(2)Engine serial number

(2) Engine serial number

e.g. D1503-2L0025
"2" indicates year of 2002 and "L" indicates June.
So, 2L indicates that the engine was manufactured in June 2002.

B. Safety precautions for servicing, disassembly and reassembly

⚠ Safety precautions for servicing

Most accidents during servicing arise from carelessness. Please remember that Safety involves both the welfare of the employees and improved work efficiency.

⚠ Safety precautions for Disassembly and reassembly

Machines must be disassembled and assembled efficiently and safely.
It is very important to thoroughly understand the construction and function of the machine, to make all appropriate preparations, and start operations according to the specified working procedures.

a. Safety measures before starting work

(1) Work clothes

1. Wear specified work cap and clothed. (Under no circumstances may workers wear undershirts only.)
   Cuffs must be kept buttoned, and any tears must be mended.)
2. Wear safety shoes.
3. Do not wear cotton gloves when working on the internal section of engine, reduction gears or hydrauric units for repair or others, or when using a hammer. Wear leather gloves, however, when hoisting wires.

(2) Inspecting equipment and tools

1. Prepare equipment (cranes, fork lifts, tool, etc.) required for servicing and inspect for any problems before starting work.
2. Hammer heads (metal parts) must be firmly secured to their handles.
3. Check hosting tools (wire ropes, hoisting chains, etc.) before use.

(3) Keep workshop in order

1. Secure appropriate space needed for disassembly to the job.
2. Secure a clean, safe place for arranging disassembled parts.
3. Store volatile substances (gasoline, light oil, thinner, oily articles, etc.) in appropriate containers at selected locations to prevent fire hazards.

b. Safety measures during work

(1) Protectors

1. Wear goggles when using chisels for chipping.
2. Use appropriate protectors during welding.
3. Wear a helmet when working with a crane or at elevated locations.

(2) Team work

1. When working with two or more people, divide the work and maintain close communication.
2. Crane work must be carried out using predetermined signals.

(3) Disassembly and assembly

1. Do not wear gloves when using hammers.
2. Use rods of the specified soft material for removing pins. Do not use a hammer as a pad.
3. Do not place fingers in holes when centering.
4. Heavy parts must be adequately supported before removing bolts.

(4) Cranes

1. In principle, use a crane for objects heavier than 44lb (20kg).
2. Crane operation and hoisting must be performed only by qualified personal.
3. Pay careful attention to the center of gravity when hoisting, and do not stand under the lifted objects.

(5) Others

1. To work under a jacked-up carrier, be sure to place wood pieces under it.
2. When charging batteries, make sure there are no open flames in the immediate vicinity.
3. All electric tools must be grounded.
4. Before welding the machine, remove the battery.
   - When removing the battery, be sure to disconnect negative (-) cord first.
   - When mounting the battery, be sure to connect the positive (+) cord first.

c. Preparation for disassembly

(1) Cleaning

Remove mud and dirt from the body before disassembly.

(2) Acceptance inspection

The machine must be checked before it is disassembled to record existing conditions, such as those listed below.

Model, serial number, and hourmeter reading

- Reason for repair and repair history
- Element stains
- Fuel and oil condition
- Parts damage *(Take photographs if necessary.)

(3) Equipment and tools

prepare equipment, tools, cranes and parts storage racks as required.

d. Precautions for disassembly and reassembly

(1) Disassembly

1. Follow the specified disassembly procedures.
2. Make alignment marks to insure correct reassembly.
3. Arrange disassembled parts in an orderly way, and attach identification tags or put marks if needed.

(2) Reassembly

1. Clean all parts before assembly. Repair any scratches or dents. Take special precautions against dirt and dust.
2. Parts with rust-preventive coatings must be assembles only after removing the coating.
3. Separated parts must be correctly reassembled using alignment marks.
4. As a rule, use a press to reassembled bearings, bushing and oil seals. Use pads when using a hammer.

C.IMPORTANT SAFETY PROCESS AND CRITICAL FUNCTIONAL PROCESS

The following instructions are related to essential adhesives, important safety process [S] and critical functional process [A] .Pay special attention in servicing these process. (Pay also close attention in reconnecting the electrical cables.)

a. Essential Adhesives

Type of screw adhesive

- Unless otherwise specified, use Three-Bond 1324 adhesive (medium-duty type). Keep the screw threads free of oil and water.

Type of instantaneous adhesive

- Use Three-Bond 1733 or Three-Bond 1741E adhesive. Keep the bond areas free of oil and water.

b. Important Safety Process [S] .

1. Reconnecting the fuel hose (clearance, hose routes, clamps, etc.)
2. Electrical cabling (engine, instrument panel, seat stand, etc.) (wiring routes, clamps and couplers)

c. Important Critical Functional Process [A] .

1. Setting up the travel wheel motor (tightening torque)
2. Reassembling the rotary joints (joint direction and shaft set-up)
3. Installing the swivel base bearing and the swivel motor (tightening torque)
4. Fitting the pump couplings (tightening torque)

D.IMPORTANT INSPECTION ITEMS AFTER REASSEMBLING

a Operate the Machine and check for Unusual Noise and Vibrations.

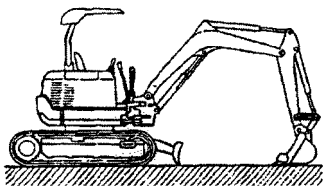
b Make Sure the Safety decals and Wireharness Clamps are in their Specified Positions.

c With the Machine Front in a Specified Posture, Check the Amount of Hydraulic Oil

Checking the oil level (For further details, refer to the Operator's Manual of each model.)

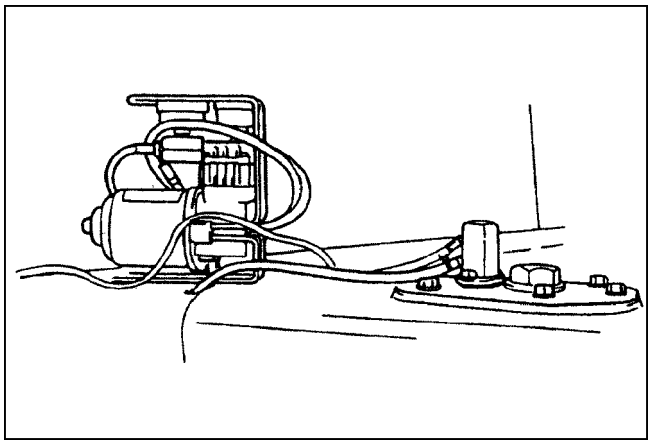
(1) Park the machine on a level ground.
(2) Make sure the hydrauric oil temperature is in the range of 10-30°C (50-86°F) and see if the oil level is within the specified zone of the oil level gauge.
(3) Keep the machine front as shown as following posture.

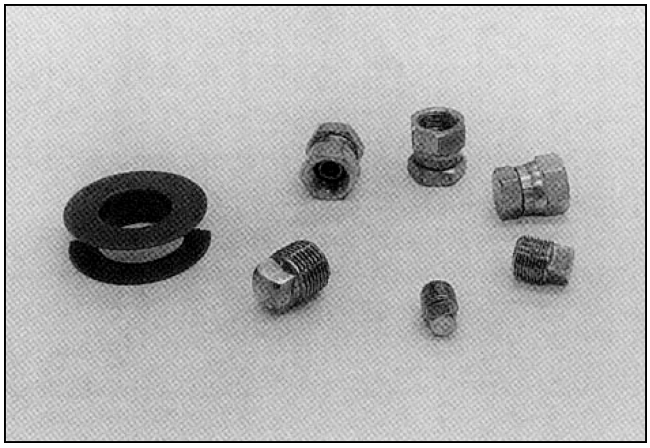
Posture: Extend the rods of the arm and bucket cylinders nearly half. Place the bucket on the ground, the offset swing at the center, and the dozer also on the ground.

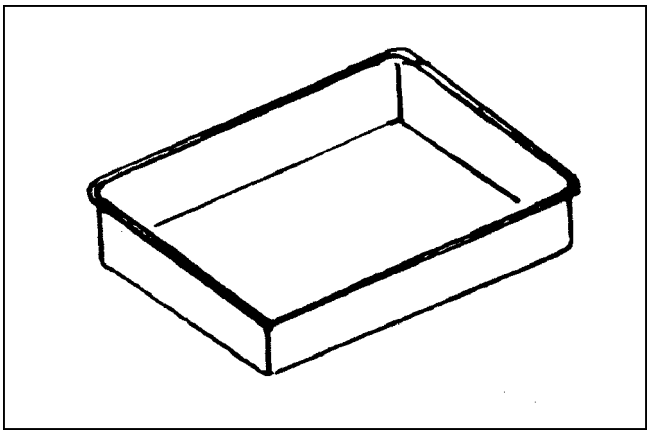


E.SERVICING FUNDAMENTALS

Locking adhesive







a. Items for Servicing

(1) Tighten bolts, nuts, adapters,and similar parts to their specified torques which are given in the list of tightening torques and adhesive as well as in this manual. Be sure to observe the specified torques for important tightened parts and components.

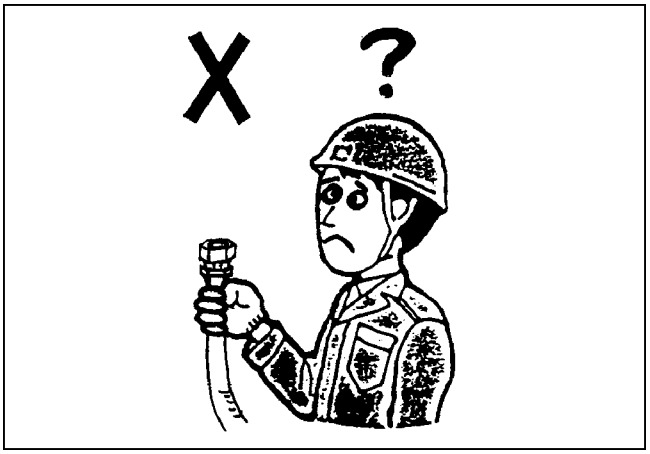
(2) Wipe out water, oil and grease off the screws on which LOCTITE adhesive is to be applied. Be sure to apply the adhesive to specified locations.

Types of screw adhesive
Equivalent to LOCTITE 271 (Heavy-duty) Equivalent to THREE-BOND 1305P (Heavy-duty) Equivalent to THREE-BOND TB1401B (Light-duty) Unless specified otherwise, use THREE-BOND 1324 (Medium-duty).

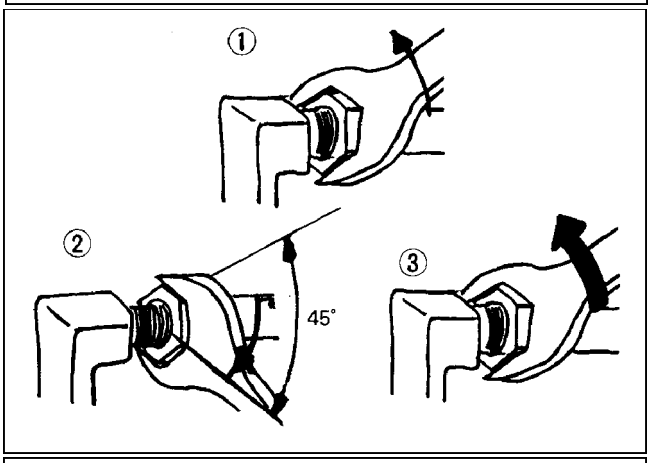
Type of instantaneous adhesive
Use THREE-BOND 1733 or 1741E

The word “LOCTITE“ in this manual denotes the red-color type.

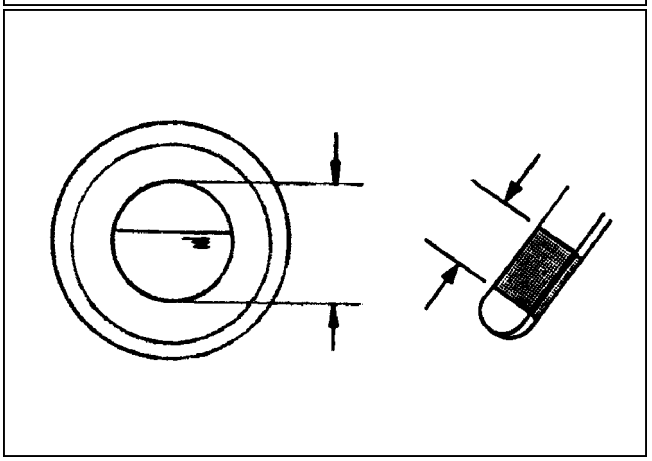
(3) Precautions in disassembling the hydraulic equipment
- Use a vacuum pump, plugs, oil pans, waste cloth and the like to prevent oil from running out or splashing.
  Wipe out leaking oil completely first and then add oil as required.
- Protect the openings with plugs, covers or the like to keep off foreign matters. Most of hydraulic system troubles are caused by the entry of foreign matters.
- Before reassembling, clean up the parts and components and apply hydraulic oil on them.
- The system consists of precision parts. Be careful not to scratch them and apply excessive force on them.



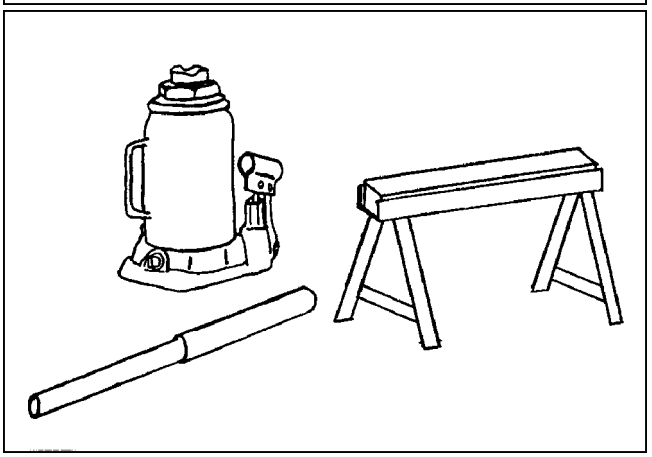
(4) Precautions in tightening hoses and pipes.
- Flexible hoses have a slight natural bend of their own. Utilize the natural bend. Be also careful not to twist them.
- Be careful not to confuse the routes of the hoses.
- Do not hold the hoses in tight contact with their adjacent parts and surfaces.



- Tightening steps
  1. First tighten the nut to its specified torque.
  2. Then loosen the nut by about 45° to fit the seat of the joint to the connection.

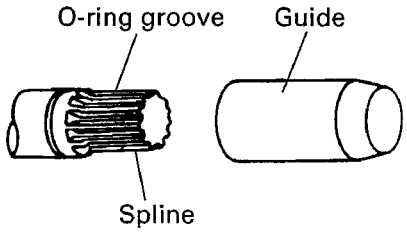


(5) The quantities of oil, fuel, water and others, except for the oil to be filled in the track rollers and idlers, are listed just as reference. Fill up the fluid up to the specified center level of a level gauge if it is provided.

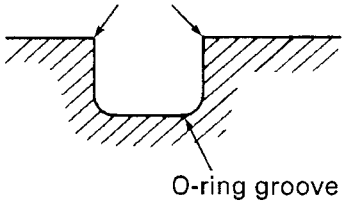


(6) Security support the machine with a jack and a supporting jig when it is jacked up for servicing.
(7) Be sure to use a crane in disassembling and reassembling heavy parts and components (frame, front attachment, crawler, etc.).

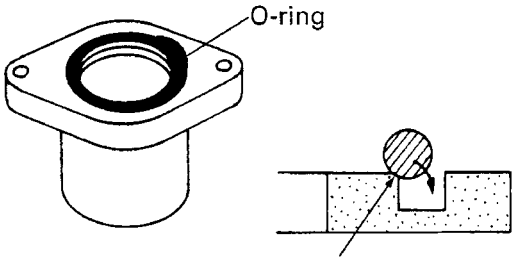
b. O-ring, Oil seal, Circlip and Roll Pin



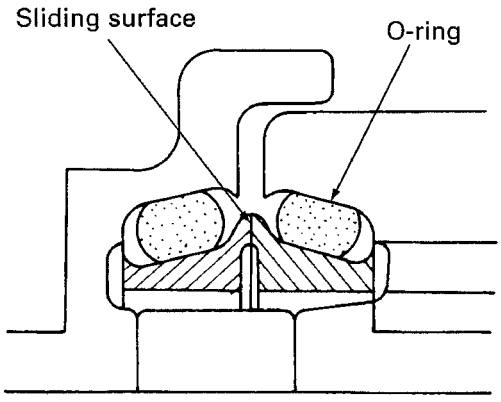
(1) General precautions
- Make sure the O-ring and the oil seal are free of anything unusual (uneven surface, scratches, chipping, etc.).
- Check the O-ring groove for burrs. Correct, if any, using an oil stone or the like.
- When putting a part past a sharp edge into position, protect such edge with a cover or get the part chamfered.



(2) O-ring
- Clean up the O-ring groove and deburr its edge as required.
- Before installing the ring, be sure to apply lubricant (grease) over it. (Do not do this to the floating seal.)
- Fit the O-ring into its groove without twist. With your fingertip, push the ring gently and evenly into the final position. Otherwise the ring would easily get twisted in contact with the inner edge of the groove.

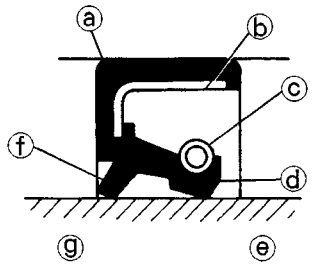


(3) Floating seal
- Be sure to wipe oil off the O-ring and the O-ring contact surface. (Note, however, that oil must be applied thinly over those of the wheel motor.)
- In fitting the O-ring into the floating seal, be careful not to twist the O-ring.
- Before installing the floating seal together with the O-ring, apply sealing oil thinly over the sliding surface. Be careful to keep the sliding surface and O-ring in alignment with the housing.
- Finally turn the floating seal 2 or 3 times by hand in order to form an oil film over the sliding surface as well as to get the sealing surface well it.

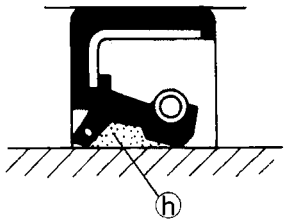


(4) Oil seal

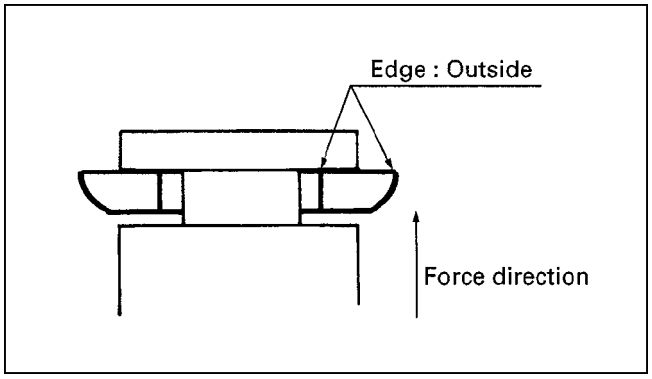
- Do not confuse the orientation of the oil seal lips. Direct the main lip toward the oil chamber; in other word, toward what is to be sealed.



a.	Packing	f.	Dustpans lip
b.	Metal ring	g.	Atmosphere (outside)
c.	Spring	h.	Grease
d.	Main lip		
e.	Oil chamber (inside)		

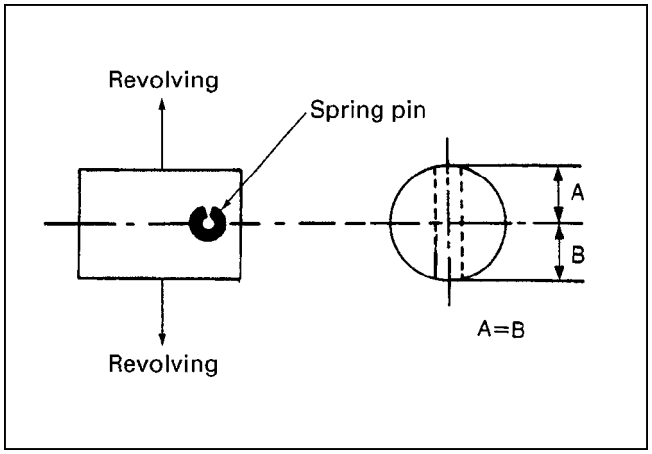


- If in dry state, the oil seal may wear out when running in the machine. To prevent this, be sure to apply lubricant (grease) over the lip sliding surface. If provided also with a dustproof lip, fill the space between this lip and the main lip with grease.
- As a rule, use a press to press-fit the oil seal. If not available, apply a suitable tool and tap it evenly without allowing any tilt. Press-fit the oil seal deep down to the bottom of the oil seal fitting boss.



(5) Mounting the circlip

- Place the circlip with its sharp edge facing outward (in the locking direction).
- Fit the circlip securely in the groove. For the hole circlip in particular, install and turn it slightly to make sure it fits well.



(6) Tapping the roll pin (spring pin)

- Place the roll pin (spring pin) with its opening perpendicular to the load.
- Place the roll pin (spring pin) with its opening in the turning direction.
- Evenly tap the roll pin (spring pin) into position.

c. Piping

(1) General precautions

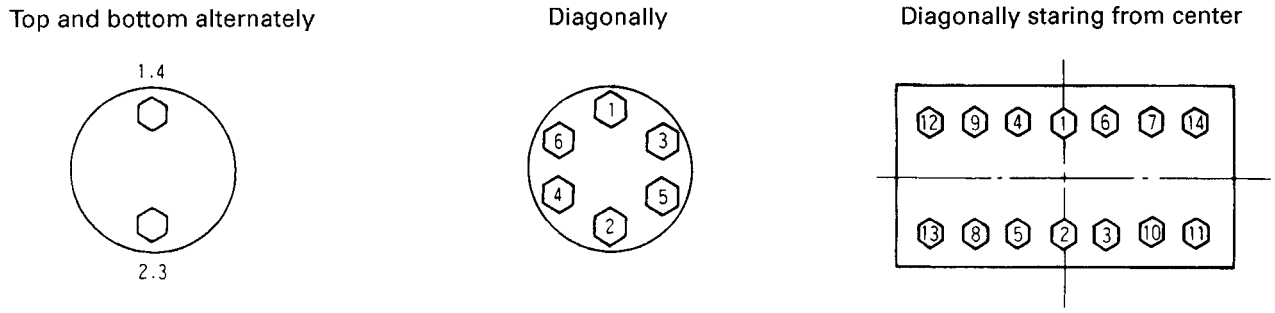
- Tightening the pipe socket to the specified torque. If too tight, the socket itself or a hydraulic component may get damaged. It too loose, an oil leak may result.
- In connecting a new hose or pipe, tighten its nut first to the specified torque and then turn it back (about 45°). Then tighten it again to the specified torque. (Do not this to the sealing tape-applied hose or pipe.)
- When disconnecting a vertical hose or pipe, separate its bottom connection first.
- In disconnecting and reconnecting the hose and pipe, be sure to use two wrenches. With one wrench, restrain the mating part to allow no twist.
- Check the mating connector's sleeve and the hose's taper for dust deposits and scratches.
- When the pipe socket has been tightened up, wipe the joint clean. Apply the maximum operating pressure 2 or 3 times to make sure there is no oil leak.

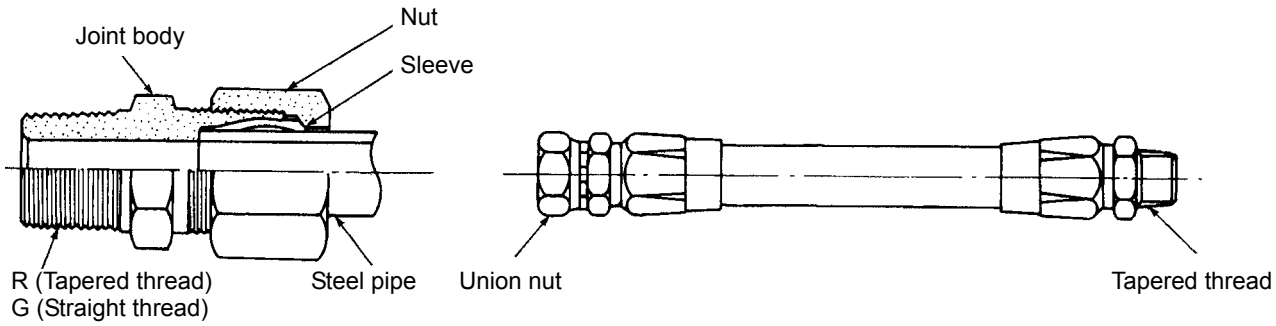
(2) Hydraulic hose

Check the hydraulic hose for too tight a connect or twist.
*Excessively tight contact
Let's suppose that a hose is in contact with another hose or other part. If the hose is pulled away by a force of 2 kg but still in contact, it means the contact is too tight.

(3) Precautions in tightening the bolts and nuts

- Use bolts of specified length.
- Do not over tighten the bolts: Its threads may get deformed or the fixed part may get damaged. Do not undertighten the bolt either: It may get loose.
- In other words, tighten the bolt to the specified torque.
- Tighten the bolts and nuts diagonally for even tightness.





(4) Hose screw

Thread size (piping screw)	Tightening torque N·m kgf·m		Wrench size
	Union nut section	Taper thread section	
1/8”	7.8 ~ 11.8 N·m 0.8 ~ 1.2 kgf·m	14.71 ~ 19.61 N·m 1.5 ~ 20 kgf·m	17 mm
1/4”	24.5 ~ 29.4 2.5 ~ 3.0	36.3 ~ 44.1 3.7 ~ 4.5	19 mm
3/8”	49.0 ~ 53.9 5.0 ~ 5.5	49.0 ~ 68.6 5.0 ~ 7.0	22 mm
1/2”	58.8 ~ 63.7 6.0 ~ 6.5	83.4 ~ 88.3 8.5 ~ 9.0	27 mm
3/4”	117.7 ~ 127.5 12.0 ~ 13.0	127.5 ~ 147.1 13.0 ~ 15.0	36 mm
1”	137.3 ~ 147.1 14.0 ~ 15.0	147.1 ~ 166.7 15.0 ~ 17.0	41 mm

Metric Size Hose

Thread size (piping screw)	Torque N·m kgf·m
M12 × 1.5	20 ~ 30 2.0 ~ 3.1
M14 × 1.5	20 ~ 30 2.0 ~ 3.1
M16 × 1.5	30 ~ 50 3.1 ~ 5.1
M18 × 1.5	30 ~ 50 3.1 ~ 5.1
M22 × 1.5	40 ~ 60 4.1 ~ 6.1

(5) Joint bodies

Thread size (piping screw)	Tightening torque N·m kgf·m		Spanner size (reference)	Remarks Steel pipe (OD)	
	R (tapered thread)	G (straight thread)			
1/8”	19.6 ~ 29.4 N·m 2.0 ~ 3.0 kgf·m	—	17 mm	When in steel pipe is in use.	8 mm
1/4”	36.3 ~ 44.1 3.7 ~ 4.5	W/O-ring *Joint Torque* 58.8 ~ 78.5 6 ~ 8	19 mm		12 mm
3/8”	39.2 ~ 49.0 4.0 ~ 5.0	W/O-ring *Joint Torque* 78.5 ~ 98.1 8 ~ 10	23 mm		15 mm
1/2”	49.0 ~ 68.6 5.0 ~ 7.0	W/O-ring *Joint Torque* 117.7 ~ 137.3 12 ~ 14	26 mm		16 mm

(6) Tightening torque table for hose clamp (Screw type)

No.	Dia. (mm)	Code No.	Tightening torque N·m kgf·m
1	Ø12 ~ 16	09318-89016	2.5 ~ 3.4 25 ~ 35
2	Ø19 ~ 25	09318-89024	
3	Ø31 ~ 40	09318-89039	
4	Ø36 ~ 46	09318-89045	
5	Ø15 ~ 25	RC101-64580	4.9 ~ 5.9 50 ~ 60
6	Ø26 ~ 38	68311-72820	
7	Ø13 ~ 20	RB101-63630	3.4 ~ 4.4 35 ~ 45
8	Ø40 ~ 55	RC411-63180	4.9 ~ 5.9 50 ~ 60
9	Ø77 ~ 95	69284-63170	
10	Ø50 ~ 60	RC401-63190	
11	Ø32 ~ 44	RD411-63820	

(7) Nuts for piping

Steel pipe size (O.D. × I.D. × Thickness)	Tightening torque N·m kgf·m	Spanner size (reference)	Remarks
8 × 6 × 1 mm	29.4 ~ 39.2 3.0 ~ 4.0	17 mm	When sleeve nut is in use.
10 × 7 × 1.5 mm	39.2 ~ 44.1 4.0 ~ 4.5	19 mm	
12 × 9 × 1.5 mm	53.9 ~ 63.7 5.5 ~ 6.5	21 mm	
16 × 12 × 2 mm	88.3 ~ 98.1 9.0 ~ 10.0	29 mm	
18 × 14 × 2 mm	127.5 ~ 137.3 13.0 ~ 14.0	32 mm	
27.2 × 21.6 × 2.8 mm	235.4 ~ 254.97 24.0 ~ 16.0	41 mm	

(8) Tightening torque of bolts and nuts

Refer to the tightness torque table below.

Bolts, Nuts / Nominal Dia.	4T 	7T 	9T 
	SS41	S40C, S45C	SCr4
M6	7.8 ~ 9.3 N·m 0.80 ~ 0.95 kgf·m	9.8 ~ 11.3 N·m 1.00 ~ 1.15 kgf·m	12.3 ~ 14.2 N·m 1.25 ~ 1.45 kgf·m
M8	17.7 ~ 20.6 N·m 1.80 ~ 2.10 kgf·m	23.5 ~ 27.5 N·m 2.40 ~ 2.80 kgf·m	29.4 ~ 34.3 N·m 3.00 ~ 3.50 kgf·m
M10	39.2 ~ 45.1 N·m 4.00 ~ 4.60 kgf·m	48.0 ~ 55.9 N·m 4.90 ~ 5.70 kgf·m	60.8 ~ 70.6 N·m 6.20 ~ 7.20 kgf·m
M12	62.8 ~ 72.6 N·m 6.40 ~ 7.40 kgf·m	77.5 ~ 90.2 N·m 7.90 ~ 9.20 kgf·m	103.0 ~ 117.7 N·m 10.50 ~ 12.00 kgf·m
M14	107.9 ~ 125.5 N·m 11.00 ~ 12.80 kgf·m	123.6 ~ 147.1 N·m 12.60 ~ 15.0 kgf·m	166.7 ~ 196.1 N·m 17.00 ~ 20.00 kgf·m
M16	166.7 ~ 191.2 N·m 17.00 ~ 19.50 kgf·m	196.1 ~ 225.6 N·m 20.00 ~ 23.00 kgf·m	259.9 ~ 304.0 N·m 26.50 ~ 31.00 kgf·m
M18	245.2 ~ 284.4 N·m 25.00 ~ 29.0 kgf·m	274.6 ~ 318.7 N·m 28.00 ~ 32.50 kgf·m	343.2~ 402.1 N·m 35.00 ~ 41.00 kgf·m
M20	333.4~ 392.2 N·m 34.00 ~ 40.00 kgf·m	367.7 ~ 431.5 N·m 37.50 ~ 44.0 kgf·m	519.8 ~ 568.8 N·m 53.00 ~ 58.00 kgf·m

(9) Types and materials of bolts and nuts

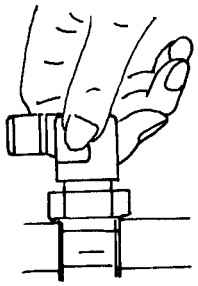
[ex. bolts]

Types	Material	Tensile strength	Hardness	Bolt head marking	
4T	SS41	Over 392 MPa 4000 kgf/cm^2	H_RB 62 ~ 98		No mark or marked 4
7T	S40C S45C	Over 686 MPa 7000 kgf/cm^2	H_RC 20 ~ 28		Marked 7
9T	SCr4	Over 882 MPa 9000 kgf/cm^2	H_RC 28 ~ 34		Marked 9

(10)Washer-equipped elbow

Tightening torque

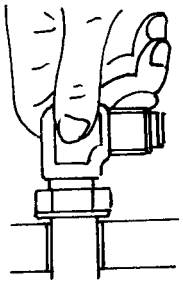
Size	N·m	kgf·m
G1/4	25 ~ 30	2.5 ~ 3.0
G3/8	49 ~ 54	5.0 ~ 5.5
G1/2	59 ~ 64	6.0 ~ 6.5
G1/8	15 ~ 16.5	1.5 ~ 1.7



Tightening procedure

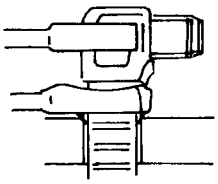
1. Connecting with the valve
   - Screw in the elbow by hand until the washer comes into contact.

Note: Clean up the mating seal beforehand.



2. Positioning
   - Turn the elbow back to its set position.

Note: Do not make any more than one turn back.



3. Fixing
   - Tighten up the lock nut with a wrench.
   - Lock nut tightening torque

F. Maintenance intervals

a. Maintenance intervals chart:EU - version

	General Maintenance	Elapsed Operating Hour *																				
		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	Interval
Operator Services	Check engine oil level																					daily
	Check hydraulic oil level																					daily
	Chcek fuel level																					daily
	Check coolant level																					daily
	Grease front attachments																					daily
	Check V-belt																					daily
	Check water in fuel filter																					daily
	Tracks and chassis: clean, visual inspection and check tension	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	weekly (50 hrs)
	Grease swivel gear	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	50 hrs
	Check, clean air filter 1.)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	50 hrs
	Check nuts and bolts		○		○		○		○		○		○		○		○		○		○	100 hrs
	Grease swivel gear bearing				○				○				○				○				○	200 hrs
	Check battery electrolyte level										○										○	500 hrs
	Drain water in fuel tank										○										○	500 hrs

* The services identified with ● must be carried out at the specified service hours after initial operation.

1.) Under dusty conditions the air filter must be cleaned more frequently or renewed.

2.) When using a hydraulic hammer over 20% every 800h. When using a hydraulic hammer over 60%every 300h.
When using a hydraulic hammer over 40%every 400h. When using a hydraulic hammer over 80%every 200h.

3.) When using a hydraulic hammer over 50%every 200h. When using a hydraulic hammer over 50%every 100h.

4.) Earlier if necessary.

5.) At least annually.

	Service	Elapsed Operating Hours *																				
		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	Interval
Servicing by skilled personnel or KUBOTA dealer	Change engine oil and oil filter	●				○					○					○					○	250 h
	Inspect coolant hoses and clamps					○					○					○					○	250 h
	Check/adjust V-belt tension					○					○					○					○	250 h
	Grease pilot valve linkage					○					○					○					○	250 h
	Change fuel filter 4.)										○										○	500 h
	Change hydraulic return line filter element 3.)					●					○										○	500 h
	Change drive unit oil 5.)	●									○										○	500 h
	Change hydraulic oil and suction filter. 2.)																				○	1000 h
	Renewing the Pilot Circuit Filter																				○	1000 h
	Change air filter elements1.)																				○	1000 h
	Change idler and track roller oil																					2000 h
	Check altemator and starter motor						Please contact your KUBOTA dealer.															2000 h
	Inspect electric cables and connections						Please contact your KUBOTA dealer.															annually
	Change coolant																					every 2 years
	Change hydraulic hoses						Please contact your KUBOTA dealer.															every 6 years

b. Maintenance interval chart : PP - version

No.	Check points		Intervals	Hour meter indicator									Consequently	Ref. page		
				50	100	150	200	250	300	350	400	450				
1	Coolant		check	Daily check												
			change										every 2 years			
2	Fuel		check	Daily check												
3	Engine oil		check	Daily check												
			change	◉					○				every 250 hrs			
4	Hydraulic oil		check	Daily check												
			change										every 1000 hrs		*1	
5	Lubrication points		-	Daily check												
6	Radiator and oil cooler		check	Daily check												
7	Engine and electrical wiring		check	Daily check									every year			
8	Fuel tank, Fuel filter		drain	○	○	○	○	○	○	○	○	○	every 50 hrs			
9	Battery condition		check	○	○	○	○	○	○	○	○	○	every 50 hrs			
10	Greasing swivel bearing teeth		-	○	○	○	○	○	○	○	○	○	every 50 hrs			
11	Fan belt tension		adjust				○				○		every 200 hrs			
12	Radiator hoses and clamps		check				○				○		every 200 hrs			
			replace										every 2 years			
13	Air filter element	Outer element	clean				○				○		every 200 hrs		*2	@
			replace										every 1000 hrs		*2	
		Inner element	replace										every 1000 hrs		*2	
14	Greasing swivel ball bearings		-				○				○		every 200 hrs			
15	Fuel filter element		replace								○		every 400 hrs			@
16	Engine oil filter		replace	◉					○				every 250 hrs			
17	Drive unit oil		change		◉								every 500 hrs			
18	Hydraulic return filter element		replace					◉					every 500 hrs			
19	Hydraulic suction filter element		replace										every 1000 hrs			
20	Fuel injection nozzle injection pressure		check										every 1500 hrs		*4	@
21	Front idler and track roller oil		change										every 2000 hrs			
22	Alternator and starter motor		check										every 2000 hrs			
23	Injection pump		check										every 3000 hrs		*4	@
24	Radiator system		rinse										every 2 years			
25	Fuel line and intake air line		check				○				○		every 200 hrs			@
			replace										every 2 years		*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											
			change									every 2 years			
2	Fuel		check	Daily check											
3	Engine oil		check	Daily check											
			change		○					○		every 250 hrs			
4	Hydraulic oil		check	Daily check											
			change								○	every 1000 hrs		*1	
5	Lubrication points		-	Daily check											
6	Radiator and oil cooler		check	Daily check											
7	Engine and electrical wiring		check	Daily check								every year			
8	Fuel tank, Fuel filter		drain	○	○	○	○	○	○	○	○	every 50 hrs			
9	Battery condition		check	○	○	○	○	○	○	○	○	every 50 hrs			
10	Greasing swivel bearing teeth		-	○	○	○	○	○	○	○	○	every 50 hrs			
11	Fan belt tension		adjust			○				○	○	every 200 hrs			
12	Radiator hoses and clamps		check			○				○	○	every 200 hrs			
			replace									every 2 years			
13	Air filter element	Outer element	clean			○				○	○	every 200 hrs		*2	@
			replace								○	every 1000 hrs		*2	
		Inner element	replace								○	every 1000 hrs		*2	
14	Greasing swivel ball bearings		-			○				○	○	every 200 hrs			
15	Fuel filter element		replace							○		every 400 hrs			@
16	Engine oil filter		replace		○					○		every 250 hrs			
17	Drive unit oil		change									every 500 hrs			
18	Hydraulic return filter element		replace						○			every 500 hrs			
19	Hydraulic suction filter element		replace								○	every 1000 hrs			
20	Fuel injection nozzle injection pressure		check									every 1500 hrs		*4	@
21	Front idler and track roller oil		change									every 2000 hrs			
22	Alternator and starter motor		check									every 2000 hrs			
23	Injection pump		check									every 3000 hrs		*4	@
24	Radiator system		rinse									every 2 years			
25	Fuel line and intake air line		check			○				○	○	every 200 hrs			@
			replace									every 2 years		*3	

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".

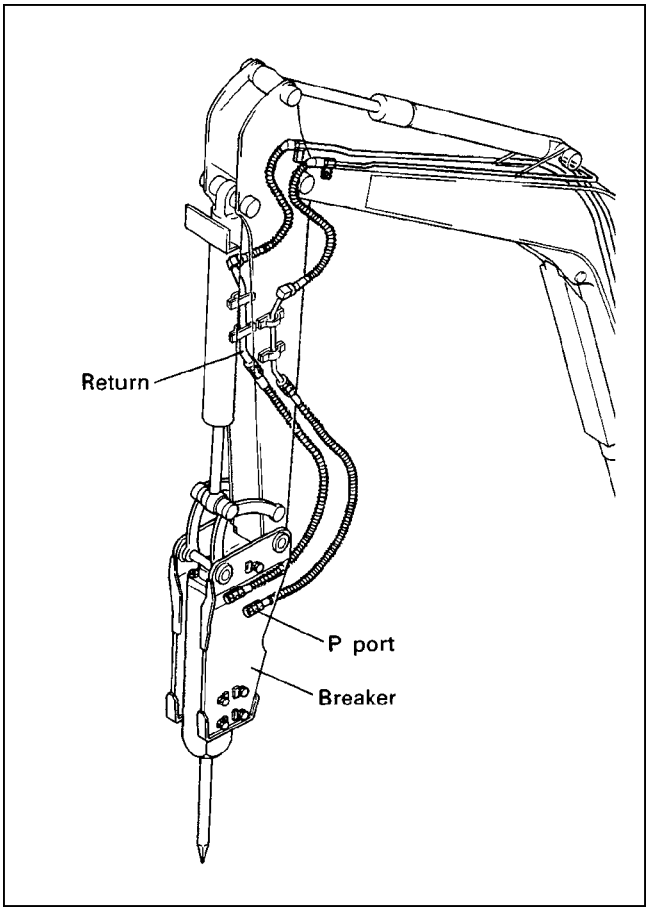
*2 Clean and replace the air filter more frequently if used under dusty conditions. By heavy soiling, replace the filter.

*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.

c. 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 measure 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 at normal excavating work.
   2. Use only the recommended oils mentioned in the operator's manual when changing or fill 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.	500 Hrs.	1000 Hrs.
Breaker work portion	20%	every 800 Hrs.	300 Hrs.	
	40%	every 400 Hrs.		
	60%	every 300 Hrs.	100 Hrs.	
	More than 80%	every 200 Hrs.		

d. Periodic replacement of important parts

To ensure safety in traveling and operating the machine, the user is strongly requested to carry out periodic inspection and servicing. For added safety, the following important parts, related to safety and fire hazards in particular, must be replaced at their specified intervals.
With the passage of time, these parts easily get degraded in material or worn out. They are difficult to check for anything unusual even at periodic inspection and servicing. Even if nothing unusual is found, it is essential to replace them with new ones after their specified service life, in order to maintain complete function.
If by any chance any of these parts gets in trouble even before its service life, it must be repaired or replaced as usual.
In replacing the hoses, check also the hose clamps for deformation, cracks and other troubles. Replace the hose clamps too with new ones, as required.
Check all the hydraulic hoses, including those to be replaced at regular intervals, for the following points. Tighten up or replace them, as required.
When replacing the hydraulic hoses, change their O-rings and sealing for new ones at the same time.

• Check the fuel and hydraulic hoses too at the following periodic inspections.

Inspection intervals	Inspection item
Daily inspection	Fuel and hydraulic hose connections as well as crimped parts for oil leak
Monthly inspection	Fuel and hydraulic hose connections as well as crimped parts for oil leak Fuel and hydraulic hoses for damages (cracks, wear-out and peel-off)
Specified self-imposed (yearly) inspection	Fuel and hydraulic hose connections as well as crimped parts for oil leak Fuel and hydraulic hoses for interference, deformation, degrading, twist and other damages (cracks, wear-out, peel-off)

• List of important parts

No.	Periodic-replaced parts	Q'ty	Replacement intervals
1	Fuel hose (Fuel tank ~ Fuel filter)	1	2 years or 4000 operating hours, whichever comes earlier
2	Fuel hose (Fuel filter ~ Fuel pump)	1	
3	Fuel hose (Fuel pump ~ Fuel nozzle)	1	
4	Fuel hose (Fuel nozzle ~ Fuel tank)	1	
5	Hydraulic hose (Main pump suction)	1	
6	Hydraulic hose (Main pump delivery)	4	
7	Hydraulic hose (Boom cylinder)	*2	
8	Hydraulic hose (Arm cylinder)	*2+2	
9	Hydraulic hose (Bucket cylinder)	*4	
10	Hydraulic hose (Swing cylinder)	2	
11	Hydraulic hose (Dozer cylinder)	4	
12	Hydraulic hose (Service port)	*2+2	
13	Hydraulic hose (Swivel motor)	2	

Note: The *-marked hydraulic hoses are Kubota's genuine ultra wear-resistant hoses. Be sure to use these parts.

II. Machine body

A. Specifications

a. Machine weight

	Track	Arm	Unit	KX61-3 EU	KX71-3 EU	KX71-3 PP
Canopy	Rubber	STD.	kgf	2530	2720	-
			(lbs)	(5578)	(5997)	
		Long	kgf	2540	2730	2780
			(lbs)	(5600)	(6019)	(6129)
	Steel	STD.	kgf	2625	2815	-
			(lbs)	(5787)	(6206)	
		Long	kgf	2635	2825	2875
			(lbs)	(5809)	(6228)	(6338)
Cabin	Rubber	STD.	kgf	2640	2830	-
			(lbs)	(5820)	(6239)	
		Long	kgf	2650	2840	2890
			(lbs)	(5842)	(6261)	(6371)
	Steel	STD.	kgf	2735	2925	-
			(lbs)	(6030)	(6449)	
		Long	kgf	2745	2935	2985
			(lbs)	(6052)	(6471)	(6581)
Cabin (Light weight)	Rubber	STD.	kgf	2580	-	-
			(lbs)	(5688)		
		Long	kgf	2590	-	-
			(lbs)	(5710)		
	Steel	STD.	kgf	2675	-	-
			(lbs)	(5897)		
		Long	kgf	2685	-	-
			(lbs)	(5919)		

(Note: Cabin - canopy = 105kgf, Steel crawler - rubber crawler = 95kgf, Long arm - STD. arm = 10kgf)

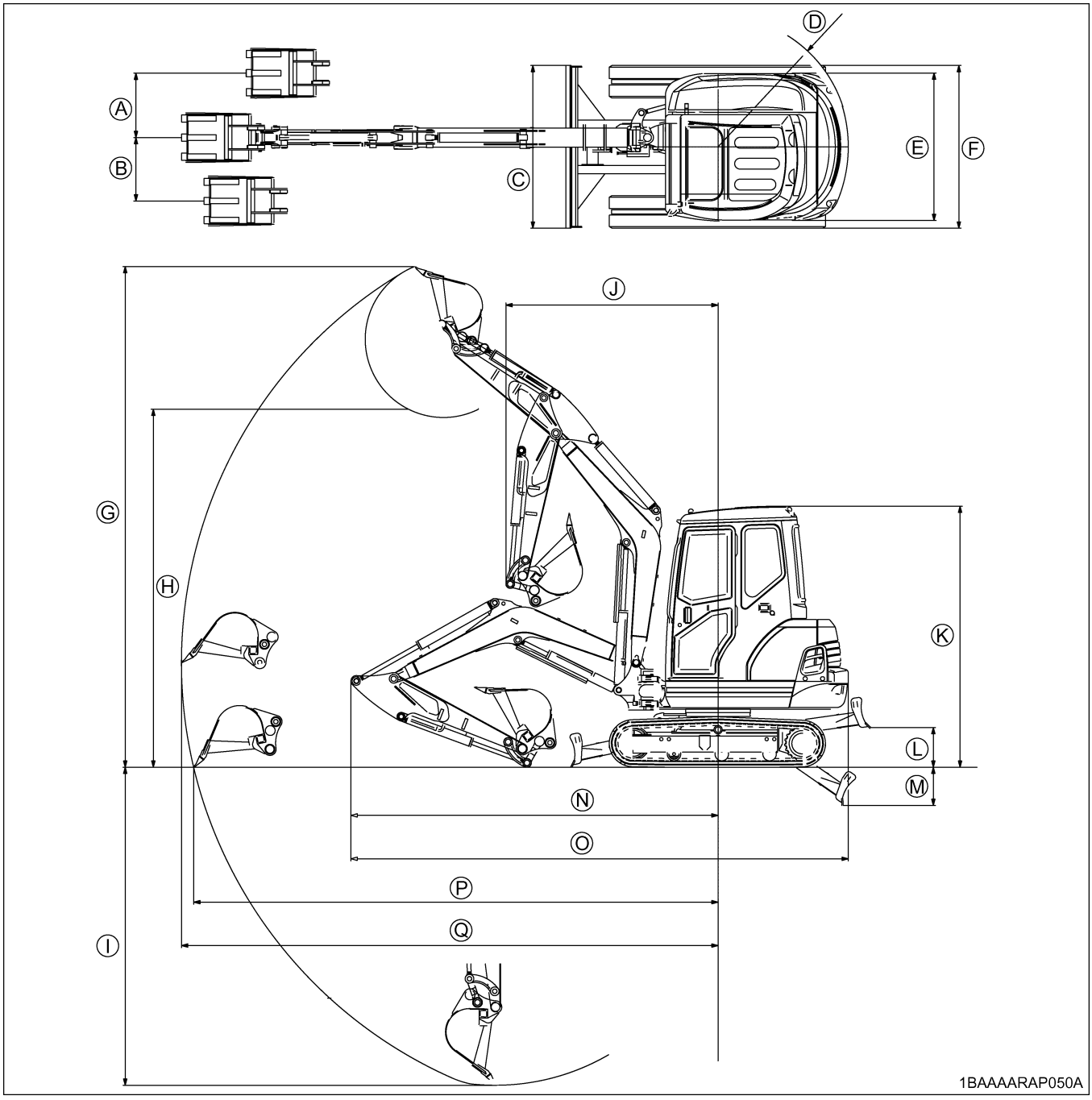
b. Machine specifications

[1] Major specifications

		Unit		KX61-3		KX71-3 EU		KX71-3 PP	
Engine									
Type				Vertical, water-cooled 4 cycle, 4 cylinders diesel					
Model				V1505-E2BH-9-EU		V1505-E2BH-10-EU		V1505-E2BH-10	
gross engine output (SAE J1349)		kW		18.3		20.6		←	
		PS		24.9		28.0		←	
Displacement		cc	in^3	1498.0	91.4	1498.0	91.4	←	
Dimensions									
Overall length		mm	in	4270	168.1	4520	178.0	4550	179.1
Overall width		mm	in	1400	55.1	1500	59.1	←	
Overall crawler width		mm	in	1400	55.1	1500	59.1	←	
Overall height	Canopy	mm	in	2430	95.7	2430	95.7	←	
	Cabin	mm	in	2410	94.9	2410	94.9	←	
Min. ground clearance		mm	in	305	12.0	305	12.0	←	
Max. digging depth	STD. Arm	mm	in	2490	98.0	2680	105.5	←	
	Long Arm	mm	in	2740	107.9	2870	113.0	←	
Max. digging height	STD. Arm	mm	in	4360	171.7	4470	176.0	←	
	Long Arm	mm	in	4540	178.7	4600	181.1	←	
Max. digging radius	STD. Arm	mm	in	4480	176.4	4700	185.0	←	
	Long Arm	mm	in	4720	185.8	4890	192.5	←	
Max. dumping height	STD. Arm	mm	in	3060	120.5	3170	124.8	←	
	Long Arm	mm	in	3240	127.6	3300	129.9	←	
Swing angle (left/right)		deg.		78 / 57		←		←	
Travel speed	Low speed	km/h	mph	2.8	1.7	2.7	1.7	2.6	1.6
	High speed	km/h	mph	4.4	2.7	4.6	2.9	4.5	2.8
Swivel speed		rpm		9.5		←		←	
Max. traction force	Low speed	kN	lbf	20.2	4.5	22.3	5.0	22.1	5.0
		kgf		2.1		2.3		2.3	
	High speed	kN	lbf	11.7	2.6	14.6	3.3	11.1	2.5
		kgf		1.2		1.5		1.1	
Performance									
Tumbler distance		mm	in	1560	61.4	←		←	
Tread		mm	in	1100	43.3	1200	47.2	←	
Crawler width x No. of shoe x pitch (Rubber crawler)		mm		300 x 53 x 80		←		←	
		in		11.8 x 2.1 x 3.2		←		←	
Bucket									
Capacity CECE heaped		m^3	yd^3	0.06	0.1	0.07	0.1	0.08	0.1
Width		mm	in	1100	43.3	1200	47.2	←	
Blade									
Width x height		mm	in	1400 x 300	55.1 x 11.8	1500 x 300	59.1 x 11.8	←	
Lift above GL / below GL		mm	in	350 x 310	13.8 x 12.2	370 x 350	14.6 x 13.8	340 x 300	13.4 x 12.2

[2] Main dimensions

	Unit	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
KX61-3 EU	mm	600	590	1400	1160	1360	1400	4540	3060	2740	1830	2410	350	310		4310	4600	4720
KX71-3 EU	mm	600	590	1500	1210	1360	1500	4610	3220	2930	1960	2410	350	310	3380	4580	4830	4940
KX71-3 PP	mm	600	590	1500	1210	1360	1500	4700	3180	2970	1940	2410	340	310	3350	4550	4880	4990
	inch	(23.62)	(23.23)	(59.06)	(47.64)	(53.54)	(59.06)	(185.04)	(125.20)	(116.93)	(76.38)	(94.88)	(13.39)	(12.20)	(131.89)	(179.13)	(192.13)	(196.46)



e. Lever stroke and operating force

		Unit	KX61-3		KX71-3 EU		KX71-3 PP		Remarks
Boom	Stroke	mm	73.0	73.0	←	←	74.0	74.0	Up / Down
		in.	2.9	2.9	←	←	2.9	2.9	
	Force	N	10.0	10.0	←	←	14.0	14.0	
		kgf	1.0	1.0	←	←	1.4	1.4	
		lbf	2.2	2.2	←	←	3.1	3.1	
Arm	Stroke	mm	73.0	73.0	←	←	74.0	74.0	Crowd / Dump
		in.	2.9	2.9	←	←	2.9	2.9	
	Force	N	10.0	10.0	←	←	14.0	14.0	
		kgf	1.0	1.0	←	←	1.4	1.4	
		lbf	2.2	2.2	←	←	3.1	3.1	
Bucket	Stroke	mm	72.0	72.0	←	←	72.0	72.0	Crowd / Dump
		in.	2.8	2.8	←	←	2.8	2.8	
	Force	N	10.0	10.0	←	←	14.0	14.0	
		kgf	1.0	1.0	←	←	1.4	1.4	
		lbf	2.2	2.2	←	←	3.1	3.1	
Swivel	Stroke	mm	72.0	72.0	←	←	72.0	72.0	Right / Left
		in.	2.8	2.8	←	←	2.8	2.8	
	Force	N	10.0	10.0	←	←	14.0	14.0	
		kgf	1.0	1.0	←	←	1.4	1.4	
		lbf	2.2	2.2	←	←	3.1	3.1	
Travel (Left / Right)	Stroke	mm	74.0	74.0	←	←	←	←	F / R
		in.	2.9	2.9	←	←	←	←	
	Force	N	16.0	16.0	←	←	←	←	
		kgf	1.6	1.6	←	←	←	←	
		lbf	3.6	3.6	←	←	←	←	
Blade	Stroke	mm	51.0	51.0	←	←	58.0	58.0	Up / Down
		in.	2.0	2.0	←	←	2.3	2.3	
	Force	N	25.0	25.0	←	←	24.0	24.0	
		kgf	2.5	2.5	←	←	2.4	2.4	
		lbf	5.6	5.6	←	←	5.4	5.4	
Acceleration	Force	N	48.0	43.0	←	←	←	←	Up / Down
		kgf	4.9	4.4	←	←	←	←	
		lbf	10.8	9.7	←	←	←	←	
Swing pedal	Force	N	33.0	33.0	←	←	45.0	45.0	Up / Down
		kgf	3.4	3.4	←	←	4.6	4.6	
		lbf	7.4	7.4	←	←	10.1	10.1	
Service port pedal	Force	N	43.0	43.0	←	←	45.0	45.0	Front / Back
		kgf	4.4	4.4	←	←	4.6	4.6	
		lbf	9.7	9.7	←	←	10.1	10.1	
Safety lock lever(Left)	Force	N	12.0	34.0	←	←	←	←	Up / Down
		kgf	1.2	3.5	←	←	←	←	
		lbf	2.7	7.6	←	←	←	←	