KUBOTA

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California Proposition 65

⚠ WARNING ⚠

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

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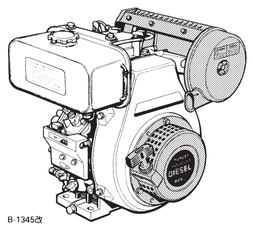
OPERATOR'S MANUAL

KUBOTA DIESEL

AC60 OC60 80 95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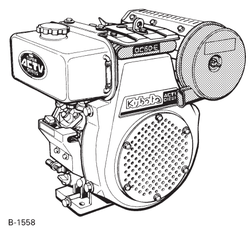
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READ AND SAVE THIS BOOK

Kubota

FOREWORD

Thank you very much for purchasing a KUBOTA diesel engine. We believe that it will serve you without fail. Before use, be sure to read this Operator's Manual carefully. With proper handling and maintenance, this diesel engine will provide excellent service over an extended period of time.

⚠ SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use this unit.

⚠ **DANGER** : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

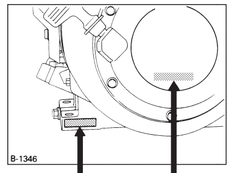
⚠ **CAUTION**: Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.

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

NOTE : Gives helpful information.

REQUESTING SERVICING

When you want to have servicing from the dealer from whom you purchased your KUBOTA diesel engine, please inform them of the model number and serial number of your KUBOTA diesel engine.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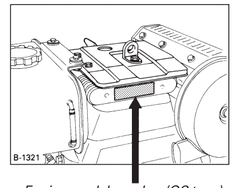
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Engine serial number

Engine model number (AC type)

Engine model number (OC type)

⚠ SAFE OPERATION

1. **Before operation, wear a proper cap and work clothes to prevent clothing, hair, towels and such from getting caught in the engine.**
2. **Before operation, check all set bolts and nuts for looseness and tighten if necessary.**
3. **Avoid placing inflammable materials close to the engine during operation.**
4. **As exhaust gases are harmful:**
   (1) Avoid operating the engine in an ill-ventilated place or where exhaust gases accumulate easily.
   (2) Take special care during operation to prevent exhaust gases from affecting yourself, or people or animals around you.
5. **When using an belt, install a cover, fence or similar device to prevent the risk of injury. Be sure to stop the engine before installing or removing the belt.**
6. **If the engine is to be lent to somebody, explain the handling procedures and point out that the Operator's Manual must be read carefully before use.**
7. **Keep children away from the engine during operation.**
8. **Do not touch the muffler, exhaust pipe or other hot parts during or immediately after operation.**
9. **Always stop the engine in the following cases:**
   (1) When checking, adjusting or cleaning each part
   (2) When discharging, pouring or injecting oil from or into each part
   (3) When cleaning off dust or other foreign matter accumulated on the muffler
10. **Do not use or charge the battery if its fluid level stands below the LOWER mark. Otherwise, the component parts may deteriorate earlier than expected, which may shorten the service life or cause an explosion. Immediately, add distilled water until the fluid level is between the UPPER and LOWER levels.**

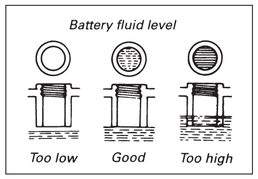
BATTERY

BATTERY

Battery and battery cable are not equipped with the engine.
Please buy them usually sold in shop.
Recommended capacity of battery (5hr Ratio)

AC60, OC60	OC80, OC95
28~32Ah	36~48Ah

INSPECTION


Battery fluid level

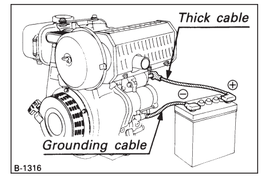
Too low *Good* *Too high*

Always handle the battery correctly to ensure maximum performance.
(1) Always carry out daily inspection and maintenance, and charge the battery before the voltage drops.
(2) Allowing the fluid level to get too low will damage the battery. Add distilled water as necessary.

⚠ **CAUTION**

- **Do not spoil clothes and skin with battery electolyte.**
  As the battery electolyte is dilute sulfuric acid, it will damage the clothes. Wash away when battery electrolyte sticks to the clothes.

CONNECTING



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Connect
thick cable to **plus (+)** terminal of battery
ground cable to **minus (−)** terminal of battery

CHARGING

⚠ **DANGER**

- **Do not use or charge the battery if its fluid level stands below the LOWER (lower limit level) mark.**
  Otherwise, the battery component parts may deteriorate earlier than expected, which may shorten the battery's service life or cause an explosion.
  Immediately, add distilled water until the battery's fluid level is between the UPPER and LOWER levels.

Some of the engine parts–e.g., fuel filter –are not resistant to acids. Be sure to charge the battery in a place away from the engine, following the instructions of the battery manufacturer.

SPECIFICATIONS

Specifications \ Model		AC60-D	AC60-G	OC60-D	OC60-G	OC80-D	OC80-G	OC95-D	OC95-G
Type		Vertical, air-cooled, 4-cycle diesel engine		Vertical, Oil & Air-cooled, 4-cycle diesel engine					
Number of cylinders		1							
Bore × Stroke (mm)		72×68				77×77		83×77	
Displacement (L)		0.276				0.358		0.416	
Rated output (kW/rpm)		4.1/3600	4.1/1800	4.1/3600	4.1/1800	5.1/3600	5.1/1800	6.3/3600	6.3/1800
Maximum output (kW/rpm)		4.6/3600	4.6/1800	4.5/3600	4.5/1800	5.9/3600	5.9/1800	7.0/3600	7.0/1800
Dimensions	Length (mm)	379.5		331		426			
	Width (mm)	462		409		500			
	Height (mm)	429		434		478			
Weight (kg)	Electric start	—		38		56			
	Recoil start	32		35		—			
	Electric & recoil	36		39		—			
Cooling system		Air-cooled		ACTV (Oil & Air cooling)					
Combustion system		Direct injection system		TVCS (swirl chamber type)					
Fuel		Diesel fuel oil (SAE No.2-D)							
Lubricating oil		API Service CF, CD or CE-class (SAE #30, 20, 10W30)							
Lubricating system		Forced lubrication with trochoid pump							
Fuel tank capacity (L)		3.6				5.5			
Crankcase oil capacity (L)		1.3				1.7			
Rotational direction		Counterclockwise viewed from the power take-off shaft							
Starting system		12V, 0.7kW starting motor/ Recoil starter				12V, 1.2kW starting motor			

- Specifications are subject to change for improvement without prior notice.

PERIODIC SERVICE

▲ Check ○ Replenishment ■ Cleaning ● Changing
[NOTE]
- The item marked with ◎ should be carried out when the work site is especially dusty.
- Some models have no tail pipe.

Position \ Interval	Daily	25 hours after initial operation	Every 100 hours	Every 300 hours	Every 500 hours	Every 800 hours	Every 1500 hours	Every 3000 hours	Every 1 year	Every 2 year		
Crankcase oil	▲ ○	●	●									
Air cleaner (paper element type)	◎		■						●			@
Fuel filter			■		●							
Fuel tank	▲ ○			■								
Tail pipe of muffler		■										
Rubber hoses and Clamp bands	▲									●		
Valve clearance						▲					✳	
Nozzle							▲ ■				✳	@
Injection pump								▲			✳	@
Battery			▲									

✳ Consult your local KUBOTA Dealer for this service.
- When the battery is used for less than 100 hours in a year, check its electrolyte yearly. (for refillable battery's only)
- The items listed above (@ marked) are registered as emission related critical parts by KUBOTA in the U.S. EPA nonroad 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.

PULLEY

To achieve the most efficiency, the pulley must be a size most appropriate for the machine to be driven by the engine. If the size of the pulley is not suited to the machine, the engine will emit black fumes and output will decrease, not only lowering operating efficiency, but also reducing the life of the engine.

To select the proper pulley size, use the following formula:

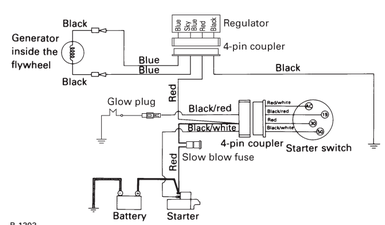
●Engine pulley size:

$$\text{Machine pulley size} \times \frac{\text{Machine speed}}{\text{Engine speed}}$$

●Machine pulley size:

$$\text{Engine pulley size} \times \frac{\text{Engine speed}}{\text{Machine speed}}$$

WIRING DIAGRAM



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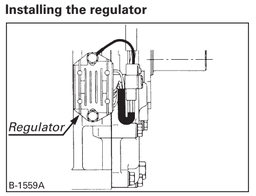
[NOTE]
- This WIRING DIAGRAM is for the standard model (with 48W generator). This is different from that of the model with 180W generator in wiring for the regulator.

GENUINE REGULATOR INSTALLATION EXAMPLE

Installing the regulator



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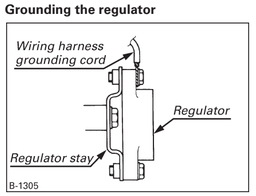
Grounding the regulator



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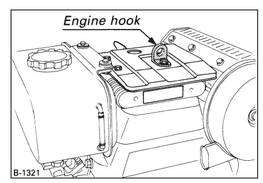
HOW TO HOIST UP THE ENGINE



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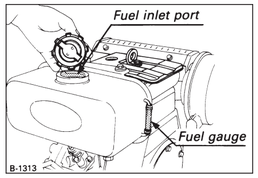
[NOTE]
- This engine hook cannot be used to hoist up the engine with a machine.

PRE-START CHECKS

CAPACITY

Item	Capacity	
	AC60, OC60	OC80, OC95
Fuel tank	3.6L	5.5L
Crankcase (oil)	1.3L	1.7L

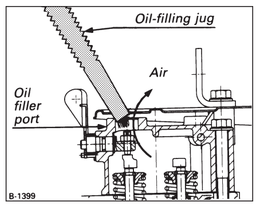
FUEL



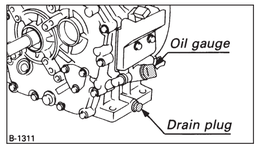
Use SAE No.2-D Diesel Fuel Oil.
As air trapped in the fuel is purged automatically, there is no need to bleed the air.

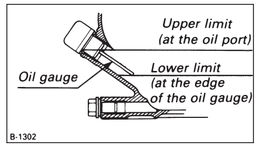
CAUTION

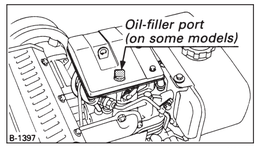
- **The engine must be shut down and kept away from any source of fire when fuel is added.**



CRANKCASE OIL



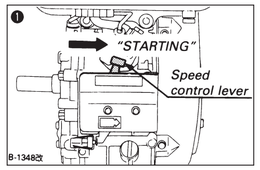




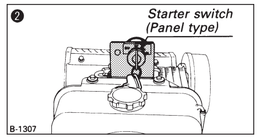
Place the engine horizontally and fill it with oil.
Always check the oil level with the oil gauge screwed in.
On models with an oil filler port in the head cover, be sure to take out the oil gauge first and then pour oil. When filling oil, take care not to let the oil-filling jug's tip or the like block the oil filler port: this is for air inside the engine to go out of the oil filler port. This is essential for measuring the oil level correctly after letting the poured oil flow down into the oil pan.

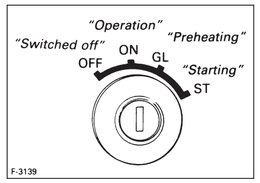
STARTING AND OPERATION

STARTING (Electric starting model)



Set the speed control lever to the "starting" position.





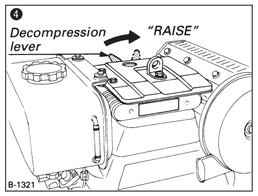
Setting the starter switch to "ST" (starting) rotates the starter and starts the engine.
As soon as the engine starts, release the starter switch.

(The starter switch position varies by model.)

❸ **When the temperature is 5°C (41°F) or less**

Leave the starter switch at "GL" (to preheat) for approximately five seconds, then set it to "ST" (starting).

❹ **When combined with a high-starting load machine such as a compressor**



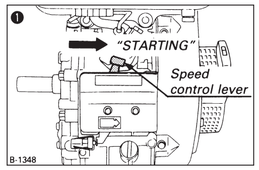
Use the decompression lever for a smoother start.
Raise the decompression lever and turn the starter switch to "ST" (starting). Release the decompression lever after the engine rotates smoothly.

(Some models have no decompression lever.)

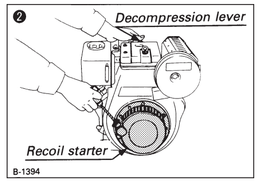
[NOTE]

(1) If the engine does not start after starter motor is activated for 10 seconds, wait for about 30 seconds and try again, otherwise, damage to starter motor may occur.
(2) Never set the starter switch to "ST" during operation to avoid damaging the starter motor.

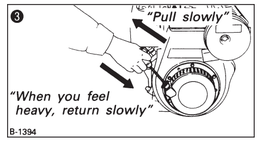
STARTING (Recoil starting model)



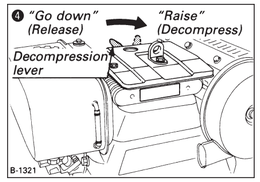
Set the speed control lever to the "starting" position.



Make sure the sound of an injection.
① Put up the decompression lever with your left hand and pull the recoil starter rope with your right hand four or five times to turn the crank.
② After making sure of the sound of injection, take step ❸.
③ If you can not hear the sound, check the fuel level or the position of the speed control lever.

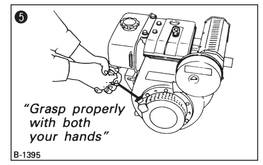


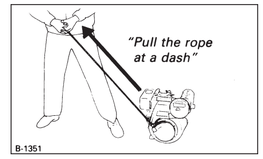
Set the engine to "Compression".
① Take your hand off the decompression lever and pull the recoil starter rope gradually.
② When you feel heavy in pulling the rope, it is the position of "Compression". Stop pulling the rope and return the handle slowly to the original position.



Raise the decompression lever. (Decompress)
① Make it certain that the decompression lever does not go down even after hand is apart from the lever.
② In case the decompression lever goes down, please repeat the operation refferred to in previous item ❸.

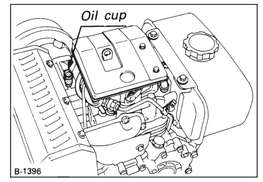
(This decompression device is automatic return system. After pulling the rope of recoil starter, the decompression lever automatically returns to the original position. And the decompression is released.)





Start the engine.
① Did you raise the decompression lever?
② Grasp the handle of recoil starter properly with your two hands.
③ Pull the rope fully at a dash and the engine starts. (Pulling the rope at a dash is the knack for easy starting.)
④ In case engine does not start, repeat item ❸.

STARTING AT LOW TEMPERATURE (Recoil starting model)



Pour a small amount of fuel through the oil cup of the air cleaner flange for smooth starting at low temperatures.
(1) Take the steps ❶ and ❷ of the recoil starting and make sure the injection sound is proper.
(2) Open the oil cup lid and pour a small amount (less than 3 cc) of fuel.
(3) Close the oil cup lid.
(4) Take the steps ❸ thru ❺ of the recoil starting to start the engine.
(Some models have no oil cup.)

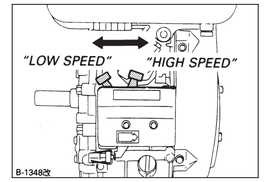
[NOTE]

(1) Do not put in more than 3 cc of fuel, because otherwise the starting will become difficult.
(2) If the engine fails to start at the first try, put in a smaller amount of fuel for the next.
(3) It is essential to use SAE10W or SAE10W30 oil for the crankcase in cold season. Higher-viscosity oil makes starting difficult.
(4) Never open the oil cup lid while the engine is running. Dust or dirt may be sucked in, possibly damaging the engine.

CAUTION

- **Never pour any fuel or oil in the oil cup while the engine is running. The engine may overrun, which is very dangerous.**

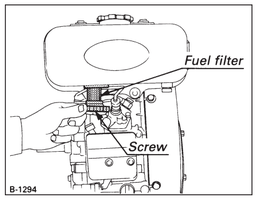
OPERATION



Warm-up
As it takes a certain amount of time for oil to circulate through the engine, execute no-load operation for several minutes to check the engine condition.
Break-in
Break-in the engine for the first week (40 to 50 hours) without applying excess load.

MAINTENANCE (Refer to "PERIODIC SERVICE" when to maintenance.)

THE FUEL FILTER

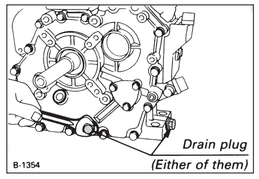


(1) Since the fuel filter is made of high-quality filter paper designed to collect fine dust, remove it after every 100 hours of operation by loosening the screw and clean it in fresh fuel.
(2) Before removing the fuel filter, always empty the fuel tank by removing the drain plug.

[NOTE]

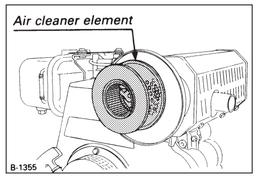
(1) If the fuel filter breaks, replace it. Otherwise, dust invasion will occur, shortening the service life of the fuel injection pump or nozzle.
(2) Note that rough handling of the fuel filter results in damage.

THE CRANKCASE OIL



Change the crank case oil 25 hours after initial operation and every 100 hours thereafter, using the following procedure:
(1) While the engine is still warm, empty the crankcase by removing the drain plug.
(2) Fill the crankcase up to the specified level with fresh oil.

THE AIR CLEANER



Clean the air cleaner after every 100 hours of operation. If the work site is especially dusty, check and clean the air cleaner every day.

Cleaning procedure

(1) Remove any dust from the air cleaner and wipe the inner surfaces.
(2) Remove dust from the air cleaner element by tapping it gently or by applying compressed air from the inside while rotating the element. If the element is oily or coated with carbon dust, soak it in a neutral detergent solution for 15 minutes, wash it several times, rinse with fresh water, then allow it to dry.

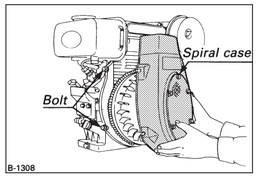
[NOTE]

(1) Replace the element every year or after every sixth cleaning, whichever comes first.
(2) If the element breaks, replace it. Otherwise, the service life of the engine will be shortened.

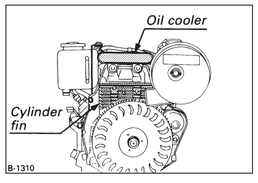
THE OIL COOLER

CAUTION

- **Always stop the engine before cleaning the oil cooler.**

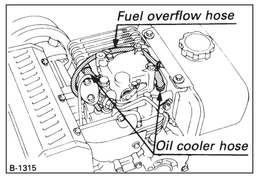


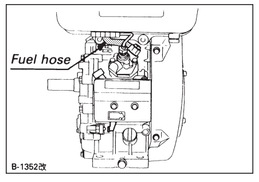
(1) Loosen the four bolts and remove the spiral case.



(2) Check if the cylinder and oil cooler fins are clogged with dust. If so, blow it off using an air gun. As the oil cooler fins are fragile, to prevent damage, never use a screwdriver or spatula.

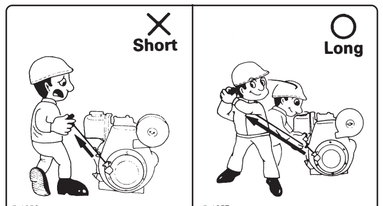
THE RUBBER HOSE





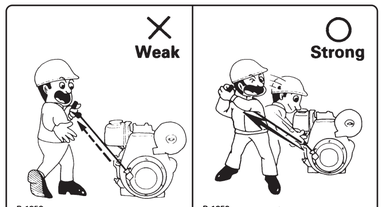
Replace the fuel and oil cooler hoses every two years. When leakage is detected during inspection, immediately replace the hose even if its service period has not expired.

PRECAUTIONS AT RECOIL STARTING



If you pull the rope short, it causes engine not only unstart but also it gives shock to your hand.

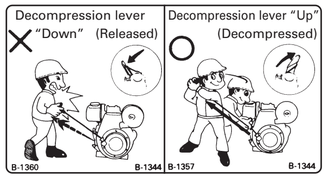
Pull the rope fully at a dash.



The engine does not start if the pulling power is weak and slow.

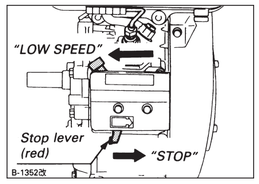
Pull the rope strongly at a dash.

[IMPORTANT]



(1) When starting the engine, be sure to raise the decompression lever.
(Refer to item STARTING ❹.)
If you try to start the engine without raising the decompression lever, it causes not only difficulty in starting but also sometimes the cause of rope breakdown.
(2) After starting, if you notice unusual sound or smoke from Air Cleaner, stop the engine immediately. Because there is a possibility that engine rotates reversely.

STOPPING



(1) Reduce the engine speed and operate it for two or three minutes.
(2) Press the stop lever (red) in the direction of the arrow until the engine shuts down.
(3) Set the starter switch to "OFF", then extract it. (Electric starting model)
- Loosening the idling set bolt enables the speed control lever to shut the engine down. For details, contact your nearest local sales representative.

[NOTE]

- Never stop the engine using the decompression lever. Otherwise, valves or related parts may be damaged.

STORAGE

(1) Replace the engine oil and clean each part.
(2) Thoroughly clean the air cleaner element to prevent dust from sticking to it.
(3) After the engine cools down, place a cover over it to protect it from dust, then store in a place free from moisture and dust.

CAUTION

- **To avoid the risk of fire when storing the engine in a small room, allow sufficient time for the engine to cool down before storage.**

(4) If the engine is to be stored for a long period, disconnect the battery from the engine, adjust the fluid level properly and store it in a dry, dark place.
(5) Since the battery discharges even during storage, charge it every month in summer or every two months in winter.