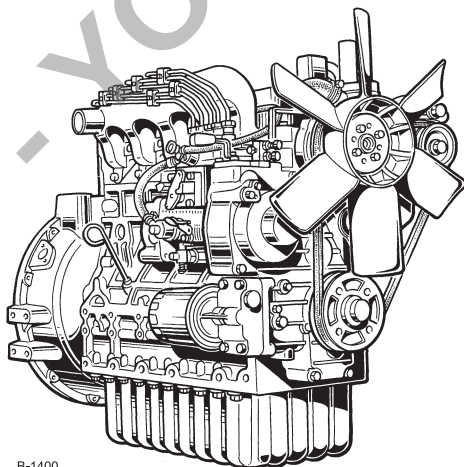


OPERATOR'S MANUAL

KUBOTA DIESEL ENGINE

**MODELS D1403-EBG·V1903-EBG
D1703-EBG·V2203-EBG**



B-1400

17298-8917-1

READ AND SAVE THIS BOOK

Kubota

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SAFE OPERATION

Careful operation is your best assurance against an accident. Read and understand this section carefully before operating the engine. All operators, no matter how much experience they may have, should read this and other related manuals before operating the engine or any equipment attached to it. It is the owner's obligation to provide all operators with this information and instruct them on safe operation.

Be sure to observe the following for safe operation.

1. OBSERVE SAFETY INSTRUCTIONS

- Read and understand carefully this "OPERATOR'S MANUAL" and "LABELS ON THE ENGINE" before attempting to start and operate the engine.
- Learn how to operate and work safely. Know your equipment and its limitations. Always keep the engine in good condition.
- Before allowing other people to use your engine, explain how to operate and have them read this manual before operation.
- DO NOT modify the engine. UNAUTHORIZED MODIFICATIONS to the engine may impair the function and/or safety and affect engine life. If the engine does not perform properly, consult your local Kubota Engine Distributor first.



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2. WEAR SAFE CLOTHING AND PERSONAL PROTECTIVE EQUIPMENT (PPE)

- DO NOT wear loose, torn or bulky clothing around the machine that may catch on working controls and projections or into fans, pulleys and other moving parts causing personal injury.
- Use additional safety items-PPE, e.g. hard hat, safety protection, safety goggles, gloves, etc., as appropriate or required.
- DO NOT operate the machine or any equipment attached to it while under the influence of alcohol, medication, or other drugs, or while fatigued.
- DO NOT wear radio or music headphones while operating the engine.



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OPERATING THE ENGINE

STARTING THE ENGINE(NORMAL)



CAUTION

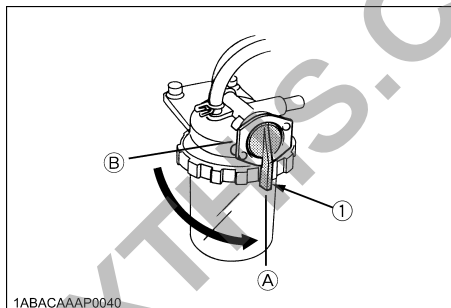
To avoid personal injury:

- Do not allow children to approach the machine while the engine is running.
- Be sure to install the machine on which the engine is installed, on a flat place.
- Do not run the engine on gradients.
- Do not run the engine in an enclosed area. Exhaust gas can cause air pollution and exhaust gas poisoning.
- Keep your hands away from rotating parts (such as fan, pulley, belt, flywheel etc.) during operation.
- Do not operate the machine while under the influence of alcohol or drugs.
- Do not wear loose, torn or bulky clothing around the machine. It may catch on moving parts or controls, leading to the risk of accident. Use additional safety items, e.g. hard hat, safety boots or shoes, eye and hearing protection, gloves, etc., as appropriate or required.
- Do not wear radio or music headphones while operating engine.
- Check to see if it is safe around the engine before starting.
- Reinstall safeguards and shields securely and clear all maintenance tools when starting the engine after maintenance.

IMPORTANT :

- Do not use ether or any starting fluid for starting the engine, or a severe damage will occur.
- When starting the engine after a long storage (of more than 3 months), first set the stop lever to the "STOP" position and then activate the starter for about 10 seconds to allow oil to reach every engine part.

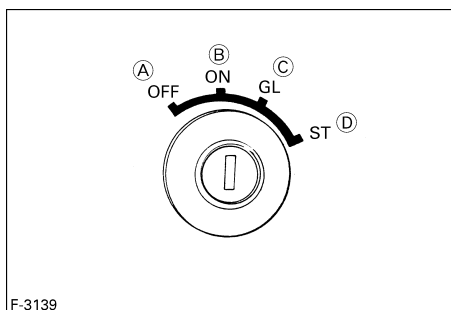
1. Set the fuel lever to the "ON" position.



(1) Fuel lever

(A) "ON"
(B) "OFF"

2. Place the engine stop lever to the "START" position.
3. Insert the key into the key switch and turn it to the "OPERATION" position.



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(A) "OFF" SWITCHED OFF
(B) "ON" OPERATION
(C) "GL" PREHEATING
(D) "ST" STARTING

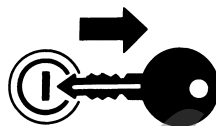
MAINTENANCE



CAUTION

To avoid personal injury:

- Be sure to conduct daily checks, periodic maintenance, refueling or cleaning on a level surface with the engine shut off and remove the key.
- Before allowing other people to use your engine, explain how to operate, and have them read this manual before operation.
- When cleaning any parts, do not use gasoline but use regular cleanser.
- Always use proper tools, that are in good condition. Make sure you understand how to use them, before performing any service work.
- When installing, be sure to tighten all bolts lest they should be loose. Tighten the bolts by the specified torque.
- Do not put any tools on the battery, or battery terminals may short out. Severe burns or fire could result. Detach the battery from the engine before maintenance.
- Do not touch muffler or exhaust pipes while they are hot; Severe burns could result.



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ENGINE OIL

**CAUTION**

To avoid personal injury:

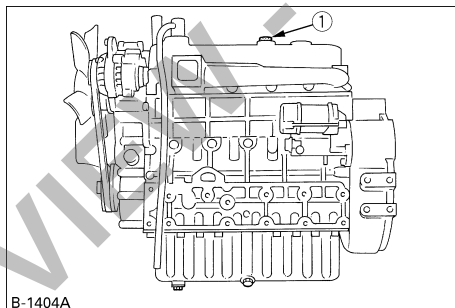
- Be sure to stop the engine before checking and changing the engine oil and the oil filter cartridge.
- Do not touch muffler or exhaust pipes while they are hot; Severe burns could result. Always stop the engine and allow it to cool before conducting inspections, maintenance, or for a cleaning procedure.
- Contact with engine oil can damage your skin. Put on gloves when using engine oil. If you come in contact with engine oil, wash it off immediately.

NOTE :

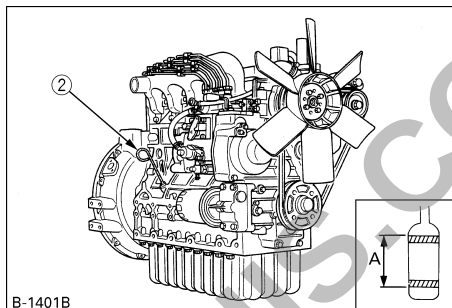
- Be sure to inspect the engine, locating it on a level place. If placed on gradients accurately, oil quantity may not be measured.

■Checking oil level and adding engine oil

1. Check the engine oil level before starting or more than 5 minutes after stopping the engine.
2. Remove the oil level gauge, wipe it clean and reinstall it.
3. Take the oil level gauge out again, and check the oil level.



B-1404A



B-1401B

- (1) Oil filler plug
(2) Oil level gauge
- [Lower end of oil level gauge]
(A) Engine oil level within this range is proper.

4. If the oil level is too low, remove the oil filler plug, and add new oil to the prescribed level.
5. After adding oil, wait more than 5 minutes and check the oil level again. It takes some time for the oil to drain down to the oil pan.
6. If the engine is operated with the oil level nearing the lower limit, however, oil may deteriorate quickly; keeping the oil level near the upper limit is thus recommended.

Engine oil quantity

Models	Oil pan depth	
	124 mm (4.88 in.)	*90 mm (3.54 in.)
D1403-EBG D1703-EBG	7.0 L (1.85 U.S.gals.)	5.6 L (1.48 U.S.gals.)
V1903-EBG V2203-EBG	9.5 L (2.51 U.S.gals.)	7.6 L (2.01 U.S.gals.)

* 90 mm (3.54 in.) oil pan depth is optional.

Oil quantities shown are for standard oil pans.

IMPORTANT :

- Engine oil should be MIL-L-2104C or have properties of API classification CD grades or higher.
Change the type of engine oil according to the ambient temperature.

Above 25°C (77°F)	SAE30 or SAE10W-30 SAE15W-40
-10°C to 25°C (14°F to 77°F)	SAE10W-30 or SAE15W-40
Below -10°C (14°F)	SAE10W-30

- When using oil of different brands from the previous one, be sure to drain all the previous oil before adding the new engine oil.

SPECIFICATIONS

Model		D1403-EBG	D1703-EBG
Type		Vertical, water-cooled, 4-cycle diesel engine	
Number of cylinders		3	
Bore and stroke	mm (in.)	80 x 92.4 (3.15 x 3.64)	87 x 92.4 (3.43 x 3.64)
Total displacement	L (cu.in.)	1.393 (85.01)	1.647 (100.51)
Combustion chamber		Spherical Type (New TVCS)	
SAE NET Continuous H.P. (SAEJ1349)	kW / rpm	12.6 / 1800 (16.9 / 1800)	15.1 / 1800 (20.3 / 1800)
	(HP / rpm)	10.6 / 1500 (14.3 / 1500)	12.8 / 1500 (17.2 / 1500)
SAE NET Standby H.P. (SAEJ1349)	kW / rpm	14.2 / 1800 (19.1 / 1800)	17.0 / 1800 (22.9 / 1800)
	(HP / rpm)	12.0 / 1500 (16.2 / 1500)	14.4 / 1500 (19.4 / 1500)
Maximum bare speed	rpm	1890 / 1575	
Minimum bare idling speed	rpm	1250 to 1350 / 950 to 1050	
Order of firing		1-2-3	
Direction of rotation		Counter-clockwise (viewed from flywheel side)	
Injection pump		Bosch Type mini pump	
Injection pressure Mpa (kgf/cm ² , psi)		13.73 (140, 1991)	
Injection timing (Before T.D.C.)		0.23 rad (13.5°)	0.25 rad (14.5°)
Compression ratio		23 : 1	
Fuel		Diesel Fuel No.2-D (ASTM D975)	
Lubricant (API classification)		above CD grade	
Dimension (length x width x height)	mm (in.)	605.6 x 482 x 643.5 (23.84 x 18.98 x 25.33)	
Dry weight (BB Spec.)	kg (lbs.)	170 (374.8)	
Starting system		Cell starter (with glow plug)	
Starting motor		12 V, 1.4 kW	
Charging generator		12 V, 480 W	
Recommended battery capacity		12 V, 70 to 80 AH	

NOTE :

- Flywheel type is SAE clutch No. 7-1/2 or its equivalent.
- Flywheel housing type is SAE No. 4 or its equivalent.
- Governor drop is within 5%
- Continuous will operate at the stated rating continuously and have a 10% overload capability for one hour in 12 hours.
- Standby will operate at the stated full rating for one hour in 12 hours. No overload capacity is specified for this rating.
- Specifications are subject to change without notice.

TROUBLESHOOTING

If the engine does not function properly, use the following chart to identify and correct the cause.

■ When it is difficult to start the engine

Cause	Countermeasures
Fuel is thick and doesn't flow.	* Check the fuel tank and fuel filter. * Remove water, dirt and other impurities. * As all fuel will be filtered by the filter, if there should be water or other foreign matters on the filter, clean the filter with kerosene.
Air or water mixed in fuel system	* If air is in the fuel filter or injection lines, the fuel pump will not work properly. * To attain proper fuel injection pressure, check carefully for loosened fuel line coupling, loose cap nut, etc. * Loosen joint bolt stop fuel filter and air vent screws of fuel injection pump to eliminate all the air in the fuel system.
Thick carbon deposits on orifice of injection nozzle.	* This is caused when water or dirt is mixed in the fuel. Clean the nozzle injection piece, being careful not to damage the orifice. * Check to see if nozzle is working properly or not. If not, install a new nozzle
Engine oil becomes thick in cold weather and engine cranks slow.	* Change grade of oil according to the weather (temperature.)
Battery is discharged and the engine will not crank.	* Charge battery. * In winter, always remove battery from machine, charge fully and keep indoors. Install in machine at time of use.

■ When output is insufficient

Cause	Countermeasures
Carbon stuck around orifice of nozzle piece	* Clean orifice and needle valve, being very careful not to damage the nozzle orifice. * Check nozzle to see if good. If not, replace with new parts.
Fuel is insufficient.	* Check fuel system.
Overheating of moving parts	* Check lubricating oil system. * Check to see if lubricating oil filter is working properly. * Filter element deposited with impurities would cause poor lubrication. Change element.
Air cleaner is dirty	* Clean the element every 100 hours of operation.
Injection pump wear	* Do not use poor quality fuel as it will cause wear of the pump. Only use No. 2-D diesel fuel.(See "FUEL" in "PERIODIC SERVICE" Section)

NOTE :

- If the cause of trouble can not be found, contact your KUBOTA dealer.

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