ENGLISH

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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)

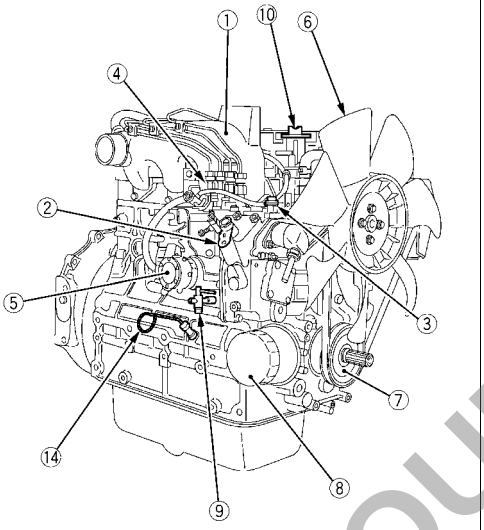
- DO NOT wear loose, torn or bulky clothing around the machine that may catch on working controls and projections or into fans, pulleys and other moving parts causing personal injury.
- Use additional safety items-PPE, e.g. hard hat, safety protection, safety goggles, gloves, etc., as appropriate or 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.



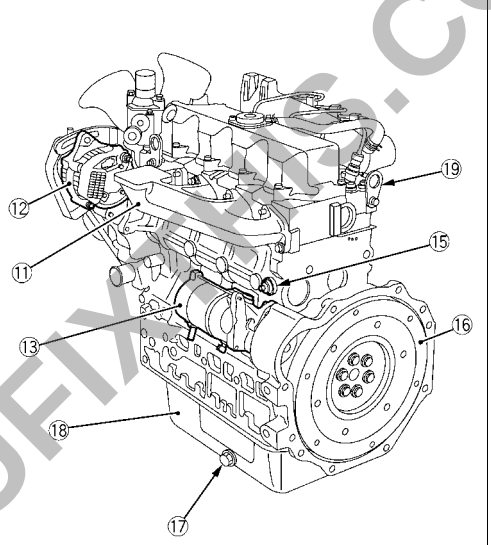
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NAMES OF PARTS



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1ABACAAAP0300

(1) Intake manifold
(2) Speed control lever
(3) Engine stop lever
(4) Injection pump
(5) Fuel feed pump
(6) Cooling fan
(7) Fan drive pulley
(8) Oil filter cartridge
(9) Water drain cock
(10) Oil filler plug
(11) Exhaust manifold
(12) Alternator
(13) Starter
(14) Oil level gauge
(15) Oil pressure switch
(16) Flywheel
(17) Oil drain plug
(18) Oil pan
(19) Engine hook

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OPERATING THE ENGINE

STARTING THE ENGINE (NORMAL)

⚠ CAUTION

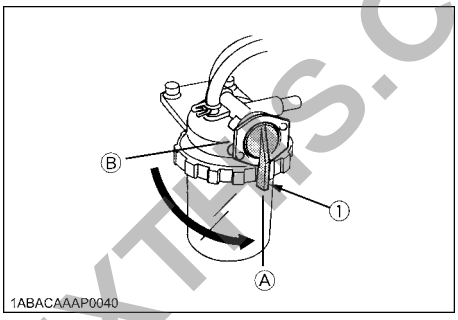
To avoid personal injury:

- **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.

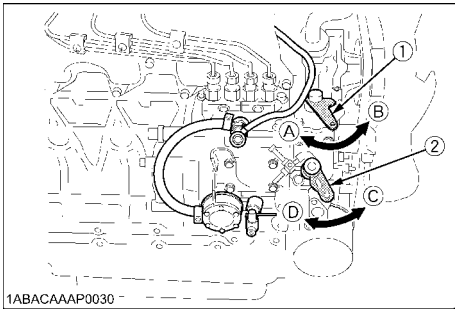
1. Set the fuel lever to the "ON" position.



(1) Fuel lever
(A) "ON"
(B) "OFF"

2. Place the engine stop lever to the "START" position.

3. Place the speed control lever at more than half "OPERATION".



(1) Engine stop lever
(2) Speed Control lever
(A) "STOP"
(B) "START"
(C) "IDLING"
(D) "OPERATION"

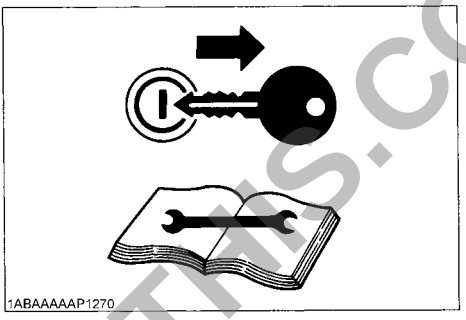
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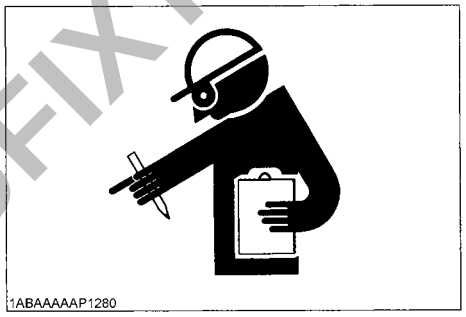
MAINTENANCE

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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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.

Engine oil quantity

Models	Oil pan depth	
	124 mm (4.88 in.)	*90 mm (3.54 in.)
D1503-M-E D1703-M-E D1803-M-E	7.0 L (1.85 U.S.gals.)	5.6 L (1.48 U.S.gals.)
V2003-M-E V2203-M-E V2003-M-T-E V2403-M-E	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
0°C to 25°C(32°F to 77°F)	SAE20 or SAE10W-30 SAE15W-40
below 0°C(32°F)	SAE10W or SAE10W-30 SAE15W-40

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

■Changing engine oil

CAUTION

To avoid personal injury:
- **Be sure to stop the engine before draining engine oil.**
- **When draining engine oil, place some container underneath the engine and dispose it according to local regulations.**
- **Do not drain oil after running the engine. Allow engine to cool down sufficiently.**

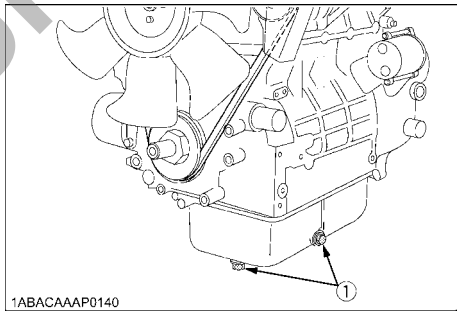
1. Change oil after the initial 50 hours of operation and every 200 hours thereafter. (See table below.)

NOTE :
- **Changing interval thereafter**

Models	Oil pan depth	
	124 mm (4.88 in.)	*90 mm (3.54 in.)
D1503-M-E D1703-M-E D1803-M-E V2003-M-E V2203-M-E V2003-M-T-E V2403-M-E	200 Hrs	150 Hrs
Initial	50 Hrs	

* 90 mm (3.54 in.) oil pan depth is optional.
**Standard replacement interval
- API service classification : above CD grade
- Ambient temperature : below 35°C (95°F)

2. Remove the drain plug at the bottom of the engine, and drain all the old oil. Drain oil will drain easier when the oil is warm.



(1) Oil drain plug

3. Add new engine oil up to the upper limit of the oil level gauge.

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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.

NOTE :

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

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SPECIFICATIONS

Model	D1503-M-E	D1703-M-E	D1803-M-E
Type	Vertical, water-cooled, 4-cycle diesel engine		
Number of cylinders	3		
Bore and stroke mm (in.)	83 x 92.4 (3.27 x 3.64)	87 x 92.4 (3.43 x 3.64)	87 x 102.4 (3.43 x 4.04)
Total displacement L (cu.in.)	1.499 (91.44)	1.647 (100.51)	1.826 (111.43)
Combustion chamber	Spherical Type (E-TVCS)		
SAE NET Intermittent kW / rpm H.P. (SAEJ1349) (HP / rpm)	22.8 / 2800 (30.5 / 2800)	25.7 / 2800 (34.5 / 2800)	26.9 / 2600 (36.1 / 2600)
SAE NET Continuous kW / rpm H.P. (SAEJ1349) (HP / rpm)	19.8 / 2800 (26.5 / 2800)	22.4 / 2800 (30.0 / 2800)	23.3 / 2600 (31.2 / 2600)
Maximum bare speed rpm	3000		2800
Minimum bare idling speed rpm	750 to 850		
Order of firing	1-2-3		
Direction of rotation	Counter-clockwise (viewed from flywheel side)		
Injection pump	Bosch Type mini pump		
Injection pressure	13.73 MPa, 1991 psi (140 kgf/cm²)		
Injection timing (Before T.D.C.)	0.314 rad (18°)		
Compression ratio	23.0	22.6	23.8
Fuel	Diesel Fuel No.2-D		
Lubricant (API classification)	above CD grade		
Dimension mm (in.) (length x width x height)	572.1 x 507.1 x 643.3 (22.5 x 20.0 x 25.3)		575.9 x 499.0 x 685.0 (22.7 x 19.8 x 27.0)
Dry weight (BB Spec.) kg (lbs.)	148 (326.4)		151 (33)
Starting system	Cell starter (with glow plug)		
Starting motor	12 V, 1.4 kW		12 V, 2.0 kW
Charging generator	12 V, 480 W		
Recommended battery capacity	12 V, 70 to 80 AH		12 V, 100 to 120 AH

NOTE :
- Specifications are subject to change without notice.

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