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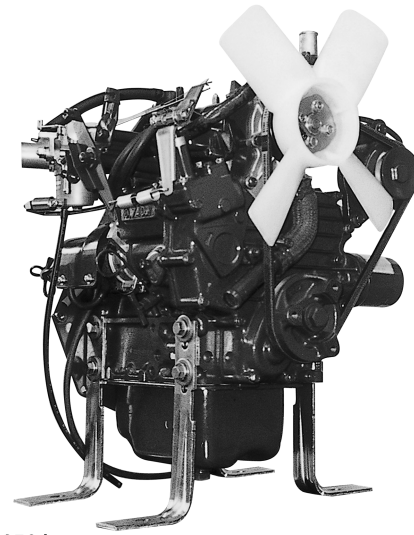
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KUBOTA LIQUID COOLED GASOLINE/LPG ENGINE

OPERATOR'S MANUAL WG752-E2/DF752-E2



D-2350A

This product is subject to change for the purpose of improvement.

THE WG752-E2/DF752-E2 ENGINE CONFORMS TO 2008 AND LATER U.S. EPA PHASE 2 AND EU EMISSION REGULATIONS FOR SI SOREs.

• EPA USEFUL LIFE CATEGORY: A

READ AND SAVE THIS BOOK



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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INTRODUCTION

Thank you very much for purchasing a KUBOTA engine. This operator's manual is intended to acquaint you with the right way of using/operating this engine with hints on routine checking and care. Please read this manual carefully and observe the hints given etc. so that your engine can fully exhibit its true performance for a long time.

SPECIFICATIONS

Item	Unit	WG752-E2		DF752-E2	
		Gasoline	Gasoline	Gasoline	LPG
Type		Vertical, Water-cooled 4 cycle			
No. of cyl. – bore × stroke	mm (in.)	3-φ 68 × L68 (3-φ 2.68 × L2.68)			
Total displacement	L (cu-in.)	0.740 (45.21)			
Brake horse power	SAE Gross int.	18.5 (24.8) / 3600	17.7 (23.8) / 3600		
	SAE net int.	17.1 (23.0) / 3600	16.4 (22.0) / 3600		
Max. torque	SAE net cont.	13.4 (18.0) / 3600	12.7 (17.0) / 3600		
	SAE net int.	54.9 (40.5) / 2400	52.0 (38.3) / 2400		
Governor type		Centrifugal ball mechanical type			
Ignition system		Full transistor (no points)			
Fuel used		Unleaded gasoline		Commercial LPG*	
Lubricating oil capacity	L (US gal.)	3.25 (0.859)			
Starter		12 V × 0.7 kW			
Total dimensions (L × W × H)	mm (in.)	421 (16.57) × 392 (15.43) × 540 (21.26)			
Weight (Dry)	kg (lbs)	61.7 (136.0)			

Common tune up specification		
Adjustment of idle speed	r/s (rpm)	1500±100
High idle setting	r/s (rpm)	3850 ~ 3950
Ignition timing	deg. BTDC	18±1
Spark plug type / Spark plug gap	mm (in.)	NGK BKR4E-11/1.0-1.1 (0.039-0.043)
Intake / Exhaust valve clearance	mm (in.)	0.165±0.02 (0.0065±0.00079)
Check when engine is cold.		

Specifications subject to change without notice.

* NOTE : LPG regulator with vaporizer operates on a liquid withdrawal type system.

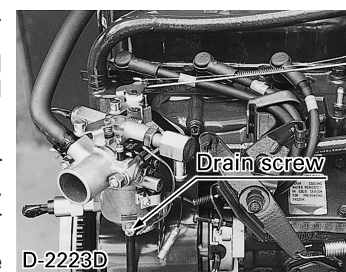
SAFE OPERATION

- Before operation, wear a proper cap and work clothes to prevent clothing, hair, towels and such from getting caught in the engine.
- Before operation, check all set bolts and nuts for looseness and tighten them if necessary.
- Avoid placing inflammable materials close to the engine during operation.
- 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.
- Be sure to keep the flywheel safety covered during operation.
- When using a fan belt, install a cover, fence or similar device to prevent the risk of injury.
- Keep children and pets away from the engine during operation.
- Do not touch the muffler, exhaust pipe or other hot parts, during or immediately after operation.
- 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
 - (4) When checking radiator coolant level
- If the engine is to be lent to someone, explain the handling procedures and point out that the Operator's Manual must be read carefully before use.
- Use the standard LPG fuel recommended by KUBOTA. The use of other fuel may cause a hazardous or dangerous condition.
- LPG fuel in the gaseous state is heavier than air and will settle in low areas, this may be hazardous. Please follow all operator's manual instructions when changing the fuel tank and servicing the fuel system.

LONG-TERM STORAGE

In order to keep the engine in good working condition, be sure to observe the following.

- Close the liquid withdrawal valve of the LPG fuel tank and start the engine to empty the fuels in fuel pipings. (DF752-E2)
- Empty the gasoline fuel tank.
- Loosen the drain screw of the carburetor float chamber using a screw driver to let gasoline out of the carburetor.
- Store the engine or its equipment in a well-ventilated and shady place.
- Remove the battery, recharge it, adjust the electrolyte to the proper level, and store it in a dry and shady place.



IMPORTANT INFORMATIONS OF EXHAUST EMISSION REGULATION

- To conform to U.S. EPA and EU SOREs (Small Off-Road Engines) emission regulations, the following standards must be followed before using the WG752-E2/DF752-E2 engine.
- INLET AND EXHAUST SYSTEM (COMMON)**
THE WG752-E2/DF752-E2 ENGINE MUST USE THE BELOW AIR CLEANER AND INLET PIPE, AND EXHAUST BACK PRESSURE OF THE MUFFLER MUST BE WITHIN THE BELOW VALUES;

PART	PART NO.
GENUINE AIR CLEANER	15372-11010
GENUINE INLET PIPE	12581-11620

BRAKE HORSE POWER	SAE net int.	ALLOWABLE MAXIMUM EXHAUST BACK PRESSURE
17.1 kW (23 HP)/ 3600 rpm		19.6 kPa (147.1 mmHg)/ 3600rpm

Any modifications to the fuel system or any adjustments made on this engine will cause this engine to be in non-compliance with emission regulations. See "LPG FUEL SYSTEM AND DIAGRAMS" and "TAMPER RESISTANCE" section.

- KUBOTA RECOMMENDED LPG FUEL SPECIFICATIONS (DF752-E2)**

- Commercial Propane gas only.
- Equivalent to Propanes H-D-5 of GPA* standards.

C ₃ H ₈	C ₃ H ₆	C ₄ H ₁₀	Others
≥90%	≤5%	≤2.5%	-

(vol %)

* GPA means Gas Processors Association (U.S.A.)

- LENGTH OF THE LPG VAPOR HOSE (DF752-E2)**

The length of the LPG vapor hose between the LPG carburetor and its regulator must be within 300 ± 20mm (11.8 ± 0.8 in.)
The incorrect use of the hose may not conform to EPA EMISSION REGULATIONS.

LPG FUEL SYSTEM AND DIAGRAMS (DF752-E2)

- Never use LPG fuel on the WG752-E2 engine. Otherwise severe damage will occur.
- All fuel connections added to this engine must be installed by qualified personnel and utilizing recognized procedures and standards.
- These non-KUBOTA installed parts, such as hoses, fittings, piping and shut off solenoid valve should be approved for LPG use and conform to UL, CSA, NFPA, MSHA and all other applicable standards.

- TIGHTENING TORQUES AND LEAK CHECK FOR LPG REGULATOR WITH VAPORIZER**

(1) Each fitting must be sealed with approved joint sealant compound, and be tightened to the specified torque using a wrench and leak check must be performed as show in the below table.

[TIGHTENING TORQUE AND LEAK CHECK PRESSURE]

FITTING	Qty.	SIZE	tightening torque			leak check press.		
			N-m	kgf-m	ft-lbs	kPa	kgf/cm ²	psi
LPG OUT (VAPOR)	1	PT-3/8	29.4~58.8	3.0~6.0	21.7~43.4	> 9.8	> 0.1	> 1.42
LPG IN (LIQUID)*	1	PT-1/4	19.6~39.2	2.0~4.0	14.5~28.9	> 1471	> 15	> 213
WATER IN/OUT	2	PT-3/8	29.4~58.8	3.0~6.0	21.7~43.4	> 245	> 2.5	> 35.6

* NOT KUBOTA supplied

- CHANGE THE ANGLE OF LPG FITTING OF DUAL FUEL CARBURETOR**

The fitting on the dual fuel carburetor may be mounted on any position since is not sealed.
The nut may be loosened using a wrench.
LPG fitting may be changed to any specified angle.
The nut should be tightened to the specified torque using a wrench as shown in the below table.

[TIGHTENING TORQUE]

FITTING	Qty.	SIZE	tightening torque			leak check
			N-m	kgf-m	ft-lbs	soap solution or its equivalent
LPG IN (VAPOR)	1	M12×1.25	11.8~26.5	1.2~2.7	8.7~19.5	

- LPG REGULATOR WITH VAPORIZER (DF752-E2)**
When operating DF752-E2 on LPG, only a KUBOTA GENUINE LPG REGULATOR KIT can be used.
Only this regulator can be installed by an authorized KUBOTA DISTRIBUTOR or the manufacturer of the equipment in which this engine is used.
- HIGH ALTITUDE OPERATION**

IMPORTANT

Altitude compensation kit is applied for EPA certified engines only. EPA emission regulations require the ultimate users of non-road SI engine under 19 kW, as their obligation, to adjust the emissions by installing the appropriate genuine altitude compensation kit. And the engine manufacturer must provide such kit when the engine is operated at an altitude that exceeds the standard level, as guaranteed by the engine manufacturer. For this purpose, KUBOTA prepared genuine altitude compensation kit described below. The ultimate users of SI engines must comply with the regulations through the installation of the appropriate altitude compensation kit for the altitude range where the engine will be operated.

Altitude Compensation Kit	Applicable Altitude Ranges
Original carburetor (with 0 m kit)	0 m ↔ 2300 ft
1000 m compensation kit	300 m ↔ 1700 m 1000 ft ↔ 5600 ft
2000 m compensation kit	1300 m ↔ 2700 m 4300 ft ↔ 8900 ft

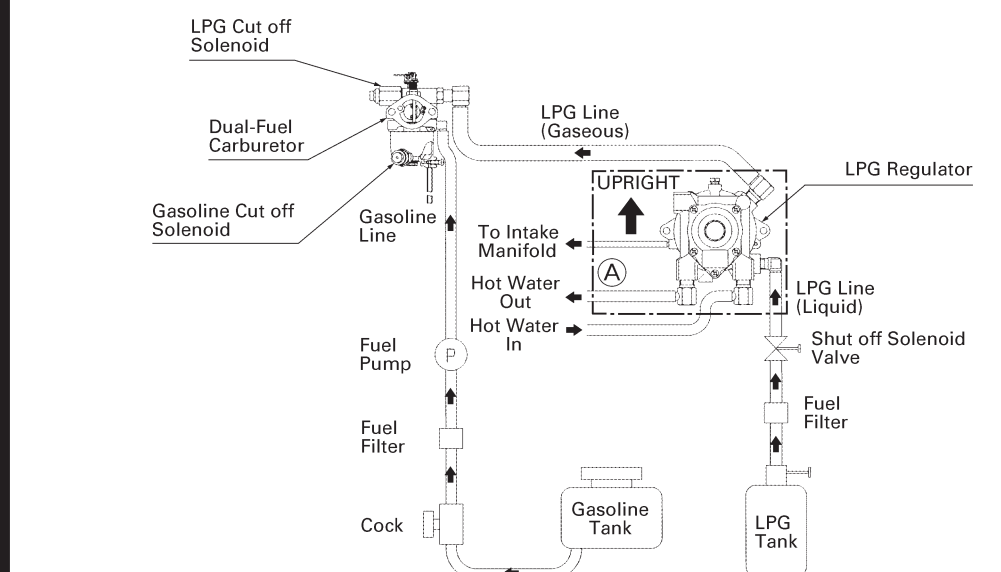
*) Prepare for the users who have lost original carburetor's jet. Altitude compensation kit part number: Please contact your local KUBOTA dealer and specify your engine type and engine serial No. Please consult your local KUBOTA dealer for further information on the altitude compensation kit.

CONSULT YOUR LOCAL KUBOTA DEALER FOR FURTHER INFORMATION ON THIS PROCEDURE.

- An approved, listed fuel filter and shut off solenoid valve must be installed between the LPG tank and KUBOTA LPG regulator with vaporizer.

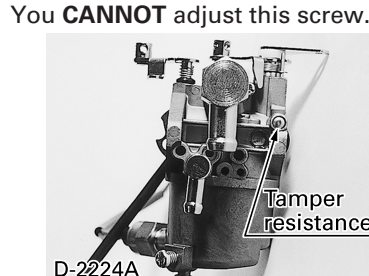
- SETTING OF LPG REGULATOR AND VIBRATION LIMITS**

Install the LPG regulator in UPRIGHT position as shown in below (A) marking figure. It must be installed within 4G vibration level. If not, it may not supply necessary LPG fuel to the engine.
(See "PRE-OPERATION CHECK, ② FUEL, LPG" section)



TAMPER RESISTANCE

- Carburetor (WG752-E2), Dual fuel carburetor (DF752-E2)**
The carburetor is tamper resistant; the idle mixture screw has been covered by tamper plug after adjustment at the factory. You CANNOT adjust this screw.
- Distributor**
The distributor is tamper resistant; the ignition timing adjustment screw has been covered after adjustment at the factory. You CANNOT adjust the ignition timing.

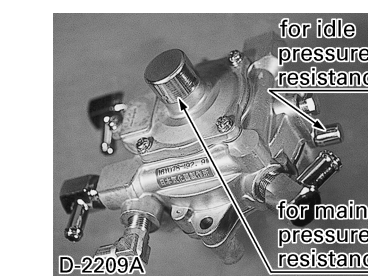


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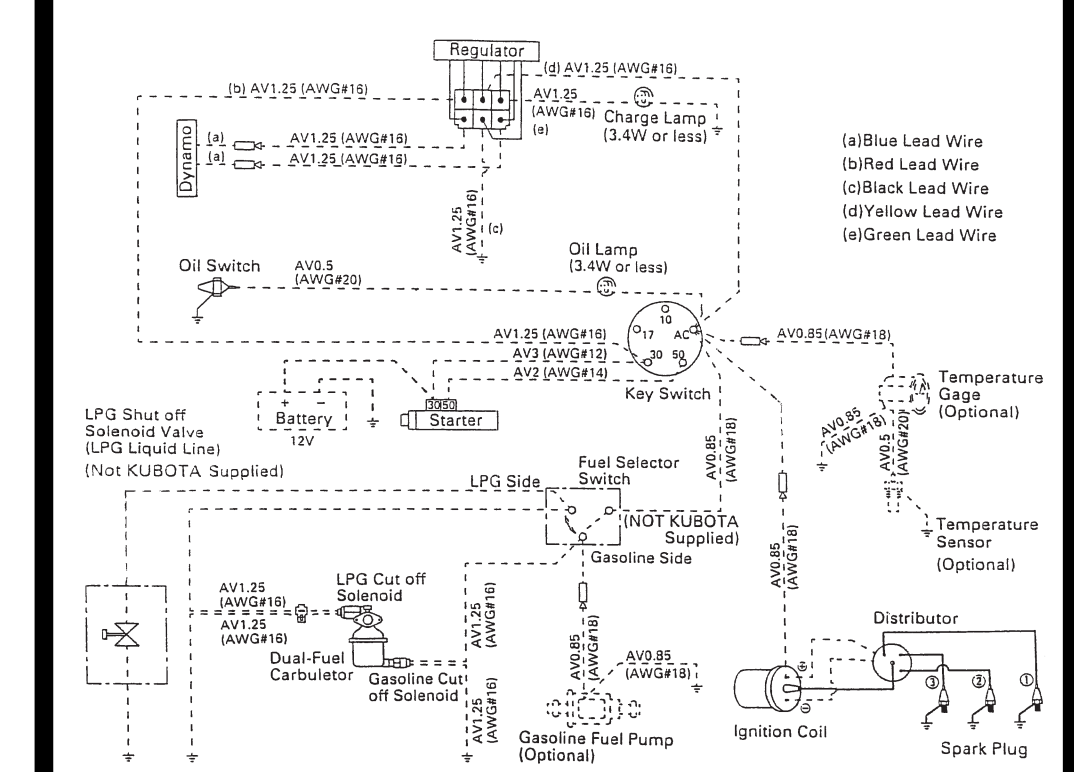
- LPG regulator (DF752-E2)**
LPG regulator is tamper resistant; the main and idle pressure adjustment screws have been covered by tamper caps after adjustment at the factory. You CANNOT adjust the above 2 screws.



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If service or repair is needed, contact your local KUBOTA dealer.

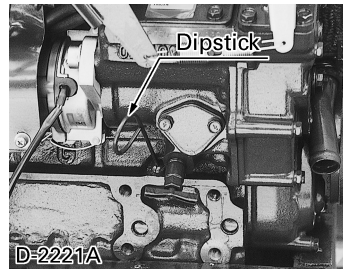
WIRING DIAGRAMS



PRE-OPERATION CHECK

1 ENGINE OIL

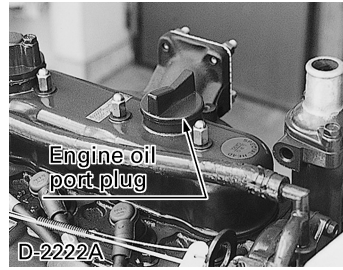
- Checking oil level and adding engine oil.
- (1) Detach the dipstick, wipe it clean, reinsert it, take it out again, and check the oil level.
- (2) Add engine oil if necessary. Engine oil level within this range A is proper.



IMPORTANT :

Engine oil should meet as a minimum SAE viscosity and SH class grades (API classification). Change the engine oil according to the ambient temperature, expected between changes.

above 77°F	SAE30 or 10W30
32°F to 77°F	SAE20 or 10W30
32°F to 0°F	SAE10W or 10W30

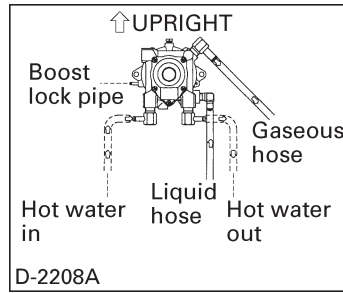


2 FUEL

- Gasoline
- 1. Use unleaded gasoline only.
- DO NOT use gasoline blended with methyl alcohol.
- LPG (DF752-E2)
- 1. Use Commercial LPG only.
- 2. Fuel tank is liquid withdrawal type.

IMPORTANT :

- Be sure that the fill up valve and the liquid withdrawal valve are closed.
- Be sure that LPG hose is connected with the liquid withdrawal valve.
- Be sure that LPG tank is placed firmly not to move by machine vibration. (See "LPG FUEL SYSTEM AND DIAGRAMS" section.)



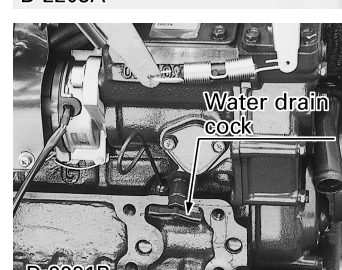
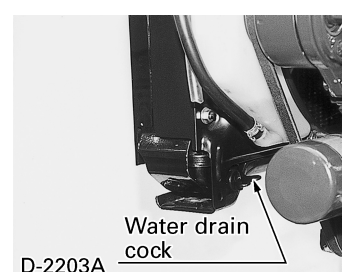
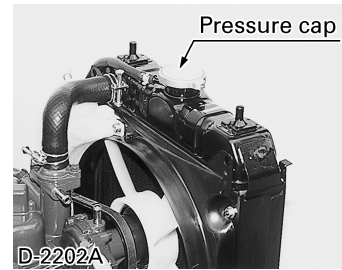
3 RADIATOR

▲ WARNING :

To avoid personal injury :

- Do not touch or remove radiator cap when engine is hot !

- Checking level, adding and changing coolant.
- (1) Remove the radiator pressure cap and check to see if coolant reaches the supply port.
- (2) To prevent possible coolant problems to the engine, always assure a 50% / 50% anti-freeze and H₂O mixture regardless of temperature. Use only ethylene glycol or propylene glycol type anti-freeze for this engine.
- (3) In case of loss of coolant, add the appropriate amount of 50% / 50% mixture of anti-freeze and water. In addition, check two drain cocks at the lower position of the radiator and the side of the crankcase to see if they are securely tightened.
- (4) Change anti-freeze and H₂O mixture once a year.



4 BATTERY

Checking the electrolyte level.

- The electrolyte level drops as water evaporates. Excessively low electrolyte level can damage the battery.
- Be sure to add only distilled water.
- Be sure to wear protective clothing and safety glasses when checking battery condition !

IMPORTANT :

- When there is a fear of the temperature dropping below 5°F (-15°C) detach the battery from the machine, and keep it in doors to be reinstalled just before the next operation.

MAINTENANCE / CHECKING SCHEDULE

In order to keep your engine in good working conditions, be sure to follow the maintenance / checking schedule given in the table below. (The schedule applies to an engine in use under normal conditions.)

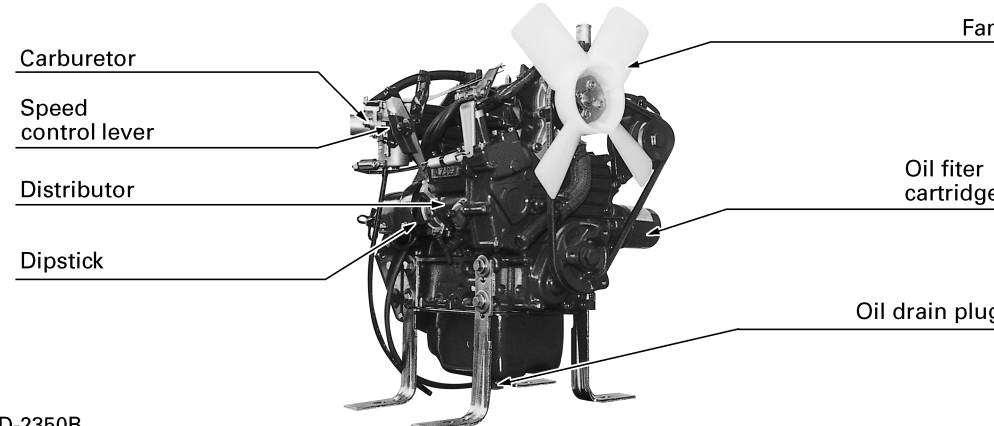
Item	Interval	Every 8 hours (daily)	Every 50 hours (weekly)	Every 100 hours	Every 200 hours	Every 1000 hours	Yearly	Each 2 years	Remarks & Ref. Item No.
		●	●	●	●	●	●	●	
Each parts	Check / Clean	●							
Engine oil	Check / Replenish	●							3
Oil filter cartridge	Change		(Intail change)		●				4
Spark plug	Clean			●					5
	Adjust			▲					
	Change					●			
Ignition wires	Change							●	
Air cleaner element	Check	▲							2
	Clean	▲	●						
	Change						●*1		
Intake pipe / clamp bands	Change							●	
Fuel filter	Check / Clean			●					
	Change							●	
Fuel tank	Clean							●	Gasoline line
	Check setting	▲		●					LPG line
Fuel pipe / clamps (Gasoline line)	Check		●						
	Change							●	
Fuel pipe / clamps (LPG line : LPG tank-Dual carburetor)	Check the connector	●							
	Check fuel leakage		●						
	Change							●	
Carburetor	Clean						●		10
LPG vaporizer regulator	Check					●			Hot water line / vacuum lock pipe
	Change							●	Hot water line / vacuum lock pipe
	Check inner parts*2							●	
Battery	Check		●						
	Change							●	
Radiator coolant	Check	●							6
	Change							●	
Radiator hoses and clamp bands	Check			●					6
	Change							●	
Radiator and water jacket	Clean							●	6
Fan belt tension	Check			●					1
	Adjust			▲					
Valve clearance	Adjust					●			
Cylinder head	Clean					●			
Valve seats	Check / relap					●			

▲ : If necessary

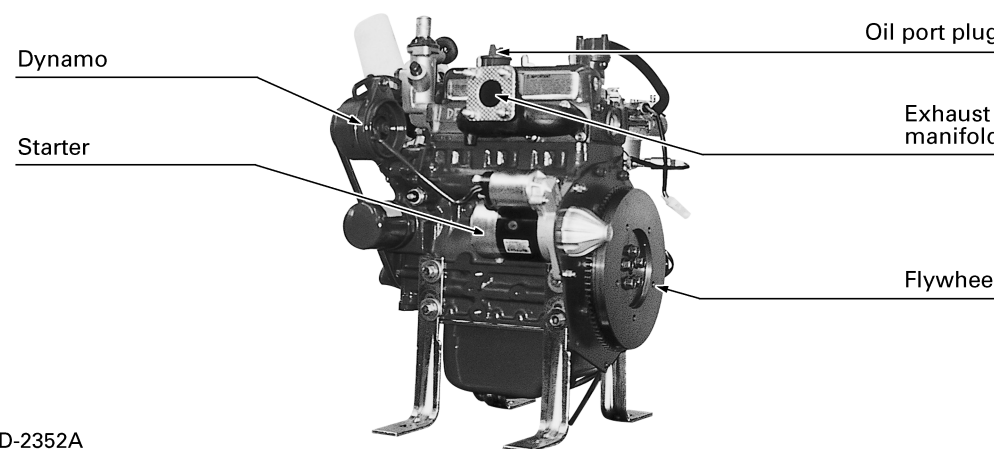
*1 Change more often when operating under dusty conditions.

*2 If necessary, contact your local KUBOTA dealer.

To keep your KUBOTA performing for many years of service, use only genuine KUBOTA replacement parts.



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[DF752-E2]

MAINTENANCE

BREAK-IN :

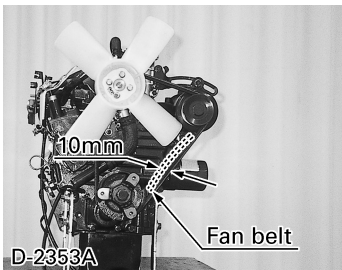
During the engine break-in period, observe the following.

- (1) Change engine oil and oil filter cartridge, after the initial 50 hours of operation.
- (2) When the ambient temperature is low, only operate the machine after the engine has been completely warmed up.

PERIODIC SERVICE :

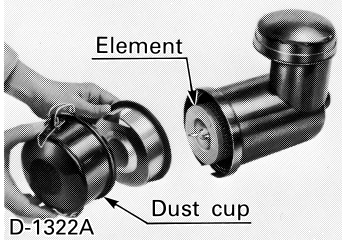
(1) FAN BELT – Adjustment of tension

An improperly adjusted fan belt can cause engine over-heating and insufficient battery charging. Push on the fan belt at the middle with a finger and check that it deflects about 10 mm (0.4 in.).



(2) AIR CLEANER – Cleaning of element & Replace

- ① The element used on this engine is a dry type and so do not apply oil to it.
- ② When dry dust adheres to the element, blow compressed air from the inside turning the element, pressure of compressed air must be under 205 kPa (2.1 kgf/cm², 30 psi).
- ③ Replace the element every year or every six cleanings.
- ④ Install the air cleaner dust cup with "TOP" indicated on the rear of the cup.
- ⑤ Do not over-service the air filter element.



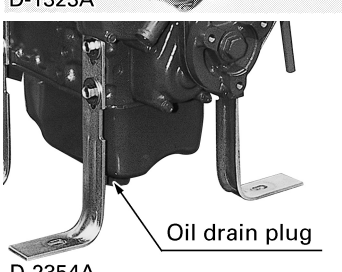
(3) ENGINE OIL – Changing engine oil

- ① Place an oil pan under the engine. Remove the drain plug at the bottom of the engine, and drain all the old oil. Draining oil will be easy and complete if done while the engine is still warm.
- ② Supply new engine oil up to the upper limit of the dipstick.



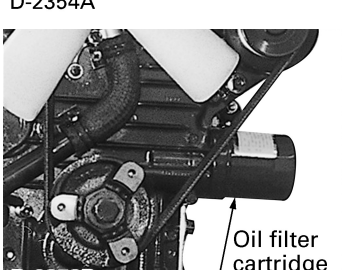
(4) OIL FILTER CARTRIDGE – Replacing

- ① Remove the oil filter cartridge with a filter wrench.
- ② Apply a film of oil to the gasket for the cartridge.
- ③ Screw in the cartridge by hand. When the gasket comes in contact with the seal surface, tighten the cartridge enough by hand.



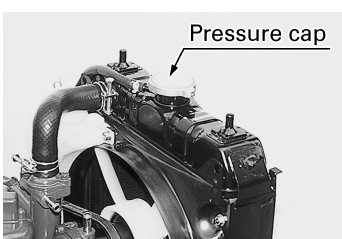
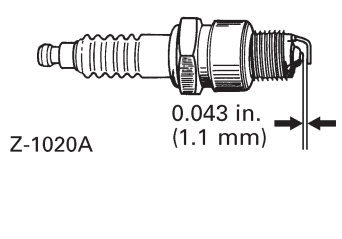
(5) SPARK PLUG – Cleaning & Adjustment clearance

If the spark plug electrode or its insulator is soiled or is covered with deposited carbon, it may cause engine trouble. The soil, carbon deposits etc. can be brushed off using a wire brush. After cleaning, be sure to adjust for proper clearance.



(6) RADIATOR

- ① In the event of insufficient coolant, fill the radiator with a 50% / 50% mixture of anti-freeze / H₂O and check. If radiator is equipped with a coolant recovery tank, fill this tank also to the level indicated on the tank.
 - ② Never use muddy or sea water as coolant.
 - ③ Be sure to tighten the radiator pressure cap securely after supplying coolant.
- Checking radiator hoses (water pipes)
1. Check to see the radiator hoses are properly fixed every 200 hours of operation or six months, whichever comes first.
 - ① If clamp bands are loose and water leaks, tighten bands securely.
 - ② If radiator hoses are swollen, hardened or cracked, replace hoses and tighten clamp bands securely.
 2. If checked and found that hoses are swollen, hardened or cracked, replace hoses and clamp bands every 2 years or earlier.



(7) LPG LEAKAGE CHECK (for DF752-E2)

Turn on the gas at low idling rpm and use a soap solution or its equivalent to check all connections for leaks between the fuel tank and dual fuel carburetor. Bubbles will indicate a loose connection.

▲ WARNING : NEVER TEST FOR GAS LEAKS WITH A FLAME.

(8) LPG FUEL TANK CHECK (for DF752-E2)

Check that LPG fuel tank is installed firmly. Be sure that the fill up valve and liquid withdrawal valve of the LPG fuel tank can be opened and closed easily.

(9) LPG REGULATOR CHECK (for DF752-E2)

Check that the hot water lines are not leaking. Check that the vacuum lock pipe is not damaged.

(10) CARBURETOR CHECK

Clean and check for leakage. Check throttle plate for dirt.

STARTING THE ENGINE

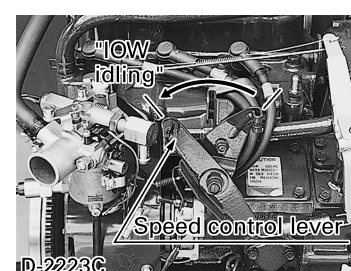
Gasoline

- ① Open the fuel cock of the gasoline line.

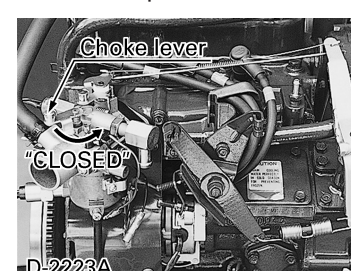
- ② Turn the fuel selector switch* to the "Gasoline" position. (DF752-E2)

* Not KUBOTA supplied the fuel selector switch. See "WIRING DIAGRAMS" section about the wiring.

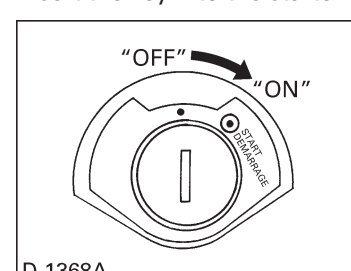
- ③ Set the speed control lever to "low idling".



- ④ Move the choke lever to the "CLOSED" position.



- ⑤ Insert the key into the starter switch and turn it to the "ON" (●) position.



- ⑥ Check to see that the oil pressure lamp and charge lamp are ON.

- ⑦ Turn the key to the "START" position and the starter will begin turning. Release the key immediately, when the engine starts.

LPG

- ① Open the liquid withdrawal valve of the LPG fuel tank.

- ② Turn the fuel selector switch* to the "LPG" position. (DF752-E2)

- ④ DO NOT move the choke lever, when LPG starting.

Gasoline

- ⑧ If the engine is started, open the choke lever gradually (move the lever to the "OPEN" position).



- ⑨ Check to see that the oil pressure lamp and charge lamp are OFF. If not, immediately stop the engine and check the cause.

- ⑩ Warm up the engine at medium speed running for 3 to 5 minutes.

IMPORTANT :

- (1) NEVER turn the starter switch while the engine is running.
- (2) Be sure to warm up the engine not only in winter but also in other warmer seasons.
- (3) In case of converting the fuel (gasoline ↔ LPG) while running the engine, the engine should be operated with the engine speed high and no-loaded. If you convert the fuel with the engine speed low, the engine will stop. (DF752-E2)

LPG

- ⑧ Do not move the choke lever, when LPG starting.

STOPPING THE ENGINE

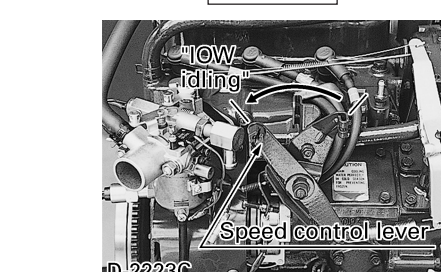
Gasoline

- ① Disengage the engine drive power and set the speed control lever to "low idling".

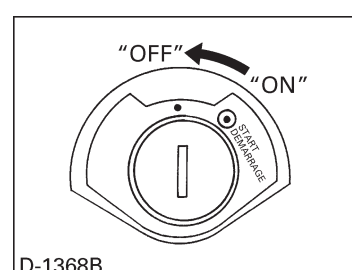
- ② Close the fuel cock of the gasoline line.
- ③ Cool down the engine for 2 to 3 minutes.

- ④ Turn the starter switch to the "OFF" (●) position. Remove the key at the "OFF" position.

LPG



- ② Close the liquid withdrawal valve of the LPG fuel tank.



D-1368B