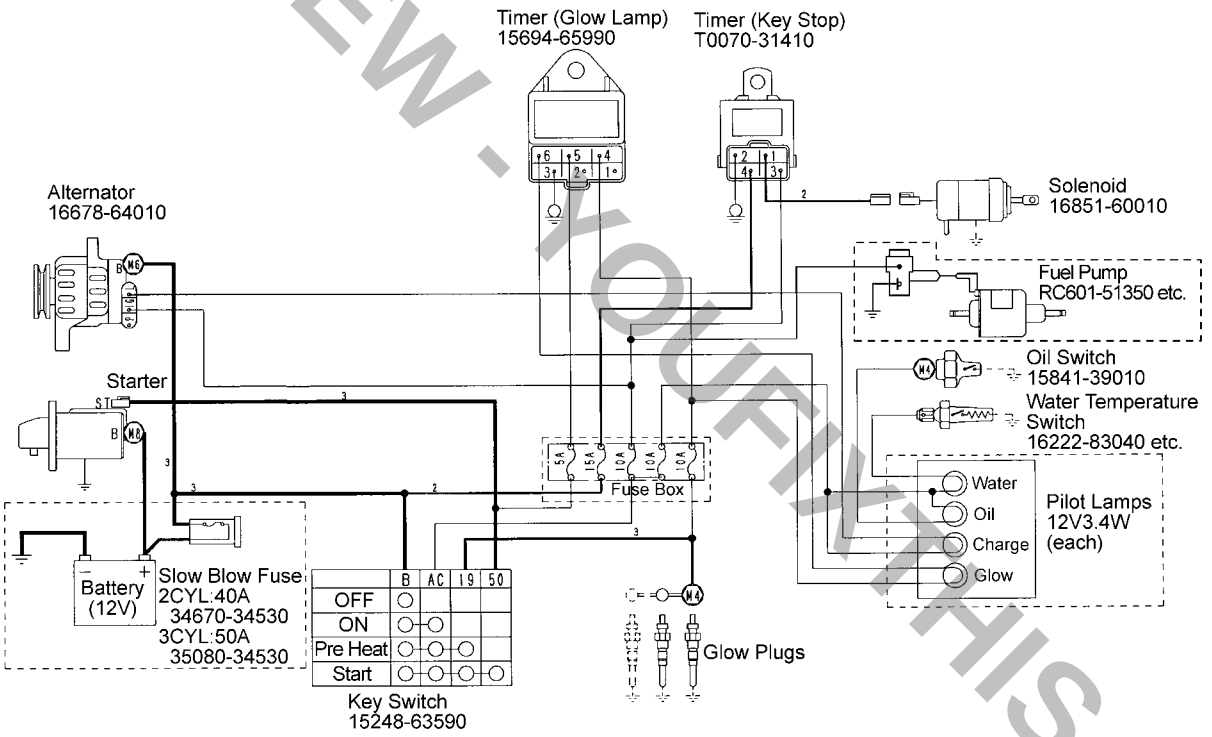
EU standard for Alternator (Energize to stop)



*The parts boxed in [ ] are reference, NOT equipped for standard engine spec.
*Use wire size 0.5 ~ 0.85 mm^2 with no mark.

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Vol % Anti-freeze	Freezing Point		Boiling Point *	
	℃	℉	℃	℉
50	-37	-34	108	226

*At 1.013 x 10^5 Pa (760 mmHg) pressure (atmospheric). A higher boiling point is obtained by using a radiator pressure cap which permits the development of pressure within the cooling system.

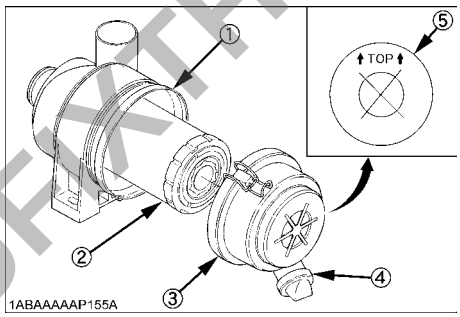
5. Adding the LLC
   (1) Add only water if the coolant level reduces in the cooling system by evaporation.
   (2) If there is a coolant leak, add the LLC of the same manufacturer and type in the same coolant percentage.
   *Never add any long-life coolant of different manufacturer. (Different brands may have different additive components, and the engine may fail to perform as specified.)
6. When the LLC is mixed, do not employ any radiator cleaning agent. The LLC contains anti-corrosive agent. If mixed with the cleaning agent, sludge may build up, adversely affecting the engine parts.
7. Kubota's genuine long-life coolant has a service life of 2 years. Be sure to change the coolant every 2 years.

NOTE :
- The above data represents industry standards that necessitate minimum glycol content in the concentrated anti-freeze.

AIR CLEANER

As the element of the air cleaner employed on this engine is a dry type, never apply oil to it.

1. Open the evacuator valve once a week under ordinary conditions-or daily when used in a dusty place-to get rid of large particles of dust and dirt.
2. Wipe the inside air cleaner clean with cloth or the like if it is dirty or wet.
3. Avoid touching the element except when cleaning.
4. 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/cm^2, 30 psi).
5. Replace the element every year or every six cleanings.



(1) Air cleaner body
(2) Element
(3) Cover
(4) Evacuator valve
(5) "TOP" mark

IMPORTANT :
- Make sure the hooking clip for cover for the element is tight enough. If it is loose, dust and dirt may be sucked, wearing down the cylinder liner and piston ring earlier and thereby resulting in poor power output.

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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 air vent screws stop fuel filter and 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 for 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	Z482-E	Z602-E	D662-E
Type	Vertical, water-cooled, 4-cycle diesel engine		
Number of cylinders	2		3
Bore and stroke mm (in.)	67 x 68 (2.64 x 2.68)	72 x 73.6 (2.83 x 2.90)	64 x 68 (2.52 x 2.68)
Total displacement L (cu.in.)	0.479 (29.23)	0.599 (36.55)	0.656 (40.03)
Combustion chamber	Spherical Type (ETVCS)		
SAE NET Intermittent kW / rpm H.P. (SAEJ1349) (HP / rpm)	9.32 / 3600 (12.5 / 3600)	11.6 / 3600 (15.6 / 3600)	12.9 / 3600 (17.3 / 3600)
SAE NET Continuous kW / rpm H.P. (SAEJ1349) (HP / rpm)	8.05 / 3600 (10.8 / 3600)	10.1 / 3600 (13.5 / 3600)	11.18 / 3600 (15.0 / 3600)
Maximum bare speed rpm	3800	3850	3800
Minimum bare idling speed rpm	800 to 900	900 to 1000	800 to 900
Order of firing	1-2		1-2-3
Direction of rotation	Counter-clockwise (viewed from flywheel side)		
Injection pump	Bosch MD Type mini pump		
Injection pressure	13.73 MPa, 1991 psi (140 kgf/cm²)		
Injection timing (Before T.D.C.)	0.366 rad (20°)	0.35 rad (20°)	0.366 rad (20°)
Compression ratio	23.5 : 1	24 : 1	23.5 : 1
Fuel	Diesel Fuel No.2-D		
Lubricant (API classification)	above CD grade		
Dimension mm (in.) (length x width x height)	351 x 389 x 520 (13.82 x 15.31 x 20.47)	385 x 421 x 544 (15.16 x 16.57 x 21.42)	426 x 389 x 520 (16.77 x 15.31 x 20.47)
Dry weight (BB Spec.) kg (lbs.)	53.1 (117.1)	57.0 (125.7)	63.7 (140.4)
Starting system	Cell starter (with glow plug)		
Starting motor	12 V, 0.8 kW	12 V, 1.0 kW	12 V, 0.8 kW
Charging generator	12 V, 150 W	12 V, 480 W	12 V, 150 W
Recommended battery capacity (5Hr capacity)	12 V, 28 AH, equivalent	12 V, 36 AH, equivalent	

NOTE :
- Specifications are subject to change without notice.
- The battery capacity is indicated in 5-hour ratio.

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SERVICE INTERVALS

Observe the following for service and maintenance.

Interval	Item	Ref. page		
Every 50 hours	Check of fuel pipes and clamp bands	12		@
See NOTE	Change of engine oil (depending on the oil pan)	13,14	◎	
Every 100 hours	Cleaning of air cleaner element	18	*1	@
	Cleaning of fuel filter	13		
	Check of fan belt tightness	19		
Every 200 hours	Replacement of oil filter cartridge (depending on the oil pan)	15	◎	
	Check of intake air line	-		@
Every 200 hours of operation or six months	Check of radiator hoses and clamp bands	17		
Every 400 hours	Replacement of fuel filter element	13		@
Every 500 hours	Removal of sediment in fuel tank	-		
	Cleaning of water jacket (radiator interior)	-		
	Replacement of fan belt	19		
Every year or every 6 cleanings of air cleaner element	Replacement of air cleaner element	18	*2	@
Every 800 hours	Check of valve clearance	-	*3	
Every 1500 hours	Check of fuel injection nozzle injection pressure	-	*3	@
Every 3000 hours	Check of injection pump	-	*3	@
Every two years	Replacement of radiator hoses and clamp bands	17		
	Replacement of fuel pipes and clamps	12	*3	@
	Change of radiator coolant (L.L.C.)	15		
	Replacement of intake air line	-	*4	@

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OPERATING THE ENGINE

STARTING THE ENGINE (NORMAL)

⚠ CAUTION

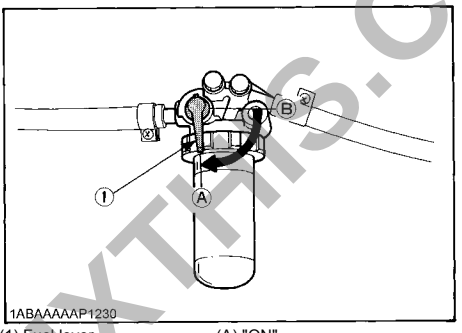
To avoid personal injury:

- **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.

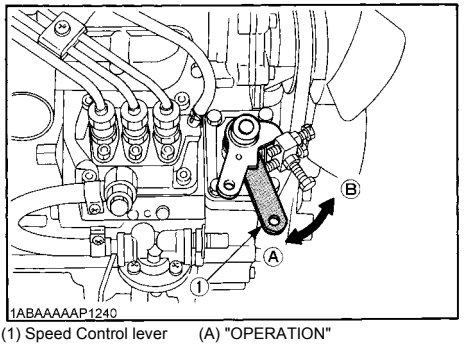
1. Set the fuel lever to "ON" position.



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

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

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



(1) Speed Control lever (A) "OPERATION" (B) "IDLING"

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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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ENGLISH

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