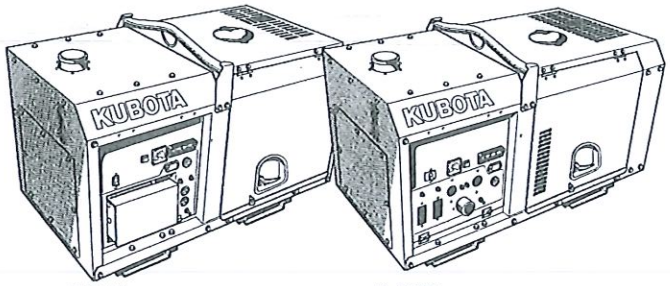
OPERATOR'S MANUAL

ENGLISH

KUBOTA

DIESEL GENERATOR

GL6000-STD · GL6000-AUS
GL7000-USA · GL7000-USA-TM · GL7000-STD
GL9000-STD · GL9000-AUS
GL11000-USA · GL11000-USA-TM · GL11000-STD



D-2396 D-2397

G3102-8916-5

READ AND SAVE THIS BOOK

Kubota

⚠ WARNING

To prevent electrical shock the following instruction must be followed.
Before the generator can be connected to a building's electrical system, a licensed electrician must install an isolation (transfer) switch in the building's main fuse box. The switch is the connection point for generator power and allows selection of generator or main line power to the building.
This will prevent the generator from charging the main power line (backfeeding) when the main power supply has failed or has been turned off for line repair. Backfeeding can electrocute or injure line maintenance personnel. Also, generator and building electrical system damage can occur when normal operating power returns if unit is used without an isolation switch.

California Proposition 65

⚠ WARNING ⚠

Engine exhaust, some of its constituents, certain vehicle components and fluids, contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

IMPORTANT

The engine in this machine is not equipped by the manufacture with a standard spark arrester.
It is a violation of California Public Resource Code Section 4442 to use or operate this engine on or near any forest-covered, brush-covered land, or grass- covered land unless the exhaust system is equipped with a working spark arrester meeting state laws. Other states or federal areas may have similar laws.

ENGLISH

FOREWORD

You are now the proud owner of a KUBOTA Diesel Engine Generator. This generator is a product of KUBOTA quality engineering and manufacturing. It is made of fine materials and under a rigid quality control system with correct maintenance. It will give you long, satisfactory service. To obtain the best use of your generator, please read this manual carefully. It will help you become familiar with the operation of the generator and contains many helpful hints about generator maintenance. It is KUBOTA's policy to utilize as quickly as possible every advance in our research. The immediate use of new techniques in the manufacture of products may cause some small parts of this manual to be outdated. KUBOTA distributors and dealers will have the most up-to-date information. Please do not hesitate to consult with them.

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.

WARNING : Indicates a potentially hazardous situation which, if not avoided, could 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.

ENGLISH

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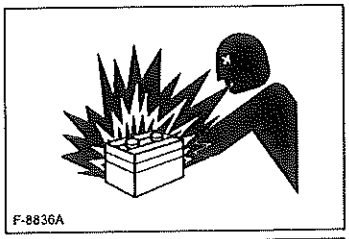
SAFETY PRECAUTIONS

- To operate the machine safely, be sure to follow the instructions below.

DANGER

To avoid personal injury:

- Hazard of being caught up in the machine: Do not touch any rotating parts.
- 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. (for only refillable battery)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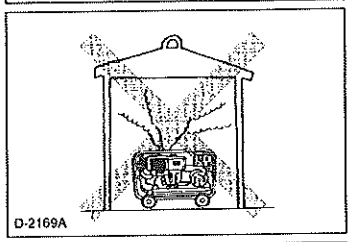
WARNING

To avoid personal injury:

- Exhaust gas poisoning hazard: Do not use the machine in any poorly-ventilated place such as indoors and tunnels.
- Exhaust gas poisoning and fire hazard: Do not direct the exhaust to people and buildings.
- Electric shock hazard: Do not touch the machine with wet hands.
- Electric shock hazard: Do not touch the terminals and sockets while the machine is running.
- Electric shock and injury hazard: Do not check and service the machine while it is running.
- Electric shock and injury hazard: Do not tamper with the machine.
- Fire hazard: Flames prohibited. Keep the machine more than 1 m(3 feet) away from flammable materials.
- Electric shock or fire hazard: Do not use the machine in the rain.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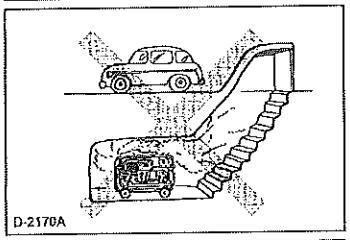
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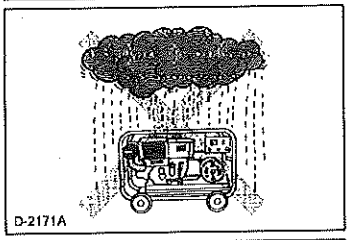
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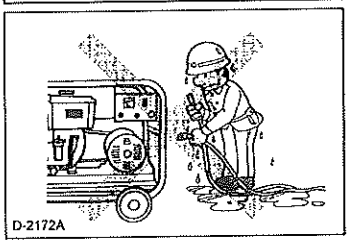
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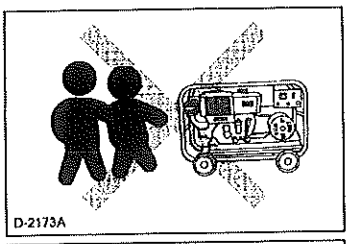
ENGLISH

⚠ CAUTION

To avoid personal injury:

- Electric shock and fire hazard: Do not connect the machine to any indoor (commercial) power outlet.
- Electric shock and injury hazard: Do not allow children to run the machine.
- Electric shock and injury hazard: Turn off the circuit breaker before starting the machine.
- Injury hazard: Do not touch the muffler.
- Injury hazard: Do not run the machine tilted.
- Injury hazard: Do not move the machine while it is running.
- Fire hazard: Stop the engine before adding fuel.
- Fire hazard: Do not enclose the machine, nor cover it with a box or the like.
- Fire hazard: Pay attention to the type and amount of fuel.
- Do not get the warning label dirty or peeled off.
- Be sure to hand over the operation manual to any other operator.
- Electric shock hazard: Ground the machine using the ground terminal on the control panel.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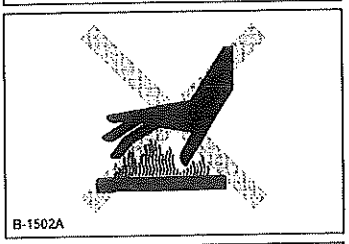
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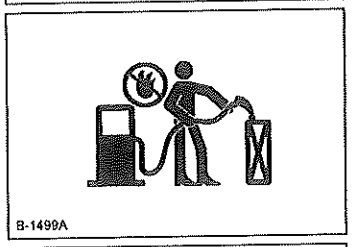
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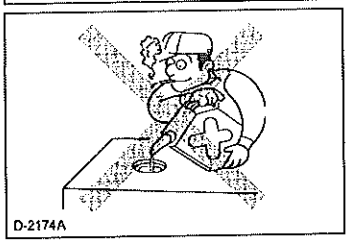
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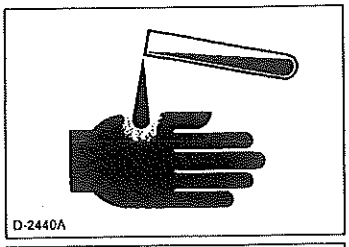
⚠ CAUTION

To avoid personal injury:

- Anti-freeze contains poison. Wear rubber gloves to avoid personal injury. In case of contact with skin, wash it off immediately.
- DO NOT mix different types of Anti-freeze. The mixture can produce chemical reaction causing harmful substances. Use approved Anti-freeze.
- Be mindful of the environment and the ecology. Before draining any fluids, find out the correct way of disposing of them. Observe the relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters and batteries.
- When draining fluids from the engine, place some container underneath the engine body.
- DO NOT pour waste onto the grounds, down a drain, or into any water source.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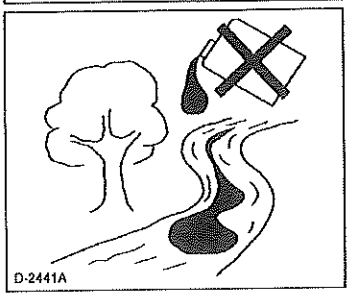
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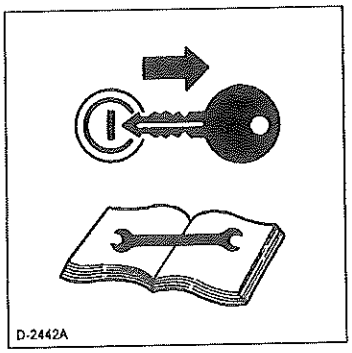
⚠ CAUTION

To avoid personal injury:

- When checking engine or servicing, place the engine on a wide and level ground. DO NOT work on anything that is supported ONLY by lift jacks or a hoist. Always use blocks or correct stands to support the engine before servicing.
- Detach the battery from the engine before conducting service. Put a "DO NOT OPERATE!" tag in the key switch to avoid accidental starting.
- To avoid sparks from an accidental short circuit always disconnect the battery's ground cable (-) first and connect it last.
- Be sure to stop the engine and remove the key when conducting daily and periodic maintenance, servicing and cleaning.
- Check or conduct maintenance after the engine, coolant, muffler, or muffler cover have been cooled off completely.
- Always use the appropriate tools and jig-fixture in good condition when performing any service work. Make sure you understand how to use them before service.
- Use ONLY correct engine barring techniques for manually rotating the engine. DO NOT attempt to rotate the engine by pulling or prying on the cooling fan and V-belt. This practice can cause serious personal injury or premature machine damage to the cooling fan.
- Replace fuel pipes and lubricant pipes with their hose clamps every 2 years or earlier whether they are damaged or not. They are made of rubber and are aged gradually.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Keep first aid kit and fire extinguisher handy at all times.



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DANGER, WARNING AND CAUTION LABELS

Pay special attention to all labels on the generator.
Refer to following representations for labels used on the GL Series Generator. Labels are available individually from your KUBOTA Dealer.

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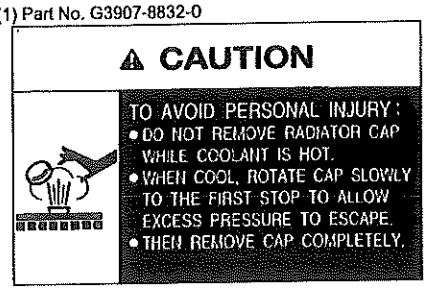

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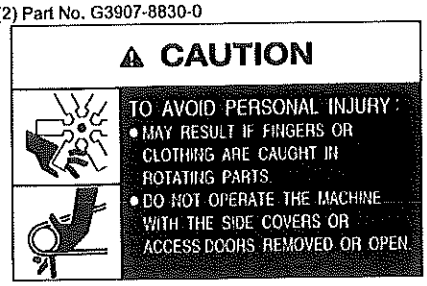

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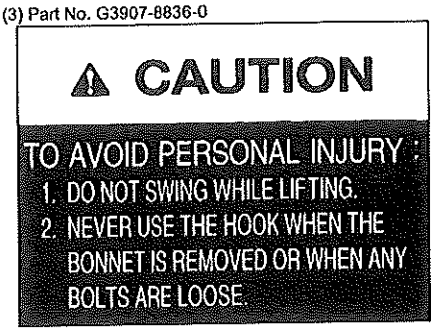

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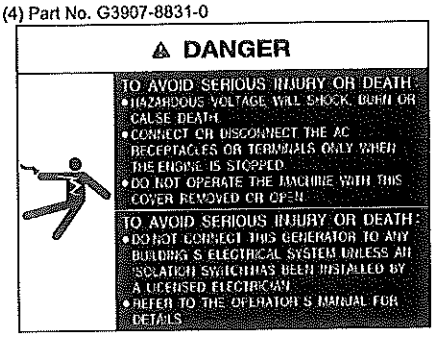

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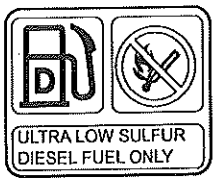

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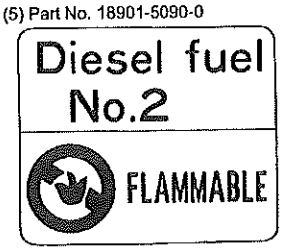

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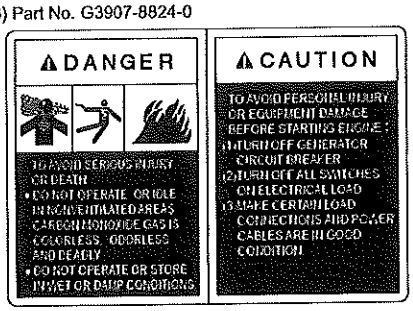

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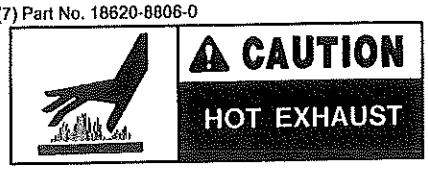

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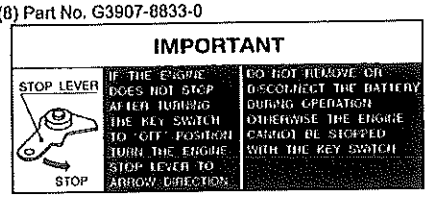

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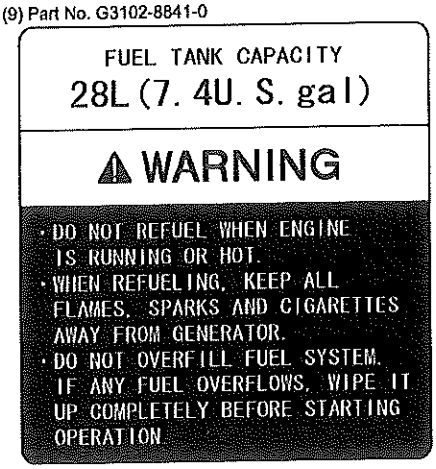

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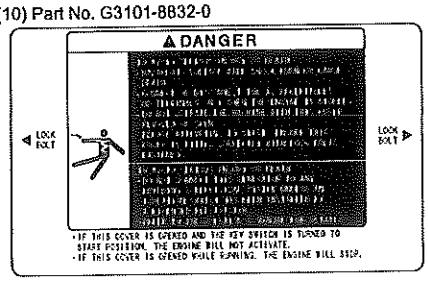

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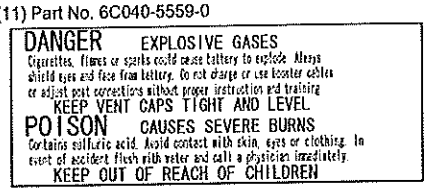

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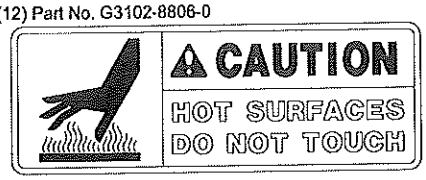

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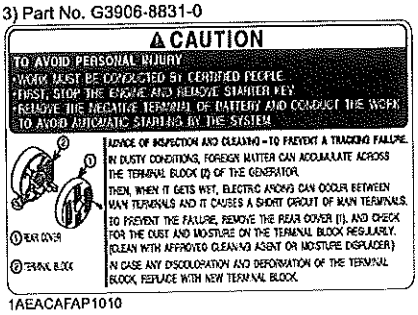

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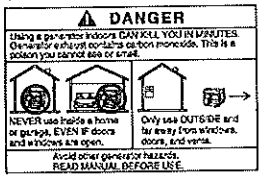

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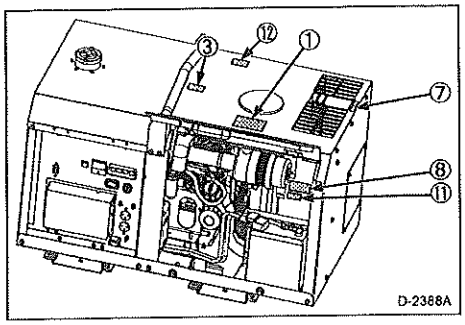
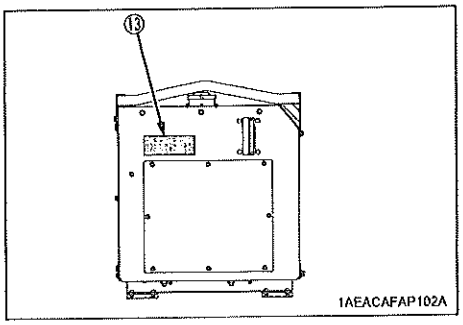
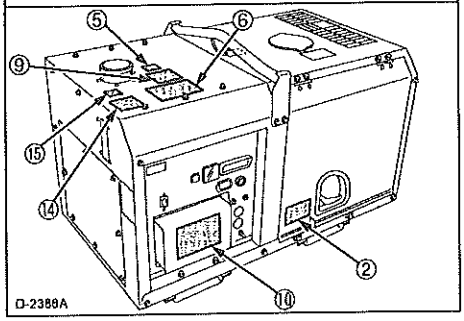




Terminal connection type



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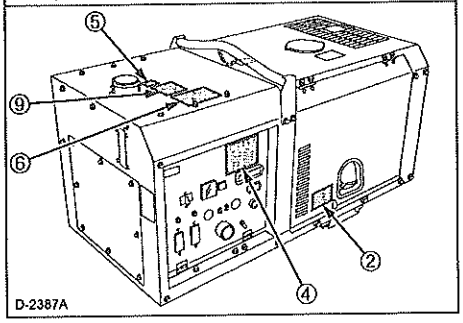


CARE OF DANGER, WARNING AND CAUTION LABELS

1. Keep danger, warning and caution labels clean and free from obstructing material.
2. Clean danger, warning and caution labels with soap and water, dry with a soft cloth.
3. Replace damaged or missing danger, warning and caution labels with new labels from your local KUBOTA Dealer.
4. If a component with danger, warning and caution label(s) affixed is replaced with new part, make sure new label(s) is (are) attached in the same location(s) as the replaced component.
5. Mount new danger, warning and caution labels by applying on a clean dry surface and pressing any bubbles to outside edge.

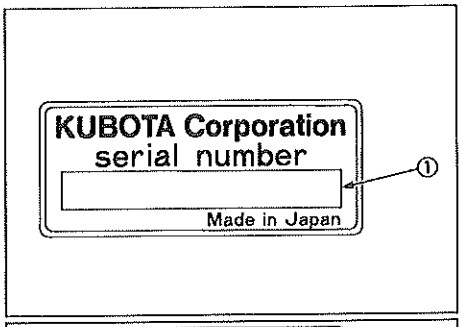
SERVICING OF GENERATOR

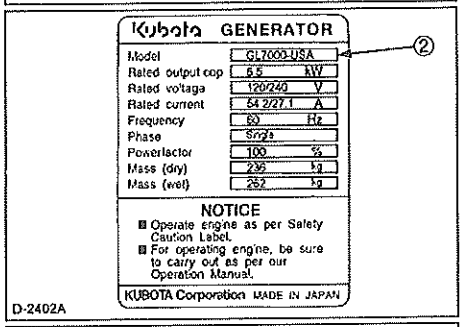
Your dealer is interested in your new generator and has the desire to help you get the most value from it. After reading this manual thoroughly, you will find that you can do some of the regular maintenance yourself.
However, when in need of parts or major service, be sure to see your KUBOTA Dealer.
For service, contact the KUBOTA Dealership from which you purchased your generator or your local KUBOTA Dealer.

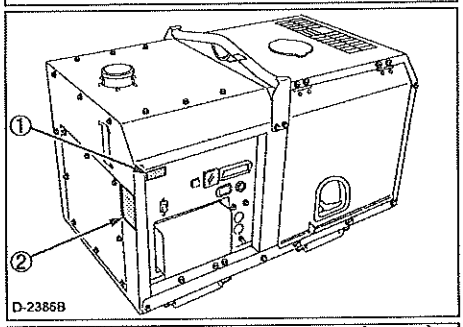
When in need of parts, be prepared to give your dealer the generator and engine serial numbers.
Locate the serial numbers now and record them in the space provided below.

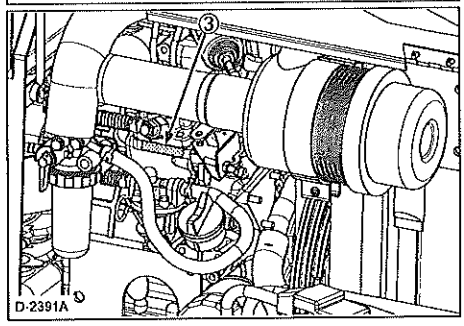
	model	Serial No.
Generator		
Engine		
Date of Purchase		
Name of Dealer		
(To be filled in by purchaser)		

(1) Generator serial number
(2) Generator model
(3) Engine serial number









ENGLISH

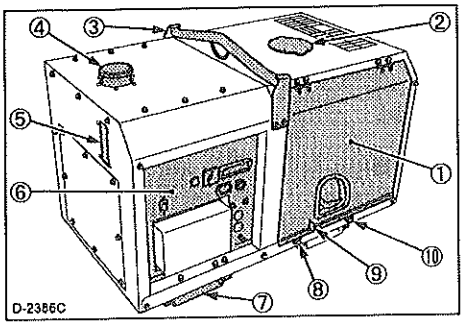
SPECIFICATION

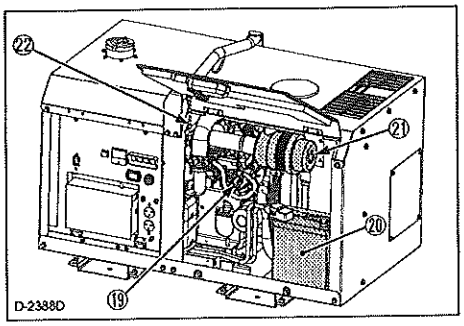
GENERATOR							
Model	Unit	GL6000		GL7000			
		–STD	–AUS	–USA	–USA-TM	–STD	
Design	—	Salient-pole, revolving-field AC generator (AVR system with separate and self-excitation brush)					
Frequency	Hz	50		60			
Rated Output (COP)	kVA	5.5		6.5			
	kW	5.5		6.5			
Rated Voltage	V	220	240	120/240		110/220	
Rated amperage	A	25	22.9	54.2/27.1		59.1/29.5	
Phase & Wire	ø-W	1-2		1-4			
Power Factor	%	100					
No. of Poles	—	2					
Insulation	—	Rotor coil: Class F, Stator coil: Class B					
Voltage Regulation	%	5 (No load to full load)					
Type of Coupling	—	Direct coupled					
DIESEL ENGINE							
Model	—	Z482					
Design	—	Vertical, water-cooled, 4-cycle diesel engine					
No. of cylinders	—	2					
Bore × stroke	mm (in.)	ø 67 × 68 (2.6 × 2.7)					
Displacement	L (cu. in.)	0.479 (29.2)					
Engine speed	rpm	3000		3600			
Lubricating Oil	—	API service class CF or higher					
Oil capacity	L (U.S.gal.)	2.2 (0.58)					
Coolant capacity	L (U.S.gal.)	3.7 (0.98)					
SET							
Fuel	—	Diesel fuel No. 2 (ASTM D975)					
Fuel consumption (at full load)	L (U.S.gal.)/h	2.4 (0.63)		2.7 (0.71)			
Fuel tank capacity	L (U.S.gal.)	28 (7.4)					
Continuous Operating Hours	hrs	12		10			
Battery (V × Ah/5Hr)	—	44B19R (12V × 27Ah)					
Starting System	—	Electric					
L × W × H	mm (in.)	1066 × 618 × 698 (42.0 × 24.3 × 27.5)					
Approx Net Wt.	kg (lbs.)	235 (518)					
Output Terminal	—	O	—	—	O	O	
Output Receptacle	—	O	O	O	O	O	
Emergency Stop System	—	In case of abnormal : Oil pressure, water temperature					

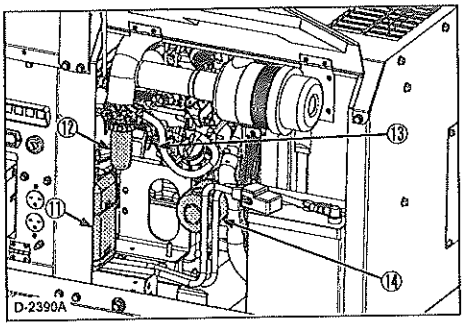
GENERATOR							
Model	Unit	GL9000		GL11000			
		–STD	–AUS	–USA	–USA-TM	–STD	
Design	—	Salient-pole, revolving-field AC generator (AVR system with separate and self-excitation brush)					
Frequency	Hz	50		60			
Rated Output (COP)	kVA	8		10			
	kW	8		10			
Rated Voltage	V	220	240	120/240		110/220	
Rated amperage	A	36.4	33.3	83.3/41.7		90.9/45.5	
Phase & Wire	ø-W	1-2		1-3			
Power Factor	%	100					
No. of Poles	—	2					
Insulation	—	Rotor coil: Class F, Stator coil: Class B					
Voltage Regulation	%	5 (No load to full load)					
Type of Coupling	—	Direct coupled					
DIESEL ENGINE							
Model	—	D722					
Design	—	Vertical, water-cooled, 4-cycle diesel engine					
No. of cylinders	—	3					
Bore × stroke	mm (in.)	ø 67 × 68 (2.6 × 2.7)					
Displacement	L (cu. in.)	0.719 (43.9)					
Engine speed	rpm	3000		3600			
Lubricating Oil	—	API service class CF or higher					
Oil capacity	L (U.S.gal.)	3.4 (0.90)					
Coolant capacity	L (U.S.gal.)	4.1 (1.1)					
SET							
Fuel	—	Diesel fuel No. 2 (ASTM D975)					
Fuel consumption (at full load)	L (U.S.gal.)/h	3.3 (0.87)		4.1 (1.08)			
Fuel tank capacity	L (U.S.gal.)	28 (7.4)					
Continuous Operating Hours	hrs	8.5		7.0			
Battery (V × Ah/5Hr)	—	55B24R (12V × 36Ah)					
Starting System	—	Electric					
L × W × H	mm (in.)	1281 × 618 × 698 (50.4 × 24.3 × 27.5)					
Approx Net Wt.	kg (lbs.)	280 (617)					
Output	Terminal	—	O	—	—	O	O
	Receptacle	—	O	O	O	O	O
Emergency Stop System		—	In case of abnormal : Oil pressure, water temperature				

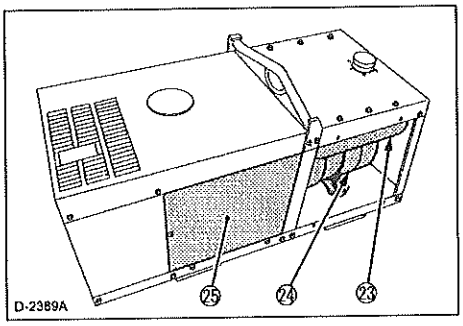
ENGLISH

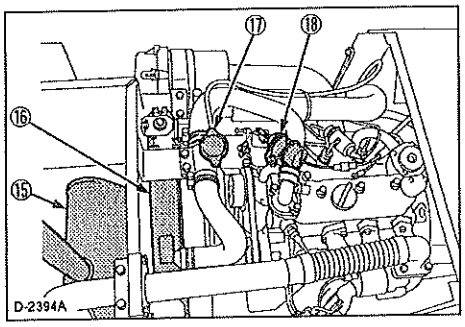
NOMENCLATURE









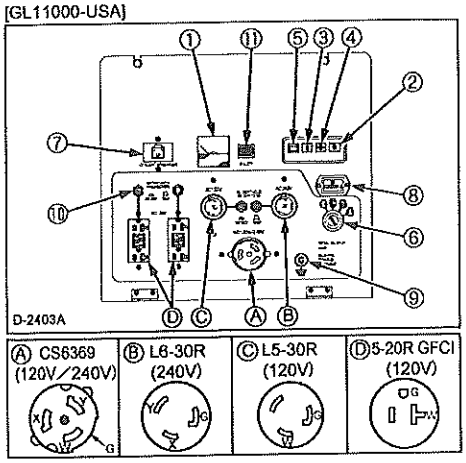


(1) Door
(2) Coolant filling port
(3) Hook
(4) Fuel tank cap
(5) Fuel gauge
(6) Control panel
(7) Base
(8) Engine oil drain plug
(9) Door lock
(10) Coolant drain plug
(11) Reserve tank
(12) Fuel filter
(13) Oil dipstick
(14) Oil filter cartridge
(15) Muffler
(16) Radiator
(17) Radiator cap
(18) Solenoid
(19) Engine oil port
(20) Battery
(21) Air cleaner
(22) Door stopper
(23) Fuel tank
(24) Alternator
(25) Safety shield

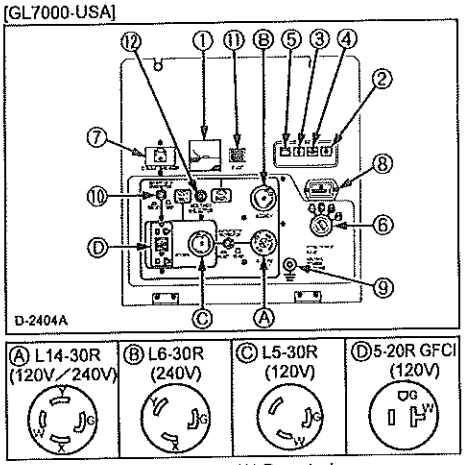
Control Panel

Standard Model
◆ 1 Phase Type
(120/240V Dual voltage Type)

[GL11000-USA]



[GL7000-USA]



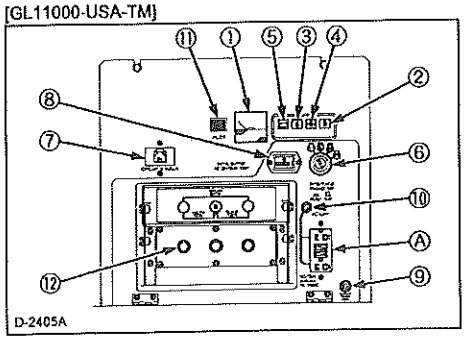
(1) A.C. Voltmeter
(2) Glow timer lamp
(3) Water temperature lamp
(4) Oil pressure lamp
(5) Battery charge lamp
(6) Starter switch (key)
(7) Circuit breaker
(8) Hour meter
(9) Ground terminal
(10) Protector (Receptacle)
(11) Pilot lamp
(12) Full power switch

(A) Receptacle
(B) Receptacle
(C) Receptacle
(D) Receptacle

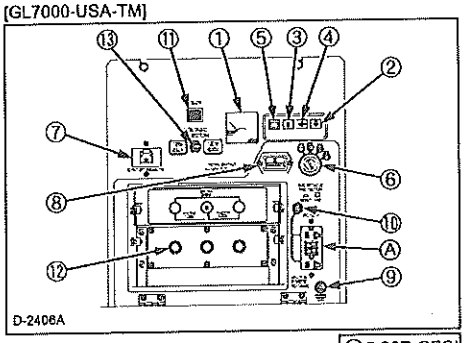
ENGLISH

◆ 1 Phase Type
(120V/240V Dual voltage type)

[GL11000-USA-TM]

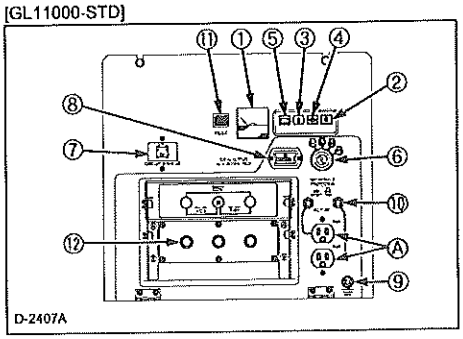


[GL7000-USA-TM]

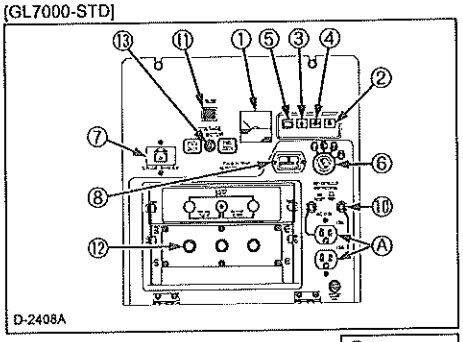


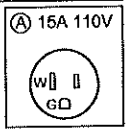
◆ 1 Phase Type
(110V/220V Dual voltage type)

[GL11000-STD]



[GL7000-STD]



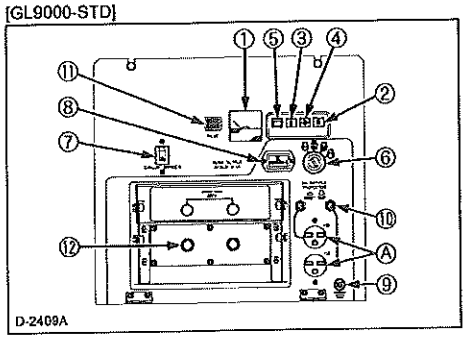


(1) A.C. Voltmeter
(2) Glow timer lamp
(3) Water temperature lamp
(4) Oil pressure lamp
(5) Battery charge lamp
(6) Starter switch (key)
(7) Circuit breaker
(8) Hour meter
(9) Ground terminal
(10) Protector (Receptacle)
(11) Pilot lamp
(12) Terminals (Output)
(13) Full power switch

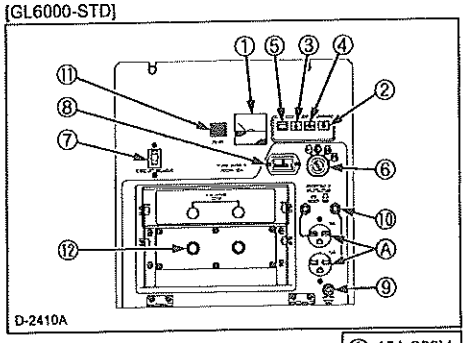
(A) Receptacle

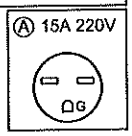
◆ 1 Phase Type (220V Type)

[GL9000-STD]



[GL6000-STD]





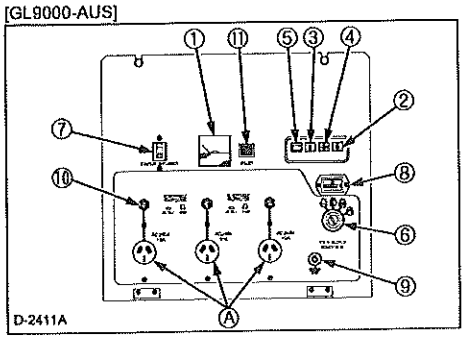
(1) A.C. Voltmeter
(2) Glow timer lamp
(3) Water temperature lamp
(4) Oil pressure lamp
(5) Battery charge lamp
(6) Starter switch (key)
(7) Circuit breaker
(8) Hour meter
(9) Ground terminal
(10) Protector (Receptacle)
(11) Pilot lamp
(12) Terminals (Output)

(A) Receptacle

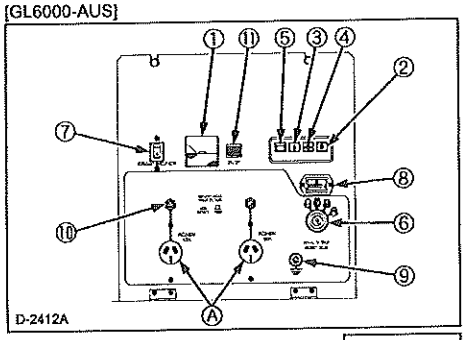
AUS Model

◆ 1 Phase Type (240V Type)

[GL9000-AUS]



[GL6000-AUS]



(1) A.C. Voltmeter
(2) Glow timer lamp
(3) Water temperature lamp
(4) Oil pressure lamp
(5) Battery charge lamp
(6) Starter switch (key)
(7) Circuit breaker
(8) Hour meter
(9) Ground terminal
(10) Protector (Receptacle)
(11) Pilot lamp

(A) Receptacles

GROUND FAULT CIRCUIT INTERRUPTER (GFCI) RECEPTACLE

⚠ WARNING

(1) Do not operate or store in wet or damp conditions.

(2) This Ground Fault Circuit Interrupter reduces the hazards of ground fault currents that can cause loss of life.

(3) The GFCI will not protect against short circuits or over loads.

(4) Do not use the GFCI or other standard receptacles on the circuit until the GFCI has been fully and successfully tested.

See following test procedure.

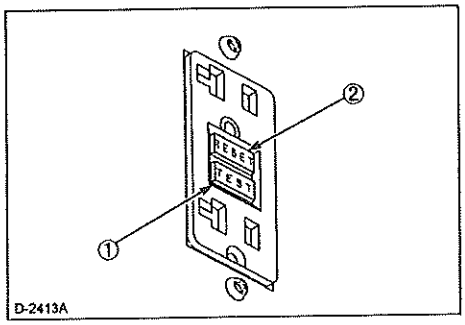
TESTING PROCEDURE

(1) Unplug all appliances from the GFCI receptacle.
(2) Start the engine.
(3) At the circuit breaker turn power ON to the circuit.
(4) Depress the "TEST" button.
The "RESET" button should extend with a click.
If the "RESET" button does not extend, contact your KUBOTA dealer.
(5) Depress the "RESET" button firmly into the GFCI unit, until an audible click is heard.
If it resets properly, the "RESET" button will be flush with the surface of the "TEST" button.
If the "RESET" button is not flush with "TEST" button, contact your KUBOTA dealer.

■ When the "RESET" button extends during operation:

(1) Unplug all appliances from the GFCI receptacle.
(2) Depress the "RESET" button firmly into the GFCI unit, until an audible click is heard.
If the GFCI can not be reset, the GFCI is faulty. Contact your KUBOTA dealer. If the GFCI resets properly, check such things as fault insulation or wet wiring inside the appliance or its cord. If you've found the short, it should be repaired before it is used again.

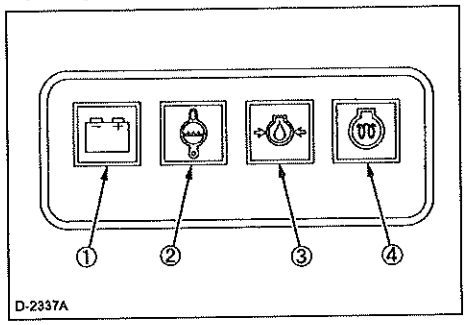
1. Perform this test on a regular monthly basis to ensure proper operation of the GFCI receptacle.
2. If the generator is stored outdoors, unprotected from the weather, test the GFCI receptacle before each use.
3. An attached "OCCUPANT'S TEST RECORD" label should be retained and placed in a conspicuous location to remind the operator that for maximum protection against electrical shock.
4. Record your test on the GFCI test card.
5. After disassembling and assembling the generator, check the circuit of GFCI with the RECEPTACLE CIRCUIT TESTER and test as above TEST PROCEDURE.



(1) "TEST" button
(2) "RESET" button

■ Easy Checker

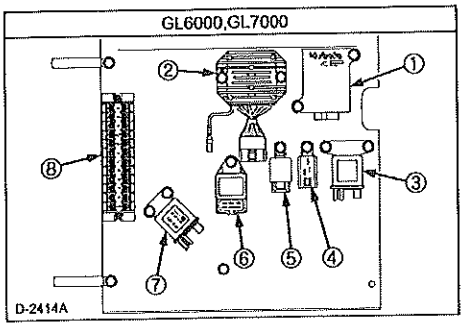
When an abnormal condition occurs with a part monitored by the easy checker while the engine is running, a lamp flashes to warn the operator of the impending trouble.



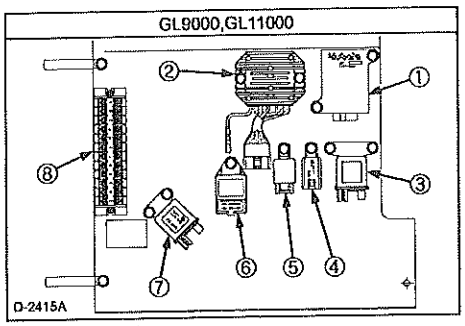
(1) Charge warning lamp
(2) Water temperature-overheat warning lamp, flashes on when cooling water rises to 112° to 118°C.
(3) Engine oil pressure drop warning lamp, flashes on below 68.7 to 127.5 kPa (0.7 to 1.3 kgf/cm²) oil pressure.
(4) Glow timer lamp

Control Box

GL6000,GL7000



GL9000,GL11000



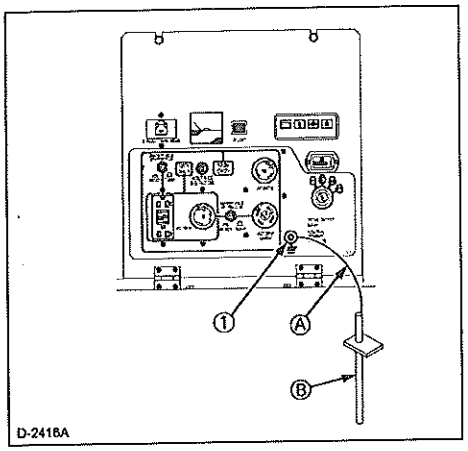
(1) Emergency unit
(2) Regulator
(3) Glow relay
(4) Relay A
(5) Relay B
(6) Glow lamp timer
(7) Starter relay
(8) Exterior connection terminal taps

PREPARATION TO SUPPLY THE ELECTRIC POWER

1. Generator grounding

The end user, equipment owner or operator must contact his local, state, county or municipal electric code department to determine the approved generator grounding method to be used in his application or location.
Recommendations in the NEC (National Electrical Code), NFPA (National Fire Protection Association), AUSTRALIAN STANDARDS and OSHA (Occupational Safety and Health Administration) regulations must be followed to assure compliance and safe operation.
Always be sure to ground (earth) the generator terminals to comply with the local, state, national or OSHA requirements.

One possible connection method for construction site use is as follows:



(1) Generator ground terminal

(A) #6AWG Flexible copper ground connection

(B) Metal ground rod or building cold water pipe system per N.E.C. code

2. Recommended capacity of electrical devices

APPLICATION RANGE

You can operate the GL-series generator in the following range.

Typical Apparatus	Light and heaters	Commutator motor	Induction motor
GL6000	5.5 kW	2.8 kW	0.8 kW
GL7000	6.5 kW	3.3 kW	0.8 kW
GL9000	8 kW	4.0 kW	1.2 kW
GL11000	10 kW	5.0 kW	1.6 kW

NOTE :

- Keep an inverter load below 50% of the generator capacity.
- Make sure that total active mercury lamp load is below 30% or so of the generator capacity. Turn on the mercury lamps one by one. Be careful not to turn off the lamps and on again immediately. The generator voltage may rise to extremely high levels and the AVR may get damaged.
- Before turning on the lamps again, wait for 10 minutes or so until the lamps cool down enough.
- The data shown above is only a guideline to approximate load capacities and may vary from generator model to generator model, with different types of loads at rated outputs. These values may be different from actual applications because of the input characteristics peculiar to each load.

- **Connecting a motor.**
  When starting the motor, the voltage drops immediately. The circuit may be opened if an electromagnetic switch is connected to the same circuit. When connecting two motors or more, make sure the total current capacity of the motors does not exceed the total rated current.
- **Connecting to lights and electric heaters.**
  When connecting to lights or electric heaters, the generator can be used up to the rated capacity. When using a single phase, it can be used up to the rated current.
- **Power factor calculations.**
  The power factor calculation is used to determine input of the electrical devices.

  AC devices
  Electric power (W)
  = Voltage (V) × Current (A) ÷ Power factor

Power factors of commonly used devices are listed in the following table.

Load type	Power factor
Single-phase induction motors	0.4 to 0.75
Electric heaters, incandescent lamps	1.0
Commutator motor	0.8 to 0.95
Fluorescent lamps, mercury lamps	0.4 to 0.9
AC arc welder	0.4 to 0.6

- Ordinarily, a motor is rated in kW. This does not refer to motor output.

  Motor input (kVA)

$$= \frac{\text{Motor output (kW)}}{\text{Motor efficiency} \times \text{power factor}}$$

NOTE :

- If a lighting system is employed together with some types of computers and inverter air-conditioners and/or the regulated power supply for TV sets, the lights might suffer flickering. This phenomenon does not indicate a fault of the generator: it is caused by poor matching between the above-mentioned regulated power supply and the generator's automatic voltage regulator. In such a case, modify the load combination to eliminate the flickering.

ENGLISH

CONNECTING THE LOAD

■ Connection Notes

⚠ WARNING

To avoid personal injury:

- **Before the generator can be connected to a building's electrical system, a licensed electrician must install an isolation (transfer) switch in the building's main fuse box. The switch is the connection point for generator power and allows selection of generator or main line power to the building. This will prevent the generator from charging the main power line (backfeeding) when the main power supply has failed or has been turned off for line repair. Backfeeding can electrocute or injure line maintenance personnel. Also, generator and building electrical system damage can occur when normal operating power returns if unit is used without an isolation switch.**

1. Avoid connecting the generator to commercial power outlet.
2. Avoid connecting the generator in parallel with any other generator.

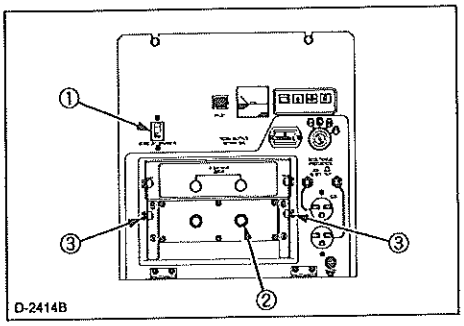
■ Connecting the Load (Terminal output Model)

⚠ WARNING

To avoid personal injury:

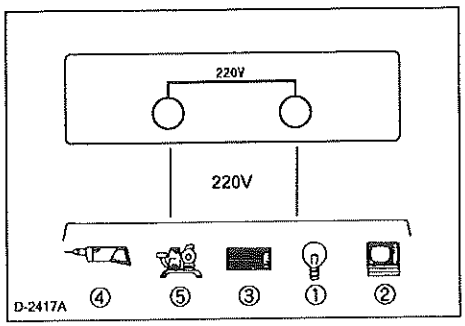
- **Connect or disconnect the load to the AC receptacles or terminals only when the engine is stopped.**
- **For your safety, close the terminal cover after connecting the load.**
- **For your safety, secure the cover with the lock bolts.**

1. Turn OFF the circuit breaker on the control panel.
2. Connect the load to the A.C. output terminals.
3. Be sure to close the terminal cover after connecting the load.



(1) Circuit breaker
(2) Terminals (output)
(3) Cover lock bolt

◆ **Single phase 2 terminals type**
i) GL6000-STD, GL9000-STD
50Hz 220V



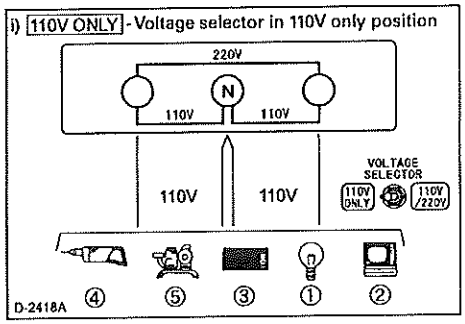
(1) Light
(2) Television
(3) Air conditioner
(4) Electric drill
(5) Motor pump

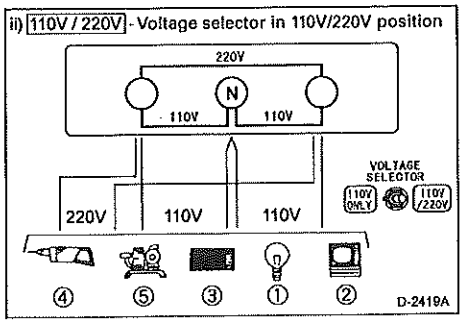
◆ **Single phase 3 terminals type (1P4W type)**
(Dual voltage type)
i) GL7000-STD
60Hz 110V
ii) GL7000-STD
60Hz 110/220V

⚠ WARNING

To avoid personal injury:

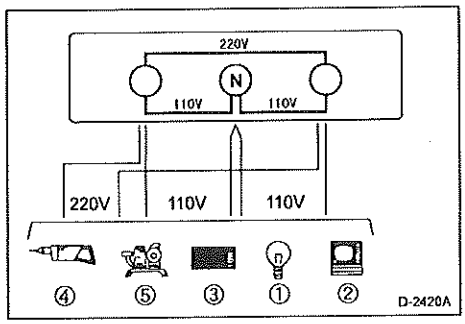
- **Do not switch the voltage selector with generator on. Serious damage will occur.**





(1) Light
(2) Television
(3) Air conditioner
(4) Electric drill
(5) Motor pump

◆ **Single phase 3 terminals type (1P3W type)**
(Dual voltage type)
i) GL11000-STD
60Hz 110/220V



(1) Light
(2) Television
(3) Air conditioner
(4) Electric drill
(5) Motor pump

ENGLISH

◆ **Single phase 3 terminals type (1P4W type) (Dual voltage type)**

i) GL7000-USA-TM
60Hz 120V

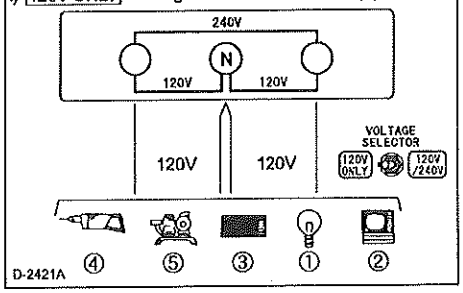
ii) GL7000-USA-TM
60Hz 120/240V

⚠ WARNING

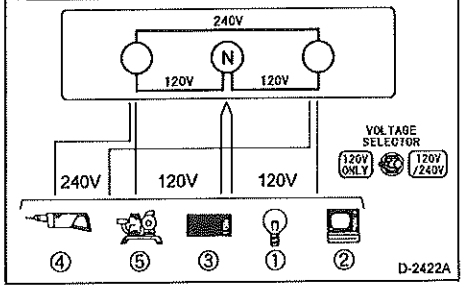
To avoid personal injury:

- **Do not switch the voltage selector with generator on. Serious damage will occur.**

i) 120V ONLY - Voltage selector in 120V only position



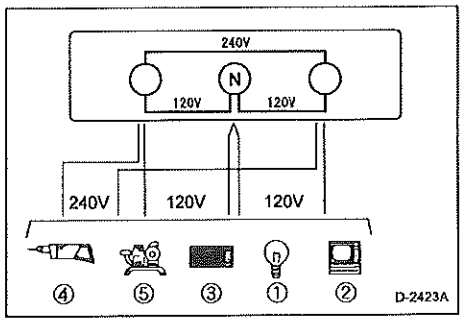
ii) 120V / 240V - Voltage selector in 120V/240V position



(1) Light
(2) Television
(3) Air conditioner
(4) Electric drill
(5) Motor pump

◆ **Single phase 3 terminals type (1P3W type) (Dual voltage type)**

i) GL11000-USA-TM
60Hz 120/240V



(1) Light
(2) Television
(3) Air conditioner
(4) Electric drill
(5) Motor pump

■ Connecting the Load (Receptacles output Model)

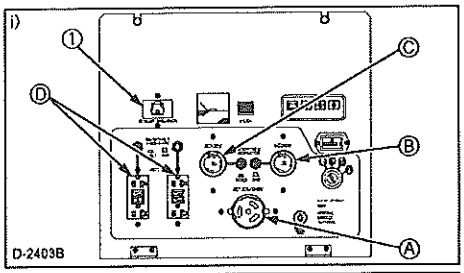
⚠ WARNING

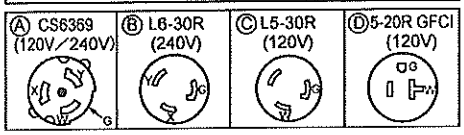
To avoid personal injury:

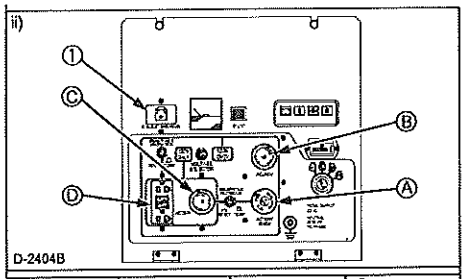
- **Connect or disconnect the load to the AC receptacle only when the engine is stopped.**

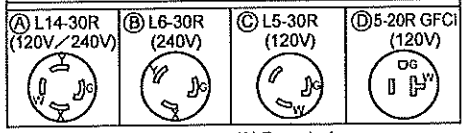
i) GL11000-USA
60Hz 120/240V
ii) GL7000-USA
60Hz 120/240V

1. Turn OFF the circuit breakers on the control panel.









(1) Circuit breaker

(A) Receptacle
(B) Receptacle
(C) Receptacle
(D) Receptacle

2. Connect the load to the A.C. receptacles.

■ Connecting the Load (AUS Model)

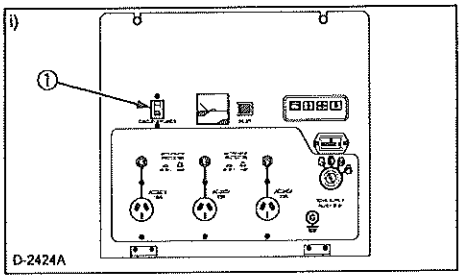
⚠ WARNING

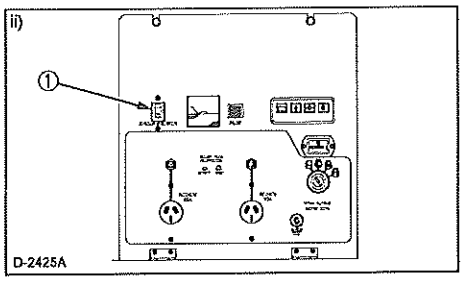
To avoid personal injury:

- **Connect or disconnect the load to the AC receptacle only when the engine is stopped.**

i) GL9000-AUS
50Hz 240V
ii) GL6000-AUS
50Hz 240V

1. Turn OFF the circuit breakers on the control panel.





(1) Circuit breaker

2. Connect the load to the A.C. receptacles.

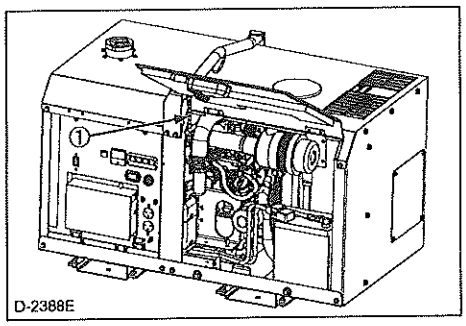
PRE-OPERATION CHECK

How to open the Door

⚠ CAUTION

To avoid personal injury from contact with moving parts;

- **DO NOT open the door or generator side cover while the engine is running.**
- **Do not touch muffler or exhaust pipes while they are hot; Severe burns could result.**



(1) Door stopper

Daily Check

To prevent problems from occurring, it is important to know the condition of the generator. Always perform the following check items before starting the generator.

⚠ CAUTION

To avoid personal injury:

- **Before checking or servicing the generator, make sure it is on a level surface with the engine shut off.**

◆ **Check items**

-Check for oil and coolant leakage
-Check cooling air inlet and outlet for obstructions or clogging
-Check radiator fins for clogging
-Check fan belt tension
-Check engine oil level
-Check coolant level
-Check generator grounding
-Refuel
(See "Fuel" in "PERIODIC SERVICE" section.)
-Care of danger, warning and caution labels
(See "DANGER, WARNING AND CAUTION LABELS" in "⚠SAFETY PRECAUTIONS" section.)

⚠ CAUTION

To avoid personal injury from contact with moving parts;

- **DO NOT open the door or generator side cover while the engine is running.**
- **Do not touch muffler or exhaust pipes while they are hot; Severe burns could result.**

◆ **Battery**

The battery is shipped in dry, charged condition without electrolyte.
The battery must be charged properly before using for the first time.

⚠ DANGER

To avoid the possibility of battery explosion:

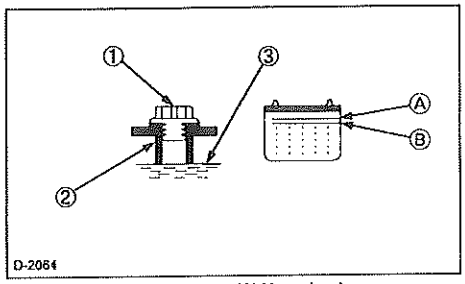
The battery comes in two types: refillable and non-refillable. For using the refillable type battery, follow the instructions below.

- **DO NOT use or charge the battery if the fluid level is below the LOWER (lower limit level) mark.**
  Otherwise, the battery component parts may deteriorate prematurely, shorten the battery's service life; which may cause an explosion.

Immediately, add distilled water until the battery's fluid level comes somewhere between the UPPER and LOWER levels.

- **Keep all sparks and flames away from the battery and fuel tank. A battery, especially when charging, will give off hydrogen and oxygen gases which can explode and cause serious personal injury.**

1. Remove the vent plugs.
2. Fill cells up to the upper level with electrolyte. [Specific gravity of sulfuric acid 1.270 to 1.290 (at 20°C = 68°F)]
3. Allow the battery to sit for about one hour after filling.
4. If the electrolyte level is dropped, refill with electrolyte up to the upper level.
5. Replace the vent plugs.
6. Charge the battery at the normal charging rate of 6.0 amperes.
7. Wash off any electrolyte which may have spilled.



(1) Vent plug opening (A) Upper level
(2) Electrolyte level indication tube (B) Lower level
(3) Indicated level

NOTE :

- The duration of dry charged efficiency, will decrease in proportion to the period of time elapsed after shipment and during storage. To obtain the longest service life of the battery, it is necessary for the battery to be charged for a sufficient period of time. Continue to charge until all cells are gassing freely, and the voltage and specific gravity reading in all cells remain constant for 3 or more successive readings taken at 30 minute intervals.
- When the battery has been charged fully, the specific gravity of electrolyte should be 1.270 to 1.290 (at 20°C = 68°F).

◆ **Engine oil**

The generator has been shipped without engine oil. Fill with oil to the correct level before attempting to start the engine.

1. Place the machine on a level surface.
2. Remove the oil cap.
3. Add engine oil of grade CD or higher, up to the upper mark on the oil level gauge.

NOTE :

- See "Engine Oil" in "PERIODIC SERVICE" section for engine oil capacity and checking engine oil level.

◆ **Coolant**

⚠ CAUTION

To avoid personal injury:

- **Place the machine on a level surface.**
- **DO NOT remove the radiator cap while coolant is hot. When cool, rotate the radiator cap slowly to the first stop to allow excess pressure to escape. Then remove cap completely.**

1. Remove the radiator cap and fill with specified coolant until the coolant level is just below the port.
2. Fill with coolant to the "FULL" mark on the reserve tank.
3. Securely tighten radiator cap and reserve tank cap.

NOTE :

- See "Radiator" in "PERIODIC SERVICE" section for changing coolant.

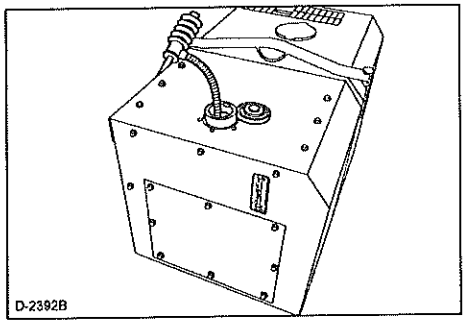
◆ **Fuel**

⚠ WARNING

To avoid personal injury:

- **DO NOT refuel when engine is running or hot.**
- **Always shut off the engine before refueling.**
- **DO NOT overfill fuel system. If any fuel overflows, wipe it up completely before starting operation.**
- **When refueling, keep all flames, sparks and cigarettes away from generator.**

1. Always fill the fuel through the fuel tank strainer.
2. Make sure that dirt or water does not enter the fuel tank.
3. Fill with Diesel fuel No.2-D (ASTMD975).
4. Below 0°C (32°F) a mix of No.1-D and No.2-D is acceptable.
5. Fuel level is read by fuel gauge.



NOTE :

- If the fuel tank should empty completely causing the engine to stop, then the fuel system requires air bleeding after filling the tank and before restarting the engine.
  (See "Air bleeding the fuel system" in "PERIODIC SERVICE" section.)

OPERATING THE GENERATOR

⚠ WARNING

To avoid electric shock or fire:

- **Do not operate or store in wet or damp conditions.**

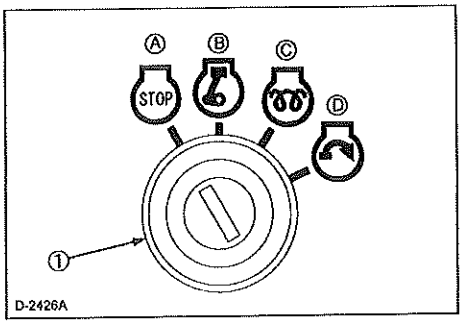
⚠ CAUTION

To avoid personal injury:

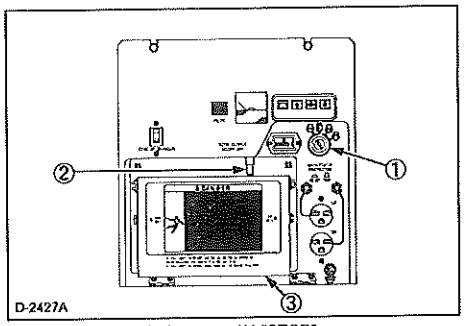
- **Read "⚠SAFETY PRECAUTIONS" in the front of this manual.**
- **Read the danger, warning and caution labels located on the generator.**
- **To avoid the danger of exhaust fume poisoning, do not operate the engine in a closed building without proper ventilation.**
- **Always turn OFF the circuit breaker before starting the generator.**
- **Turn OFF all switches on the electrical devices.**
- **Check the wiring and connections of the electrical devices before starting the machine.**
- **DO NOT touch the live parts during operation.**

■ SAFETY DEVICES

1. Terminal cover is equipped with safety devices to detect the opening and/or closing condition of cover.
2. Safety switch (2) is located on the terminal cover. If you turn the key switch to "START" with the terminal cover open, the starter of engine will not activate.
3. Turn the key switch to "STOP" to close the terminal cover and then restart the engine.
4. If you open the terminal cover while the engine is running, the emergency stop system will stop the engine.
   To maintain the battery's life as much as possible, turn the key switch to the "STOP" position.



D-2426A



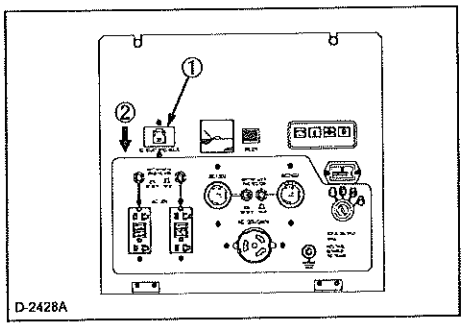
D-2427A

(1) Starter switch (Key)
(2) Safety switch
(3) Terminal cover

(A) "STOP"
(B) "ON"
(C) "PREHEAT"
(D) "START"

■ Starting the Engine

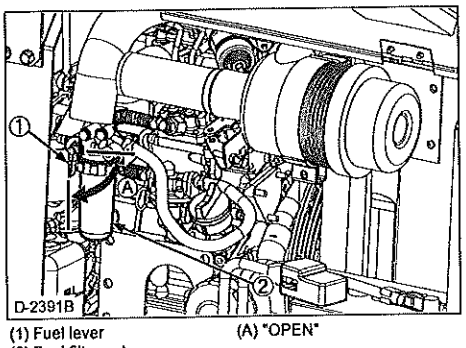
1. **Turn OFF all switches on the electrical devices.**
2. **Turn OFF the circuit breakers on the control panel.**



D-2428A

(1) Circuit breaker
(2) "OFF"

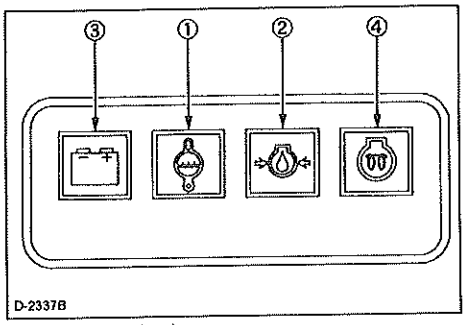
3. Ensure that the fuel lever is set to the "OPEN" Position.



(1) Fuel lever (A) "OPEN"
(2) Fuel filter pot

4. Insert the key into the main switch and turn it "ON".

5. Check the battery charge lamp and oil pressure lamp are ON.



(1) Water temperature lamp
(2) Oil pressure lamp
(3) Battery charge lamp
(4) Glow timer lamp

IMPORTANT :

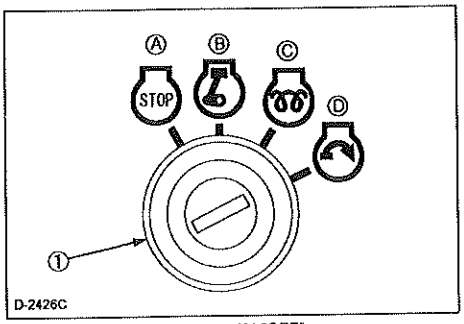
- Do not use ether or any starting fluid for starting the engine, or severe engine damage will occur.

6. Turn the key to "PREHEAT" position.

NOTE :

- See "Cold Weather Starting" section as to the preheating times.

7. Turn the key to the "START" position and release when the engine starts.



(1) Starter switch (Key) (A) "OFF"
(B) "ON"
(C) "PREHEAT"
(D) "START"

IMPORTANT :

- Do not run the starter motor continuously for more than 10 seconds at a time, or it may damage the starter. If the engine fails to start, wait for about 30 seconds and try again.

8. Check to see that the battery charge lamp, oil pressure lamp and water temperature lamp are OFF.

9. Check the warning lamps.
Whenever the engine stops automatically during operation, correct the problem before restarting the engine.

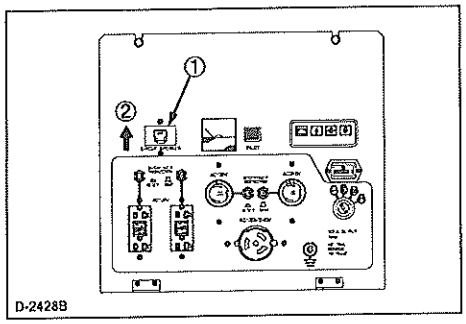
IMPORTANT :

- Be sure to warm up the engine, not only in winter, but also in warmer seasons. An insufficiently warmed-up engine can shorten its service life.

◆ **Warm-up in cold ambient temperatures**
In cold weather, the engine oil may be cold with increased viscosity. This can delay oil circulation or abnormally low oil pressure for some time after engine start-up. This can result trouble in the lubrication circuit or damage to the engine moving parts.
To prevent the above problems, perform the following instructions:
Warm up the engine at rated revolution with no load.

Ambient temperature	Warm-up time requirement
Above 0°C (32°F)	At least 10 minutes
0°C (32°F) to -10°C (14°F)	10 to 20 minutes
Below -10°C (14°F)	More than 20 minutes

10.Turn ON the circuit breaker on the control panel.



(1) Circuit breaker
(2) "ON"

IMPORTANT :
- When there is a severe overload or short circuit in the wiring of the generator, the circuit breaker turns OFF. If this happens, eliminate the cause and then turn the circuit breaker ON again.

11.Turn ON the electrical device switches for the connections.

■ Cold Weather Starting

If the ambient temperature is below * -5°C (23°F) and the engine is very cold, start it in the following manner: Take steps (1) through (5) in "STARTING THE ENGINE" section.

6. Turn the starter switch (key) to the "PREHEAT" position until the glow plug indicator goes off.

NOTE :
- If the ambient temperature is low, the preheating time will take longer.

IMPORTANT :
- Shown below are the standard preheating times for various temperatures. This operation, however, is not required, when the engine is warmed up.

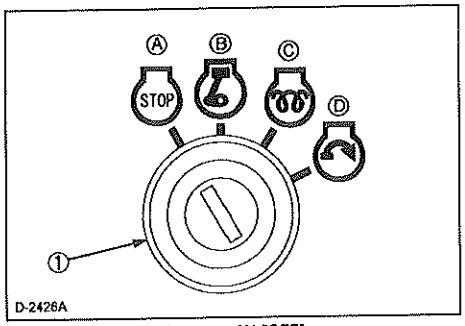
Ambient temperature	Preheating time
Above 10°C (50°F)	NO NEED
10°C (50°F) to -5°C (23°F)	Until glow lamp goes off
*Below -5°C (23°F)	Approx. 5 seconds after the glow lamp goes off
Limit of continuous use	20 seconds

7. Turn the key to "START" position and the engine should start.
(If the engine fails to start after 10 seconds, turn off the key for 30 seconds. Then repeat steps (6) and (7) above.)

IMPORTANT :
- Do not allow the starter motor to run continuously for more than 10 seconds.
- Be sure to warm up the engine, not only in winter, but also in warmer seasons. An insufficiently warmed-up engine can shorten its service life.
- When there is possibility of temperature drops below -15°C (5°F) detach the battery from the machine, and keep it indoor in a safe area. Reinstalled the battery before the next operation.

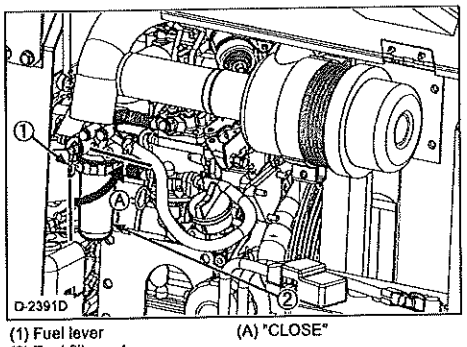
■ Stopping the Engine

1. **Turn OFF all electrical device switches for connected loads.**
2. **Turn OFF the circuit breakers.**
3. **Allow the engine to run with no load for about 5 minutes before stopping the engine completely.**
4. **Turn the main switch (key) to the "OFF" position.**



(1) Starter switch (Key)
(A) "OFF"
(B) "ON"
(C) "PREHEAT"
(D) "START"

5. **Turn the fuel lever to the "CLOSE" position.**



(1) Fuel lever
(2) Fuel filler pot
(A) "CLOSE"

■ If the Engine Fails to Stop in the Usual Procedure (EMERGENCY STOP)

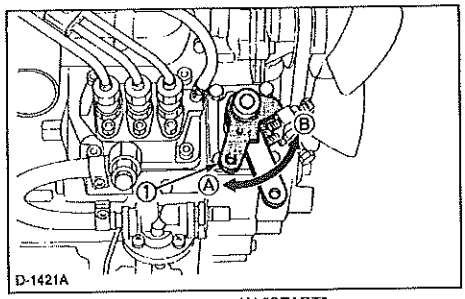
If the engine does not stop after turning the key switch to "OFF" position, take the following (EMERGENCY STOP) procedure.

⚠ CAUTION

To avoid personal injury:

- **Keep your hands away from the rotating parts, such as cooling fan and V-belt. Otherwise personal injury may be caused when manipulating the engine stop lever.**

1. Open the door, using the door knob.
2. Turn the engine stop lever to "STOP" direction and hold it for 5 to 10 seconds to shut off the engine.



(1) Engine stop lever
(A) "START"
(B) "STOP"

3. After stopping the engine, make sure that the door is closed and the main switch (key) is at OFF.
4. The following causes are possible for such unusual engine shut-off.
   Pinpoint and correct the cause of trouble.
   - Check for the stop solenoid.
   - Check to see if the battery has discharged too much or is in trouble.
   - Check for disconnection of the battery terminals.

ENGLISH

SERVICE INTERVALS

Observe the following for service and maintenance.
The lubricating oil change intervals listed in the table below are for Classes CF, CE and CD lubricating oils of API classification with a low-sulfur fuel in use. If the CF-4 or CG-4 lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals than recommended in the table below depending on the operating condition.

No.	Check point	Interval											Ref. page		
		First 50 hours	Every 50 hours	Every 100 hours	Every 200 hours	Every 400 hours	Every 500 hours	Every 800 hours	Every 1500 hours	Every 3000 hours	Every 1 year	Every 2 years			
1	Check of fuel pipes and clamp bands		○										26		@
2	Change of engine oil	◎		○									28	◎	
3	Cleaning of air cleaner element			○									29	*1	@
4	Check of battery electrolyte level			◎							○		33		
5	Check of fan belt tension			○									36		
6	Check of radiator hoses and clamp bands				○								32		
7	Check of intake air hose				○								—		@
8	Replacement of oil filter cartridge	◎			○								28	◎	
9	Replacement of fuel filter cartridge or element					○							—		@
10	Cleaning of fuel filter			○									27		
11	Cleaning of water jacket (radiator interior)						○						32		
12	Replacement of fan belt							○					36		
13	Check of valve clearance							○					—		
14	Replacement of air cleaner element										○		29	*2	@
15	Check of damage in electric wiring and loose connections										○		35		
16	Check of fuel injection nozzle injection pressure								○				—	*3	@
17	Check of injection pump									○			—	*3	@
18	Replacement of fuel pipes, fuel gauge and clamp bands											○	26	*3	@
19	Replacement of radiator hoses and clamp bands											○	32		
20	Replacement of battery											○	33		
21	Change of radiator coolant (L.L.C.)											○	31		
22	Replacement of intake air hose											○	—	*4	@

IMPORTANT :

- The jobs indicated by ◎ must be done after the first 50 hours of operation.

*1 Air cleaner should be cleaned more often in dusty conditions than in normal conditions.
*2 After 6 times of cleaning.
*3 Consult your local KUBOTA Dealer for this service.
*4 Replace earlier if necessary.

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

For North American market

NOTE :

◆ **Engine Oil:**

- Oil used in the engine should have an American Petroleum Institute (API) service classification and Proper SAE Engine Oil according to the ambient temperatures as shown P27.

- Refer to the following table for the suitable API classification engine oil according to and the fuel.

Fuel used	Engine oil classification (API classification)
Ultra Low Sulfur Fuel [<0.0015% (15 ppm)]	**CF, CF-4, CG-4, CH-4** or **CI-4**

- The CJ-4 engine oil is intended for DPF (Diesel Particulate Filter) type engines.

◆ **Fuel:**

- Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for temperatures below -20°C (-4°F) or elevations above 1500 m (5000 ft).
- Diesel fuels specified to EN 590 or ASTM D975 are recommended.
- No.2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87)
- Since this engine adopts EPA Tier 4 and Interim Tier 4 standards, the use of ultra low sulfur fuel is mandatory in EPA regulated area (North America). Therefore, please use No.2-D S15 diesel fuel as an alternative to No.2-D, or use No.1-D S15 diesel fuel as an alternative to No.1-D if outside air temperature is below -10°C (14°F).

For other than North American market

NOTE :

◆ **Engine Oil:**

- Oil used in the engine should have an American Petroleum Institute (API) service classification and Proper SAE Engine Oil according to the ambient temperatures as shown P27.
- With the emission control now in effect, the CF-4 and CG-4 lubricating oils have been developed for use of a low-sulfur fuel on on-road vehicle engines. When an off-road vehicle engine runs on a high-sulfur fuel, it is advisable to employ the "CF or better" lubricating oil with a high Total Base Number (TBN of 10 minimum).

- Refer to the following table for the suitable API classification engine oil according to the fuel.

Fuel used	Engine oil classification (API classification)
High Sulfur Fuel [≧0.05% (500 ppm)]	**CF** (If the "CF-4, CG-4, CH-4 or CI-4" lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals. (approximately half))
Low Sulfur Fuel [<0.05% (500 ppm)] or Ultra Low Sulfur Fuel [<0.0015% (15 ppm)]	**CF, CF-4, CG-4, CH-4** or **CI-4**

- The CJ-4 engine oil is intended for DPF (Diesel Particulate Filter) type engines.

◆ **Fuel:**

- Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for temperatures below -20°C (-4°F) or elevations above 1500 m (5000 ft).
- If diesel fuel with sulfur content greater than 0.5% (5000 ppm) sulfur content is used, reduce the service interval for engine oil and filter by 50%.
- DO NOT use diesel fuel with sulfur content greater than 1.0% (10000 ppm).
- Diesel fuels specified to EN 590 or ASTM D975 are recommended.
- No.2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87)

PERIODIC SERVICE

■ Fuel

Fuel is flammable and can be dangerous. You should handle fuel with care.

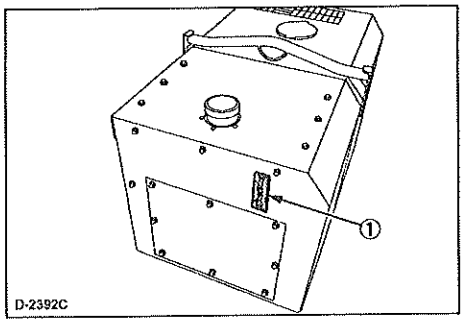
⚠ CAUTION

To avoid personal injury:

- **DO NOT mix gasoline or alcohol with diesel fuel. This mixture can cause an explosion.**
- **Be careful not to spill fuel during refueling. If fuel should spill, wipe it off at once, or it may cause a fire.**
- **Stop the engine before refueling. Keep the machine away from fire.**
- **Be sure to stop the engine while refueling or bleeding and when cleaning or changing fuel filter or fuel pipes. DO NOT smoke when working around the machine or when refueling.**
- **Check the above fuel systems in a well ventilated and open place.**
- **When fuel and lubricant are spilled, refuel after the machine cooled down.**

◆ Fuel level check and refueling

1. Check to see that the fuel level is above the lower limit of the fuel level gauge.
2. If the fuel is too low, add fuel to the upper limit. Do not overfill.



(1) Fuel level gauge

No.2-D is a distillate fuel oil of lower volatility for engines in industrial and heavy mobile service.
(SAE J313 JUN87)
Grade of Diesel Fuel Oil According to ASTM D975

Flash Point, °C (°F)	Water and Sediment, volume %	Carbon Residue on, 10 percent Residuum, %	Ash, weight %
Min	Max	Max	Max
52 (125)	0.05	0.35	0.01

Distillation Temperatures, °C (°F) 90% Point		Viscosity Kinematic cSt or mm²/s at 40°C		Viscosity Sayboit, SUS at 100°F		Sulfur, weight %	Copper strip Corrosion	Cetane Number
Min	Max	Min	Max	Min	Max	Max	Max	Min
282 (540)	338 (640)	1.9	4.1	32.6	40.1	0.50	No.3	40

The cetane number is required not to be less than 45.

IMPORTANT :

- Be sure to use a strainer when filling the fuel tank, or dirt or sand in the fuel may cause trouble in the fuel injection pump.
- Always use diesel fuel. You are required not to use alternative fuel, because its quality is unknown and affect the generator performance. Kerosene, which is very low in cetane rating, adversely affects the engine. Diesel fuel differs in grades depending on the temperature.
- Be careful not to let the fuel tank become empty, or air can enter the fuel system, necessitating bleeding before next engine start.

Fuel tank capacity L (U.S.gal.)

Model	Capacity
GL6000, GL7000 [Engine model : Z482]	28 (7.4)
GL9000, GL11000 [Engine model : D722]	

◆ **Air bleeding the fuel system**

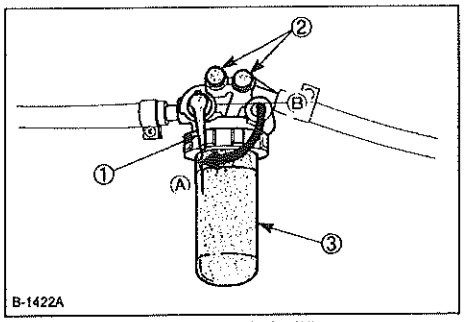
CAUTION

To avoid personal injury;

- **Do not bleed a hot engine as this could cause fuel to spill onto a hot exhaust manifold creating a danger of fire.**

Air bleeding of the fuel system is required if;
- After the fuel filter and pipes have been detached and refitted;
- After the fuel tank has become empty; or
- Before the engine is to be used after long storage.

[PROCEDURE]
1. Fill the fuel tank to the fullest extent. Open the fuel filter cock.
2. Loosen air vent plug of the fuel filter a few turns.
3. Screw back the plug when bubbles do not come up any more.
4. Open the air vent plug on top of the fuel injection pump.
5. Retighten the plug when bubbles do not come up any more.



(1) Fuel filter cock
(2) Air vent plug
(3) Fuel filter pot
(A) "OPEN"
(B) "CLOSE"

◆ **Checking the fuel pipes**

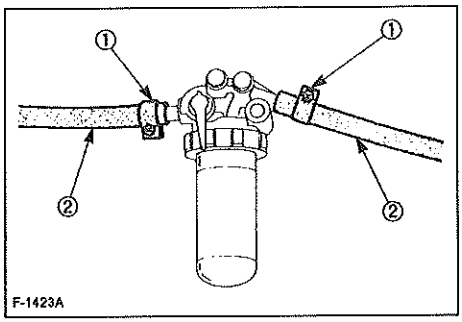
CAUTION

To avoid personal injury:

- **Check or replace the fuel pipes after stopping the engine. Broken fuel pipes can cause fires.**

Check the fuel pipes every 50 hours of operation. When if;
1. If the clamp band is loose, apply oil to the screw of the band, and tighten the band securely.
2. If the fuel pipes made of rubber became worn out replace them and clamp bands every two years.
3. If the fuel pipes and clamp bands are found worn or damaged before two years' time, replace or repair them at once.
4. After replacement of the pipes and bands, air-bleed the fuel system.

IMPORTANT :
- When the fuel pipes are not installed, plug them at both ends with clean cloth or paper to prevent dirt from entering. Dirt in the pipes can cause fuel injection pump malfunction.

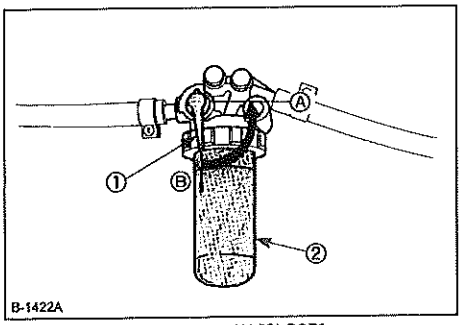


(1) Clamp band
(2) Fuel pipe

◆ **Cleaning the fuel filter pot**

Every 100 hours of operation, clean the fuel filter in a clean place to prevent dust intrusion.

1. Close the fuel filter lever.



(1) Fuel filter lever (A) "CLOSE"
(2) Fuel filter pot (B) "OPEN"

2. Remove the top cap, and rinse the inside with diesel fuel.
3. Take out the element, and rinse it with diesel fuel.
4. After cleaning, reinstall the fuel filter, keeping out of dust and dirt.
5. Air-bleed the injection pump.

IMPORTANT :

- Entrance of dust and dirt can cause a malfunction of the fuel injection pump and the injection nozzle. Wash the fuel filter pot periodically.

■ 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 cleaning.**
- **Contact with engine oil can damage your skin.**
  Put on gloves when handling engine oil. If you come in contact with engine oil, wash it off immediately.

NOTE :

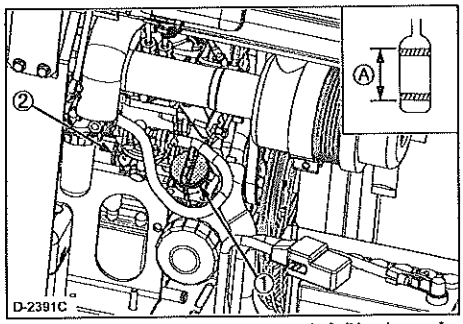
- Be sure to check the engine oil on a level surface. If placed on gradients, oil quantity can not be measured accurately.

IMPORTANT :

- Do not operate a diesel engine when engine oil is overfilled. This can effect the air intake system which could result in engine damage or malfunction.

◆ **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.



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

4. If the oil level is too low, remove the oil port, 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, the oil may deteriorate more quickly than normal, therefore, keeping the oil level near the upper limit is recommended.

Engine oil capacity L (U.S.qts.)

Model	Capacity
GL6000, GL7000 **[Engine model : Z482]**	2.2 (2.3)
GL9000, GL11000 **[Engine model : D722]**	3.4 (3.6)

IMPORTANT :

- Engine oil should be MIL-L-2104C or have properties of API classification CF 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 to 25°C (14 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.

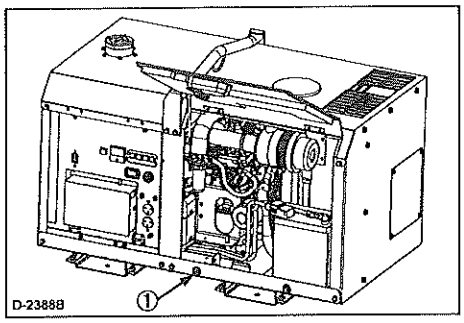
◆ **Changing Engine Oil**

⚠ CAUTION

To avoid personal injury:

- **Be sure to stop the engine before draining engine oil.**
- **When draining engine oil, place a suitable container underneath the engine and dispose of it according to local regulations.**
- **DO NOT drain oil from a hot engine. Allow engine to cool down sufficiently to avoid being burned.**

1. Change oil after the initial 50 hours of operation and every 100 hours thereafter.
2. Remove the drain plug to drain the engine oil. Drain all the old oil, drains easier and completely when the engine is warm. Inspect drain plug gasket. Replace if damaged.



(1) Engine oil drain plug

3. Install the oil drain plug and gasket.
4. Add new engine oil up to the upper line of the oil level gauge.

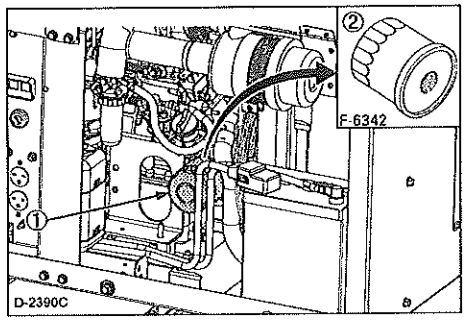
◆ **Replacing the Oil Filter Cartridge**

⚠ CAUTION

To avoid personal injury:

- **Be sure to stop the engine before changing the oil filter cartridge.**
- **Allow engine to cool down sufficiently. Oil can be hot and cause burns.**

1. Replace the oil filter cartridge every 200 hours of operation.
2. Remove the old oil filter cartridge with a filter wrench. Dispose of filter properly.
3. Apply a film of oil to the gasket of the new cartridge.
4. Screw in the cartridge by hand. When the gasket contacts the seal surface, tighten the cartridge firmly only by hand. If you tighten the cartridge with a wrench, it will be tightened too much.



(1) Oil filter cartridge
(2) Remove with a filter wrench
(Tighten with your hand)

5. After the new cartridge has been replaced, the engine oil level normally decreases a little. Therefore run the engine for a while and check for oil leaks through the seal before checking the engine oil level. Add oil if necessary.

NOTE :

- Completely wipe off any oil sticking to the machine in the filter area.

■ Air Cleaner

⚠ CAUTION

To avoid personal injury:

- **Be sure to stop the engine before cleaning air filter element.**

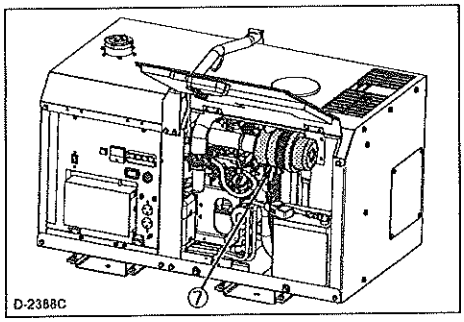
IMPORTANT :

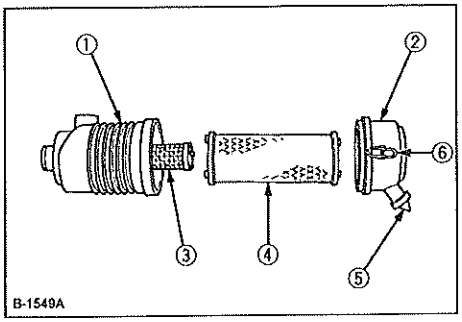
- Make sure hooking clip is tight enough. If it is loose, dust and dirt may be sucked into the engine, causing excessive wear or premature engine failure and need for engine repair.

◈ Cleaning Secondary Air Filter Element

Since 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 severe or dusty conditions. This will get rid of large particles of dust and dirt.
2. Wipe the inside air cleaner clean with cloth 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. When carbon or oil adheres to the element, soak the element in detergent for 15 minutes, then wash it several times in water, rinse with clean water and dry it naturally.
6. After the element is fully dried, inspect the inside of the element with a light, and check if it is damaged or not. (referring to the instructions on the label attached to the element.)
7. Replace the primary element every year or every 6 cleanings. If the primary element is heavily stained, replace it sooner. At this time, also replace the secondary element.
8. The secondary element should be removed only if it is to be replaced.
9. To protect the engine, do not remove the secondary element in normal servicing of the primary element.





(1) Air cleaner body
(2) Cover
(3) Secondary element
(4) Primary element
(5) Evacuator valve
(6) Hooking clip
(7) Air cleaner

◈ Cleaning Primary Air Filter Element

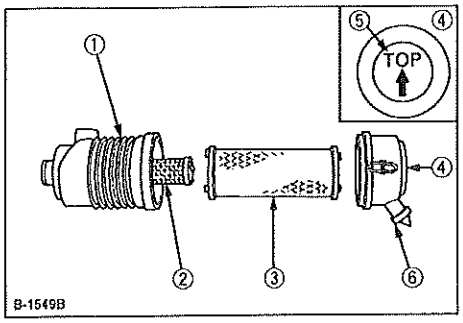
1. To clean the element, use clean dry compressed air on the inside of the element.
   Air pressure at the nozzle must not exceed 205 kPa (2.1 kgf/cm^2, 30 psi).
   Maintain reasonable distance between the nozzle and filter.
2. To wash the elements, use Donaldson ND-1500 Filter Cleaner, or its equivalent, which is especially effective on oily and soot-laden filters. Follow instructions that are supplied with the filter cleaner.

◈ Evacuator Valve

Open the evacuator valve once a week under ordinary conditions - or daily when used in dusty condition - to get rid of large particles of dust and dirt.

IMPORTANT :

- If the dust cup is mounted incorrectly, dust or dirt will not collect in the cup and allow the dust to come into direct contact with the element and thus require the element be replaced prematurely.



(1) Air cleaner body
(2) Secondary element
(3) Primary element
(4) Dust cup
(5) "TOP" mark
(6) Evecuator valve

◆ Air Cleaner with Dust Cup

Remove and clean out the dust cup once a week under normal conditions or daily in extreme conditions.
Do not allow the dust cup to fill above half way regardless of conditions.
Install the air cleaner dust cup with "TOP" indicated on the rear of the cup in the upward position with horizontally mounted air cleaner bodies or vertically mounted air cleaner bodies, the cup may be mounted in any direction.

■ Radiator

Make it a rule to check the coolant level before every operation.

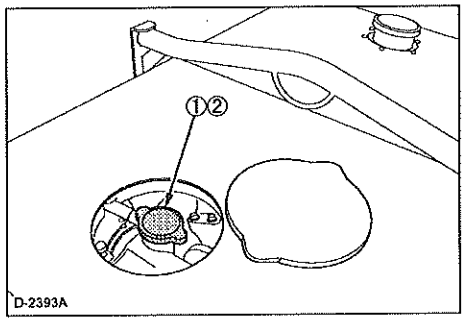
⚠ CAUTION

To avoid personal injury:

- **DO NOT stop the engine suddenly, stop it after about 5 minutes of unloaded idling.**
- **Work only after letting the engine and radiator cool off completely (more than 30 minutes after it has been stopped).**
- **DO NOT remove the radiator cap while coolant is hot. When cool, rotate cap slowly to the first stop to allow excess pressure to escape. Then remove cap completely.**
  If overheating should occur, steam gushes out from the radiator or reserve tank; Allow the engine to cool before attempting to open the cap. Severe burns could result.

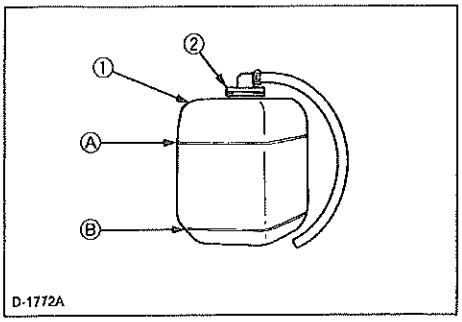
◆ Checking coolant level, adding coolant

1. Remove the radiator cap after the engine has completely cooled, and check to see that coolant reaches the supply port.



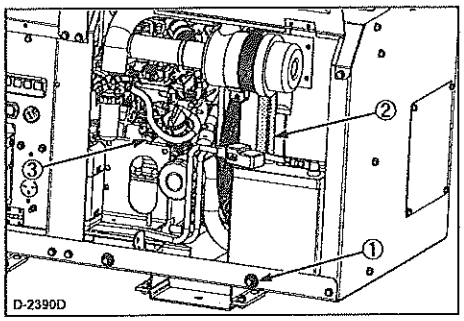
(1) Radiator cap
(2) Coolant filling port

2. If the radiator is provided with a reserve tank, check the coolant level of the reserve tank. When it is between the "FULL" and "LOW" marks, the coolant will usually last for one day's work.



(1) Reserve tank
(2) Cap
(A) "FULL" Upper line 0.6 L (0.63 U.s.qts.)
(B) "LOW"

3. When the coolant level drops due to evaporation, add only 50/50 coolant up to the full level.
4. Check to see the two drain plug; one is at the crankcase side and the other is at the lower part of the radiator as shown below.



(1) Coolant drain plug (Radiator)
(2) Radiator
(3) Coolant drain plug (Engine)

IMPORTANT :

- If the radiator cap has to be removed, proceed with caution and securely retighten the cap.
- If coolant is leaking, consult your local KUBOTA Dealer.
- Make sure that muddy or sea water is not used in the radiator.
- Use clean, fresh water and 50% anti-freeze to fill the recovery tank.
- Do not refill reserve tank with coolant over the "FULL" level mark.
- Be sure to close the radiator cap securely. If the cap is loose or improperly closed, coolant may leak out and decrease the level quickly.
- When coolant is added, coolant level may drop the first time the engine is started. Stop the engine, and add coolant if necessary.

◆ Changing coolant

1. To drain coolant, always remove both drain plugs and simultaneously open the radiator cap as well. With the radiator cap kept closed, the coolant will not drain completely. Dispose of used coolant properly.
2. Remove the overflow pipe of the radiator pressure cap to drain the reserve tank.
3. Prescribed coolant volume

L (U.S.qts.)

Model	Capacity
GL6000, GL7000 **[Engine model : Z482]**	3.7 (3.9)
GL9000, GL11000 **[Engine model : D722]**	4.1 (4.3)

include reserve tank 0.6 L (0.63 U.S.qts.)

4. An improperly tightened radiator cap or a gap between the cap and the seat increases loss of coolant.
5. Coolant (Water and anti-freeze)

All seasons: Pure water and anti-freeze (See "Anti-freeze" in "Radiator" section.)

◆ Remedies for Rapid Coolant Loss

1. Check for dust and dirt between the radiator fins and cooling tube. Clean the fins and the tubes as if necessary.
2. Check the tension of the fan belt. If loose, tighten it securely.
3. Check the internal blockage in the radiator cooling tubes. If scale forms in the tubes, clean with the scale inhibitor or its equivalent.

◆ **Checking radiator hoses and clamps**

⚠ CAUTION

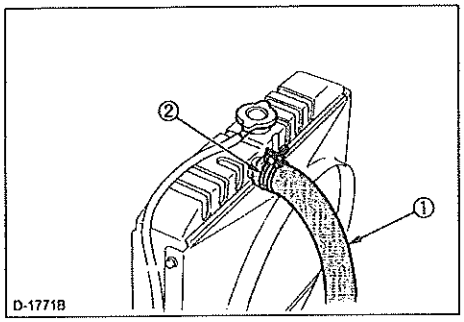
To avoid personal injury:

- **Be sure to check radiator hoses and hose clamps periodically. If radiator hoses are damaged or coolant leaks out, overheating can occur.**

Check to see if radiator hoses are properly fixed every 200 hours of operation or 6 months, whichever comes first.

1. If hose clamps are loose or water leaks, tighten hose clamps securely.
2. Replace hoses and hose clamps if radiator hoses are swollen, hardened or cracked.

Replace hoses and hose clamps every 2 years, or earlier as required, if hoses are found to be swollen, hardened or cracked.



(1) Radiator hose
(2) Hose clamp

◆ **Precaution at overheating**

The event that the coolant temperature is nearly or more than the boiling point is called **"OVERHEATING"**.
While running, make the following checks to see that all parts are working correctly. **If anything is unusual, inspect it, referring to the relevant description in "SERVICE INTERVALS" and "PERIODIC SERVICE" section.**

- **Coolant**

If the coolant temperature warning lamp lights up or if steam or coolant does not stop squirting from the radiator overflow pipe, turn off the load and **keep the engine idling (COOLING-DOWN) for at least 5 minutes** to let it cool down gradually. Then stop the engine and take the following inspection and servicing.

1. Check to see if the coolant runs short or if there is any coolant leak;
2. Check to see if there is any obstacle around the cooling air inlet or outlet;
3. Check to see if there is any dirt or dust between radiator fins and tube;
4. Check to see if the fan belt is too loose; and
5. Check to see if radiator water pipe is clogged.

◆ **Cleaning radiator core (outside)**

If dust is between the fin and tube, wash it away with running water.

IMPORTANT :

- Do not clean radiator with firm tools such as spatulas or screwdrivers. They may damage the delicate fins or tubes. It can cause coolant leaks or decrease cooling performance.
- Be careful to keep water off of electrical parts.

◆ **Cleaning the radiator**

Clean the cooling system of the engine every 500 hours. In addition, clean it before adding anti-freeze and before stopping use of anti-freeze.

■ **Anti-freeze**

⚠ CAUTION

To avoid personal injury:

- **When using anti-freeze, put on some protection such as rubber gloves (Anti-freeze contains poison.).**
- **If should drink anti-freeze, throw up at once and take medical attention.**
- **When anti-freeze comes in contact with the skin or clothing, wash it off immediately.**
- **Do not mix different types of anti-freeze. The mixture can produce chemical reaction causing harmful substances.**
- **Anti-freeze is extremely flammable and explosive under certain conditions. Keep fire and children away from anti-freeze.**
- **When draining fluids from the engine, place some container underneath the engine body.**
- **Do not pour waste onto the grounds, down a drain, or into any water source.**
- **Also, observe the relevant environmental protection regulations when disposing of anti-freeze.**

Always use a 50/50 mix of long-life coolant and clean soft water in KUBOTA engines.
Contact KUBOTA concerning coolant for extreme conditions.

1. Long-life coolant (hereafter LLC) comes in several types. Use ethylene glycol (EG) type for this engine.
2. Before employing LLC-mixed cooling water, flush the radiator with fresh water. Repeat this procedure 2 or 3 times to clean up the radiator and engine block from inside.

3. Mixing the LLC
   Premix 50% LLC with 50% clean soft water. When mixing, stir it up well, and then fill into the radiator.
4. The procedure for the mixing of water and anti-freeze differs according to the make of the anti-freeze. Refer to SAE J1034 standard, more specifically also to SAE J814c.

Vol % Anti-freeze	Freezing Point		Boiling Point *	
	°C	°F	°C	°F
50	-37	-34	108	226

*At 1.013 × 10^5Pa (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 represent industry standards that necessitate a minimum glycol content in the concentrated anti-freeze.

■ Battery

⚠ WARNING

To avoid personal injury:
- **Be careful not to let the battery electrolyte contact your body or clothing.**
- **Wear eye protection and rubber gloves, since the diluted sulfuric acid solution burns skin and eyes, and eats holes in clothing. Should this occur, immediately wash it off with running water and get medical attention.**

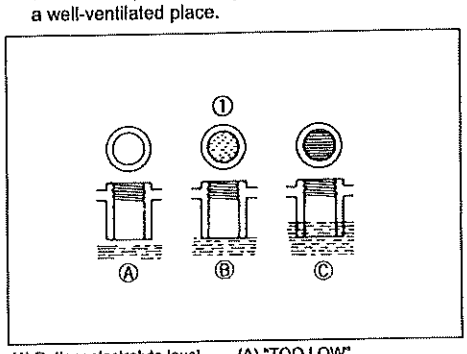
Mishandling of the battery shortens the service life and adds to maintenance costs. Obtain the maximum performance and the longest life of the battery by handling properly and with care.
Engine starting will be difficult, if the battery charge is low. Be sure to keep the battery in a fully charged state for best performance and battery life.

◆ Battery charging

⚠ DANGER

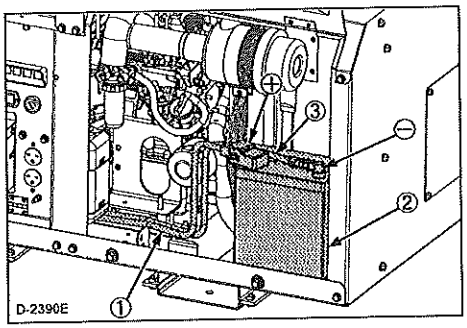
To avoid the possibility of battery explosion:
The batteries come in two types: refillable and non-refillable. For using the refillable type battery, follow the instructions below.
- **DO Not use or charge the battery if the fluid level is below the LOWER (lower limit level) mark.**
  Otherwise, the battery component parts may deteriorate prematurely, which will shorten the battery's service life or may cause an explosion.
  Immediately, add distilled water until the battery's fluid level comes somewhere between the UPPER and LOWER levels.
- **When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging the battery.**
- **When charging the battery, ensure the vent caps are securely in place (if equipped).**
- **When disconnecting the cable from the battery, start with the negative terminal, and when connecting them, start with the positive terminal first.**
- **DO NOT check the battery charge by placing a metal object across the terminals. Use a voltmeter or hydrometer.**

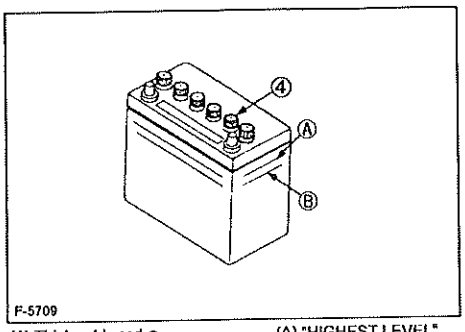
1. Make sure that each electrolyte level is to the bottom of vent wells, if necessary, add only distilled water in a well-ventilated place.



(1) Battery electrolyte level
(A) "TOO LOW"
(B) "PROPER"
(C) "TOO HIGH"

2. To slow charge the battery, connect the charger positive terminal to the battery positive terminal, and the negative to the negative, then recharge in the normal manner.
3. Quick recharging charges the battery at a high rate in a short time. This is only for emergencies.
4. Recharge the battery as early as possible, or battery life will be extremely shortened.
5. When exchanging an old battery for a new one, use a battery of equal specifications shown in page 2 to 3.





(1) Thick cable red ⊕
(2) Battery case
(3) Negative / ground cable black ⊖
(4) Plug
(A) "HIGHEST LEVEL"
(B) "LOWEST LEVEL"

IMPORTANT :

- Connect the charger positive terminal to the battery positive terminal, and negative to the negative.
- When disconnecting the cable from the battery, start with the negative terminal first.
  When connecting the cable to the battery, start with the positive terminal first.
  If reversed, the contact of tools on the battery may cause a shortage.
- DO NOT remove or disconnect the battery during operation, otherwise the engine cannot be stopped with the key switch.

◈ Instructions for Long Term Storage

1. When storing the generator for long periods of time, remove the battery, adjust the electrolyte to the proper level, and store in a dry and dark place.
2. The battery naturally discharges while it is stored. Recharge it 1 month in summer, and every 2 months in winter.

◈ Battery Boost Starting

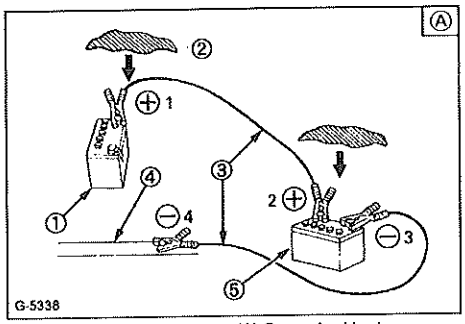
⚠ DANGER

To avoid serious personal injury:

- **Battery gases can explode. Keep cigarettes, sparks, and flames away from battery.**
- **If generator battery is frozen, do not battery boost start engine.**
- **DO NOT connect other end of negative ⊖ jumper cable to negative ⊖ terminal of generator battery.**
- **Connect to chassis or engine.**

When battery boost starting engine, follow the instructions below to safely start the engine.

1. Bring helper battery of the same voltage as disabled generator within easy cable reach.
2. Put on safety goggles and rubber gloves.
3. Ensure the vent caps are securely in place. (if equipped)
4. Cover vent caps with damp rags. Do not allow the rag to touch the battery terminals.
5. Attach the red clamp to the positive (red, ⊕ or pos.) terminal of the dead battery and clamp the other end of the same cable to the positive (red, ⊕ or pos.) terminal of the helper battery.



(1) Dead battery
(2) Lay a damp rag over vent caps.
(3) Jumper cables
(4) Engine block or frame
(5) Helper battery
(A) Connect cables in numerical order. Disconnect in reverse order after use.

6. Clamp the other cable to the negative (black, ⊖ or neg.) terminal of the helper battery.
7. Clamp the other end to the engine block or frame of the generator as far from the dead battery as possible.
8. Start the disabled generator.
9. Disconnect the jumper cables in the exact reverse order of attachment. (Steps 7, 6 and 5).
10. Remove and discard the damp rags.

IMPORTANT :

- This machine has a 12 volt negative ⊖ ground starting system.
- Use only same voltage for jump starting.
- Use of a higher voltage source on generators electrical system could result in severe damage to generators electrical system.

■ Electric Wiring

⚠ CAUTION

To avoid personal injury:

Shorting of electric cable or wiring may cause a fire.

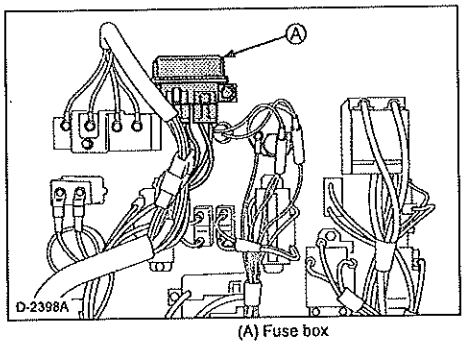
- **Check to see if electric cables and wiring are swollen, hardened or cracked.**
- **Keep dust and water away from all power connections.**

Loose wiring and terminal parts make bad connections, be sure to repair them before starting the engine.

Damaged wiring reduces the capacity of electrical parts. Change or repair damaged wiring immediately.

■ Fuse

The electrical system is protected from potential damage by fuses.
A blown fuse indicates that there is an overload or a short circuit somewhere in the electrical system.
If any of the fuses should blow, replace with a new one of the same capacity.

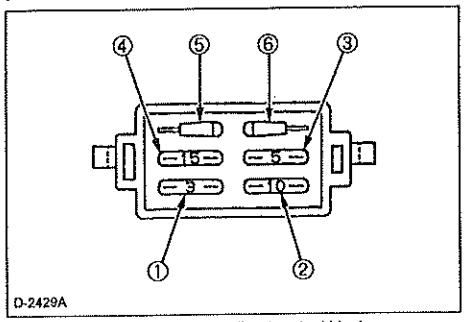


(A) Fuse box

IMPORTANT :

- Before replacing a blown fuse, determine why the fuse blew and make any necessary repairs. Failure to follow this procedure may result in serious damage to the generator electrical system. Refer to the troubleshooting section of this manual or your local KUBOTA Dealer for specific information.

[Engine model ··· Z482, D722]



(1) Fuse 3A : External connection terminal block
(2) Fuse 10A : AC (Accessory Line)
(3) Fuse 5A : Glow
(4) Fuse 15A : Solenoid
(5) Fuse 15A : (spare)
(6) Fuse 10A : (spare)

■ Fan Belt

◆ Adjusting Fan Belt Tension

⚠ CAUTION

To avoid personal injury:

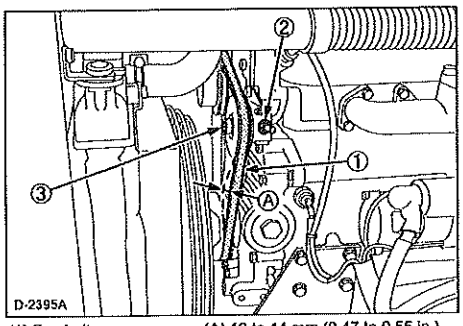
- **Be sure to stop the engine and remove the key before checking the belt tension.**
- **Be sure to reinstall the detached safety shield after maintenance or checking.**

Proper fan belt tension	A deflection of between 12 to 14 mm (0.47 to 0.55 in.) when the belt is pressed in the middle of the span.

1. Stop the engine and remove the key.
2. Apply moderate thumb pressure to belt between pulleys.
3. If the belt tension is not as specified, loosen the lock nut and turn the adjust nut to get the belt tension within the specified range.
4. Tighten up the lock nut.
5. Replace fan belt if it is damaged.

IMPORTANT :

- If belt is loosen or damaged and the fan is damaged, it could result in overheating or insufficient charging. Adjust correctly or replace the belt.



(1) Fan belt
(2) Bolt and adjust nut
(3) Lock nut
(A) 12 to 14 mm (0.47 to 0.55 in.) (under load of 98 N (22.1 lbs.))

TRANSPORTING / STORAGE

■ Transporting

⚠ CAUTION

To avoid personal injury:

- **Secure the generator to prevent movement during operation.**
- **DO NOT stand near or under the generator while it is suspended.**
- **The generator is heavy. Utilize suitable equipment to lift and transport. Keep hands and feet away from under the suspended generator.**
- **When transporting the generator, remove the ⊖ battery cable, close the fuel cock lever, and keep the generator level to prevent fuel spillage.**
- **Use hangers and wire ropes which are strong enough to withstand the weight of the machine.**

1. When transporting the generator, use only suitable transporting equipment, such as crane, fork lift or etc.
2. The generator is equipped with the 2 inlets in the machine bed for forklift forks. Transportability is increased by 2 ways; special forklift openings and 1-point lifting hook.
   Use lifting equipment of sufficient capacity.

Model	Approx. gross wt. kg (lbs.)
GL6000, GL7000 **[Engine model: Z482]**	262 (577)
GL9000, GL11000 **[Engine model: D722]**	310 (683)

■ Storage

⚠ CAUTION

To avoid personal injury:

- **DO NOT clean the machine with engine running.**
- **To avoid the danger of exhaust fume poisoning, do not operate the engine in a closed building without proper ventilation.**
- **When storing the generator just after running, let the engine cool off.**

Before storing the generator for more than a few months, remove any dirt on the machine, and:

1. Remove dirty engine coolant, fill with new coolant and run the engine for about 5 minutes.
   When coolant is added, coolant level drops the first time the engine is started, stop the engine and add more coolant.
2. Remove dirty engine oil, fill with new oil and run the engine for about 5 minutes to let the oil penetrate to all the parts.
3. Check all the bolts and nuts, and tighten if necessary.
4. Remove the battery from the generator, adjust the electrolyte level, and recharge it. Store the battery in a dry and dark place.
5. When the engine is not used for a long period of time, run it for about 5 minutes under no load every 2 to 3 months to keep it free from rust. If the engine is stored without any running, moisture in the air may condense into dew over the sliding parts of the engine, resulting in rust.
6. If you forget to run the engine for longer than 5 to 6 months, apply enough engine oil to the valve guide and valve stem seal and make sure the valves work smoothly before starting the engine.
7. Store the generator in a flat place and remove the key.
8. Do not store the generator in a place where flammable materials such as dry grass or straw are present.
9. When covering the generator for storage, let engine and muffler cool off completely.
10. Operate the engine after checking and repairing damaged wiring or pipes, and clearing flammable materials carried by rodents, insects or birds.

TROUBLESHOOTING

⚠ CAUTION

To avoid personal injury:

- **Always perform any check at "STOP" condition except for special check in which operation is required.**
- **Do not touch the charging section during operation.**
- **Keep your hands and body away from the rotating parts during operation.**

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

■ Generator

Trouble	Cause	Countermeasure
After electrical equipment connected, generator does not operate.	Circuit breaker is off.	• Turn breaker "ON".
	Contact of output terminal and socket is bad.	• Reinstall.
	Malfunction of electrical equipment	• Request repair.
Not generating	Bad contact of brush	• Check, cleaning and maintenance of contact face and contact force of brush and slip ring. (⚠ Danger: All works should be performed when stopped)
Circuit breaker can not be operated.	Overload	• Reduce load.
	Short circuit of load circuitry connected to output section	• Repair load.
Output cannot be obtained. **• Rotation goes slow.** **• Voltage drops.** **• Breaker turns off.**	Initial current is too much. (e.g. motor load)	• Reduce load.
	Overload	• Reduce load.
Engine indicates loaded condition.	Short circuit of generator wiring	• Stop immediately. Request for repair.

■ Easy checker

Trouble	Cause	Countermeasure
When the key is turned, the lamp doesn't light on.	Bulb is defective.	• Replace
	Component or wiring defect of charging circuit	• Check, repair
The water temperature lamp lights on when operating.	Engine overheating.	• See "Precaution overheating" in "Radiator" section. (See page 97)
	Water temperature sensor faulty.	• Replace the water temperature sensor.
	Water temperature sensor wiring faulty.	• Repair the wiring.
The oil pressure lamp lights on when operating.	Insufficient engine oil.	• Add engine oil.
	Lubricating system in trouble.	• Check the system.
	Oil pressure sensor faulty.	• Replace the sensor.
	Oil pressure sensor wiring faulty.	• Repair the wiring.
The battery charge lamp lights on when operating.	Poor contact of sub winding.	• Connect tightly.
	Sub winding problem.	• Check the sub winding.

■ Engine

Trouble		Cause	Countermeasure
Not started.	**Not turned or slow turning.**	Battery trouble.	• Replacement of battery.
		Insufficient battery charge.	• Recharge battery.
		Slow turning at cold circumstance due to high viscosity of engine oil. Fuse blown out (Slow blow fuse)	• Replace engine oil to D5W40 or D10W30 for cold. • Replace fuse.
		Terminal cover open.	• Close terminal cover. Fix terminal cover with panel lock bolts.
	Normal turning, but not started.	Fuel shortage.	• Refuel.
		Fuel does not flow.	• Check fuel filter. If filter is dirty, replace. • Check fuel tank. Remove the settled impurities or moisture.
		Air and water are contained in fuel supply line.	• Check pipe and fastening clamp. If any damage exists, replace or repair. • Relieve air. • Remove water inside of fuel tank and filter.
		Injection pipe is loosened.	• Re-tighten.
Engine starts but stops immediately.		Engine oil shortage.	• Add engine oil to upper limit of gauge.
Rotation is irregular.		Fuel shortage.	• Refuel.
		Fuel does not flow.	• Check fuel filter. If filter is dirty, replace. • Check fuel tank. Remove the settled impurities or moisture.
		Air and water are contained in the fuel supply line.	• Check pipe and fastening clamp. If any damage exists, replace it, or repair.
			• Relieve air.
			• Remove water inside of fuel tank and filter.
		Injection pipe is loosened.	• Re-tighten.
Engine suddenly stops.		Fuel shortage.	• Refuel.
		Insufficient engine oil.	• Fill oil.
		Water temperature is too high. • Insufficient cooling water. • Loosened water pump belt. • Blockage of radiator.	• Fill cooling water. • Adjust belt tension. • Clean.
		Terminal cover open.	• Close terminal cover. Fix terminal cover with panel lock bolts.
Insufficient output. **When loaded, rotation goes slow.**		Choke of air cleaner element.	• Replace air cleaner element.
		Choke of fuel system.	• Check.
		Choke of fuel filter.	• Element cleaning.
		Oil deterioration.	• Replace engine oil.
		Overload.	• Refer to generator.
Coolant leaks out.		Insufficient cooling water.	• Fill cooling water.
		Loosened fan belt.	• Adjust belt tension.
		Blockage of radiator.	• Clean.
Exhaust gas is bad.		Choke of air cleaner element.	• Clean air cleaner element.
		Engine oil is over filled.	• Remove oil to upper limit of gauge.
		Fuel quality is bad.	• Replace fuel with good quality fuel.
Abnormal sound **Large vibration.**		Crack of vibration-proof rubber.	• Replace.
		Others.	• Check, repair.

If you have any questions, contact your KUBOTA dealer.

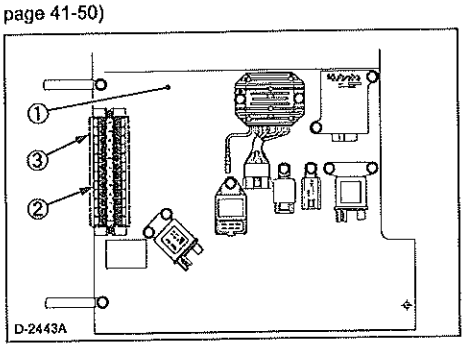
ENGLISH

AUTOMATIC START/STOP UNIT (A S/S UNIT)

To connect the machine to the A S/S UNIT the generator is equipped with the ectt on the left side panel of the control panel.
To connect the exterior apparatus with the machine, perform the following instructions;

1. Remove the terminal taps cover.
2. Connect the unit to the ectt with the wiring harnesses, following the operator's manual of the A S/S unit.
3. To assemble the ttc, set the ttc.

For nomenclature and connection of terminal taps are referred to the "WIRING DIAGRAMS" section. (See page 41-50)

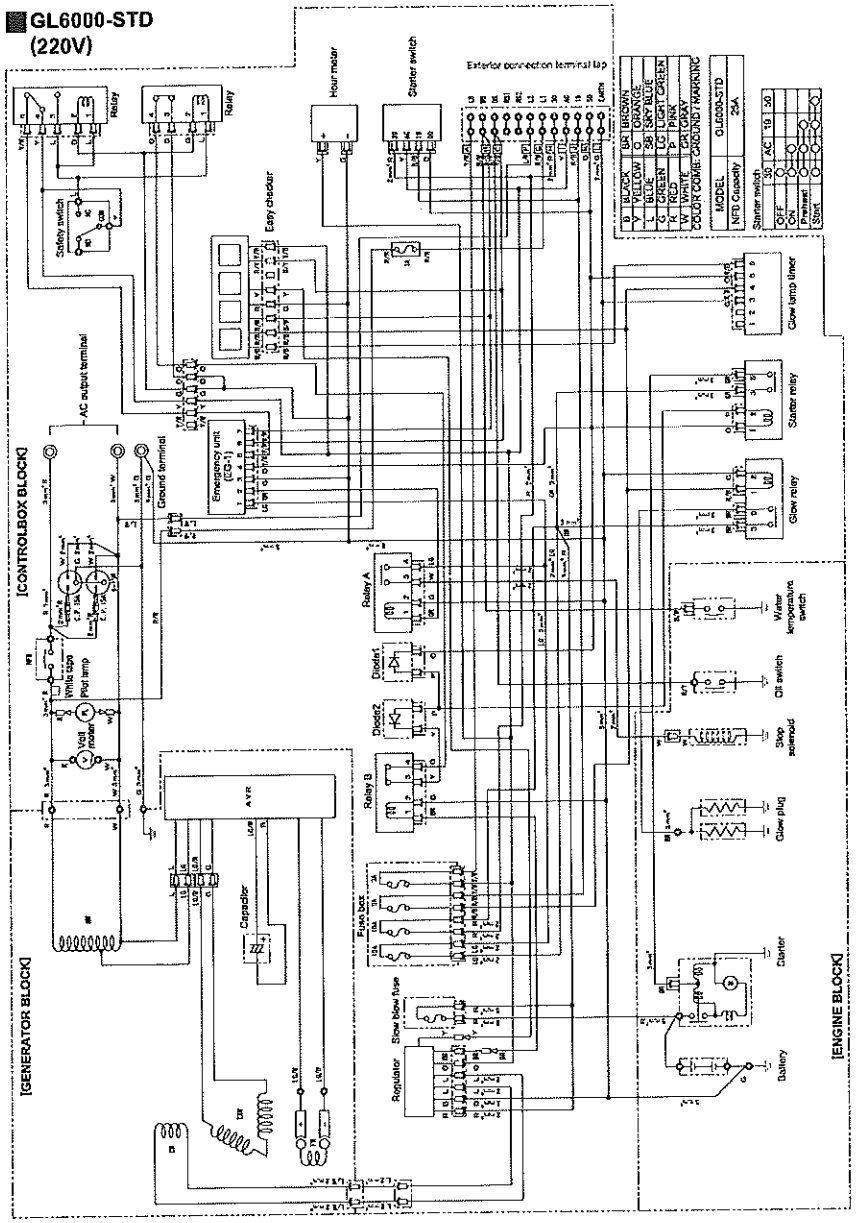


(1) Plate
(2) Exterior connection terminal taps (ectt)
(3) Terminal taps cover (ttc)

ENGLISH

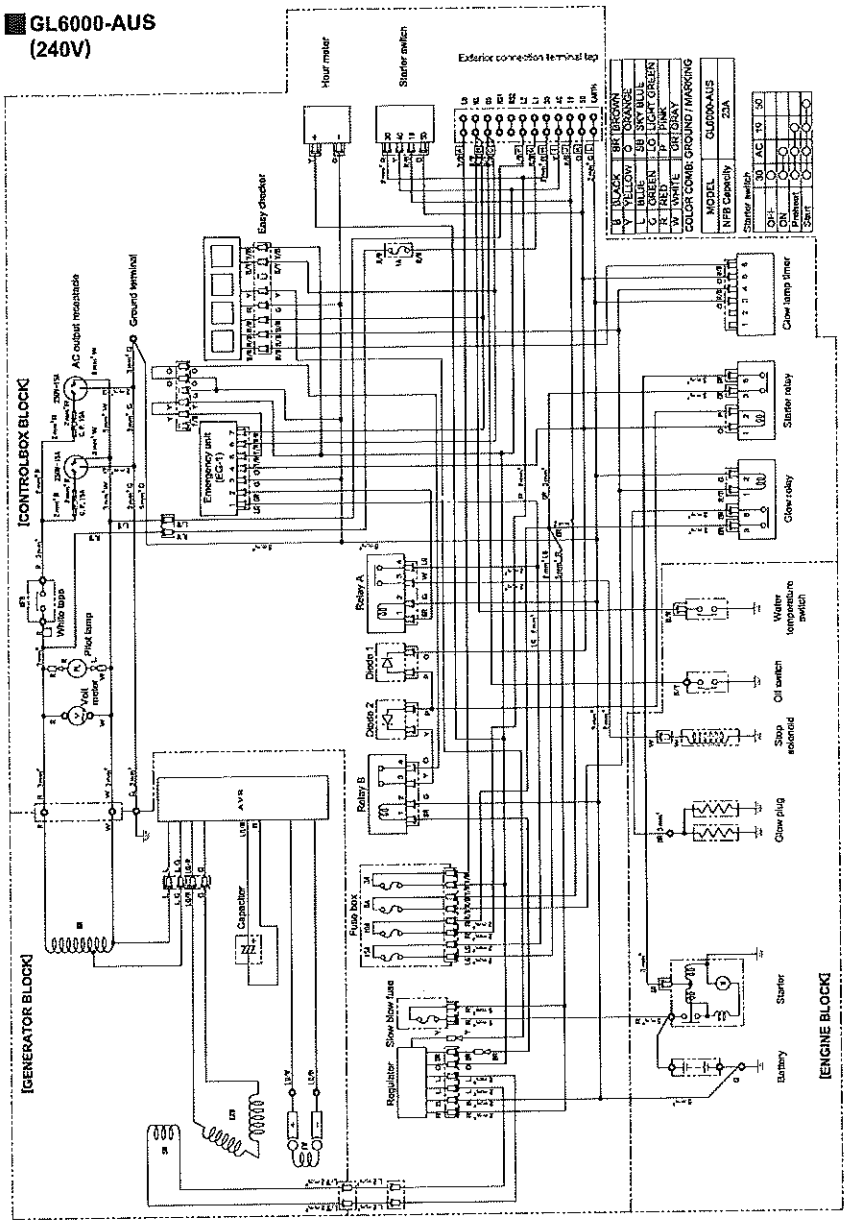
WIRING DIAGRAM

GL6000-STD
(220V)

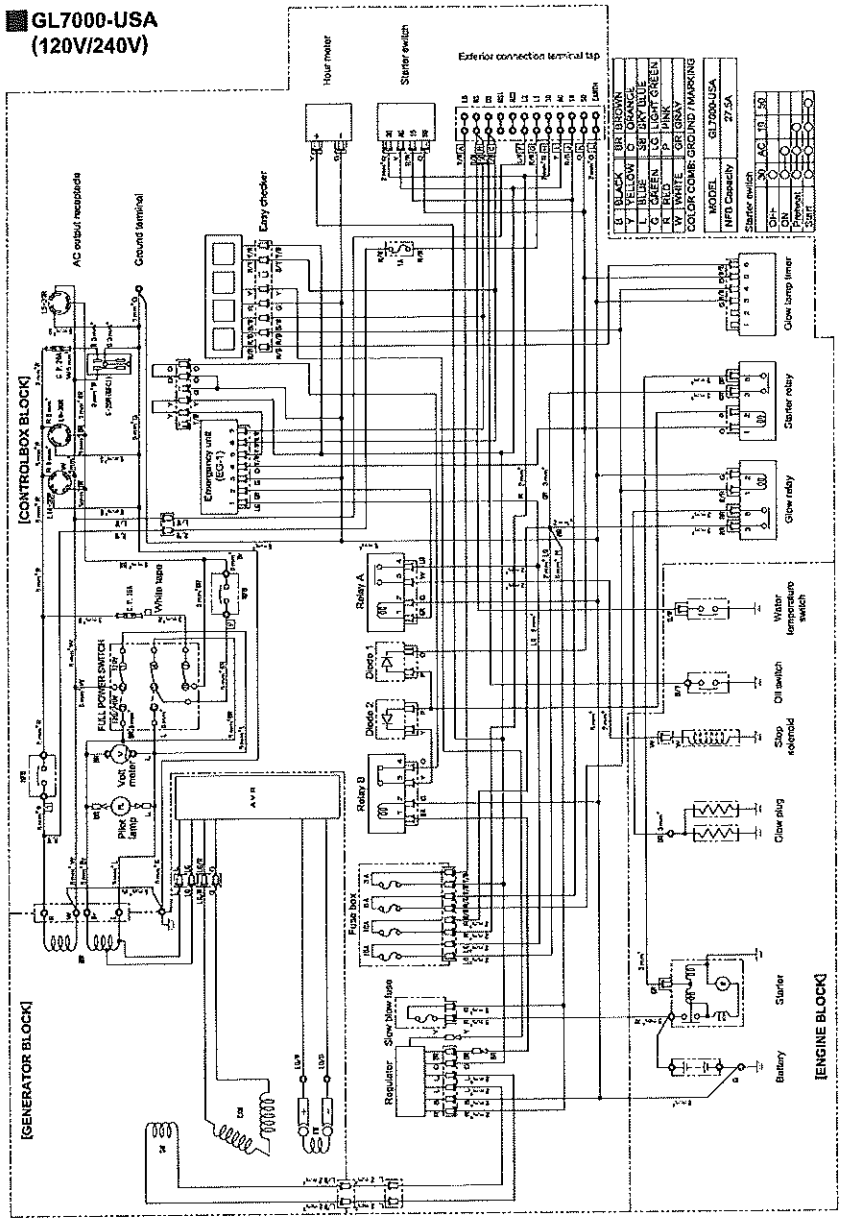


ENGLISH

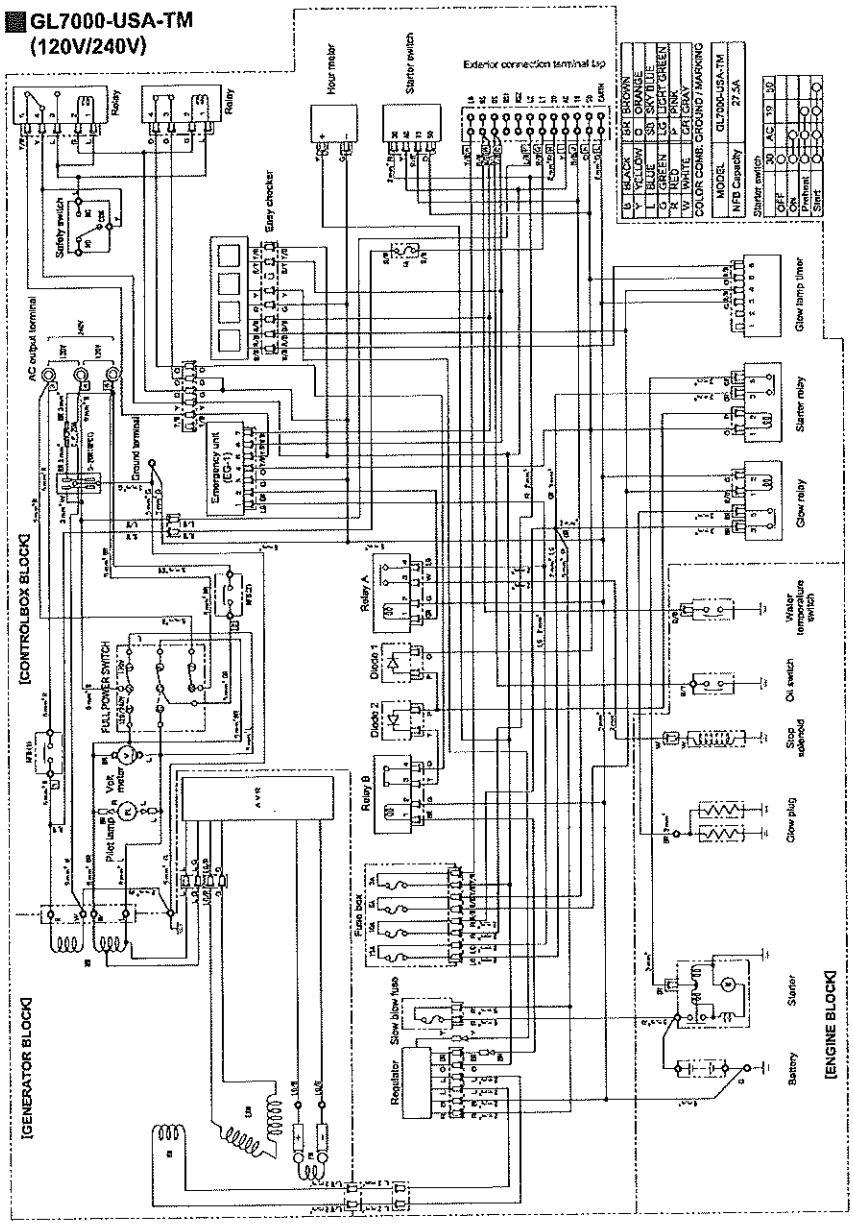
GL6000-AUS (240V)



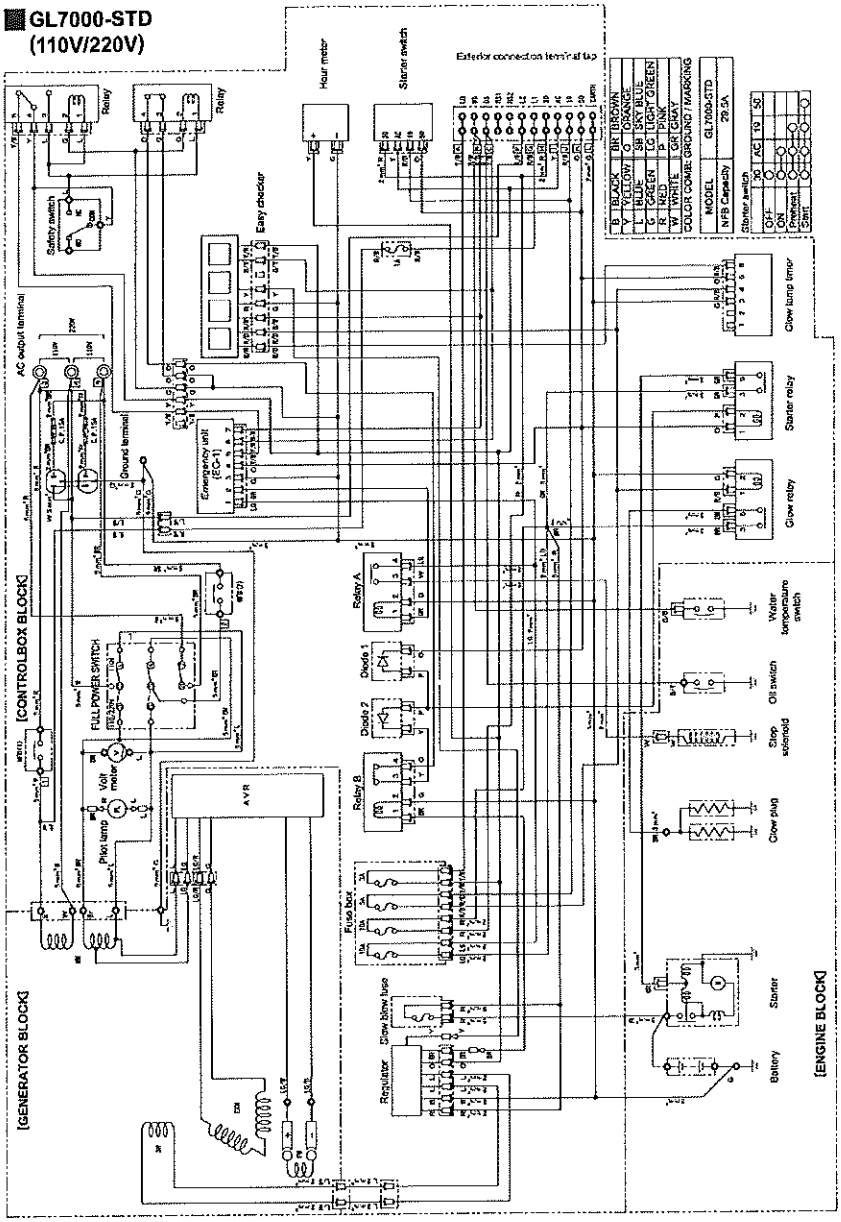
GL7000-USA (120V/240V)



GL7000-USA-TM (120V/240V)

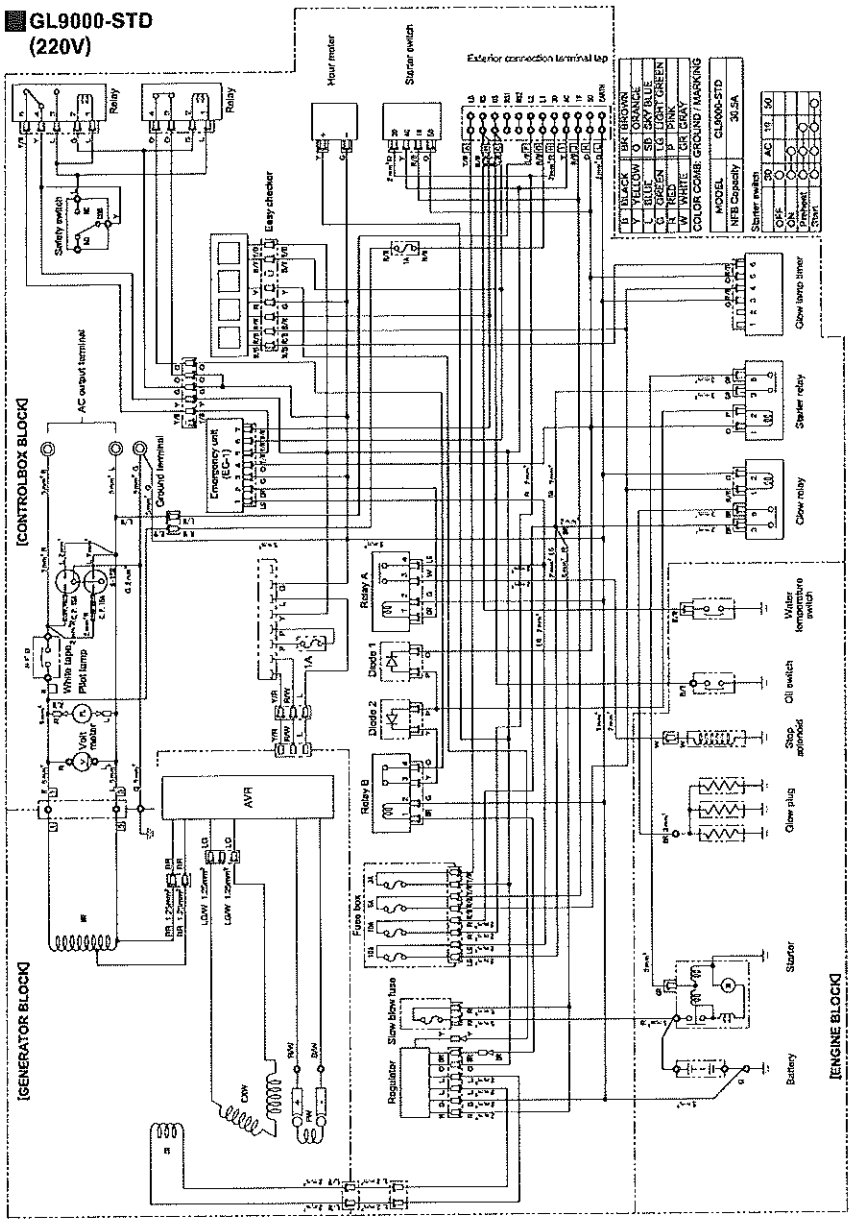


GL7000-STD (110V/220V)

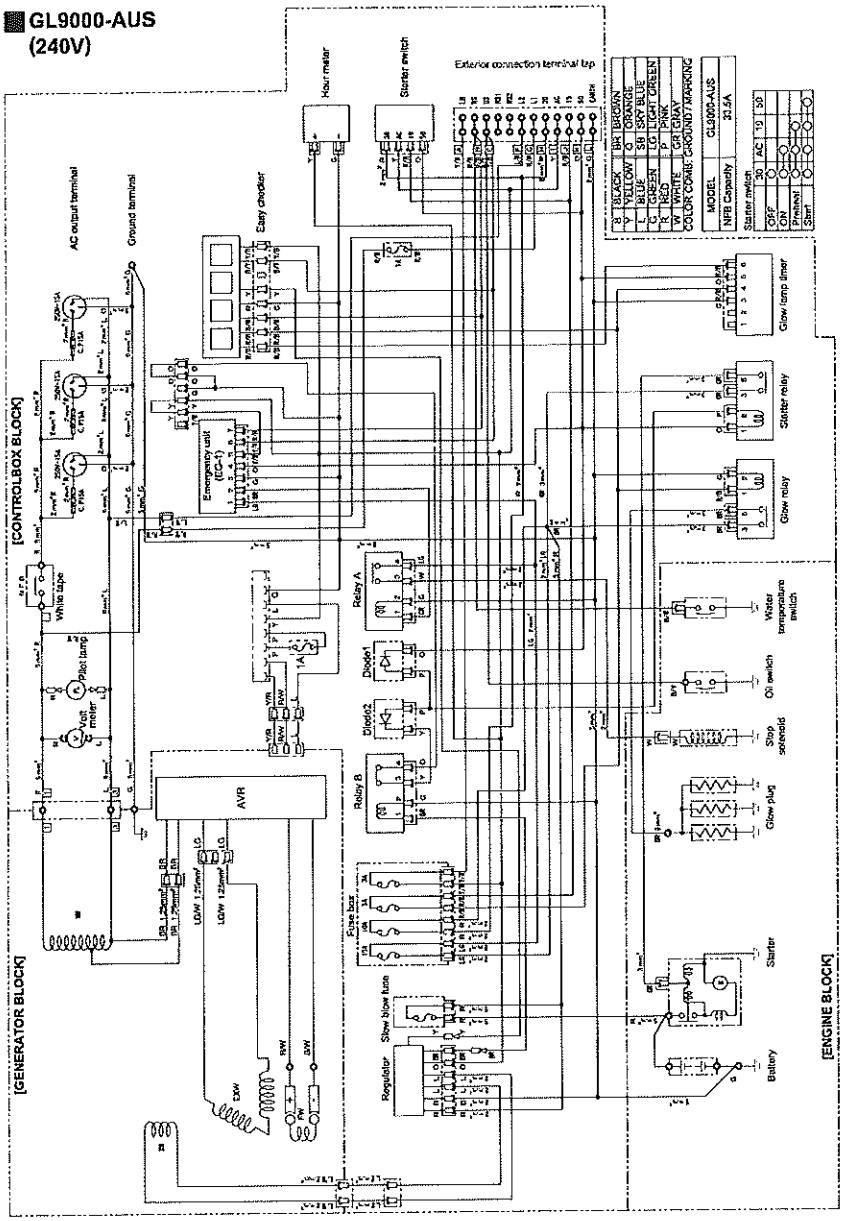


ENGLISH

GL9000-STD (220V)

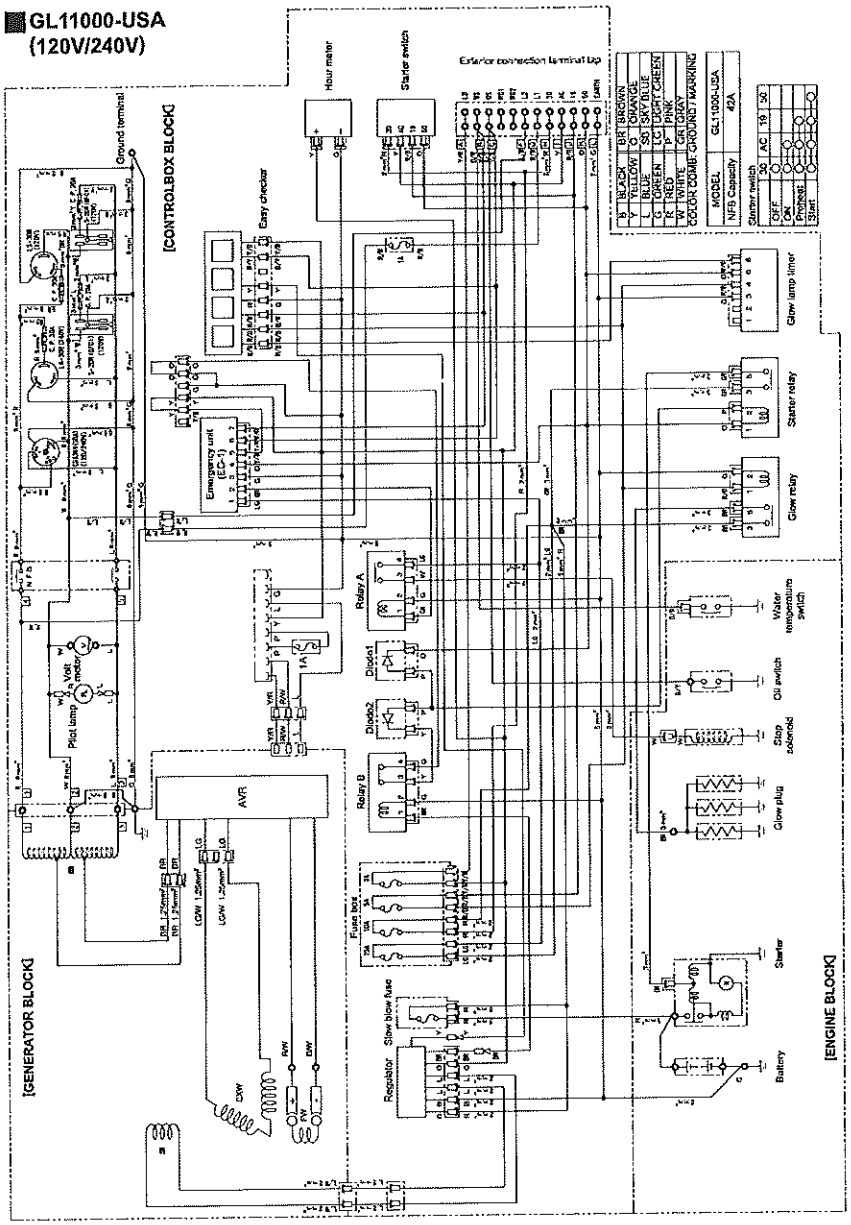


GL9000-AUS (240V)

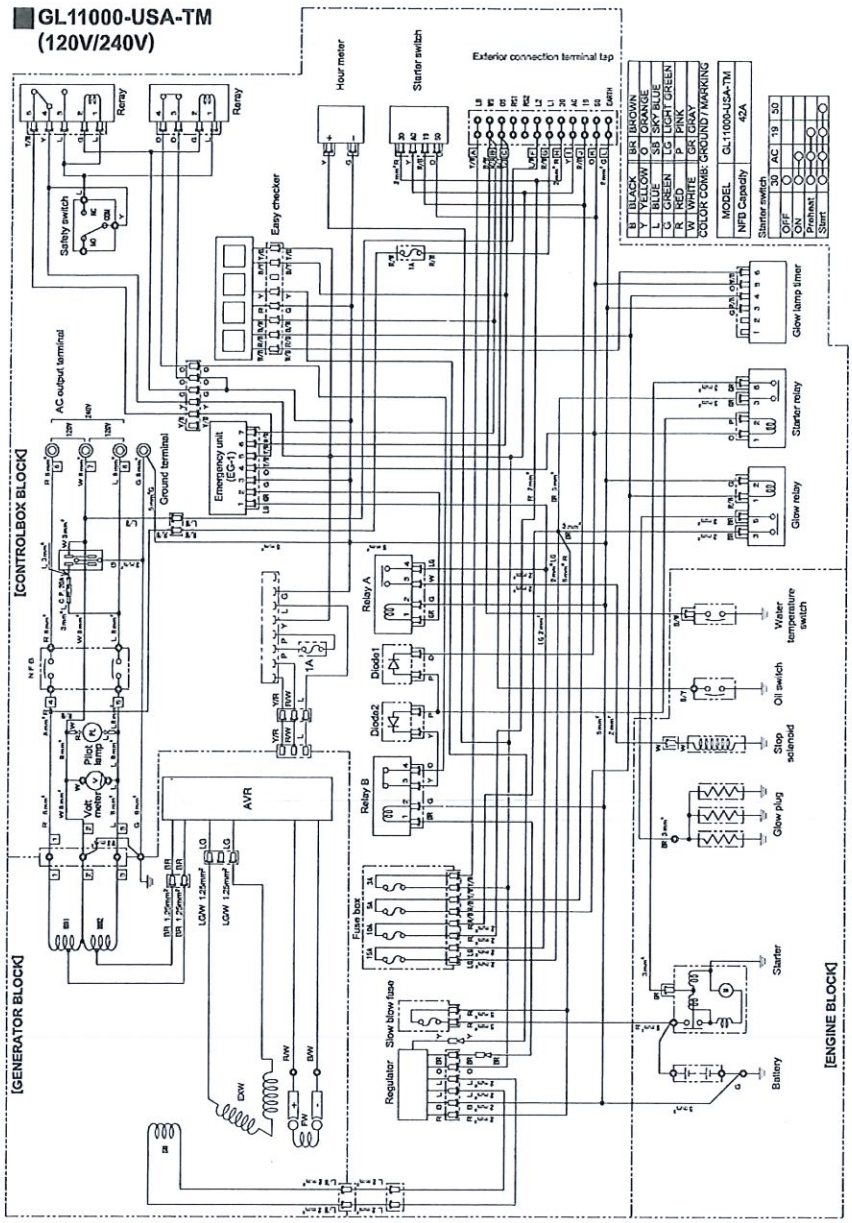


ENGLISH

GL11000-USA (120V/240V)



GL11000-USA-TM (120V/240V)



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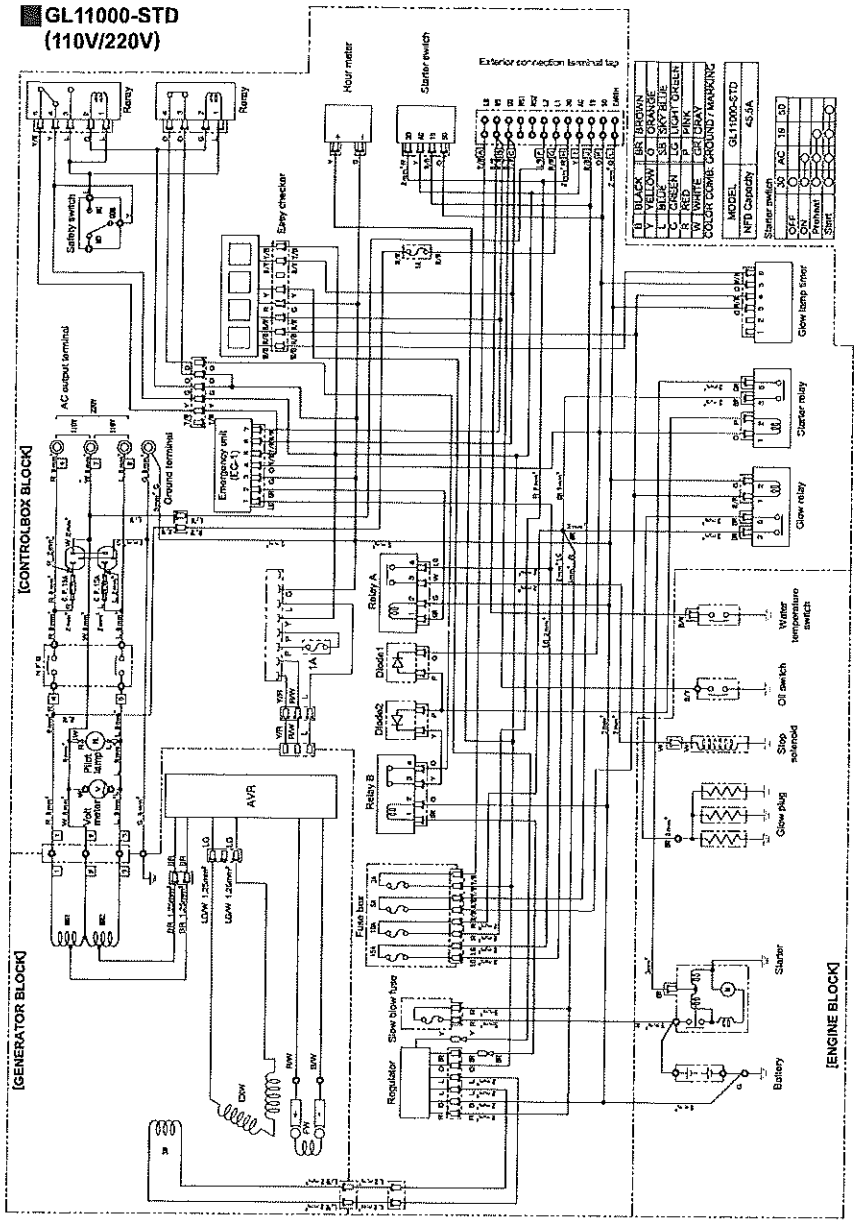
GL11000-STD (110V/220V)