

ISO 9001
CERTIFIED

shindaiwa

**OWNER'S AND
OPERATOR'S MANUAL**

Sound Proof
Diesel Engine Generator

DG150MI
DG250MI

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CAUTION : Do not operate the Generator, or any other appliance,
before you have read and understood the instructions for use.



Shindaiwa Kogyo Co.,Ltd.


71000-94011

Introduction

Thank you for purchasing Shindaiwa Sound Proof Diesel Engine Generator.

- This user manual was created to ensure the safe operation of this equipment. Therefore, the manufacturer of this equipment strongly recommends that the user follow the instructions herein, to avoid unnecessary accidents and repairs.
- Please operate this equipment after thoroughly reviewing and understanding the contents of this manual.
- Please attach this manual, if the equipment will be sub-leased.
- Please store this manual near the equipment for easy reference.

<i>Following convention will be used throughout the manual to indicate the degree of cautions.</i>	
 Danger	<i>Can cause severe injuries or death.</i>
 Caution	<i>Can cause minor injuries or damage to the equipment or other properties</i>
<Caution>	<i>Other types of caution</i>

- Even some of the items noted in  **Caution** may lead to severe injuries. Please read all items and follow all the safety guidelines.

1 Safety Guidelines



Danger :Suffocation from exhaust fume

- Exhaust fume from the engine contains many elements harmful to human. Do not operate this equipment in poorly ventilated area, such as inside a room or in a tunnel



Danger :Electrical Shock

- Do not touch the output terminals during operation.
- Be sure to place covers over the output terminals and fasten with fasteners.
- Do not insert metal objects (such as pin or wire) into plug-in receptacles.
- Do not touch wiring or any electronic parts inside equipment during operation.
- Ground the every earth grounding terminal to the earth as set out in the manual.
If even one of all is unconnected by mistake or accident, it will be much more dangerous for human body than the NO RELAY case, because leaking current inevitably goes through the body.
- Even though all the earth terminals of the loads have been grounded to the earth, the earth grounding terminal and the outer bonnet (canopy) grounding terminal should be grounded to the earth.
- There is always a danger of being electrocuted by short-circuit. Be sure to test generator's insulation resistance periodically.
- Before connecting or disconnecting a load cable to/from output terminals, always turn a circuit breaker to OFF position, stop the engine, and remove the engine key. A person performing the maintenance should always keep the key.
- Before performing any equipment check or maintenance, stop the engine, and remove the engine key. A person performing the maintenance should always keep the key.



Danger :Injuries

- Close all doors and place locks during operating this equipment, to avoid injuries by unintentionally touching cooling fan and fan belt.



Caution :Suffocation from exhaust fume

- Do not point the exhaust fume toward pedestrians or building.

**Caution****:Injuries to eyes and skin**

- Battery fluid contains diluted sulfuric acid. Avoid contact with eyes, skin or on clothing. If the acid comes in contact, especially with eyes, flush with a lot of water, and contact your physician immediately.

**Caution****:Fire**

- This equipment uses Diesel Oil as a fuel. When refueling, always stop the engine, and keep away from fire. Moreover, always wait until the engine cools down before refueling.
- Always wipe any drip of Diesel fuel or Lubrication oil. Do not use this equipment when a leak is found. Repair the equipment before use.
- Temperature around muffler and exhaust can get extremely high. Keep any inflammable items (such as fuel, gas, paint, etc.) away from the equipment.
- Battery may emit some combustible gas, so keep it away from fire and sparks.
- Always operate this equipment on flat surface and, at least 1 meter away from any objects (wall, box, etc.).
- Do not connect AC output to any indoor wiring.
- Always wait until the equipment cools down, before placing any covering materials for storage.

**Caution****:Burns**

- Do not open the radiator cap while operating this equipment or immediately after stopping the equipment, to avoid sustaining burns from hot vapor.
- Do not touch the engine and muffler during operation and immediately after stopping the equipment, for the temperature can reach extremely high.
- When checking engine oil or changing oil, always stop the engine, and wait until the engine cools down. If you open either the oil gauge or the oil filler cap during operation, hot oil may cause some injury.

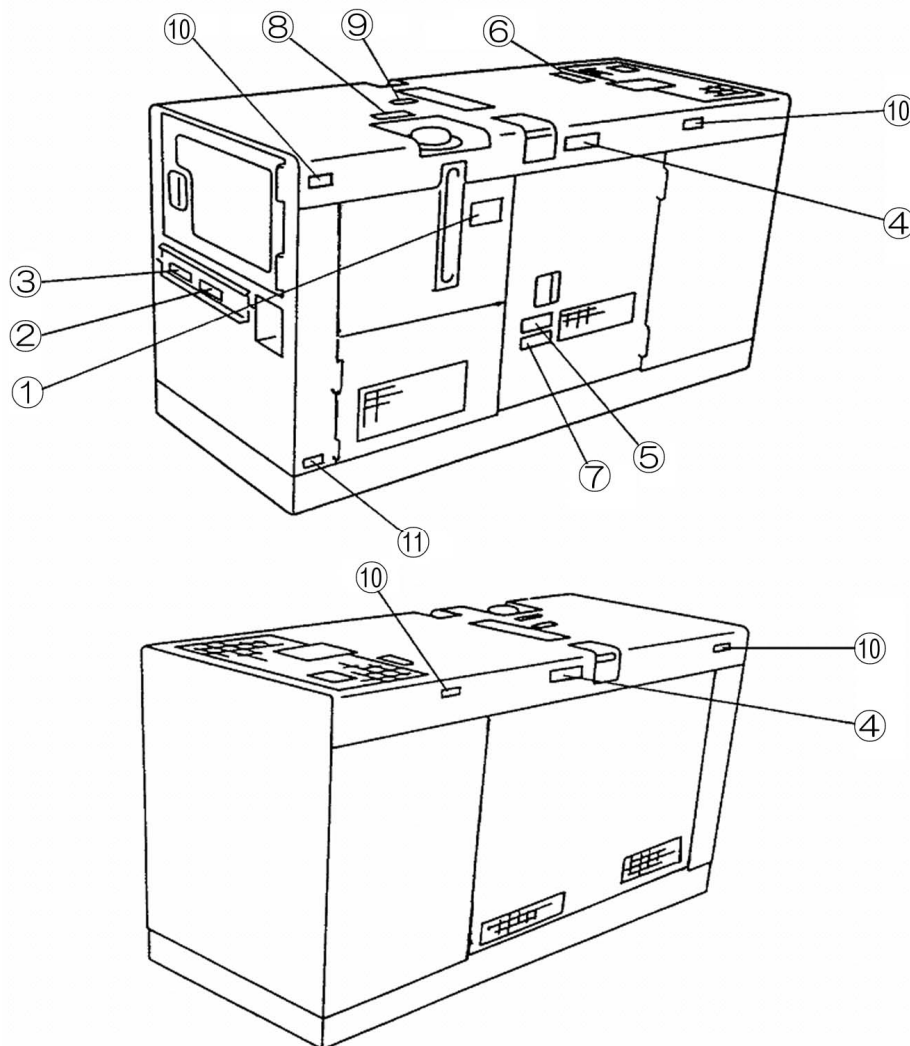
**Caution****:Injuries**

- When lifting the equipment, always use a lift hook.
- Do not use Side rope-through, for it may cause equipment to drop.
- Always place the equipment on a flat and stable surface, to keep the equipment from sliding.
- When starting the engine, turn off the connected equipment and set the circuit breaker to OFF position.
- Do not move the equipment during operation.
- When performing equipment check and maintenance, always stop the engine.
- Do not operate the equipment, if the equipment is being modified or if the parts are removed.

Location of Warning labels

When the warning labels become unreadable or damaged, place new labels on the appropriate location, as specified in the following figure. When ordering the label, use following part numbers.

1	Safety guidelines	Part Number 19402-00188
2	Suffocation from exhaust fume	Part Number 19402-00161
3	Electrical Shock	Part Number 19402-00163
4	Injuries	Part Number 19402-00167
5	Injuries	Part Number 19402-00162
6	Burns	Part Number 19402-00165
7	Burns	Part Number 19402-00164
8	Fire	Part Number 19402-00166
9	Lift points	Part Number 19401-00153
10	Tie (Sleeper) Marker	Part Number 19401-00207
11	Bonnet Grounding Terminal	Part Number 19401-00206



2 Specifications

2.1 Specification Matrix

Name of Generator			DG150MI		DG250MI	
Alternator	Type	Unit	Blushless, Rotating Field, 3-Phase, 4-Pole, Synchronous AC Generator			
	Rated Output	kVA	12.5	15	20	25
		kW	10	12	16	20
	Rated Voltage (or the below)	V	200	220	200	220
	Rated Current (or the below)	A	36.1	39.4	57.7	65.6
	Rated Voltage	V	400	440	400	440
	Rated Current	A	18	19.7	28.8	32.8
	Frequency	Hz	50	60	50	60
	Rated speed	min ⁻¹	1500	1800	1500	1800
	Winding	-	3-phase, 4-wire, Star with neutral			
	Power factor	%	80			
	Insulation class	-	F			
	Excitation	-	Self-excitation with AVR			
	No. of poles	-	4			
Engine	Types	-	Vertical Water-cooled 4-cycle Diesel Engine			
	Model (Manufacturer)	-	3LD1 (ISUZU)		AA-4LE1 (ISUZU)	
	No. of Cylinders (bore x stroke)	mm	3 (83.1 x 92)		4 (85 x 96)	
	Continuous rated output	kW	12.6	14.9	19.1	23.5
		PS	17.1	20.3	26	32
	Rated speed	min ⁻¹	1500/1800			
	Displacement	L	1.496		2.179	
	Combustion system	-	Swirl Chambered			
	Cooling method	-	Radiator			
	Lubricating method	-	Forced lubrication			
	Starting method	-	Electric start			
	Fuel	-	Diesel Fuel (ASTM No. 2-D) or Equivalent			
	Lubricant oil	-	CD class			
	Fuel tank capacity	L	65			
	Lubricant volume (Full)	L	7.4		8.5	
	Cooling water volume	L	5.8		8.6	
	Starting motor capacity	V- kW	12 - 1.2		12 - 1.8	
Charging dynamo capacity	V-A	12-20				
Battery	-	80D26R x 1		75D31R x 1		
Operation Device	Volt/Freq/Amp meter	-	O		O	
	Voltage regulator	-	O		O	
Protection Device	Oil pressure, Water temp.	-	Lamp indication (Engine stops)			
	Battery charge	-	Lamp indication			
Control Panel	Hour meter	-	O		O	
Unit	Dimensions (L x W x H)	mm	1390 x 650 x 890		1550x 650 x 890	
	Dry weight	kg	493		566	

2.2 Ambient Condition

Use the equipment under the following ambient condition. The other condition may cause trouble, insufficient output power or deterioration of durability.

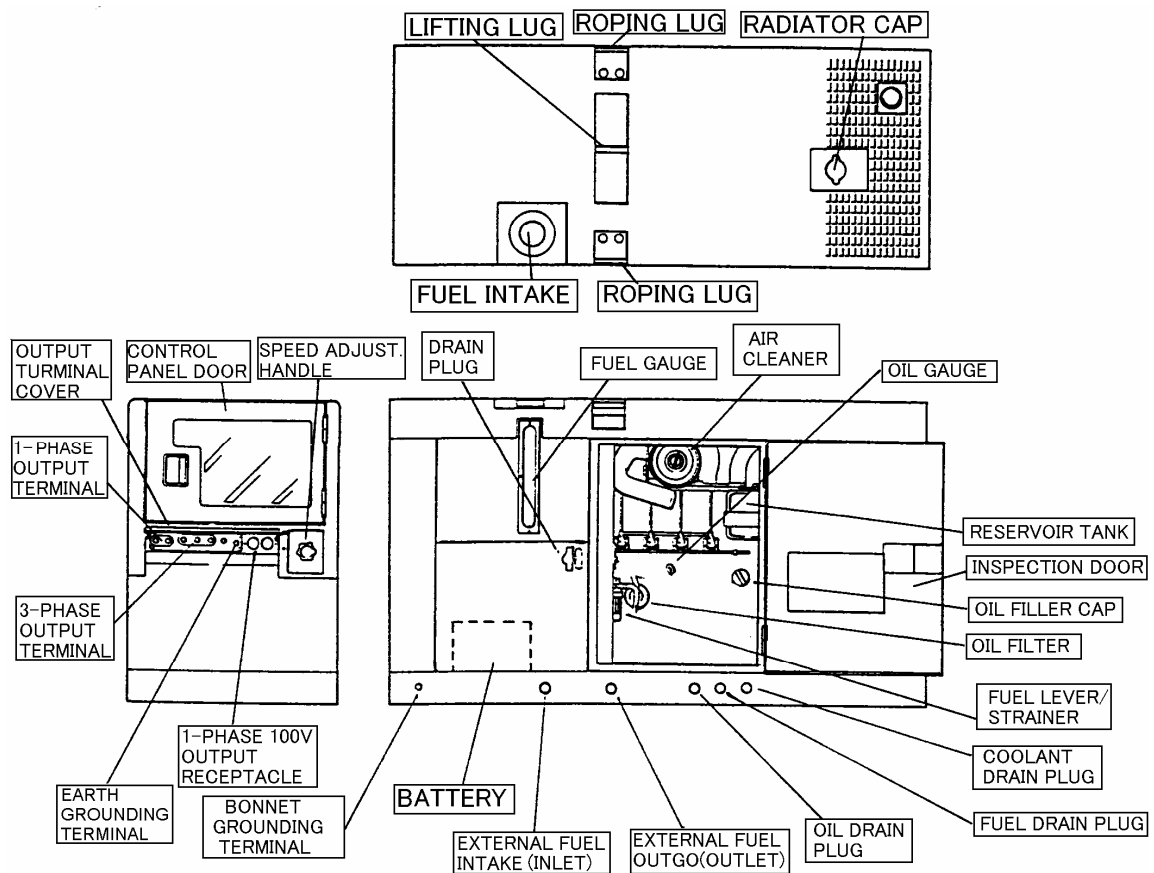
- Ambient Temperature: -15°C ~40°C
- Humidity : less than 80%
- Altitude : less than 300m

3 Use

- Power source for construction –use equipment, such as submersible pump
- Power source for lighting
- Power source for electric tools and home appliances

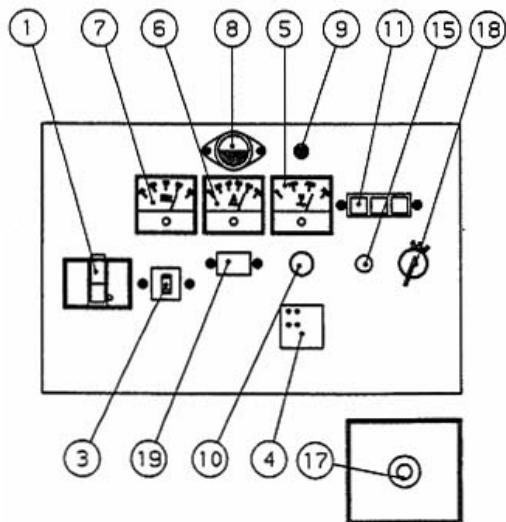
4 Parts

4.1 External view

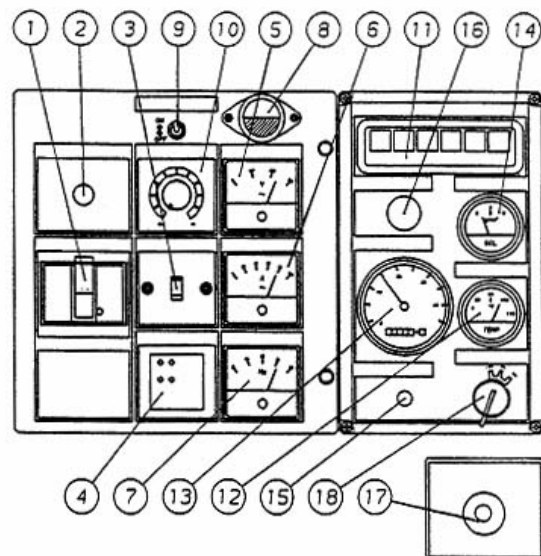


4.2 Control panel

[DG150MI]



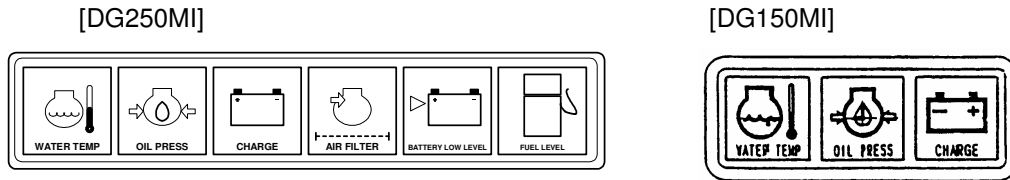
[DG250MI]



No.	Name	No.	Name
1	3-Phase Circuit Breaker	11	Monitor Indication Lamp
2	Pilot Lamp	12	Water Temperature Gauge
3	Single-Phase Circuit Breaker	13	Tachometer (Hour Meter incorporated)
4	Earth Leakage Relay	14	Oil Pressure Gauge
5	Voltage Meter	15	Preheat Lamp
6	Amp. Meter	16	Emergency Stop Button
7	Frequency Meter	17	Throttle Handle
8	Panel Light	18	Starter Switch
9	Panel Light Switch	19	Hour meter
10	Voltage Regulator		

5 Equipment

5.1 Monitor Display



DG250MI is equipped with monitoring function for water/coolant temperature, oil pressure, battery charge, air filter flow, battery fluid level, and fuel level. DG150MI is equipped with monitoring function for water/coolant temperature, oil pressure and battery charge.

When the equipment is started under normal condition, Oil Pressure and Battery Charge lamps will flash when the Starter Switch is turned from STOP to OPERATING, and all lamps will go off, immediately after the engine is started.

When the abnormality is detected either in water temperature or in oil pressure, the corresponding monitor lamp will flash, and the automatic shutoff shall be engaged.

When the automatic shutoff is engaged, turn the starter switch to STOP position, then restart the engine. When the automatic shutoff is engaged next time, check all parts of the corresponding alarm.

5.1.1 Water Temperature Monitoring Lamp (for temperature High)



Danger : Injuries

- Close all doors and place locks during operating this equipment, to avoid injuries by unintentionally touching cooling fan and fan belt.



Caution : Burns

- Do not open the radiator cap while operating this equipment or immediately after stopping the equipment, to avoid sustaining burns from hot vapor.
- Do not touch the engine and muffler during operation and immediately after stopping the equipment, for the temperature can reach extremely high.



WATER TEMP

When the water temperature reaches 110 degrees Celsius during operation, the water temperature-monitoring lamp will flash, and the automatic shutoff will be engaged.

When this occurs, check the Coolant reservoir tank, and replenish if needed (refer to 8-2 *Checking coolant / water level*).

If the water level is normal, check for loose fan belt or possible water leak in the cooling system, after the engine is cooled down.

<Caution>

If the water level is too low, the sensor cannot detect the water temperature. Be sure to check the water level in the radiator and the Coolant reservoir tank prior to operating the equipment.

5.1.2 Engine Oil Monitoring Lamp (for oil pressure low)



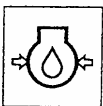
Danger : Injuries

- Close all doors and place locks during operating this equipment, to avoid injuries by unintentionally touching cooling fan and fan belt.



Caution : Burns

- Do not touch the engine and muffler during operation and immediately after stopping the equipment, for the temperature can reach extremely high.
- When checking engine oil or changing oil, always stop the engine, and wait until the engine cools down. If you open either the oil gauge or the oil filler cap during operation, hot oil may cause some injury.



OIL PRESS

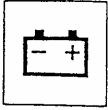
When the engine oil pressure drops below 0.98 x 100kPa (1kgf/cm²) during operation, the oil pressure monitoring lamp will flash, and the automatic shutoff will be engaged.

When this occurs, check the engine oil level, and replenish to the maximum level if needed

<Caution>

The engine oil pressure monitor cannot detect the degradation of engine oil itself. Please check the engine oil periodically, and change if needed (refer to 8-1 *Checking Engine Oil*).

5.1.3 Battery Charge Monitoring Lamp (charge lamp)



When the battery is unable to be charged during operation, the battery charge-monitoring lamp will flash.

CHARGE

Check the belt for damages or cut, and replace if needed.

<Caution>

- For changing the belt, refer to the User Manual for Engine.
- Battery Charge Monitor cannot detect the degradation of battery life nor the battery fluid level (refer to 8-6 *Checking Battery*)

5.1.4 Air Filter Monitoring Lamp (clogged filter element) [DG250MI only]



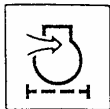
Danger : Injuries

- Close all doors and place locks during operating this equipment, to avoid injuries by unintentionally touching cooling fan and fan belt.



Caution : Burns

- Do not touch the engine and muffler during operation and immediately after stopping the equipment, for the temperature can reach extremely high.



AIR FILTER

When the air filter element becomes dirty or clogged, the air filter monitoring lamp will flash. Turn off the engine and clean the filter element or replace if needed. (refer to 10. *Maintenance*)

5.1.5 Battery Fluid Monitoring Lamp (insufficient battery fluid) [DG250MI only]



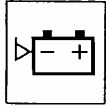
Caution : Injuries to eyes and skin

- Battery fluid contains diluted sulfuric acid. Avoid contact with eyes, skin or on clothing. If the acid comes in contact, especially with eyes, flush with a lot of water, and contact your physician immediately.



Caution : Fire

- Battery may emit some combustible gas, so keep it away from fire and sparks.



BATT LOWLEVEL

When the battery fluid level is low, Battery Fluid Monitoring Lamp will flash.

If the lamp is flashing, quickly add some distilled water. (refer to 8.6 Checking Battery)

5.1.6 Fluid Level Monitoring Lamp [DG250MI only]



Caution : Fire

- This equipment uses Diesel fuel as a fuel. When refueling, always stop the engine, and keep away from fire. Moreover, always wait until the engine cools down before refueling.
- Always wipe any drip of Diesel fuel or oil. Do not use this equipment when a leak is found. Repair the equipment before use.



FUEL LEVEL

When the fuel level reaches less than 1/4 tank, Fluid Level Monitoring Lamp will flash.

If the lamp is flashing, add fuel.

<Caution>

Just after the engine started, lamp will not flash promptly even in the event of 1/4 tank level fuel, which is not malfunction.

5.2 Gauges

5.2.1 Tachometer [DG250MI only]



Tachometer displays the revolution of engine and the generator.

The frequency of the generator is 50Hz at 1500min⁻¹ and 60Hz at 1800min⁻¹.

5.2.2 Hour Meter

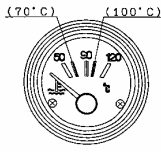


Hour Meter keeps track of utilization time. Use this meter to schedule your Preventative Maintenance. Note that the Hour Meter will operate, as long as the start switch is in ON position, regardless of whether the engine is perating or stopped.

<Caution>

DG250MI incorporates Hour Meter in Tachometer.

5.2.3 Water Temperature Gauge [DG250MI only]

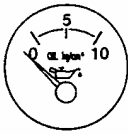


Water Temperature Gauge displays the temperature of engine coolant. Normal temperature may vary depending on the environment, but it should be between 75 to 90 degree Celsius.

<Caution>

If the temperature exceeds normal value, disconnect the load, idle the engine at 1000min^{-1} , and wait until the reading falls to the normal temperature range.

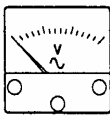
5.2.4 Oil Pressure Gauge [DG250MI only]



Oil Pressure Gauge displays the pressure of engine oil. Normal pressure may vary depending on the environment, but it should display $2.9 - 4.9 \times 100\text{kPa}$ ($3-4\text{kgf/cm}^2$). However, under cold weather, the pressure gauge may display higher reading. Continue idling until the pressure falls to normal range.

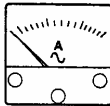
5.2.5 Generator Gauges

5.2.5.1 Voltage Meter



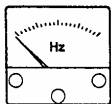
Voltage Meter displays the voltage output (Phase to Phase) from the generator.

5.2.5.2 Amp Meter



Amp Meter displays the electrical (Phase) current output from the generator.

5.2.5.3 Frequency Meter



Frequency meter will display the frequency of the power source

5.2.6 Lamp

5.2.6.1 Preheat Lamp



When the start switch is turned to <Operation or Pre-heating> position, the Preheat Lamp will be turned. When preheating is completed, preheat lamp turns off and operation can start.

<Caution>

Pre-heating may vary depending on the environment, but it should finishes in about 1-5 seconds.

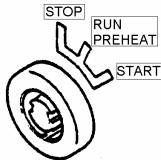
2.2.6.2 Pilot Lamp [DG250MI only]



Pilot Lamp indicates whether or not the generator is generating electricity, when the engine is driving.

5.2.7 Switch

5.2.7.1 Starter Switch



①STOP

When the switch is set to this position, all power will be off. The switch must be set to this position to remove the key.

②RUN / PREHEAT

The switch must be set to this position during operation. This position is also used during cold season, to preheat Glow Plug.

<Caution>

Do not leave the switch to this position, while the engine is stopped.
A battery discharges.

③START

This position will allow user to start the engine. When a user release the key, the setting will automatically return to <Operating / Preheating> position.

5.2.7.2 Panel Light Switch



This switch turns Panel Light to ON and OFF. The switch can only be used when the Start switch is in OPERATING position.

5.2.7.3 Emergency Stop button [DG250MI only]

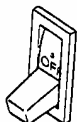


This button is used to stop the engine in emergency. Keep pressing the button until the engine comes to complete halt.

<Caution>

Keep pressing the button until the engine stops in several seconds.
After the engine stops, be sure to return the starter switch to the STOP Position.

5.2.7.4 Circuit Breaker



By turning this circuit breaker switch to ON position, power will be transferred to the output terminal and to the load side. By turning to OFF position, it will shut down all power to the load side, preventing overload and short-circuit, and also breaking the earth leakage.

<Caution>

Do not use this breaker as the ON/OFF switch to the load.
The earth leakage breaking function is for 3-Phase circuit only, not 1-Phase Circuit.

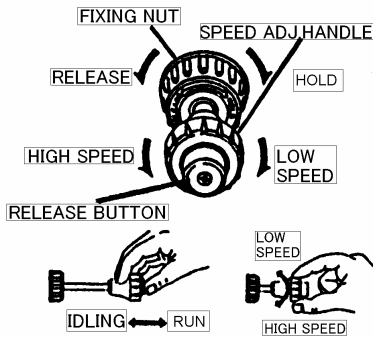
5.2.8 Voltage Regulator and Throttle Handle

5.2.8.1 Voltage Regulator



The dial adjusts output voltage. By turning the dial clockwise, an operator can increase voltage. By turning the dial counter-clockwise, an operator can decrease voltage.

5.2.8.2 Throttle Handle

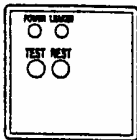


This handle controls the engine revolution. By turning the throttle clockwise, engine speed slows down; turning the handle counter-clockwise increases the speed. The lock of the handle at the required position (speed) can be done by turning the Locknut clockwise. Always lock the handle while the generator is operating. The engine speed can also be changed to high or low by pulling the handle all the way out or pushing all the way in, while the release button on the knob pressed.

<Caution>

Always lock the handle while the generator is operating. Failure to do so may result in fluctuation in frequency (engine speed).

5.2.8.3 Earth Leakage Relay Unit



Sensing the earth leakage current, the unit (relay) send a signal to the 3-phase and the 1-phase breaker to trip-off in order to shut-off the circuit to the terminals (loads).

<Refer to.7-3 Earth Leakage Relay Unit and Grounding>

5.3 Fuel Line Changeover Valve (3-way valve)



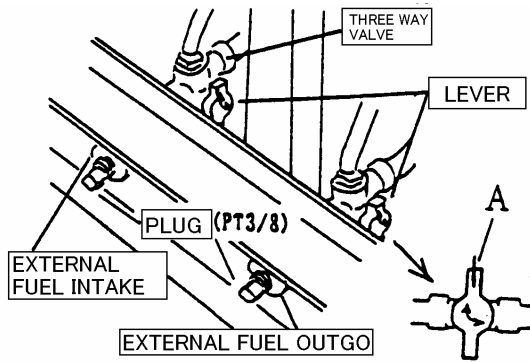
Caution

:Burns

- Always stop the engine when performing any work on the fuel line.
- Always wipe any drip of Diesel fuel or engine oil. Do not use this equipment, when leak is found. Repair the equipment before use.

By switching the 3-way valve, you can use fuel from external fuel tank. In this case, the Diesel fuel in the built-in tank will not be used.

5.3.1 Using fuel from built-in fuel tank

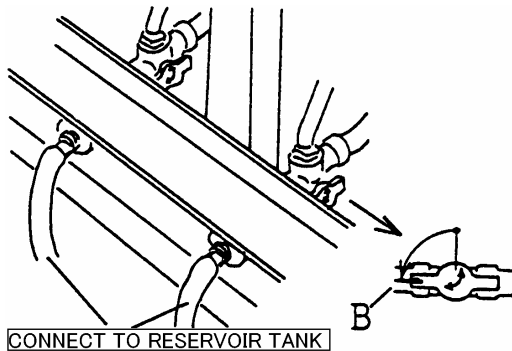


The lever for 3-way valve is set to **A** when the equipment is shipped. In addition, both the external fuel intake and the external fuel return are safeguarded with PT-3/8 plugs. Do not remove the plugs, when using the built-in fuel tank.

<Caution>

Always set the lever for 3-way valve back to **A** position and cover the external fuel intake and return port with the supplied plugs, after the hoses are removed.

5.3.2 Using fuel from external fuel tank



Connect hoses from the external fuel tank to the external fuel intake and the external fuel return ports, and set the lever for 3-way valve to **B** position. You can now supply the fuel from the external gas tank. For detail instruction, refer to 9-5 Connecting to the external Fuel tank

6 Transport and Installation

6.1 Transportation



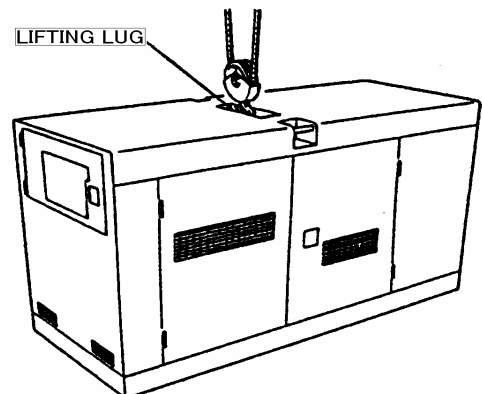
Caution

Injuries

- When lifting the equipment, always use a lift hook.
- Do not use Side rope-through to attach your lift hook, for it may cause equipment to drop.

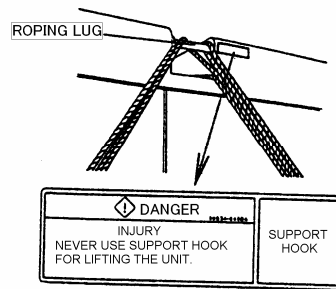
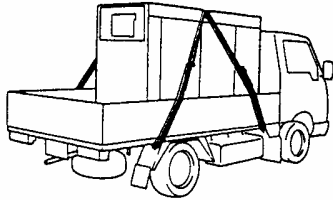
6.1.1 Lifting Equipment

Always use a Lift Hook, when lifting the equipment for transportation.



6.1.2 Transportation

When transporting this equipment, make sure that the equipment is secured properly with ropes tied to the Side Rope Through.



<Caution>

Always use extreme care when loading, unloading, and transporting the equipment. Failure to do so may result in damages and malfunction of the equipment.

6.2 Installation



Danger :Suffocation from exhaust fume

- Exhaust fume from the engine contains many elements harmful to human. Do not operate this equipment in poorly ventilated area, such as inside a room or in a tunnel



Caution :Suffocation from exhaust fume

- Do not point the exhaust fume toward pedestrians or building.



Caution :Fire

- Always operate this equipment on flat surface and, at least 1 meter away from any objects (wall, box, etc.).
- Temperature around muffler and exhaust can get extremely high. Keep any inflammable items (such as fuel, gas, paint, etc.) away from the equipment.

- Always set the equipment on hard, flat surface.
- Keep the equipment at least 1m from a wall or any obstacles, to allow workable space to access the control panel and opening of the panel door.

<Caution>

- This equipment must be operated on hard and flat surface. Operating under any other conditions may result in malfunctions.

- Do not block the airflow from radiator vent or muffler exhaust. It may result in reduced engine performance, overheating, or damage to the electrical parts.
- Operating in dusty area or salty air (by the ocean), or any other particulate environment may result in clogged radiator, which may cause overheating, other malfunctions and insulation deterioration. Use extreme care, frequent checks and maintenance.

7 Connection

7.1 Selecting Cable

Select the cable with proper gauge, based on its allowable amperage and the distance between the generator and the machinery to be connected.



Caution

:Electrical damages

- If the load exceeds the allowable amperage, the overheating may damage the cable.
- If the cable is either too long or too small a gauge, there will be greater voltage drop to loads, which may result in reduced performance in the connected loads, malfunction, or damages.

<Caution>

It is recommended to select the proper gauge and length of cable, with consideration of the maximum 5% marginal drop only for the rated voltage, between the terminals of loads and generator via the cables.

■ Expedient Expression: the voltage drop of cables

○ 3-Phase 3-Wire

$$\text{Voltage Drop (V)} = \frac{1}{58} \times \frac{\text{Length(m)}}{\text{Gauge(mm}^2\text{)}} \times \text{Current (A)} \times \sqrt{3}$$

○ 1-Phase 2-Wire

$$\text{Voltage Drop (V)} = \frac{1}{58} \times \frac{\text{Length(m)}}{\text{Gauge(mm}^2\text{)}} \times \text{Current (A)} \times 2$$

■ Selection of cable

(Example) 220V and Voltage Drop 11V

3-Phase 3-Wire Cap Tire Cable, Single Core

(Unit: mm²)

Length Current	50m or below	75m	100m	125m	150m	200m
20A	3.5	5.5	8	8	14	14
40A	8	14	14	14	22	22
60A	14	14	22	22	30	38
80A	14	22	22	30	38	50

(Example) 100V and Voltage Drop 5V

1-Phase 2-Wire Cap Tire Cable, Single Core

(Unit: mm²)

Length Current	50m or below	75m	100m
10A	5.5	5.5	8
20A	8	14	22
30A	14	22	22

7.2 Connecting Cable



Danger :Electrical Shock

Before connecting or disconnecting a load cable from output terminals, always turn a circuit breaker to OFF position, stop the engine, and remove the engine key. A person performing the maintenance should always keep the key.



Caution :Fire

Do not connect AC output to any indoor wiring.

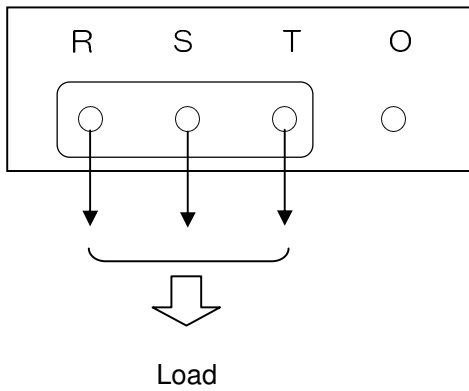
<Caution>

- Divide loads into 3 circuits proportionally as possible, when using the maximum output power especially, and connect them to each phase (R,S,T) respectively.
- Be careful to limit the current under the rated current per the phase .
- The 1-Phase terminals and receptacles output power are originated from the R and T Phase output powers.

7.2.1 Load Connection Terminal Plate (3-Phase / 1-phase)

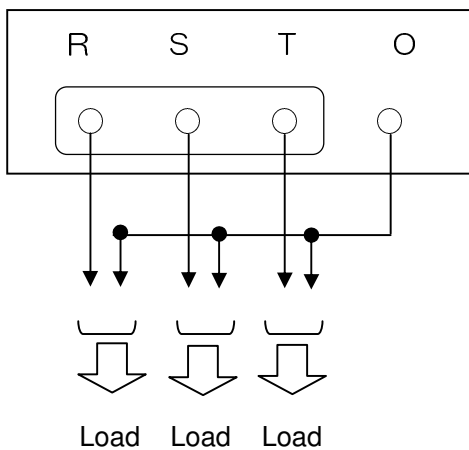
■ For 3-Phase Load

Terminal Voltage : 200V / 220V (or 400V / 440V) at 50Hz / 60Hz



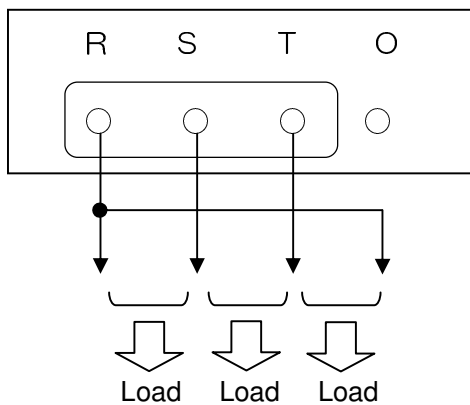
■ For 1-Phase Load (1)

Terminal Voltage : 115V / 127V (or 230V / 254V) at 50Hz / 60Hz



■ For 1-Phase Load (2)

Terminal Voltage: 200V/220V (or 400V/440V) at 50Hz/60Hz

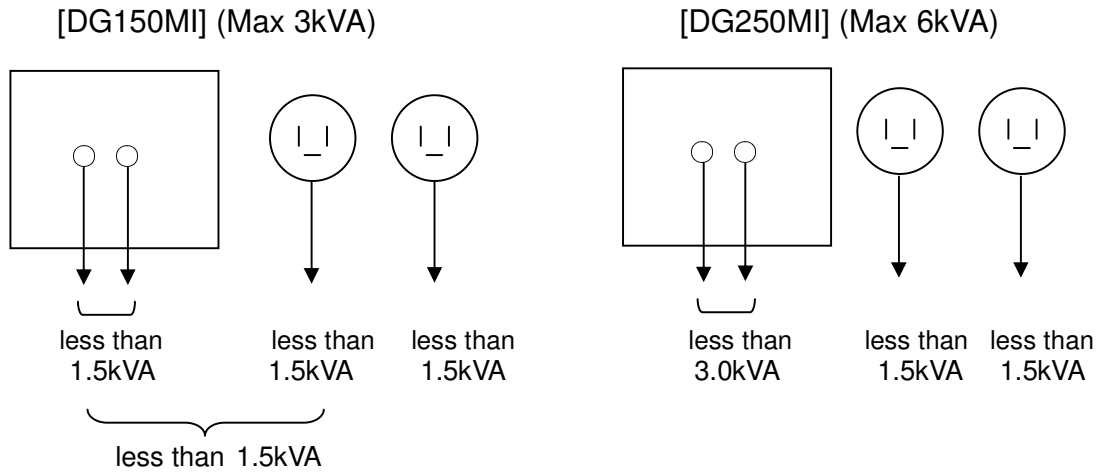


7.2.2 1-Phase Output Terminals & Receptacles

7.2.2.1 200 / 220V

The terminal Voltage: 100V/110V at 50Hz/60Hz only

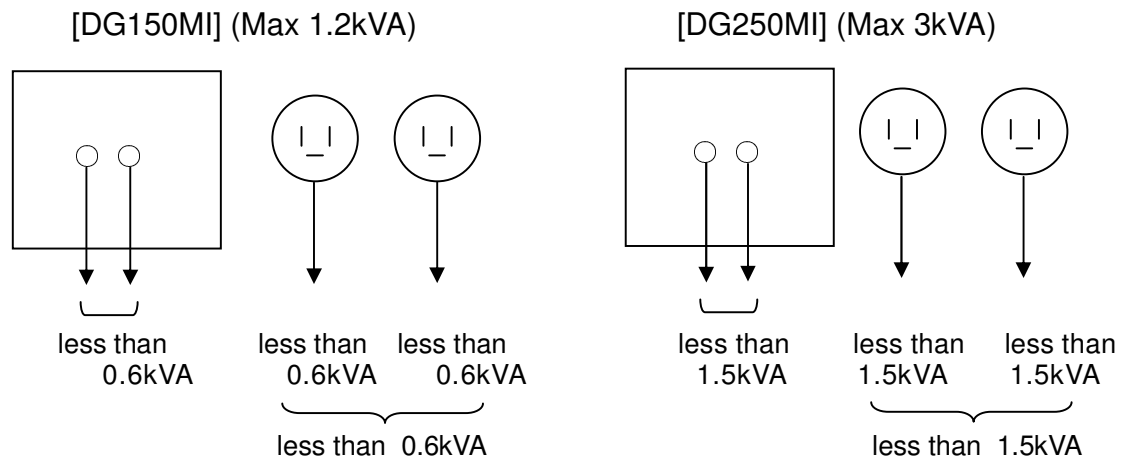
In the case of no use of 3-Phase output power, refer to the following drawings and charts.



7.2.2.2 400 / 440V

The terminal Voltage: 100V/110V at 50Hz/60Hz only

In the case of no use of 3-Phase output power, refer to the following drawing and chart.



7.3 Earth Leakage Relay and Grounding



Danger :Electrical Shock

- Ground the every earth grounding terminal to the earth as set out in the manual.
If even one no of all is unconnected by mistake or accident, it will be much more dangerous for human body than the –relay case, because leaking current inevitably goes through the body.
- Even though all the bonnets of the loads have been grounded to the earth, the earth grounding terminal and the outer bonnet (canopy) grounding terminal should be grounded to the earth.
- Grounding should be made after the engine is stopped.
- Whenever the earth leakage breaker relay is activated, you should always repair the leaking place first of all.

The generator is provided with the earth leakage breaker relay to detect any leakage produced due to such the trouble as insulation failure of the load while the generator is running and to cut off the circuit for protection against any accident such as electrical shock resulting from the trouble.

■The specification of the earth leakage relay;

- Rated Sensitive Current: 30mA (or below) (Grounding resistance: 500Ω or below)
- Sensitive time: Within 0.1 second

<Caution>

Different sensitivity relay is available to change. But, in the case, consult with our engineering Section, because the value each of grounding resistance and grounding condenser will be different accordingly. In the event bigger value sensitive relay (100, 200, 500mA, etc.) than 30mA will be used in the device, they are too high in value to prevent from electrical shock. Therefore, install each load with the 30mA (or below) relay separately.

The detailed information about sensitive current selection is prepared to give by the article No.151.2 In Earth Leakage Breaker – Selection of The Wiring Regulations issued by Japan Electric Association.

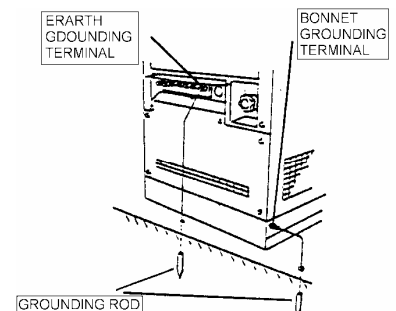
7.3.1 Grounding Work

The qualified electrician should perform the grounding of the following 3 points (500Ω or below).

- The earth neutral grounding terminal in the output terminal block
- The Outer Bonnet (Canopy) grounding terminal of the generator
- The Outer Bonnet of the load

<Caution>

In the event you cannot ground the generator to the earth, consult with the authorized distributor or our engineering section

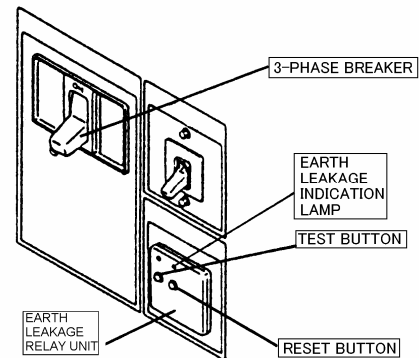


7.3.2 Operation Check

! Danger : Electrical Shock

Before turning the 3-Phase circuit breaker to ON Position, ensure that the breaker or the switch of loads are positioned to OFF.

Operate the 3-Phase circuit breaker, well-communicating with The electrician by the load side.



Before operating the generator, check always if the device can work.

- ① Ensure that the breakers and the switches of load(s) are positioned to OFF.
- ② Ensure that the 3-Phase circuit breaker and the 1-Phase circuit breaker are positioned to OFF.
- ③ Following the procedure in 「9-1 Initializing / Preparation」, start an engine.
- ④ Turn (Push-up) the 3-Phase circuit breaker (lever) to ON position.
- ⑤ Push the test button (red) in the earth leakage relay unit. When the button is pushed, the earth leakage indicating lamp turns ON and the 3-Phase circuit breaker is positioned in the middle between ON and OFF positions simultaneously, the device works normally.
- ⑥ Push the reset button. The earth leakage indicating lamp (red) turns OFF subsequently.
- ⑦ Turn (Push-down) the 3-Phase circuit breaker (lever) to OFF position.

In the event you cannot complete every step of the above procedure to the end, the device is out of order. Consult with our authorized distributor or our engineering section and ask to repair.

7.3.3 The earth leakage breaker relay has activated

In the event the earth leakage breaker relay has activated, the earth leakage indicating lamp Turns ON and the 3-Phase earth leakage breaker (lever) trips off to be positioned in the middle between ON and OFF positions.

In the above condition, even though you stop the engine once and start it again, the 3-Phase Circuit breaker (lever) does not restore to ON or OFF, and the reset button does not function, because the device keeps detecting current leakage.

Stop the engine promptly and find the leakage point to repair. After repairing the leakage point(s), proceed with the following restoration steps.

(In the case the earth leakage indicating lamp does not turn to ON simultaneously, the cause is Over-Load or Short-Circuit.)

- ① Push the reset button or stop the engine.
- ② Restore (Push-down) the 3-Phase circuit breaker (lever) and the 1-Phase circuit breaker (lever) to OFF position.

By the above procedure, you can reset the breakers to ON positions.

8 Initialization and pre-check



Danger :Electrical Shock · Injuries

Before performing any equipment check or maintenance, stop the engine, and remove the engine key.
A person performing the maintenance should always keep the key.



Caution :Fire · Burns

When checking engine, always stop the engine, and keep away from fire.
Wait until the engine cools down, before performing any checks.



Caution :Fire

Always wipe any drip of fuel or oil. Do not use this equipment when a leak is found.
Repair the equipment before use.

8.1 Checking Engine Oil

* Please refer to the user's manual for Engine separately

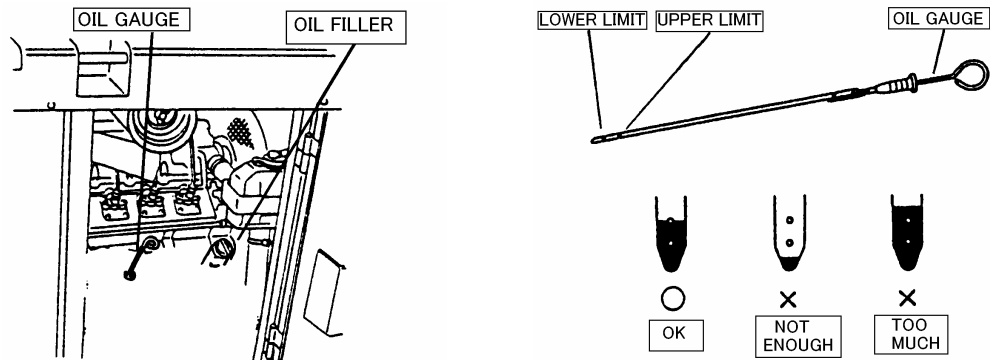
When checking for engine oil, be sure to keep the equipment leveled, and insert the oil gauge all the way.
Prior to starting the equipment, make sure to fill the engine oil to the MAX line through the oil filler.

<Caution>

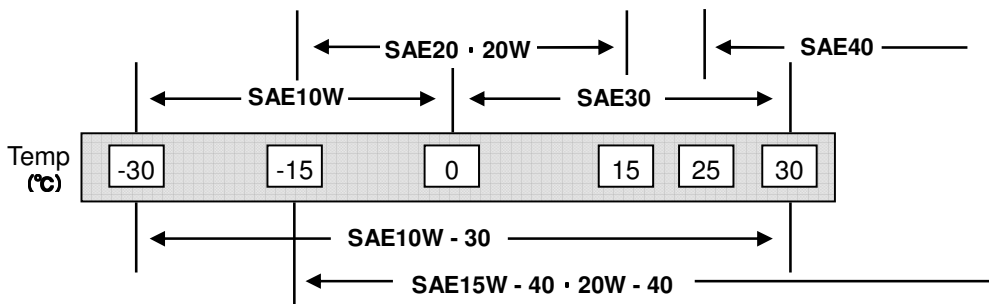
- If the equipment is not leveled, you cannot obtain accurate oil level.
- Do not overfill the engine oil. The excessive amount of engine oil may damage the engine.

8.1.1 Selecting proper engine oil Use the API class CD grade or higher.

8.1.2 Use the engine oil for Diesel engine with proper viscosity, based on the temperature (refer to the chart below).



○Viscosity and temperature



8.1.3 Engine Oil Capacity

(Unit : L)

Lubrication Oil (including the oil in filter)	
DG150MI	7.4 (0.4)
DG250MI	8.5 (0.4)

* Value in () shows the oil in filter

8.2 Checking Coolant / Water

* Also refer to the User's Manual for Engine

! Danger :Injuries

Before performing any equipment check or maintenance, stop the engine, and remove the engine key. A person performing the maintenance should always keep the key.



Caution :Burns

- Do not open the radiator cap while operating this equipment or immediately after stopping the equipment, to avoid sustaining burns from hot vapor.
- Do not touch the engine and muffler during operation and immediately after stopping the equipment, for the temperature can reach extremely high.

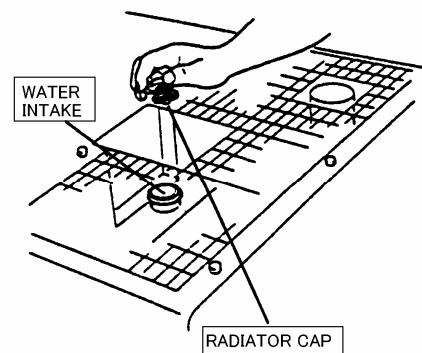
Check the radiator and coolant reservoir tank for water and add water in case of shortage.

8.2.1 Checking Radiator / Adding water

- ① Remove the radiator cap
- ② Fill up the radiator up to the top
- ③ Install the cap back and tighten

<Caution>

With respect to DG150MI, check and add water, after unscrewing the bolt holding the radiator cap.

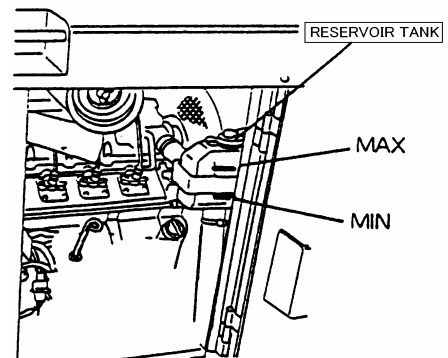


8.2.2 Checking Coolant reservoir tank / Adding coolant

- ① Check to see if the coolant level is between MIN and MAX line
- ② Fill up to the MAX line, if the coolant level is low

<Caution>

- Use soft water, such as tap water
- If the outside temperature is near freezing, use Long Life Coolant (LLC) (30% mixture LLC is used, when shipped from factory)
- Use same type of coolant with identical mixture ratio for the reservoir tank
- Mixture ratio of the coolant should be between 30 to 45%, depending on the outside temperature
- Replace LLC every 2 years or 400 hours



Mixture ratio (for reference only)

Ambient temperature (Celsius)	-15°C	-20°C	-30°C
Mixture ratio	30%	35%	45%

8.2.3 Coolant Capacity

(Unit : L)

Total Coolant Volume (including reservoir tank)	
DG150MI	7.4 (0.4)
DG250MI	8.5 (0.4)

* Value in () shows the reservoir tank's volume

8.3 Checking Fan Belt

* Also refer to the user's manual for Engine separately



Danger :Injuries

- Before performing any equipment check or maintenance, stop the engine, and remove the engine key. A person performing the maintenance should always keep the key.
- Close all doors and place locks during operating this equipment, to avoid injuries by unintentionally touching cooling fan and fan belt.

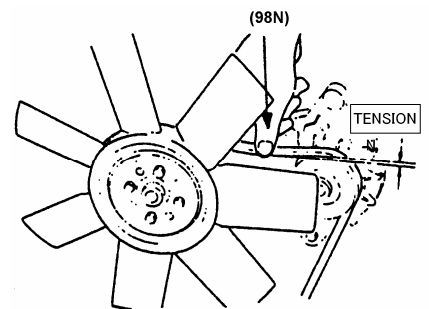


Caution :Burns

- Do not touch the engine and muffler during operation and immediately after stopping the equipment, for the temperature can reach extremely high.

8.3.1 Tension

Tension should be optimum when the fan belt has 8 to 12mm slacks, when applying finger pressure (about 98N{approximately 10kgf}) at midpoint between fan pulley and alternator pulley.



8.3.2 Condition

Check for any damage on the fan belt. Replace if necessary.

<Caution>

- Refer to the <User's manual for Engine> for adjusting and replacing of the fan belt.

8.4 Checking Fuel



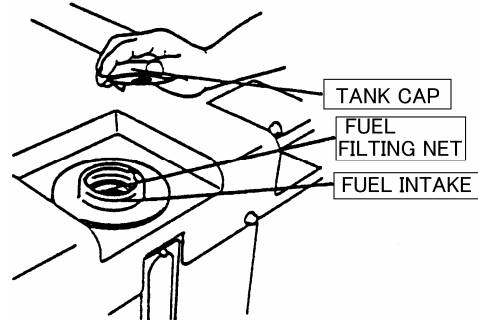
Caution :Fire

Always wipe any drip of Diesel fuel or oil. Do not use this equipment when a leak is found. Repair the equipment before use.

Check for the fuel level in the tank. Add if necessary.

<Caution>

- Use Diesel fuel, ASTM D975 No.2-D in the event ambient temperature reaches down to -5°C.
- Always use the Diesel fuel strainer
- Fill the fuel tank slightly less than the FULL tank,
- Fuel requirements:



NOTICE: The fuel injection pump, injector or other parts of the fuel system and engine can be damaged if you use any fuel or fuel additive other than those specifically recommended by Isuzu.

Such damage is not our responsibility, and is not covered by the Warranty. To help avoid fuel system or engine damage, please heed the following:

- Some service stations mix used engine oil with diesel fuel. Some manufacturers of large diesel engines allow this; however, for your diesel engine, do not use the diesel fuel which has been contaminated with engine oil. Besides causing engine damage, such fuel can also affect emission control. Before using any diesel fuel, check with the service station operator to see if the fuel has been mixed with engine oil.
- Do not use any fuel additive. At the time this manual was printed, no other fuel additive was recommended. (See your authorized dealer to find out if this has changed.)

The engine is designed to use either Number 1-D or No. 2-D diesel fuel. However, for better fuel economy, use No. 2-D diesel fuel whenever possible. At temperatures less than -7 °C (20° F), No.2-D fuel may pose operating problems (see “Cold Weather Operation” which follows). At colder temperatures, use No.1-D fuel (if available) or use a “winterized” Number 2-D (a blend of No. 1-D and No. 2-D). This blended fuel is usually called No. 2-D also, but can be used in colder temperatures than No.2-D fuel which has not been “winterized”. Check with the service station operator to be sure you can get the properly blended fuel. Note that diesel fuel may foam during a fill-up. This can cause the automatic pump nozzle to shut off even though your tank is not full.

Notice: Do not use home heating oil or gasoline in your diesel engine; either may cause engine damage.

8.5 Checking Fuel, Engine Oil, and Water leakage



Caution :Fire

Do not use this equipment when a leak is found. Repair the equipment before use.

Be sure to check for any fuel leak at the hose connection, and oil and coolant leak by opening side doors.

8.6 Checking Battery



Caution :Injuries to eyes and skin

Battery fluid contains diluted sulfuric acid. Avoid contact with eyes, skin or on clothing.

If the acid comes in contact, especially with eyes, flush with a lot of water, and contact your physician immediately.



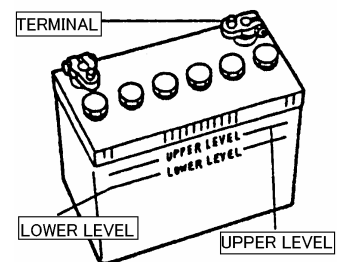
Caution :Fire

Battery may emit some combustible gas, so keep it away from fire and sparks.

- ① Check the fluid level. If the level is near or lower than the MIN level, add distilled water until the fluid level reaches the MAX limit.
- ② Make sure that the battery cables are firmly secured to the posts. Tighten the clamps if necessary.

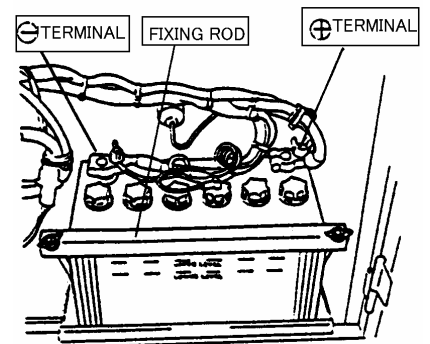
<Caution>

Check the hydrometer of the battery fluid. If it falls below 1.23, the battery requires recharging. Please call our authorized distributor or our engineering section.



■ Replacing the battery

- ① Remove the clamp and cable from **negative (-)** post from the battery. (always remove negative side first)
- ② Remove the hold-down clamp from the battery.
- ③ Remove the clamp and cable from **positive (+)** post from the battery.
- ④ Remove the battery from the seat
* Reinstall the new battery in the reverse order (always install the cable to the positive (+) post of the new battery first.



<Caution>

Make sure that the removed cable does not come in contact with the battery post.

9 Operation

9.1 Initializing / preparation



Danger :Suffocation from exhaust fume

Exhaust fume from the engine contains many elements harmful to human.

Do not operate this equipment in poorly ventilated area, such as inside a room or in a tunnel .



Caution :Suffocation from exhaust fume

Do not point the exhaust fume toward pedestrians or building.



Caution :Fire

- Temperature around muffler and exhaust can get extremely high.
Keep any inflammable items (such as fuel, gas, paint, etc.) away from the equipment.
- Always operate this equipment on flat surface and, at least 1 meter away from any objects (wall, box, etc.).



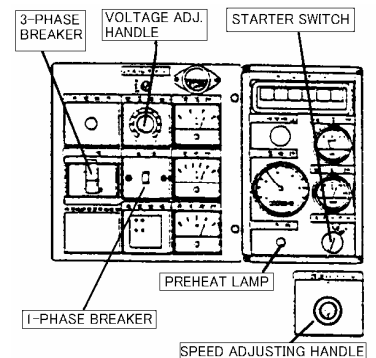
Caution :Injuries

- Always place the equipment on a flat and stable surface, to keep the equipment from sliding.
- When starting the engine, turn off the connected equipment and set the circuit breaker to OFF position.

- ① Turn the circuit breaker for single-phase and 3-phase on the control panel to OFF position
- ② Press the speed control knob all the way in, while pressing the release button.
- ③ Turn the starter switch to <START/PREHEAT> position, and start the engine.
- ④ Start the engine promptly, when the pre-heating status lamp comes OFF.

<Caution>

- Preheating time may vary from 1 to 5 seconds, depending on the water temperature.
 - Do not drive the starter motor for more than 10 seconds successively.
 - If you need to restart, wait at least 30 seconds before the retry.
- ⑤ Release the starter switch, as soon as the engine is started
 - ⑥ Keep the engine idle for at least 10 minutes
 - ⑦ Pull the speed control knob all the way out, while pressing the release button.



And then adjust the speed by speed control knob and adjust to the No-load revolution.

		No-load revolution
50 Hz	Operation	1575 min ⁻¹ (52.5 Hz)
60 Hz	Operation	1890 min ⁻¹ (63.0 Hz)

<Caution>

By adjusting the speed to the above revolutions, the frequency will be 50Hz or 60Hz.

- ⑧ Lock the Speed Control handle with locknut

<Caution>

Ensure that the speed control handle is surely locked with locknut, otherwise the frequency (engine revolution) may fluctuate.

- ⑨ Adjust to the required voltage by adjusting Voltage regulator.
⑩ Turn the circuit breaker to ON position to send power to the load side.



Danger : Electrical Shock • Injuries

- Before turning the circuit breaker to ON position to send power to the load side, always ensure that any circuit breaker and switch of loads are positioned to OFF.
In the case the generator and the load are away from each other, proceed with the above steps, communicating well with the other person by the load in order to prevent from accident.

9.2 During Operation

9.2.1 Post startup check

- Make sure that all meters (gauges) and displays are working properly (refer to 5. Equipment)
- Check for any unusual vibration or noise
- Check for any unusual color from the exhaust. Under normal condition, the exhaust fume has no color or light bluish color.

<Caution>

If finding out abnormality, consult with the distributor or our engineering section in order to repair, without using the machine.

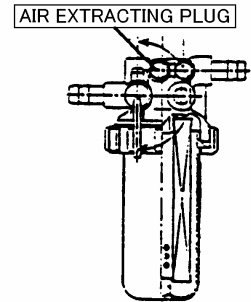
9.2.2 Adjustment During operation

- Make minor adjustment to voltage and speed using the Speed Control Knob and Voltage Regulator, by monitoring Tachometer, frequency meter, and voltage meter

- **Vacuuming the air out of the fuelling system in event of no fuel**

* Refer to the <User's manual for Engine> separately.

This generator is equipped with automatic vacuuming air feature. Thus if the engine stops due to running out of fuel, follow the next steps to vacuum the air out.



- ① Add fuel to the fuel tank
- ② Loosen the air extracting plug to remove the air out. Tighten the plug, ensuring all the air out.
- ③ Turn the starter switch to <Operating/Preheating> position. It will take approximately 10 seconds to vacuum the air out.

<Caution>

Ensure that all the air is completely extracted from fuel line, by pushing the speed control knob all the way out and start the engine.

In the case air is in the fuel line, the engine speed is unstable, and proceed with the vacuuming steps again.

9.3 Stopping the Generator

- ① Turn the switch and the circuit breaker for the load equipment to OFF
- ② Turn the circuit breaker for single-phase and 3-phase on the control panel to OFF position
- ③ Loosen the locknut for the Speed Control knob
- ④ Press the Speed Control knob all the way in, while pressing Release Button, and let the engine idle at 1000min^{-1}
- ⑤ Keep the engine idle (cooling down) for at least 3 minutes
- ⑥ Turn the starter switch to STOP position

9.4 Protection Features

This generator is equipped with automatic shutdown feature and display of the location of alarm, in event of any alarm situation. In event of the automatic shutdown or alarm lamp flashing, turn off the engine and investigate the alarm.

Protection Feature List

No.	Symptoms	Action			Cause
		Circuit Breaker OFF	Automatic Engine Shutoff	Alarm Lamp Flash	
1	High Coolant temperature	--	○	○	Engine coolant temperature is too high (default at 110 degrees Celsius)
2	Oil pressure drop	--	○	○	Engine oil pressure dropped (default at 0.98x100kPa) (1.0kgf/cm ²)
3	Insufficient battery charge	--	--	○	When the battery can no longer hold charge
4 ※	Dirty filter or clogged	--	--	○	When an air filter becomes dirty and clogged
5 ※	Low battery fluid	--	--	○	When the battery fluid is low
6 ※	Low fuel	--	--	○	When the fuel falls below recommended level
7	Current leaks to the earth	○	--	○	When current leaks to the earth (Only 3-Phase)
8	Overload	○	--	--	When the circuit overloads

※ indicates the feature incorporated with DG250MI

○ indicates the automatic feature in the both generators

9.5 Connecting to External Fuel Tank



Caution

:Fire

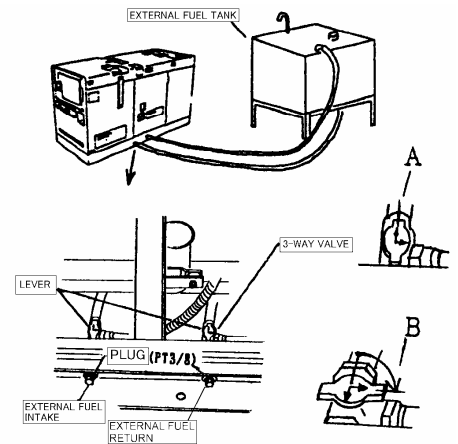
- Always stop the engine, when working on the fuel line.
- Always wipe any drip of Diesel fuel or oil. Do not use this equipment when a leak is found. Repair the equipment before use.
- Ensure that there is no fuel leakage on the fuel line after the fuel line working finished.

- ① Turn the lever for 3-way valve to A position
- ② Disconnect the P/T-3/8 plugs from both the external fuel intake and an external fuel return, and connect the hoses from an external fuel tank, as shown below.

- ③ Turn the lever for 3-way valve to B position.
- ④ Vacuum out the air from connected hoses. This will allow the use of the fuel from an external fuel tank.

<Caution>

- To vacuum out the air from the fuel line, refer to <9.2 During Operation> section.
- Use always oil-proof hose in 8-10mm inner diameter as connecting hose.
- The fuel level in the external fuel tank should be 0 to 3m higher than the bottom of the generator.
- To avoid any leaks from the external fuel intake and an external fuel return ports, always turn the lever for 3-way valve to A position.
- Use extreme caution when connecting the hoses. If the lever position is not set properly, the fuel may leak from either the built-in fuel tank or an external fuel tank.



10 Maintenance



Danger :Electrical Shock • Injuries

- Before performing any equipment check or maintenance, stop the engine, and remove the engine key. A person performing the maintenance should always keep the key.



Caution :Fire • Burns

- When checking engine, always stop the engine, and keep away from fire. Wait until the engine cools down, before performing any checks.



Caution :Fire

- Always wipe any drip of gasoline or oil. Do not use this equipment when a leak is found. Repair the equipment before use.

To optimize the use of this generator, we recommend the periodical equipment checks and maintenance, based on following maintenance matrix. Use the hour meter as a guide for the operating time.

<Caution>

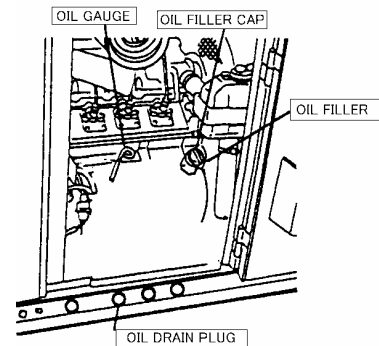
- The authorized technicians should perform all maintenance work, except for the pre-startup checks.
- Request for the maintenance items with ● mark to the authorized dealer or our engineering section.
- This chart only covers the simple checks and maintenance for the engine. For more detailed guide, please refer to the User's Manual for the engine.
- Always use our genuine replacement parts.

Description	Startup check	Every 200hrs	Every 400hrs	Every 500hrs	Every 1000hrs
Engine Side					
Clean each parts / tightening	○				
Engine oil checks / add oil	○				
Engine oil change (1 st time at 50 hr mark)	○	○			
Oil Filter change (1 st time at 50 hr mark)	○		○		
Coolant level check / add coolant	○				
Exhaust color check	○				
Coolant change			○ or 2 yr.		
Drain water from fuel filter or replace		○ Clean		○ Replace	
Drain excess water and sediments in the water separator	○				
Drain water from fuel tank		○			
Clean inside fuel tank					●
Leak check (fuel, oil, and coolant)	○				
Replacing fuel hose					● or 1 yr.
Clean or replace air cleaner element		○ Clean		○ Replace	
Battery fluid level check	○				
Battery hydrometer check				○	
Fan belt check	○				
Radiator Flush Cleaning				●	
Check and adjust engine valve clearance					●
Compression check					●
Fuel injection nozzle check			●		
Fuel injection timing check					●
Generator side					
Various meter and alarm lamps check	○				
Operation check of earth leakage relay	○				
Grounding resistance check	○				
Insulation test		○			

10.1 Oil Change

First time	50 hour mark
From second time	Every 200 hours

- ① Remove Oil Filler cap
- ② Loosen the engine oil drain plug and allow the oil to drain fully
- ③ Reinstall the drain plug
- ④ Add oil from oil filler and fill up to the MAX level. You should check the oil level on the dipstick
- ⑤ Reinstall the filler cap hand-tight



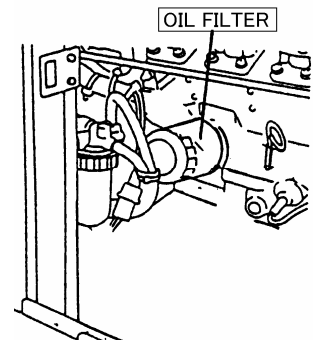
<Caution>

For the types of engine oil to use and volume to replace, refer to <8-1 Checking Engine Oil>

10.2 Oil Filter Change

First time	50 hour mark
From second time	Every 400 hours

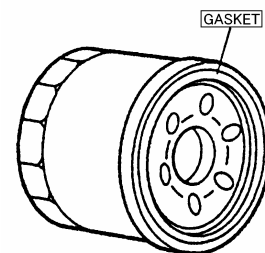
- ① Drain the engine oil fully, as described in 10.1
- ② Loosen and remove the oil filter, using an oil filter wrench
- ③ Smear a little engine oil on the rubber gasket of the new oil filter
- ④ Screw the new filter into place and tighten it by hand until the gasket contacts the seat. Then, give it additional 2/3 turn to seat the filter, using an oil filter wrench
- ⑤ Add oil and install filler cap



<Caution>

- If an oil filter wrench is not available, contact our authorized distributor or our engineering section..
- Oil filter:

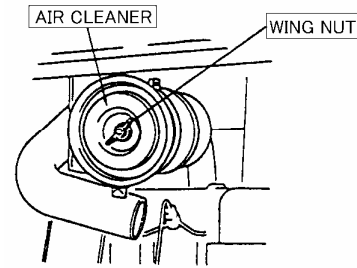
Model	ISUZU Part No.
DG150MI	8944567412
DG250MI	8944567411



10.3 Cleaning / Changing Air Filter Element

Clean	Every 200 hours
Replace	Every 500 hours

- ① Unscrew the wingnut and remove the filter element
 - ② Clean or replace the filter element, and reinstall it in reverse order
- ※With respect to DG150MI, unfasten clip in cleaner cap and remove before unscrewing the wingnut.



<Caution>

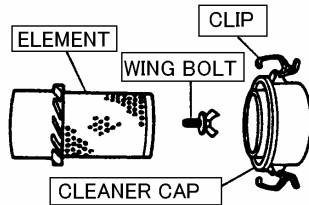
- Clean more frequently, if used in dusty environment

Air filter element:

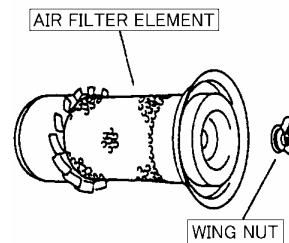
Model	ISUZU Part No.
DG150MI	8970423170
DG250MI	8971683060

- If the element has dried contaminants, it may be cleaned by blowing compressed air from the inside
- If the element has carbon or grease, it should be replaced with new element.

[DG250MI]



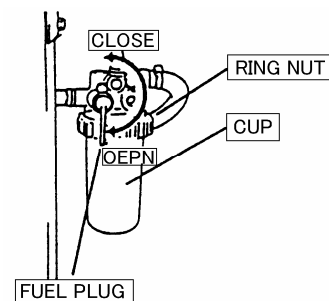
[DG150MI]



10.4 Cleaning / Changing Fuel Filter

Check	Prior to Operation
Clean	Every 200 hours
Replace	Every 500 hours

- ① Turn fuel line valve lever to CLOSE
- ② Unscrew the ringnut by turning it counterclockwise, and remove the cup and fuel filter element
- ③ Discard any dust or water inside the cup, and clean the filter element by blowing compressed air (or replace, if necessary)
(When you are replacing the filter element, be sure to replace an O-ring as well)



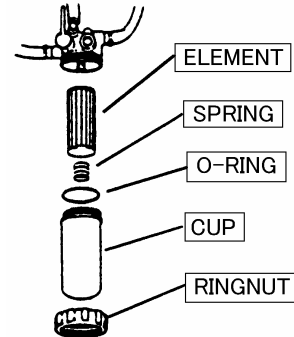
④ Reassemble it back

※ The fuel strainer in DG150MI has the water separating feature as well.

When the float (red) in the strainer comes up by 20mm from the bottom, drain the water

<Caution>

- Be sure to check for any contaminants on the O-ring, whenever reinstalling the cup
- Open the fuel line valve to OPEN after assembling, and check for any leak
- When you replace the filter element, be sure to replace an O-ring as well



Model	ISUZU Part No.
DG150MI	8943602540
DG250MI	8970713480

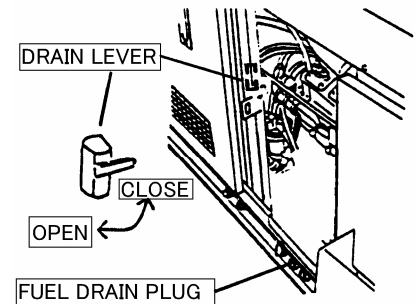
10.5 Draining Water from Fuel Tank

Drain water	Every 200 hours
-------------	-----------------

- ① Unscrew the Fuel drain plug and turn the drain lever on the tank to OPEN
- ② Reinstall the drain plug, after draining water fully and restore the drain lever to CLOSE

<Caution>

Ensure always that the drain lever on the tank is kept CLOSE after draining water



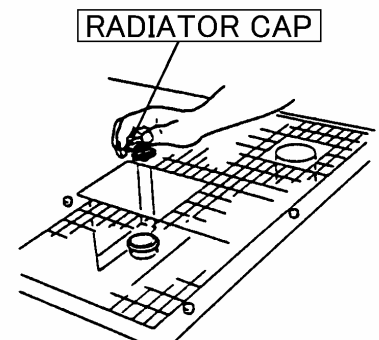
10.6 Changing Coolant / Water

Replace	Every 2 years or 400 hours
---------	----------------------------

- ① Remove the radiator cap
- ② Loosen the water drain plug
- ③ After draining all the water, reinstall the water drain plug
- ④ Loosen the fastener that holds the reservoir tank, and drain all the water

<Caution>

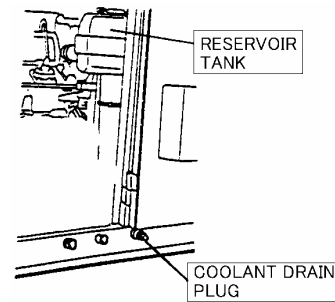
With respect to DG150MI, check and add water, after unscrewing the bolt holding the radiator cap cover



- ⑤ Install the reservoir tank back, and fill the coolant/water to the MAX level.
- ⑥ Fill the radiator with coolant/water to the top
- ⑦ Reinstall the radiator cap

<Caution>

For the types of engine oil to use, refer to
<8-2 Checking Coolant/Water>



11 Long-term Storage



Danger :Electrical Shock • Injuries

- Before performing any equipment check or maintenance, stop the engine, and remove the engine key. A person performing the maintenance should always keep the key.



Caution :Fire • Burns

- Temperature around muffler and exhaust can get extremely high. Keep any inflammable items (such as fuel, gas, paint, etc.) away from the equipment.
- When checking engine, always stop the engine, and keep away from fire. Wait until the engine cools down, before performing any checks.
- Always wipe any drip of Diesel fuel or oil. Do not use this equipment when a leak is found. Repair the equipment before use.

11.1 Storage Procedures

If the generator will not be used for more than two months, perform the following maintenance and storage procedures.

- ① Remove battery
- ② Change engine oil
- ③ Drain fuel from fuel tank and fuel filter
- ④ Clean all parts, cover the generator, and keep it in the storage, away from dust and humidity.

<Caution>

- Recharge the removed battery once a month.
- Refer to the user's manual for the care of the engine.

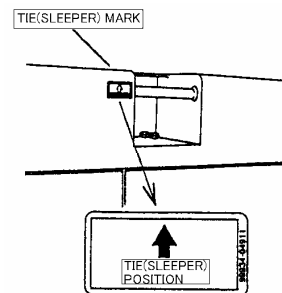
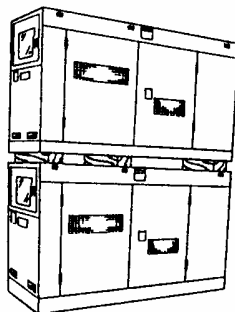
11.2 Stacking



Danger : Injuries

If you have to stack two generators in warehouse, always proceed with the following steps.

- Ensure that there is no dent on bonnet, losing bolt or no bolt in the generators.
- Always place the generators on a flat and stable surface, to keep the equipment from sliding, And to be durable for the total weight.
- When lifting the equipment, always use a lift hook.
- Always place ties (sleepers) on the marked points in the lower generator firstly and then stack the upper generator on it. All the ties should be the same size (dimension) and longer than the width of the lower generator.
- Do not stack more than 2 units. The lower generator should be bigger than the upper generator in size and weight.
- Do not operate the stacking/stacked generators.



12 Troubleshooting



Danger :Electrical Shock

- Do not operate the equipment, if the equipment or you are wet.
Before performing any equipment check or maintenance, stop the engine.



Caution :Injuries

- When performing equipment check and maintenance, always stop the engine.



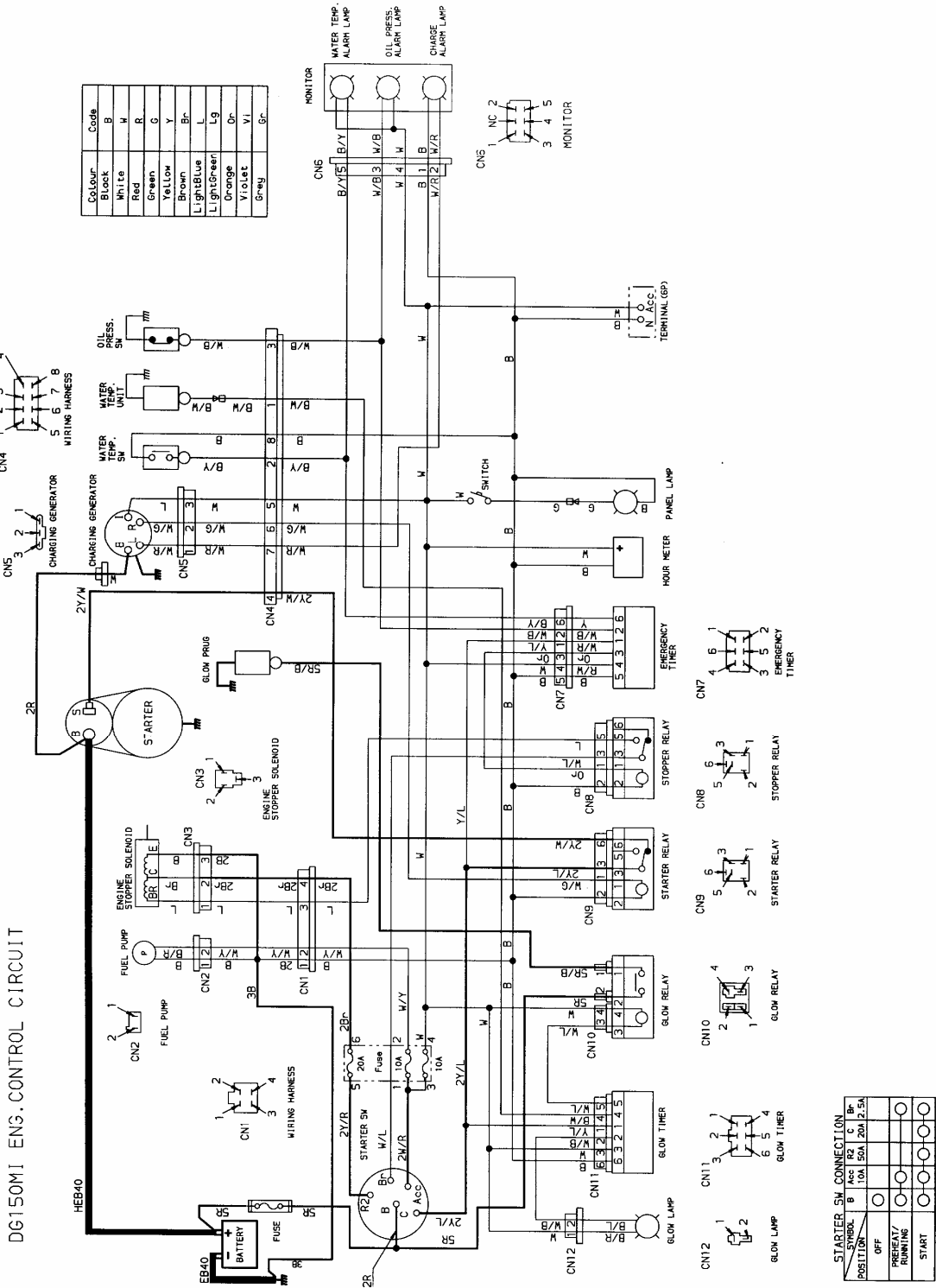
Caution :Fire • Burns

- Battery may emit some combustible gas, so keep it away from fire and sparks.
- Temperature around muffler and exhaust can get extremely high. Keep any inflammable items (such as fuel, gas, paint, etc.) away from the equipment.
- When checking engine oil or changing oil, always stop the engine, and wait until the engine cools down. If you open either the oil gauge or the oil filler cap during operation, hot oil may cause some injury.

Follow the guideline below, when performing any troubleshooting. If you cannot resolve the problems by this troubleshooting guide, contact the authorized distributor or our engineering section to request the repair.

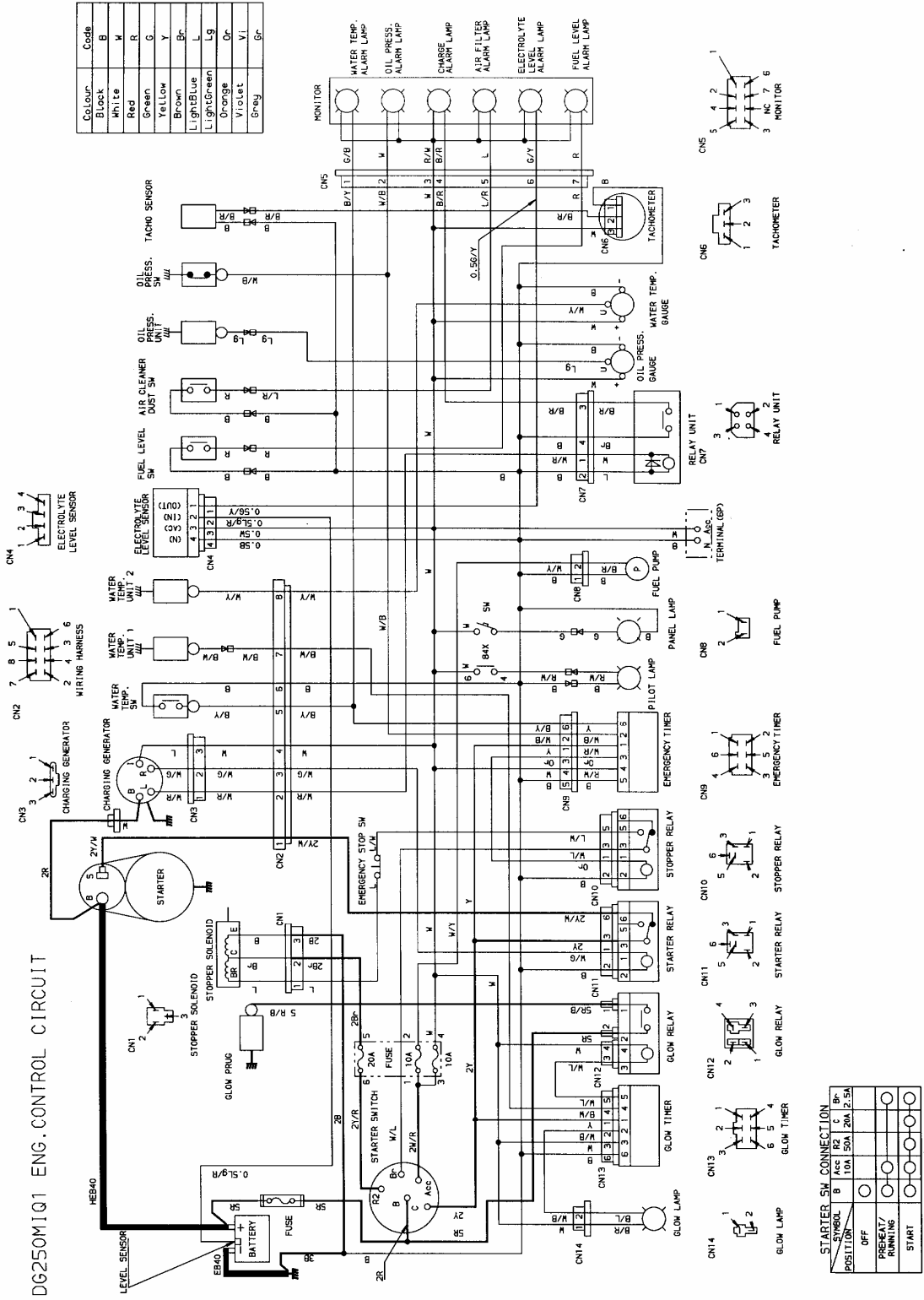
Symptoms	Possible Cause	Corrective Actions
Starter motor does not start	<ol style="list-style-type: none"> 1. Weak battery 2. Dead battery 	<ol style="list-style-type: none"> 1. Recharge battery 2. Replace battery
Engine does not start	<ol style="list-style-type: none"> 1. Fuel lever to CLOSE 2. Insufficient fuel 3. Water contaminants in fuel 	<ol style="list-style-type: none"> 1. Fuel lever to OPEN 1. Replenish fuel 2. Drain water or clean fuel tank, fuel filter, and water sedimenter
Engine starts, but stalls immediately	<ol style="list-style-type: none"> 1. Insufficient oil 2. Insufficient coolant/water 3. Air in the fuel system 	<ol style="list-style-type: none"> 1. Replenish oil 2. Replenish water 3. Vacuum out air
No AC output	<ol style="list-style-type: none"> 1. Circuit breaker is OFF 	<ol style="list-style-type: none"> 1. Turn circuit breaker to ON
Weak AC output	<ol style="list-style-type: none"> 1. Wrong frequency 2. Connected equipment's amperage exceeds the rated value(Overload) 3. Multiple equipment being connected simultaneously 4. Low SPEED 	<ol style="list-style-type: none"> 1. Adjust the frequency to match the connected equipment 2. Use equipment within the rated amperage 3. Connect load to generator one by one 4. Increase SPEED
Voltage sharply drops when connected machines start up	<ol style="list-style-type: none"> 1. Uneven load balance connection 	<ol style="list-style-type: none"> 1. Change connection
Cannot turn circuit breaker to ON position	<ol style="list-style-type: none"> 1. Circuit breaker is not completely turned to OFF position 2. Short-circuit on load side 3. Earth leakage relay activated 	<ol style="list-style-type: none"> 1. Push circuit breaker to OFF position 2. Check load side 3. Repair the leakage point
Black or white smoke is coming out of exhaust pipe successively.	<ol style="list-style-type: none"> 1. Overloading 	<ol style="list-style-type: none"> 1. Reduce the load

14 Engine Wiring Diagram



D6250MIQ1 ENG. CONTROL CIRCUIT

Colour	Code
Black	B
White	M
Red	R
Green	G
Yellow	Y
Brown	Br
Light Blue	L
Light Green	Lg
Orange	Or
Violet	V1
Grey	Gr



SYMBOL	B	Acc	R2	c	B+
POSITION	10A	50A	20A	2.5A	
PREHEAT/ RUNNING	○	○	○	○	○
START	○	○	○	○	○

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