

**ISO 9001**  
CERTIFIED

# shindaiwa®

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## OPERATOR'S MANUAL

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SOUND PROOF DIESEL  
ENGINE  
GENERATOR/WELDER

## DGW200MS/UK

Water-Cooled  
4-Cycle Diesel Engine

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

DGW200MS/UK  
X750803-4402

## Introduction

Thank you for purchasing Shindaiwa Sound Proof Diesel Engine Welder/Generator

- This user manual has been 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 include this manual, if the equipment is to be on-sold or rented out.
- Please store this manual near the equipment for easy reference.

■ Following convention will be used throughout the manual to indicate the degree of cautions.

 <b>Danger</b>	<b>Can cause serious injuries or death.</b>
 <b>Caution</b>	<b>Can cause minor injuries or damage to the equipment or other properties.</b>
<b>&lt;Caution&gt;</b>	<b>Other types of caution</b>

- Even some of the items noted in 『 **Caution**』 may lead to serious injuries. Please read all item and follow all the safety guidelines.
- The following statement refers to the noise level data contained in the EC Declaration of Conformity attached to this manual

“The figures quoted are emission levels and are not necessarily safe working levels.

Whilst there is a correlation between the emission and exposure levels, this cannot be used reliably to determine whether or not further precautions are required. Factors that influence the actual level of exposure of work-force include the characteristics of the work place, the other source of noise etc. i.e. the number of machines and other adjacent processes, and the length of time for which an operator is exposed to the noise. This information, however, will enable the user of the machine to make a better evaluation of the hazard and risk”

## 1. Safety Guidelines

### **Danger: Suffocation from exhaust fumes**

- Exhaust fumes from the engine contain many elements harmful to humans. Do not operate this equipment in poorly ventilated areas, such as inside a room or in a tunnel.

### **Danger: Electric Shock**

- Close and lock all equipment doors during operation.
- Do not touch the output terminals during operation.
- Do not insert metal objects into the receptacles.
- Do not touch wiring or electric parts inside the equipment during operation.
- Ground every grounding terminal to the earth as set out in the manual.
- Even though all the terminals of the loads have been grounded to the earth, the canopy grounding terminal should be grounded to the earth.
- Before connecting or disconnecting a plug from output receptacle, always turn the circuit breaker to OFF position.
- Before connecting or disconnecting a welding cable from output terminals, stop the engine, and remove the engine 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: Burns**

- Do not open the radiator cap while operating this equipment or immediately after stopping the equipment, to avoid the possibility of sustaining burns from hot steam or water.

### **Danger: Injuries**

- Close and lock all equipment doors during operation of this equipment, to avoid injuries by unintentionally touching cooling fan and fan belt.

### **Caution: Suffocation from exhaust fumes**

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

### **Caution: Suffocation from welding fumes**

- Be sure to wear a fume proof mask during operation, because welding fumes contains poisonous gas and dust. Pay attention to the airflow direction and sufficient ventilation also in order to prevent from inhaling the fumes.

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

- Be sure to wear spark protection glasses, long-sleeve shirts, gloves, etc. in order to protect eyes and skin from harmful sparks in welding.
- Battery fluid contains diluted sulphuric 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 seek medical attention immediately.

### **Caution: Electric Shock**

- Do not throw water onto the equipment nor operate it in the rain.
- This machine is rated to IP23.
- Do not touch high-voltage wiring during operation.

**⚠ Caution : Explosion**

- Do not use the equipment or charge the battery, if the battery fluid level is lower than the LOWER level.
- The battery may emit combustible gas, so keep it away from fire and sparks.

**⚠ Caution: Fire**

- The equipment uses Diesel fuel. When inspecting the equipment or refueling, always stop the engine and keep away from fire. Always wait until the engine cools down before refueling.
- Always wipe any drip of fuel or lubrication oil. Do not use this equipment if a leak is found. Repair the leak 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.
- Keep any inflammable items and combustible items away from the welding area, as welding creates hot sparks.
- Always operate this equipment on flat surface with at least 1 metre clearance from all objects.
- Do not connect AC output to any indoor wiring.
- Always wait until the equipment cools down, before covering for storage.
- Do not allow children near the equipment. Keep children at a safe distance from the machine at all times.

**⚠ Caution: Burns**

- Do not touch the engine and muffler during operation or immediately after stopping the equipment, as the temperature will be extremely high.
- When checking engine oil or changing oil, always stop the engine, and wait until the engine cools down.
- Be sure to wear leather gloves, apron, shoe covers, eye protection glasses/mask, safety shoes, safety cap, and long sleeve shirts, to protect from sparks.
- Do not open the side panel during operation or immediately after stopping the equipment, because some parts/components (flexible tube, resistors etc.) can reach very high temperatures inside the equipment.

**⚠ Caution: Injuries**

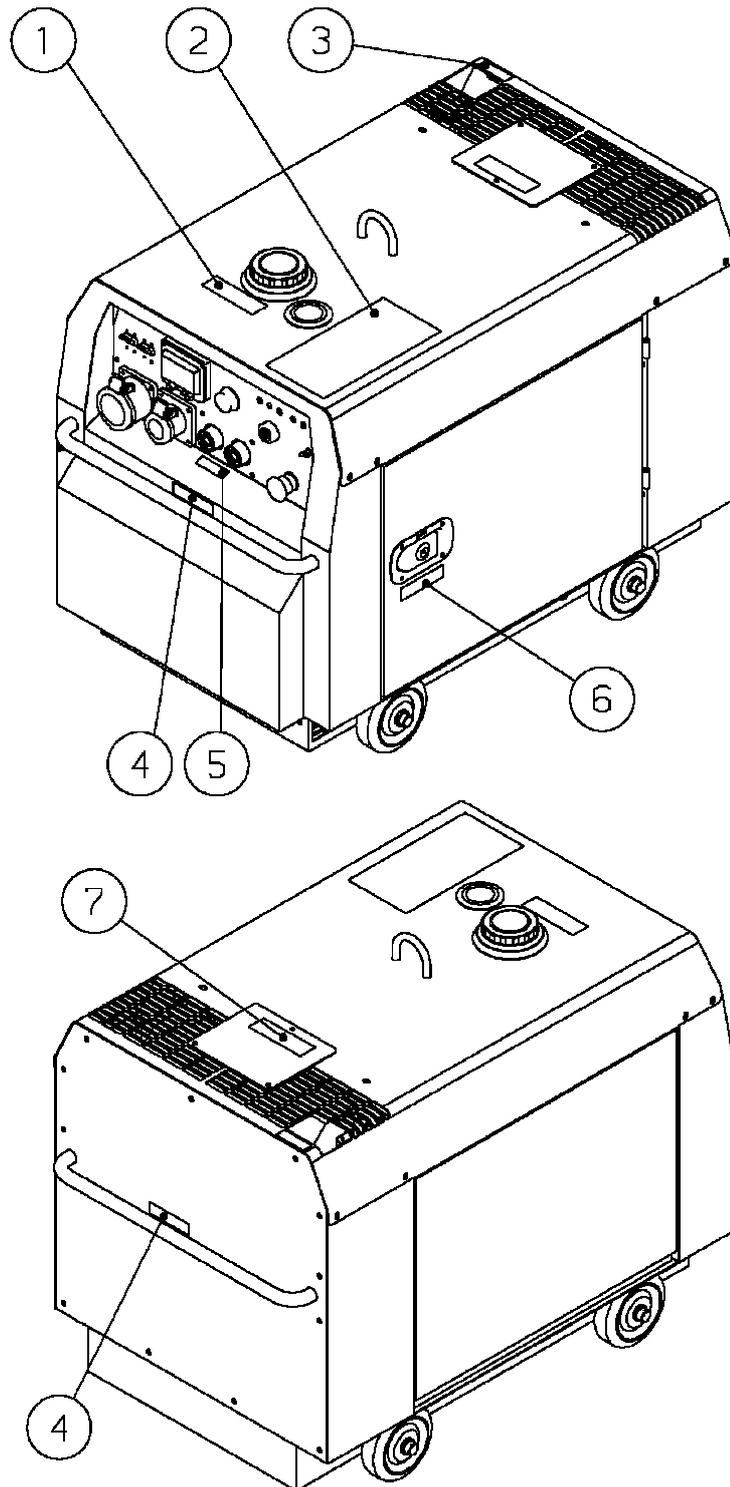
- When lifting the equipment, always use the top-mounted lifting lug. **Do not lift using the positioning handles.**
- Always use appropriate lifting gear and secure adequately during transportation.
- Always place the equipment on a flat and stable surface, and fix the wheels using the brake, to prevent equipment movement
- When starting the engine, turn off all connected equipment and set the AC output switch to the OFF position.
- Do not move the equipment during operation.
- When performing equipment checks and maintenance, always stop the engine.
- Do not operate the equipment, if equipment is faulty or if there are missing parts.

■ Location of Warning labels

When the warning labels become unreadable or damaged, place new labels on the appropriate locations, as specified in the following figure.

When ordering the label, use the following part numbers.

- ① Fire (No. X505-004880)
- ② Suffocation from exhaust fumes (No. X505-006400)
- ③ Hot surface (No. X505-006420)
- ④ Positioning handle (No. X505-006430)
- ⑤ Electric shock (No. X505-004930)
- ⑥ Injury (No. X505-004940)
- ⑦ Burns (No. X505-006410)



## 2. Specifications

Model		DGW200MS/UK
Generating Method		Rotating Field, Synchronous AC Generator
Welding Generator	Rated Current (A)	170 / 190
	Duty Cycle (%)	50
	Rated Speed (min <sup>-1</sup> )	3000 / 3600
	No Load Voltage (V)	MAX 80
	Current Adj. Range (A)	60 – 180 / 50 - 200
	Welding Rod (Φ )	2.0 - 4.0
AC Generator	Rated Frequency (Hz)	50 / 60
	Rated Speed (min <sup>-1</sup> )	3000 / 3600
	Phase	1-Phase
	Rated Voltage (V)	110 CTE
	Power Factor	1.0
	Rated Current (A)	27.2 / 30.0
	Rated Output (kVA)	3.0 / 3.3
	Rating	Continuous
Engine	Model	Kubota Z482-B
	Type	Water-Cooled 4-Cycle Diesel Engine
	Displacement (L)	0.479
	Rated Output (kW/min <sup>-1</sup> )	7.8 / 3000 or 9.2 / 3600
	Fuel	ASTM No.2 Diesel Fuel or Equivalent
	Lubricant Oil	API Class CD or Higher
	Lubrication Oil Volume (L)	2.05 (Effective 0.7)
	Cooling Water Volume (L)	2.8 (Sub Tank Capacity 0.6 L included)
	Starting Method	Starter Motor
Battery		44B19L
Fuel Tank Capacity (L)		15
Dimension	Length (mm)	998
	Width (mm)	603
	Height (mm)	773
Dry Weight (kg)		222

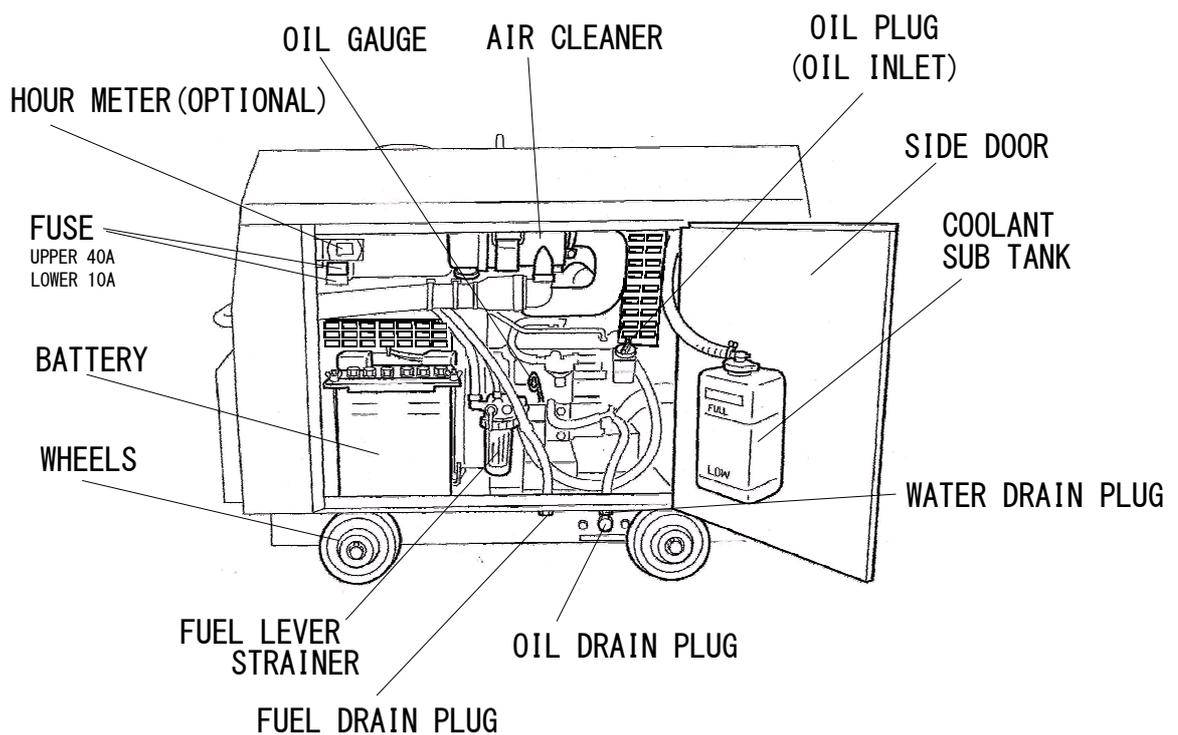
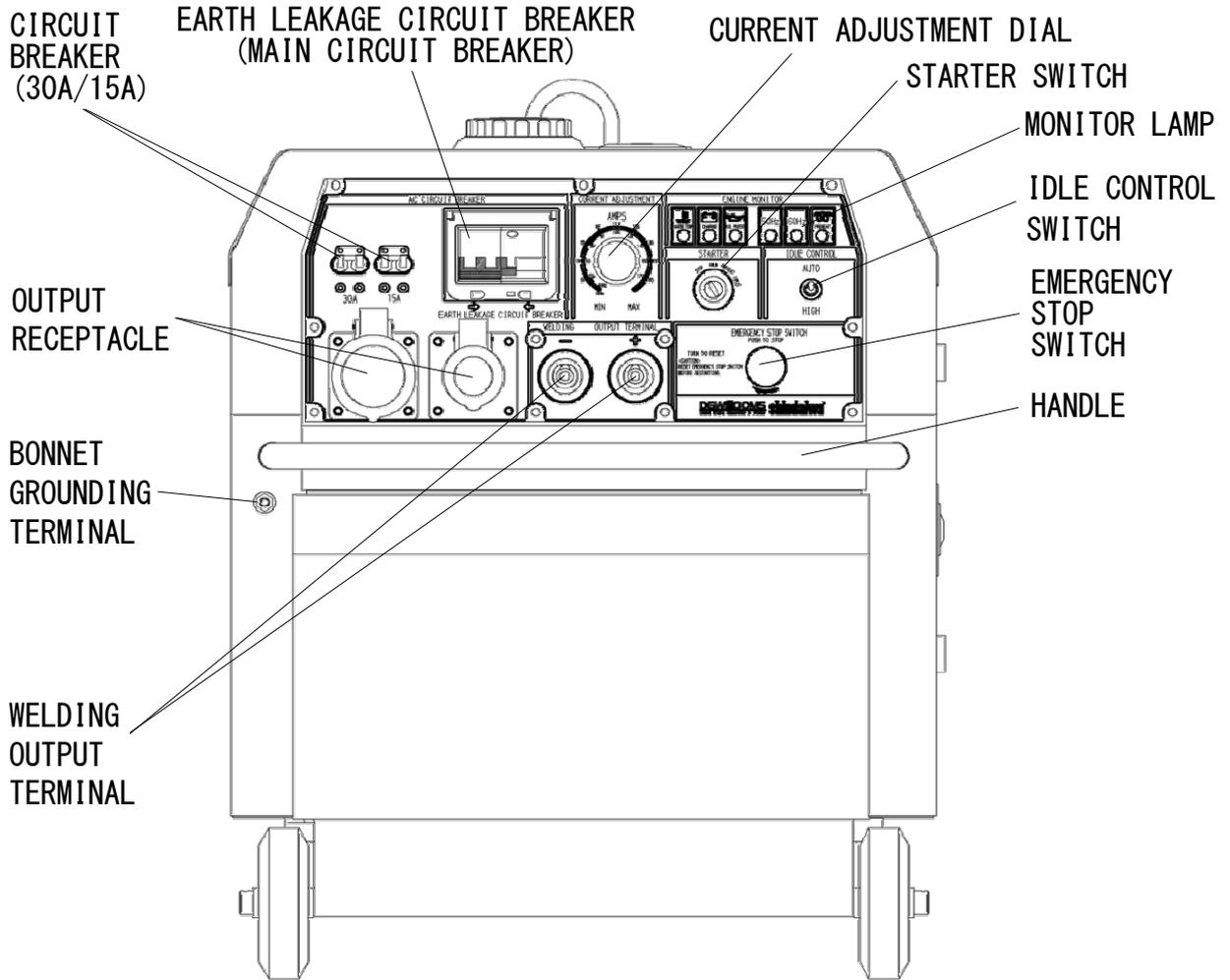
### 3. Use

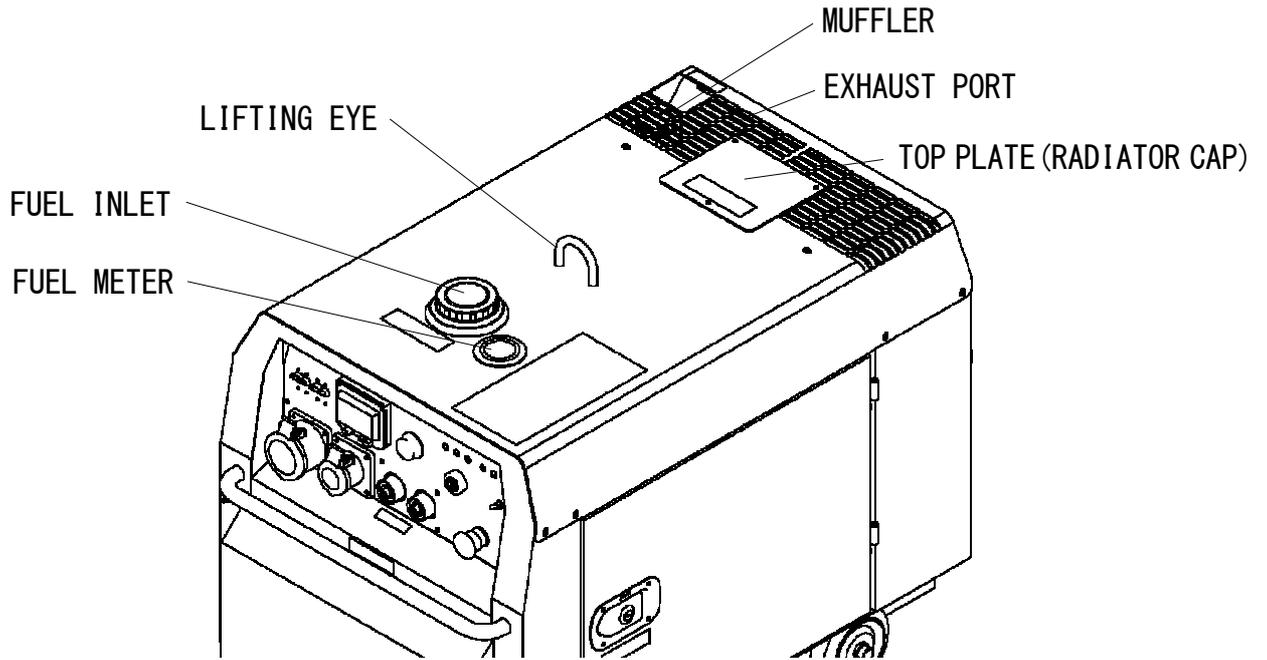
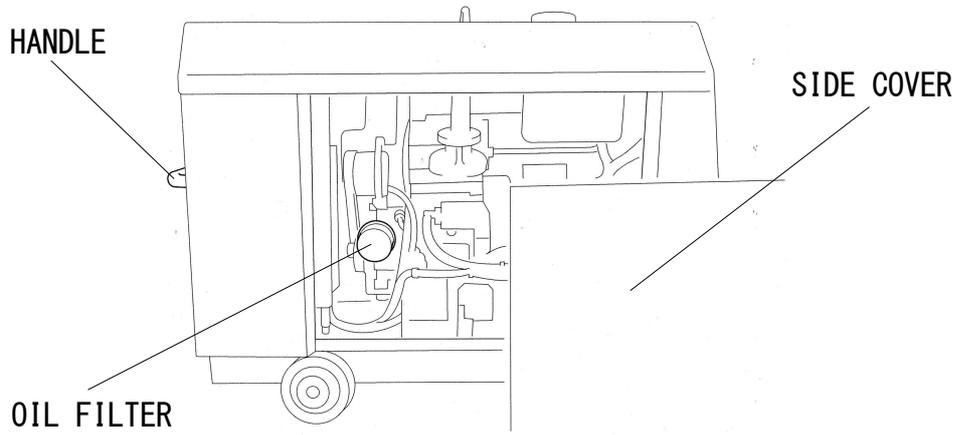
- Arc Welding
- Power Source for electric tools
- Power Source for lights
- 

#### **Caution : Damage to the equipment or other properties**

- Consult with your dealer or authorized distributor when utilizing this equipment around devices with microcomputer control or ultra-precision items, which are very sensitive to voltage fluctuation.
- Keep the equipment away from those devices to avoid influence from electromagnetic noise.
- Consult with hospital or medical equipment companies before using this equipment on medical apparatus.
- It is recommended you follow this instruction manual strictly, to avoid unnecessary accidents, repairs, and damage.

**4. Parts**

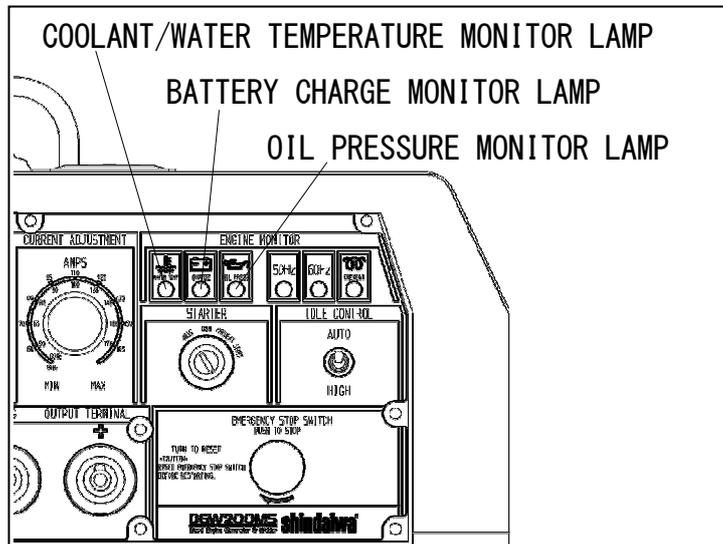




**5. Equipment**

**5-1. Monitor Lamp**

This equipment is fitted with Oil Pressure, Battery Charge and Water/Coolant Temperature monitoring.



When the machine is started by the starter switch from STOP to RUN under normal condition, Oil Pressure and Battery Lamps will flash, and then the lamps will go OFF, immediately after the engine starts.

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

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

### (1) Oil Pressure Monitor Lamp

#### **Danger: Injuries**

- Close and lock all equipment doors 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, always stop the engine, and wait until the engine cools down.

When the engine oil pressure drops during operation, the oil pressure monitor 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 sensor cannot detect the degradation of engine oil. Please check the engine oil periodically, and change if needed.  
(Refer to 『11. Checking Maintenance』 )

### (2) Battery Charge Monitor Lamp

When the battery is unable to be recharged during operation, the battery charge monitor lamp will flash and the automatic shutoff will be engaged.

In the event this occurs, consult with the dealer or authorized distributor.

<Caution>

- The battery charge monitor cannot detect the degradation of the battery nor the battery fluid level. Check the battery fluid level periodically.  
(Refer to 『6-5. Checking Battery』 )

### (3) Coolant/Water Temperature Monitor Lamp

#### **Danger: Injuries**

- Close and lock all doors during operation of 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 steams or water.
- Do not touch the engine or muffler during operation or immediately after stopping the equipment, as the temperature will be extremely high.

When the water temperature rises abnormally, the coolant/water temperature monitor lamp will flash, and the automatic shutoff will be engaged.

If this occurs, check the coolant/water reservoir tank, and replenish if needed.

(Refer to 『 6-2. Checking Coolant / Water 』 )

If the water level is normal, there may be a possibility of overloading. Always use the equipment within the rated duty cycle and output power.

<Caution>

- In the event coolant/water level is too low to detect, the sensor does not monitor temperature. Be sure to check the level in the sub tank before operation.

### 5-2. Idle Control

The Idle Control feature is to set the engine speed low automatically (after approximately 8 seconds) for the purpose of reducing noise and fuel consumption, whenever welding operation or generating operation is not performed.

The engine automatically moves to high speed when welding or electric supply starts.

#### **Caution: Damage to the equipment or other property**

- Always turn the Idle Control switch to HIGH if the load incorporates an electromagnetic switch.

<Caution>

- If the load connected is less than 0.5amps the Idle Control feature may not function. In this case, switch the idle control switch HIGH.
- When welding operation or electric supply is used intermittently, turn the switch to HIGH.

### 5-3. Circuit Breaker

#### **Danger: Injuries**

- Be sure to turn off the power switch on the load when switching the circuit breaker to ON.

In case the electric load exceeds the rated output (overload), the circuit breaker will be activated in order to break the circuit. If the load trips during operation, check the breaker first. If you find the breaker position is at OFF, reset it by the following procedures.

- ① Turn off all the power switches in the loads.
- ② Return the breaker to ON.

<Caution>

- Refer to 『 9-2. Output Limitation 』 and be careful not to use overloaded (over current)

#### 5-4. Earth Leakage Circuit Breaker and Grounding

##### ⚠ **Danger: Electric Shock**

- Ground the grounding terminal to the earth as set out in the manual.
- Even though all the terminals of the loads have been grounded to the earth, the canopy grounding terminal should be grounded to the earth.
- Grounding should be made after the engine is stopped.
- If the earth leakage relay activates, you should always find out and repair the fault first.

The equipment is provided with an earth leakage relay in the Circuit Breaker to detect any leakage due to faults like insulation failure of the load while the generator is running.

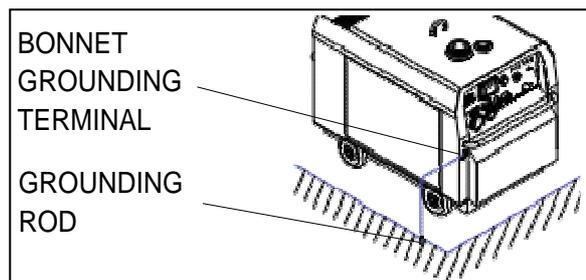
The specifications of the earth leakage relay:

- Rated Sensitive Current: 30mA (or below)  
(Grounding resistance: 500Ω or below)

##### (1) Grounding Work

A qualified electrician should perform the grounding work of the following 2 points(500Ω or below).

- The Outer canopy of this equipment (Canopy grounding terminal)
- The earth point on the load



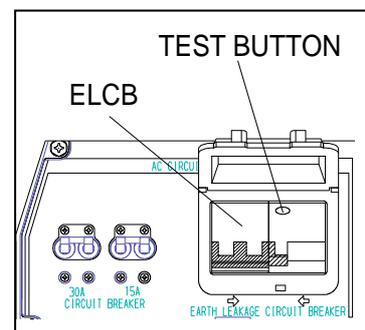
<Caution>

- In the event you cannot ground the generator to the earth, consult with the authorized distributor or our dealer.

##### (2) Operation Check

Before operating the equipment, check that the device works correctly as shown in the following procedure.

- ① Start engine after turning the Idle Control Switch to [HIGH].
- ② Lift the ELCB (lever) to [ON] position.
- ③ Push the test button. The device is found to be normal when the ELCB (lever) trips to [OFF].



- In the event you cannot complete all steps in the above procedure to the end, the device is out of order. Consult with our authorized distributor or our dealer to repair.

##### (3) The Earth Leakage Relay has activated

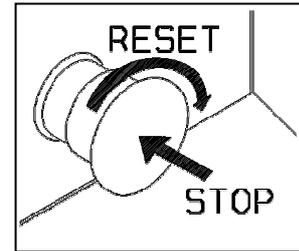
##### ⚠ **Caution: Electric Shock / Injuries**

- Be sure to disconnect all the loads to the equipment when turning the breakers ON again, after the earth leakage relay has activated.

When the earth leakage relay has activated, the ELCB (lever) turns to [OFF].  
In the case, stop the engine promptly and find the leakage fault and repair.  
After repairing, reset the ELCB (lever) to [ON].

#### 5-5. Emergency Stop Switch

The Emergency Stop Switch stops the engine in an emergency. By pushing the switch, the engine stops. Ensure you reset the Starter Switch to [STOP] and reset the Emergency Stop Switch, turning clockwise after use.



<Caution>

Always stop the engine with starter Key unless in case of an emergency stop switch.

## 6. Initialization and Pre-check

### **⚠ Caution : Fire · Burns · Injuries**

- When checking the engine, always stop the engine, and wait until the engine cools down, before performing any checks.

### 6-1. Checking Engine Oil

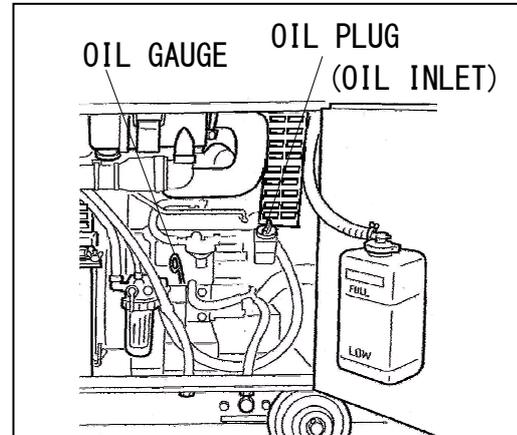
When checking for engine oil, be sure to keep the equipment level, and insert the oil gauge all the way in.

Prior to starting the equipment, make sure to fill the engine oil to the UPPER line through the engine oil plug.

Oil Volume: about 2.0L (Total)

Effective Oil Volume: approx. 0.7L

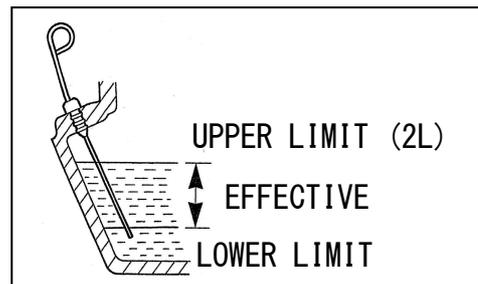
(from the lower limit to higher limit)



<Caution>

- If the equipment is not level, you cannot obtain an accurate oil level.
- Do not overfill (over UPPER line) the engine oil. The excessive volume of engine oil may damage the engine.

- Selecting correct engine oil  
Use engine oil for Diesel engines of the correct viscosity, in compliance with the ambient temperature (Refer to the chart).



<Caution>

- Use the API class CD or higher.

Viscosity and Temperature

Temperature	Over +20°C	+10~+20°C	-10~+40°C
Viscosity	SAE30	SAE20	SAE10W/30

### 6-2. Checking Coolant / Water

#### **⚠ Danger: Injuries**

- Close and lock all equipment doors during operation of this equipment, to avoid injuries by unintentionally touching cooling fan and fan belt.
- Do not open the radiator cap while operating this equipment or immediately after stopping the equipment, to avoid burns from hot steam or water.

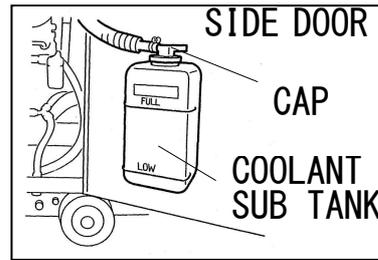
#### **⚠ Caution: Burns**

- Do not touch the engine or muffler during operation or immediately after stopping the equipment, as the temperature will be extremely high.

Check to see if the coolant/water level is between FULL and LOW levels in the sub tank. If the coolant/water is below the LOW level, fill the tank and the radiator accordingly.

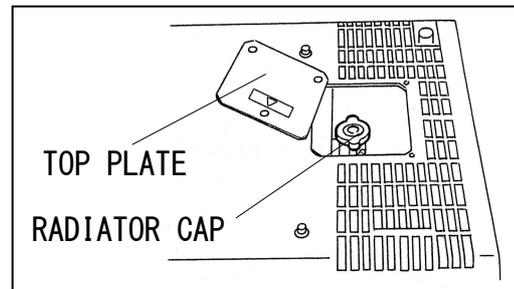
**(1) Filling to the Sub Tank**

- ① Remove the sub tank cap.
- ② Fill up the sub tank to the FULL level.
- ③ Install the cap.



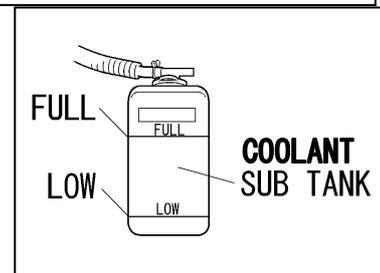
**(2) Filling to the Radiator**

- ① Remove the top plate.
- ② Remove the radiator cap.
- ③ Fill up the radiator up to the top.
- ④ Install the cap back and tighten.
- ⑤ Reinstall the top plate.



<Caution>

- Use soft water.
- If the ambient temperature is near freezing, use Long Life Coolant(LLC) (30% mixture LLC is filled when shipped from factory)
- Mixture ratio of the coolant should be 30%-45%, depending on the ambient temperature.
- Use the same LLC to the sub tank.
- Replace LLC at every 2 year or 2,000 hours.



LLC Maximum Mixture Ratio

Lowest Ambient Temperature	-15°C	-20°C	-30°C
Max Mix. Ratio	30%	35%	45%

**6-3. Checking Fuel**

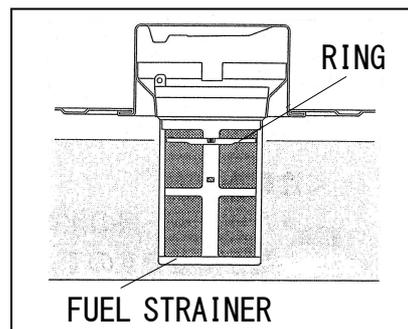
**⚠ Caution: Fire**

- Always wipe away any drips of fuel. 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 as low as -5°C.
- At temperature less than -7°C, No.2 D fuel may pose operating problem. At colder temperature, use No.1-D fuel (if available) or use "winterized" No.2-D (a blend of No.1-D and No.2-D).
- Always use the fuel strainer.
- Fill the fuel tank slightly less than the ring level.



## 6-4. 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 any leakage for fuel, oil and coolant/water at the hose connections by opening side doors. Whenever checking any fuel leakage, turn the fuel lever [OPEN] and be sure to close the fuel lever if a leak is found.

## 6-5. Checking Battery

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

- Battery fluid contains diluted sulphuric acid. Avoid contact with eyes, skin or clothing. If the acid comes in contact, especially with eyes, flush with a lot of water, and seek medical attention immediately.

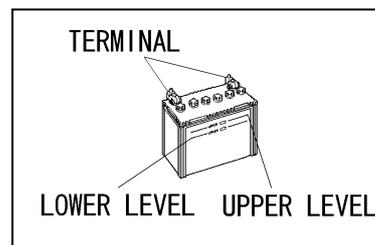
### **⚠ Caution: Explosion**

- Do not use the equipment or charge the battery, when the battery fluid level is lower than the LOWER level.
- The battery may emit combustible gas, so keep it away from fire and sparks.

### **⚠ 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 LOWER level, add distilled water until the fluid level reaches UPPER level.
- ② Make sure that the battery cables are firmly secured to the posts. Tighten the clamps if necessary.

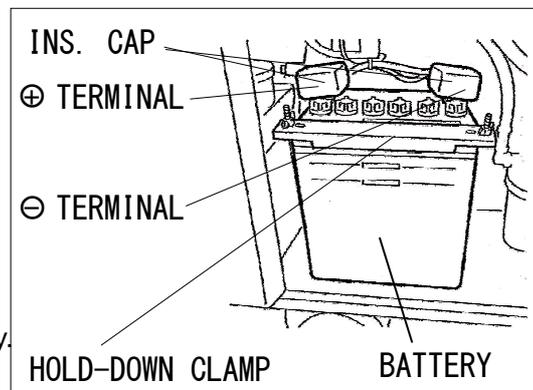


<Caution>

- Use a hydrometer to check the battery fluid. If specific gravity falls below 1.23, the battery requires recharging.

### ■ Replacing battery

- ① Remove the clamp and cable from negative (-) post in the battery. (Remove always negative side first)
- ② Remove the hold-down clamp from the battery.
- ③ Remove the clamp and cable from the positive (+) post on the battery.
- ④ Remove the battery from the seat.



- ※ Reinstall a new battery in the reverse order. (Always install the cable to the positive (+) post first.)

<Caution>

- Use the following battery.  
44B19L

## 7. Operation

### ⚠ Danger: Suffocation from exhaust fume

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

### ⚠ Caution: Suffocation from exhaust fume

- Do not point the exhaust outlets 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 metre clearance from any objects (wall, box, etc.)

### ⚠ Caution: Injuries

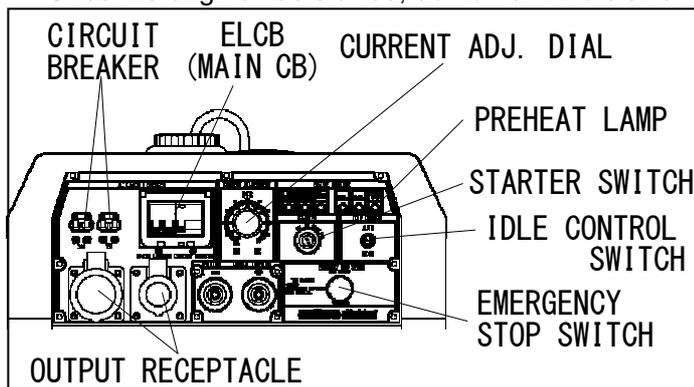
- Always place the equipment on flat and stable surface, to keep the equipment from sliding. Be sure to lock the wheels for the wheeled models.
- When starting the engine, turn off the connected equipment and set the circuit breaker to OFF position.

### 7-1. Start up

- ① Turn the circuit breakers (MAIN CB, 15A, and 30A) to OFF.
- ② Turn the fuel lever to OPEN.
- ③ Turn the Idle Control switch to AUTO.
- ④ Ensure the Emergency Stop Switch is positioned to release.
- ⑤ When the ambient temperature is below 5°C, turn the starter switch to PREHEAT. The lamp goes off when preheating has finished in about 5 seconds.
- ⑥ Turn the starter switch to START and then the engine starts by the starter motor.
- ⑦ Release the starter switch, as soon as the engine is started.
- ⑧ Keep the engine idling for around 5 minutes.

<Caution>

- Do not turn the starter motor for more than 15 seconds successively.
- If you need to restart, wait for 30 seconds or more before retry.
- Once the engine has started, do not turn the starter switch to START.



## Restart after stopping due to fuel shortage

This equipment is equipped with a self bleeding system. Therefore, even though the engine stops due to low fuel, you can restart the engine easily by the following steps.

- ① Turn the starter switch to STOP.
- ② Fill the fuel.
- ③ Turn the Idle Control switch to AUTO.
- ④ Turn the starter switch to RUN (Operation).
- ⑤ Turn the starter switch to START and drive the starter motor for about 10 seconds.
- ⑥ Release the starter switch, as soon as the engine is started.
- ⑦ Wait for about 1 minute to bleed the air out of the system.  
(The engine speed becomes stable when the air is extracted.)

### <Caution>

- Do not turn the starter motor for more than 15 seconds successively.
- If you need to restart, wait for 30 seconds or more before retry.
- Once the engine has started, do not turn the starter switch to START.
- Keep the Idle Control switch at AUTO until the air is completely extracted (until the engine speed becomes stable).

## 7-2. Stopping

- ① Push-down the breakers (MAIN CB, 15A, 30A) to OFF.
- ② Turn the Idle Control switch to AUTO.
- ③ Keep the engine idling (cooling down) for about 5 minutes.
- ④ Turn the starter switch to STOP.
- ⑤ After the engine stops, turn the fuel lever to CLOSE.

### <Caution>

- If the engine does not stop in spite of turning the starter switch to STOP, turn the fuel lever to CLOSE, the engine will stop in a few minutes.  
In this case, consult with our authorized distributor or our dealer.
- Do not attempt to turn to [STOP] position while actual welding or utilizing AC power source, it may cause the serious damage on the unit.

## 7-3. Emergency Stopping

An Emergency Stop feature is incorporated in the equipment.

Push the Emergency Stop Switch in case of an emergency or equipment abnormality during operation.

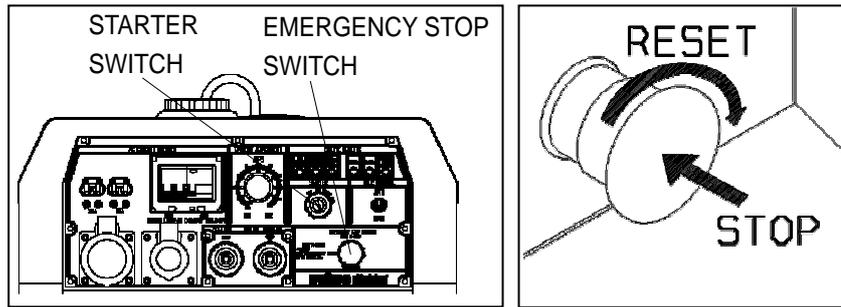
- ① Push the Emergency Stop Switch to stop engine in an emergency.

### <Caution>

- Be sure to return the Starter Switch to [STOP] after the engine stops.
  - Never hit the Emergency Stop Switch by any tools such as a hammer.
  - Never use the Emergency Stop Switch except in an emergency.
  - Turn the Fuel Lever on Fuel Strainer to [CLOSE] to stop in case the Emergency Stop Switch does not function.
- ② Turn the Emergency Stop Switch to arrow mark (clockwise) to release.

<Caution>

- Always stop the engine with starter Key unless you need to shut off using the emergency stop button.
- Be sure to re-start the engine after releasing the Emergency Stop feature.



## 8. Welding Operation

### 8-1. Selection – Welding Cable

Select the cable with correct gauge, based on the allowable amperage and distance, per the table shown below.

The welding capacity is reduced if too small a gauge cable is used.

<Caution>

- Welding cables should be used unwound.
- When the welding cables are used wrapped the welding capacity is reduced.

Proper size of cable (Unit: mm<sup>2</sup>)

Return Length \ Welding Current	20m	30m	40m	60m	80m	100m
200A	22	30	30	50	60	80
150A	22	22	22	38	50	60
100A or below	22	22	22	22	30	38

### 8-2. Polarity

There are two welding output terminals, 『+』 and 『-』.

Select the polarity according to the operation, referring to the table below.

<Caution>

- Follow the instructions of the welding rods, for the correct polarity.

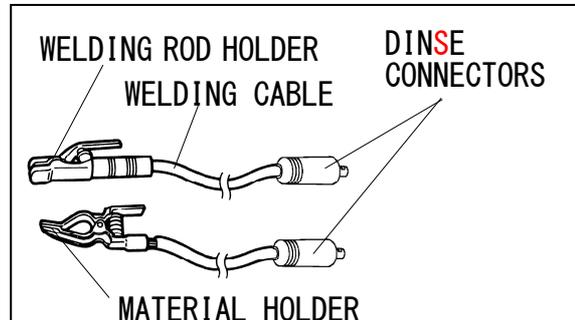
	Application	Connection
Normal Polarity	General Welding, such as Construction	Plus to the Earth (Material) Minus to holder (Rod)
Reverse Polarity	Thin Plate, Build-Up Welding, Stainless Steel	Plus to holder (Rod) Minus to the Earth (Material)

### 8-3. Connection – Welding Cable

#### **⚠ Danger: Electric Shock**

- Before connecting or disconnecting a welding cable from welding output terminals, stop the engine, and remove the engine key. The person performing this task should always keep the key.

- ① Stop the engine.
- ② Connect a welding cable to the DINSE connectors, a welding rod holder and a material holder.



#### <Caution>

- Always fit the correct size DINSE connectors.  
( Recommended parts : DIX SK 35 or DIX SK 50 or DIX SK 70)
- Ensure the welding cables connections are made correctly.
- Be sure to connect the cable to welding output terminals securely. Otherwise, welding output terminals may burn out by heat caused by poor connections.
- Do not use a cable without the DINSE connectors. If you use a cable with the insulation peeled off partly, to bind to an output terminal, the output terminal may burn out by the heat caused by poor connections and a bare part of the cable may touch the bonnet and short-circuit.

### 8-4. Duty Cycle

Duty cycle means the welding time ratio for 10 minutes. The duty cycle of the equipment is 50%, namely, the welding time is 5 minutes or less in continuous 10 minutes. Be sure to take 5 minutes breaks after 5 minutes of welding.

#### <Caution>

- The equipment may become damaged due to overheating, if welding for more than 5 successive minutes or a short break period.

This machine produces drooping characteristics to EN60974-1

## 8-5. Welding

### ⚠ Caution: Suffocation from welding fumes

- Be sure to wear a fume proof mask in operation, because welding fumes contain poisonous gas and dust. Pay attention to the airflow direction and ensure sufficient ventilation also in order to prevent from inhaling the fumes.

### ⚠ Caution: Injuries to eyes and skin

- Be sure to wear spark protection glasses (Refer to the table below) , long-sleeve shirts, gloves, etc. in order to protect eyes and skin from harmful sparks during welding.

Light Shielding Standard Glass (Japan Industrial Standard)

Light Shielding Degree No.	7	8	9	10	11	12	13
Welding Current (A)	30-75		76-200		201-400		

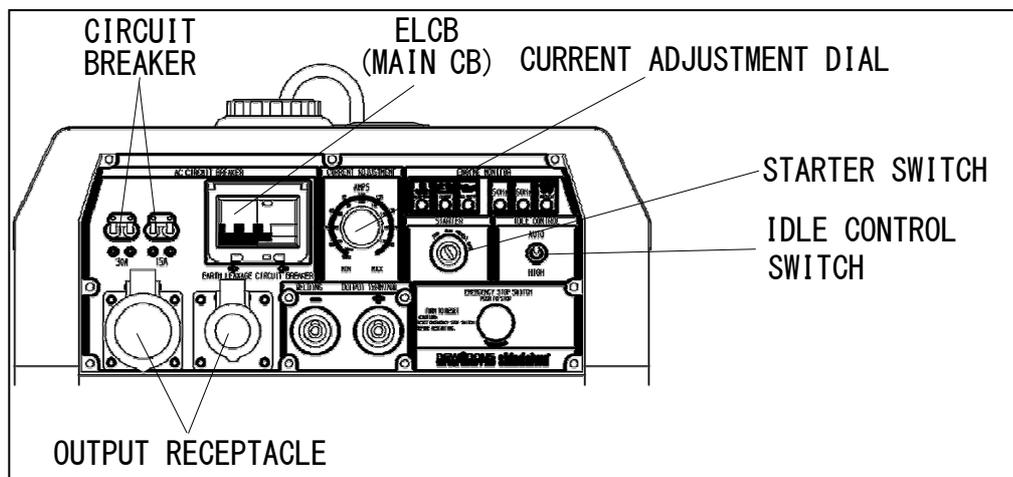
### ⚠ Caution : Fire

- Keep any flammable items and easily burning items away from the place in which welding, because welding splashes hot spatters.

### ⚠ Caution : Burns

- Be sure to wear leather gloves, apron, shoe covers, eye protection glasses (mask), safety shoes, safety cap and long sleeve shirts, because welding creates hot sparks.

After engine has started (Refer to 『 7-1. Start up 』), operate as per the following procedures.



- ① Turn the Idle Control switch AUTO.
- ② Set the current amperage by the Current Adjustment Dial.

### <Caution>

- The values on the Current Adjustment Dial are for reference only. The Cable length or the ambient temperature each affects the value.

## 9. Generator Operation

### ⚠ Danger: Electric Shock

- Do not operate the equipment, if the equipment or you are wet.

### ⚠ Caution: Injuries

- Before connecting or disconnecting a load cable from output terminals, always turn the circuit breaker to [OFF] position.
- Be sure to use the frequency designated in the load.  
(Refer to 『 5-2. Throttle 』)

### ⚠ Caution: Damage to the equipment or other properties

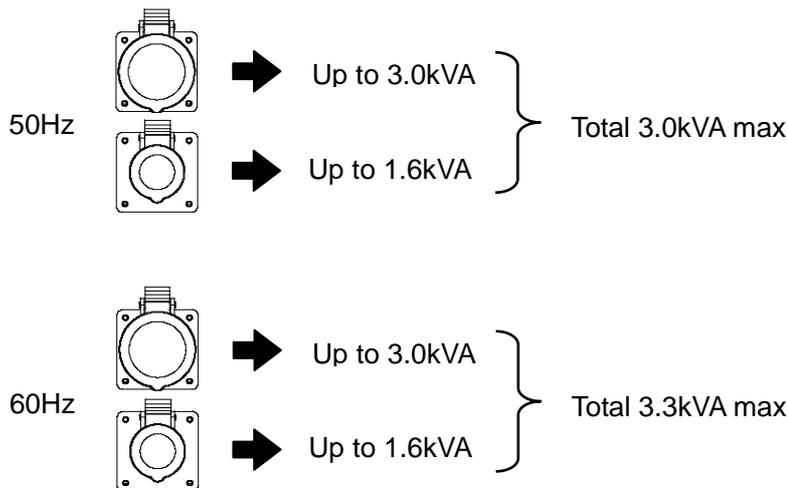
- In the event using the equipment to computers, microcomputers incorporated loads and precision equipment, there is a possibility for them to mal-function.
- Be sure to use the frequency designated in the load.  
(Refer to 『 5-2. Throttle 』), otherwise the load may become damaged.

#### <Caution>

- Total output current from 2 receptacles is as follows.

Rated Output 50Hz: 27.2A (3.0kVA)

60Hz: 30.0A (3.3kVA)



## 9-1. Operation

### ⚠ Danger: Electric Shock

- Before connecting or disconnecting a load cable from the receptacles, always turn the circuit breakers (MAIN CB, 15A, 30A) to [OFF] position. And always stop engine, and remove the engine key. The person performing the maintenance should always keep the key.
- Ground the grounding terminal to the earth as set out in the manual. If left unconnected by mistake or accident, it will be much more dangerous for human than the NO-RELAY case, because leaking current inevitably goes through the body. (Refer to 『5-7. Earth Leakage Relay』 )
- Even though all the current leakage relays in the loads have been grounded to the earth, the earth grounding terminal and the canopy should also be grounded to the earth.
- Grounding should be made after the engine is stopped.
- If the current leakage breaker activates, repair the fault first.

### ⚠ Caution: Injuries

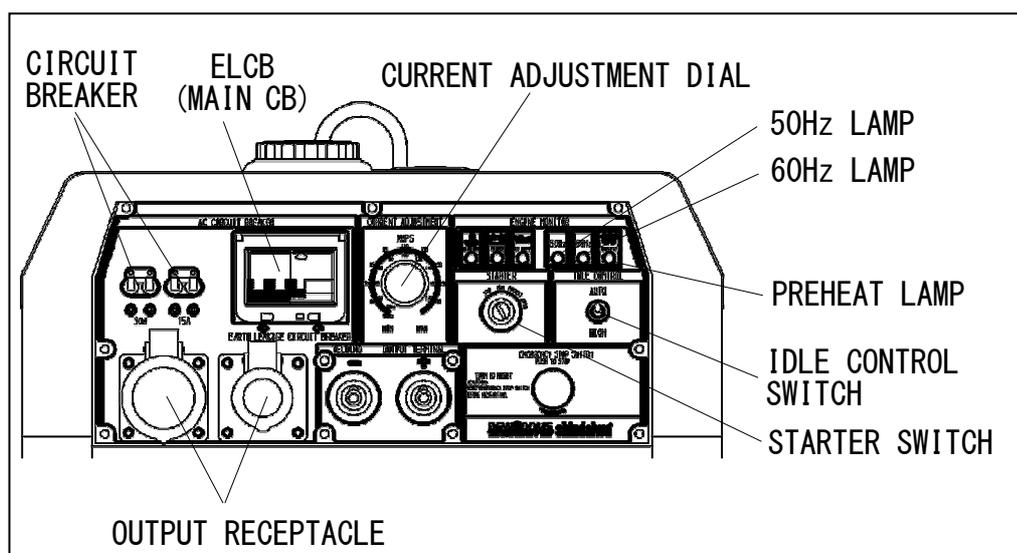
- Be sure to connect to the receptacles, after confirming that all the switches in the loads are positioned to [OFF].

### ⚠ Caution : Damage to the property • Aftermath

- Whenever connecting medical equipment or appliances, be sure to consult with the medical equipment company first.

After engine has started (Refer to 『 7-1. Start up 』), operate as per the following procedure.

- ① Turn the Idle Control Switch [AUTO].
- ② Switch the breakers (MAIN CB, 15A, 30A) [ON].  
With the above procedures, you can use 110V AC power from receptacles.



## 9-2. Output Limitation

Please refer to the following table, because electric tools and home appliances cannot be judged only by the rated output or the power consumption due to the efficiency and character of the components.

Applicable Load (For reference only)

Loads	Capacity (kW)	
	50Hz	60Hz
Electric Bulb, Heater, etc.	3.0	3.3
Electric Tools, etc (Series Motor),	1.5	1.7
Mercury Bulb (High Power Factor Type)	1.2	1.4
Submersible Pump, Compressor, etc (Induction Motor)	1.2	1.4

### <Caution>

- Be sure to use the frequency designated in the load incorporated in mercury bulb or induction motor.
- The load incorporated in motor may require greater power than the rated power consumption. Therefore, consult with our authorized distributor or our dealer to clarify.
- When connecting 2 sets or more, start the load one by one, do not start them simultaneously.
- When switching a Mercury bulb again, wait for 15 minutes (approximately) until it cools down.
- A mercury bulb may flicker.

## 10. Simultaneous Use of Welding and Generating

The circuit breaker reacts on the AC power supply circuit only. In the simultaneous use of welding and generating, overload to the engine may occur.

Refer to the following table for simultaneous use of welding and generating

Welding Output Welding Rod / Current	AC Power Output	
	50Hz	60Hz
2.0mm/60A	3.0kVA or below	3.3kVA or below
2.6mm/100A	2.5kVA or below	3.0kVA or below
3.2mm/140A	1.0kVA or below	1.5kVA or below
4.0mm/170A	0.5kVA or below	0.5kVA or below

## 11. Checking and Maintenance

### **Danger : Electric Shock • Injuries**

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

### **Danger: Burns**

- Do not open the radiator cap while operating this equipment or immediately after stopping the equipment, to avoid sustaining burns from hot water/steam.

### **Caution: Fire • Burns**

- Keep the equipment away from fire.
- When checking engine, always stop the engine. Wait until the engine cools down, before performing any checks.
- Do not touch the engine or muffler immediately after stopping the equipment, Wait until the engine cools down, before performing any checks.

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

- Battery fluid contains diluted sulphuric acid. Avoid contact with eyes, skin or clothing. If the acid comes in contact, especially with eyes, flush with lots of water, and seek medical attention.

### **Caution: Explosion**

- When the liquid level is below the LOWER level, do not use the equipment or recharge the battery.
- Battery may emit combustible gases. Keep it away from fire and sparks.

### **Caution: Fire**

- Battery may emit combustible gases, Keep it away from fire and sparks.

<Caution>

- Only authorized technicians should perform all checking and maintenance work, except for the pre-startup checks.
- Request for the maintenance item with ● mark to the authorized distributor or our dealer.
- Always use our genuine parts if replacing.
- When draining waste fluid from the equipment, catch it in a tray.
- When disposing of oil, fuel, coolant (LLC), fuel filter, battery and /or other harmful materials, please follow international regulations.
- Please do not dispose of harmful items or waste fluid into the ground or any water source.

To optimize the use of this welder-generator, we recommend periodical equipment checks and maintenance based on the following matrix.

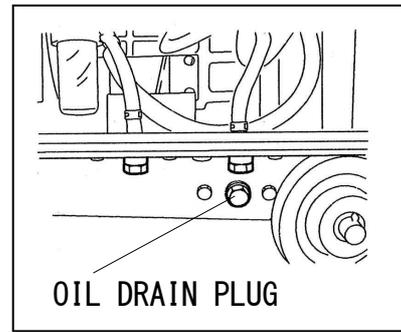
Use the hour meter as a guide for the operating time.

Checking Items		Start up Check	Checking Time					Every 2000 hrs
			At 50hrs	Every 100 hrs	Every 200 hrs	Every 400 hrs	Every 1000 hrs	
1	Check and Supply Fuel	○						
2	Check and Supply Engine Oil	○						
3	Engine Oil Change		1 <sup>st</sup> ○	2 <sup>nd</sup> or after ○				
4	Oil Filter Change		1 <sup>st</sup> ○		2 <sup>nd</sup> or after ○			
5	Check/Add Water/Coolant	○						
6	Water/Coolant Change							○ or 2 years
7	Clean Fuel Strainer		1 <sup>st</sup> ○	2 <sup>nd</sup> or after ○				
8	Change Fuel Filter					○		
9	Drain Water/Clean Fuel Tank				○			
10	Check Leakage Fuel, Oil, Water	○						
11	Check/Add Battery Water	○						
12	Clean Air Element		1 <sup>st</sup> ○	2 <sup>nd</sup> or after ○				
13	Change Air Element					○		
14	Adjust Tension V-Belt		1 <sup>st</sup> ●	2 <sup>nd</sup> or after ●				
15	Change V-Belt					● or 2 years		
16	Clean Radiator Fin					●		
17	Check Carbon Brush					●		
18	Clean Radiator (inside)					●		
19	Change Fuel Hose, Oil Hose, Water Hose Vibration-Absorbing Rubber							● or 2 years
20	Adjust/Polish Engine Valve Clearance						● Adjust	● Polish
21	Check/Adjust Injection Nozzle					●		
22	Check/Adjust Injection Pump							●

## (1) Oil Change

First Time	50 hour mark
2 <sup>nd</sup> or after	Every 100 hours

- ① Remove the oil plug.
- ② Loosen the oil drain plug and allow the oil to drain fully.
- ③ Reinstall the oil drain plug.
- ④ Checking the oil level by the oil level gauge, add oil into the oil filler (inlet) to fill up to the max level (about 2.0 litre max).
- ③ Reinstall the oil plug hand tight.



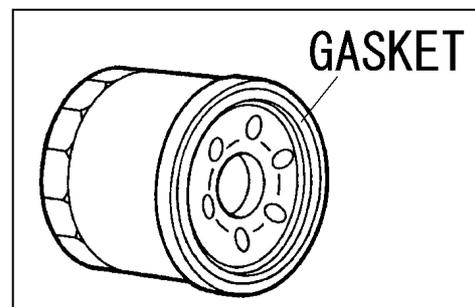
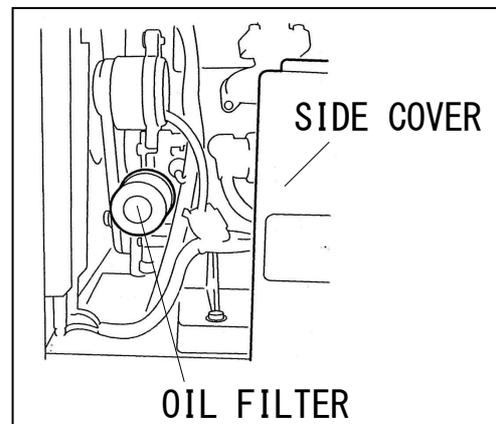
### <Caution>

- Refer to 『6-1. Checking Engine Oil』 to select engine oil.
- Whenever changing oil, change the seal as well,
- Seal Part No. : 6C090-58961 (Kubota)

## (2) Oil Filter Change

First Time	50 hour mark
2 <sup>nd</sup> or after	Every 200 hours

- ① Drain the engine oil completely, as described in 『11-1. Oil Change』 .
- ② Remove the side cover.
- ③ Loosen and remove the oil filter, using oil filter wrench.
- ④ Smear engine oil a little on the rubber gasket in a new oil filter.
- ⑤ Screw the new filter into place and tighten it by hand until the gasket contact onto the seat. Then, give it additional 『1.1/4 Turn』 to seat the filter, using a filter wrench.
- ⑥ Supply oil and install the filler cap.



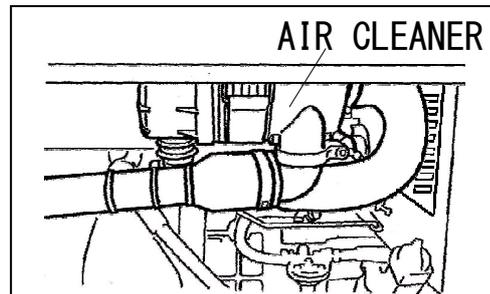
### <Caution>

- If an oil filter wrench is not available to get, contact our authorized distributor or our dealer.
- Oil Filter Part No.: 15853-32433 (Kubota)

### (3) Clean/Change Air Element

Clean	1 <sup>st</sup> 50 hours and 2 <sup>nd</sup> or after every 100 hours
Change	Every 400 hours

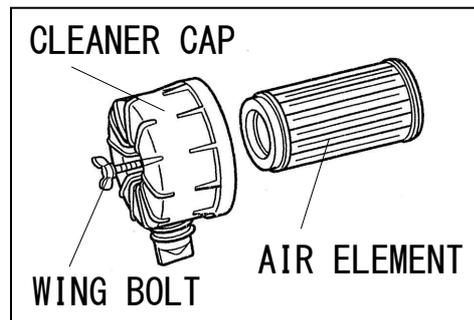
- ① Loosen the wing bolt to remove the cleaner cap.
- ② Remove the air element.
- ③ Clean or replace the air element and reinstall in reverse order.



<Caution>

- Clean more frequently, if used in dusty environment.
- Air Element Part No. 67980-82632 (Kubota)

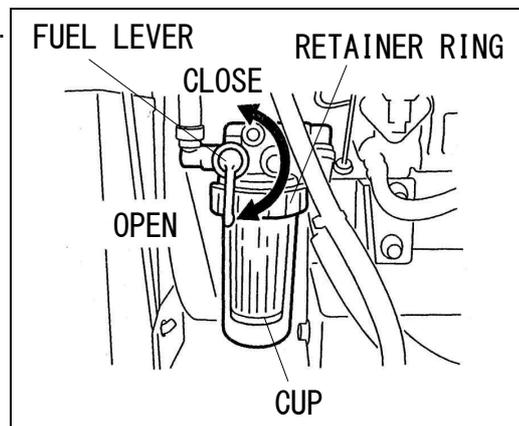
- How to clean air element  
<If the element has dried contaminants>  
It may be cleaned by blowing compressed air from the inside.  
<If the element has carbon or oil>  
It should be replaced to a new one.



### (4) Clean/Change Fuel Strainer

Clean	1 <sup>st</sup> 50 hours and 2 <sup>nd</sup> or after every 100 hours
Change	Every 400 hours

- ① Turn the fuel valve lever to [CLOSE].  
Unscrew the retainer ring counter-clockwise, and remove the cup and the fuel element.  
Discard any dust or water inside the cup, and clean the fuel element by blowing compressed air, or replace if necessary.  
Reassemble it in reverse order.



<Caution>

- Check for any contaminants from the seal, whenever reinstalling the cup.
- Turn the fuel valve lever to 『OPEN』 after assembling, and check for any leaks.
- After confirming no leak, turn the fuel valve to [CLOSE].
- Fuel Element Part No.: 16271-43561 (Kubota)

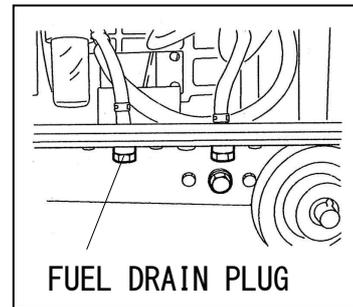
### (5) Drain Water from Fuel Tank

Drain Water	Every 200 hours
-------------	-----------------

- ① Unscrew the fuel drain plug.
- ② Reinstall the drain plug, after draining water completely

<Caution>

- Change the seal, whenever changing oil.
- Seal Part No.: 6C090-58961 (Kubota)



### (6) Changing Coolant/Water

Change	Every 2000 hours or 2 years
--------	-----------------------------

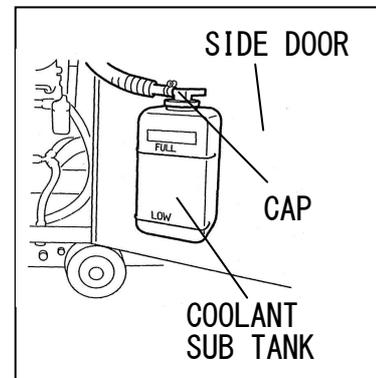
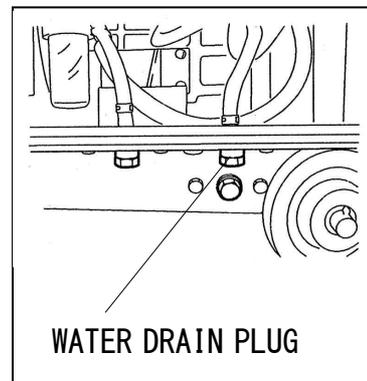
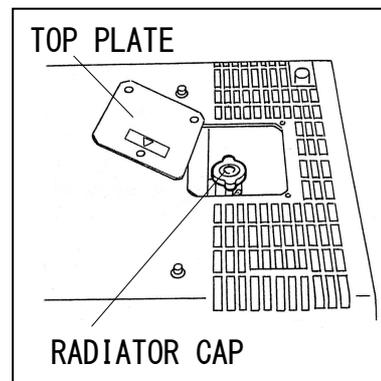
(Total Coolant/Water Capacity: about 2.8 litre, including sub tank cap. 0.6 litre.)

- ① Remove the top plate.
- ② Remove the radiator cap.
- ③ Loosen the coolant drain plug.
- ④ After draining all the coolant, reinstall the water drain plug.

<Caution>

- Change the seal, whenever changing coolant.
- Seal Part No.: 6C090-58961 (Kubota)

- ⑤ Replace all the coolant in the sub tank.
- ⑥ Fill the coolant to the neck of the water Inlet in the radiator.
- ⑦ Reinstall the radiator cap.
- ⑧ Install the top plate.



## 12. Long-Term Storage

### **Danger: Electric Shock**

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

### **Caution: Injuries**

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

### **Caution : Fire • Burns**

- When checking engine, always stop the engine, and keep away from fire. Temperatures around muffler or exhaust can be extremely high. Wait until the engine cools down, before performing any checks.

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

- ① Remove the battery.
- ② Change the engine oil.
- ③ Drain fuel from the fuel tank and the fuel strainer.
- ④ Clean all parts, cover the welder-generator, and store away from dust and humidity.

<Caution>

- Recharge the removed battery once a month.

## 13. Troubleshooting

### **Danger: Electric Shock**

- Do not touch 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**

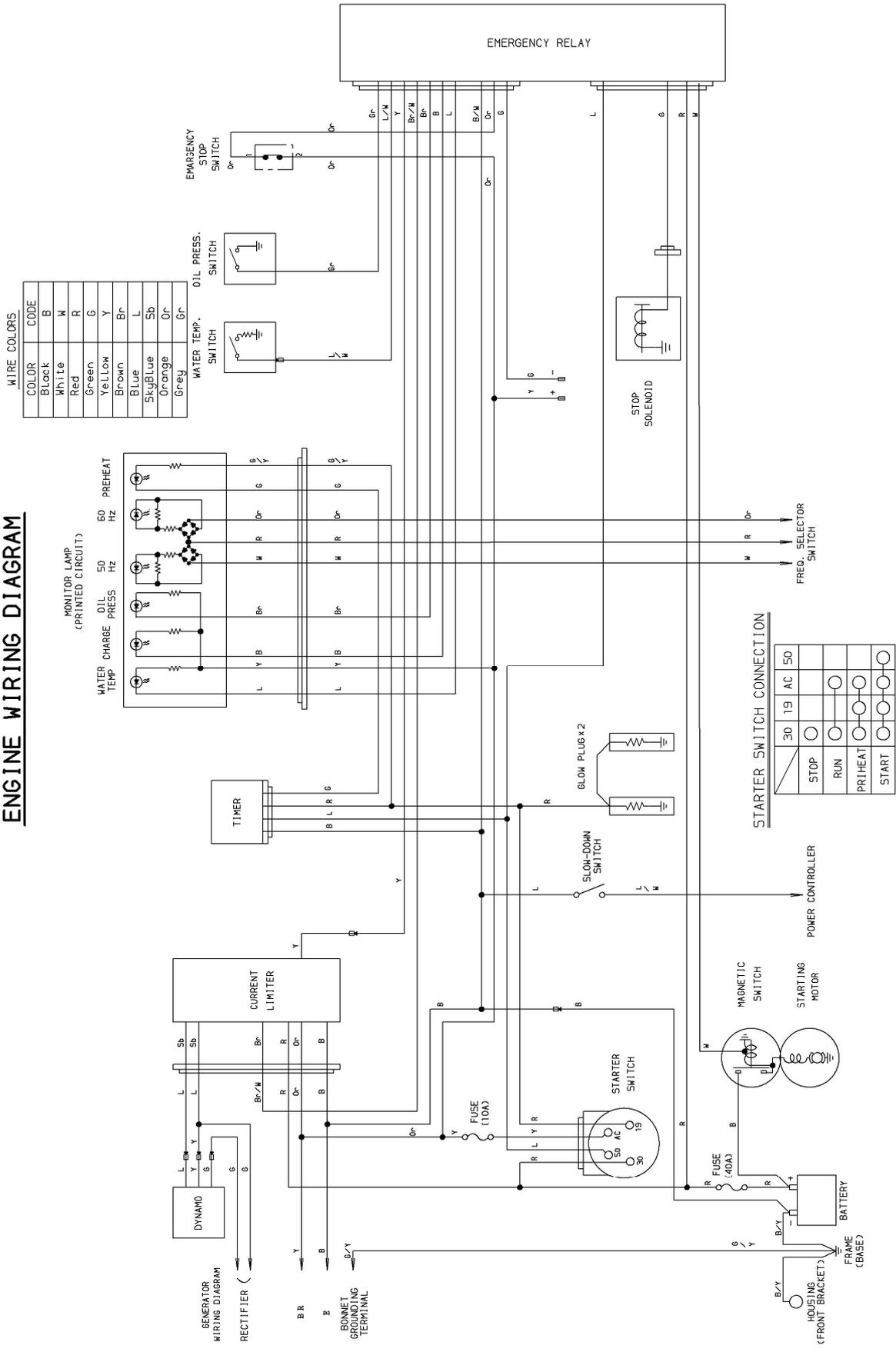
- When checking engine, always stop the engine, and keep away from fire. Temperatures around engine, muffler or exhaust can be extremely high. Wait until the engine cools down, before performing any checks.

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

Symptoms	Presumed Cause	Corrective Actions
Starter motor does not start	<ol style="list-style-type: none"> <li>1. Weak Battery</li> <li>2. Dead Battery</li> </ol>	<ol style="list-style-type: none"> <li>1. Recharge Battery</li> <li>2. Replace Battery</li> </ol>
Engine does not start	<ol style="list-style-type: none"> <li>1. Fuel lever SHUT</li> <li>2. Insufficient fuel</li> <li>3. Fuel is contaminated by the water or dust</li> <li>4. Fuse burnt</li> </ol>	<ol style="list-style-type: none"> <li>1. Fuel lever to OPEN</li> <li>2. Replenish fuel</li> <li>3. Drain water or clean fuel tank , fuel strainer</li> <li>4. Repair</li> </ol>
Engine starts, but stalls immediately	<ol style="list-style-type: none"> <li>1. Emergency Stop Switch ON</li> <li>2. Insufficient oil</li> <li>3. High Water Temperature, Insufficient coolant/water</li> <li>4. Unable to charge</li> </ol>	<ol style="list-style-type: none"> <li>1. Release the Emergency Stop Switch</li> <li>2. Replenish oil</li> <li>3. Replenish coolant/water</li> <li>4. Repair</li> </ol>
Welding arc is weak	<ol style="list-style-type: none"> <li>1. Wrong setting of current adjustment dial</li> <li>2. Poor contacts of cables</li> <li>3. Improper cable diameter</li> <li>4. Improper connection to the base material</li> <li>5. The total loads exceed the rated simultaneous use output limit</li> <li>6. Engine output is down</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn the dial clockwise</li> <li>2. Contact cables securely</li> <li>3. Change cables according to [Selection-Welding Cable]</li> <li>4. Contact securely</li> <li>5. Refer to [Simultaneous use of Welding and AC output]</li> <li>6. Clean air element</li> </ol>
Excessive welding arc	<ol style="list-style-type: none"> <li>1. The setting of current adjustment dial</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn the dial Counter-clockwise</li> </ol>
No AC output	<ol style="list-style-type: none"> <li>1. The breakers to [OFF]</li> </ol>	<ol style="list-style-type: none"> <li>1. Set the breakers to [ON]</li> </ol>
AC output is weak	<ol style="list-style-type: none"> <li>1. The current in the load exceeds the rated current</li> <li>2. The loads used simultaneously exceed the rated output</li> </ol>	<ol style="list-style-type: none"> <li>1. Refer to the article of Output Limitation</li> <li>2. Refer to [Simultaneous use of Welding and AC output]</li> </ol>
Idle Control does not activate	<ol style="list-style-type: none"> <li>1. Short circuit of welding cable</li> <li>2. The power consumption of the load is 0.5A or below</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the short circuit</li> <li>2. Turn the Idle Control switch to [HIGH]</li> </ol>
Engine does not stop	<ol style="list-style-type: none"> <li>1. Stop solenoid disorder</li> <li>2. Fuse burnt</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn the fuel valve lever to [CLOSE] to stop and repair</li> <li>2. Repair</li> </ol>
Excessive Black smoke exhaust from muffler	<ol style="list-style-type: none"> <li>1. Overloaded use</li> </ol>	<ol style="list-style-type: none"> <li>1. Keep the duty cycle of 50% and the rated output (Refer to [Output Limitation])</li> </ol>

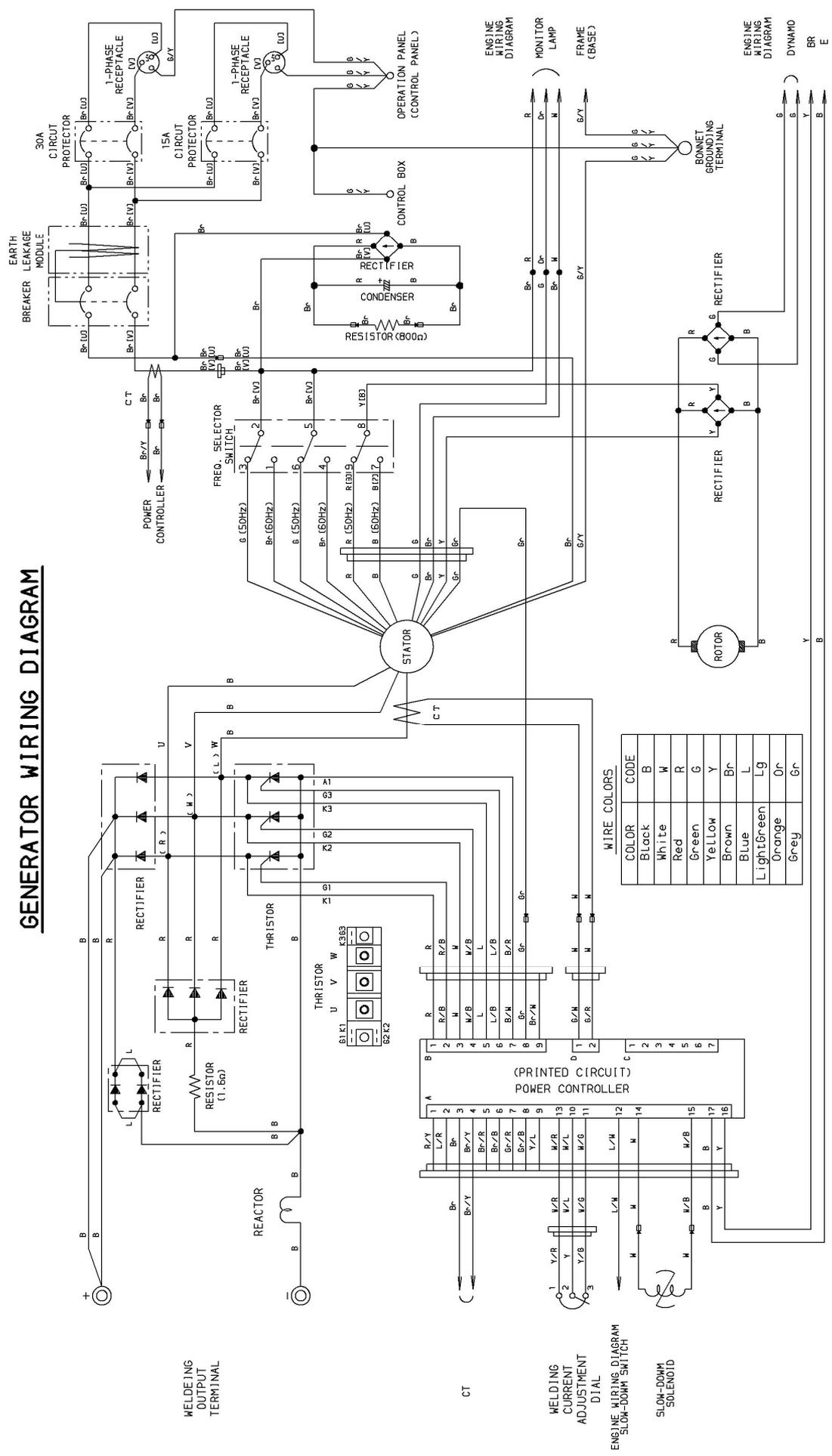
# 14. Engine Wiring Diagram

## ENGINE WIRING DIAGRAM



# 15. Generator Wiring Diagram

## GENERATOR WIRING DIAGRAM





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