ISO 9001
CERTIFIED

shindaiwa®

OPERATOR'S MANUAL

SOUND PROOF
DIESEL ENGINE
GENERATOR/WELDER

DGW300MS/UK

Water-Cooled
4-Cycle Diesel Engine

Table of Contents	Page

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

DGW300MS/UK
X750803-4302

Introduction

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

- This operation 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 supply this manual with the equipment.

■The following conventions will be used throughout the manual to indicate the degree of caution.

Danger	***Can cause serious injuries or death.***
Caution	***Can cause minor injuries or damage to the equipment or other properties.***
<Caution>	***Other types of caution***

- Even some of the items noted in 『**Caution** 』 may lead to serious injuries. Please read all items 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 weather 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 human. Do not operate this equipment in poorly ventilated area, 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 (such as pin or wire) into plug-in receptacles.
- Do not touch wiring or electric parts inside the equipment during operation.
- Ground the grounding terminal to the earth as set out in the manual. If left disconnected, it may cause injury.
- Even though all the terminals of the loads have been grounded to the earth, the canopy grounding terminal should also be grounded to the earth.
- Before connecting or disconnecting a plug from output receptacle, always turn the circuit breaker to the 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. The person performing the maintenance must always keep the key.
- This machine is rated to IP23.

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 water.

Danger: Injuries

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

Caution: Suffocation from exhaust fumes

- Do not direct the exhaust fumes toward pedestrians or buildings.

Caution: Suffocation from welding fumes

- Be sure to wear a fume proof mask during operation, as welding fumes contain poisonous gases and dust. Pay attention to the airflow direction and ensure there is sufficient ventilation in order to prevent from inhaling fumes.

Caution: Injuries to eyes and skin

- Be sure to wear spark protection glasses/mask, long-sleeve shirts, gloves, etc. in order to protect eyes and skin from harmful sparks during welding.
- 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 contact your physician immediately.

Caution: Electric Shock

- Do not flush water onto the equipment nor operate it in the rain.

⚠ Caution: Explosion

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

⚠ Caution: Fire

- The equipment uses Diesel as a 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 away any drip of Diesel fuel or lubrication oil. Do not use this equipment if 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.
- Keep any inflammable items and combustible items away from the welding area, as welding causes hot sparks.
- Always operate this equipment on flat surface and, at least 1 metre 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.
- Keep children at a safe distance from the machine at all times.

⚠ Caution: Burns

- Do not touch the engine and muffler during operation and immediately after stopping the equipment, for the temperature could 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 plug during operation, hot oil may cause some injury.
- 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 door during operation and immediately after stopping the equipment, because some parts/components (flexible tube, resistors, etc.) can reach very high temperatures inside the equipment.

⚠ Caution: Injuries

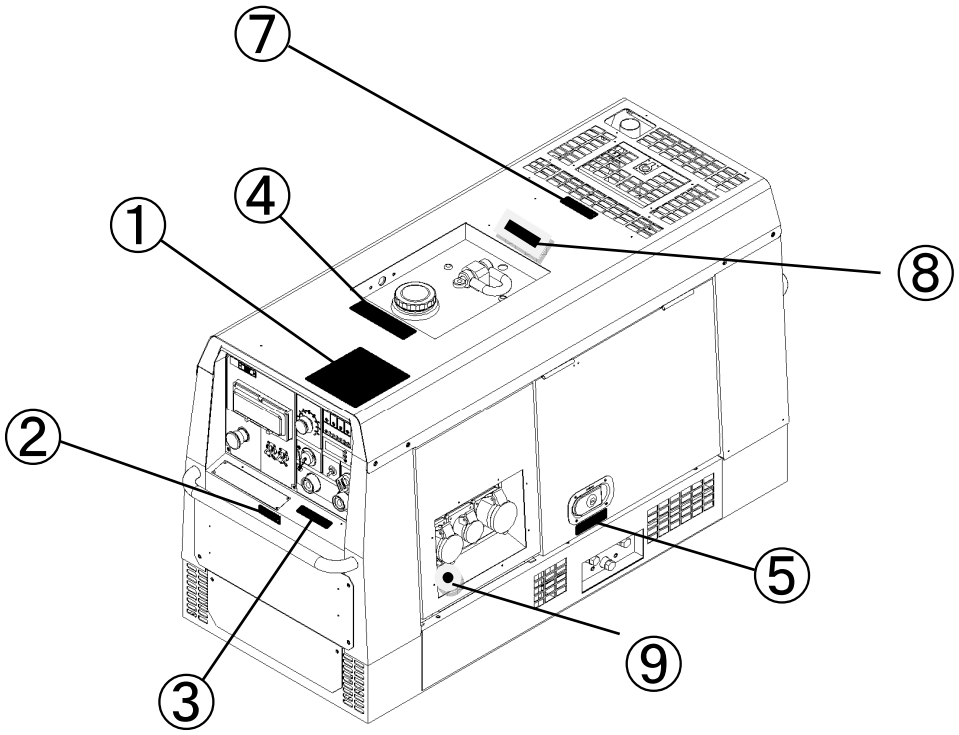
- When lifting the equipment, always use a top-mounted lifting lug. **Do not lift using the positioning handle.**
- Always use appropriate lifting gear & secure adequately during transportation.
- Always place the equipment on a flat and stable surface, and fix the wheels to prevent equipment movement.
- 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 it is faulty or if there are missing parts.

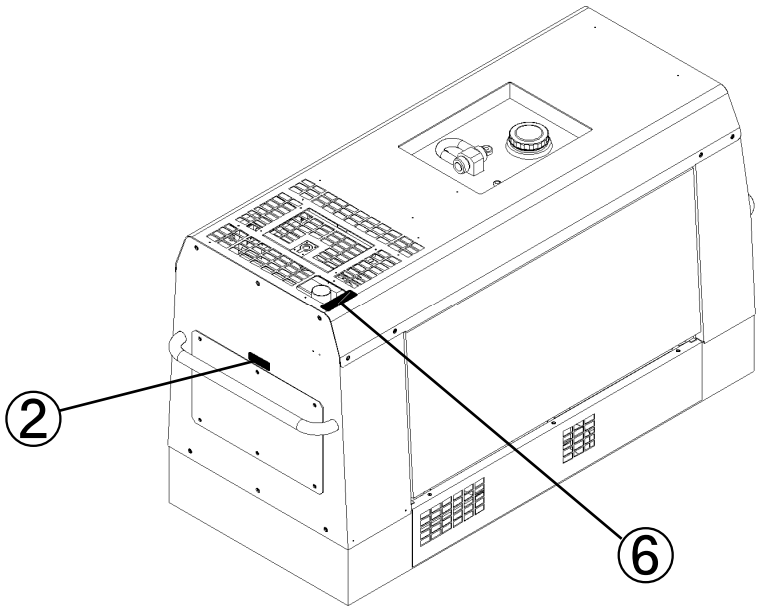
■ Location of Warning labels

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

When ordering labels, use the following part numbers.

① Suffocation from exhaust fumes (No. X505-006400)
② Positioning handle (No. X505-006430)
③ Electric shock (No. X505-004930)
④ Fire (No. X505-004880)
⑤ Injury (No. X505-004940)
⑥ Hot surface (No. X505-006420)
⑦ Burns (No. X505-006410)
⑧ Lifting eye（No. X505-xxxxxx）
⑨ Earth Grounding terminal（No. X505-xxxxxx）





2. Specifications

Model			DGW300MS/UK	
Generating Method			Rotating Field	
Welding Generator	Rated Current (A)		280	
	Duty Cycle (%)		50	
	ECO	Current Adj. Range (A)	30 – 200	
		Welding Rod (mm)	2.0 – 4.0	
	AUTO / HIGH	Current Adj. Range (A)	40 – 300	
		Welding Rod (mm)	2.0 – 6.0	
	Rated Speed (min^{-1})		3000	
	No Load Voltage (V)		MAX 85	
AC Generator	Rated Frequency (Hz)		50	
	Rated Speed (min^{-1})		3000	
	Phase		1-Phase	3-Phase
	Rated Voltage (V)		110 CTE	415
	Rated Current (A)		30	9.8
	Power Factor		1.0	0.8
	Rated Output (kVA)		3.3	7
	Rating		Continuous	
Engine	Model		Kubota D722	
	Type		Water-Cooled 4-Cycle Diesel Engine	
	Displacement (L)		0.719	
	Rated Output (kW/min^{-1})		14.9 / 3600 (Gross Intermittent)	
	Fuel		ASTM No.2 Diesel Fuel or Equivalent	
	Lubricant Oil		API Class CD or Higher	
	Lubrication Oil Volume (L)		3.8 (Effective 1.4)	
	Cooling Water Volume (L)		3.0 (Sub Tank Capacity 0.6 L included)	
	Starting Method		Starter Motor	
Battery			46B24L(Japan Industrial Standard)	
Fuel Tank Capacity (L)			37	
Dimension	Length (mm)		1410	
	Width (mm)		566	
	Height (mm)		760	
Dry Weight (kg)			348	

Generating Set: ISO 8528-8/G2

EMC Group 2 Class A

Rating Plate label is attached to the equipment

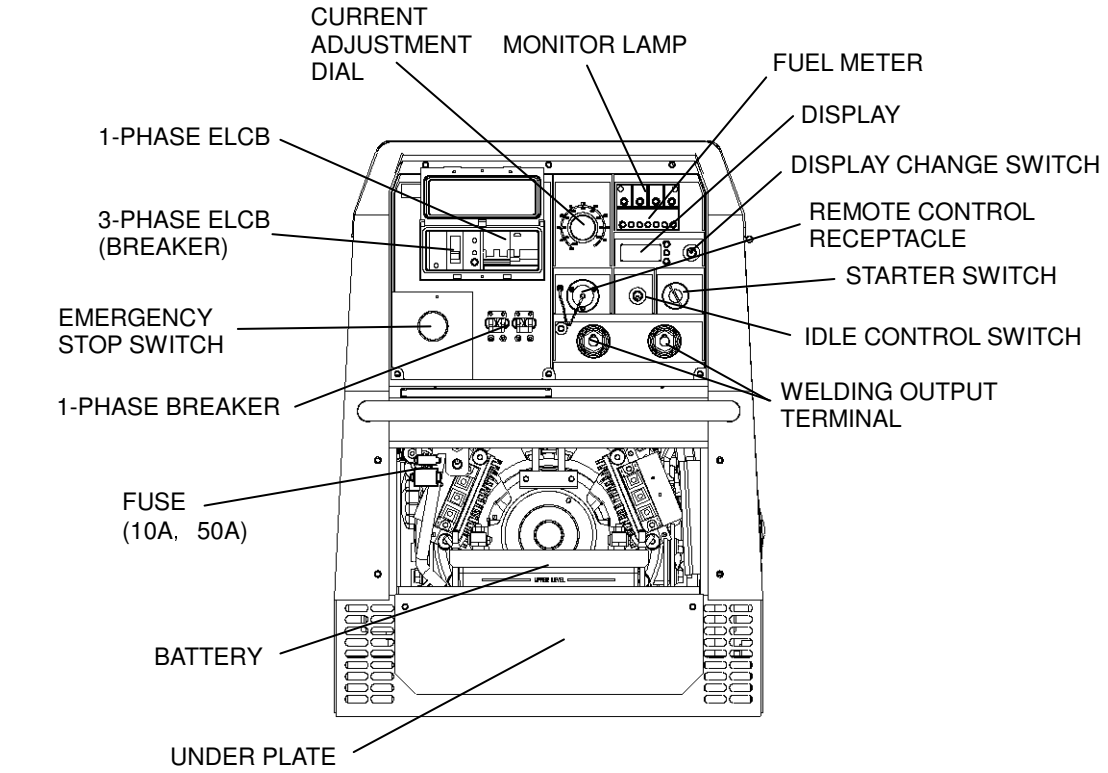
3. Use

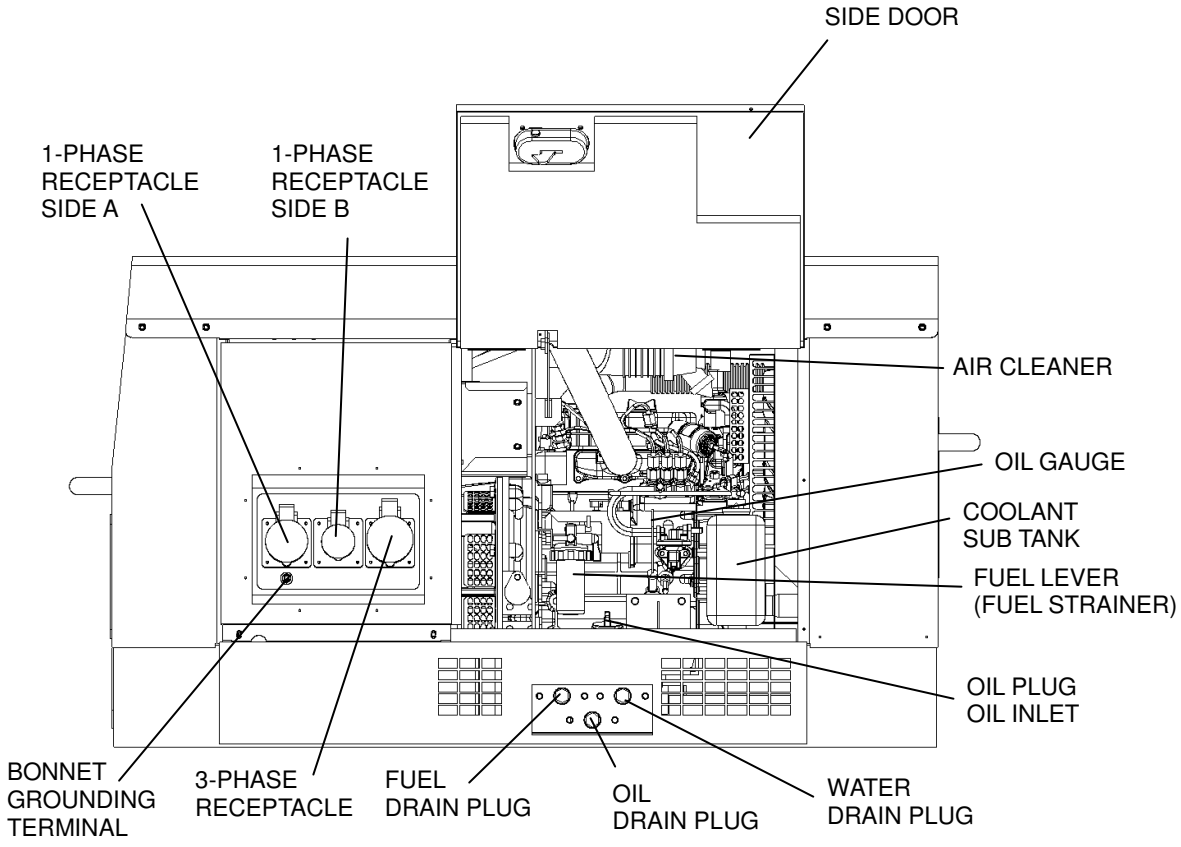
- Arc Welding
- Power Source for Lights, Electric Tools and Home Appliances
- Voltage classification G2
- EMC classification Group 2 Class A

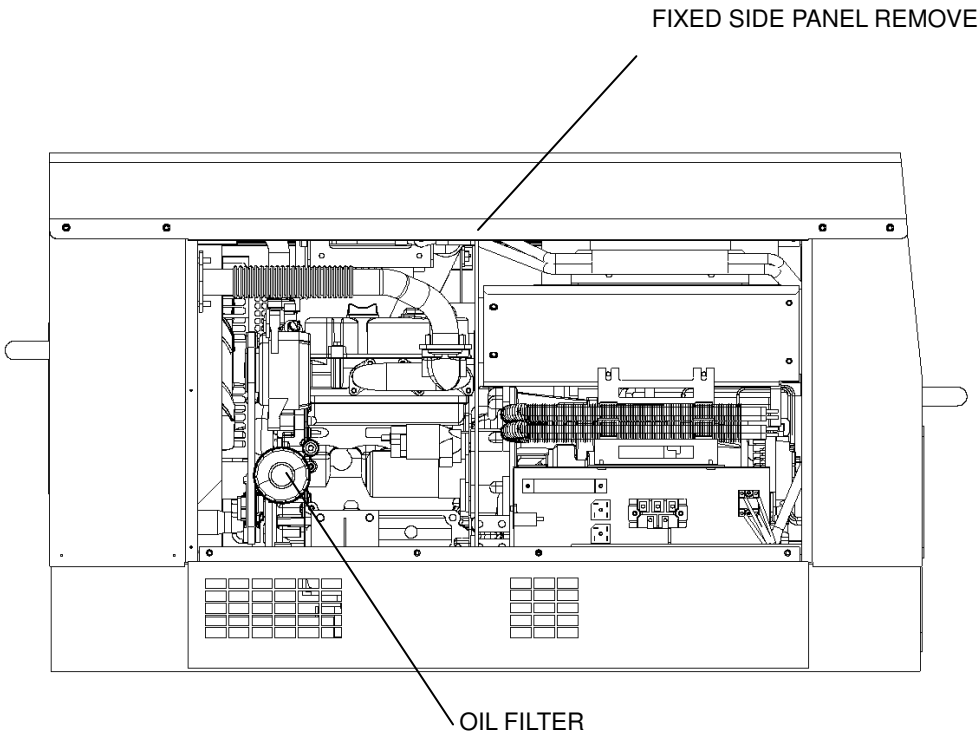
⚠ Caution: Damage to the equipment or other properties

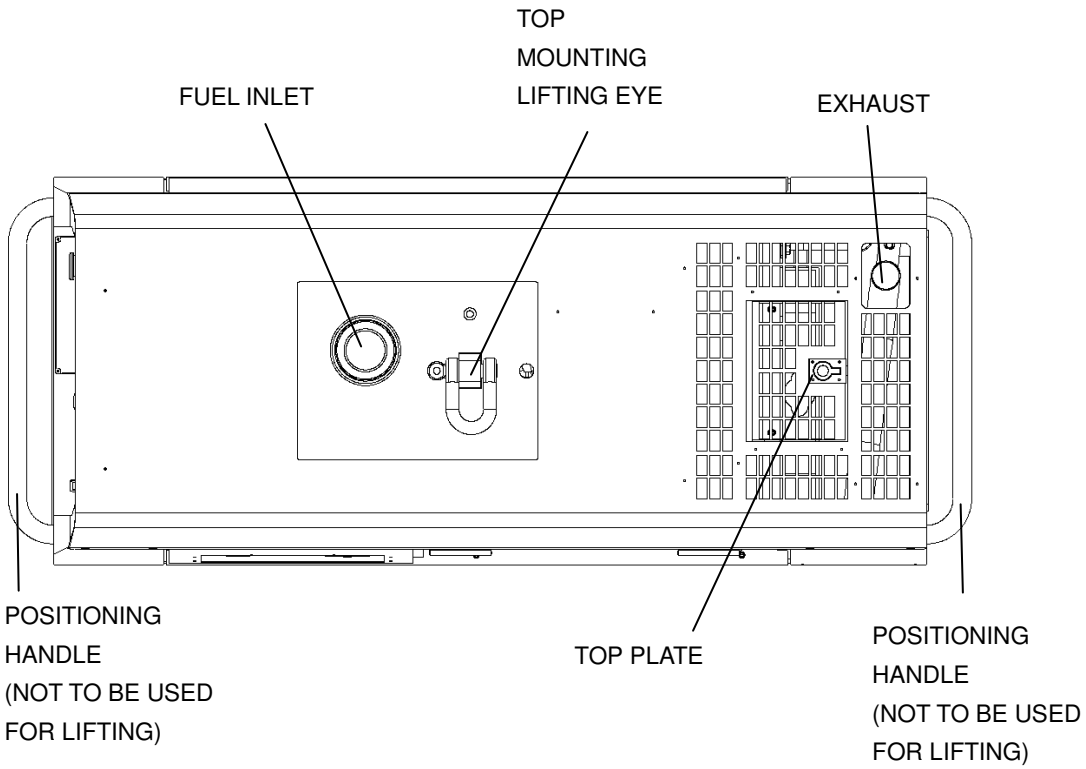
- Consult with your dealer or authorized distributor when utilizing this equipment around devises with microcomputer control or ultra-precision items, which are very sensitive to voltage fluctuation.
- Keep the equipment away from those devises to avoid influence from electromagnetic noise.
- Consult 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


CURRENT ADJUSTMENT DIAL
MONITOR LAMP
FUEL METER
DISPLAY
1-PHASE ELCB
DISPLAY CHANGE SWITCH
3-PHASE ELCB (BREAKER)
REMOTE CONTROL RECEPTACLE
STARTER SWITCH
EMERGENCY STOP SWITCH
IDLE CONTROL SWITCH
1-PHASE BREAKER
WELDING OUTPUT TERMINAL
FUSE (10A, 50A)
BATTERY
UNDER PLATE


SIDE DOOR
1-PHASE RECEPTACLE SIDE A
1-PHASE RECEPTACLE SIDE B
AIR CLEANER
OIL GAUGE
COOLANT SUB TANK
FUEL LEVER (FUEL STRAINER)
OIL PLUG OIL INLET
BONNET GROUNDING TERMINAL
3-PHASE RECEPTACLE
FUEL DRAIN PLUG
OIL DRAIN PLUG
WATER DRAIN PLUG


FIXED SIDE PANEL REMOVED
OIL FILTER


TOP
MOUNTING
LIFTING EYE
FUEL INLET
EXHAUST
POSITIONING
HANDLE
(NOT TO BE USED
FOR LIFTING)
TOP PLATE
POSITIONING
HANDLE
(NOT TO BE USED
FOR LIFTING)

5. Equipment

5-1. Eco Welding

The equipment is incorporates an Eco welding feature that provides lower noise levels, lower fuel consumption and lower gas emissions than conventional welder-generators.

When you turn the idle control switch to Eco, you will be able to weld at Max. with a 4.0mm welding rod at the low speed.

<Caution>

- Eco is designed for welding only. The engine automatically moves to high speed, if it is used for AC Output.

5-2. Display

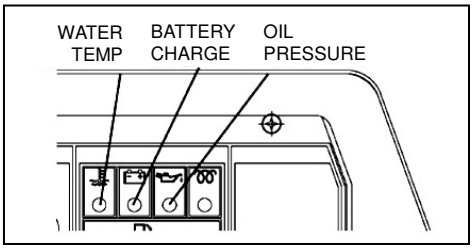
The equipment incorporates in Digital Display. It displays『AC Voltage』,『Hours worked』,『Speed』successively, by changing the display selector switch.

<Caution>

- During operation, the AC voltage meter always displays the voltage in 415V, 3-Phase both at the breaker position『ON』and『OFF』.

5-3. Monitor Lamp

The equipment incorporates a monitoring function and shut off for WATER TEMP, BATTERY CHARGING, and OIL PRESSURE.



Under normal conditions, when the starter key is turned from [STOP] to [RUN], the BATTERY CHARGING, and OIL PRESSURE monitor lamps will be illuminated. When the engine starts, all the monitor lamps will goes OFF. When fault occurs in running, the corresponding monitor lamp will flash, and the engine will be automatically shut-off.

When the automatic shut-off is engaged, turn the starter key to [STOP] position. Find and fix the fault, and then restart the engine. In the event the automatic shut-off is engaged repeatedly, check which monitor lamp turns ON or OFF and investigate further the related malfunction.

(1) Coolant/Water Temperature Monitor Lamp

Danger: Injuries

- Close and lock all equipment doors when operating 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 prevent burns from hot steam or water.

⚠ Caution: Burns

- Do not touch the engine or exhaust 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 engine shut-off will be engaged.
When this symptom occurs, check the coolant sub 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 connect equipment within the rated duty cycle and output power.

(2) Battery Charge Monitor Lamp

When the battery is unable to be charged during operation, the battery charge monitor lamp will flash and the automatic shut-off will be engaged.

<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) Oil Pressure Monitor Lamp

⚠ Danger: Injuries

- Close and lock all equipment doors when operating this equipment, to avoid injuries by unintentionally touching cooling fan and fan belt.

⚠ Caution: Burns

- Do not touch the engine and exhaust during operation or immediately after stopping the equipment, as the temperatures will be extremely high.
- When checking engine oil, always stop the engine, and wait until the engine cools down. Do not open the oil gauge or the oil filter cap during operation

If the engine oil pressure drops during operation, the oil pressure monitor lamp will flash, and the automatic shutoff will be engaged.
When this symptom occurs, check the engine oil level, and replenish to maximum level.

<Caution>

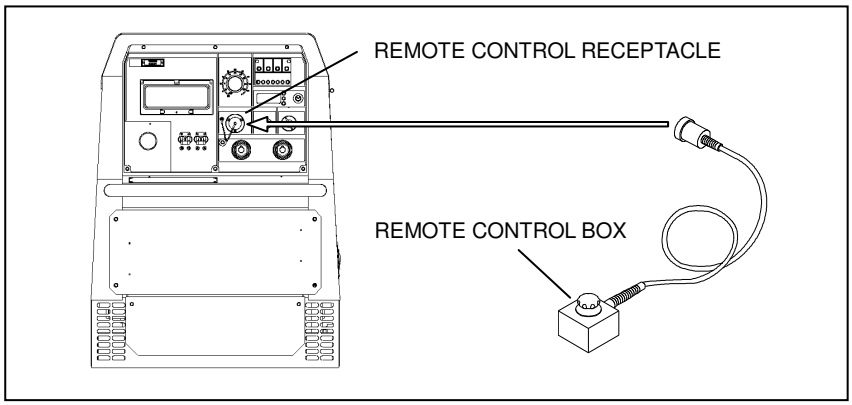
- The engine oil pressure monitor cannot detect the degradation of engine oil itself. Please check the engine oil periodically, and change if needed.
  (Refer to『11. Checking and Maintenance』)

- Check the fuse next, when the abnormality, other than WATER TEMP, BATTERY CHARGED OR OIL PRESSURE is detected. If the fuse is burned out, consult with our dealer or authorized distributor, as there may be an abnormality of electrical components or wiring which should be inspected.

5-4. Remote Control

The equipment incorporates a Remote Control receptacle.
Remote control box is an optional part.

Remote Control operation is available by connecting the compatible Remote Controller to the receptacle.



5-5. Earth Leakage Relay and Grounding

Danger: Electric Shock

- Ground the grounding terminal to the earth as set out in the manual. Failure to do so could result injury.
- Even though all the load terminals have been grounded to the earth, the canopy grounding terminal should also be grounded to the earth.
- Grounding should be made whilst the engine is stopped.
- Whenever the earth leakage relay has been activated, you should always repair the fault before re-using the machine.

The equipment is provided with an earth leakage relay (ELR) with in the Main Circuit Breaker (MCB) to detect any earth leakage due to problems such as insulation failure of the load whilst the generator is running. When activated ELR will automatically switch the MCB to the OFF position.

The specifications of the earth leakage relay:

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

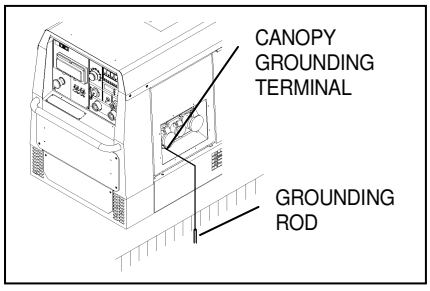
(1) Grounding Work

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

- The Canopy of this equipment (canopy grounding terminal)
- The Canopy of the load

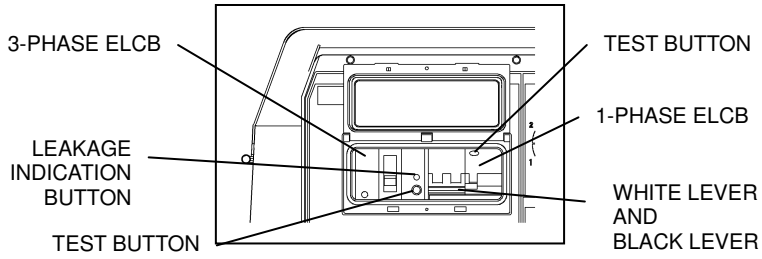
<Caution>

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



(2) Operation Check

Before operating the equipment, always check if the safety shut-down device works as shown in the following procedure.



① Ensure that the circuit breakers and load switches are positioned to [OFF].
② Start engine after turning the Idle Control Switch to [HIGH].
③ Push-up the 1-Phase and 3-Phase ELCB (lever) to the [ON] position.
④ Push the test button on 3-Phase ELCB. The earth leakage indicator button protrudes and the lever is in between the [ON] and [OFF] position.
⑤ Push down the lever [OFF] on 3-Phase ELCB.
⑥ Push the test button on 1-Phase ELCB. The ELCB (White lever and Black lever) turns to OFF.
⑦ Proceed with engine start procedure after returning a starter switch to [STOP].

■ In the event you cannot correctly complete all steps in the above procedure, the machine is out of order. Consult with our dealer or authorized distributor 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.

If the 3-Phase earth leakage relay has been activated, the leakage indication button will protrude and the lever is between [ON] and [OFF] position.
If the 1-Phase earth leakage relay has activated, The ELCB (White lever and Black lever) turns to [OFF].
In the case, stop the engine promptly and find each leakage fault.
After repairing the fault, return (push up) the ELCB (lever) to [ON].
For 3-Phase ELCB, push breaker lever down to 『OFF』 and push lever up to 『ON』 .

<Caution>
- If the 3-Phase ELCB Leakage indication button does not protrude or the 1-Phase ELCB (only Black lever) turns to OFF, it means AC Output over load.

5-6. Auto Idle Feature

The Auto Idle feature sets the engine speed automatically to low(in approximately 8 seconds) for the purpose of reducing noise and fuel consumption, whenever welding operation or electric supply is not being used.
To use the Auto Idle feature, turn the Idle Control Switch to [ECO] or [AUTO].
The engine automatically moves to high speed, whenever welding operation or electric supply starts.

⚠ **Caution: Damage to the equipment or other properties**
- Always switch the Idle Control Switch to [HIGH], when the load is incorporated with any magnet switch.

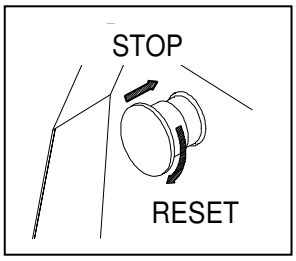
<Caution>

- When the load of less than 0.5A is connected, the Auto Idle feature may not function. In this case, turn the switch to [HIGH].
- When welding operation or electric supply performs alternately or intermittently, turn the switch to [HIGH].

5-7. Emergency Stop Switch

The Emergency Stop Switch is used to stop the engine in emergency. The engine stops immediately after pressing the button.

Be sure to restore the Starter Switch to [STOP] and reset the Emergency Stop Switch, turning clockwise after using the switch.



6. Initialization and Pre- operation check

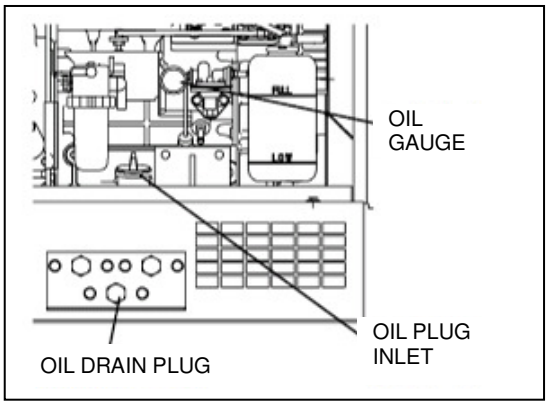
⚠ Caution : Fire · Burns · Injuries

- When checking engine, always stop the engine. Wait until the engine cools down, before performing any inspection.

6-1. Checking Engine Oil

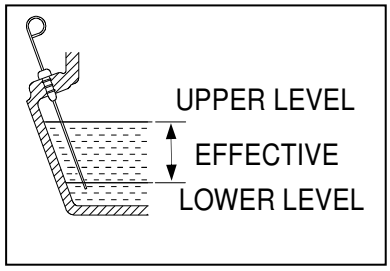
When checking for engine oil, be sure to keep the equipment leveled, and insert the oil gauge firmly.

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



<Caution>

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



■ Selecting proper engine oil

<Caution>

- Use the API class CD or higher.

Viscosity and Temperature

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

6-2. Checking Coolant / Water

⚠ Danger: Injuries

- Close and lock all equipment doors during operating this equipment, to avoid injuries by unintentionally touching moving parts.

Danger: Injuries

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

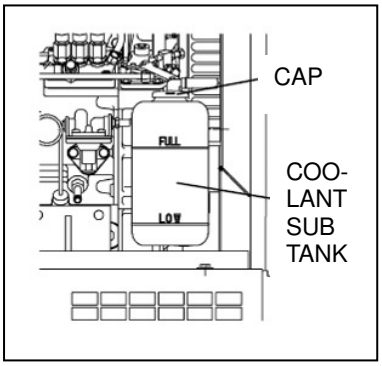
Caution: Burns

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

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

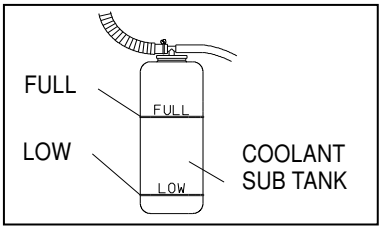
(1) Filling to the Coolant Sub Tank

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



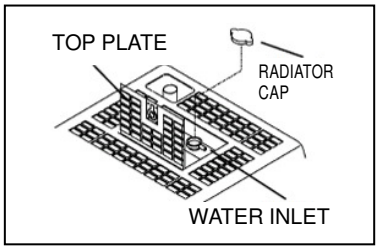
(2) Filling the Radiator

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



<Caution>

- Use Long Life Coolant (LLC), for prevent freezing and corrosion. (30%mixture LLC is filled when shipped from factory)
- Mixture ratio of the coolant should be 30%-45%, depending on the ambient temperature.
- Replace LLC at every year or 2000 hours.



Mixture Ratio (for reference only)

Lowest Ambient Temperature	-15℃	-20℃	-30℃
Mixture Ratio	30%	35%	45%

6-3. Checking Fuel

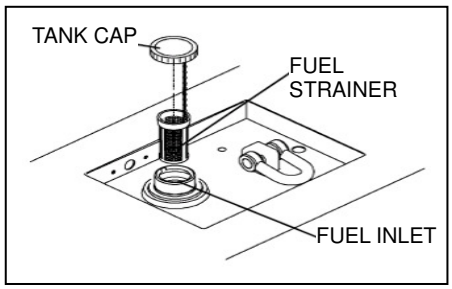
Caution: Fire

- Always wipe away any drip of fuel. Do not use this equipment if a leakage 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℃.
- The engine is designed to use either No.1-D or No.2-D Diesel fuel. However, for better economy, use No. 2-D Diesel Fuel whenever possible. At temperatures less than -7℃(20℉), 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 “winterised” No.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 temperature than No.2-D fuel which has not been “winterised”. Check with the services station operator to make 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.
- Always use the fuel strainer.
- Fill the fuel tank slightly less than the FULL.



6-4. Checking Fuel, Engine Oil and Water Leakage

⚠ Caution: Fire

- Do not use this equipment if a leakage is found. Repair the equipment before use.

Be sure to check for 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 after checking.

6-5. Checking Battery

⚠ Caution: Injuries to eyes and skin

- Battery fluid contains diluted sulphuric acid. Avoid contact with eyes, skin or clothing.
- If acid comes into contact, with eyes, flush with lots of water, and contact your physician immediately.

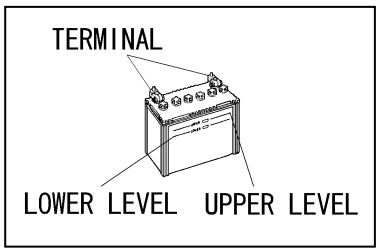
⚠ Caution: Explosion

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

⚠ Caution: Fire

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

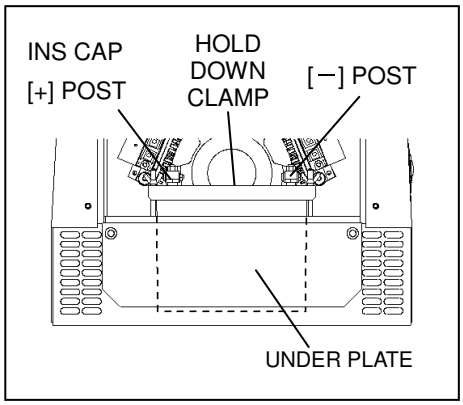
① Check the fluid level. If the level is near or lower than LOWER level, add distilled water until the fluid level reaches UPPER level.
② Make sure that the battery cables are firmly secured to the posts. Tighten the clamps if necessary.



<Caution>
- Check the specific gravity of the battery fluid. If it falls below 1.23, the battery requires recharging. Please consult with our dealer or authorized distributor.

■ Replacing battery

① Remove the under plate. (M6 bolt x 2)
② Remove the clamp and cable from negative [-] post on the battery. (Remove always negative side first)
③ Remove the hold-down clamp from the battery.
④ Remove the clamp and cable from positive [+] post on the battery.
⑤ Remove the battery from the base.



※ Reinstall a new battery in the reverse order.
(Install always the cable to the positive [+] post in the new battery first.)

<Caution>
- Use the following battery.
  ＜46B24L＞

7. Operation

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

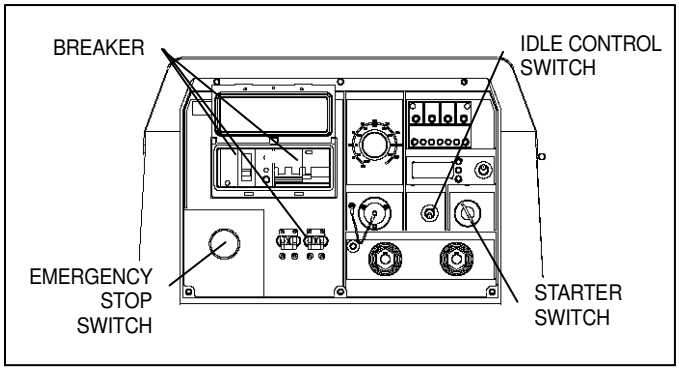
Caution: Suffocation from exhaust fumes
- Do not redirect the exhaust outlet toward pedestrians or building.

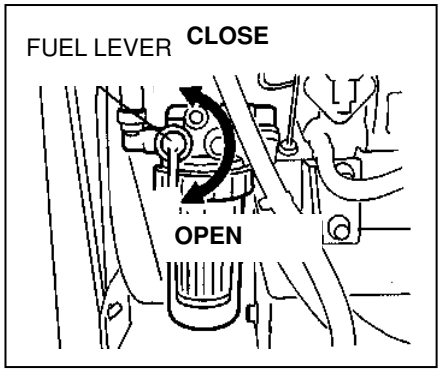
Caution: Fire
- Temperatures around muffler and exhaust can reach extremely high levels. Keep inflammable items (such as fuel, gas, paint, etc.) away from the equipment.
- Always operate this equipment on a flat surface and, at least 1 metre away from any objects (wall, box, etc.)

Caution: Injuries
- Always place the equipment on a flat and stable surface, and fix any wheels with suitable brakes, to prevent the equipment moving.
- Before starting the engine, be sure to disconnect the loads and set the breakers (1-P, 3-P) to [OFF] position.

7-1. Starting

① Turn the breakers (1-P, 3-P) to [OFF]
② Turn the Fuel lever to [OPEN].
③ Turn the Idle Control Switch to [ECO] or [AUTO].
④ Ensure the Emergency Stop Switch is in released position.
⑤ When the temperature is below -5℃, turn and keep the Starter switch to PREHEAT until the preheat lamp turns off (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 has started.
⑧ Keep the engine idle for approximately 5 minutes before use.





<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 reattempt.
- Once the engine has started, never turn the starter switch to [START].

■ Restart after stopping due to fuel shortage

This equipment has a self-bleed system. Therefore, even though the engine stops due to running out of fuel, you can restart the engine easily using the following steps.

① Turn the Starter Switch to [STOP].
② Fill the fuel.
③ Turn the Idle Control Switch to [ECO] or [AUTO].
④ Turn the Starter Switch to [START]
⑤ Release the Starter Switch, once the engine has started.
⑥ Wait for about 1 minute to bleed the air out. The engine speed becomes stable when the air is extracted.

<Caution>

- Never turn the engine HIGH speed or connect the loads until the air is extracted completely (the engine speed becomes stable)

7-2. Stopping

① Turn the breakers (1-P, 3-P) to [OFF].
② Turn the Idle Control Switch to [ECO] or [AUTO].
③ Keep the engine idling (cooling down) for approximately 5 minutes.
④ Turn the Starter Switch to [STOP].
⑤ After the engine has stopped, turn the every Fuel Lever to [CLOSE].

<Caution>

- 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 Stop

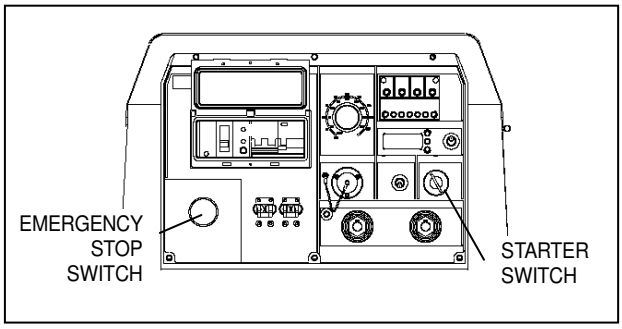
An Emergency Stop feature is incorporated in the equipment.
Push the Emergency Stop Switch in case of an emergency or if an equipment fault develops during operation.

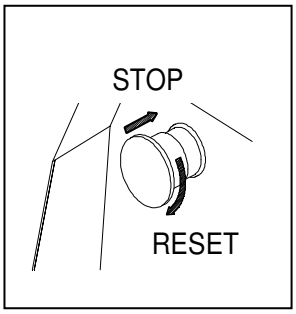
① Push the Emergency Stop Switch to stop engine in an emergency.

<Caution>

- Be sure to return the Starter Switch to [STOP] after the engine stops.
- Never use the Emergency Stop Switch except in case of an emergency.

② Turn the Emergency Stop Switch to arrow mark (clockwise) to release the feature.





8. Welding Operation

8-1. Selection – Welding Cable

Ensure adequate lighting is available. If ambient light is insufficient, use additional lights.
Select the correct cable, based on the allowable amperage distance, as per the table shown below.
The welding capacity is reduced if the small gauge cable is used.

<Caution>

- Welding cables should be used uncoiled. When the welding cables are used coiled, the welding capacity is reduced.

Correct Size of Cable (Unit: mm^2)

Return Length / Welding Current	20m	30m	40m	60m	80m	100m
300A	30	38	50	80	100	125
250A	22	30	38	60	80	100
200A	22	30	30	50	60	80
150A	22	22	22	38	50	60
100A	22	22	22	30	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 instruction of the welding rods, the polarity of which is specified.

	Application	Connection
Normal Polarity	Generals 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)

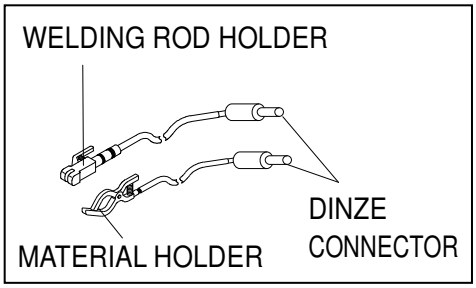
8-3. Connection – Welding Cable

Danger: Electric Shock

- Always examine welding cables, power cables and plug etc., to ensure there are no defects present, prior to operation.
- Before connecting or disconnecting a welding cable from welding output terminals, stop the engine, and remove the engine key. A person performing this task must always keep the key.

① Stop the engine.

② Connect the welding cables to the DINZE connectors, a welding rod holder and a material holder.



<Caution>

- Always fit the correct size DINZE connectors.(Recommended parts : DIX SK70)
- Ensure the welding cables connections are made correctly.
- Be sure to connect the cables tightly to welding output terminal. Otherwise, welding output terminals may burn due to the heat caused by poor connections.
- Do not use a cable without the DINZE connectors. Personal injury or damage to the machine may result as a consequence.

8-4. Duty Cycle

Duty cycle is the percentage of time the load is being applied in a 10 minutes period. For example, a 50% duty cycle represents 5 minutes of load and 5 minutes of no load in a 10 minutes period. Be sure to take 5minutes break after each 5minutes of continuous welding time.

<Caution>

- The equipment may become damaged due to overheating, if continuous welding periods exceed 5minutes or if break period is reduced.

This machine produces drooping characteristics to EN60974-1.

8-5. Welding

⚠ 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 fume.

⚠ 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 spark in welding.

Standard for Spark Protection Glass

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

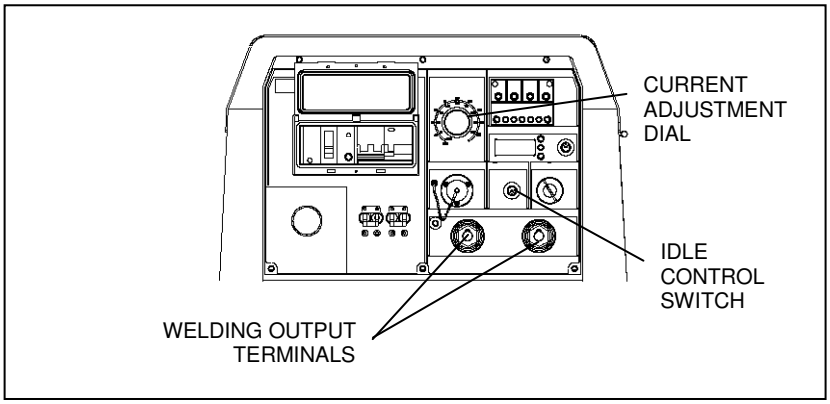
⚠ Caution: Fire

- Keep any inflammable items and combustible materials away from welding area.

⚠ Caution: Burns

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

The adjustable output range by the Current Adjustment Dial depends on the position each of the Idle Control Switch.



① Turn the Idle Control Switch to [ECO] or [AUTO] or [HIGH], according to the operation.

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.
- When the remote control box is used, the value may change to some degree.

9. Generator Operation

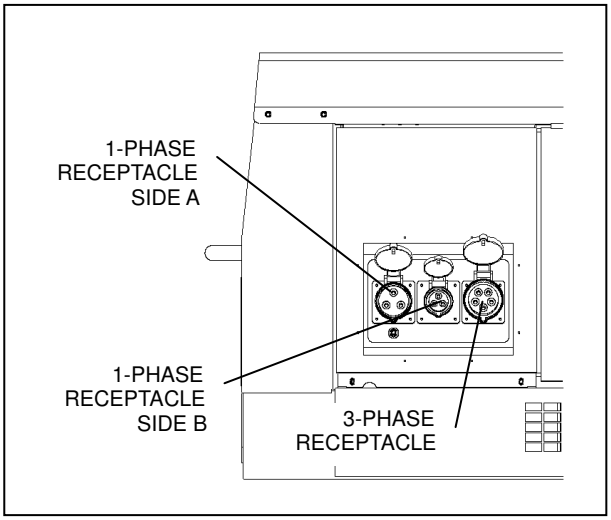
9-1. Output Range

(1) 3-Phase 415V Output Receptacle

Maximum output from the 3-Phase receptacle is 7KVA.

(2) 1-Phase110V Output Receptacles

1-Phase 110V CTE Output is available through 2 receptacles. Maximum 3.3kVA is available through 1-Phase receptacle of side A. Maximum 1.6kVA is available through 1-Phase receptacle of side B. Maximum output by 2 receptacle sets is 3.3kVA.



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 purpose only)

Loads	Capacity (kW)			
	1-Phase 110 V			3-Phase 415 V
	Receptacle side A	Receptacle side B	Receptacle 2 set use	Receptacle
Electric Bulb, Heater, etc.	3.3	1.6	3.3	---
Electric Tools, etc (Series Motor),	1.5	0.7	1.5	---
Mercury Bulb (High Power Factor Type)	1.2	0.6	1.2	---
Submersible Pump, Compressor, etc (Induction Motor)	1.2	0.6	1.2	2.8

<Caution>

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

9-3. Operation

Danger: Electric Shock

- Do not operate the equipment, if the equipment or you are wet.
- Before connecting or disconnecting a load cable from the receptacles, always turn the circuit breakers (1-P, 3-P) to [OFF] position. Always stop engine, and remove the engine key. The person performing the maintenance must always keep the key.
- Ground the grounding terminal to the earth as set out in the manual. 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..
- Whenever the current earth leakage breaker activates, you should find and repair the fault before operating.

Caution: Injuries

- Be sure to connect to the receptacles, after confirming that all the switches on the loads are set to the [OFF] position.
- Always examine welding cables, power cables and plugs etc., to ensure there are no defects present, prior to operation.
- Do not connect the equipment to any power supply network.
- Extra precautions must be taken whenever performing more hazardous welding operations such as:
  - Environments with increased risk of electric shock, for example due humidity or conductivity;
  - Inflammable surroundings and/or atmospheres;
  - Inflammable products;
  - Closed containers;
  - Elevated working positions or platforms.

Caution: Damage to the equipment or other property

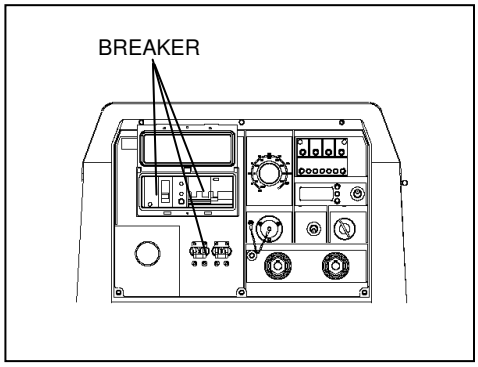
- Consult with your dealer or authorized distributor when utilizing this equipment on devises with microcomputer control or ultra-precision items, which are very sensitive to voltage fluctuation.
- Keep the equipment away from those devices to avoid influence from electromagnetic noise.
- Consult with hospital or medical equipment company before using this equipment on medical apparatus.
- It is recommended you follow this instruction manual strictly, to avoid any unnecessary accidents, repairs and damage.
- Do not use this equipment for the purpose of thawing pipes.
- If utilizing this equipment in conditions where altitude, ambient temperature and/or humidity is higher than the reference conditions, a reduction in power may be necessary..

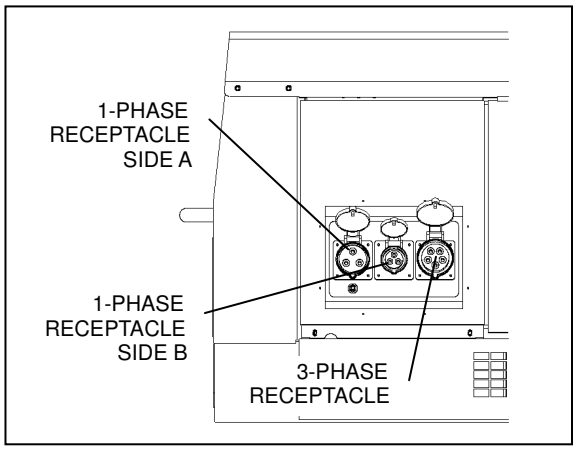
<Caution>

- The AC Volt meter reads 3-P output voltage, apart from the circuit breakers (1-P, 3-P) positions to [ON] or [OFF], when the engine is driving.

After the engine starts (Refer to 『7-1. Starting』), operate the equipment as per the following procedures.

① Turn the power switch to [OFF] in the load.
② Turn the breakers (1-P, 3-P) to [OFF].
③ Connect the load to the output receptacles.
③ Turn the breakers (1-P, 3-P) to [ON].
(Ensure the ELCB lever to be positioned at [ON].)





■ The Circuit Breaker has activated due to overload

⚠ Caution: Injuries

- Be sure to turn the power switch OFF in the load when turning the circuit breaker to [ON] again, when the circuit breaker has activated.

When the electric load exceeds the rated output (overload), the circuit breaker activates to trip off in order to shut down the circuit. Check the circuit breakers (1-P, 3-P).

In this case the leakage indication button protrudes on 3-Phase ELCB or the ELCB lever(White lever and Black lever) positions at [OFF] on 1-Phase ELCB, refer to 『5-5. Earth Leakage Relay and Grounding』.

When any breaker has tripped, restore the circuit breaker as per the following procedure.

① Turn OFF all the power switches in the loads.
② Push up the breaker to [ON]. In the case 3-Phase ELCB, once push down the breaker lever to『OFF』and push up the lever to『ON』.

<Caution>

- Take care not to overload, referring to『9-2. Output Limitation』.

10. Simultaneous Use of Welding and Generating

The circuit breakers (1-P, 3-P) react 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 and limit the AC power use.

■ Limitation of AC Power Supply in the simultaneous use of welding and generating

Welding Output		AC Power Output		
Amperage		3-Phase		1-Phase
60A		7.0kVA		3.3kVA
120A		7.0kVA		3.3kVA
140A	PLUS	6.4kVA	OR	3.3kVA
170A		5.2kVA		3.3kVA
240A		2.0kVA		1.6kVA
300A		0kVA		0kVA

<Caution>

- Eco mode is designed for welding only. The engine automatically moves to high speed, in case it is used for AC Output.

11. Checking and Maintenance

Danger : Electric Shock · Injuries

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

Caution: Fire · Burns

- Keep the equipment far away from fire.
- When checking engine, always stop the engine, and keep away from fire. Wait until the engine cools down, before performing any inspection.
- Do not open the radiator cap while operating this equipment or immediately after stopping the equipment, to prevent burns from hot steam or water.
- Do not open the side door during operation or immediately after stopping the equipment, as some parts/components (flexible tube, resistors, etc.) can reach extremely high temperature inside the equipment.

<Caution>

- Authorized technicians should perform all checks and maintenance work, except for the pre-startup checks.
- Request for the maintenance item with ● mark to our dealer or authorized distributor.
- Always use our genuine replacement parts.
- 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 disposal, please follow the international/federal regulations.
- Please do not dispose of harmful items or waste fluid to the ground or a river, pond, or other water resources and help to keep our environment clean.

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.

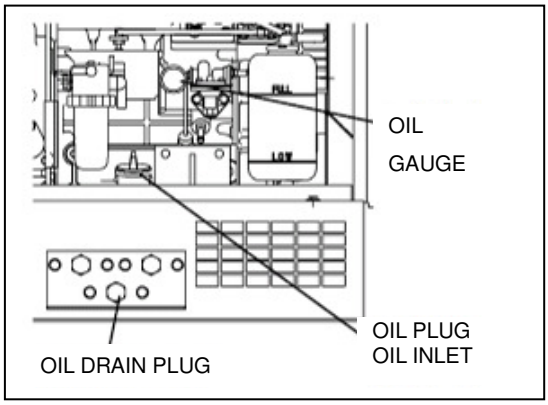
Checking Items		Pre-Startup Check	Checking Time					
			At 50hrs	Every 100 hrs	Every 200 hrs	Every 400 hrs	Every 1000 hrs	Every 2000 hrs
1	Check and Supply Fuel	○						
2	Check and Supply Engine Oil	○						
3	Engine Oil Change		1st ○	2nd or after ○				
4	Oil Filter Change		1st ○		2nd or after ○			
5	Check/Add Water/Coolant	○						
6	Water/Coolant Change							○ or one year
7	Clean Fuel Strainer		1st ○	2nd 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		1st ○	2nd or after ○				

Checking Items		Startup Check	Checking Time					
			At 50hrs	Every 100 hrs	Every 200 hrs	Every 400 hrs	Every 1000 hrs	Every 2000 hrs
13	Adjust V-Belt Tension		1st ●	2nd or after ●				
14	Change V-Belt					● or 2 years		
15	Clean Radiator Fin					●		
16	Clean Radiator (inside)					●		
17	Change Fuel Hose, Oil Hose, **Vibration-Absorbing Rubber**							● or 2 years
18	Adjust Engine Valve Clearance						● Adjust	● Plane
19	Check/Adjust Injection Nozzle					●		
20	Check/Adjust Injection Pump							●

(1) Oil Change

First Time	50 hour mark
2nd 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 to fill up to the max level (Approx. 3.8L).
④ Reinstall the oil plug hand tight.

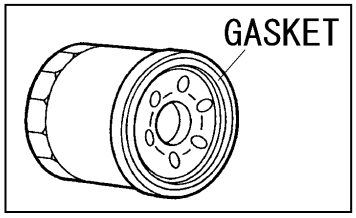


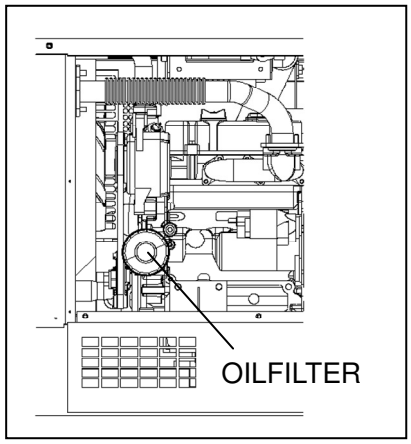
<Caution>

- Refer to 『6-1. Checking Engine Oil』 to select engine oil.
- Change the seal, whenever changing oil.
- Seal No. : 6C090-58961 (Kubota)
- After reinstalling the oil drain plug tightly, keep the engine drive for a while to check no engine oil leakage and then stop the engine.

(2) Oil Filter Change

First Time	50 hour mark
2nd or after	Every 200 hours





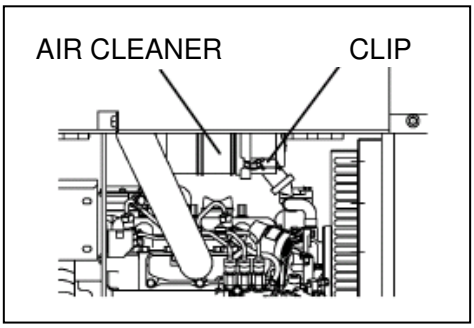
① Drain the engine oil completely, as described in『11 (1) Oil Change』.
② Loosen and remove the oil filter, using an oil filter wrench.
③ Smear a little engine oil on the rubber gasket of a new filter.
④ Screw the new filter into place and tighten it by hand until the gasket contact the seat. Then, give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

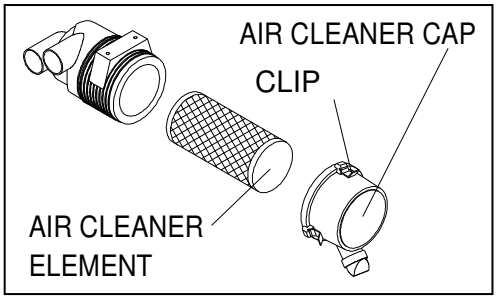
<Caution>

- If an oil filter wrench is not available, contact with our dealer or authorized distributor.
- Oil Filter Part No. : 15241-32090 (Kubota)

(3) Clean/Change Air Filter Element

Clean	1st 50 hours and Every 100 hours afterwards
Replace	Every 400 hours





① Disconnect the Air Cleaner Cap by releasing the clips.
② Remove the air element.
③ Clean or replace the air element.
<The element is adhered with dried contaminants>
Blow compressed air from inside the element.
<The element is adhered with carbon or oil>
Replace with a new one.
④ Reinstall them in reverse order.

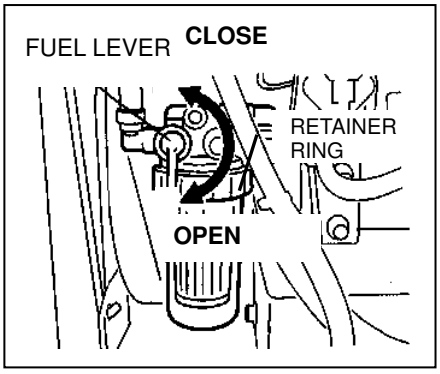
<Caution>

- Clean more frequently, if it is used in dusty environment.
- Element Part No. : 1G659-11221 (Kubota)

(4) Clean/Change Fuel Strainer

Clean	1st 50 hours and Every 100 hours afterwards
Replace	Every 400 hours

① Turn the fuel lever to [CLOSE].
② Unscrew the retainer ring counterclockwise, and remove the cup and the filter element.
③ Discard any dust or water inside the cup, and clean the filter element by blowing compressed air, or replace if necessary.
④ Reassemble it back.



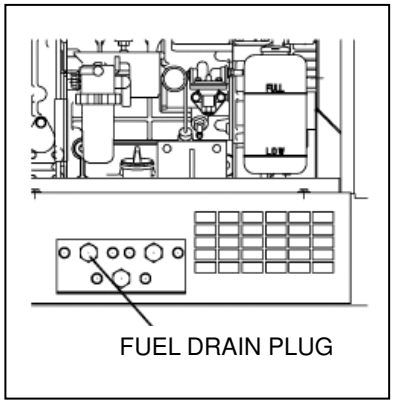
<Caution>
- Be sure to check for any contaminants on the seal, whenever reinstalling the cup.
- Turn the fuel lever to [OPEN] after assembling, and check for any leak. Having confirmed no leak without fail, turn the fuel lever to [CLOSE].
- Element Part No. : 16271-43561 (Kubota)

(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

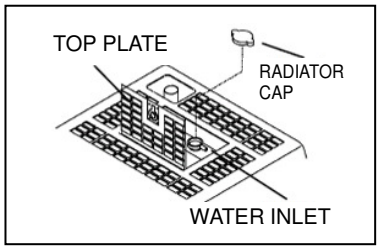
<Caution>
- Change the seal, whenever drain water.
- Seal Part No. : 6C090-58961 (Kubota)
- After reinstalling the fuel drain plug tightly, keep the engine drive for a while to check no fuel leakage and then stop the engine.



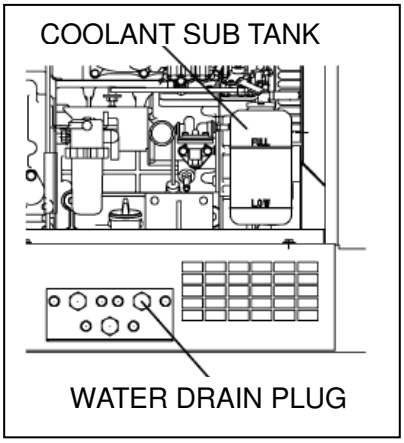
(6) Changing Coolant/Water

Replace	Every 2 years or 2000 hours

(Total Coolant/Water Capacity: about 3 L, including sub tank cap. 0.6 L)



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



<Caution>

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

⑤ Replace all the coolant/water in the engine/radiator and sub tank.
⑥ Fill the coolant/water to the MAX level (to the upper edge of the inlet).
⑦ Reinstall the radiator cap.
⑧ Close the top plate.

<Caution>

- After reinstalling the water drain plug tightly, keep the engine drive for a while to check no water leakage and then stop the engine.

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 far away from fire. Temperatures around the muffler and exhaust can get extremely high. Wait until the engine cools down, before performing any inspection.

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

① Remove the battery. **(Always remove negative [-] terminal first and always reinstall positive [+] terminal first)**
② Change the engine oil.
③ Drain fuel from the fuel tank, the Fuel Strainer.
④ Clean all parts, cover the welder-generator, and keep it in the storage, away from dust and humidity.

<Caution>

- Store the battery in a well ventilated area away from risk of naked frames.
- Recharge the removed battery once a month.

13. Troubleshooting

Danger: Electric 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.

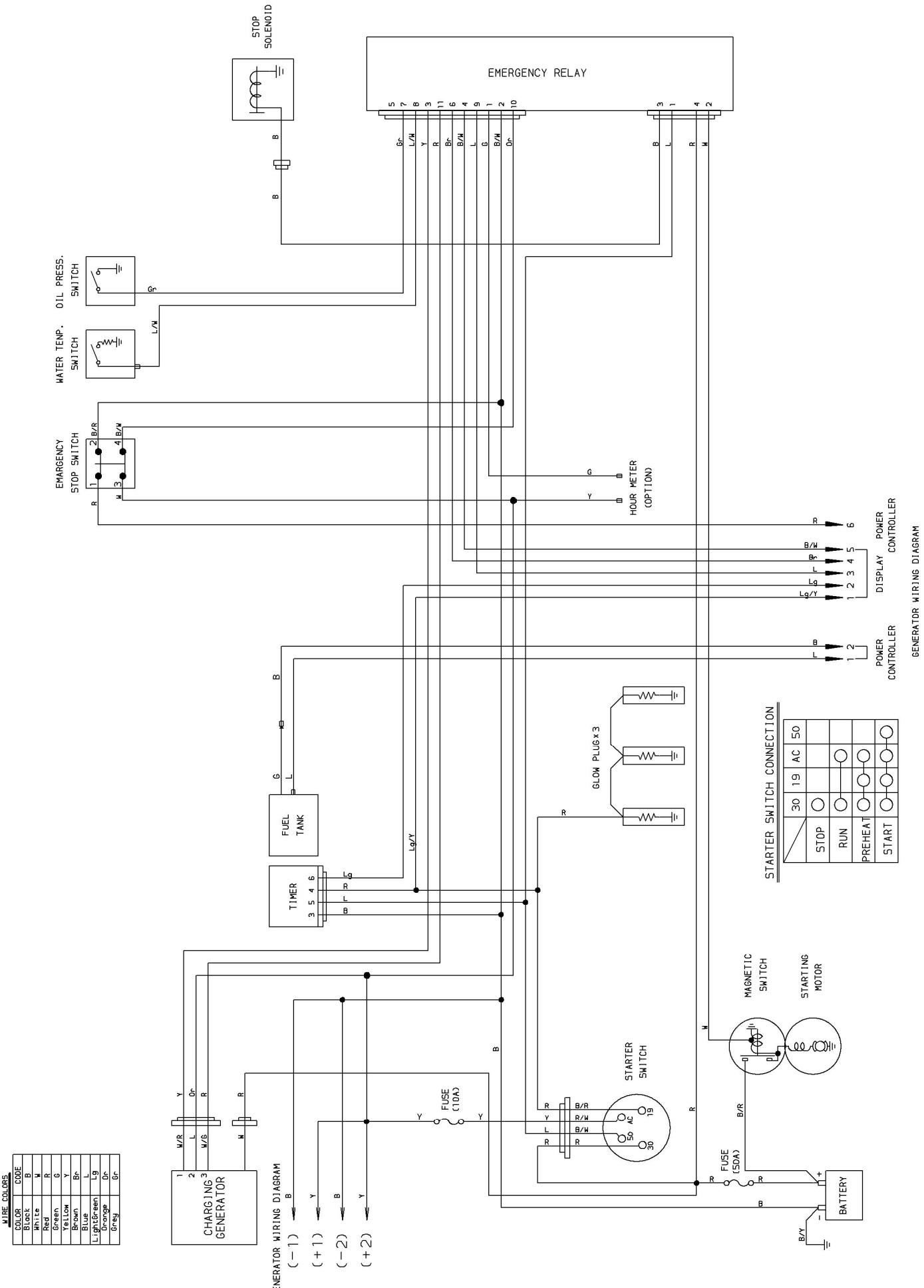
⚠ Caution : Fire・Burns

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

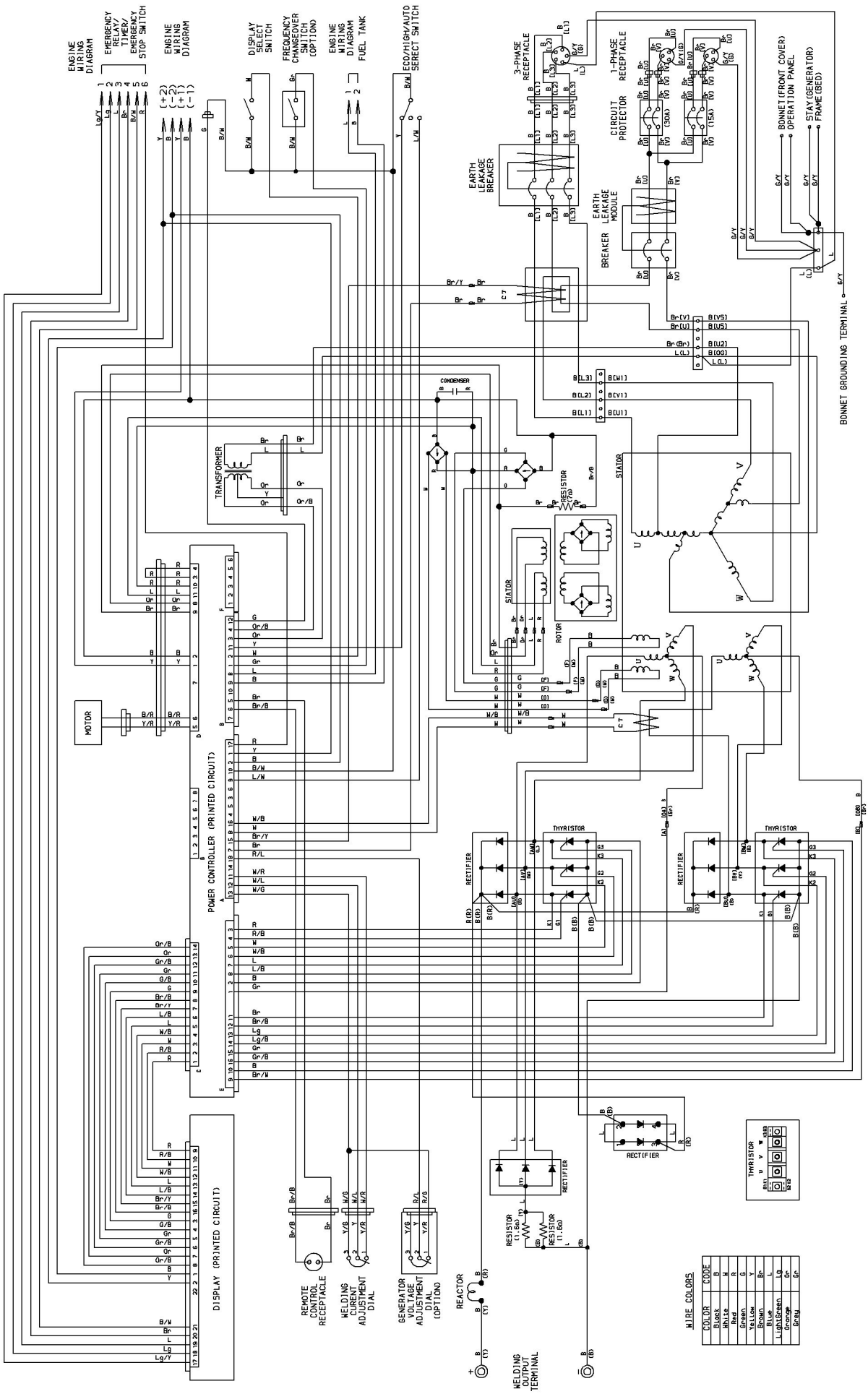
Follow the guidelines below, when performing any troubleshooting. If you cannot resolve the problems by this troubleshooting guide, contact with our dealer or authorized distributor to request the repair.

Symptoms	Possible Cause	Corrective Actions
Starter motor does not start	1. Weak Battery 2. Dead Battery	1. Recharge Battery 2. Replace Battery
Engine does not start	1. Fuel lever on fuel strainer to [CLOSE] 2. Insufficient Fuel 3. Fuse burnt 4. Fuel is contaminated by the water or dust	1. Open the fuel lever for fuel strainer 2. Replenish fuel 3. Replace the fuse 4. Drain water or clean fuel tank, fuel strainer
Engine starts, but stalls immediately	1. Insufficient oil 2. High Water Temperature, Insufficient coolant/water 3. Unable to charge 4. Emergency Stop Switch keeps pushed	1. Replenish oil 2. Replenish coolant/water 3. Repair 4. Release the Emergency Stop Switch
Excessive Black smoke exhaust from muffler	1. Overloaded use	1. Operate the machine within the rated output
Engine does not stop	1. Stop Solenoid malfunction	1. Turn the fuel lever to [CLOSE] to stop and repair
Welding Arc is weak	1. Idol Control Switch position is incorrectly selected to [ECO] mode 2. Wrong Output Control Dial position 3. Improper connection of cables 4. Improper Cable Diameter 5. Improper connection to the base material 6. Simultaneous Use of Welding and Generating exceeding maximum permissible load	1. Turn to [AUTO] or [HIGH] mode 2. Turn the dial clockwise 3. Connect securely 4. Replace the cables based on the『Welding Cable Selection』 5. Connect securely 6. Stop using AC Power output
Excessive Welding Arc	1. Idol Control Switch is to [AUTO] or [HIGH] mode 2. Wrong Output Control Dial position	1. Turn to [ECO] mode 2. Turn the dial counterclockwise
No AC Output	1. The breaker (1-P or 3-P or ELCB) positions to [OFF]	1. Turn to [ON]
AC Output is weak	1. The rated current of the load exceeds the rated output 2. Use of Welding and Generating Exceeding maximum permissible load	1. Adjust according to『OUTPUT LIMITATION』 2.Stop Welding
Unable to activate the AUTO IDLE Feature	1. Welding cables short circuit 2. The power consumption of the load is 0.5A or below	1. Repair the short circuit 2. Set the Idol Control to [HIGH] mode

14. Engine Wiring Diagram



15. Generator Wiring Diagram



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