

OPERATOR'S MANUAL

ECO 300/UK

Series 3

Original Instructions



CE



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

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Introduction

Thank you for purchasing a 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** contained on page 2 of 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 sources 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”.

EC Declaration of Conformity

In accordance with EN ISO 17050-1:2004

MANUFACTURER:

YAMABIKO CORPORATION
Shin-Ujigami 35, Kita-Hiroshima-Town
Yamagata-Gun
HIROSHIMA 731-3167, JAPAN

EUROPEAN CONTACT:

SHINDAIWA LIMITED
6, The Dell, Enterprise Drive
Four Ashes Ind. Est.
WOLVERHAMPTON WV10 7DF, UK

in accordance with the following Directive(s):

2004/108/EC	The Electromagnetic Compatibility Directive and its amending directives
2006/42/EC	The Machinery Directive
2000/14/EC	The Noise Emission in the Environment by Equipment for Use Outdoors Directive
2011/65/EU	The Restriction of Hazardous Substances Directive

hereby declare that:

Equipment	Diesel engine driven welding set
Model number	ECO300/UK
Serial Number	This certificate relates to all machines imported into UK & Eire since 2010.

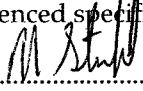
is in conformity with the applicable requirements of the following documents

Ref. No.	Title	Edition/date
BS EN ISO 12100	Safety of machinery. General principles for design. Risk assessment and risk reduction.	2010
BS EN 60204-1	Safety of machinery. Electrical equipment of machines. General requirements.	2006 + A1:2009
BS EN 60974-10	Arc welding equipment. Electromagnetic compatibility (EMC) requirements	2007
EN 12601	Reciprocating internal combustion engine driven generating sets. Safety	2010
EN 60974-1	Arc welding equipment. Welding power sources	2012

Noise measurements have been made in accordance with ISO 3744 with internal control of production (Schedule 8/Annex V). The declared noise values are as follows:

Measured sound power level	Guaranteed sound power level
88 dB L _{WA}	88 dB L _{WA}

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications and is in accordance with the requirements of the Directive(s)

Signed by: 

Name: MARK STANSFIELD

Position: DIRECTOR

Done at WOLVERHAMPTON

On 21st April 2013

Document ref. No.
2960/1050465/Rev. 1

The technical documentation for the machinery is available from:

Name: Shindaiwa Ltd

Address: 6 The Dell, Enterprise Drive, Four Ashes, Wolverhampton WV10 7DF

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 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 outlet toward pedestrians or buildings.

Caution: Suffocation from welding fumes

- Be sure to wear a fume proof mask in 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 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.
- The battery may emit combustible gas, so keep it away from fire and sparks.

⚠ Caution: Fire

- This equipment uses Diesel as a fuel. When inspecting the equipment or refuelling, always stop the engine and keep away from fire, always wait until the engine cools down before refuelling.
- Always wipe away any drips 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 a flat surface and at least 1 metre away from any object (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

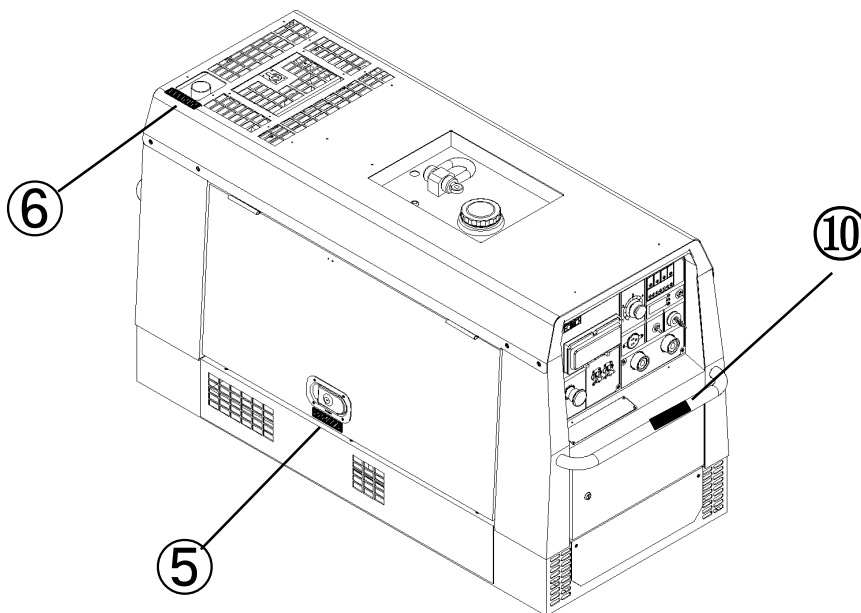
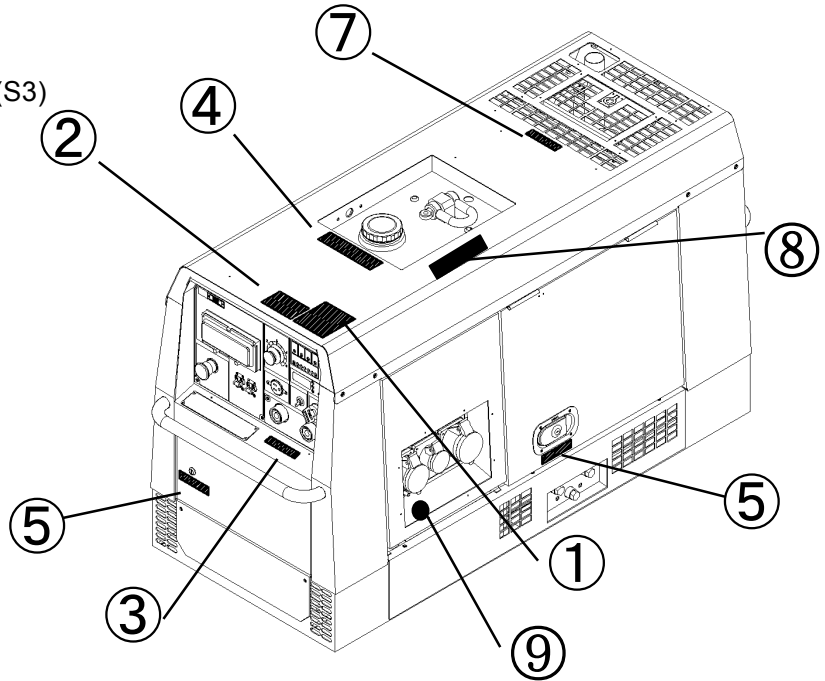
- When lifting the equipment, always use the top-mounted lifting lug. **Do not lift using the positioning handles.**
- Always use appropriate lifting gear & secure adequately during transportation.
- Always place the equipment on a flat and stable surface and fix the wheels to prevent equipment movement.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

■ Location of Warning labels











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

When ordering labels, use the following part numbers.

- ① Suffocation from exhaust fumes (No. 19402-00194)-S6
- ② Suffocation from welding fumes (No. 19402-00195)
- ③ Electric shock (No. 19402-00193)
- ④ Fire (No. 19402-00166)
- ⑤ Injury (No. 19402-00199)
- ⑥ Burns (No. 19402-00200)-S5
- ⑦ Burns (No. 19402-00201)-S16
- ⑧ Lifting Eye (S10)
- ⑨ Earth Symbol (S17)
- ⑩ Positioning Handle (S3)



LABEL REPRODUCTION

 DANGER		 CAUTION	
	SUFFOCATION FROM EXHAUST FUMES <ul style="list-style-type: none"> Do not operate this equipment in poorly ventilated areas. 	FIRE <ul style="list-style-type: none"> Always operate the equipment on flat surface and at least 1 meter away from any objects (wall, box, etc.). Keep any flammable items (such as fuel, gas, paint, etc.) away from the place of work. Leaked fuel may cause fire <ul style="list-style-type: none"> Before starting the engine, be sure to check for leakage in fuel piping or fuel strainer. If over filling fuel, wipe away any fuel spills. Turn the fuel lever to close, when stopping the engine. Be sure to check the following when cleaning the fuel strainer: <ul style="list-style-type: none"> Check for any dirt on the packing when installing the strainer cup. Check for leakage, by turning the fuel lever to OPEN, after the strainer cup is installed.  <ul style="list-style-type: none"> Please operate the equipment after thoroughly reviewing and understanding the contents of the operators manual. 	
	ELECTRIC SHOCK <ul style="list-style-type: none"> Do not touch the equipment in wet or when you are wet. Before performing any equipment check or maintenance always stop the engine. Do not touch wirings or any electric parts inside the equipment during operation. 		
	<ul style="list-style-type: none"> Do not connect AC OUTPUT to any indoor wiring. 		
	<ul style="list-style-type: none"> Do not operate this equipment in the rain, IP23 		
	INJURIES <ul style="list-style-type: none"> Before performing any equipment check or maintenance always stop the engine. 		
	INJURIES TO EYES AND SKIN <ul style="list-style-type: none"> For the protection of eyes from welding arc, always wear the arc proof glasses. For the protection of skin from welding arc or spatter, always wear leather gloves, apron, shoe covers and shirts with long sleeves. 		
	SUFFOCATION FROM WELDING FUMES <ul style="list-style-type: none"> Always operate the equipment in well ventilated areas. Always wear a fume proof mask in operation. 		

① Label (No. 19402-00194)-S6

⑥ Label (No. 19402-00200)-S5



⑦ Label (No. 19402-00201)-S16



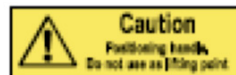
⑧ Label (No. S10)



⑨ Label (No. S17)



⑩ Label (No. S3)



2. Specifications

Model		ECO 300/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 – 5.0
	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	
Dimensions	Length x Width x Height (mm)		1410 x 566 x 760
Dry Weight (kg)		348	

Generating Set ISO 8528-8/G2

EMC Group 2 Class A

Illustration of Rating Plate Label

MODEL	ECO 300/UK	SOUND PROOF DIESEL ENGINE WELDER-GENERATOR									
SERIAL No.		Welding Generator	Rated Current (A)		280	AC Generator	Rated Frequency (Hz)		50		
YEAR OF MANUFACTURE:	2011		Duty Cycle (%)		50		Rated Speed (min ⁻¹)		3000		
NOISE LEVELS:	88 dB LWA		ECO	Current Adj. Range			30-200	Phase		1-Phase 3-Phase	
CE	IP 23 Rated		AUTO/HIGH	Current Adj. Range			40-300	Rated Voltage (V)		110 CTE 415	
			Rated Speed (min ⁻¹)		3000		Rated Current (A)		30 9.8		
FUEL:	DIESEL (ASTM No. 2-D)		No Load Voltage (V)		MAX 85		Power Factor		1.0 0.8		
FUEL TANK CAPACITY:	37 L		ENGINE:		KUBOTA D722		Rated Output (kVA)		3.3 7		
DRY WEIGHT:	348 kg		ENGINE SERIAL No.				Rating		Continuous		
Manufactured By: Yamabiko Corporation, 6-2-11, Ozuka-Nishi, Asaminami-Ku, Hiroshima, 731-3167 JAPAN											
Authorised Distributor: Shindaiwa Limited 6 The Dell, Enterprise Drive, Four Ashes, Wolverhampton, WV10 7DF Tel: +44 (0)1902 791 855 Fax: +44 (0)1902 791933											

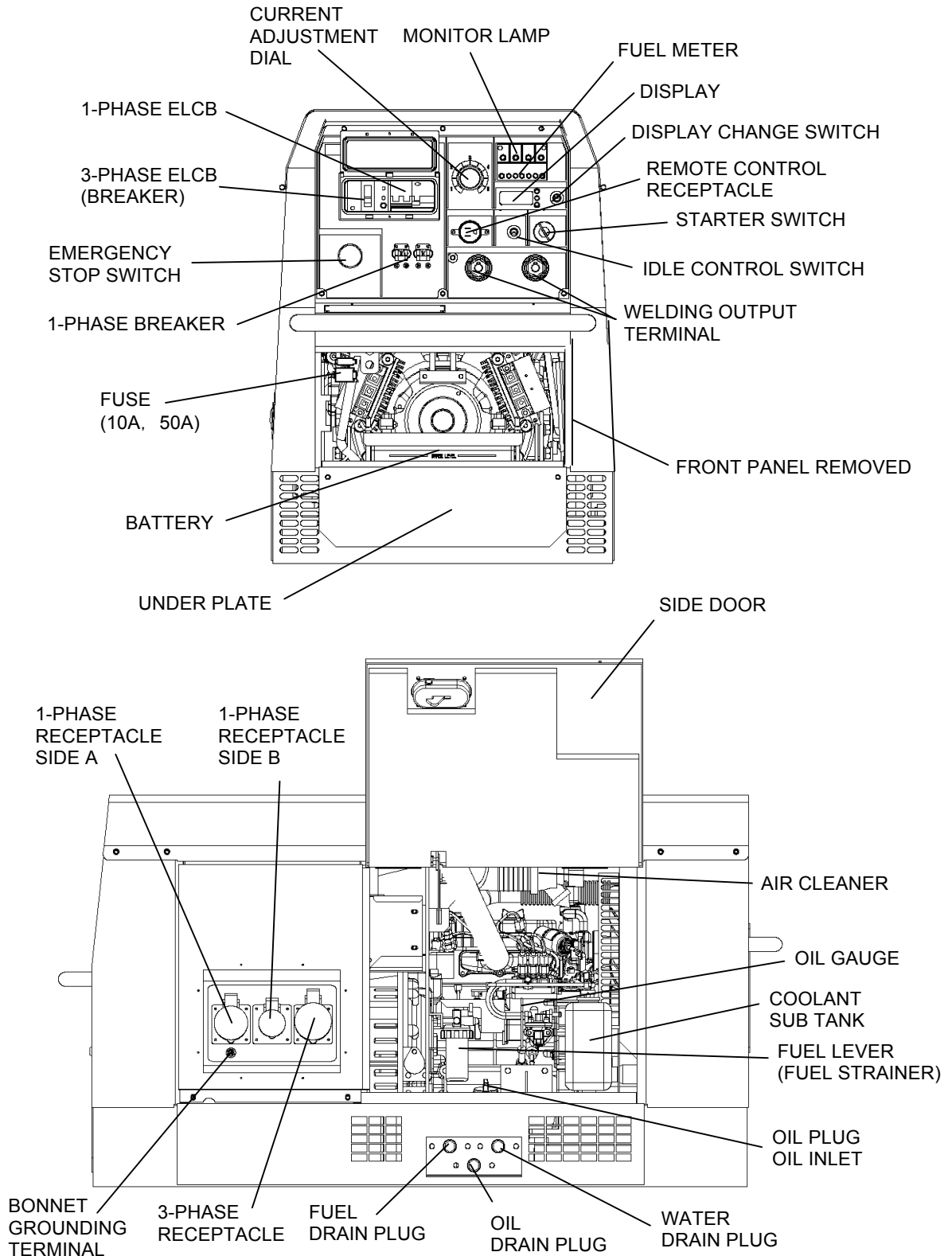
3. Use

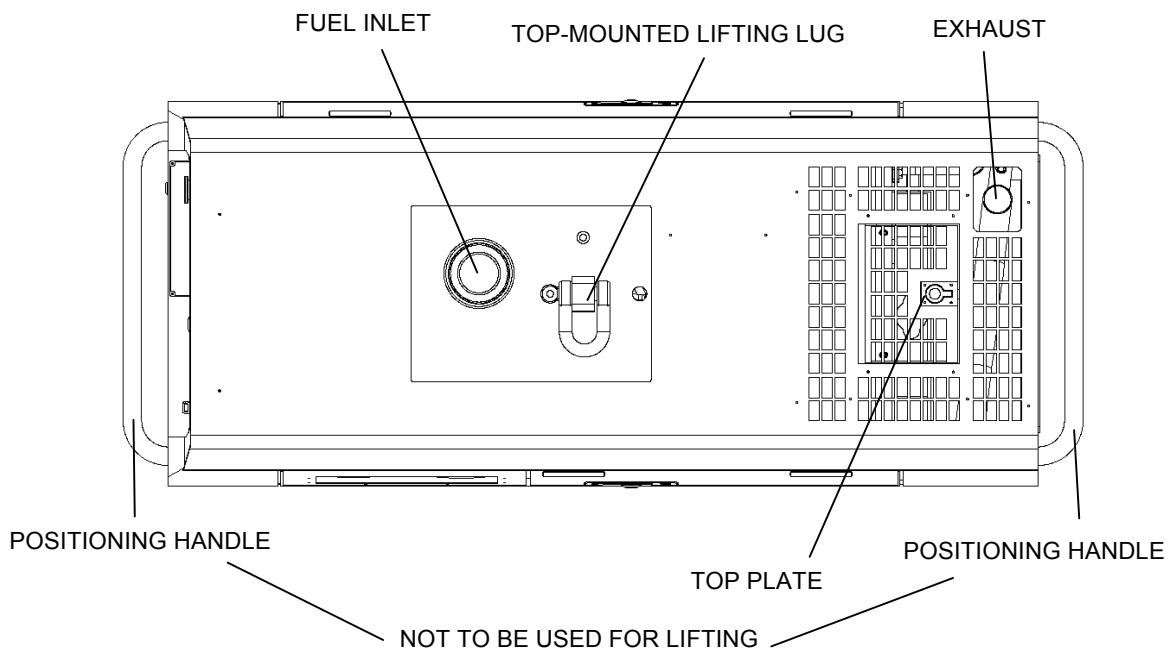
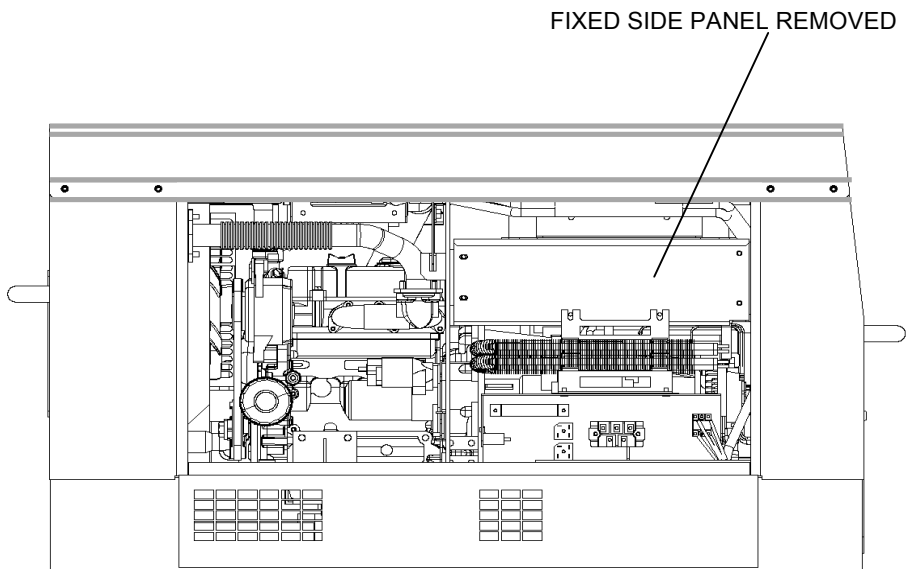
- Arc Welding
- Power Source for Lights, Electric Tools and equipment.
- Voltage classification G2
- EMC classification Group 2 Class A.

Caution: Damage to the equipment or other properties

- Consult with our dealer or authorised distributor when utilising 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. Eco Welding

This equipment 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 5.0mm 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

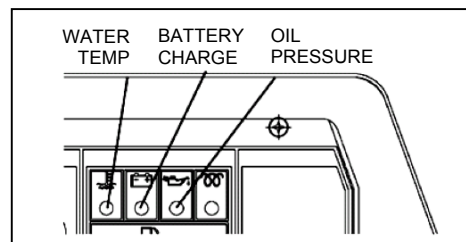
The equipment incorporates a Digital Display. It displays AC Voltage, Hours Worked and Speed successively, by changing the display selector switch.

<Caution>

- During operation, the AC voltage meter always displays the voltage in 415V, 3-Phase both with 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, the monitor lamps will go OFF. When a 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 the [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 further investigate 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.

Danger: Burns

- 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 temperatures 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

If 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 or 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 filler 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.

If this symptom occurs, check the engine oil level, and replenish to maximum level.

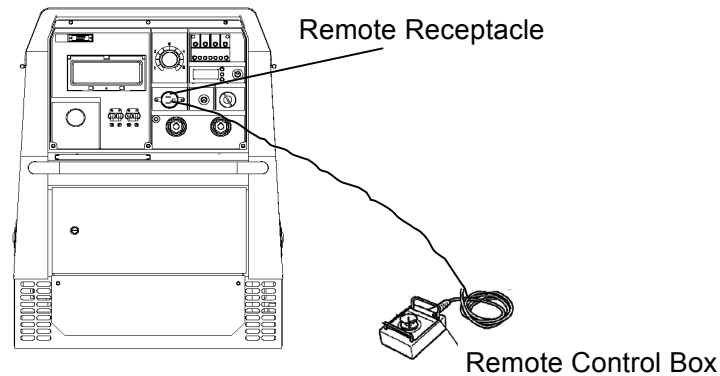
<Caution>

- 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』)

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 in 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) within 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 the 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: 500 Ω or below)

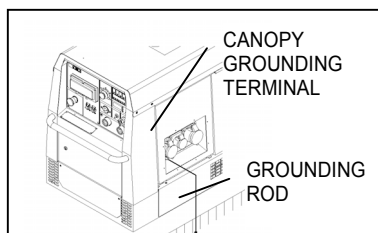
(1) Grounding Work

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

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

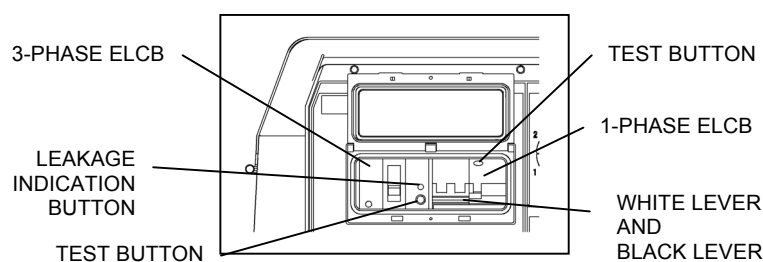
<Caution>

- In the event you cannot ground the generator to the earth, consult with a qualified electrician or Shindaiwa Ltd.



(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 the 3-Phase ELCB. The earth leakage indicator button protrudes and the lever is 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.

- In the event you cannot correctly complete all steps in the above procedure, the machine is “out of order”. Consult with a qualified electrician.

(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 the [ON] and [OFF] position.

If the 1-Phase earth leakage relay has activated, The ELCB (White lever and Black lever) turns to [OFF].

In this case, stop the engine 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 property

- Always switch the Idle Control Switch to [HIGH], when the load is incorporated with any magnet switch.

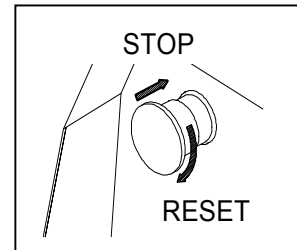
<Caution>

- When a 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. Initialisation and Pre-operation check

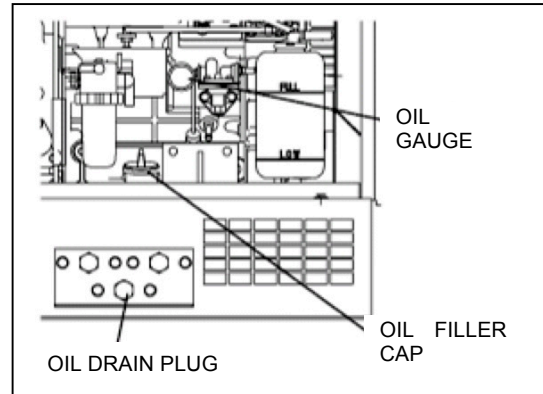
⚠ Caution: Fire • Burns • Injuries

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

6-1. Checking Engine Oil

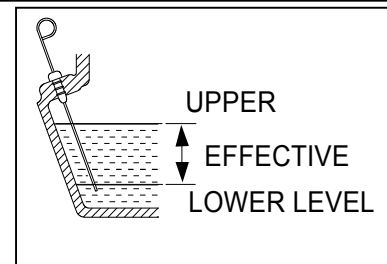
When checking for engine oil, be sure to keep the equipment level, and insert the oil gauge firmly.

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 (above UPPER line) the engine oil. Excessive amounts of engine oil may damage the engine.



- Selecting correct engine oil

<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 moving parts.

⚠ Danger: Burns

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

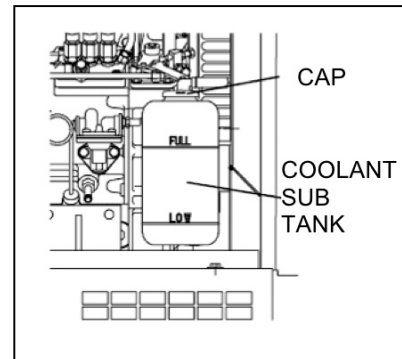
⚠ Caution : Burns

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

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.

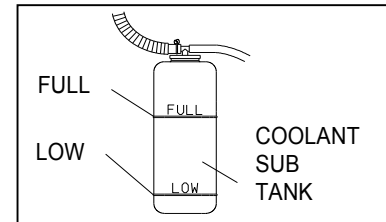
(1) Filling the Coolant Sub Tank

- ① Remove the coolant sub tank cap.
- ② Fill the coolant sub tank to the FULL level.
- ③ Place the cap back.



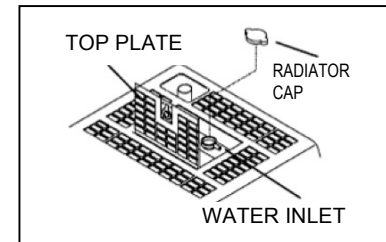
(2) Filling the Radiator

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



<Caution>

- Use Long Life Coolant (LLC), to 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°C	-20°C	-30°C
Mixture Ratio	30%	35%	45%

6-3. Checking Fuel

⚠ Caution : Fire

- Always wipe away any drips of fuel. Do not use this equipment if a leak is found. Repair the equipment before use.

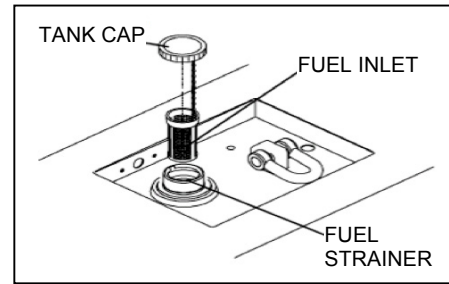
Check the fuel level in the tank. Add if necessary.

<Caution>

- Use Diesel fuel, ASTM D975 No.2-D in the event ambient temperature reaches down to -5°C.
- 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°C(20°F), No.2-D fuel may pose operating problems (see “Cold Weather Operation which follows). At colder temperatures, use No.1-D fuel (if available) or use a “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 temperatures than No.2-D fuel which has not been “winterised”. Check with the service station operator to make sure you can get the correctly 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 to slightly less than FULL.



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

⚠ Caution: Fire

- Do not use this equipment if a leak is found. Repair the equipment before use.
- Be sure to check for any leakage of fuel, oil and coolant/water at the hose connections.

6-5. Checking Battery

⚠ Caution: Injuries to eyes and skin

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

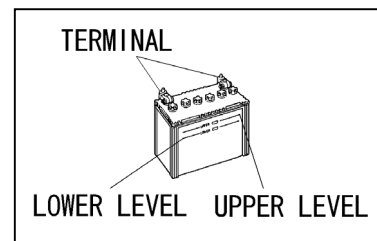
⚠ Caution: Explosion

- 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 gases, so keep away from naked flames and sparks.

⚠ Caution: Fire

- Battery may emit combustible gases, so keep away from flames and sparks.

- ① Check the fluid level. If the level is near or lower than the 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.

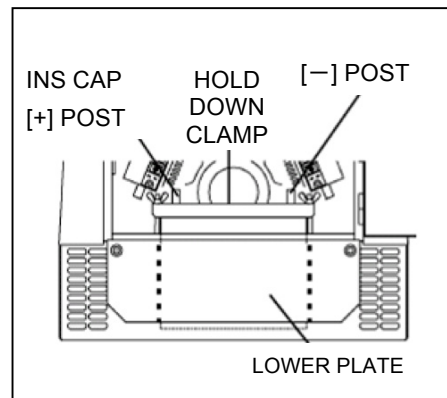


<Caution>

- Check the specific gravity of the battery fluid. If it falls below 1.23, the battery requires recharging.

■ Replacing battery

- ① Remove the upper and lower plate.
(M6 bolt x 2)
- ② Remove the clamp and cable from negative [-] post on the battery. (Always remove 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.



- ※ Install a new battery in the reverse order.
(Always install 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 contain 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 towards pedestrians or buildings.

⚠ Caution: Fire

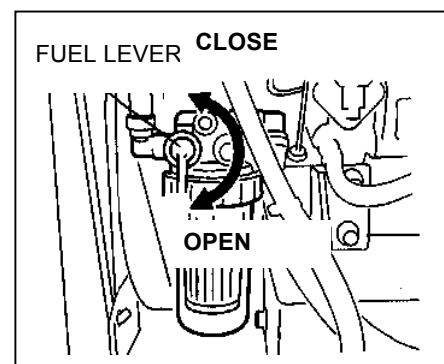
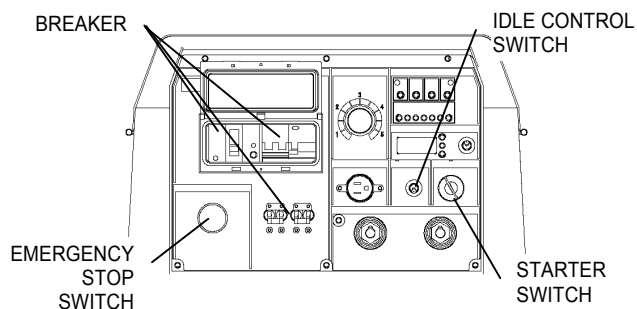
- Temperatures around muffler and exhaust can reach extremely high levels. Keep inflammable items (such as fuel, gas, paint, etc.) away from the equipment.
- Always operate this equipment on a flat surface and, with at least 1 metre clearance from any objects.

⚠ Caution: Injuries

- Always place the equipment on a flat and stable surface, and fix any wheels with suitable breaks, to prevent the equipment moving.
- Before starting the engine, be sure to disconnect the loads and set the breakers (1-P, 3-P) to the [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°C , 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 the engine starts.
- ⑦ Release the Starter Switch, as soon as the engine has started.
- ⑧ Keep the engine idling 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 to 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 Fuel Lever to [CLOSE].

<Caution>

- Do not attempt to turn to [STOP] position while actual welding or utilizing AC power source, it may cause serious damage to the unit.

7-3. Emergency Stop

An Emergency Stop feature is incorporated in the equipment.

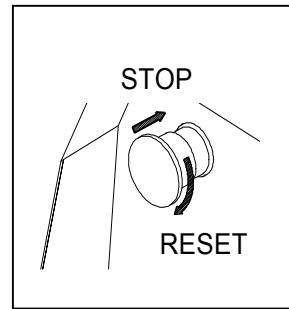
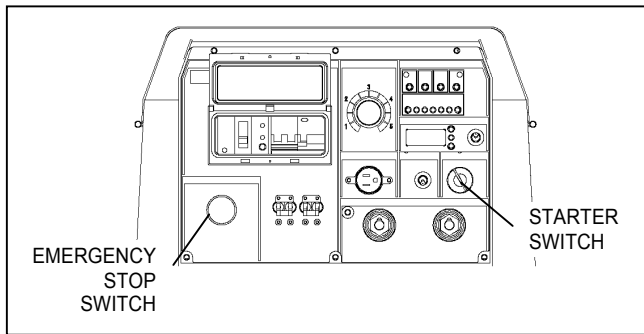
Push the Emergency Stop Switch in case of an emergency or if an equipment fault develops during operation.

- 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 and distance as per the table shown below.

The welding capacity is reduced if too small a 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: mm²)

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 instructions of the welding rods, the polarity of which is specified.

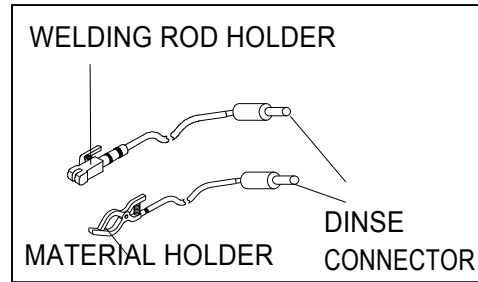
	Application	Connection
Normal Polarity	Generals Welding, such as Construction	[-] Minus to the Earth (Material) [+] Plus to holder (Rod)
Reverse Polarity	Thin Plate, Build-Up Welding, Stainless Steel	[-] Minus to holder (Rod) [+] Plus to the Earth (Material)

8-3. Connection – Welding Cable

Danger: Electric Shock

- Always examine welding cables, power cables and plugs 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. The person performing this task must always keep the key.

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



<Caution>

- Always fit the correct size DINSE connectors. (Recommended parts : DIX SK70)
- Ensure the welding cable 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 DINSE 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 minute period. For example, a 50% duty cycle represents 5 minutes of load and 5 minutes of no load in a 10 minute period. Be sure to take 5 minutes break after each 5 minutes of continuous welding time.

<Caution>

- The equipment may become damaged due to overheating, if continuous welding periods exceed 5 minutes 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 in operation, because welding fumes contain 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 (Refer to the table below), long-sleeve shirts, gloves, etc. in order to protect eyes and skin from harmful sparks in welding.

Standard for Spark Protection Glass

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

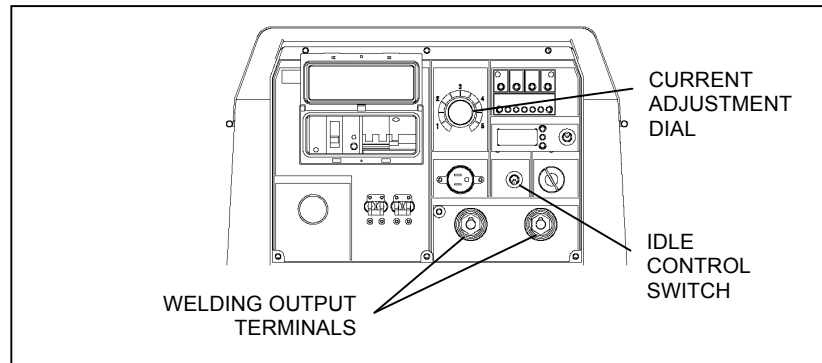
⚠ Caution: Fire

- Keep any flammable items and combustible materials away from the 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 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. Refer to the following chart next.

Switch Position	Welding Current at the dial position (A)						
	MIN	1	2	3	4	5	MAX
ECO	30	50	80	115	150	180	200
AUTO/HIGH	40	65	120	170	220	275	300

※ The values are for reference only. The Cable length or the ambient temperature will affect each value.

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

9. Generator Operation

9-1. Output Range

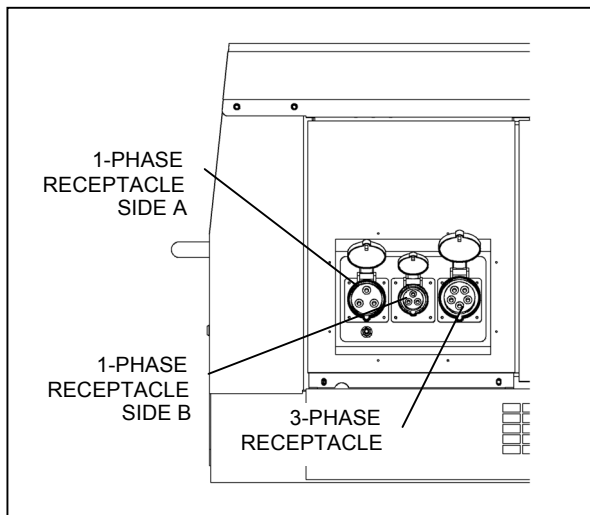
(1) 3-Phase 415V Output Receptacle

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

(2) 1-Phase 110V 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

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 the [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 before starting the engine.
- 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 checking 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 to humidity or conductivity;
 - flammable surroundings and/or atmospheres;
 - flammable products;
 - closed containers;
 - elevated working positions or platforms.

Caution: Damage to the equipment or other property

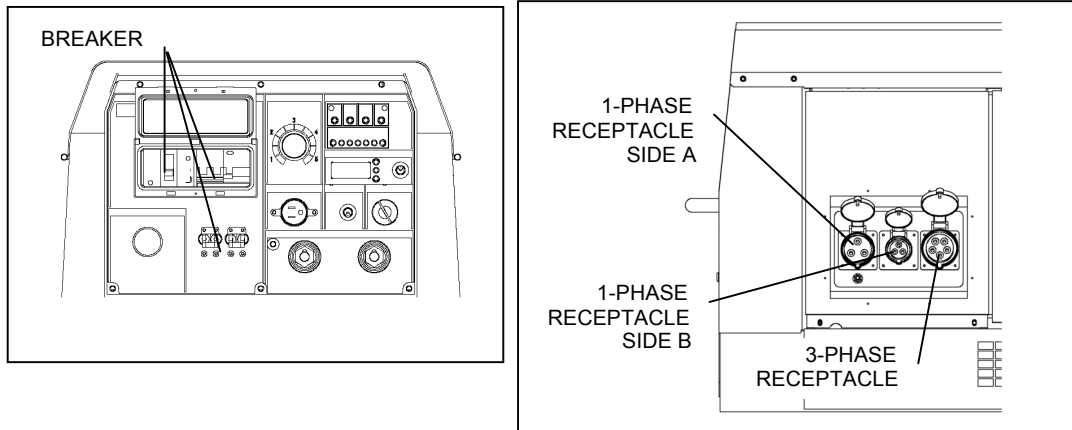
- Consult with Shindaiwa Ltd or an authorised distributor when utilising this equipment on devices with microcomputer control or ultra-precision items, which are very sensitive to voltage fluctuation.
- Keep the equipment away from those devices to avoid influence from electromagnetic noise.
- Consult with hospital or medical equipment 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 utilising 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, when the engine is running.

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

- ① Turn the power switch to [OFF] on the load.
- ② Turn the breakers (1-P, 3-P) to [OFF].
- ③ Connect the load to the output receptacles.
- ④ Turn the breakers (1-P, 3-P) to [ON].
(Ensure the ELCB lever is positioned at [ON].)



■ The Circuit Breaker has activated due to overload

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 Switch OFF the loads.
- ② Push up the breaker to [ON]. In the case 3-Phase ELCB, push down the breaker lever to 『OFF』 and push up the lever to 『ON』 .

<Caution>

- Take care not to overload, refer 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. When 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 with simultaneous use of welding and generating

Welding Output	AC Power Output		
Amperage	3-Phase		1-Phase
60A	7.0kVA	PLUS OR	3.3kVA
120A	7.0kVA		3.3kVA
140A	6.4kVA		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, if 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. The 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 temperatures.

<Caution>

- Authorised technicians should perform all checks and maintenance work, except for the pre-startup checks.
- Always use 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/UK waste disposal regulations.
- Please do not dispose of harmful items or waste fluids into the ground or a river, pond, or other water sources and help to keep our environment clean.

To optimise 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.

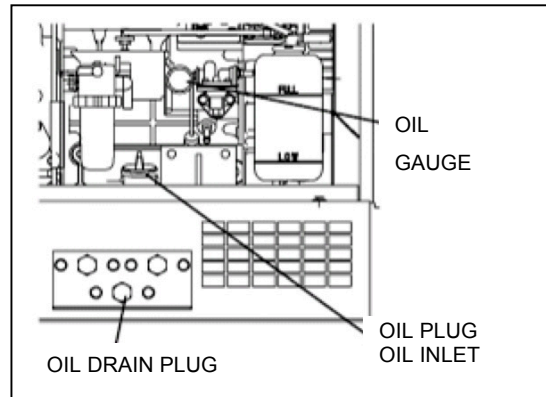
Checking Items		Pre-Startup Checks	Checking Periods					
			At 50hrs	Every 100 hrs	Every 200 hrs	Every 400 hrs	Every 1000 hrs	Every 2000 hrs
1	Check and Supply Fuel	○						
2	Check and Supply Engine Oil	○						
3	Engine Oil Change		1 st ○	2 nd or after ○				
4	Oil Filter Change		1 st ○		2 nd or after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

Checking Items		Pre-Startup Checks	Checking Periods					Every 2000 hrs
			At 50hrs	Every 100 hrs	Every 200 hrs	Every 400 hrs	Every 1000 hrs	
11	Check/Add Battery Water	○						
12	Clean Air Element		1 st ○	2 nd or after ○				
13	Adjust V-Belt Tension		1 st ○	2 nd 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	
19	Check/Adjust Injection Pump							●

(1) Oil Change

First Time	50 hour mark
2 nd or after	Every 100 hours

- ① Remove the filler cap.
- ② Remove the oil drain plug and allow the oil to drain fully.
- ③ Reinstall the oil drain plug.
- ④ Check the oil level using the oil level gauge. Add oil up to the max level (Approx. 3.8L).
- ⑤ Replace the oil filler cap hand-tight.

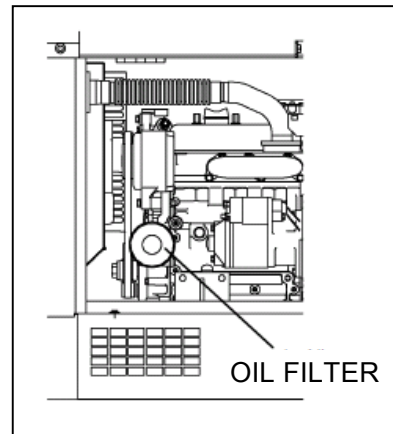
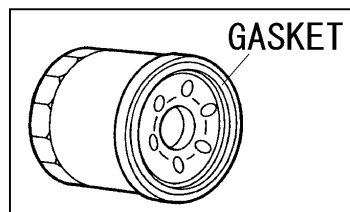


<Caution>

- Refer to 『6-1. Checking Engine Oil』 to select correct engine oil.
- Change the seal, whenever changing oil.
- Seal Part No. : 6C090-58961 (Kubota)

(2) Oil Filter Change

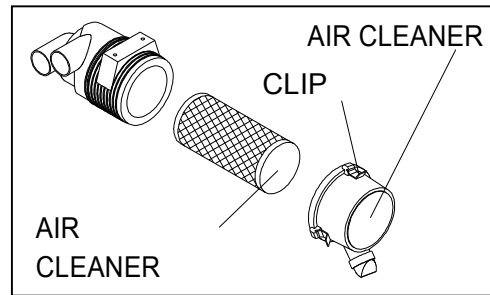
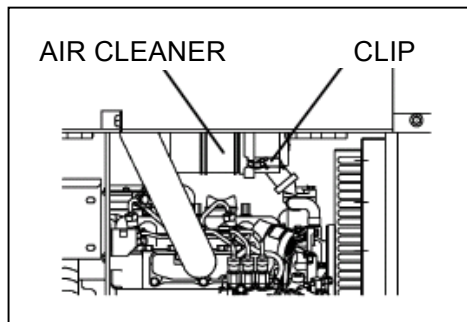
First Time	50 hour mark
2 nd or after	Every 200 hours



- 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 contacts the seat. Then, give it an additional 『1.1/4 Turn』 to seat the filter, using an oil filter wrench.
 - ⑤ Refill with oil and replace the filler cap.
- Oil Filter Part No. : 15241-32090 (Kubota)

(3) Clean/Change Air Filter Element

Clean	1 st 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.
 - <If the element is adhered with dried contaminants>
Blow compressed air from inside the element.
 - <If the element is adhered with carbon or oil>
Replace with a new one.
- ④ Reinstall them in reverse order.

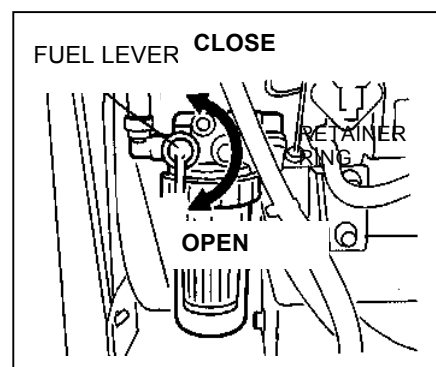
<Caution>

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

(4) Clean/Change Fuel Strainer

Clean	1 st 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.



<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 leaks. Having confirmed no leak without fail, turn the fuel lever to [CLOSE].
- Element Part No. : 16271-43561 (Kubota)

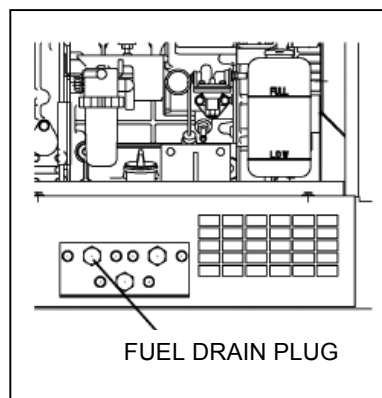
(5) Drain Water from Fuel Tank

Drain Water	Every 200 hours
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- ① Unscrew the fuel drain plug.
- ② Reinstall the drain plug, after draining water completely

<Caution>

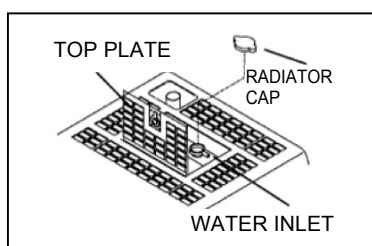
- Change the seal, whenever draining.
- Seal Part No. : 6C090-58961 (Kubota)



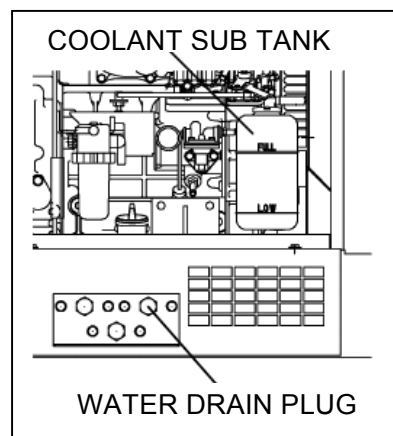
(6) Changing Coolant/Water

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 Reinstall the radiator cap.
 - ⑦ Close the top plate.

12. Long-Term Storage

Danger :Electric Shock

- Before performing any equipment checks 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 checks.

If the equipment is not to be used for more than 2 months, perform the following maintenance and storage procedures.

- ① Remove the battery.
(Always remove negative (-) side first & always reinstall positive (+) side first.)
- 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>

- Store the battery in a well ventilated area away from risk of naked flames.
- 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

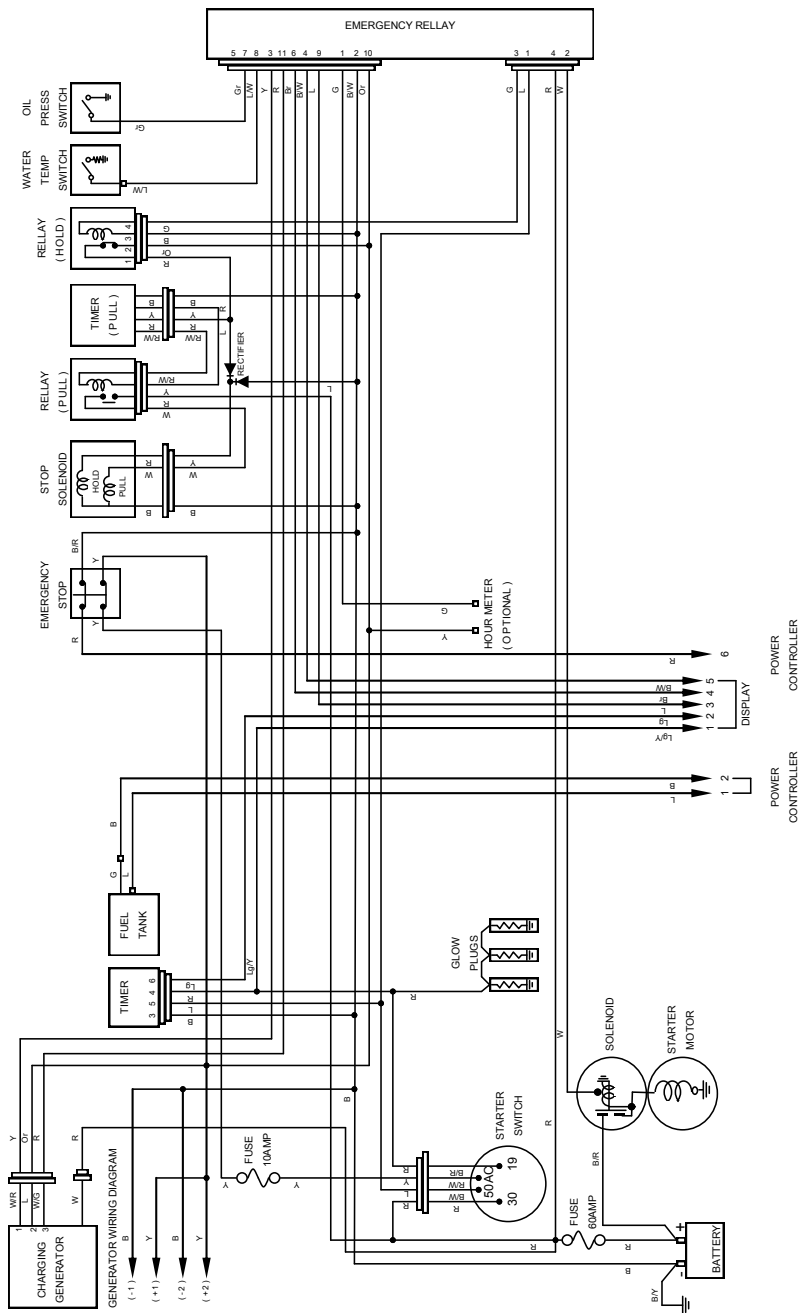
- When checking engine, always stop the engine, and keep away from fire. Temperatures around engine, muffler and exhaust can get extremely high. Wait until the engine cools down, before performing any checks.

Follow the guidelines below, when performing any troubleshooting. If you cannot resolve the problems using this troubleshooting guide, contact Shindaiwa Ltd.

Symptoms	Possible Cause	Corrective Actions
Starter motor does not turn	<ol style="list-style-type: none"> 1. Weak Battery 2. Dead Battery 	<ol style="list-style-type: none"> 1. Recharge Battery 2. Replace Battery
Engine does not start	<ol style="list-style-type: none"> 1. Fuel lever on fuel strainer to [CLOSE] 2. Insufficient Fuel 3. Fuse burnt 4. Fuel is contaminated by the water or dust 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Insufficient oil 2. Insufficient coolant/water 3. Unable to charge 	<ol style="list-style-type: none"> 1. Replenish oil 2. Replenish coolant/water 3. Repair
Excessive Black smoke from exhaust muffler	<ol style="list-style-type: none"> 1. Overloaded use 2. Air cleaner dirty 	<ol style="list-style-type: none"> 1. Operate the machine within the rated output 2. Clean/replace air cleaner
Engine does not stop	<ol style="list-style-type: none"> 1. Stop Solenoid malfunction 	<ol style="list-style-type: none"> 1. Turn the fuel lever to [CLOSE] to stop and repair
Welding Arc is weak	<ol style="list-style-type: none"> 1. Idle Control Switch position is incorrectly set 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 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Idle Control Switch is to [AUTO] or [HIGH] mode 2. Wrong Output Control Dial position 	<ol style="list-style-type: none"> 1. Turn to [ECO] mode 2. Turn the dial counterclockwise
No AC Output	<ol style="list-style-type: none"> 1. The breaker (1-P or 3-P or ELCB) positions to [OFF] 	<ol style="list-style-type: none"> 1. Turn to [ON]
AC Output is weak	<ol style="list-style-type: none"> 1. The rated current of the load exceeds the rated output 2. Use of Welding and Generating exceeding maximum permissible 	<ol style="list-style-type: none"> 1. Adjust according to 『OUTPUT LIMITATION』 2. STOP
IDLE Feature	<ol style="list-style-type: none"> 1. Welding cables short circuit 2. The power consumption of the load is 0.5A or below 	<ol style="list-style-type: none"> 1. Repair the short circuit 2. Set the Idle Control to [HIGH] mode

14. Engine Wiring Diagram

ENGINE WIRING DIAGRAM



WIRE COLORS

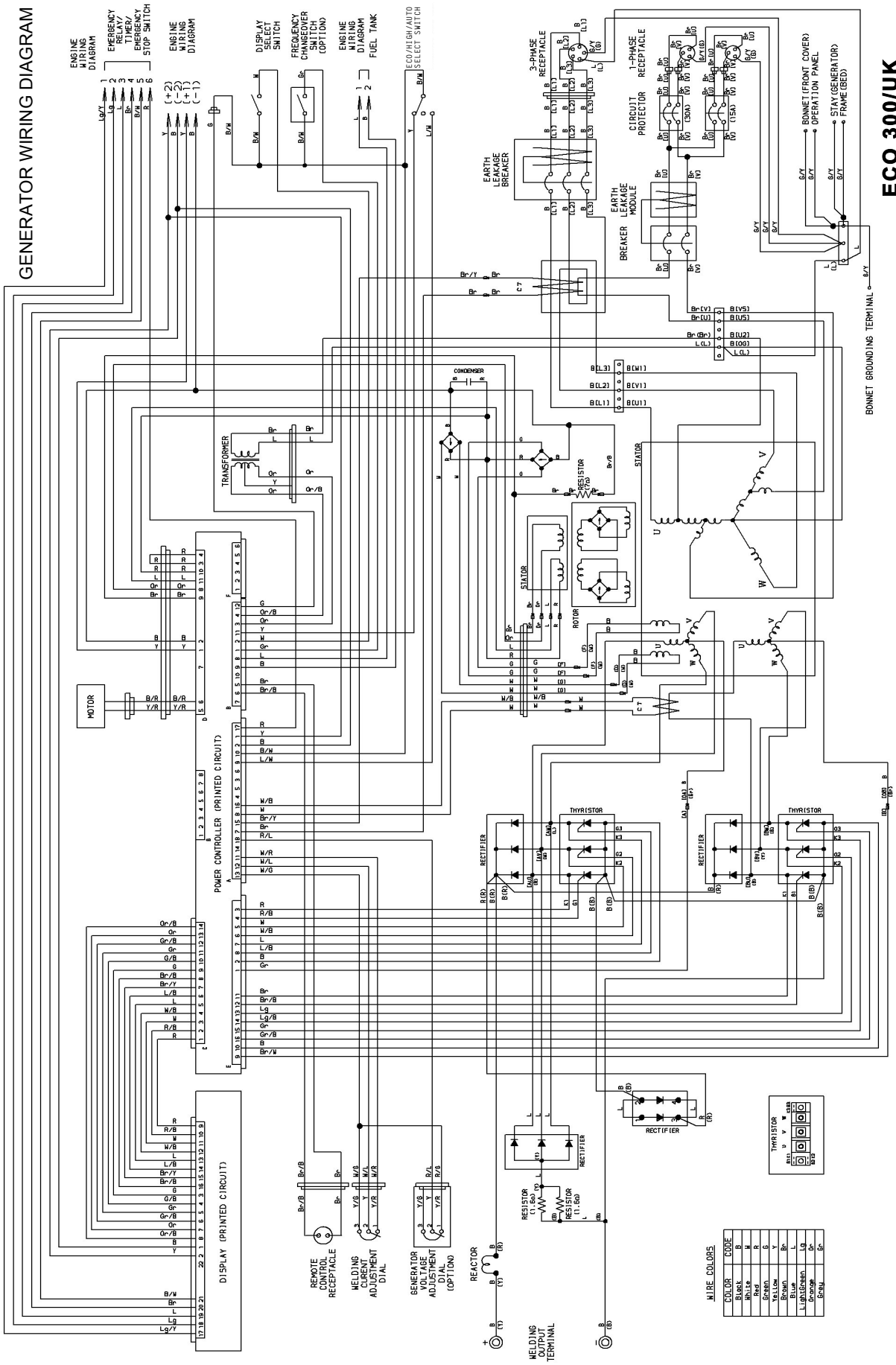
BLACK	B
WHITE	W
RED	R
GREEN	G
YELLOW	Y
BROWN	Br
BLUE	L
LIGHT GREEN	Lg
ORANGE	Or
GREY	Gr

STARTER SWITCH CONNECTION

	30	19	AC	50
STOP	○	○	○	○
RUN	○	○	○	○
HEAT	○	○	○	○
START	○	○	○	○

15. Generator Wiring Diagram

GENERATOR WIRING DIAGRAM



ECO 300/UK

BONNET GROUNDING TERMINAL = 6V

WIRE COLORS

COLOR	CODE
Black	B
Blue	BL
Red	R
Green	G
Yellow	Y
White	W
Light Green	Lg
Orange	O
Grey	Gr

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