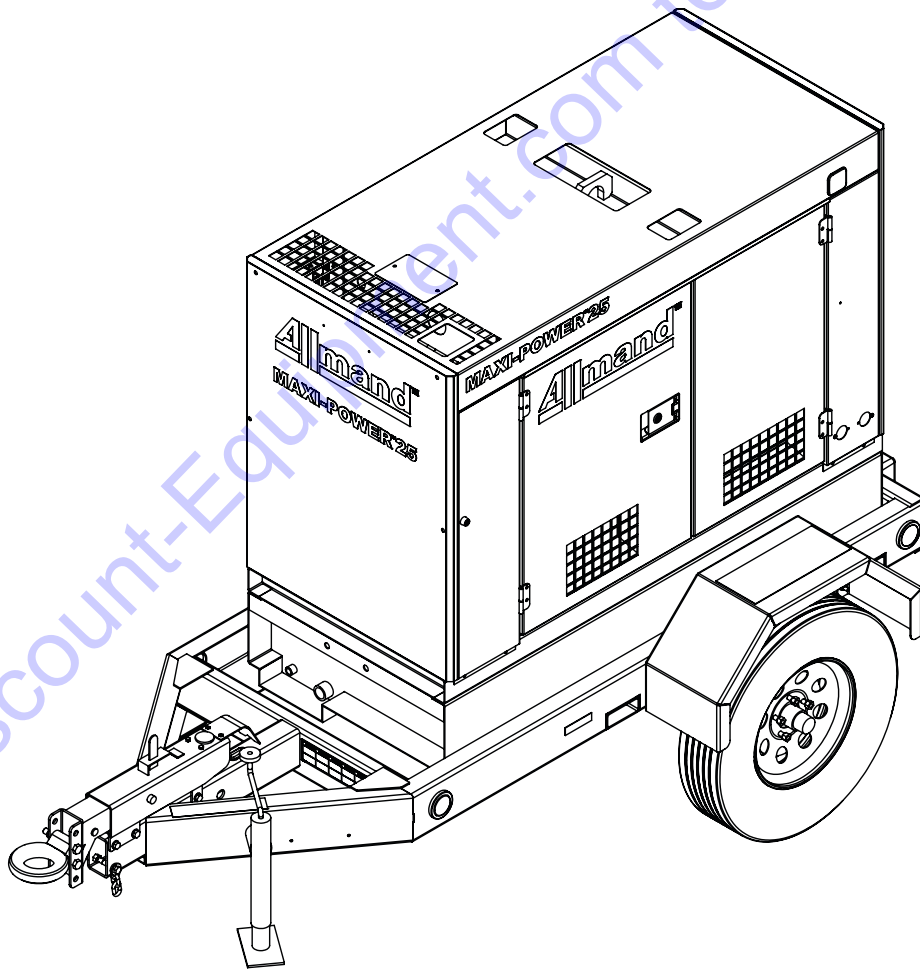


en

Operator's Manual Maxi-Power™ Towable Generator Model MP25 T4F



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Thank you for purchasing this quality-built Allmand towable generator. We are pleased that you've placed your confidence in the Allmand brand. When operated and maintained according to the instructions in this manual, your Allmand generator will provide many years of dependable service.

This manual contains safety information to make you aware of the hazards and risks associated with towable generators and how to avoid them. Because Allmand does not necessarily know all the applications this towable generator could be used for, it is important that you read and understand these instructions thoroughly before attempting to start or operate this equipment. **Save these original instructions for future reference.**

Where to Find Us

If you have any questions about the machine, contact your authorized dealer.

Knowing the model number of your Allmand Generator will make it easy to order maintenance or repair parts either online or from your local dealer. The model number is generally a number stamped into metal or on a sticker directly on your product.

Towable Generator

Model Number _____

Revision _____

Serial Number _____

Date Purchased _____

Engine

Model Number _____

Type Number _____

Code Number _____

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Operator Safety

This section explains safety precautions for operation, inspection, maintenance, installation, movement and transportation. Read these safety requirements carefully and fully understand the contents before starting the machine.


For better understanding of the precautions in this manual and on this machine, safety precautions are classified into “DANGER”, “WARNING” and “CAUTION” messages with a warning symbol  marked, according to the degree of hazard.

When one of these messages is found, please take preventive measures for safety and carry out “SAFE OPERATION AND PROPER MAINTENANCE OF THE MACHINE”.

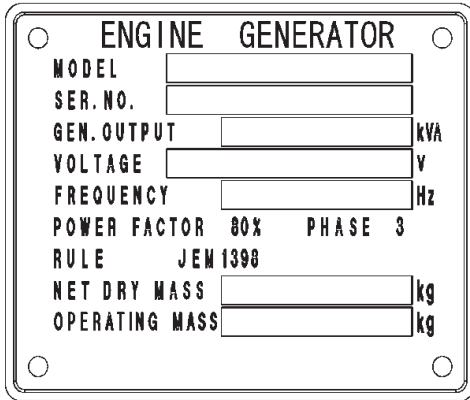
 DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
IMPORTANT	IMPORTANT indicates important caution messages for the performance or durability of the machine, which has no concern to injury or accident of or to a human body.

This manual does not describe all safety items. We, therefore, advise you to pay special attention to all items (even though they may not be described in the manual) for your safety.

PROPOSITION 65 WARNING

 WARNING
<p>Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.</p> <ul style="list-style-type: none">• Always start and operate the engine in a well-ventilated area.• If in an enclosed area, vent the exhaust to the outside.• Do not modify or tamper with the exhaust system.• Do not idle the engine except as necessary. <p>For more information, go to www.P65warnings.ca.gov/diesel.</p>

- ◆ If you have any questions about the machine, please contact our office or your nearest dealer. Be sure to have your machine's serial number to assist in providing the correct information for you. A plate stamped with the model and serial number is attached to back side of the machine.



A040491

- ◆ Each illustrated figure (Fig.) has a number (for instance, A040491) at the right bottom. This number is not a part number, but it is used only for our reference number.

The Allmand serial number tag is located on the back of the machine.



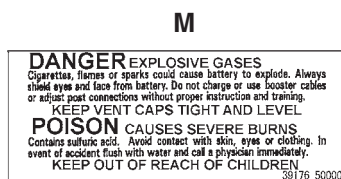
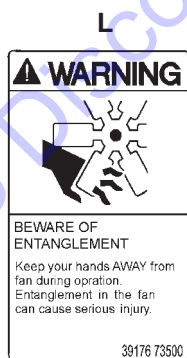
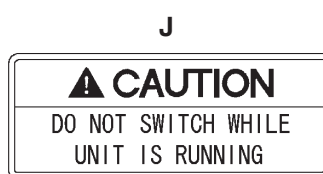
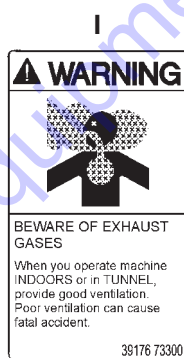
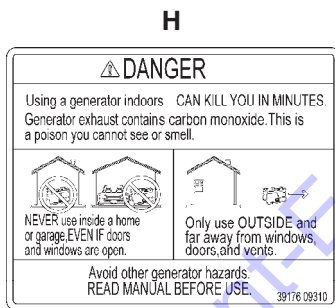
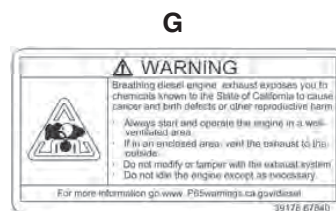
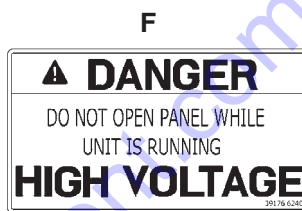
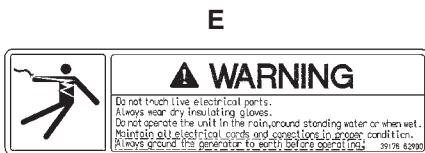
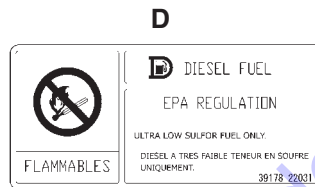
The Triton trailer VIN tag is located on the left side of the trailer tongue.



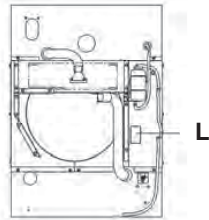
[Safety Warning Labels]

Following labels are attached to the machine.

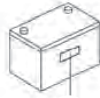
Keep them clean at all times. If they are damaged or missing, immediately place an order with your nearest dealer for replacement. Part numbers are indicated on the lower right corner of the label. Adhere a new one to the original location.



Unit Labels



Radiator casing

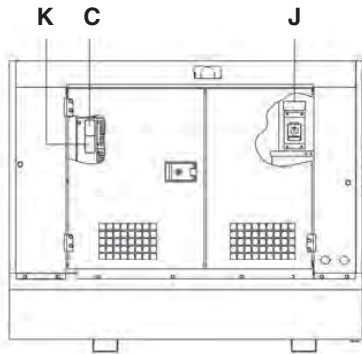


Battery



A

B



K

C

J



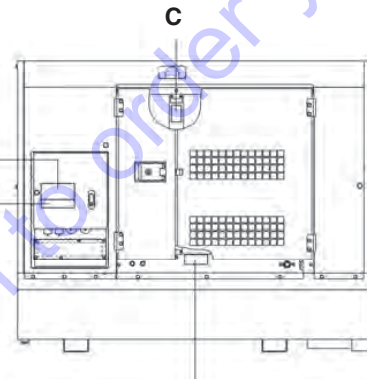
I

H

G

F

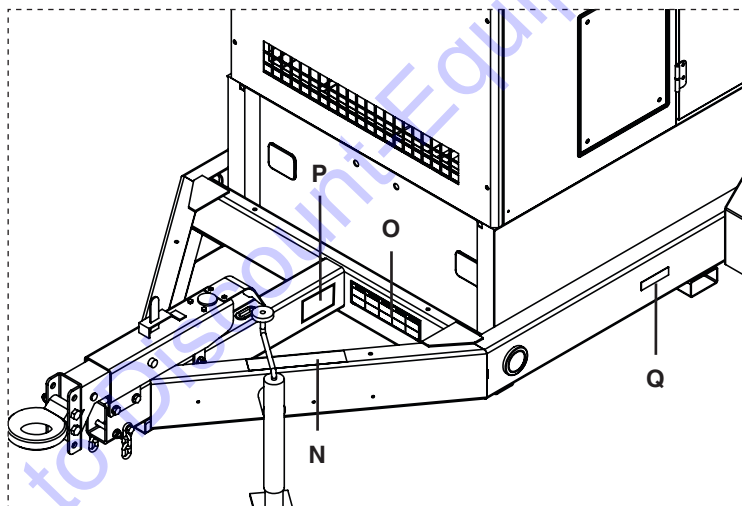
E



C

D

Trailer Labels



N

O

P

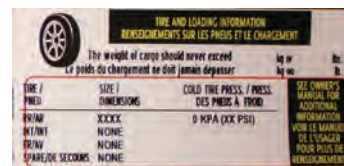
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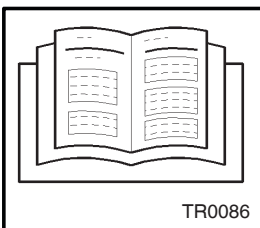
21157

⚠ DANGER



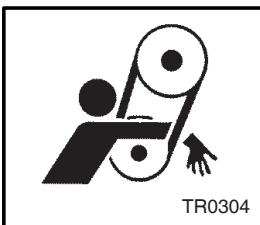
- Never touch the control panel during operation. Be aware that a voltage of several hundred volts is applied to the control panel.
- Be sure to stop the engine and turn control power switch OFF whenever the control panel has to be checked or operated. Disconnect the negative battery terminal during checking and maintenance.

⚠ WARNING



- Read each instruction plate which is displayed in the manual or on the machine carefully, understand its content and follow the indications thereof. Do not modify the machine without prior approval.
- The safety may be compromised, functions may be deteriorated, or machine life may be shortened.
- Never use the machine for the other purposes than power supply. Otherwise, serious accidents may occur.

⚠ WARNING



- Keep hands off from the rotating machinery or belts while running. It could cause serious injuries to hands.

⚠ WARNING



- When cleaning dust accumulated in devices such as filters, etc., with compressed air, wear safety glasses, etc. to protect your eyes.

CAUTION

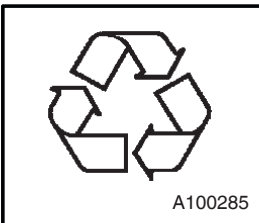


- Be sure to stop the engine and let the coolant water sufficiently cool down before draining it.
- If the drain valve is opened before the coolant water is cool enough, hot water could jet out, causing burns or scalding.

CAUTION

- When washing the machine, cover the control panel, generator and its electric parts to prevent them from being exposed to splashing water and avoid possible decrease in electrical insulation or other troubles to the machine.
- Dust, sand and dirt accumulated inside control panel could cause malfunction or difficulties with the instruments. Clean them using compressed air.

CAUTION



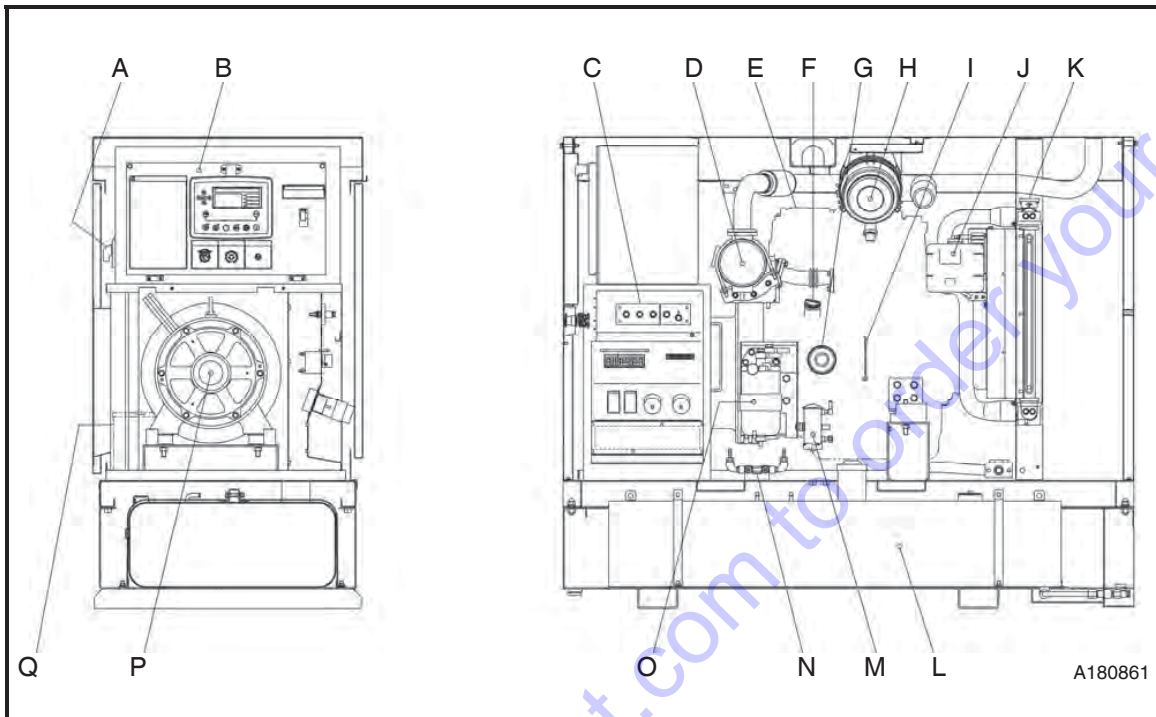
- Waste liquid from the machine contains harmful material. Do not discharge it onto the ground or into the river, lake or sea. Such material will pollute the environment.
- Be sure to use a container to hold waste liquid from the machine.
- Be sure to follow the designated regulations when disposing of oil, fuel, coolant (antifreeze), filter, battery or other harmful materials.

CAUTION

- The engine of this machine contains many electrical and electronic parts. Before welding, be sure to disconnect all electronic control equipment.
Failure to do so could result in equipment malfunction due to excessive current.

1 Features and Controls

1.1 Internal Components



No.	Description	Function
A	Voltage Selector Switch	Switching output voltage.
B	Control Panel	Controlling device; various meters and controls.
C	Output Terminal	Outlet port for AC power.
D	DOC (Diesel Oxidation Catalyst)	Catalyst for oxidizing exhaust gas.
E	Engine	Driving the generator.
F	Engine Oil Filler Port	Supplying and replenishing engine oil.
G	Engine Oil Filter	Filtering engine oil in the system.
H	Air Filter	Filtering dust from intake air.
I	Engine Oil Level Gauge	Checking the engine oil level.
J	Reserve Tank	Checking and replenishing coolant level.
K	Radiator	Cooling the engine.
L	Fuel Tank	Storing fuel.
M	Fuel air-bleeding electromagnetic pump	Automatically bleeding air from fuel pipes.
N	Fuel Pipe Selector Valve	Switching to supply fuel from outer tank.
O	Fuel Filter	Filtering foreign matter and dust mixed in fuel.
P	Alternator	Generating AC power to be supplied.
Q	Battery	Electrical power for starting engine.

2 Transporting and Set-Up



Read entire Operator's Manual before you attempt to setup, transport, or operate your new towable generator.

Your towable generator is ready for use after it has been properly setup with the recommended oil and fuel. If you have any problems with the setup of your towable generator, contact your authorized dealer

2.1 Transporting



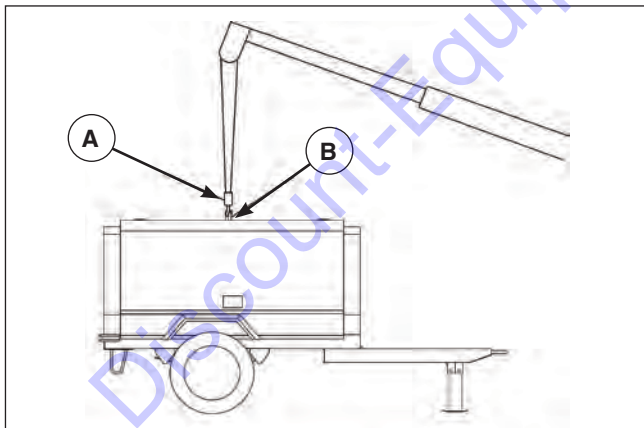
WARNING When loading and unloading the unit, be sure to use the lifting bail (B) located at the top center of the unit.

- Never get under the unit when lifted.
- Never lift the unit while in operation.
- If the unit is transported by truck, fasten it by chains at the front eye and rear stand. Also be sure to place a set of chocks against the front and rear of each wheel.

Lifting the Generator

Before lifting the unit, make sure to check the lifting bail for any cracks, loose bolts, etc.

1. Connect the hook (A) of the crane or shackle with the lifting bail (B) eye fitted at the top center of the unit. Ensure there is no person standing around the unit. Then perform hoisting operation.
2. Select a truck or crane with capacity sufficient for the weight and size of the unit. See **Specifications**.
3. Never hang anything from generator while lifting. Bail is designed to carry only weight of generator.



Towing the Generator



WARNING Before towing the machine, make sure to check and confirm the following points. Failure to follow the instructions below, could result in serious injury or death.

- Proper tire air pressure.
- Tire lug nuts are not loose.
- Tires are not worn or damaged.
- Ensure that the end of the drawbar is securely connected to the coupler of the towing vehicle.

- Ensure there is no damage to the towing vehicle and the drawbar of the machine.
- Be sure to keep hands and fingers away from any part of the coupling device when coupling or uncoupling a drawing device to a draw bar.
- Be sure the height of the hitch is adjusted so that the trailer is level while connected to the tow vehicle.
- Make sure to drive the towing vehicle safely.

2.2 Set-Up



WARNING 

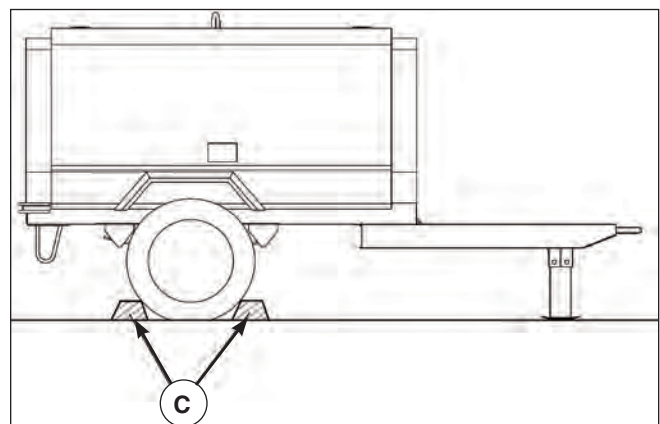
- Exhaust gas from the engine is poisonous, and could cause death when inhaled.
- Do not operate the unit indoors.
- Do not position the exhaust gas outlet in the direction of a person or building.

The machine should be operated in the following conditions:

- Ambient temperature 5°F to 104°F (-5°C to 40°C).
- Humidity less than 85%.
- At altitudes lower than 3,281 ft (1000 meters) above sea level.
- Set up the machine in a place with good ventilation, lower temperature, and with surroundings as dry as possible.
- If more than two machines are placed parallel in operation, keep enough distance so that exhaust air from one machine does not affect the other.
- Set up the unit in an area where fresh air is always available.
- Keep enough space around the unit for inspection and maintenance access.



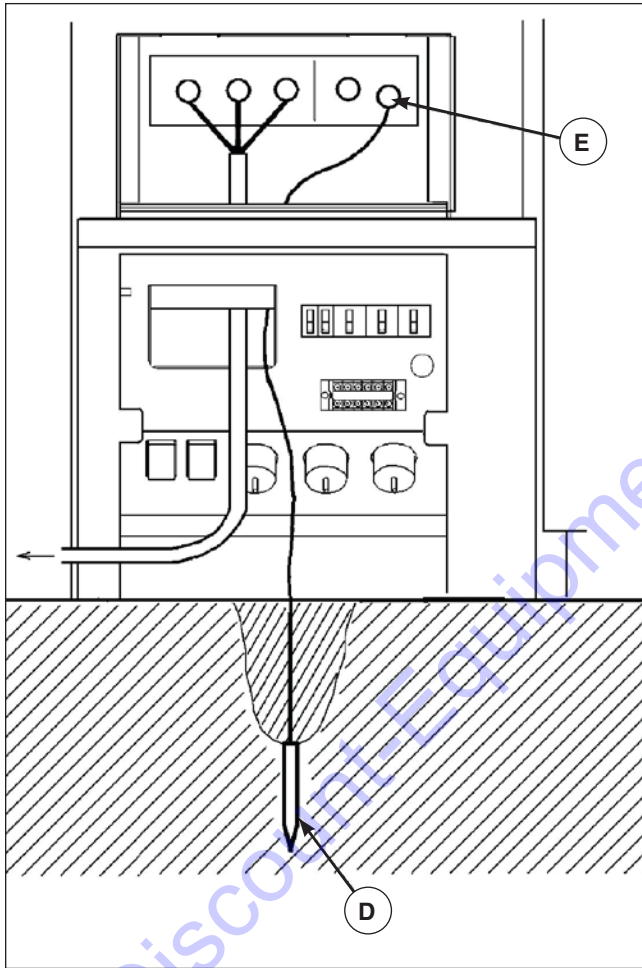
WARNING The machine must be parked horizontally on a level surface. If the machine must be parked on a slope, place it across the grade to prevent rolling. Do not park on a slope exceeding 15°. Be sure to place wheel chocks (C) against the front and back of each wheel.



2.3 Grounding

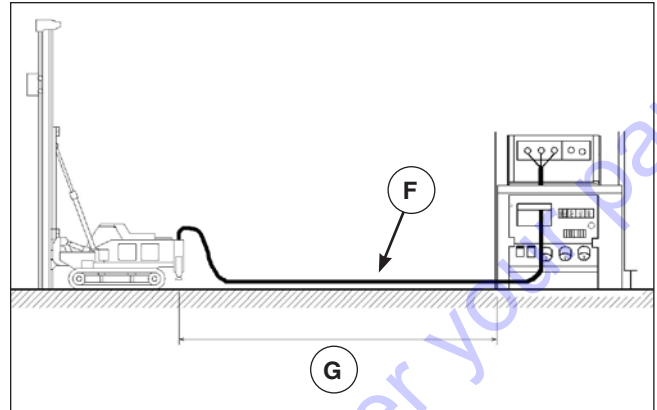


- Failure to properly ground the unit could result in death or serious injury. Be sure to properly ground the unit before operation.
1. Using a mallet, install a grounding rod (D) firmly into the ground, less than 5 feet (1.5 m) from the unit's grounding terminal (E).
 2. Connect the grounding rod cable to the grounding terminal.



2.4 Selecting Cable

- Select a cable (F) with sufficient diameter by considering the permissible current on the cable and the distance from the generator to the load (G).
- If the current flowing to the load exceeds the permissible current of the cable, resultant overheating may burn the cable. Similarly, if the cable is too small in thickness to the length, the input voltage to the load will fall to cause the load input power to drop, as a result, the performance of the machine cannot be displayed.



- Below is a simplified three-phase three-wire formula to seek voltage drop or cross-sectional area of the cable from cable length and working current. Select such a cable length and thickness so that the voltage drop will remain less than 5%.

Output system	Voltage drop	Cross-Sectional Area of Cable	e: Voltage drop (V) e ¹ : Voltage drop between outside line or one line of each phase and neutral line
Three-phase 3-wire Type	$e = 30.8 \times L \times I / 1000 \times A$	$A = 30.8 \times L \times I / 1000 \times e$	A: Cable thickness (mm ²)
Three-phase 4-wire Type	$e = 17.8 \times L \times I / 1000 \times A$	$A = 30.8 \times L \times I / 1000 \times e^1$	L: Cable length (m) I: Working current (A)

- The following tables show the relations between the cable length and the cable thickness (nominal cross-sectional area) suited to the working current. (Based on the condition that working voltage is 200 V, with voltage drop of 10V.)

Single-Conductor Cable (Unit: in² (mm²))

Length (ft (m)) / Current	164 (50)	246 (75)	328 (100)	410 (125)	492 (150)	656 (200)
50A	0.01 (8)	0.02 (14)	0.03 (22)	0.03 (22)	0.05 (30)	0.06 (38)
100A	0.02 (22)	0.05 (30)	0.06 (38)	0.08 (50)	0.08 (50)	0.09 (60)
150A	0.06 (38)	0.06 (38)	0.08 (50)	0.09 (60)	0.12 (80)	0.16 (100)

Three-Conductor Cable (Unit: in² (mm²))

Length (ft (m)) / Current	164 (50)	246 (75)	328 (100)	410 (125)	492 (150)	656 (200)
50A	0.02 (14)	0.02 (14)	0.03 (22)	0.03 (22)	0.05 (30)	0.06 (38)
100A	0.06 (38)	0.06 (38)	0.06 (38)	0.08 (50)	0.08 (50)	0.09 (60)
150A	0.03x2 (22x2)	0.03x2 (22x2)	0.06x2 (38x2)	0.06x2 (38x2)	0.06x2 (38x2)	0.08x2 (50x2)

2.5 Fuel Pipe Selector Valve



WARNING

- Monitor the fuel feeding conditions while feeding fuel from a separate fuel storage tank.
- Do not switch the selector valve to the external tank position unless an external tank is being used. Fuel pipe damage and fuel leakage may result.
- Do not use excessive force operating the selector valve handle. Valve damage and fuel leakage may result.

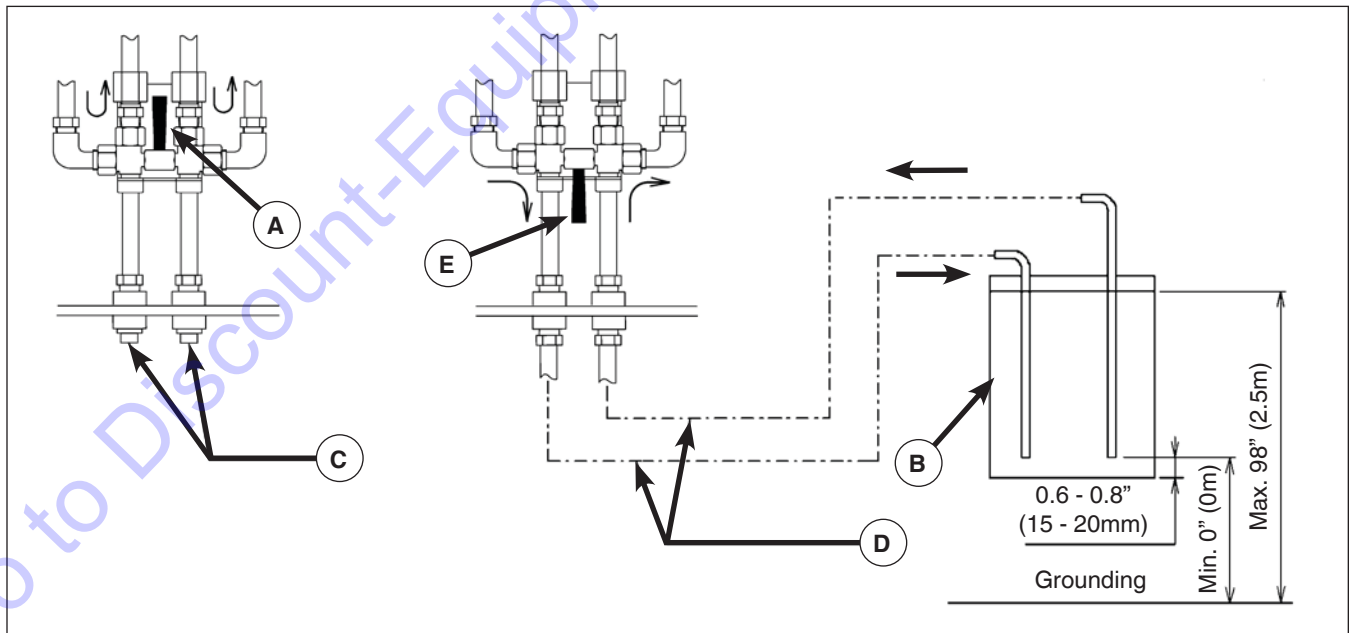
This valve is designed to feed fuel to the engine from an external fuel storage tank.

Operation

1. Unit is delivered from factory with fuel line piping and selector valves set as shown (A). When operating the unit using installed fuel tank, run the machine with the fuel line piping and selector valves with the factory-arranged settings.
2. When using a separate storage tank (B), remove the plugs (C) fitted at the connections to the separator tank and make piping connections as shown in D. Then switch the selector valve handle as shown (E).
3. When removing the external tank, be sure to return the selector valve handle to the original position (A), remove the external tank piping connections, and reinstall the plugs.

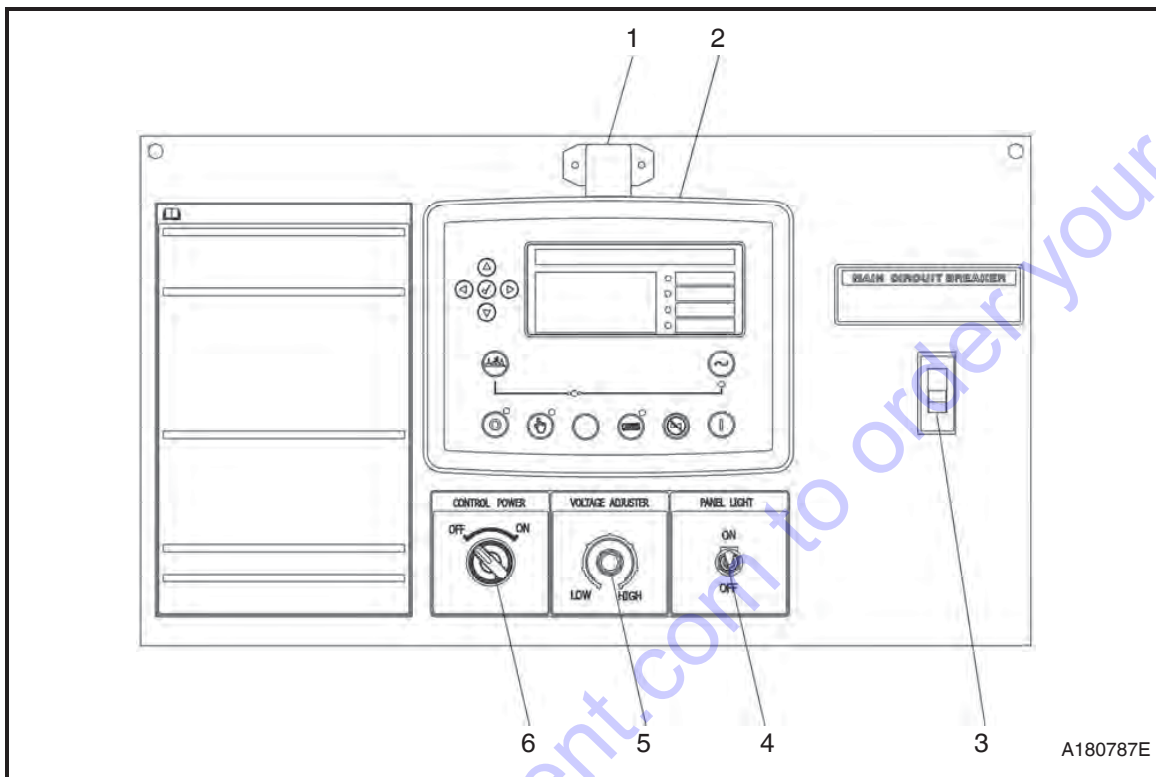
Installation of Separate Storage Fuel Tank and Piping

1. Use oil resistant fuel hose with inside diameter of 8mm to 10mm.
2. Install the fuel tank so that the fuel level of the tank may be kept at a level 0 - 98" (0 - 2.5m) higher than the machine.
3. In order to avoid suction of water and sediment, install the suction and return pipe so that the inlet ports are 0.6 - 0.8" (15 - 20mm) higher than the bottom of the tank (B).
4. When refilling fuel in the tank, be careful to not mix water and sediment.



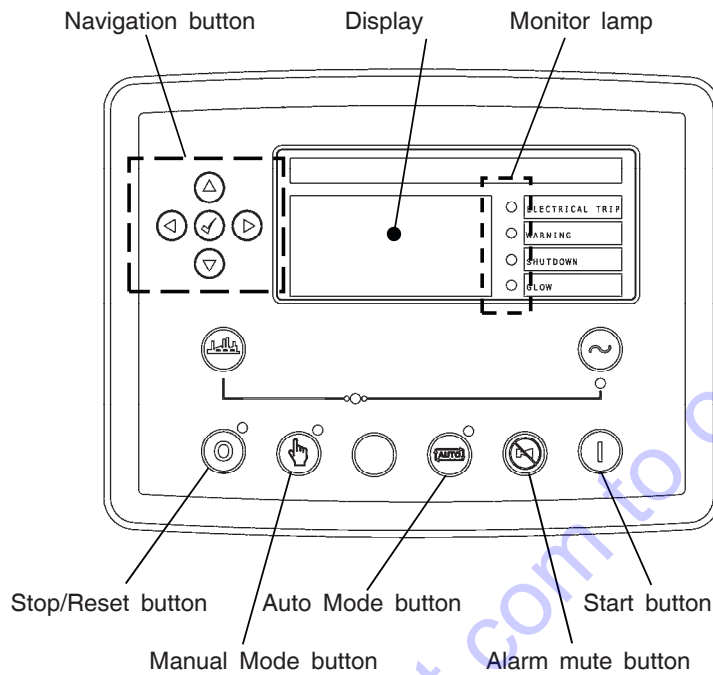
3 Operation

3.1 Control Panel



- 1. Panel Light
- 2. Control Panel
- 3. Circuit Breaker
- 4. Panel Light Switch
- 5. Voltage Adjuster
- 6. Control Power Switch

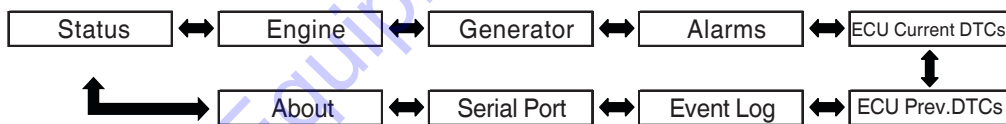
Control Panel



A180097E

[How to switch monitor]

1. Items shown below can be selected by pressing ◀ or ▶ button.

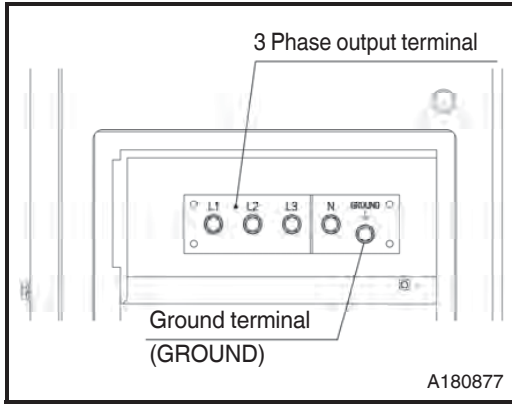


2. Parameters within an item can be viewed by pressing ▲ and ▼ button.

3. Monitor will return to main screen if no commands are entered for 3 minutes.

3.2 Connecting Loads

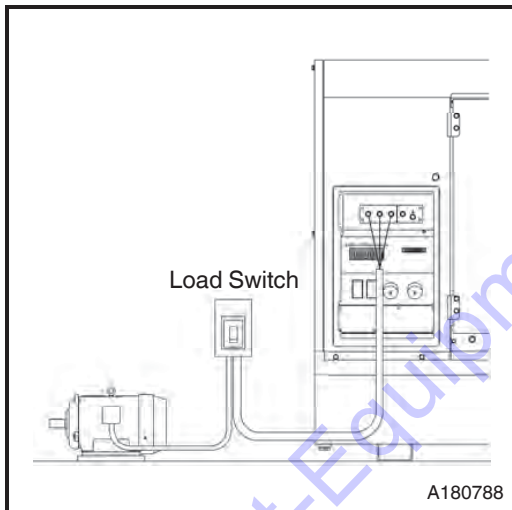
Select a cable with sufficient diameter by considering the load capacity and the distance from the generator to the load. Use terminals for connection and securely fasten them. (See 2.4)



- After checking phase number and voltage of the load, make sure to connect them correctly.

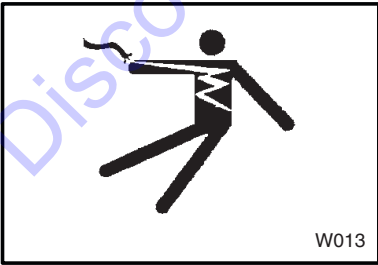
---Terminal Size---

3 Phase output (L1,L2,L3,N)	M8
Ground terminal (GROUND)	M8



- Install a load switch between the output terminal and the load to switch on/off the load. Do not switch the load on/off directly by the circuit-breaker of the generator. It could cause damage to the circuit-breaker.
- Connect the connecting cable to the load so that the output terminals should not touch each other.

⚠ WARNING

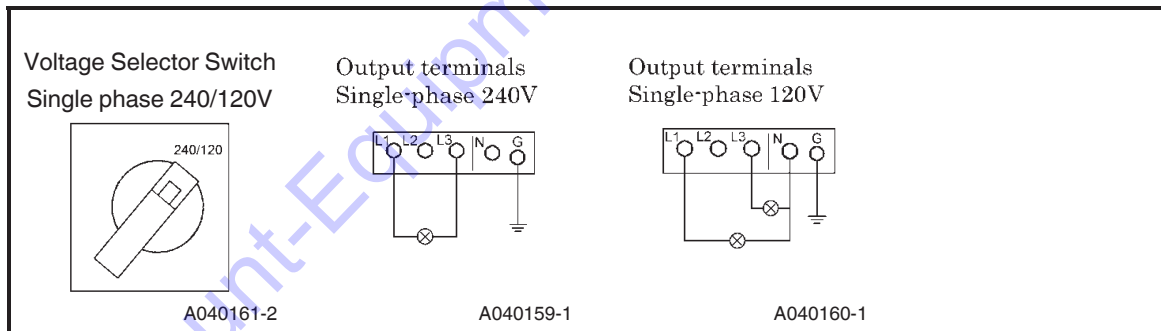
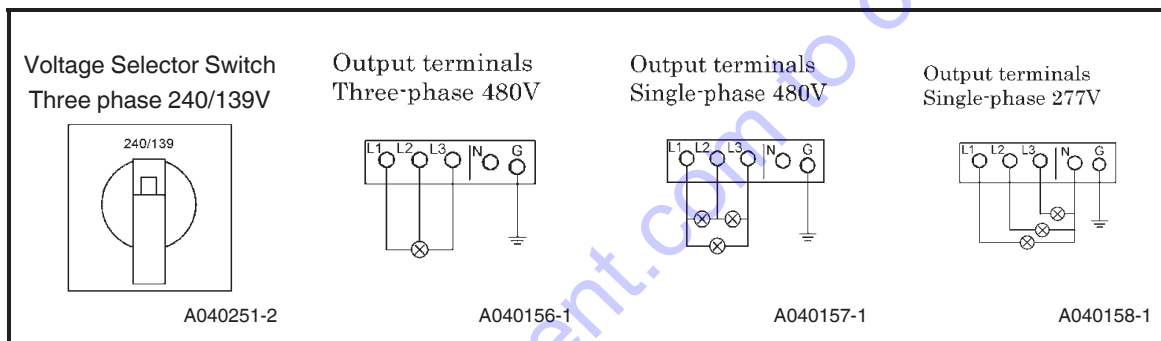
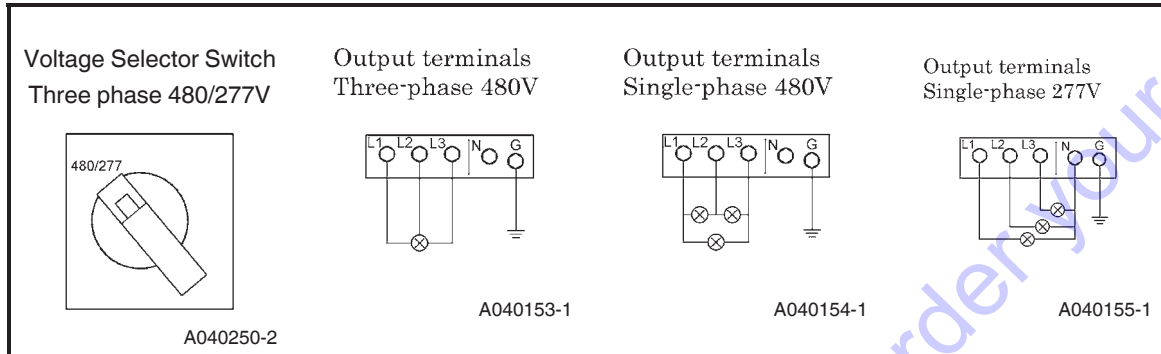


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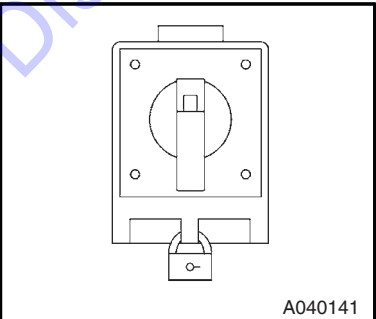
- When removing or connecting a connecting cable for changing load, be sure to switch OFF the circuit breaker, and then carry out a work. The operator must keep the key during operation.
- For a connecting cable to load, do not use a cable with damaged sheath nor an inappropriate insulation cable to the voltage. Secure connections between each cable terminal and input/output terminal. Otherwise, it may be slacked during operation and may cause a fire or an electric shock accident.

3.2.1 Output Terminal connections

Voltage can be selected with voltage selector switch.



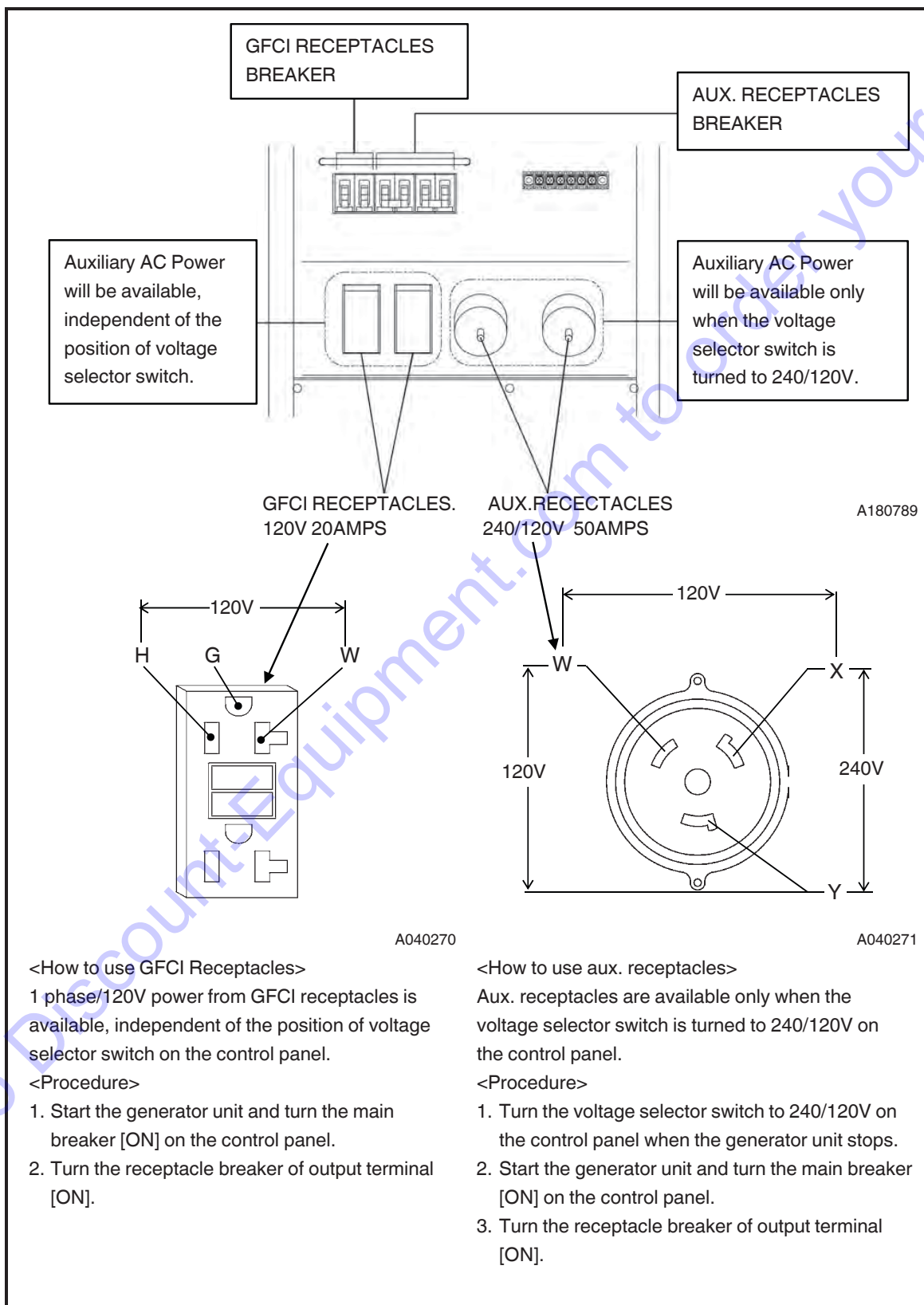
CAUTION



A040141

- During operation, do not operate the voltage selector switch. Voltage selection during operation may cause abnormal voltage on the load side to damage the load and may cause a fire.
- In addition, it could cause damage to generator and automatic voltage regulator (AVR).
- Be sure to shut off the generator before using the voltage selector switch.
- When voltage selection is completed, lock the voltage selector switch in position to prevent anyone from operating it.

3.2.2 Auxiliary AC Power



<How to use GFCI Receptacles>
 1 phase/120V power from GFCI receptacles is available, independent of the position of voltage selector switch on the control panel.
 <Procedure>
 1. Start the generator unit and turn the main breaker [ON] on the control panel.
 2. Turn the receptacle breaker of output terminal [ON].

<How to use aux. receptacles>
 Aux. receptacles are available only when the voltage selector switch is turned to 240/120V on the control panel.
 <Procedure>
 1. Turn the voltage selector switch to 240/120V on the control panel when the generator unit stops.
 2. Start the generator unit and turn the main breaker [ON] on the control panel.
 3. Turn the receptacle breaker of output terminal [ON].

3.2.3 The Maximum Combined Simultaneous Power Consumption

The following chart shows the maximum power available from the 120V-20A GFCI receptacles during simultaneous consumption (main terminals and receptacles) for both single or three phase settings. Values shown in the left column give the maximum current available at the 120V-20A GFCI receptacles compared to the value of the simultaneous current consumption from the main terminals.

[Allowable load capacity of GFCI at single phase]

Single Phase (240/120V)	GFCI Receptacle
kW	A
14.4	0
13.2	5
12.0	10
10.8	15
9.6	20

[Allowable load capacity of GFCI at three phase]

Three Phase (240/480V)	GFCI Receptacle
kVA	A
25.0	0
20.8	5
16.7	10
12.5	15
8.4	20

 **CAUTION**

- When the main terminal, single-phase (240/120V) or three-phase (240/480V) is used together with the GFCI outlet (single-phase 120V), the above allowable load capacity of the GFCI outlet must not be exceeded.

3.3 Engine Oil • Coolant • Fuel

3.3.1 Engine Oil

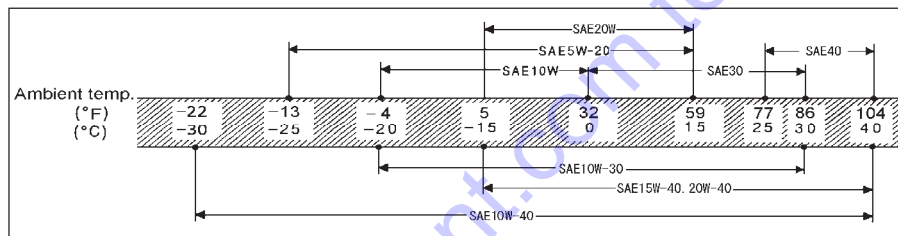
Use engine oil recommended below. Be sure to use CJ-4 class or higher engine oil or superior class.
(Using engine oil with poor quality may shorten the life of the engine).

Classification	API service classification CJ-4 class or higher
Viscosity	SAE10W-40 (as ex-factory)

IMPORTANT

- Viscosity of engine oil greatly affects starting, performance, and oil consumption of the engine, as well as wear of the moving parts. Choose appropriate oil based upon the table below according to the outside air temperature.

Ambient temperature range and oil viscosity (SAE)



A180818E

- Do not mix oils. If two or more different brands of oil are mixed, its performance can be deteriorated.
- When the machine is operating under a light load (20% or less) for a prolonged period of time, check the viscosity of the engine oil and other fluids, and replace oil early using about half of the regular replacement time as a guide.
- Unit is delivered ex. factory, filled with engine oil recommended by engine manufacturer.
- Dispose of oil in accordance with local laws and regulations.

3.3.2 Coolant

Coolant freezing could cause cracks of cylinder and radiator. Be sure to always use mixture of LLC (antifreeze) and soft water (like tap water) of good quality.

IMPORTANT

- When water with dirt, sand, or dust, or hard water such as well water (ground water) is used, deposits can form inside the radiator or on the cylinder head and resulting in engine overheat from poor coolant flow.
- Adjust mixing ratio of coolant according to the temperature. (55% volume coolant is filled when the unit is shipped from factory.) Use coolant within the range of its mixing ratio between 60%. (If LLC (antifreeze) exceeds more than 60%, it may decrease its antifreezing effect.)

Mixing ratio of LLC (antifreeze) (reference)

Outside temperature (°F)	5	-4	-13	-22	-31	-40	-49
Outside temperature (°C)	-15	-20	-25	-30	-35	-40	-45
Mixing ratio (%)	30	35	40	45	50	55	60

- Dispose of LLC (Antifreeze) in accordance with local laws and regulations.

3.3.3 Fuel

IMPORTANT

- Never use fuel with sulfur content greater than 0.0015% (15 ppm).
- Use only ultra-low sulfur fuel.
- Use such diesel fuel which conforms to either standard EN590 or ASTM D975.
- Dispose of fuel in accordance with local laws and regulations.

CAUTION

- Diesel fuel is required to meet the following conditions.
 - Free from even minute dust particles
 - High optimum viscosity
 - High cetane number (more than 45)
 - High fluidity even at low temperature
 - Low carbon residue content

3.4 Before Starting the Unit

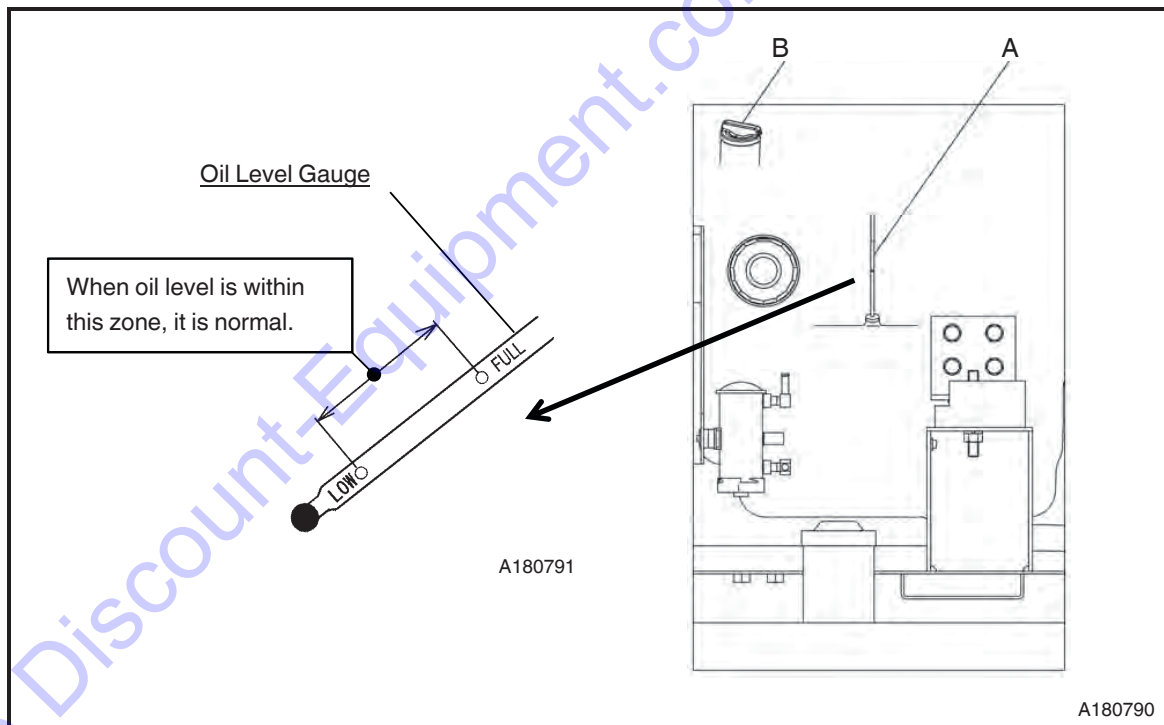
Be sure to check the unit before operation. When any abnormality is found, be sure to repair it before starting. Be sure to make daily check before operation. If the unit is operated without prior check and without noticing its abnormality, such operation could cause seizure of components or may even cause fire.

3.4.1 Check Engine Oil Level

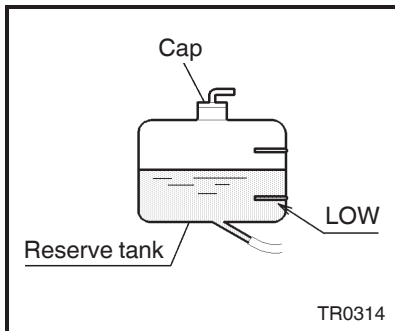
The unit should be level before the checking oil level. When you check oil level after you have started operation, wait more than 10 minutes after stopping the engine before checking the oil level.

<Procedures>

1. Pull out the engine oil level gauge [A] and wipe it with a clean cloth.
2. Re-insert the engine oil level gauge fully and pull it out again. If the gauge shows the oil level between LOW and FULL limits, it is normal.
3. When the oil level is below its LOW, add engine oil from engine oil filler port [B].
 - If the oil is found to be dirty or contaminated, change the oil. (See 5.4.1)
 - To prevent engine output reduction when oil level is too high, do not put more oil in than FULL.



3.4.2 Check Coolant Level



- Check the coolant level in the surge tank. If it is lower than the limit, open the cap and refill the coolant. (Level must be kept above LOW.)
- If the coolant in the surge tank is exceedingly low or empty, remove the radiator cap and check the amount of coolant in the radiator. Refill coolant within the radiator and surge tank. (See 5.4.21)

CAUTION

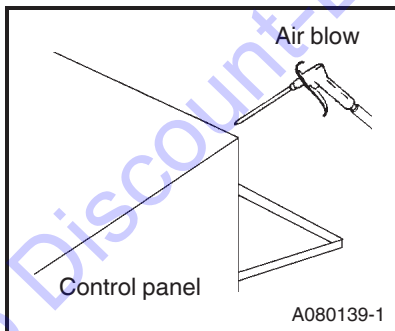


- When removing the radiator cap, lightly turn it and release the internal pressure without completely opening it once the first stage lock is released. After confirming that the internal pressure has been released, turn it off while pushing in until the second stage lock is released. If this procedure is neglected, its inner pressure can blow off the radiator cap, and steam jetting out of the radiator could cause scalding.

IMPORTANT

- Do not operate the machine without sufficient coolant. Insufficient coolant can cause air bubbles to form and damage the radiator.

3.4.3 Clean Instruments In Control Panel



- Before starting operation, open control panel and check each breaker, terminal plate and each controller for any dust, sand and dirt accumulated.
- If the machine is operated with dust, sand, or dirt in the instrumentation, it could cause malfunction or damage. When necessary, clean the inside of the panel with compressed air. Wear protective eyewear when cleaning.

3.4.4 Check Fuel


Before starting operation, make sure to check the level of residual fuel so that fuel shortage during operation can be avoided. If necessary, drain condensate accumulated at the bottom of the fuel tank.

- Refilling fuel tank should be done in an outdoor well-ventilated place.
- **Do not fill fuel up to the filler level.**

When fuel tank is filled up to the filler level, the expansion volume of the tank is too small and could lead to problems with fuel flow and containment. Furthermore, fuel may spill from the fuel tank due to vibration caused during movement or transportation of the unit.

※ **When using an external fuel tank, note that the Fuel Level indication on the monitor will not reflect the actual fuel level.**

CAUTION

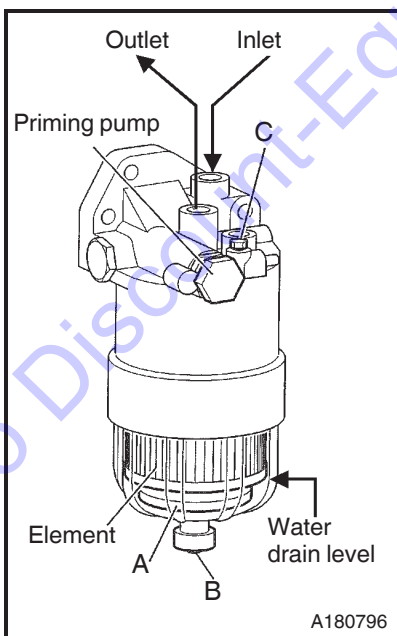


D004

- Do not, under any circumstance, bring lit cigarettes and/or matches to the fuel.
- The fuel is extremely flammable and dangerous. Be careful of fire because the fuel is very likely to catch fire.
- Refuel only after stopping the engine, and never leave open fuel can near the machine. Do not spill. It could cause a fire. When it is spilt, wipe it up completely.
- Never use alcohol-base cleaning fluid. If it sticks to such parts made of plastic, it causes degradation of liquid surface visibility, and, in the worst case, can lead to cracking and result in fuel leaks.

3.4.5 Check Fuel Filter Drain

If the red float [A] inside the fuel filter is above line, drain water from the fuel filter.



<Procedure>

1. Before draining water, attach a drain hose to the drain plug [B].
 2. Prepare a container. Loosen drain plug [B] and air bleeding plug [C] to drain.
 3. After draining finished, be sure to tighten [B] and [C].
- Do not remove fuel filter case [A] as fuel is overflow if it is removed. If it is necessary to remove it, plug inlet hose with a clip etc.
 - Drain the condensate into a container, and then dispose of condensate according to the designated regulations.

3.4.6 Check Interior

Periodically check the inside of the generator for dust and flammables

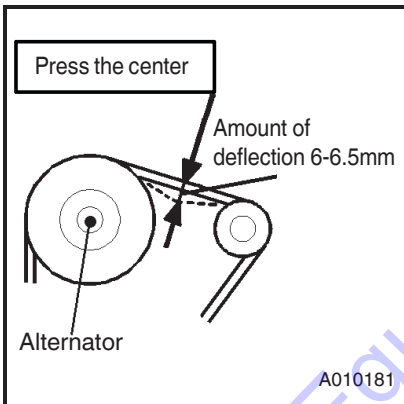
CAUTION

- Please wear personal protective equipment, such as a helmet, safety glasses, earplugs, safety shoes, gloves, and a mask as appropriate to the work environment.
- Periodically check the inside of the generator for dust and flammables. When any flammables such as chips of wood, dead leaves (dry leaves) and waste paper are left near heated exhaust muffler and heated exhaust pipe, all of them should be removed.
- Keep a fire extinguisher available by the machine in case of unexpected fire.
- It is advisable to have a list of phone numbers of doctors, ambulance and the fire department available in case of emergency.

3.4.7 Check Belt Tension

Adjust the alternator belt by the following procedure:

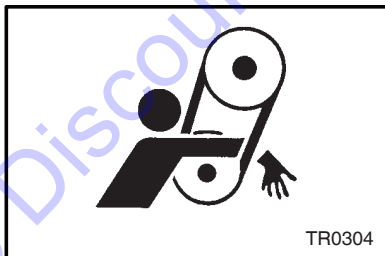
Unfasten the mounting bolts and nuts of the alternator to adjust the alternator belt.



<Procedure>

1. Visually check there are no cracks or wear or other damage to the belt.
 2. Belt tension is adjusted by loosening the alternator mounting bolts and nuts. While pressing the center of the belt slightly, adjust belt tension by loosening fitting bolt so the amount of deflection is between 6 and 6.5mm (98 N).
 3. If there is any oil or coolant on the belt, wipe it off completely during service.
- Refer to engine instruction manual for more details for belt adjustment.

WARNING



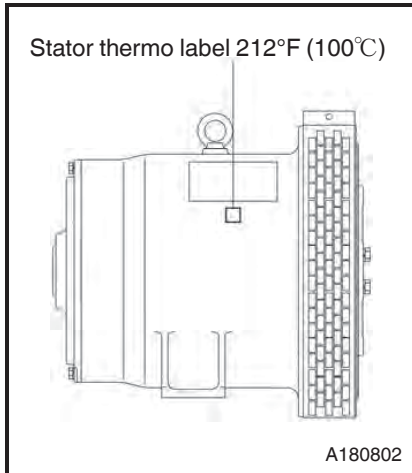
- Be sure to stop the engine whenever the tension of the belt is to be adjusted.
- Remove the negative (-) side cable from the battery.
- If the machine is running, it might catch the operator's hand into the belts, and this could cause a serious injury.
- Be sure to stop the engine whenever inspections and maintenance near the cooling fan.
- If the machine is running, it might catch the operator's hand into the fan, and this could cause a serious injury.

IMPORTANT

- Over-tensioning of the belt leads to shaft breakage and reduced bearing life. If it is too loose, belt slippage may lead to premature breakage of the belt or damage to the machine due to overheating.

3.4.8 Check Thermo Label of Alternator

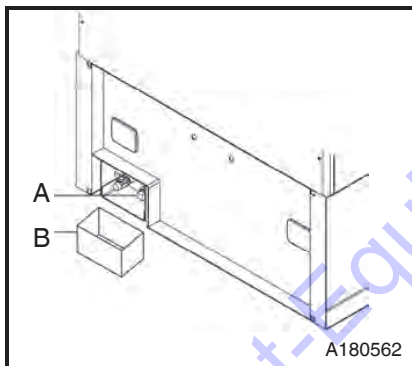
Thermo label on the stator irreversibly changes its color from white to brown by reaching or exceeding 212°F (100°C), that signalize overload during operation. Do not overload the generator.



- Remove the trash and dust from the generator inside by compressed air blowing.
- Replace thermo label, if it have changed the color once.
- When replacing, contact your nearest dealer.

3.4.9 Check Oil Fence Drain

Oil fence drain port is located at the front of the machine.



- Remove drain plug [A] from the oil fence drain to drain the condensate.
- Check that all condensate is drained, and then re-install the drain plug.
- Drain the condensate into a container [B], and then dispose of condensate according to the designated regulations.

3.4.10 Check Doors

Pull the handle forward to open the door. Be sure to close the door tightly so that its latch is firmly caught.

WARNING

PK0028

- Keep the door closed and locked while running the machine.
- When opening the door unavoidably, be careful not to touch the moving s and hot parts. Scalding or serious injury could result.

3.5 Operating Procedure

Make sure that all enclosure doors are closed before starting.

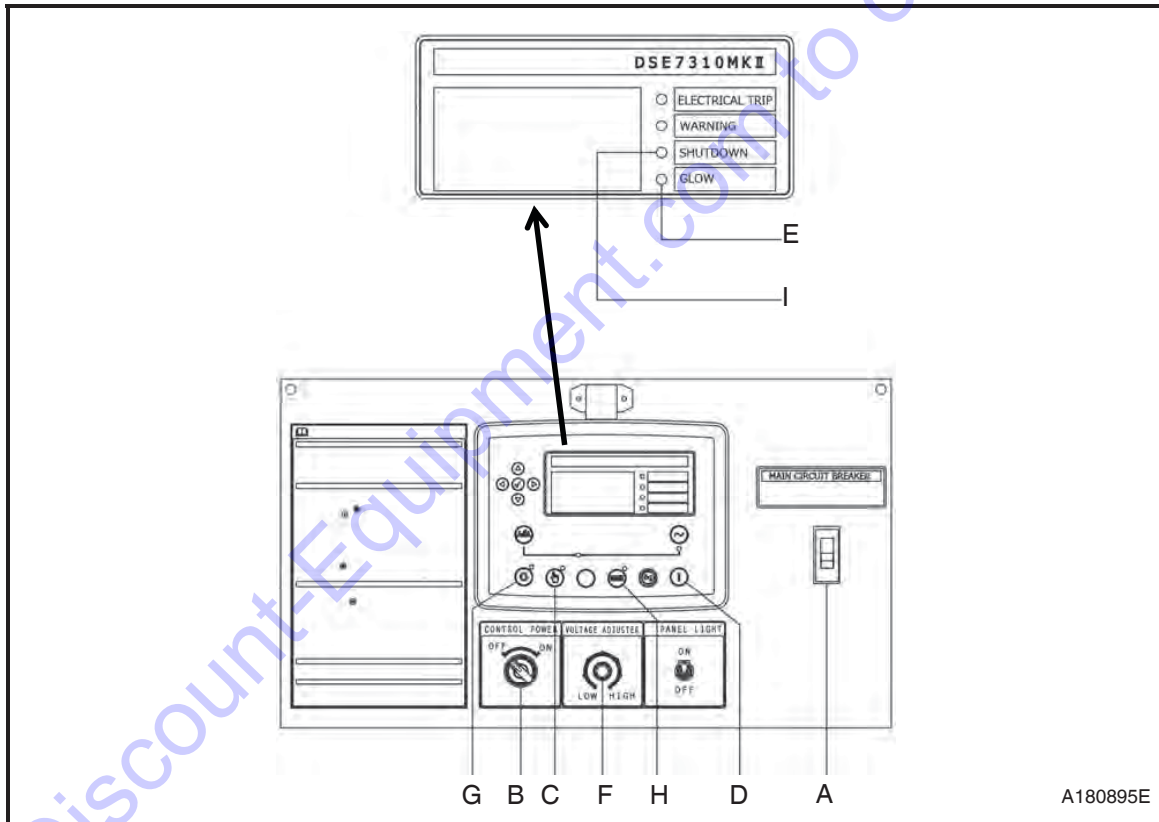
3.5.1 Operating Procedure

To start, please follow the procedure below.

Manual Start Procedure

<Procedure>

1. Set the circuit breaker [A] on the instrument panel to [OFF] position.
2. Set the selector switch [B] to [ON] position.
3. Push the manual mode button [C].
4. Push the start button [D] to run the engine.
(Preheating is started automatically in cold weather. After the glow lamp [E] is off, the engine starts.)
5. Once engine has started, let it warm up approximately 5 minutes at no-load condition.



WARNING

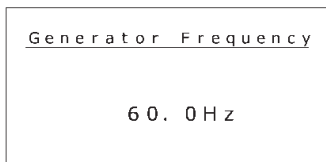


- Keep the output terminal cover shut and locked whenever the machine is running. Note that a voltage of several hundred volts is applied to the output terminal and control board. When opening the output terminal cover is unavoidable, be careful not to touch the output terminal. Electric shock or serious injury could result.

Check frequency and voltage

<Procedure>

1. After warming up, display **Generator** monitor and press ▲▼ to show [Generator Frequency].
Check that the frequency of the generator is at 60Hz after warm up. (See 3-2)



Monitor Screen

2. Press ▲▼ to show [Generator Voltage] and adjust to rated voltage with a voltage adjuster [F].

Generator Voltage	
L1-L2	480V
L2-L3	480V
L3-L1	480V

Display



Voltage Adjuster

Operation with Load

<Procedure>

1. Set the circuit breaker [A] to [ON] and supply power to the load.
 - During operation, check and confirm whether the generator functions properly. (See. 3.5.2)
- ※ Before starting to supply power to the load, make sure that the voltage is in accordance with the load.

IMPORTANT

- After the engine starts up, warm it up unloaded for approx. 5 minutes.
- Warming up after starting up is necessary for smooth operation of the engine.
Do not operate the engine at full load immediately after it starts up.
This will shorten the equipment life.
- During the warm-up operation, examine the different parts of the equipment for any looseness, leakage of water, oil, fuel, and other irregularities.
- Also, make sure that the alarm lamps are off.
- Be sure to operate the generator at the rated frequency, irrespective of the load capacity.
If the machine is operated with a frequency lower than the rated frequency, it could cause the generator main machine or to be burned.

<Shutdown Procedure>

1. Stop the load.
 2. Set the circuit-breaker [A] to [OFF] position.
 3. After about 5 minutes cooling down operation, push the stop button [G] to stop the engine.
 4. Set the power control switch [B] to [OFF] position.
- ※ The engine controller is on for a few minutes after engine is stopped. Do not remove the battery cables, etc., during this period.

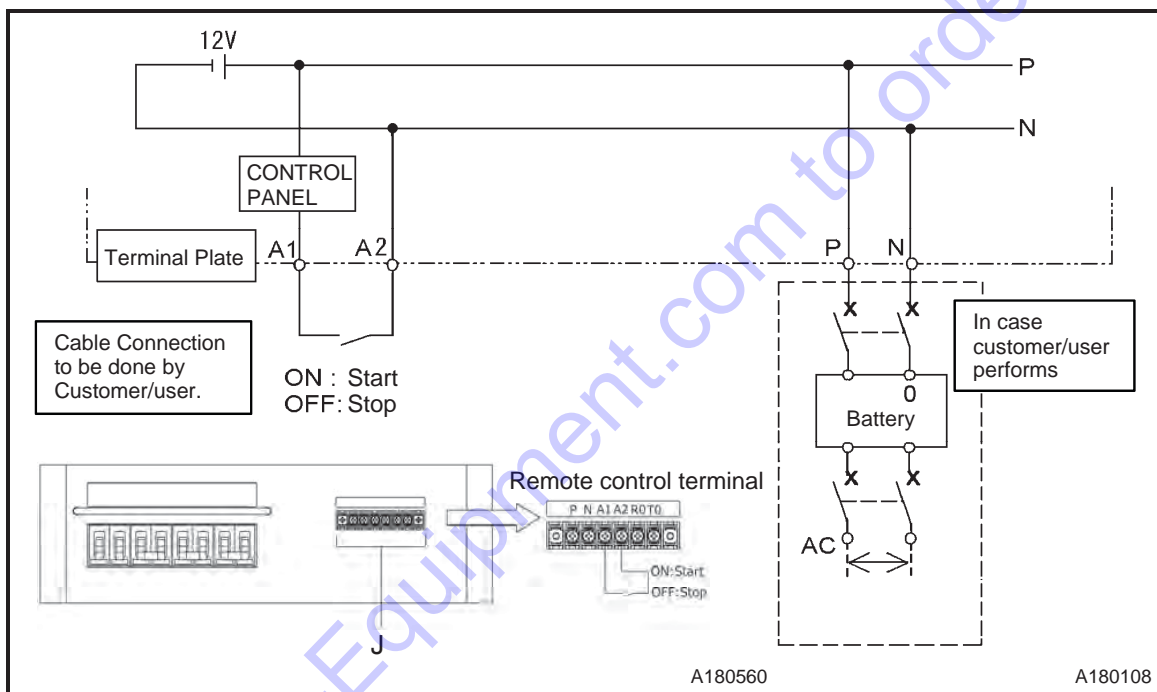
Auto Start

1. Cable connection method of remote control switch.

- The remote control terminal [J] is provided inside the output terminal. Perform cable connection as shown below for remote control operation of the machine. For this cable connection job, make sure to remove the battery cathode cable terminal.

<Procedure>

1. Perform manual start to adjust voltage, stop the engine.
2. Push the auto mode button [H].
3. Set the circuit breaker [J] to [ON] position.
4. Setting remote control terminals [A1-A2] to [ON] starts the engine.
(In cold conditions, pre-heating starts automatically. After glow lamp [E] is switched off, the engine starts.)
5. Setting remote control terminals [A1-A2] to OFF stops the engine.



CAUTION



Inspection and maintenance prohibited during automatic operation

- Never put your hands close to the interior of the machine, because the generator can begin operation without warning even while the machine is set to the stop position.
- Before starting inspection and maintenance job, make sure to hang the tag "Under inspection and maintenance".
- Remove the battery cathode cable terminal.

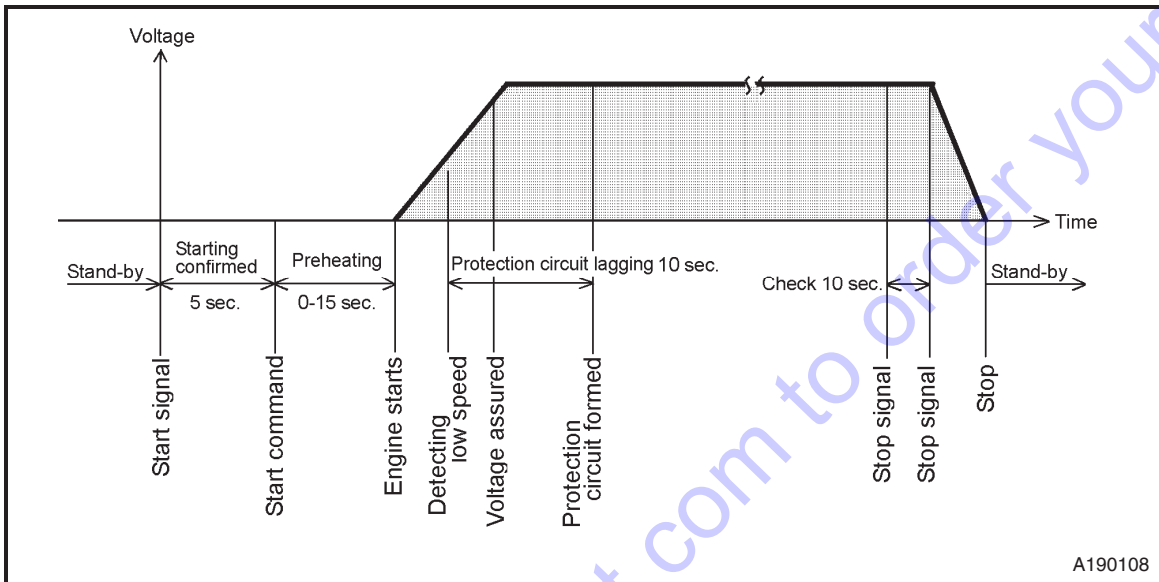
IMPORTANT

Install the battery charger

- While the unit is in stand-by conditions during automatic operation, battery discharge occurs. Make sure to charge battery, operating the battery charger.

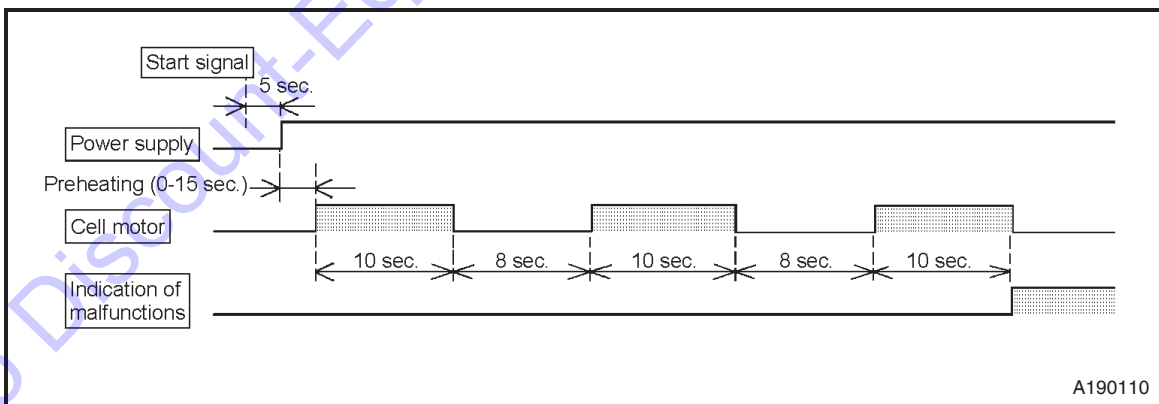
2. Function

- When the start signal activates in stand-by mode, it starts the unit. (This includes preheating.) When the stop signal activates, the unit will continue to operate for 10 seconds to cool down, then the unit stops and is placed again in stand-by mode.



3. Starting Action

- If the engine will not start after cranking for 10 seconds, stop it for 8 seconds before trying again. If the engine will not start even after cranking is repeated three times, the SHUTDOWN lamp [I] will illuminate due to Fail to Start error.
- If the engine will not start and the SHUTDOWN lamp is illuminated, troubleshoot the cause of engine failure before proceeding.



IMPORTANT *Perform periodical inspection and maintenance of the generator*

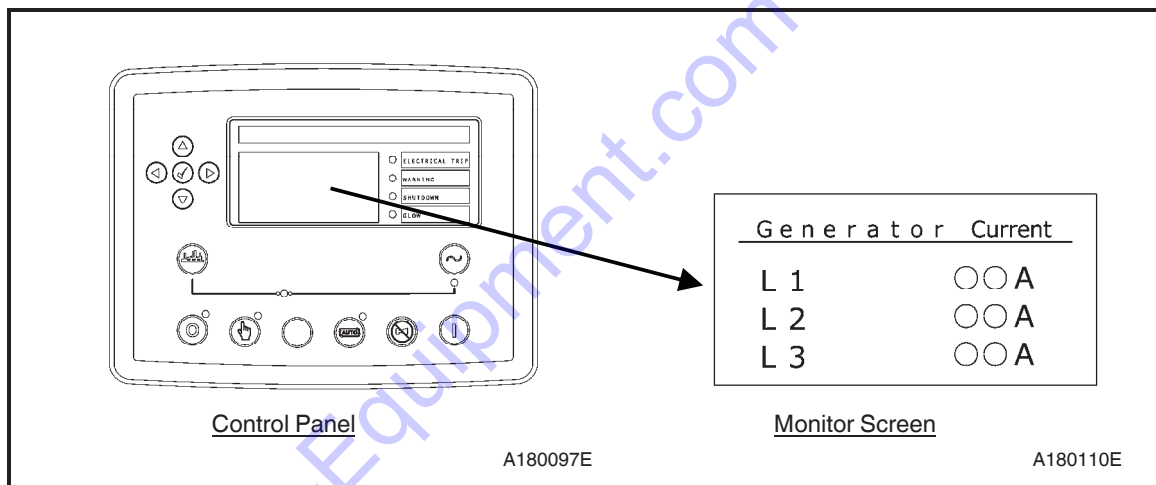
- To check performance, run the unit for 5 to 10 minutes once in a week.

3.5.2 Meters and indicator lights during operation

During normal operation, each indication of instruments is shown in the table below. Refer to the table for daily checks.

Note: The values marked * vary with location of the voltage selector switch.


		Voltage (V)	Frequency (Hz)	Ammeter (A)	Monitor Lamp			
					ELECTRICAL TRIP	WARNING	SHUTDOWN	GLOW
Before Start	CONTROL POWER switch (ON)	0	0	0	● OFF	● OFF	● OFF	● OFF
	During Operation	* 240 480	60	Less than rated current		● OFF		



- Be sure to frequently check meters and indicators for proper operation, or any machine water, oil, fuel leaks, etc.
- The above table gives standard values. They may vary slightly depending on operating conditions and other factors.
- In single-phase load operation, check the current of L1, L2, and L3 phase with displaying Generator page. Each current should be balanced if unbalanced. Change load connections so the current of L1, L2, and L3 is equally balanced. Make sure that the current of each phase does not exceed the rated one.

※Keeping a record of machine operation and service checks in the Operation Log will help with discovering any underlying issues or problems with the machine before they become severe.


CAUTION



PK0028

- Do not under any circumstance, open the portions below during operation.
- Coolant drain valve
- Engine oil drain valve

CAUTION



H990432

- Never work nearby hot portions of the machine while it is running.
- Do not touch hot portions of the machine while inspecting the machine when running.
- Parts such as the engine, exhaust manifold, exhaust pipe, muffler, radiator and intercooler are especially hot. Never touch those parts, because it could cause scalding.
- Coolant water and engine oil are also very hot and dangerous to touch. Avoid checking or refilling them while the machine is running.

CAUTION

- When the breaker functions often during operation, reduce the load.
- When using 1-phase load, check the current of each phase and try to keep the load of each phase constantly average.
- If you continue to operate the generator while ignoring or neglecting these cautions, it could cause overheating and result in fire. Furthermore, should operation continue at a lower level than the standard rated frequency, it could burn the generator and any motors of the attached load.

3.5.3 Panel light

- The panel is equipped with an LED light. Turn the panel light switch [ON] to use.
- When illumination is not necessary, turn the light [OFF]. If the machine is always operated with the lamp switched [ON], the lamp life can be reduced.

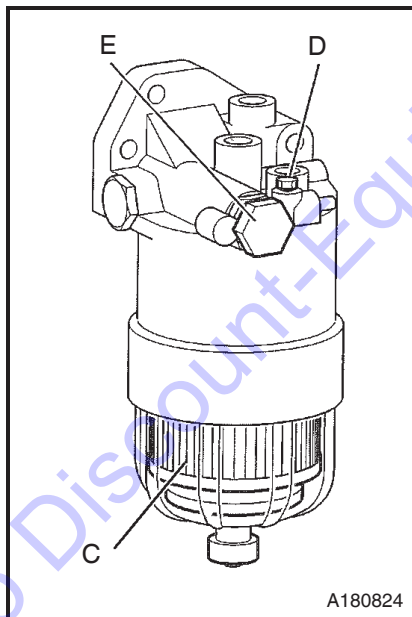
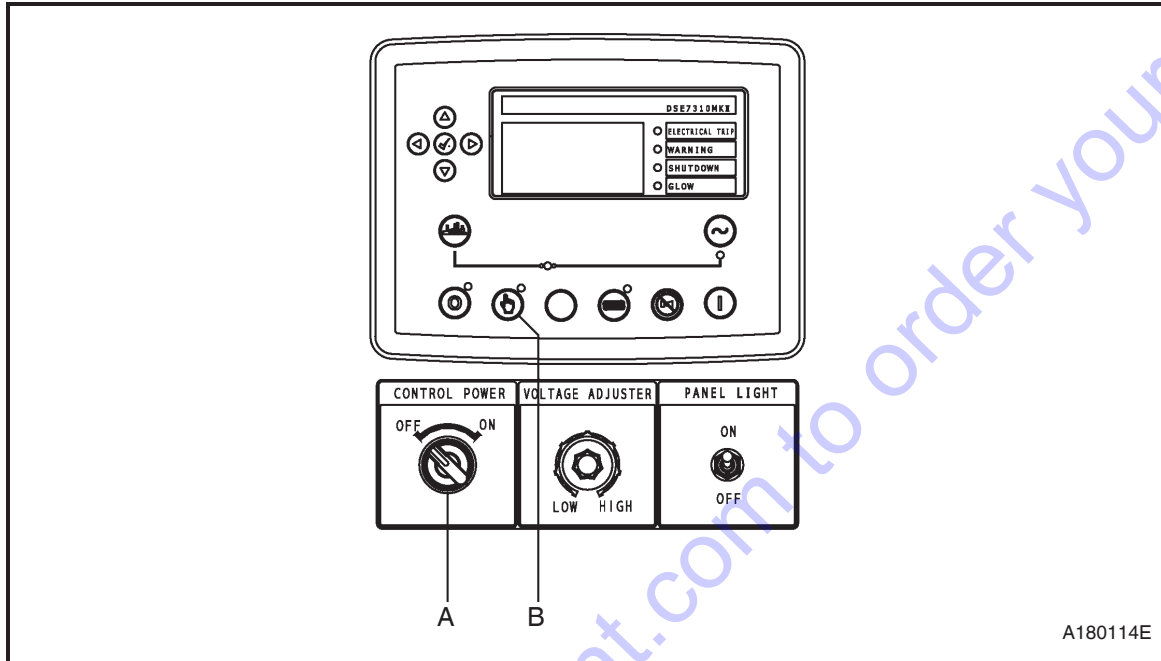
3.5.4 Operating procedures when engine fails to start up on first attempt

If the engine repeatedly fails to start, the following causes are suspected. Check the following:

- No fuel
- Clogging of the fuel filter
- Discharge of battery (Low cranking speed)

3.5.5 Fuel line air bleeding device

If the machine runs out of fuel, bleed the air, according to the following procedures.

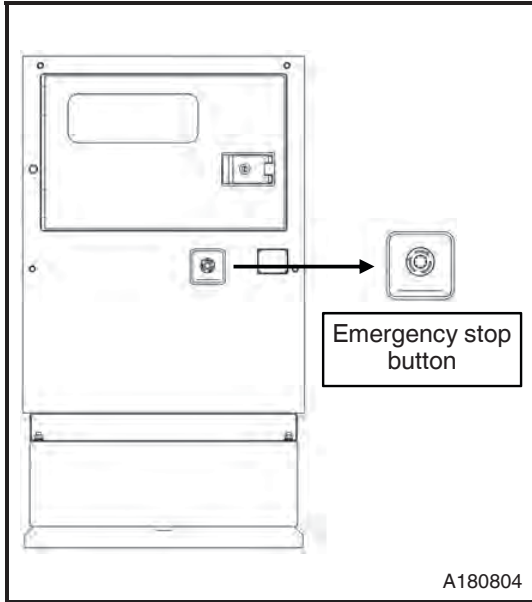


<Procedure>

1. Refill the fuel.
2. Set the control power switch [A] to [ON] position.
3. Press the manual mode button [B] to activate the electromagnetic pump.
4. Loosen the air bleeding plug [D] of the fuel filter element [C] and loosen the priming pump [E], push the priming pump back and forth until fuel comes out (more than 20 times).
5. After air bleeding is completed, tighten the air bleeding plug and push the priming pump back and forth until the fuel filter element is filled with fuel (more than 10 times).
6. Wait about 1 minute, and then loosen the air bleeding plug to bleed air from the fuel filter element.
7. Repeat steps 4 to 6 until the air does not come out of the air bleeding plug.
8. Finally, firmly tighten the air bleeding plug and priming pump to wipe the surrounding fuel clean.

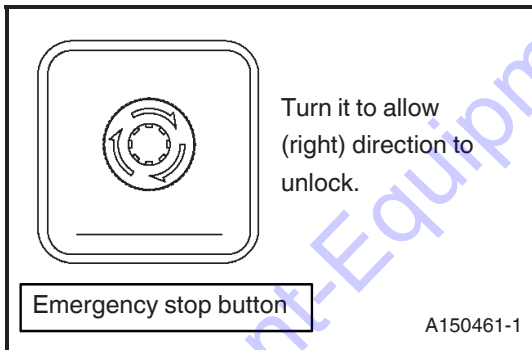
3.6 Emergency Stop

3.6.1 Emergency stopping procedures



- If it is necessary to stop the generator for emergency, press the Emergency Stop button located under the control panel.
When shutting down with the emergency stop button, the machine will stop immediately.

3.6.2 Cancellation of emergency stop button



- After emergency stopping, be sure to carry out an investigation of the problem which caused you to use the emergency stop and take appropriate countermeasures. Release emergency stop button only after resolving the problem that required an emergency stop. To reset the button, turn the button head in the direction of the arrow.
- ※ If it is not reset, the machine cannot restart.

4 Troubleshooting

4.1 Protection device

To prevent issues during operation, this machine is equipped with various protection devices.

4.1.1 List of protective devices, warning lamps, and monitor alarms

This machine is equipped with protective devices, and indicates the type of issue with lamps and messages on the monitor display as shown in the table below.

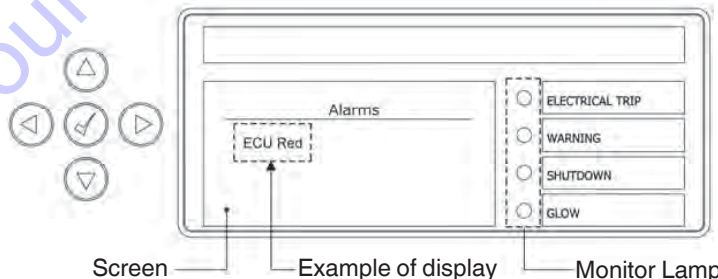
Shown below are the typical items. When the Warning lamp is activated or any other monitor alarm is displayed due to other engine trouble, contact your nearest dealer.

Item	Control Panel					Function
	Monitor Lamp			Screen		
	Electrical Trip	Warning	Shutdown	Alarms	ECU Current DTCs	
Low Engine Oil Pressure	☀️-ON	-	☀️-ON	ECU Red	ENG Oil Press. Low	Warning: lower than 14PSI (0.098MPa)
High Coolant Temp	☀️-ON	-	☀️-ON	ECU Red	Water Temp High	Shutdown: above 212°F (100°C)
Over speed	☀️-ON	-	☀️-ON	ECU Red	Engine Speed High	Shutdown: above 2070rpm
Clogging Air Filter	-	☀️-ON	-	Air Filter	-	When it is clogged or necessary to clean.
Oil Fence	-	☀️-ON	-	Containment Level	-	When condensate (fuel, engine oil and coolant) is accumulated more than 13.2gal (50 liters)
Low Fuel Level*	-	☀️-ON	-	Low Fuel	-	Warning: less than 5% of capacity
Over Current/ Short Circuit	☀️-ON	-	☀️-ON	Over Current	-	When it occurs
High Voltage	☀️-ON	-	☀️-ON	Over Voltage	-	Shutdown: above 108%
Other Engine Trouble	**	**	**	-	**	**

*Not functional when using an auxiliary/external fuel tank.

**Please contact your nearest dealer.

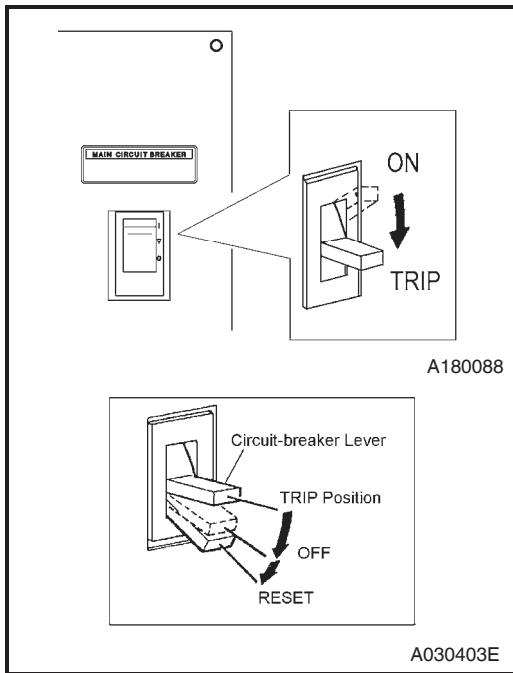
When ECU Red or ECU Amber is displayed, press button once to change screen to ECU current DTCs and check screen.



CAUTION

- If the protective device operates and the engine stops or the circuit breaker trips, refer to the cause of the failure and the countermeasure item, eliminate the cause and restart operation.

4.1.2 Circuit Breaker



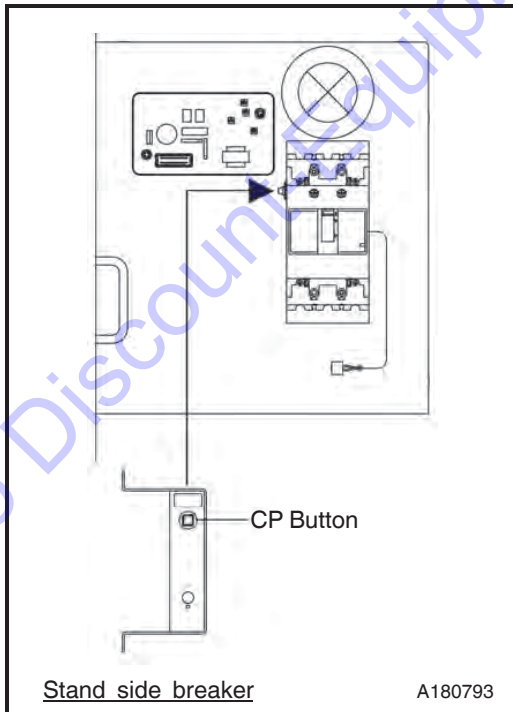
- In case of an overload or short-circuited wire connection, the circuit-breaker trips.
- When the breaker is tripped, stop the machine immediately and reset the circuit breaker after resolving the cause of the trouble.

<How to reset>

- In order to reset the lever of circuit breaker, press the lever downward firmly until the lever “clicks” into place.

4.1.3 Circuit protector (CP) for AVR protection

AVR is equipped with a circuit-protector (CP) for protection against over current. It will activate under the following conditions:



- The machine is overloaded while engine speed is still low.
- The output voltage of machine is increased higher than the specified voltage.

<Symptom>

- When the CP operates, following symptoms will occur.
 1. The voltage will not reach rated voltage.
 2. The voltage is usable, but voltage fluctuation is wide and voltage restoration is slow when loaded.

<How to reset>

- Reset it by pressing CP (AVR) button provided at the side of the breaker plate in the control panel.

4.2 Troubleshooting

Should any trouble occur during operation, do not leave it. Investigate the cause and take appropriate measures. Read the manual carefully and fully understand what to do in case of trouble.

- The better you understand the construction and function of the machine, the faster you can find a problem and solution.
- This chapter describes the state, cause and countermeasures of important troubles in detail:

Symptom	Cause	Counter measures
Starter does not rotate. Low starter revolution speed even when starting.	(1) Battery malfunction (2) Charging malfunction (3) Alternator malfunction (4) Starter malfunction	Check Battery→Charge/Change Change Change
Starter rotates normally but engine does not start up.	(1) No diesel fuel oil (2) Air mixing in fuel piping (3) Fuel filter clogging (4) Nozzle clogging (5) Malfunction of controller	Replenish fuel Bleed air Disassemble/Clean and Change Disassemble and clean Check fuse Check connector Check controller
※ “Engine Oil Pressure Low” is displayed on the monitor screen.	(1) Engine oil shortage (2) Engine oil filter clogging (3) Loosened or disconnected wiring, or connector (4) Oil pressure switch malfunction	Replenish fuel Change Check/tightening Change
※ “Water Temperature High” is displayed the monitor screen.	(1) Shortage of coolant (2) Slip of belt (3) Radiator clogging (4) Faulty thermostat (5) Looseness, disconnection of wiring or connectors (6) Faulty coolant temperature switch	Replenish Adjust tension Clean Change Check/tightening Change
※ “Air Filter” is displayed on the monitor screen.	(1) Air filter clogging	Clean
※ “Containment Level” is displayed on the monitor screen.	(1) Condensate accumulated in the oil fence. (2) Oil fence level sensor is not functioning.	Drain Check/ Change

※ Refer to section 4.1.1 for monitor lamp and display.

Symptom	Cause	Counter measures
Circuit breaker trips.	(1) Overloaded (2) Short-circuit occurred at the load side.	Reduce the load Get rid of cause of short-circuiting.
Even when operated at a rated speed, no voltage or too low voltage generated.	(1) Poor tightening of terminals (2) Broken or short-circuited circuit to exciter field winding (3) Faulty exciter (4) Function circuit protector (CP) for AVR protection (5) Faulty AVR (6) Broken or short-circuited winding of generator main machine (7) Faulty silicon rectifier (mounted on generator main machine rotor) (8) Faulty voltmeter	Check/tightening Repair Repair Reset Change Repair Change Change
Too high voltage generated when set at the rated frequency (50Hz/60Hz), Voltage will not drop even when the voltage regulator controlling knob is turned.	(1) Loosened or disconnected wiring, or connector to AVR (2) Broken wire or poor contact of AVR variable resistor (3) Faulty AVR	Check/tightening Repair or change Change
Unstable voltage generation	(1) Poor tightening of each terminal (2) Function circuit protector (CP) for AVR protection (3) Faulty AVR	Check/tightening Reset Change


- Contact your nearest dealer if you find it difficult to repair by yourselves.
- Please see engine operation manual for more details of engine trouble.

5 Maintenance

5.1 Important Items at Periodic Inspection and Maintenance

The following table shows the inspection and maintenance intervals under normal operation conditions. When used or operated under hard environmental conditions, it is impossible to warrant the machine even if the above conditions are performed according to the intervals listed in the above table.

- Be sure to use appropriate tools for inspection and maintenance work. Inappropriate tools could cause unexpected injury.
- Please wear personal protective equipment such as a helmet, safety glasses, earplugs, safety shoes, gloves, and a mask as appropriate to the work environment
- Do not touch hot portions of the machine while inspecting the machine when running. Parts such as the engine, exhaust manifold, exhaust pipe, exhaust muffler, radiator, inter cooler, generator, and pipe are especially hot, so never touch those parts, because it could cause scalding.

WARNING	Hang a “Under Maintenance” tag
	<ul style="list-style-type: none">● Before starting inspection, set the machine’s circuit breaker to OFF, and then attach the “Under Inspection” label to an easy-to-see location.● Remove the negative (-) side cable from the battery. If the above procedure is neglected, and another person starts operating the machine during check or maintenance, it could cause serious injury.

IMPORTANT	Instructions and unspecified work prohibited
<ul style="list-style-type: none">● Be sure to use recommended fuel, DEF, oil, grease, or antifreeze.● Do not disassemble or adjust engine, compressor or part(s) for which inspection or maintenance is not referred to in this manual.● Use genuine parts for replacement.● Any breakdown, caused by using unapproved parts or by wrong handling, will be out of the scope of “WARRANTY”.● Do not pour water or steam on electrical components.● Place a container or a pan underneath the oil port to receiver waste liquid so that such liquid cannot be spilt out on the floor or inside the machine.● Be sure that no waste liquid is disposed of on the ground. Such waste on the ground, river or lake will cause serious environmental contamination. Be sure to follow the local regulations. If harmful material such as oil, antifreeze solution or filters are disposed of incorrectly, the responsible person should be punished by the authority.● Observe local regulations when disposing of such toxic materials as oil, fuel, coolant (Antifreeze), filters, and battery etc.	

5.2 Maintenance Schedule

Such items marked ○ shall be carried out by customers. For the following items or clauses marked ●, contact your nearest dealer because they require expert technical knowledge on them.

The following table shows the intervals of inspection and maintenance under normal operation conditions. Inspection and maintenance should be done at either of the hour or the period mentioned in the remarks column, whichever comes earlier.

(This table is a guide only, it is not a guaranteed time. Please change maintenance interval according to usage load environmental condition.)

Maintenance		Daily	Every 250 hours	Every 500 hours	Every 1,000 hours	Ref.	Remarks
Generator	Clean instruments in control panel	○				3-10	Clean as required.
	Check thermo label of alternator	○				3-13	
	Check control panel	○				3-18	
	Check GFCI receptacles		○			5-8	Every 1 month
	Check insulation resistance		○			5-9	Every 2 months
	Check thermo label on the generator		○			5-10	Every 2 months
Engine related	Check engine oil level	○				3-9	
	Check coolant level	○				3-10	
	Check fuel	○				3-11	
	Check fuel filter drain	○				3-11	
	Check belt tension	○				3-12	In the case of NG, it exchanges.
	Change engine oil		○			5-4	
	Change engine oil filter element			○		5-5	
	Check battery electrolyte		○			5-5	
	Check and clean air filter elements		○			5-7	
	Check accumulations in exhaust system		○			5-8	
	Drain fuel tank		○			5-10	
	Check specific gravity of battery electrolyte.			○		5-5	
	Change fuel filter element			○		5-11	
	Clean outside of radiator			○		5-11	Clean as required.
	Clean fuel air bleeding pump filter			○		5-11	
	Check and cleaning of the supply pump strainer			○		5-12	
	Check exhaust flexible pipe			○		5-13	Every 4 months
	Change air filter element				○	5-13	
	Change coolant (LLC)				○ (Every 2 years)	5-15	
	Clean fuel tank				●		

Maintenance	Daily	Every 250 hours	Every 500 hours	Every 1,000 hours	Ref.	Remarks	
Others	Check interior	○			3-12		
	Check oil fence drain	○			3-13		
	Check terminal and wirings			○	5-12	Every 4 months	
	Check engine/generator mount				○	5-14	Every 1 year
	Check each rubber hose				○	5-14	Every 1 year
	Clean the oil fence and check for rust				●	5-15	Every 1 year

The above intervals of inspection and maintenance are respectively based on the operation time of 125 hours of used per month and of 1,500 hours of use per year.

Maintenance	Every 1,000 hours	Every 1,500 hours	Every 3,000 hours	Remarks
Engine body	Check and adjustment of engine valve clearance	●		Please contact nearby distributor or engine distributor for inspection and maintenance.
	Clean EGR cooler		●	
	Check and clean EGR valve		●	
	Check and clean injector		●	

5.3 Periodic Replacement Parts

Part number changes upon modification. For replacement of parts, make sure whether the part number is correct or applicable.

Description	Part Number	Q'ty
Air Filter Element	32143 11700	1
Engine Oil Filter Element	ISUZU 894456-7412	1
Fuel Filter Element	ISUZU 898143-0411	1
Gasket Kit for Fuel Air Bleeding Electric Pump	ISUZU 898071-4040	1set
Engine Supply Pump Strainer [A]	ISUZU 898074-9550	1
Engine Supply Pump Strainer Gasket [B]	ISUZU 109630-0830	3
Engine Supply Pump Strainer Gasket [C]	ISUZU 109630-0850	3
Belt	ISUZU 898095-3350	1

5.4 Maintenance Items

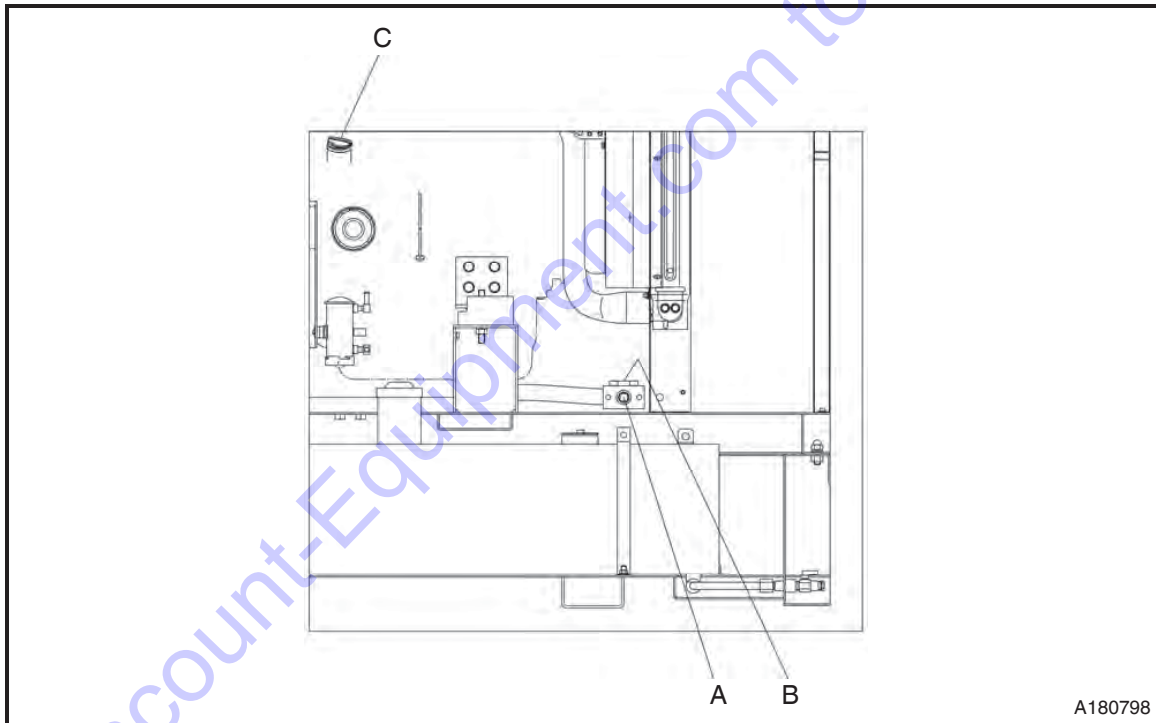
5.4.1 Change Engine Oil

Every 250 Hours

When checking, replenishing, and draining the engine oil, be sure to wait more than 10 minutes after engine stops to allow it to cool down.

<Procedure>

1. Remove the engine oil filler port cap [C], and remove the drain plug [A] fixed outside, and then open the drain valve [B] fixed inside to drain oil.
2. After draining completed, close the drain valve [B] and install the drain plug [A] remove the engine oil filler port cap [C], refill new engine oil. **[Oil supply: about 9L]**
3. After finishing the oil supply, tighten the cap of engine oil filler port firmly.
4. Make sure to check engine oil level with the engine oil level gauge before start the unit.
5. After finishing the oil supply, tighten the cap of engine oil filler port firmly.



CAUTION

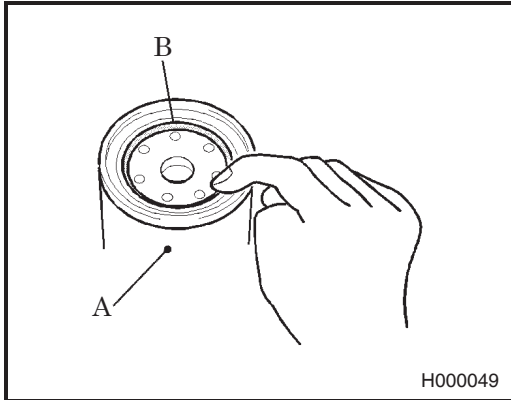


Caution in filling or draining engine oil

- Engine oil is very hot and highly pressurized during or just after the operation. Hot oil could blow out and can cause injury
- Never supply more engine oil than the proper level. Too much oil could cause white smoke out of the exhaust, and it can cause damage and accident to engine.

5.4.2 Change Engine Oil Filter Element

Every 500 Hours



<Procedure>

1. Take out the oil filter element [A] using a filter wrench.
2. After coating fuel on the new oil filter element packing [B], screw it in. After the packing touches the sealing face, tighten another 2/3 turn with a filter wrench. After installing the oil filter element, check it for any leak
3. during operation. **(For part number, See 5.3)**

5.4.3 Check Battery

Battery electrolyte : every 250 hours

Specific gravity of battery electrolyte : every 500 hours

If there to be a problem in starting an engine due to a flat battery, carry out the checks by following the procedures below:

- **Ordinary type battery:**

Measure specific gravity of battery electrolyte, and if it shows below 1.24, recharge the battery immediately. (See 5.4.4)

- **Enclosed type battery:**

Check the indicator on top surface of the battery.




If the indicator shows that charge is needed, recharge the battery immediately.

If specific gravity of battery electrolyte does not rise despite replenishing distilled water or charging battery, replace battery with a new one quickly.

5.4.4 Maintenance of Battery

Battery may generate hydrogen gas and may explode. Therefore, recharging should be done at a well-ventilated place.

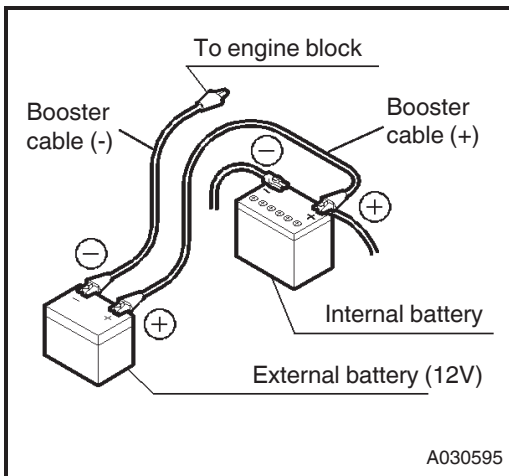
- Do not check the battery by short-circuiting the positive and negative terminals with a metallic piece.
- Never operate the machine nor charge the batteries with low battery liquid. Continuing operation at this lower level will cause deterioration of some parts, reduction of battery life, and also it may cause explosions. Add distilled water so that the liquid level is between the “UPPER LEVEL” and “LOWER LEVEL” if the level is too low.
- Wear protective gloves and safety glasses when handling a battery.
 - If battery electrolytes contact your clothes or skin, wash it away with a large amount of water immediately.
 - If the battery electrolytes get into your eyes, flush them immediately with plenty of water and see a doctor at once. Severe damage to eyes and vision may result.

WARNING	Handling Battery
 D004	<ul style="list-style-type: none">● Keep flames away from battery.● Do not spark near the battery nor light a match, nor bring lit cigarette and match close to the battery.● Do not charge a frozen battery as it may explode. If the battery is frozen, warm it up until the battery temperature becomes 16°C to 30°C.● Battery electrolyte is diluted sulfuric acid. In case of mishandling, it could cause skin burning.● Dispose of battery, observing local regulations.
 W010	
 TR0093	

[Charge battery]

- Use the battery charger after you confirm whether it is in good operating condition and ready for use.
- Disconnect the cable between battery and the machine, and charge the battery with a 12V battery charger. Do not charge two batteries at the same time.
- Be sure not to connect (+) and (-) terminals backwards.

[How to use booster cable]



<Procedure>

1. Stop the engine.
2. Connect one end of the (+) booster cable to the (+) terminal of the machine battery.
3. Connect the other end of the (+) booster cable to the (+) terminal of the external battery.
4. Connect one end of the (-) booster cable to the (-) terminal of the external battery.
5. Connect the other end of the (-) booster cable to the engine block of the machine.
6. Start up the engine.
7. Disconnect the booster cable by following the procedure back in the reverse order.

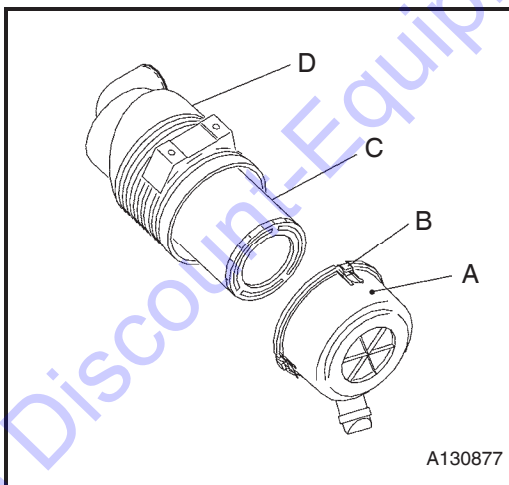


Do not reverse the cable connection

- When a booster cable has to be used or when cables are connected again after a battery is replaced, be careful not to connect (+) and (-) terminals backwards. A backwards connection will cause sparking and damage to each component.

5.4.5 Check and Clean Air Filter Elements

Every 250 Hours



Clean the air filter displayed on the monitor screen.

<Procedure>

1. After removing the cap [A] by loosening its cap fixing latch [B], clean its interior properly.
2. Remove the element [C], and clean it.
3. When installing the cap after finishing the cleaning job, push the element into the case [D] firmly by hand, and then make sure that the cap fixing latches attach securely to the case. Lastly, tighten the latches.

- If the element is found heavily dusty, replace it with a new one. **(For part number, See 5.3)**

IMPORTANT

- When an element that is clogged or has holes or cracks is used, dust or foreign material will get in the engine. This causes accelerated wear in moving parts within the engine. Be sure to perform daily checks and appropriate cleaning so that the life of the engine will not be shortened.

5.4.6 Check Accumulations in Exhaust System

Every 250 Hours

When a diesel engine driven generator is continuously operated with less than 30% load or no load for a long time, carbon will be stuck inside the exhaust pipes, exhaust muffler, and engine body. Unburned fuel may also come out from connected portions of exhaust pipe and outlet port of the exhaust muffler. If it is continuously operated under the conditions, the fuel which comes out could ignite and cause a fire. Further, wet-stacking and carbon accumulation could cause power drop in the engine as well as overheating, resulting a serious damage to the engine. If this occurs, eliminate the carbon accumulation by burning it under full load operation (to increase exhaust heat) until the exhaust gas becomes almost clear. (For load current, refer to the following table as a standard value.)

Frequency	Hz	60	
Rated voltage	V	240	480
Load current	A	48	24

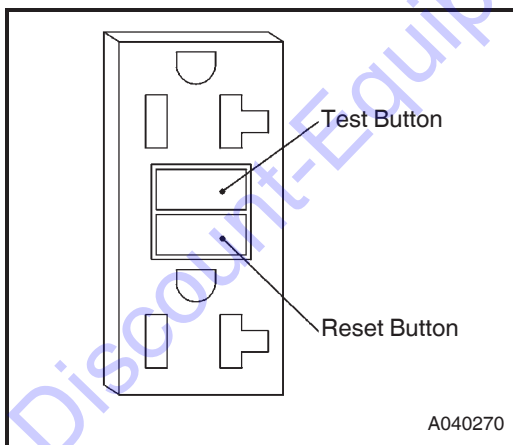
CAUTION

- In case of load operation, increase load factor step by step with checking the conditions of exhaust. Do not place flammables surroundings because it could sometimes cause sparks from exhaust pipe.

5.4.7 Check GFCI Receptacles

Every 1 month or 250 Hours

Periodically, check the GFCI operation for safety.



<Procedure>

1. Unplug all appliances from the generator.
2. Start the engine.
3. Turn [ON] the breaker on the instrument panel of this machine.
4. Press the test button.
5. Press the reset button.
 - The reset button should extend with a click.
 - If the reset button does not extend, contact your nearest dealer.
6. When the reset button extends during operation.
 - Unplug all appliances from the GFCI protected receptacle.
 - Press the reset button:

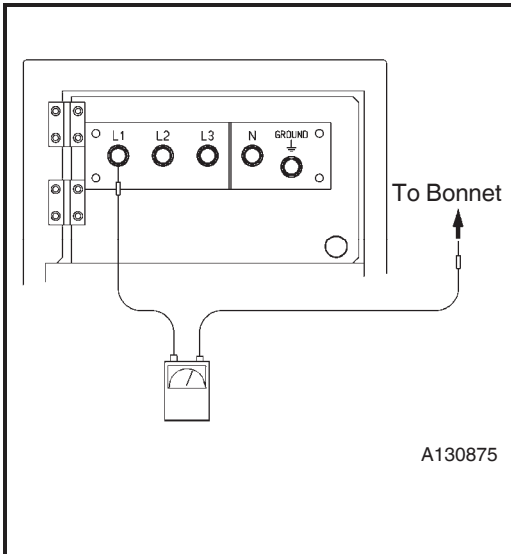
If the GFCI cannot be reset: The GFCI is faulty. Contact your nearest dealer. If the GFCI resets properly: Check the appliance or the power cord.

DANGER

- If the generator is stored outdoors, unprotected from the weather, test the GFCI receptacle before each use.
- In case the GFCI has tripped due to the hazard of ground fault currents, investigate the cause and correct it.

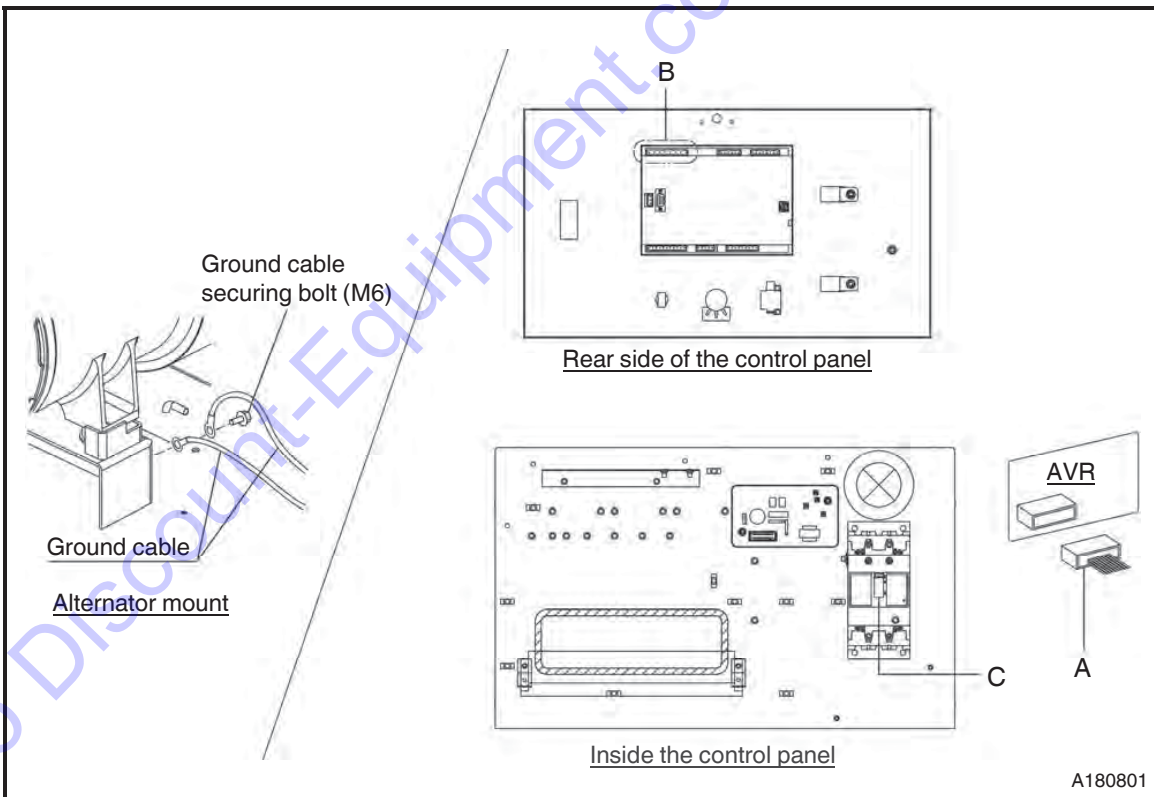
5.4.8 Check Insulation Resistance

Every 2 months or 250 Hours



<Procedure>

1. Remove the load side cable from the output terminal board.
2. Loose and remove the bolt (M6) securing the ground cable between [N] and [GROUND] on the output terminal board.
3. Remove the connector [A] inside the generator control panel.
4. Remove connector [B] at the rear side of the control panel.
5. Switch ON circuit breaker [C], measure each insulation resistance between the terminals L1, L2, L3 terminal and bonnet.
6. If insulation resistance value measured is found more than $1M\Omega$, it is good.
7. After checking the insulation resistance, reinstall the ground cable between [N] and [GROUND], AVR connector [A], and connector [B] at the rear side of the control panel.



IMPORTANT

- Insulation resistance should be regularly checked or measured with a 500V insulation resistance meter. If it is reduced to lower than 1M Ω , it could cause an electrical leakage or a fire.
- For recovery or improvement of insulation resistance, wipe and clean dust and dirt around output terminals, circuit breaker, generator body outlet port and receptacle and dry them. If insulation resistance does not recover after cleaning, contact your nearest dealer.

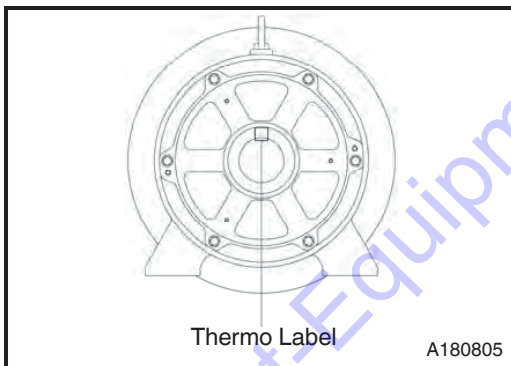
DANGER

- After making sure that the insulation resistance of the generator is higher than 1 M Ω , be sure to re-connect the cable between the terminal [N] and terminal [GROUND] just as it was originally connected. If it is left disconnected, the grounding becomes imperfect so that it could cause electric shock.

5.4.9 Check Thermo Label on the Generator

Every 2 months or 250 Hours

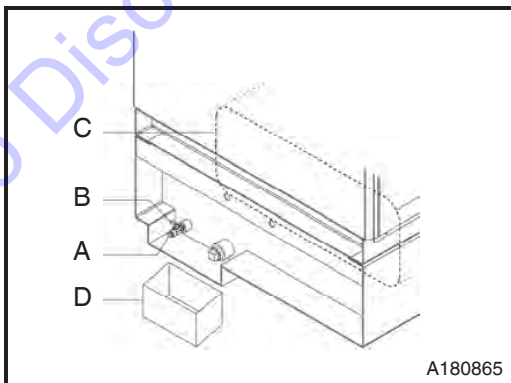
Thermo label on the rotor bearing irreversibly changes its color from white to blue by reaching or exceeding 176°F (80°C). Be sure to check the bearing for abnormal noise and vibration if it has changed color.



- Replace thermo label if it has changed color.
- When replacing, contact your nearest dealer.

5.4.10 Drain Fuel Tank

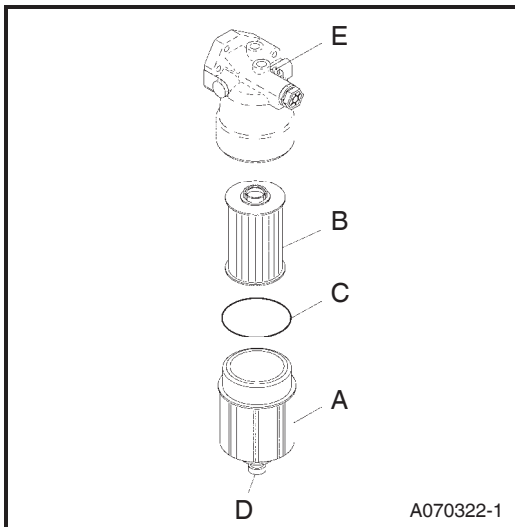
Every 250 Hours



- To drain fuel tank, remove drain plug [A], and open drain valve [B] to drain the condensate accumulated in fuel tank [C].
- After making sure that all condensate is completely drained out, close drain valve [B] firmly and install drain plug [A].
- Drain the condensate into a container [D] and dispose of condensate according to applicable regulations.

5.4.11 Change Fuel filter Element

Every 500 Hours



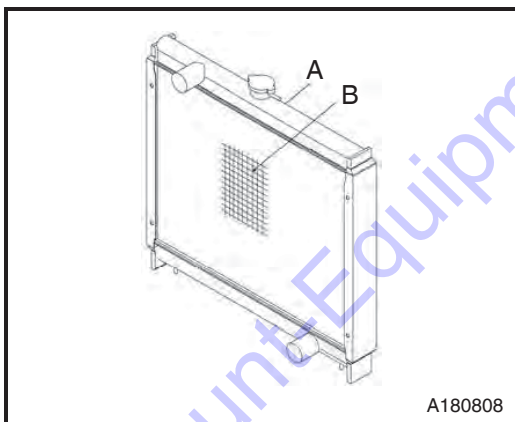
<Procedure>

1. Loosen the drain plug [D] and air bleeding plug [E] to discharge the fuel inside the filter. After draining completed, tighten the drain plug and air bleeding plug securely.
2. Use the special filter wrench to remove the filter case [A].
3. Replace the O-ring [C] with new one and place new element [B] in the case. Thinly apply the fuel on the O-ring, and screw in the element.
(For part number, See 5.3)
4. After the O-ring contact seal surface, tighten the case with the filter wrench.
5. Remove the air from fuel. **(See 3.5.5)**

- After installing element [B], check it for any leak during operation.
- Refer to the engine instruction manual for more details.

5.4.12 Clean Outside of Radiator

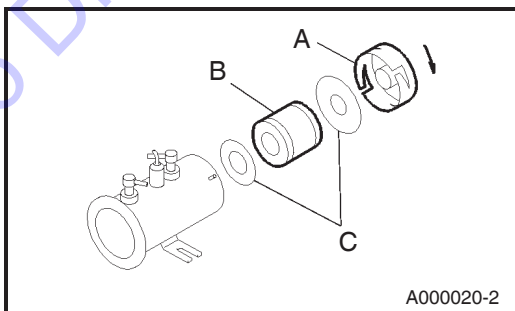
Every 500 Hours



- If the fin tubes [B] of radiator [A] are clogged by dust or other foreign materials, the heat exchange efficiency drops and this will raise coolant temperature. These tubes and fins should be cleaned depending on the state of dirt inside the tubes even before maintenance schedule.
- Do not use high pressure washer for cleaning as it may damage fin tubes.
- When the unit is used or installed near seaside, clean the radiator using fresh water at least than once a month.

5.4.13 Clean Fuel Air Bleeding Pump Filter

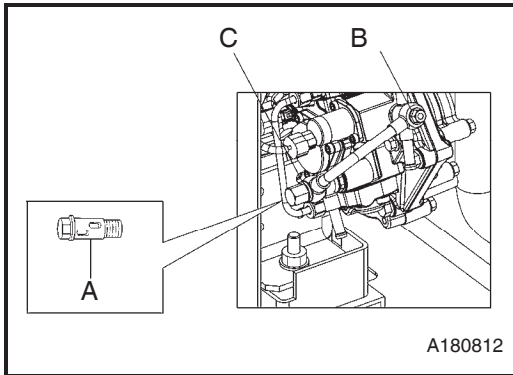
Every 500 Hours



- Turn the cap [A] to the left to remove and clean filter [B] inside.
- Replace the gasket [C] whenever the filter [B] is removed. **(For part number, See 5.3)**
- Prepare a container as the fuel inside may spill out.

5.4.14 Check and Cleaning of the Supply pump strainer

Every 500 Hours



- Loosen the supply pump strainer [A] (joint bolt built-in type) and remove it. After washing it with diesel oil, blow dust and dirt off with high pressure air. Replace the gasket [B] and [C] as well.

(For part number, See 5.3)

- In case the conditions of lowered engine power and engine stop will not be improved even after the supply pump strainer [A] (joint bolt built-in type) has been cleaned, it should be replaced.

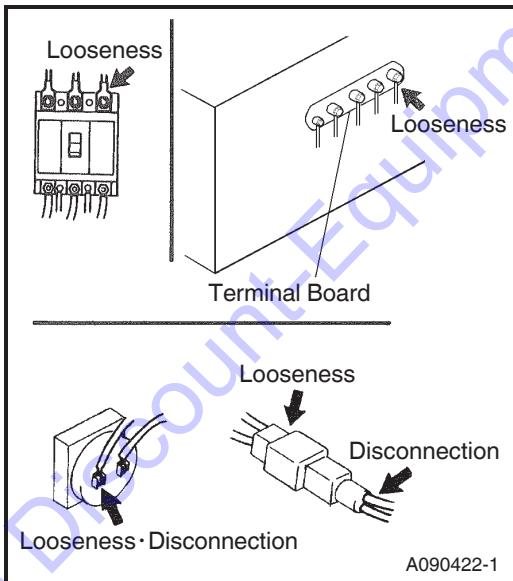
(For part number, See 5.3)

CAUTION

- Do not pull out the supply pump strainer inside as it cannot be disassembled.
(For more information, please refer to the engine instruction manual)

5.4.15 Check Terminal and Wirings

Every 4 months or 500 Hours



Check for any looseness on the cables, any damage on insulated covers, and disconnection, disconnected cables, or short-circuits etc.

[Checking points of electrical circuits on the generator side]

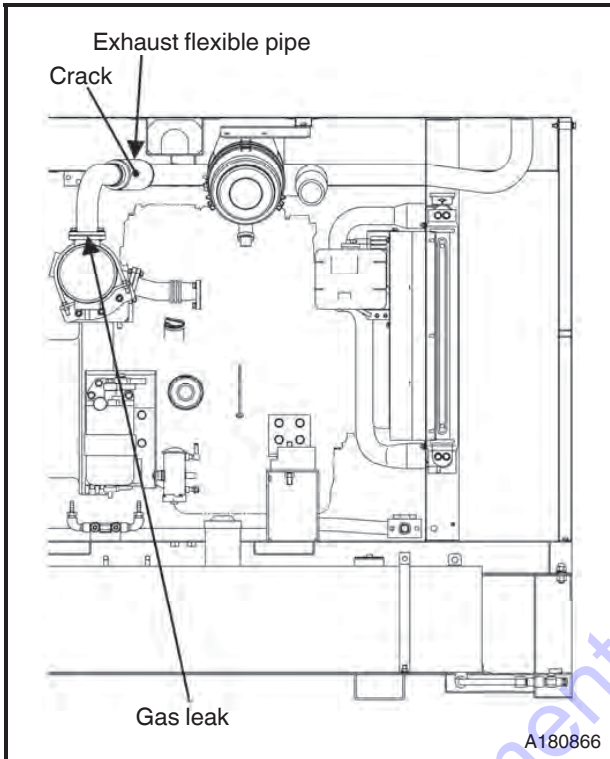
- Terminal connection of 3-phase output terminal plate.
- Main circuit of circuit breaker.
- Terminal connection on control box.
- Each terminal connection of each instrument.

[Checking points of electrical circuits on the engine side]

- Portion of connectors to the engine.
- Check for looseness of terminal connections.
- Rubbing and wear of the wire.

5.4.16 Check Exhaust Flexible Pipe

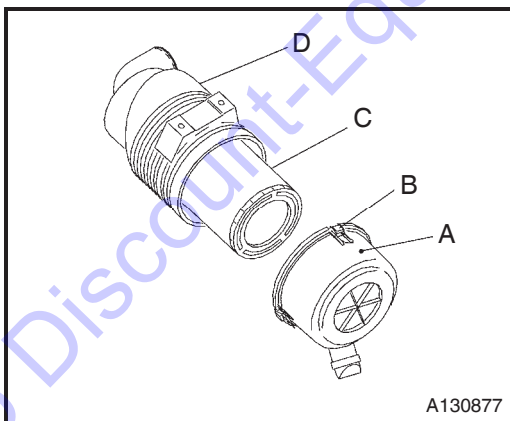
Every 4 months or 500 Hours



- Check the flexible pipe between the DOC and engine exhaust outlet for cracks and exhaust gas leakage.
- If any leak is found, take care to avoid getting burned by exhaust gas.

5.4.17 Change Air Filter Elements

Every 1,000 Hours



<Procedure>

1. After removing the cap [A] by loosening its cap fixing latch [B], clean its interior properly.
2. Replace element [C] with new ones.
(For part number, See 5.3)
3. When installing the cap, firmly push the element into the case [D] by hand and make sure that the hooks of the cap fixing latches are securely attached and tightened.

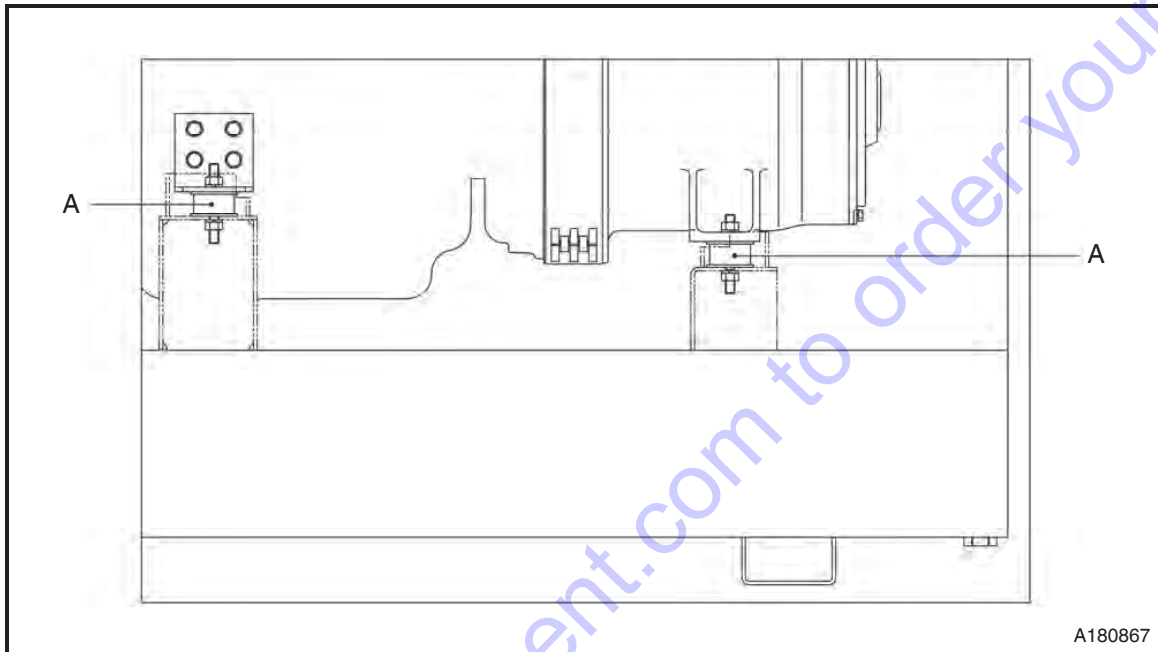
IMPORTANT

- Air filter is an important part which is crucial to machine's performance and life.
Be sure to use genuine parts.

5.4.18 Check Engine/Generator Mount

Every year or 1,000 Hours

The vibration isolation rubbers [A] are used for the support of generator and engine.
Check the rubber for any damage or deterioration due to oil sticking.



5.4.19 Check Each Rubber Hose

Every year or 1,000 Hours

Check all the rubber hoses for hardening, cracks, and fissures.

- If any hardening, cracks, or fissures are found on a hose (air filter, intercooler, radiator, fuel and drain), replace it with a new one.
- Check each hose clamp and if any loose hoses are found, retighten them.
- Even before the maintenance interval comes, replace hoses if hardening, cracks, or fissures are found. When replacing, contact your nearest dealer.

5.4.20 Clean the oil fence and check for rust

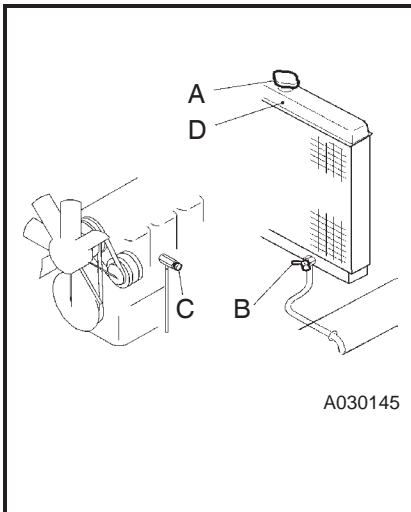
Every year or 1,000 Hours

Expert knowledge is required to clean the inside of the oil fence and to check it for rust. Contact your nearest dealer.

5.4.21 Change Coolant

Every 2 years

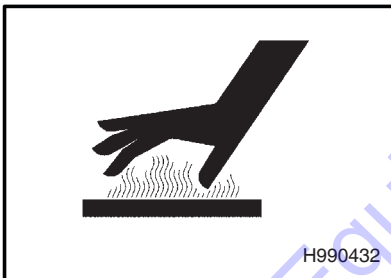
When removing the radiator cap, be sure to stop the machine and wait until the coolant cools down.



<Procedure>

1. To drain coolant, remove the radiator cap [A], then loosen the drain valve [B].
 2. Be sure to also open the drain plug [C] on the engine cylinder block for drainage.
 3. Drain coolant of reserve tank.
 4. When the coolant is completely drained out, close each drain valve [B] and drain plug [C], and supply new coolant from the filler port of radiator [D].
 5. After changing the coolant, run the engine under unload operation for 2 to 3 minutes, then stop it. Check the coolant level again and replenish it if necessary.
- For the details of replacement, refer to engine operation manual.

CAUTION



Caution in changing coolant

- Be sure to stop the machine and loosen the radiator cap slowly, after the coolant water is sufficiently cooled and the inner pressure is released, then take the cap off. If the following procedures are neglected, the radiator cap could be blown by the internal pressure or hot moisture air be blown out to cause burning. Therefore, make sure to carry out them without fail.
- LLC (Antifreeze) is a toxic material.
- When a person has drunk LLC (Antifreeze) by accident, make him vomit and make him see a doctor immediately.
- When a person gets LLC (Antifreeze) in his eyes, wash the eyes with clean running water and make him see a doctor immediately.
- When LLC (Antifreeze) is stored, put it in a container with an indication saying "LLC (Antifreeze) inside" and seal it up, then Keep it in a place away from children.
- Beware of flames.

5.5 Trailer Maintenance

Grease Trailer Hub Bearing

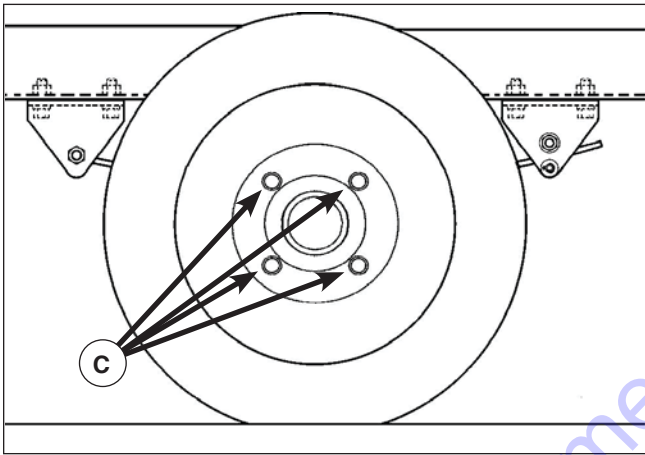
Contact your authorized dealer.

Check Wheel Lug Nuts / Tire Pressure

Check tightness of wheel lug nuts (C). Tighten to 90 - 100 lb-ft (122 - 136 Nm).

Also check tire pressure. Adjust to 50 PSI (345 kPa).

Tire size: ST205/75R15 Load Range C



6 Storage

6.1 Preparation for Long-term Storage

When the machine is left unused or not operated longer than half a year (6 months), store it in a dry place free of dust after the following treatments have been done to it.

- Put the machine in an enclosure if it is stored outside. Avoid leaving the machine outside with a sheet cover directly on the paint for a long period of time, or this will cause rust to the machine.
- Perform the following treatments at least once every three months.

<Procedure>

1. Discharge existing lubricant from the engine oil pan. Pour new lubricant in the engine to clean the internals of the engine. After running it for a while, drain it again.
2. Spread lubricant on each moving part.
3. Completely charge the battery and disconnect grounding wires. Remove the battery from the machine, if possible, and store it in a dry place. (Charge the battery at least once every month.)
4. Discharge coolant and fuel from the machine.
5. Seal air-intake port of engine and other openings like the muffler with a vinyl sheet, packing tape, etc., to prevent moisture and dust from getting in the machine.
6. Measure the insulation resistance of the generator, and make sure that it is more than 1M Ohms.(See 5.4.8)
7. Be sure to repair any trouble and maintain the machine so that it will be ready for the next operation.

6.2 Disposal of Product

- When disposing of this machine, first drain the cooling water and oils. If you require any additional instruction or advice, contact your nearest dealer.

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7 Specifications

7.1 Specifications (not including trailer)

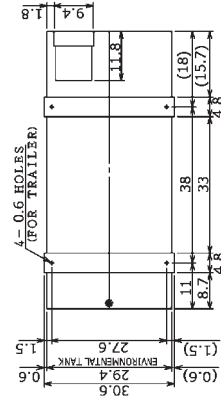
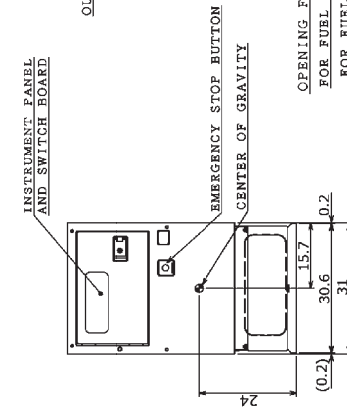
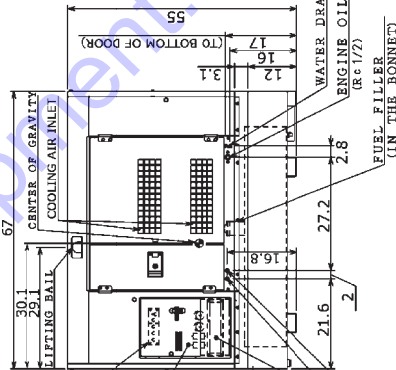
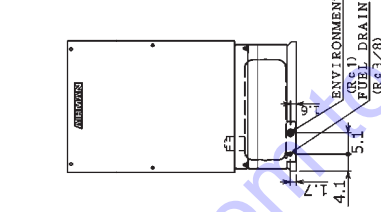
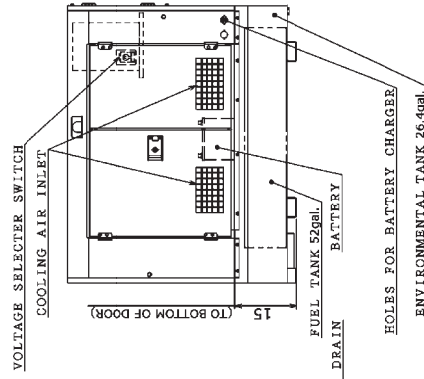
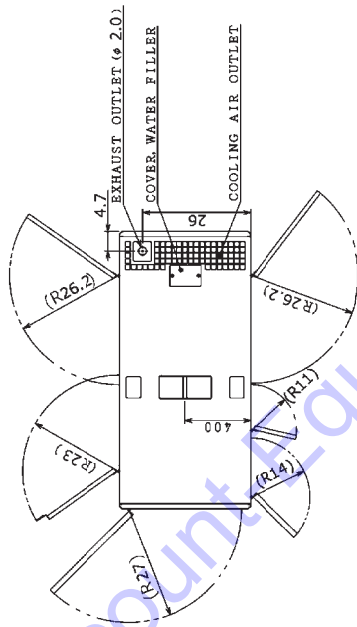
Model		MP25 T4F			
Generator	Exciting system	Brushless			
	Armature Connection	Double star		Parallel zig-zag	
	Phase number	3 Phase – 4 wire		1 Phase – 3 wires	
	Power Factor	%	80	100	
	Frequency	Hz	60		
	Rated Output	kVA (kW)	25 (20)		14.4 (14.4)
	Voltage	V	240	480	240/120
	Amps	A	60	30	60
Engine	Model	ISUZU 4LE2T			
	Type	4 Cycle, water cooled, direct injection, EGR			
	Aftertreatment	DOC			
	No. of Cylinders	4			
	Displacement	cu.in.(liters)	133(2.179)		
	Output	HP (kW)	33.3(24.8)		
	Engine Speed	min ⁻¹	1,800		
	Lubricating Oil Capacity	gal. (liters)	2.23(8.4)		
	Coolant Capacity (including radiator)	gal. (liters)	2.75(10.4)		
	Battery	80D26R(12V)			
	Fuel Tank Capacity	gal. (liters)	52(195)		
Dimensions	Length	in. (mm)	67(1,690)		
	Width	in. (mm)	31(800)		
	Height	in. (mm)	55(1,400)		
	Dry Weight	lbs. (kg)	1,764(800)		
	Operating Weight	lbs. (kg)	2,161(980)		
Others	Oil Fence Capacity	gal. (liters)	26.4(100)		

Specifications (including trailer)	
Tire Size	205/75R15
Axle Type	Single Torsion
Trailer Brake Type	Hydraulic Surge
Dry Weight (lbs / kg)	2,455 / 1,114
Operating Weight (lbs / kg)	2,780 / 1,261
Length (in / mm)	121 / 3,073
Width (in / mm)	60 / 1,524
Height (in / mm)	71 / 1,803
Trailer GVWR (lbs / kg)	3,500 / 1,588

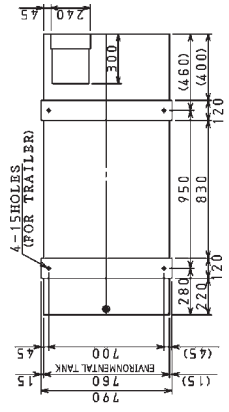
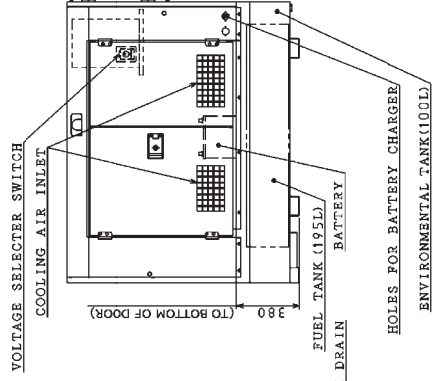
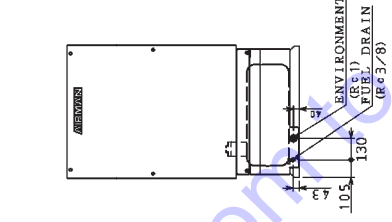
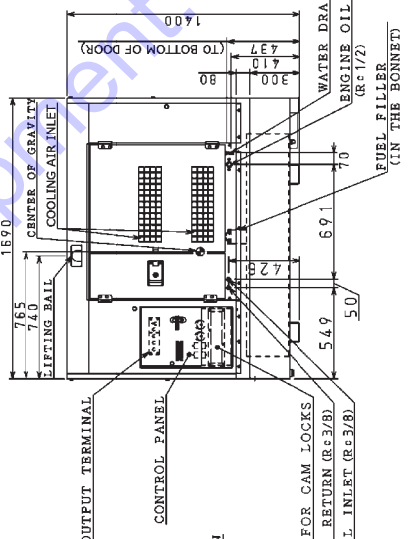
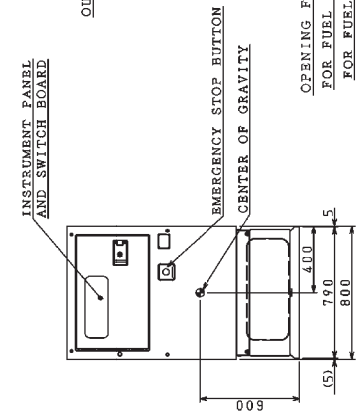
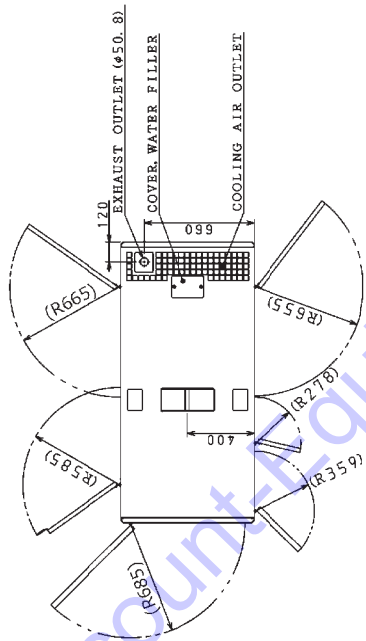
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7.2 Dimensions

(units: in)

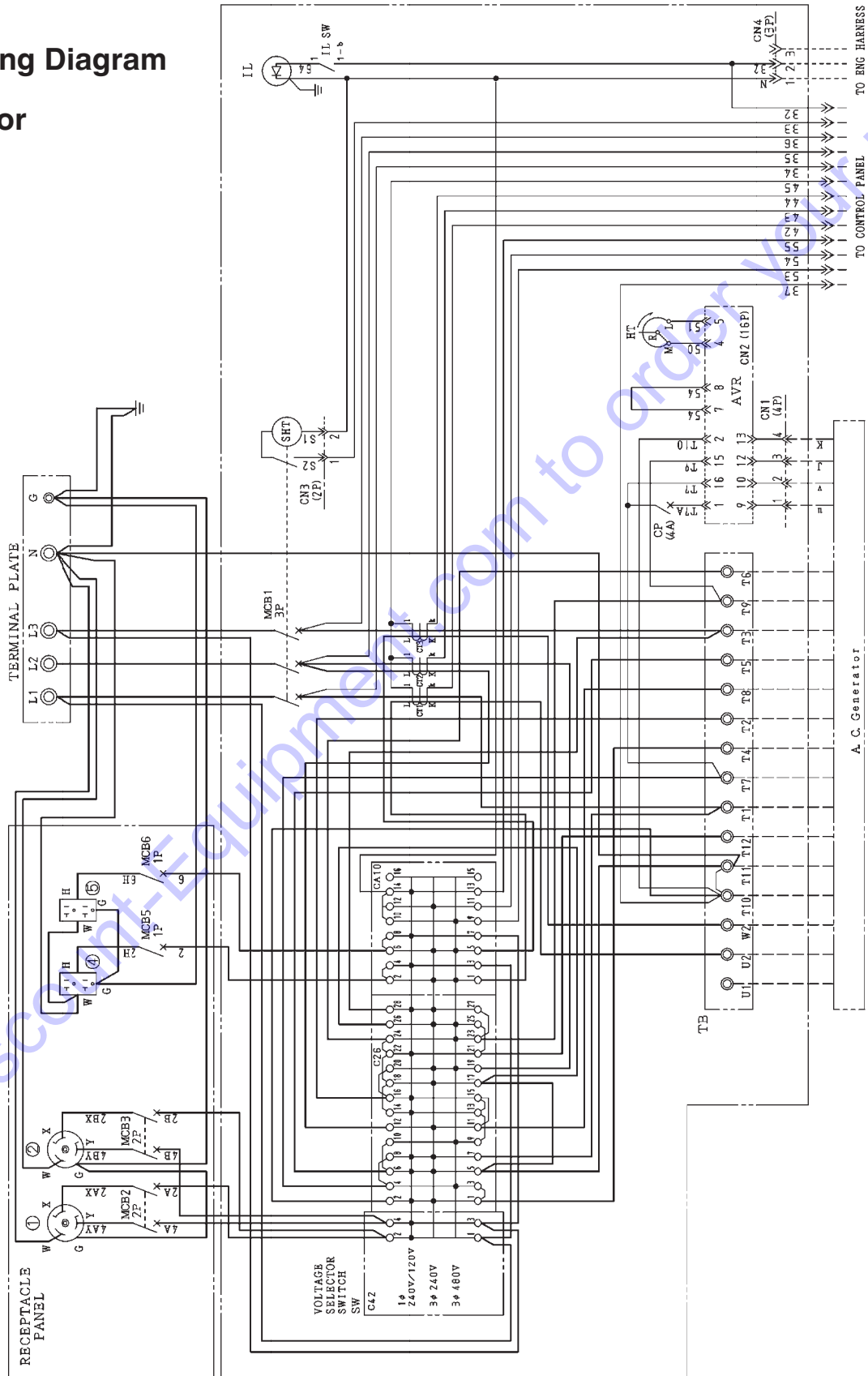


(units: mm)

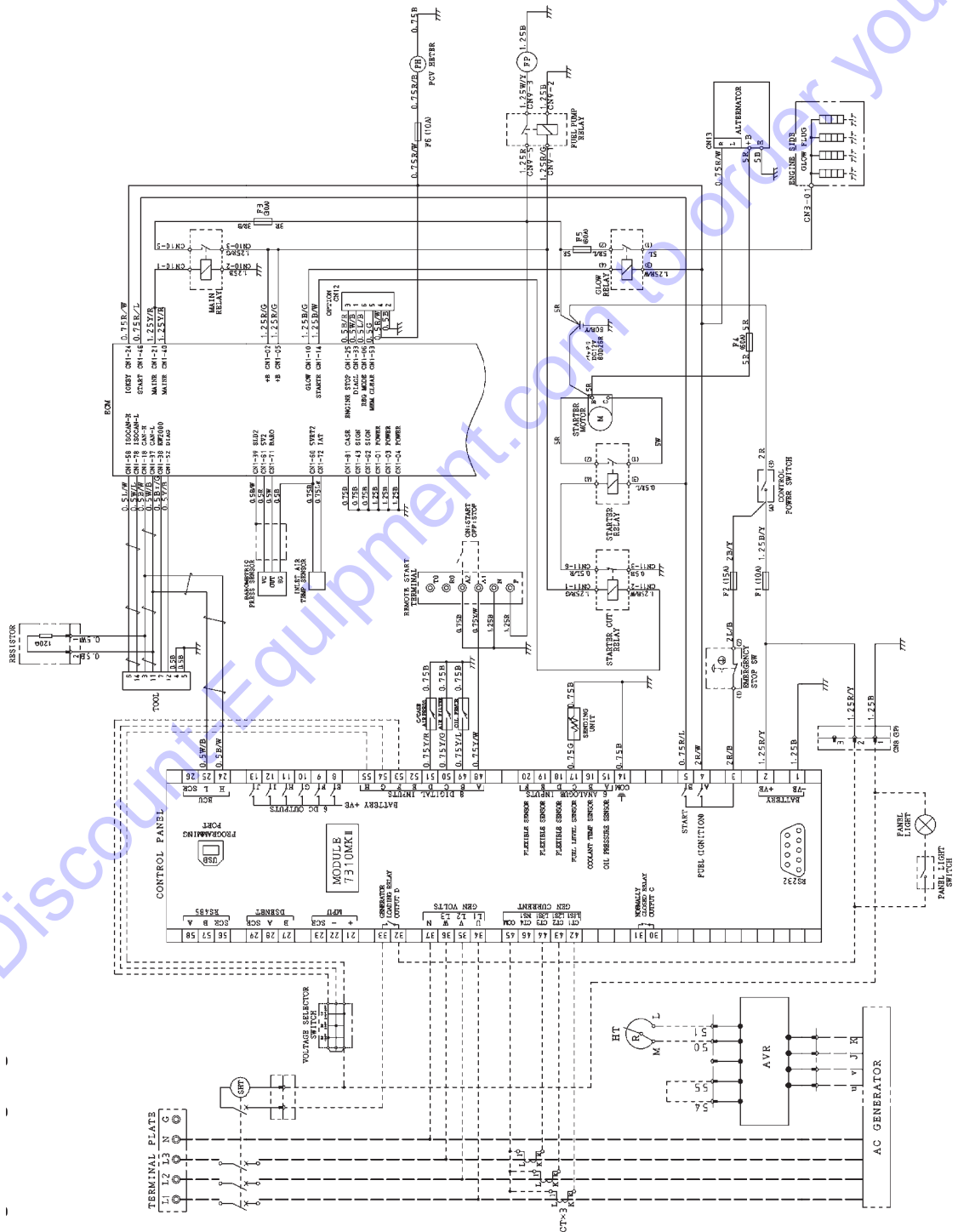
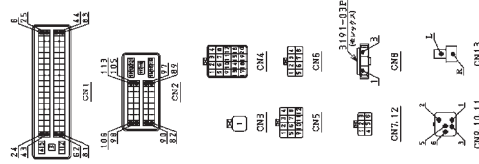


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7.3 Wiring Diagram Generator

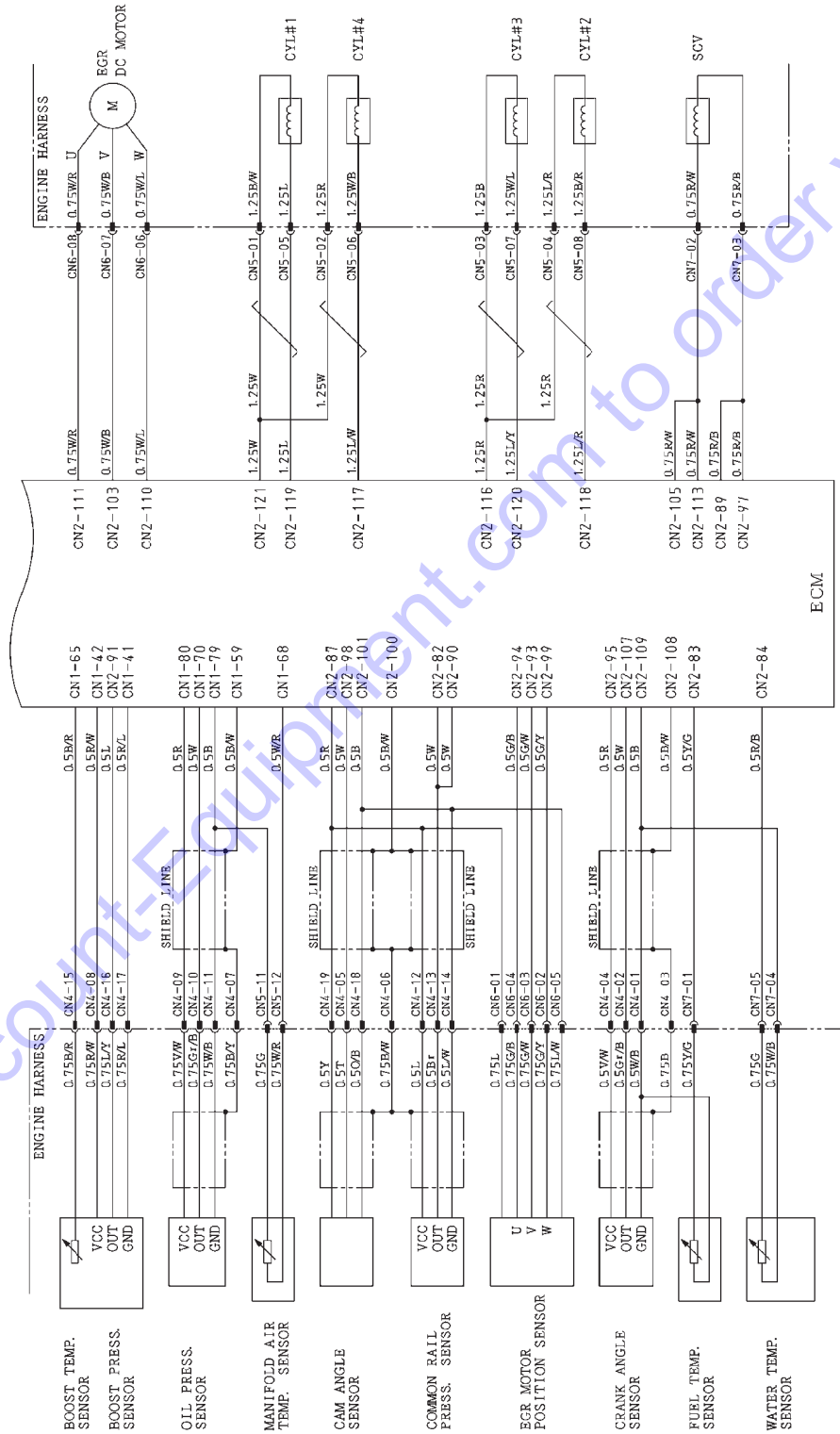


Engine

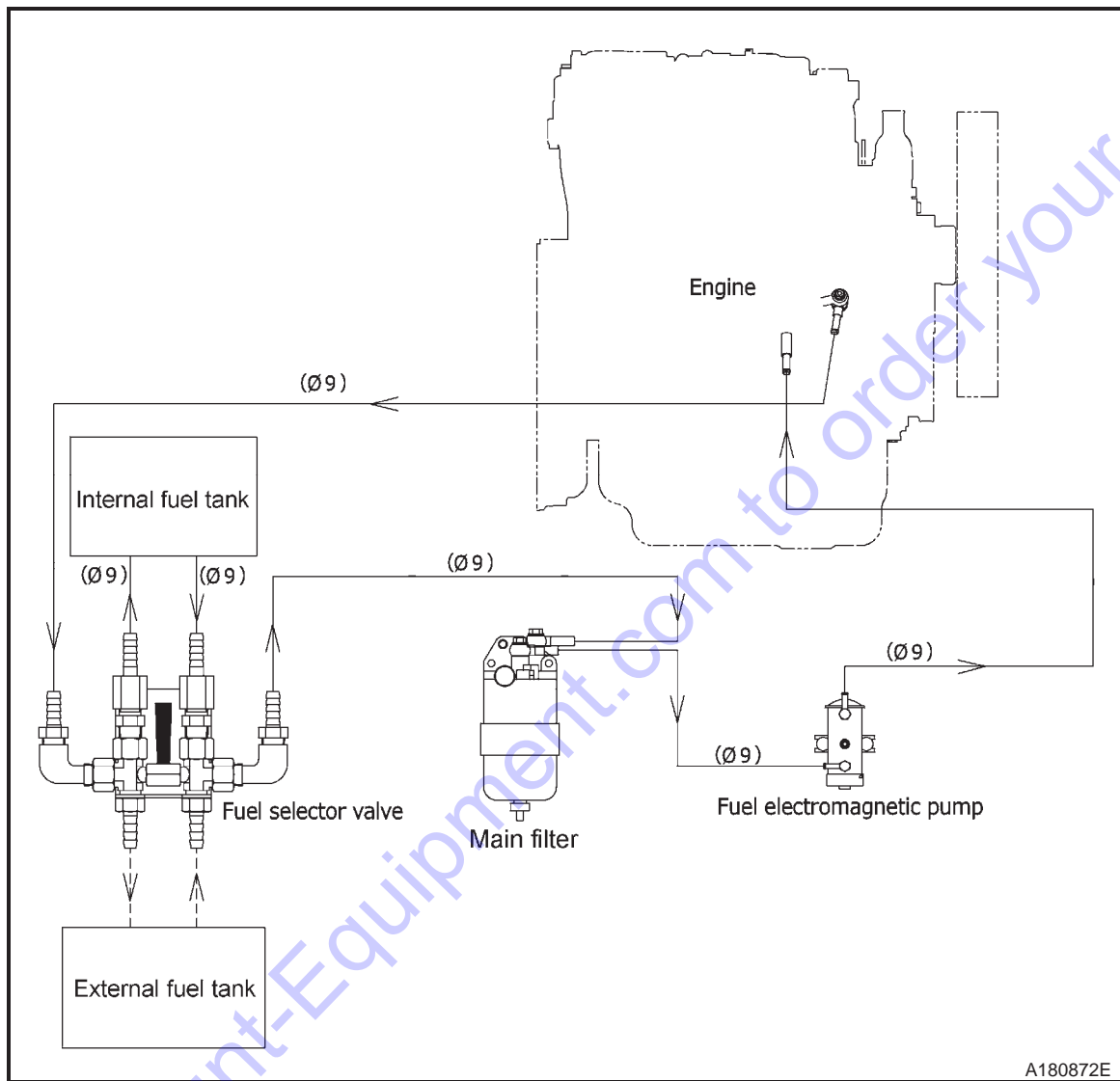


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7.4 Connector Terminal Arrangement



7.5 Piping Diagram



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Addendum A - Cam Locks / Arctic Kit

NOTE: Location and configuration of kit components may differ according to model.

Cam Lock Receptacles

The cam lock receptacles allow for quick connection and disconnection of loads.

1. Connect the cam lock connectors from the load to the cam lock receptacles on the lower portion of the outlet panel on the unit. See Figure A1. Be sure to connect the load correctly. See **Connecting Loads**.



WARNING

Electrocution Hazard. Do not connect or disconnect loads to the cam lock receptacles while the unit is in operation.

NOTICE: Do not operate the voltage selector switch while the unit is in operation. Unit damage may result.

Arctic Kit

Block Heater / Battery Heater

The block heater / battery heater keeps the engine block and battery heated while the unit is not in use.

The block heater / battery heater should be used whenever the unit is not in use in temperatures below 32° F (0° C).

1. Plug the female end of a heavy-duty power cord (not supplied) into the Block Heater / Battery Heater recessed receptacle (A, Figure A2).
2. Plug the male end of the power cord into a standard 120V outlet.
3. Unplug the block heater / battery heater before putting the unit into operation.

Battery Charger

The battery charger keeps the battery charged while the unit is not in use.

1. Plug the female end of a heavy-duty power cord (not supplied) into the Battery Charger recessed receptacle (B, Figure A2).
2. Plug the male end of the power cord into a standard 120V outlet.
3. The red light (A, Figure A3) on the battery charger module, located in the left front section of the engine compartment (see Figure A3) indicates the battery is charging. The green light (B) indicates full charge. (The battery charger can stay plugged in after the battery reaches full charge without damaging the battery.)
4. Unplug the battery charger before putting the unit into operation.

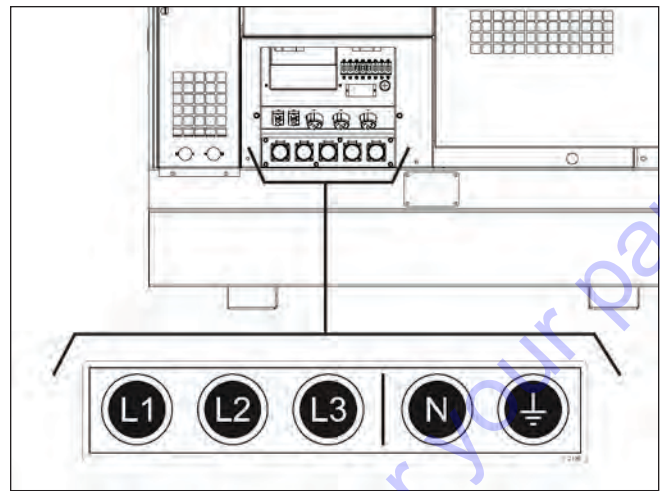


Figure A1

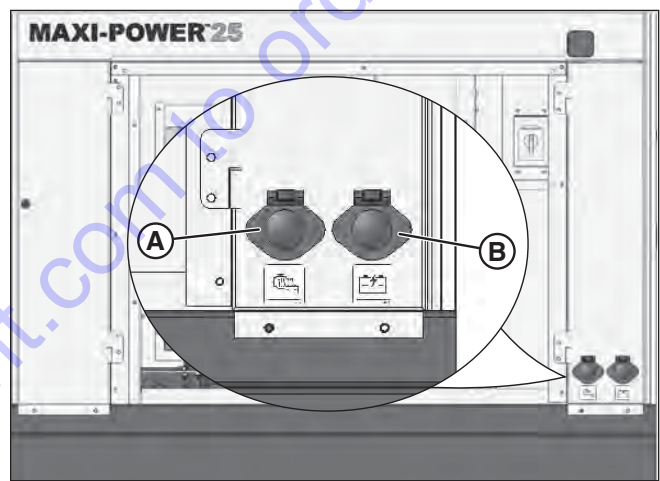


Figure A2

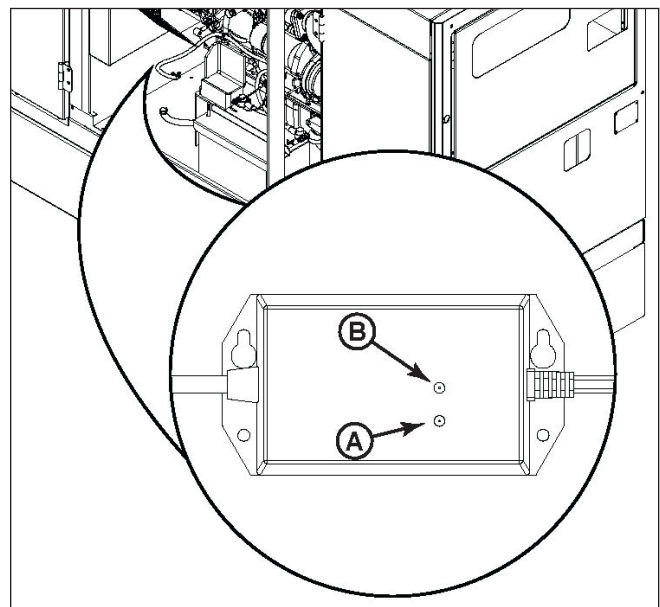


Figure A3



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Model:	<input type="text"/>
Description:	<input type="text"/>
Part Number:	<input type="text"/>
Quantity:	<input type="text"/>
Notes:	<input type="text"/>

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