



DGK100D Owners Manual

Sound Attenuated Diesel Generator Sets

WARNING!

CALIFORNIA - Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.



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1. INTRODUCTION

Thank you for purchasing a Shindaiwa KWiet Power Sound Attenuated Diesel Generator.

This manual contains important information for maintenance and safe operation of the Shindaiwa diesel generator DGK100D.

- Please read and understand this manual before operating to avoid accidents or unnecessary repairs.
- This manual should always be kept on or near the generator at all times
- Always keep the generator properly maintained.

For periodic maintenance and repair of the engine, please contact KWiet Power dealer or authorized ISUZU service center.

ENGINE MODEL : BI-4HK1 (ISUZU)
US EPA Tier 3 Compliant



Isuzu 4HK1 engine is electronically controlled engine. Please read Isuzu 4HK1 engine Instruction Manual and related service manuals thoroughly before performing service on the engine.

2. SAFETY INSTRUCTIONS

In this manual, safety and caution items are classified as **[WARNING]** and **[CAUTION]**.



WARNING

Indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury and property damage.

Note that  **CAUTION** item can also lead to major accidents under some circumstances if not correctly followed.

All items listed in this manual are important for safe operation of the generator unit. Be sure to observe them closely.

2. SAFETY INSTRUCTIONS

WARNING

DANGER OF ELECTRIC SHOCK

DO NOT TOUCH OUTPUT TERMINALS DURING EQUIPMENT OPERATION!

Do not touch the output terminal while the generator unit is operating since it can cause an electric shock. When it is necessary to touch the output terminals such as for load connections, make sure that the engine is not operating.

DANGER OF EXHAUST GAS POISONING

DO NOT OPERATE GENERATOR UNIT IN AN ENCLOSED AREA!

The exhaust gas of the engine contains substances that are harmful to human health. Operate the unit in a well ventilated area. Using the generator unit indoor or in enclosed place can cause exhaust gas poisoning.

DANGER OF INJURY CAUSED BY ROTATING PARTS

DO NOT TOUCH ROTATING PARTS DURING EQUIPMENT OPERATION!

Stay clear of rotating parts such as the belt, pulleys and the fan while the generator unit is running. Your hands or other parts of your body can be caught by rotating parts, or strike your body with great force, thus causing injury. Turn off the engine before inspecting the unit or conducting maintenance work.

DANGER OF ELECTRIC SHOCK, INJURIES AND BURNS

PRECAUTIONS FOR MAINTENANCE AND INSPECTIONS!

Before conducting an inspection or maintenance work, remove the key from the starter switch, and place a [DO NOT OPERATE EQUIPMENT] sign or similar warning over the starter switch. An accidental operation of the engine during an inspection or maintenance work can cause a serious accident.

2. SAFETY INSTRUCTIONS

CAUTION

[TRANSPORTATION]



DANGER OF EQUIPMENT DROPPING



HANDLE SUSPENDING EQUIPMENTS CAREFULLY!

- (1) Do not use twisted or frayed wire cable to lift up the unit, as it can be break easily.
- (2) Do not twist chains, since twisted chains can break easily.



HANDLING EQUIPMENT AT DESIGNATED LOCATION!

The generator unit is designed with a single lifting hook on the top section.

Do not lift the unit at any other sections. If wire cables are attached to the other parts, the unit can become unbalanced or drop when it is lifted.

[INSTALLATION]



DANGER OF INJURIES



DO NOT OPERATE EQUIPMENT IN SLOPED/UNEVEN LOCATION!

Do not operate the generator on unlevelled or soft ground surfaces, the generator unit can move or tilt and could cause personal injuries.

[OPERATION]



DANGER OF FIRE



USE EXTRA CAUTION WHEN ADDING FUEL OR OIL!

Before adding fuel or oil, stop the engine and make sure there is no open flame in the area. If fuel is spilled or leaks onto hot parts or electric components, a fire could occur. If fuel or oil is spilt, clean the area immediately. Close the cap securely after supplying fuel or oil.

2. SAFETY INSTRUCTIONS

[MAINTENANCE AND INSPECTION]



DANGER OF BURNS AND FIRE



DISCONNECT THE BATTERY BEFORE INSPECTION AND MAINTENANCE!

Before inspecting electrical parts, disconnect the negative (-) cable from the terminal of the battery. If the maintenance is conducted with the battery cables connected, the electric current flowing from the positive (+) terminal of the battery can cause a short-circuit resulting in burns or fire.



DO NOT SPLASH WATER ON ELECTRICAL PARTS WHEN CLEANING!

When cleaning the generator unit with water, close all doors of the generator unit. If water is splashed on the control panel, it could cause a malfunctions and a short-circuit, and result in a fire. If water is accidentally splashed on electrical components or the control panel, use compressed air to dry out completely.



PRECAUTIONS IN HANDLING BATTERY



HANDLING BATTERY CAREFULLY!

The battery generates hydrogen gas and oxygen, which are flammable. A flame when brought near the battery can cause an explosion. Handle the battery with extra caution.

- (1) Wear protective glasses and rubber gloves when conducting maintenance work or inspecting the battery.
- (2) Do not smoke or generate a spark near the battery.
- (3) Stop the engine before conducting an inspection or maintenance of the battery.
- (4) Do not touch both terminals of the battery with a tool or metal object.
- (5) When removing the battery cables, disconnect the cable at the negative (-) terminal first.
When connecting the cables, install the positive (+) terminal first.
- (6) Change the battery in a well-ventilated area only.
- (7) Connect the cables securely to each terminal posts. Loose cables could be causing faulty contact, which can generate a spark and causing an explosion.
- (8) Before conducting maintenance work on the electrical system or conducting electric welding, remove the negative (-) cable from the battery to cut-off the electric current flow to the circuits.

2. SAFETY INSTRUCTIONS



BE CAREFUL OF ELECTROLYTE!

Electrolyte contains dilute sulfuric acid. Careless handling of the battery can cause the electrolyte to spill resulting in loss of sight or burns.

- (1) Any work that requires the handling of electrolyte must be conducted under the supervision of a battery expert or a person experienced in handling batteries.
- (2) Do not use the battery with the electrolyte surface below the minimum level, as it can cause an explosion.
- (3) If electrolyte spills on the skin or clothing, wash immediately with plenty of water, then clean thoroughly with soap.
- (4) If electrolyte accidentally enters the eye, wash immediately with plenty of clean water and consult a doctor immediately. Electrolyte can cause the loss of eye sight.
- (5) If electrolyte is accidentally swallowed, rinse mouth repeatedly with plenty of water, drink large amounts of water, and consult a doctor immediately.

3. SPECIFICATION

GENERAL SPECIFICATION

DGK100D Specifications				
Alternator	Generator Type		Revolving Field Brushless Ac 3 Phase-120/240V 1 Phase	
	Rated Output	kVA	100	
		kW	80	
	Voltage-Three phase		V	208,240,480
	Voltage-Single phase		V	120,139,240,277
	Amps	Single phase-120V		242 x 2 (ZigZag)
		Single phase-240V		242 (ZigZag)
		Three phase-240V		241
		Three phase-480V		120
	Frequency-regulation		Hz	60/50 ± less than 0.25%
	Rated speed		rpm	1800/1500
	Winding			Star with Neutral
	Power factor			0.8
	Insulation class			F
Excitation			Self excitation (brushless)	
No. of poles			4	
Engine	Type		Vertical Water-cooled 4-cycle Diesel	
	Model (Manufacturer)		BT-4HK1 (ISUZU)	
	No. of Cylinders (bore x stroke)		(in./mm)	4 (6.10 x 4.92 / 155 x 125)
	Continuous rated output			114.7kW (153hp) / 1800min ⁻¹
	Rated speed,60/50Hz		rpm	1800/1500
	Displacement		Cu.in./liters	317/5.193
	Combustion system			Direct Injection,Turbo,Intercooler
	Cooling method			Radiator
	Lubricating method			Forced lubrication
	Starting method			Electric
	Fuel			ASTEM No. 2 Diesel
	Fuel Consumption		gal./liters	5.147 / 23.4 per hour @ full load
	Lubricating oil			CD class or higher
	Fuel tank capacity		gal./liters	58.6 / 222
	Lubricant volume		gal./liters	5.81 / 22
	Cooling water volume		gal./liters	6.07 / 23
	Starting motor capacity		V-kW	12V-2.5kW
	Charging alternator capacity		V-A	12V-110A
Battery capacity		V-AH	12V- 150AH	
Meters	Voltage/Frequency/Amperage/Hour			
Voltage Regulation	Automatic Voltage Regulator (No Load to Full Load)		3 Phase ± 1.0% 1 Phase ± 5.0%	
Speed Regulation			± 0.25%	
Shutdowns	Oil pressure, Water temperature, Over Speed		Lamp indication with shutdown	
Warning	Battery charge		Lamp indication	
Unit	Dimensions (L x W x H)		in./mm	102 x 49 x 71 / 2590 x 1240 x 1800
	Dry weight		lbs./kg	4564 / 2070
Sound Level	No Load		dB(A)	58
	Full Load		dB(A)	61

US emission certified at 1800 rpm only

Specifications are subject to change without notice.

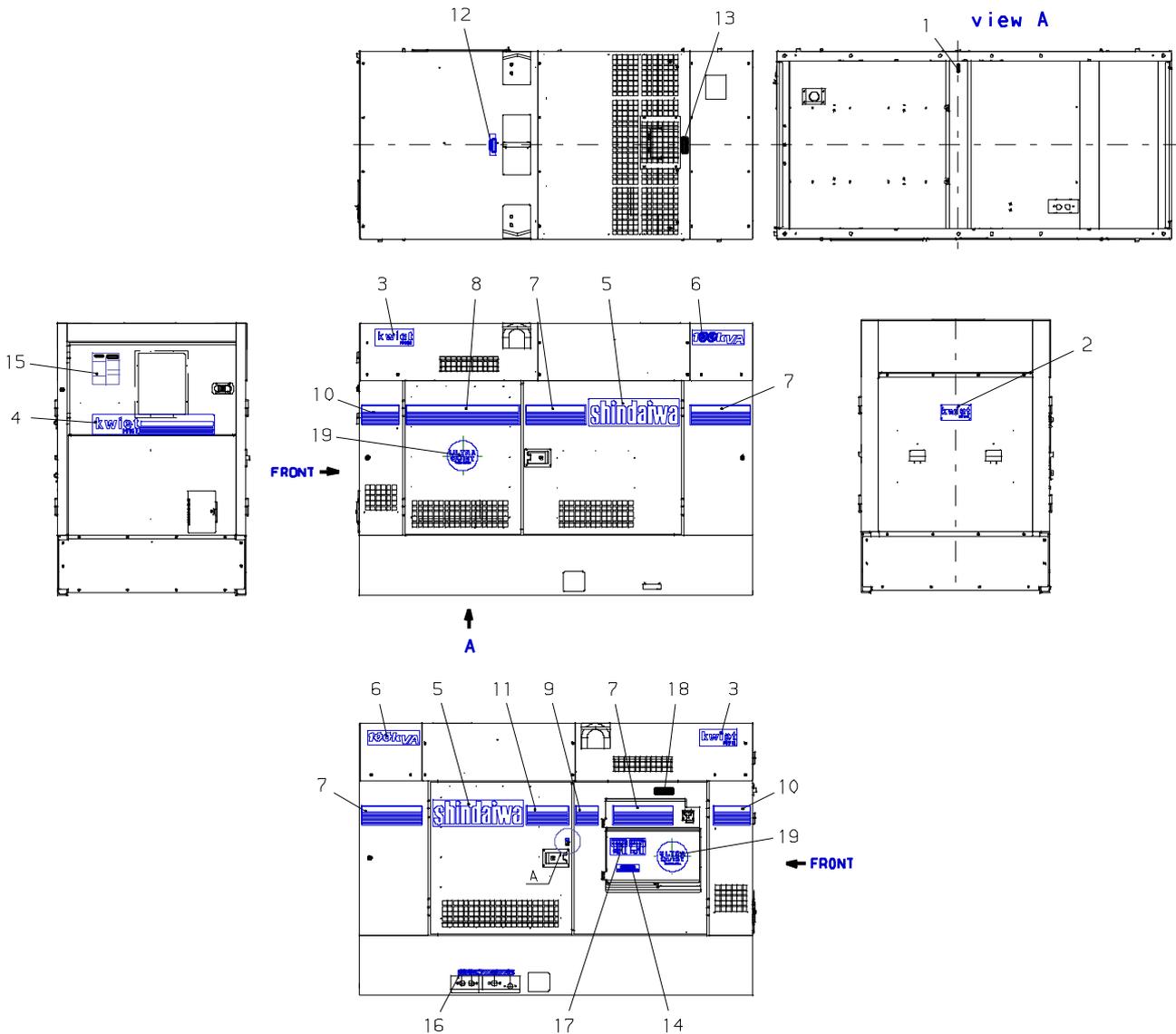
Standard specification condition:

Altitude: 3280 ft (1000m) or lower, Temperature: 5 to 104° F (-15 to +40°C),

Humidity: 85% or lower (no condensation) *Reference data only*

4. DESCRIPTION

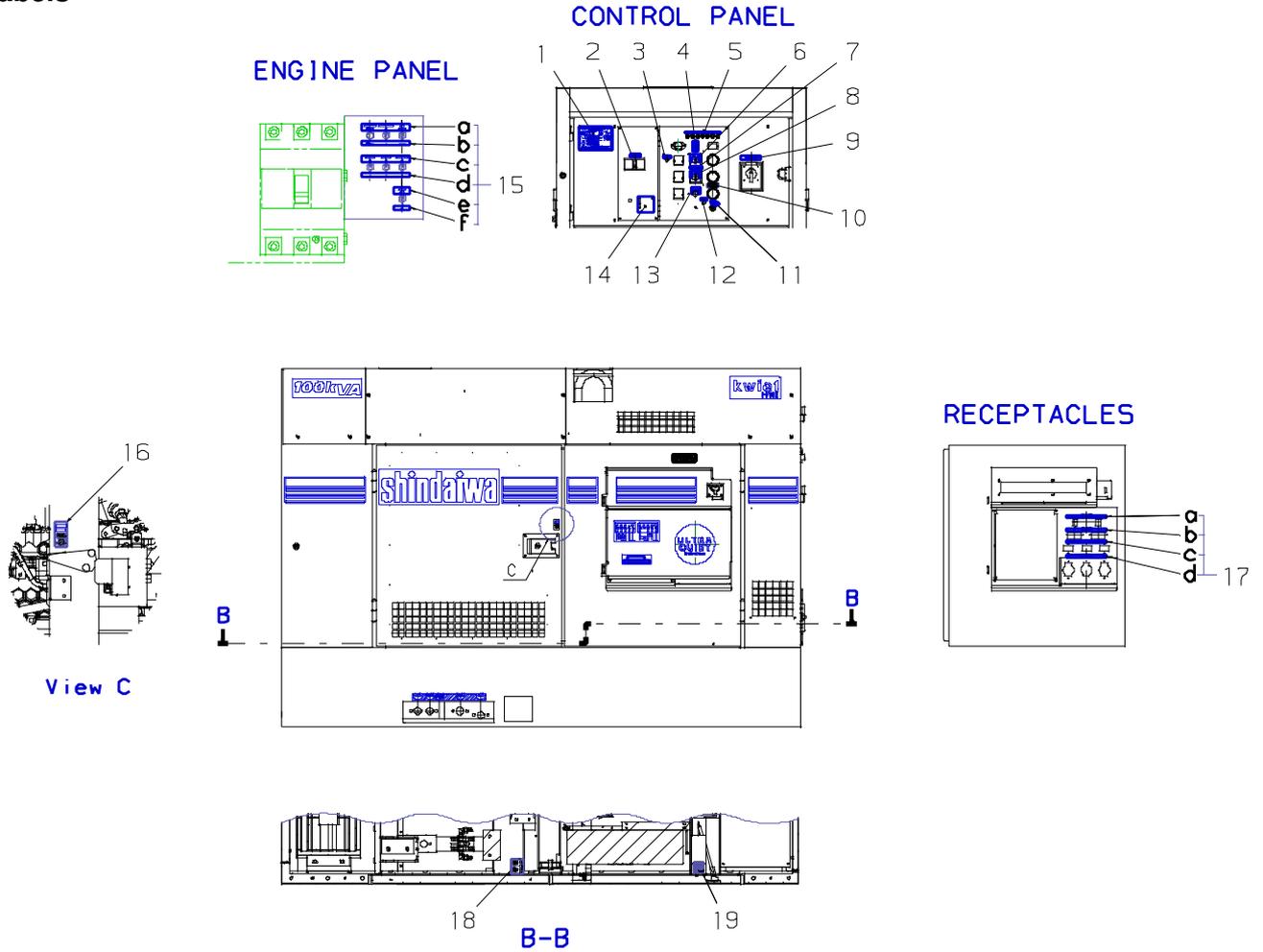
4.1 Labels



1. Serial Number Plate	71290-91320	11. Striping Label	19407-00085
2. Kwiet Power Plate	19502-26000	12. Danger-Lifting Hook	19402-00210
3. Kwiet Power Label	19406-00089	13. Caution: GM spec LLC	19402-00295
4. Kwiet Power Label	19406-00109	14. ELECTIRC SHOOK Label	19402-00215
5. Shindaiwa Label	19420-00096	15. General Safety	19402-00306
6. 100kVA Label	19404-00047	16. Fuel and oil drain	19401-00472
7. Striping Label	19407-00073	17. Output Position Label	19401-00473
8. Striping Label	19407-00074	18. Terminal cover instruction	19401-00431
9. Striping Label	19407-00083	19. ULTRA QUIET	19406-00111
10.Striping Label	19407-00084		

4. DESCRIPTION

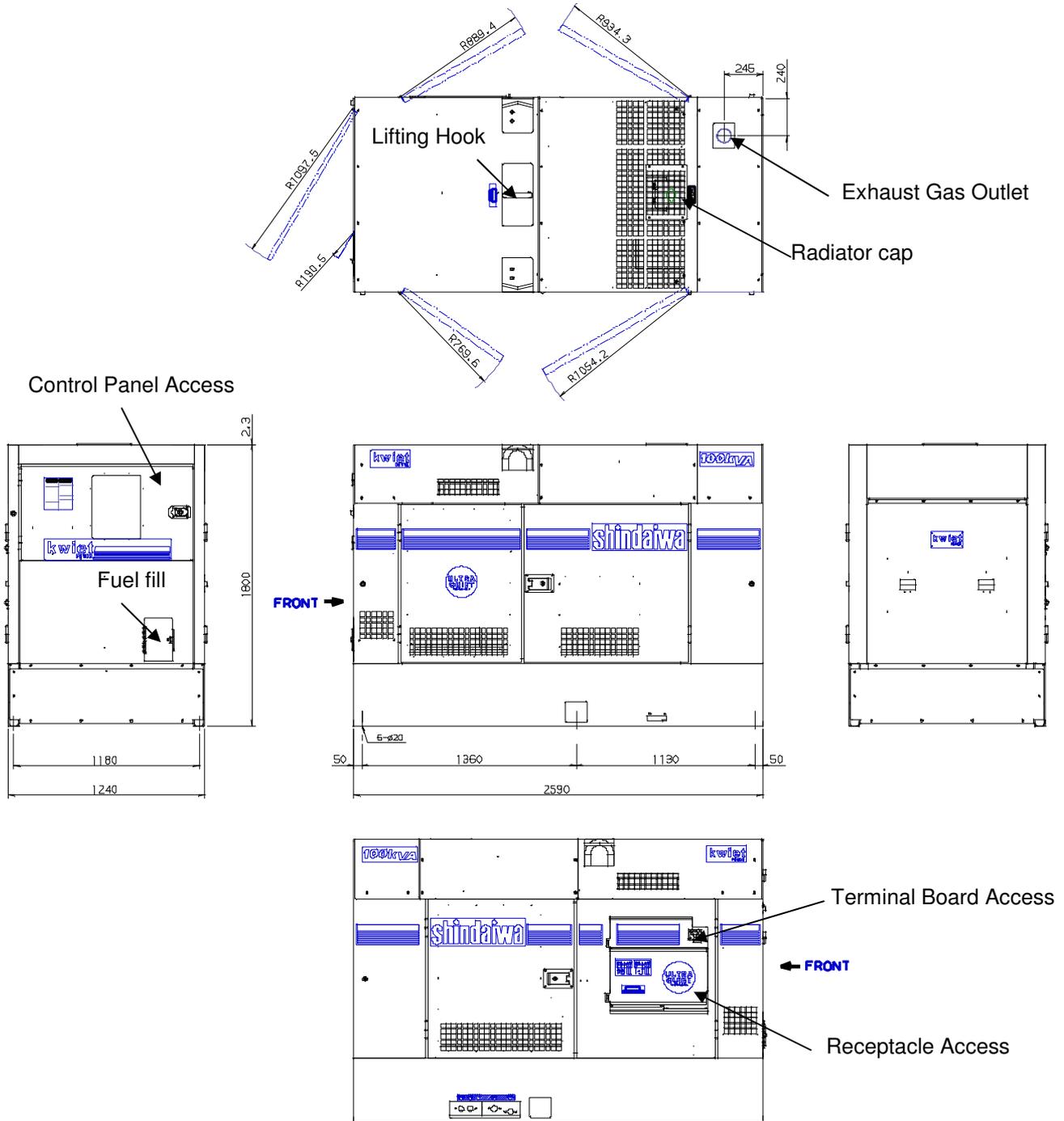
4.1 Labels



1. Generator Name Plate	71290-91310	11. Stop-Run-Start	19401-00216
2. Main Circuit Breaker	19401-00235	12. Glow Lamp	19401-00373
3. Pilot Lamp	19401-00211	13. Voltage Regulator	19401-00214
4. Panel Light	19401-00212	14. Auto Start (Optional)	19407-00055
5. Monitor Lamp Label	19401-00475	15. Engine Control	19401-00476
6. Off L1-L2 L2-L3 L3-L1 Off	19401-00258	16. Door Stopper Release	19401-00477
7. Ammeter Switch Inst	19401-00323	17. Circuit Breaker and receptacle	19401-00474
8. Off L1 L2 L3 Off	19401-00259	18. 3 Way Fuel Valves	19401-00372
9. Voltage Selector Switch Caution	19402-00288	19. Door Lock Release	19401-00478
10. Internal Fuel Tank only	19401-00479		

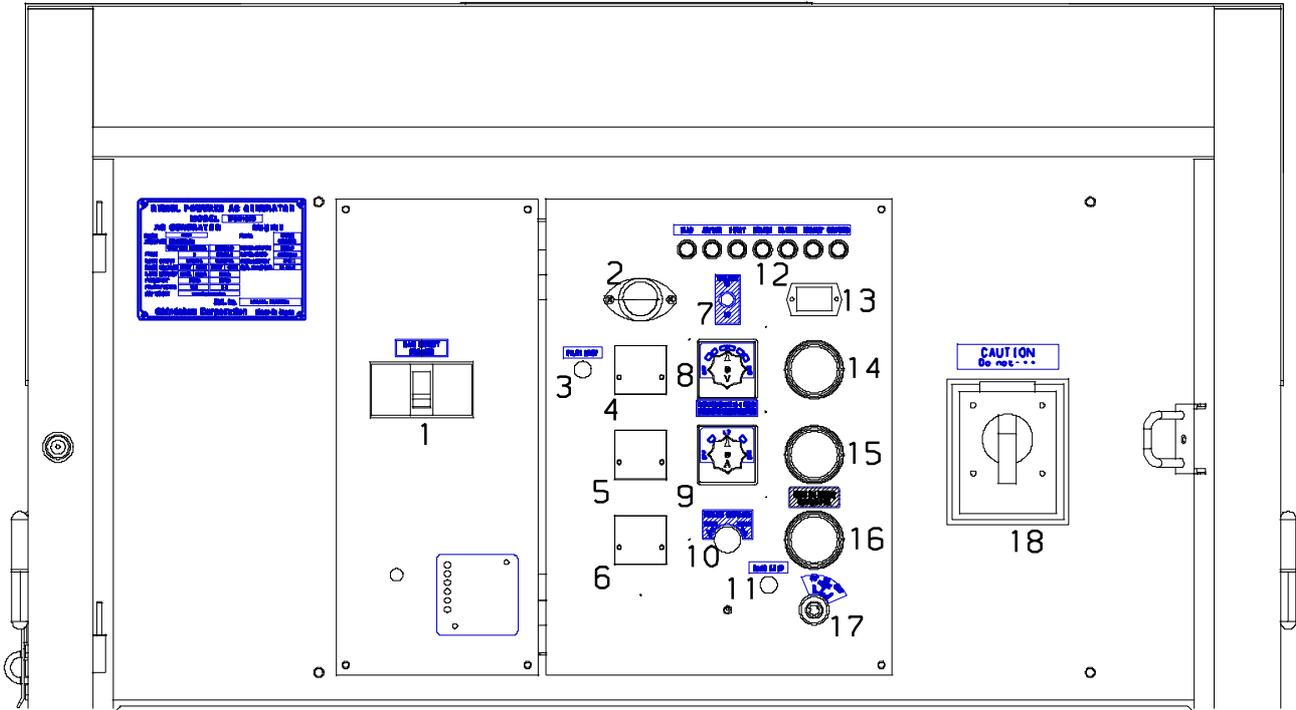
4. DESCRIPTION

4.2 Outline Drawing



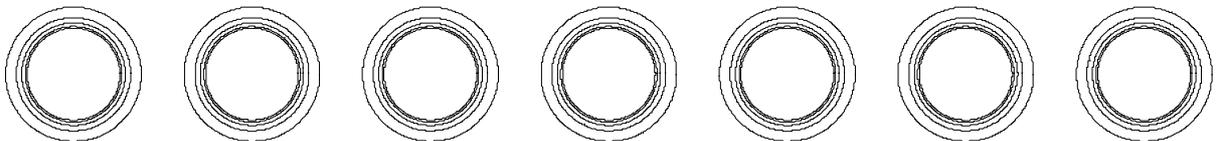
4. DESCRIPTION

4.3 Control Panel



- | | |
|------------------------------|-------------------------------|
| 1. Main Circuit Breaker | 10. Voltage Adjust Rheostat |
| 2. Panel Light | 11. Glow Lamp |
| 3. Pilot Lamp | 12. Monitor Lights |
| 4. Voltmeter | 13. Hour Meter |
| 5. Ammeter | 14. Coolant Temperature Gauge |
| 6. Frequency Meter | 15. Oil Pressure Gauge |
| 7. Panel Light Switch | 16. Fuel Gauge |
| 8. Voltmeter Selector Switch | 17. Starter Switch |
| 9. Ammeter Selector Switch | 18. Voltage Selector Switch |

* 12. Monitor lights details



4. DESCRIPTION

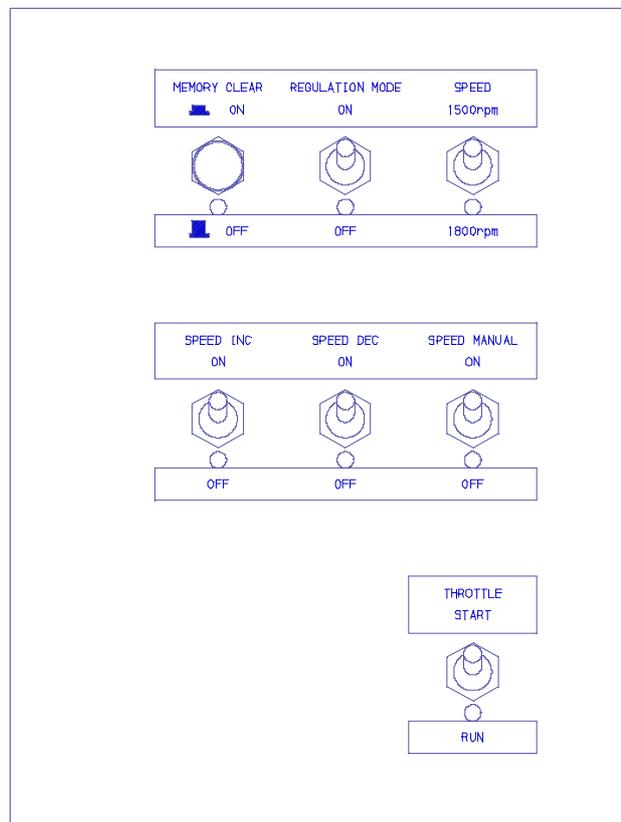
4.3 Control Panel (Continued)

NO.	Name	Description of function
1	Main Circuit Breaker	Connects (On) or disconnects(Off) the load from the output of the generator.
2	Panel light	Illuminates control panel
3	Pilot Lamp	Indicates when the generator is running.
4	Voltmeter	Indicates voltage
5	Ammeter	Indicates phase current.
6	Ferquency meter	Indicates electrical frequency.
7	Panel light switch	Used to light the control panel
8	Voltage selector switch	Selects voltage output at terminals.
9	Ammeter selector switch	Selects the phase current the ammeter is displaying.
10	Voltage adjust rheostat	Used to adjust voltage.
11	Glow lamp	Indicates during glowing
12	Monitor Lights	Light when an equipment malfunction occurs.
13	Hour meter	Indicates total operating hours of the generator unit.
14	Coolant temperature gauge	Indicates temperature of the engine coolant.
15	Oil pressure gauge	Indicates lubricating oil pressure.
16	Fuel gauge	Indicates the fuel level in the internal tank.
17	Starter switch	OFF:Stops engine operation. ON:Supplies electricity for control operation and starts pre-heating. START: Starts the engine.
18	Voltage selector switch	Selects the phase voltage the voltmeter is displaying.

4. DESCRIPTION

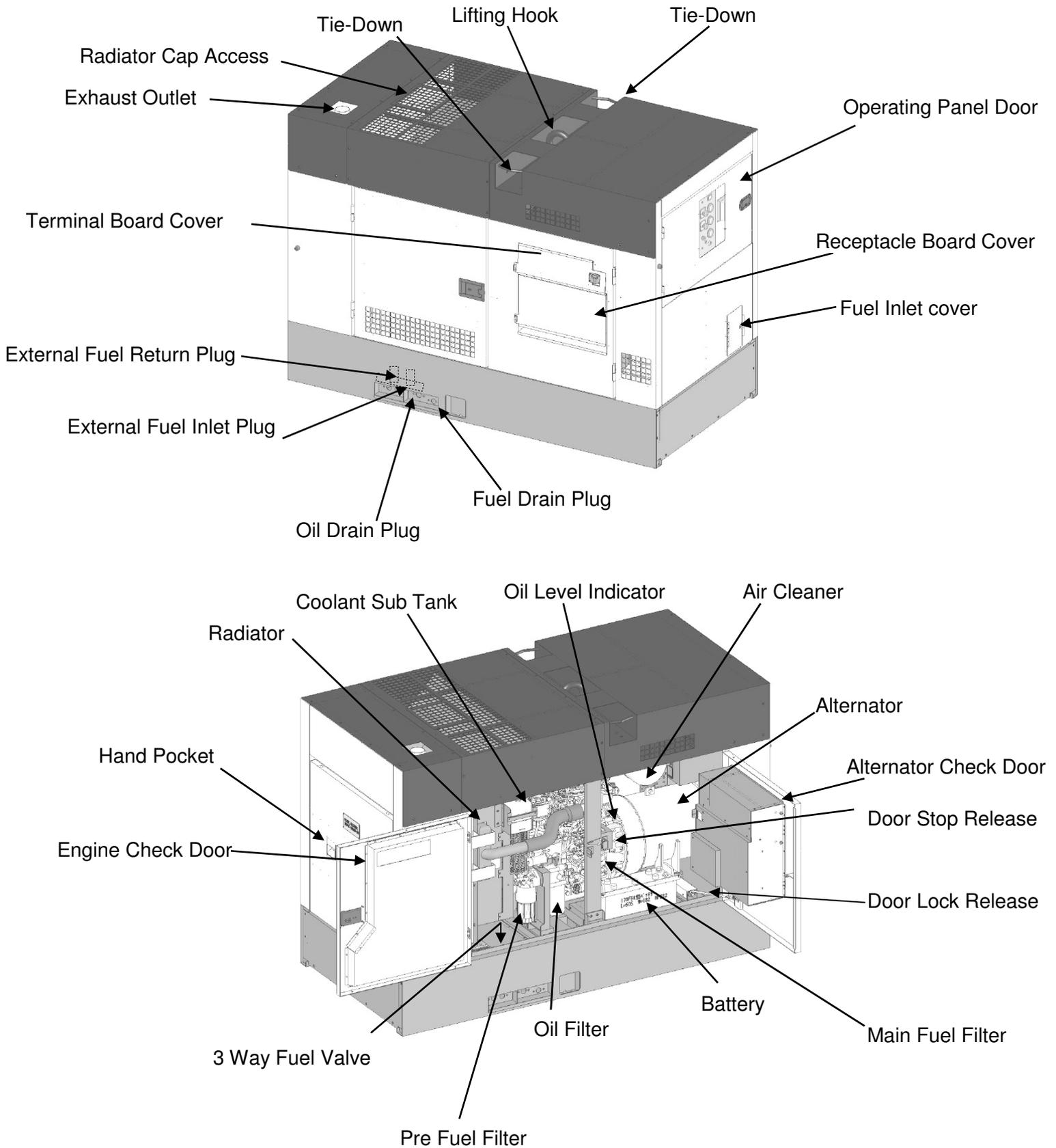
4.4 Engine operating switch

SWITCH NAME	FUNCTION	HOW TO OPERATE/NOTE
REGULATION MODE	Decreases rpm according to the load.	Normally rpm 1800/60Hz isn't influenced by a load. With this switch on, rpm decreases according to a load, for example rpm decreases 5% of rating rpm with full load.
THROTTLE START	Change Hi Idle mode and Low Idle mode.	"START" means Low Idle mode, "RUN" means High Idle mode. Hi Idle mode is linked to "SPEED" switch.
SPEED	Change 1500rpm and 1800rpm.	
SPEED INC.	Rpm increases 10sec/Hz, up to 110% of rated rpm.	Must have SPEED MANUAL switch "ON".
SPEED DEC.	Rpm decreases 10sec/Hz, down to 1000rpm.	Must have SPEED MANUAL switch "ON".
SPEED MANUAL	Main switch of SPEED INC and SPEED DEC.	
MEMORY CLEAR	Clears Engine trouble histories by "ON" position.	Refer to "How to clear Trouble code", Isuzu Engine Troubleshooting Manual



4. DESCRIPTION

4.5 Layout

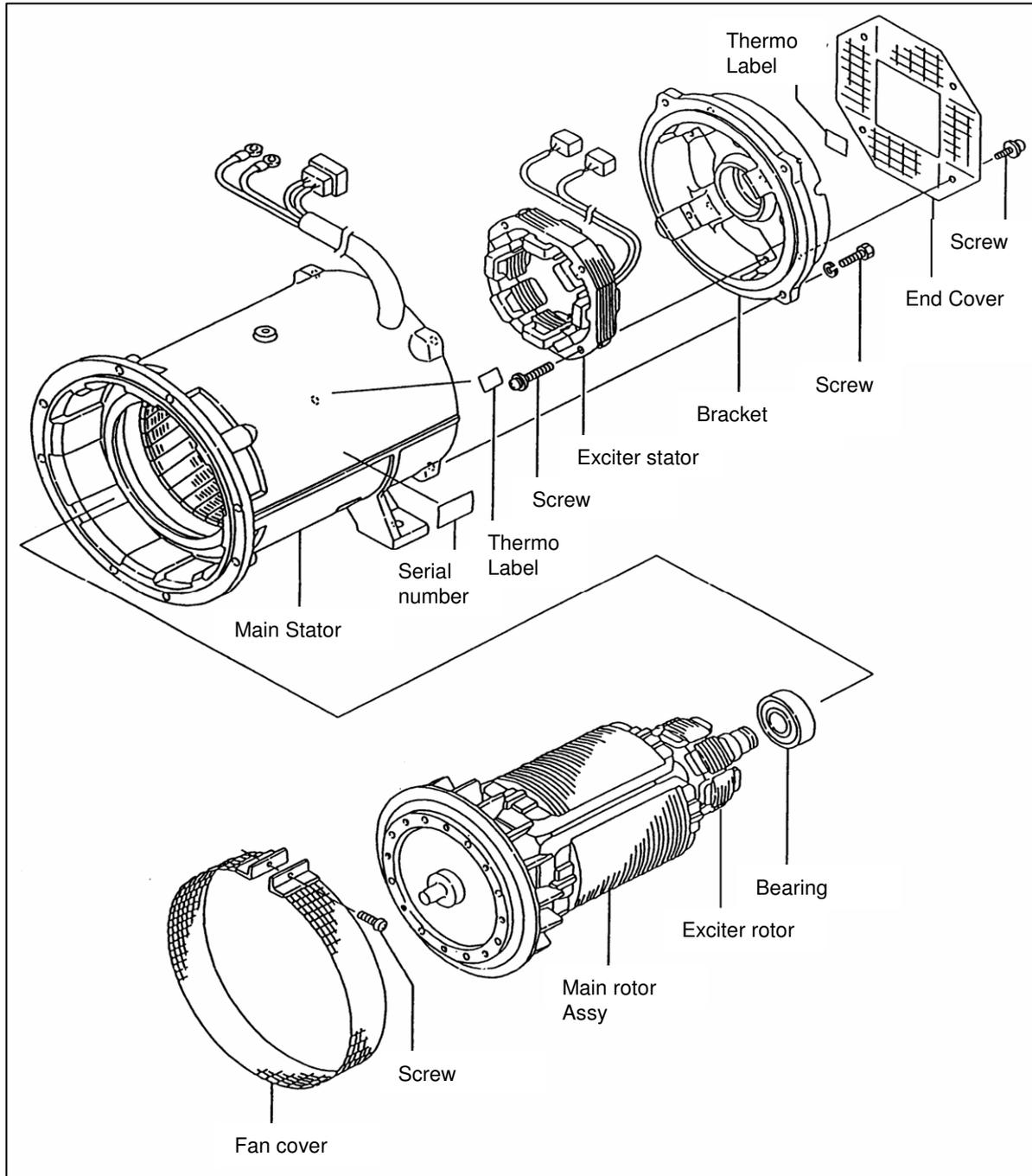


4.DESRIPTION

4.6 Generator

The main parts of the generator consist of rigid casting, and it has superior quality and durability with the features of a powerful damper winding to minimize wave distortion.

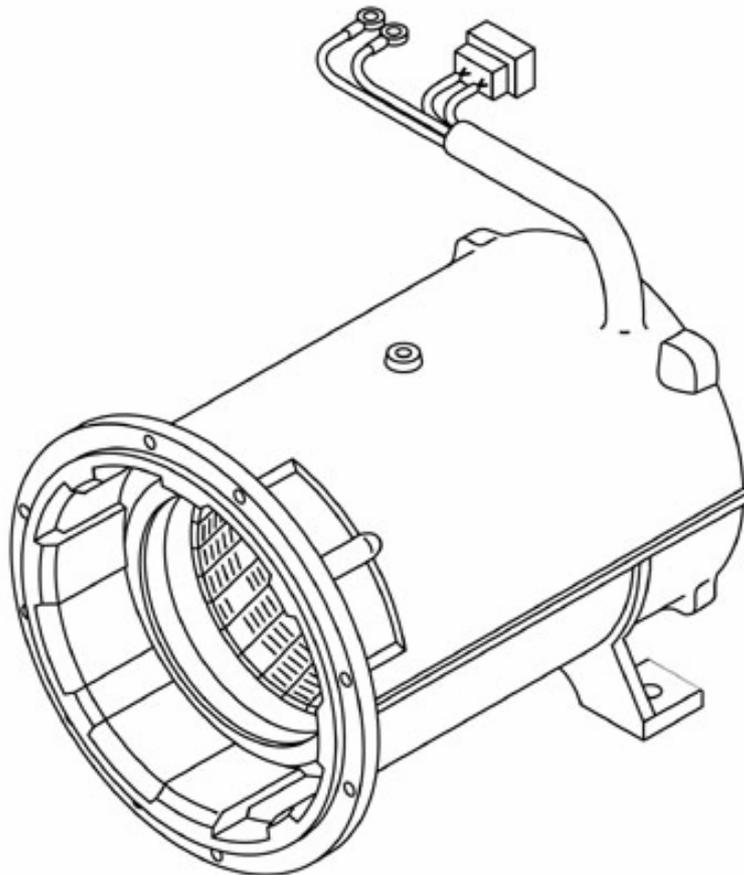
Exploded View



4. DESCRIPTION

Stator

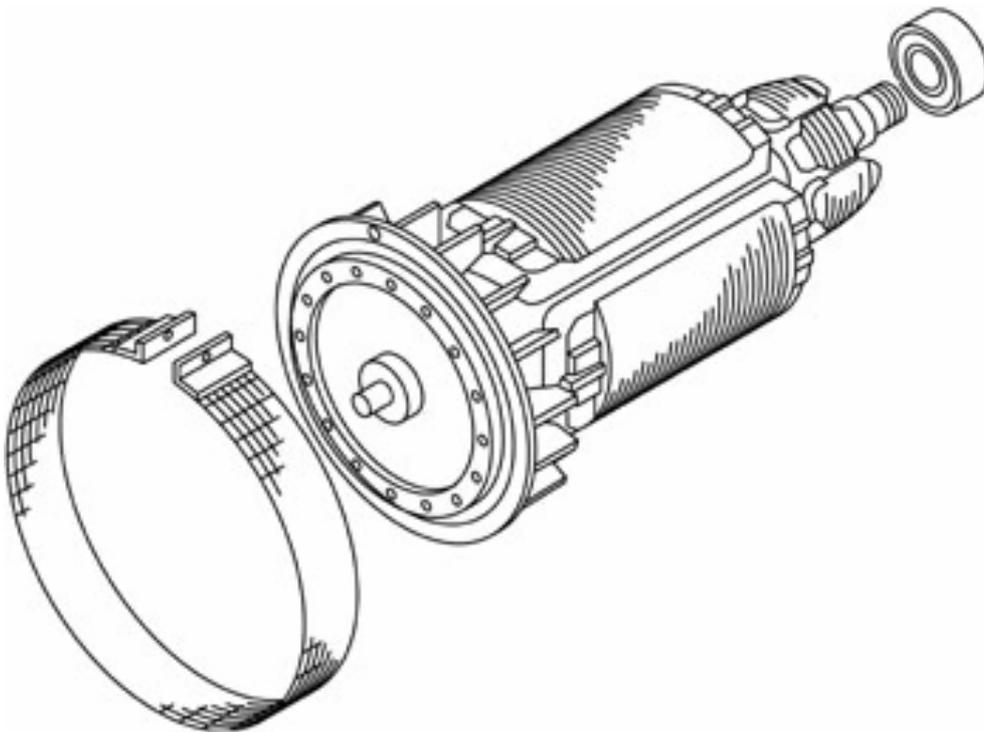
The stator is the external stationary portion of the generator that actually provides the electricity for distribution to the load(s). It is composed of several individual coils of copper wire distributed and wound such that the magnetic field associated with the rotor passes over and around the coils and in turn produces an electric potential (voltage) that is used as the supply voltage to the load(s). This stator also houses the stationary coils used as the exciter stator for the generator field exciter. The stator is bolted directly to the flywheel housing of the engine. The end bracket and end cover are bolted directly to the end of the stator opposite to where the stator is bolted to the flywheel housing.



4. DESCRIPTION

Rotor

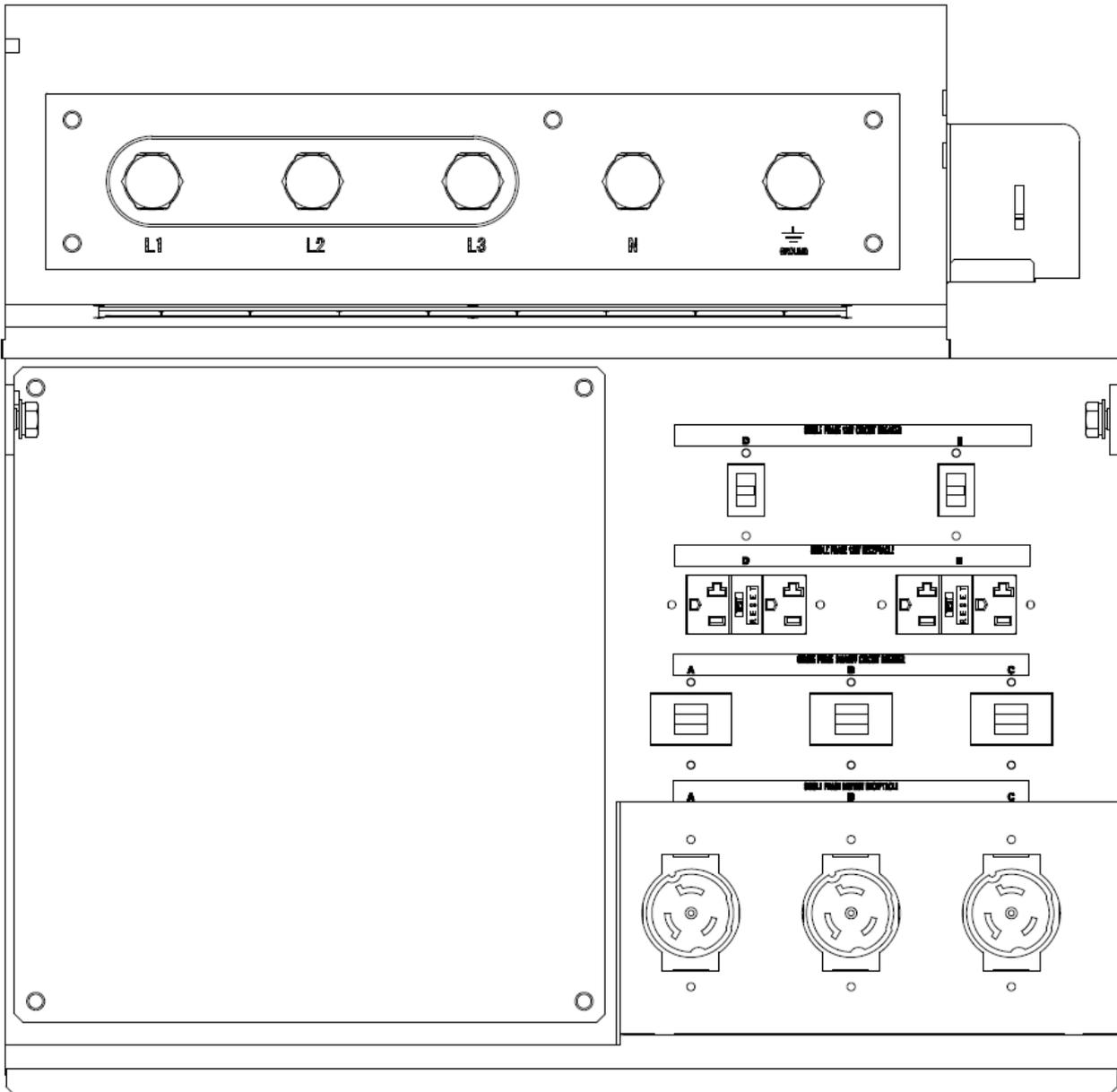
The rotor is the portion of the generator bolted directly to the crankshaft of the engine so that it rotates at the same speed that the engine crankshaft is rotating. The opposite end of the rotor is supported by the generator end bracket using a single ball bearing. The rotor has the field coils attached to it. The amount of current through the field coils determines the strength of the rotating magnetic field being used to generate a potential in the stator and therefore determines the output voltage of the generator. Field coil current is regulated by the exciter output, which is in turn regulated by the automatic voltage regulator. The rotating portion of the exciter is also mounted on the rotor.



4. DESCRIPTION

4.7 Receptacles and Main Terminals

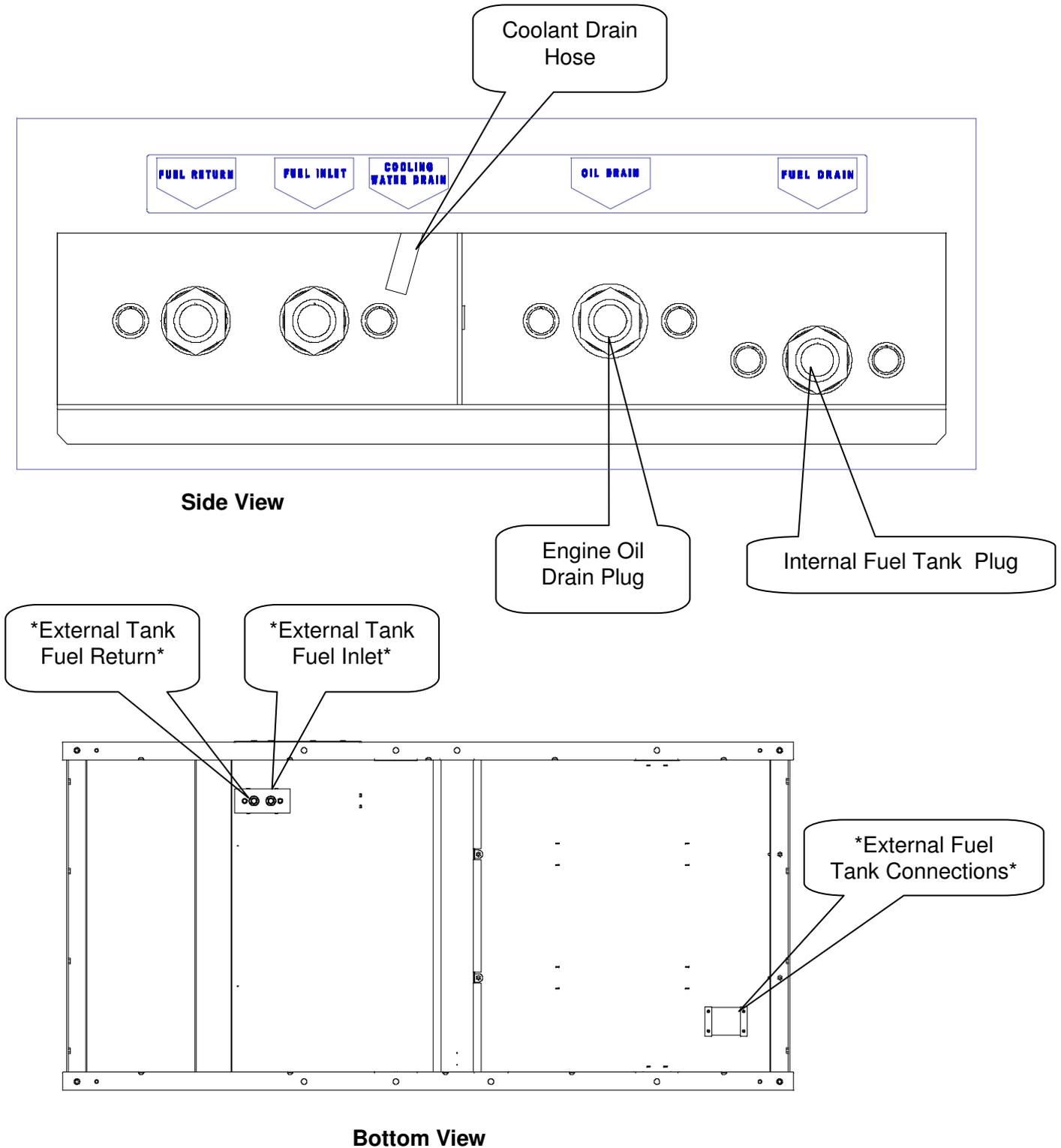
Note: All duplex receptacles are GFCI protected and are rated at 20 amp. All twist loc receptacles are rated at 50 amps.



Note: Terminal cover must remain closed during operation or main breaker will trip.

4. DESCRIPTION

4.8 Drain Plugs and External Fuel Ports



The inlet and outlet for external fuel tank are located on the bottom of the generator bed from the factory but can also be easily relocate to the side of the frame depending on the application.

5. EQUIPMENT

5.1 Engine Control Circuit

Automatic pre-heating system

When the starter switch is set to [ON] position electricity flows to the glow plug and glow indicator. Preheating time is about 15 to 1 seconds though it is automatically based on coolant temperature.

Control power

When the starter switch is set to the [ON] position. Electricity for control power is supplied from the battery.

Starting

When the starter switch is set to the [START] position, the generator unit starts. After the engine starts, release the switch, and it will return to the [ON] position automatically.

Stopping

When the starter switch is set to the [STOP] position, cutting off the electricity from the battery shuts off the engine.

Protection

(1)Over current

When output amperage becomes excessively high, the circuit breaker trips and the lever is positioned between [ON] and [OFF]. Move the lever to the [OFF] position first, and then set the lever to the [ON] position to reset.

(2)Low oil pressure

When lubricating oil pressure becomes excessively low, emergency timer shuts down the engine.

(3)High coolant temperature

When coolant temperature becomes excessively high, emergency timer shuts down the engine.

(4)Over speed

When the engine speed becomes over 2,070rpm, it shuts the engine down immediately.

5. EQUIPMENT

5.2 Monitor Displays

The diesel generator set is equipped with monitoring functions for coolant temperature, oil pressure, battery charge condition, diagnosis, boost temperature, over speed and air filter.

Under normal operating conditions these monitoring lamps will come on momentarily when the engine is first started but will go off very shortly thereafter.

If an abnormal condition is detected in the coolant temperature or oil pressure, the corresponding monitor lamp will flash and the automatic shutdown will be activated. This will cause the engine to shut down. Insufficient battery charging will cause the light to flash only. The diagnosis lamp flashes but does not shut the engine down if the electronic control module detects a fault that could affect engine operation. The boost temperature lamp flashes but does not shut the engine down if there is an excessive temperature at the inlet to the intake manifold. The over speed light flashes and shuts the engine down on an over speed condition. The air filter lamp flashes but does not shut the engine down if the air filter occurred clogging.

If an automatic shutdown is activated, check for and correct the cause of the shutdown prior to trying to restart the generator set.

Coolant Temperature Monitoring Lamp

WARNING

Injuries

- To Avoid injuries by unintentional contact with the fan and/or fan belts, close and lock all doors while operating this equipment.

Burns

- To avoid sustaining burns from hot vapor, do not open the radiator cap while operating or immediately after stopping the equipment.
- Due to extremely high temperatures, do not come in contact with the engine and/or muffler while operating or immediately after stopping this equipment.

If the coolant temperature reaches 221° Fahrenheit increasing during operation, the coolant temperature monitoring lamp will flash and automatic shutdown will activate.

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

(Refer to 9.4 Checking Engine Coolant).

If the coolant level is normal, check for a loose fan belt or possible water leak in the cooling system. Always allow the engine to cool down prior to making these checks.

5. EQUIPMENT

CAUTION

- If the coolant level is too low the temperature sensor cannot detect the coolant temperature. Always check the coolant level in the radiator and coolant reservoir tank prior to operating this equipment.

Engine Oil Monitoring Lamp

WARNING

Injuries

- To avoid injuries by unintentional contact with the cooling fan and/or belts, close and lock all doors while operating this equipment.

WARNING

Burns

- Due to extremely high temperatures, do not come in contact with the engine and/or muffler while operating or immediately after stopping this equipment.
- When checking or changing the engine oil, always stop the engine and wait until the engine to cool down. Opening either the line to the oil gauge or the oil filler cap during operation may cause injury due to hot oil.

If the engine oil pressure drops below 14.5 psi during operation, the oil pressure monitoring lamp will flash, and the automatic shutdown will activate. If this occurs, check the engine oil level, and fill to the maximum level if needed.

CAUTION

- The oil pressure sensor cannot detect engine oil degradation due to extended use. Oil change intervals listed under section 11.2 must be strictly adhered to.

Battery Charge Monitoring Lamp

Insufficient battery charge during operation will cause the battery charge monitoring lamp to flash. If this occurs, check the condition and tightness of the fan belt and replace or tighten if necessary.

CAUTION

- For changing the belt, refer to the engine Workshop Manual.
- The Battery Charge Monitor cannot detect the degradation of battery life or the battery fluid level (refer to 9.7 Checking the Battery.)

5. EQUIPMENT

Diagnosis Lamp

DANGER

Injuries

- To avoid injuries by unintentional contact with the cooling fan and/or fan belts, close and lock all doors while operating this equipment.

CAUTION

Burns

- Due to extremely high temperatures, do not come in contact with the engine and/or muffler while operating or immediately after stopping this equipment.
- When checking or charging engine oil, always stop the engine and wait until the engine cools down. Operating either the line to the oil gauge or the oil filler cap during operation may cause injury due to hot oil.

If the electronic control module detects a fault that could affect engine operation it will flash the diagnosis lamp to indicate that further diagnosis as to the source of fault is necessary. This will not shut the engine down. Investigate and correct the cause of the diagnosis lamp.

Boost Temperature Lamp

DANGER

Injuries

- To avoid injuries by unintentional contact with the cooling fan and/or fan belts, close and lock all doors while operating this equipment.

CAUTION

Burns

- Due to extremely high temperatures, do not come in contact with the engine and/or muffler while operating or immediately after stopping this equipment.
- When checking or charging engine oil, always stop the engine and wait until the engine cools down. Operating either the line to the oil gauge or the oil filler cap during operation may cause injury due to hot oil.

If the inlet temperature of the inlet manifold exceeds 185° F the boost temperature lamp will flash but will not shut the engine down. Investigate and correct the reason for the excessive temperature.

5. EQUIPMENT

Over Speed Lamp

 **DANGER**

Injuries

- To avoid injuries by unintentional contact with the cooling fan and/or fan belts, close and lock all doors while operating this equipment.

 **CAUTION**

Burns

- Due to extremely high temperatures, do not come in contact with the engine and/or muffler while operating or immediately after stopping this equipment.
- When checking or charging engine oil, always stop the engine and wait until the engine cools down. Operating either the line to the oil gauge or the oil filler cap during operation may cause injury due to hot oil.

If the electronic control module detects a fault that could affect engine operation it will flash the diagnosis lamp to indicate that further diagnosis as to the source of fault is necessary. This will not shut the engine down. Investigate and correct the cause of the diagnosis lamp.

Air Filter Element Monitoring Lamp

If the air filter occurred clogging up, the air filter element monitoring lamp will flash. If this occurs, stop the engine and replace/clean the air filter. (* refer to page 56)

(No need to push the reset button on the indicator)

 **CAUTION**

- In dusty or other harsh environments, increase the frequency of cleaning or replacing of filters.
- Take care not to cause air leakage (sucking) when reassembling the air cleaner.

5. EQUIPMENT

5.3 Meters and Gauges

Hour Meter

The hour meter keeps track of the run time. The meter should be used to schedule preventative maintenance. **Note:** The hour meter will continue to operate as long as the starter switch is in the on position regardless if the engine is running or not.

Coolant Temperature Gauge

Coolant temperature gauge displays the temperature of the engine coolant. Normal operating temperature will vary between 167° to 212° F depending on load and ambient temperature.

Oil Pressure Gauge

Oil pressure gauge indicates the pressure of the engine oil. Normal operating pressures may vary depending on conditions but should display between 49 and 100 PSI. In colder climates the oil pressure gauge may read higher at start up due to the viscosity of the engine oil. Allow engine to warm until a normal reading is obtained.

Fuel Gauge

The fuel gauge indicates the level of fuel in the internal tank only. If an external fuel tank is being used the fuel gauge will not indicate the fuel level in the external tank.

Voltmeter

The volt meter displays the phase to phase output voltage from the generator.

Ammeter

The amp meter displays the electrical output current from the generator. The displayed current output will be dependant on the position of the amp meter selector switch.

Frequency Meter

The frequency meter will display the frequency of the generated power.

5. EQUIPMENT

5.4 Lamps and Lights

Glow Lamp

When the starter switch is turned to the run/preheat position the glow lamp will illuminate. The glow lamp will stay lit until the preheat cycle is completed and the engine is now ready to start. The preheat cycle time will depend on the ambient and engine temperatures.

Pilot Lamp

The pilot lamp indicates whether or not electricity is being generated when the engine is running. When the pilot light is illuminated the engine is running and there is electricity being generated. When the pilot lamp is not illuminated and the engine is running then there is no electricity being generated and indicates a problem with the generator system.

Panel Light

The panel light is used to illuminate the generator control panel. The light can be turned on and off with the toggle switch located to the right of the panel light. The panel light will only operate when the starter switch is in the run position.

5.5 Switches

Starter Switch

The starter switch is a three position switch used for starting, stopping and preheating the engine.

Positions:

Stop:

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

Run/Preheat:

The switch must be in this position during operation. This position also is used to begin the engine preheat cycle and to remove air from the fuel system. **Note:** Do not leave the switch in this position if the engine is not running or the battery will drain and the hour meter will still operate until the battery is discharged.

Start:

This position is to allow the operator to start the engine. The switch will automatically return to the run/preheat position when the key is released. **Note:** Do not hold the switch in this position after the engine starts or starter damage may occur.

5. EQUIPMENT

Voltmeter Selector Switch

The voltmeter selector switch is a 5 position switch located on the control panel to the left of the voltmeter. The voltmeter selector switch selects which phase voltage is displayed on the voltmeter.

Positions:

Off:

There are two off positions on the voltmeter selector switch. One at the full clockwise position and one at the full counter-clockwise position of the switch. In either off position the voltmeter will not display any voltage.

L1-L2:

In the L1-L2 position the voltmeter will display the phase voltage between L1 and L2.

L2-L3:

In the L2-L3 position the voltmeter will display the phase voltage between L2 and L3.

L3-L1:

In the L3-L1 position the voltmeter will display the phase voltage between L3 and L1.

Ammeter Selector Switch

The ammeter selector switch is a 5 position switch located on the control panel to the left of the ammeter. The ammeter selector switch selects which phase current is displayed on the ammeter.

Positions:

Off:

There are two off positions on the ammeter selector switch. One at the full clockwise position and one at the full counter-clockwise position of the switch. In either off position the ammeter will not display any amps. This switch must be in the L1 or L3 position to read single phase current.

L1:

In the L1 position the ammeter indicates the 3-Phase amps for L1 and single-Phase amps for L1.

L2:

In the L2 position the ammeter indicated the 3-Phase amps for L2.

L3:

In the L3 position the ammeter indicates the 3-Phase amps for L3 and single-Phase amps for L3.

5. EQUIPMENT

5.6 Output Circuit Breakers

The DGK100D has a main output circuit breakers for the main terminals located on the left side of the control panel. The main circuit breaker, is for connecting and disconnecting the load on terminals L1, L2 and L3. The single phase circuit breakers is for connecting and disconnecting the load on the receptacles on the receptacle board. Turning the circuit breaker on will allow power to flow to the load. Turning the circuit breaker off will remove the power to the load. The breakers will also trip in the event of an overload condition on the generator or if the main terminal door is opened.

Note: Terminal cover must remain closed during operation or main circuit breaker will trip.

5.7 Voltage Adjustment Rheostat

The voltage adjustment rheostat is used to adjust the generated output of the generator. Turning the voltage adjustment knob clockwise will increase the output voltage and turning the knob counter-clockwise will decrease the voltage. The adjust range available for the voltage adjustment knob is plus 5% and minus 15%.

5. EQUIPMENT

5.8 Voltage Selector Switch

The voltage selector switch is a 3 position switch located to the right of the control panel. The voltage selector switch makes a quick and convenient method of changing the generator output voltage and is lockable.

Note: This switch should NEVER be changed while the generator is running or serious damage may occur!

Positions:

3 PHASE 480/277:

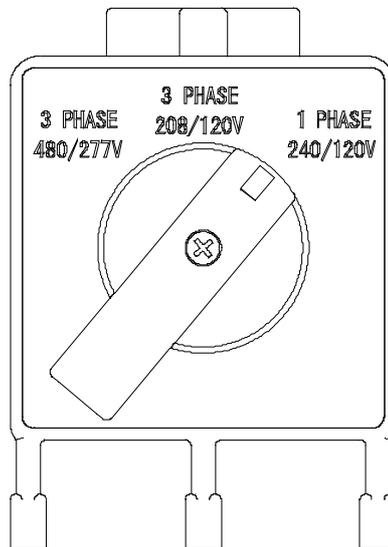
The 3 phase 480/277 position gives the output from the generator of 480 volts 3 phase and 277 volts single phase at the 3 phase terminal board and 240/120 volts at the single phase terminal board.

3 PHASE 208/120:

The 3 phase 208/120 position gives the output from the generator of 208 volts 3 phase and 120 volts single phase at the 3 phase terminal board and 240/120 volts at the single phase terminal board.

1 PHASE 240/120:

The 1 phase 240/120 position gives the output from the generator of 240/120 volts 1 phase at the single phase terminal board.



5. EQUIPMENT

5.9 3 Way Fuel Valve

The 3 way fuel valve is located inside the enclosure on the right side of the engine. The 3 way fuel valve provides a quick and convenient method of attaching an external fuel tank for supplying fuel to the engine. The 3 way valve comes from the factory in the B position that uses the internal fuel tank for fuel supply.

Positions:

A – Position:

When using an external fuel tank for the fuel supply to the engine, remove the 1/2" pipe plugs, connect the fuel lines from the external tank to the appropriate inlet and return port fittings and then set the 3 way valve to position **A**. **Note:** The internal fuel tank will not supply fuel to the engine when in the **A** position.

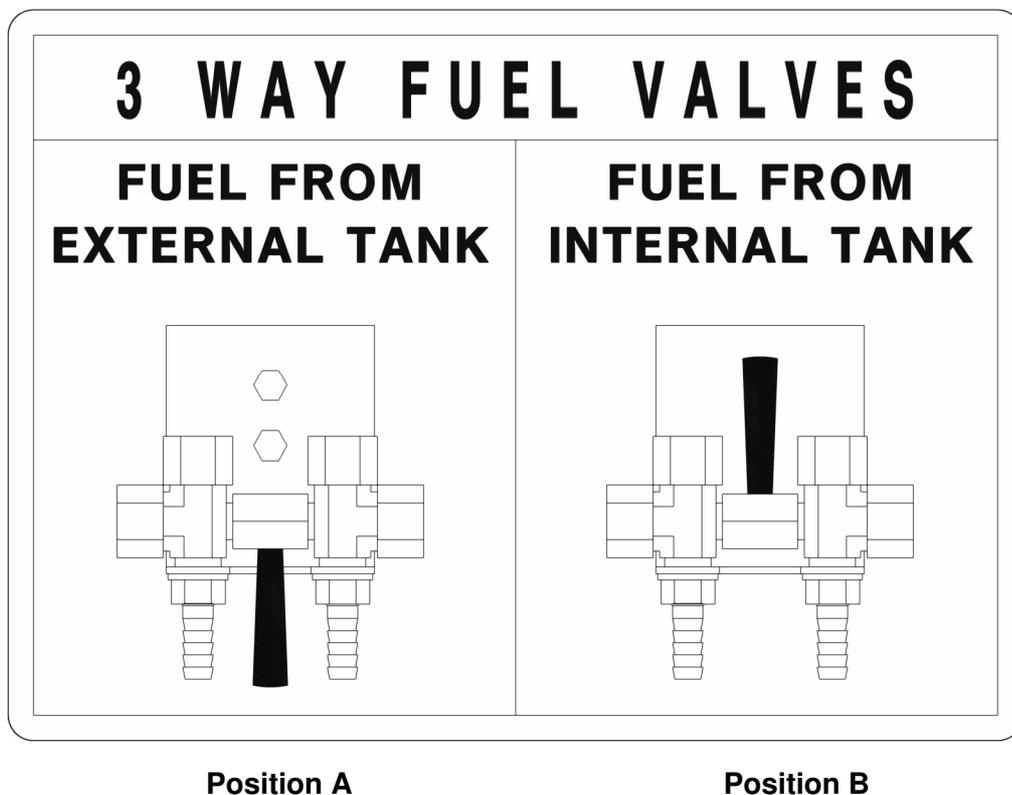
B – Position:

When using the internal tank for the fuel supply to the engine, set the 3 way valve to position **B**. In the **B** position the fuel for the engine is supplied by the internal fuel tank.

Note: Always ensure external fuel ports are plugged with the supplied 1/2" pipe plug fittings when the 3 way valve is in the B position.



- Always stop the engine prior to performing any work on the fuel system or lines.
- Immediately clean up any fuel leakage.



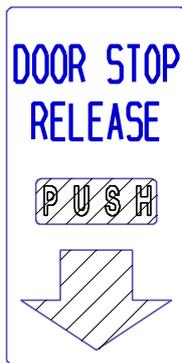
5. EQUIPMENT

5.10 Door Stop Release

The Door Stop Release Lever is located inside the enclosure on the middle of maintenance door. The Door Stop Release Lever provide a quick and convenient door opening. Just push the Door Stop Release Lever when opening the maintenance door.

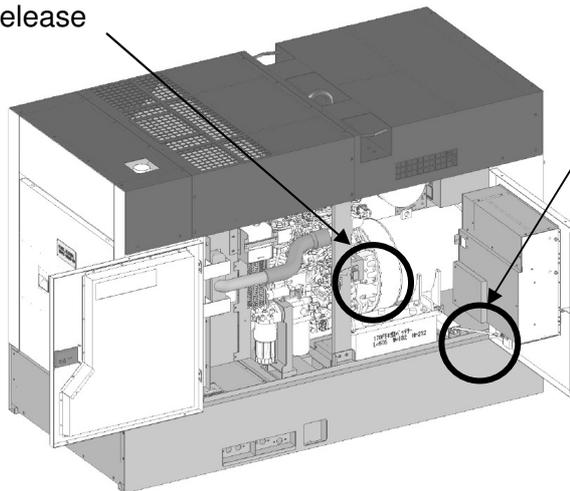
5.11 Door Lock Release

The Door Lock Release Lever is located inside the enclosure on the right of maintenance door. The Door Lock Release Lever locks the maintenance door as it is opened approx 90 degrees to Keep the door opening. Just pull the Door Lock Release Lever when closing the maintenance door.



Door Stop Release

Door Lock Release



CAUTION

- Always pay attention not to your finger being caught in the door and the lever.

6. LIFTING, TRANSPORTING AND INSTALLING

6.1 Lifting

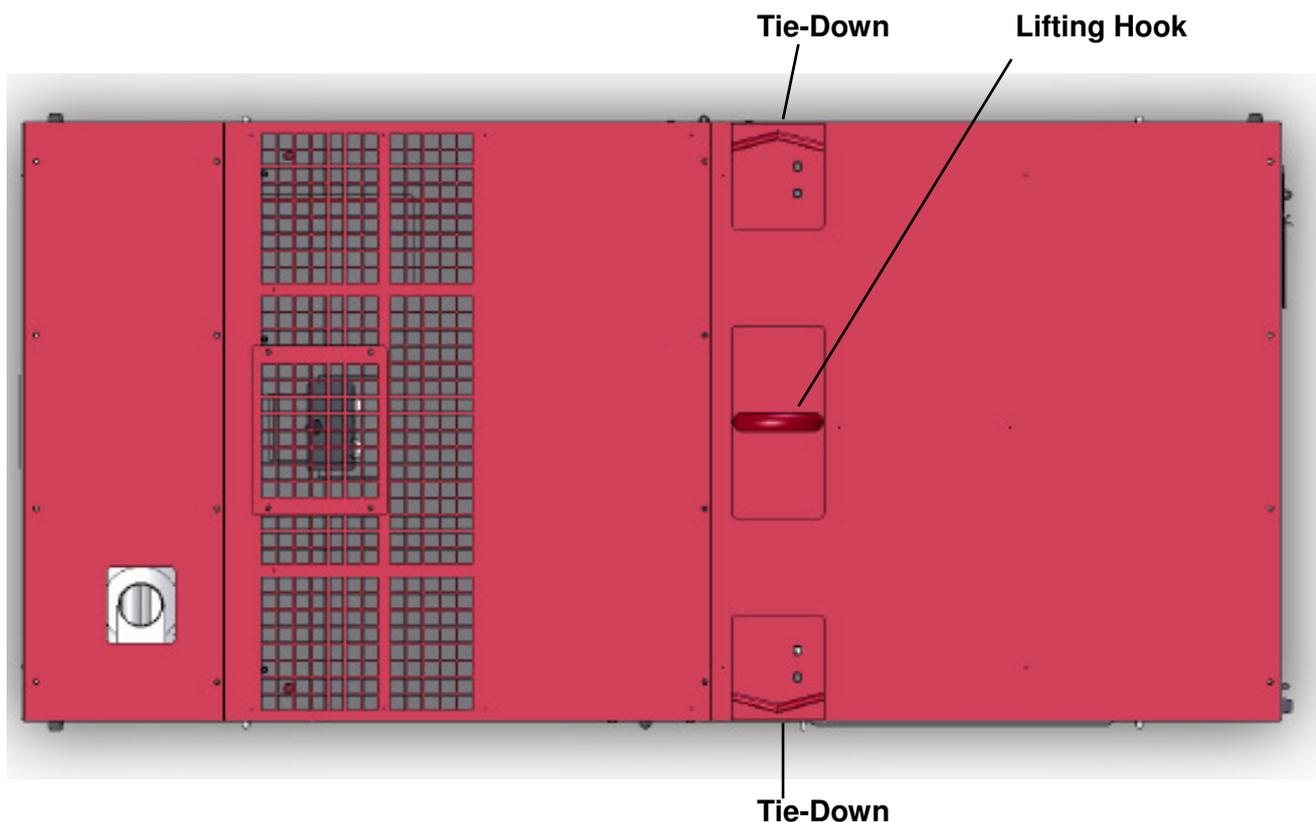
WARNING

- The lifting hook is designed to lift only the weight of the generator. Do not lift any additional added weight such as fuel tanks and/or trailers with the lifting hook.

CAUTION

- Use only the installed lifting hook for lifting the equipment.
- Do not use the tie down posts for lifting as they are not designed to hold the weight of the equipment.

Always use the installed lifting hook whenever the lifting of the equipment is necessary. **Note: The lifting hook is designed to lift only the weight of the generator. Do not lift any additional weight such as a fuel tank and/or trailer with the lifting hook. Do not lift with the tie downs.**



CAUTION

- Temperatures around the muffler and exhaust system can get extremely hot. Keep any flammable items (such as fuel, gas, paint, etc.) away from this equipment.

6. LIFTING, TRANSPORTING AND INSTALLING

6.2 Transporting

WARNING

- Always use extreme caution when loading, unloading or transporting this equipment. Failure to do so may result in personal injury or death and/or damage to the equipment resulting in a malfunction.

When transporting this equipment, ensure that the equipment is properly secured using the tie down posts.

6.3 Installing

WARNING

Suffocation from exhaust gases:

- Exhaust fumes from the engine contains many elements that are proven to be harmful to humans. Do not operate this equipment in poorly ventilated areas such as inside a building or in tunnels.
- Do not direct the exhaust fumes towards pedestrians or buildings.

CAUTION

Fire:

- Always operate this equipment on flat surfaces and at least 3 feet away from and objects, such as a wall, as overheating may occur due to lack of air flow.
- Temperatures around the muffler and exhaust system can get extremely hot. Keep any flammable items such as fuel, gas, paint, etc.) away from this equipment.

- Always place this equipment on a hard, flat and level surface.
- Keep the equipment at least 3 feet away from any obstruction that might obstruct the air flow to the exhaust or radiator cooling air. Failure to do so may result in a reduction in engine performance, overheating or damage to the equipment.
- Operating the equipment in dusty or other harsh environments may result in a clogged radiator or air filter element and may result in overheating. Be sure to check the radiator, air filter element, fuel filter, etc. on a daily basis and in some cases more often in this type of condition.

7. CONNECTING CABLES



Electric Shock:

- Before connecting or disconnecting the load cables from the output terminal, always turn the output circuit breakers to the OFF position, stop the engine, and remove the starter switch. The person performing the connection or disconnection should always have possession of the key.
- Do not come in contact with or allow anything else to come in contact with the output terminals during operation.
- Be sure to place the protective covers over the output terminals and fasten them securely while operating this equipment.
- Do not insert metal objects (such as pins or wires) into plug-in receptacles.
- Do not touch the wiring or any electrical or electronic parts inside the equipment during operation.
- There is always a danger of being electrocuted by a short-circuit to ground. Be sure to test the generator's insulation resistance to ground periodically.
- Before connecting or disconnecting the load cables from the output terminal, always turn the output circuit breakers to the OFF position, stop the engine, and remove the starter switch. The person performing the connection or disconnection should always have possession of the key.
- Before performing any equipment check or maintenance, stop the engine, and remove the doors while operating this equipment.

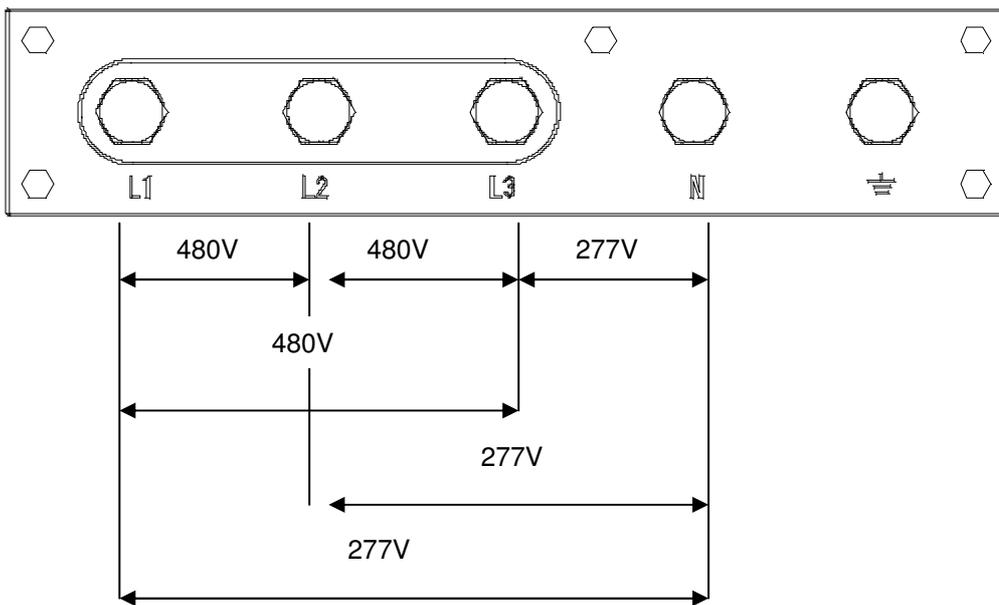
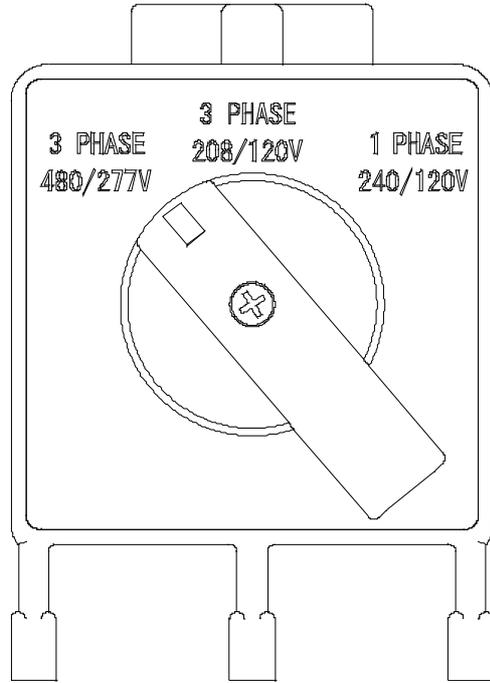
Fire:

- connect the AC output to any indoor wiring without an approved disconnecting device between the generator and the building's electrical service.

Note: Terminal cover must remain closed during operation or main breaker will trip.

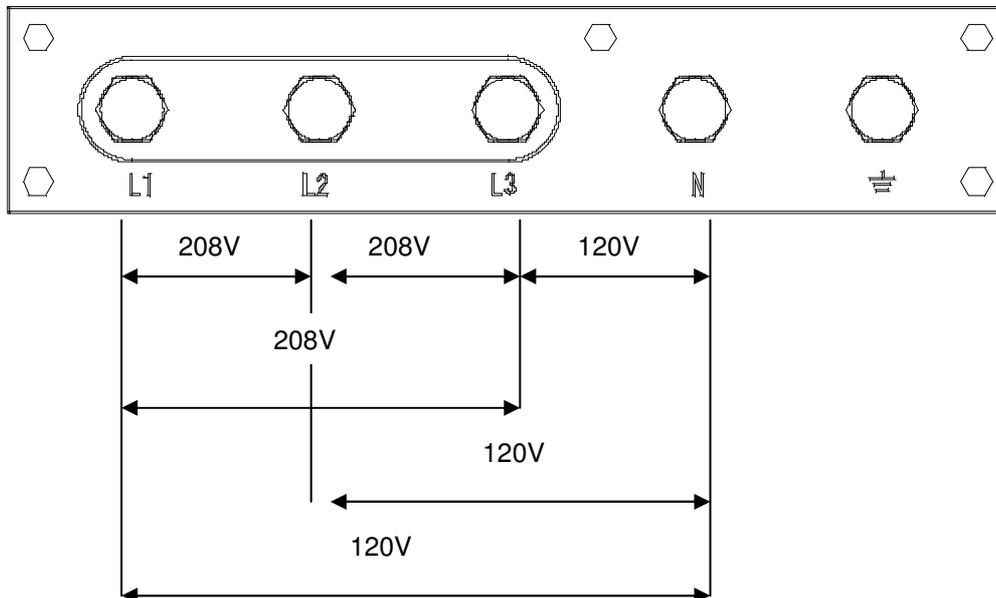
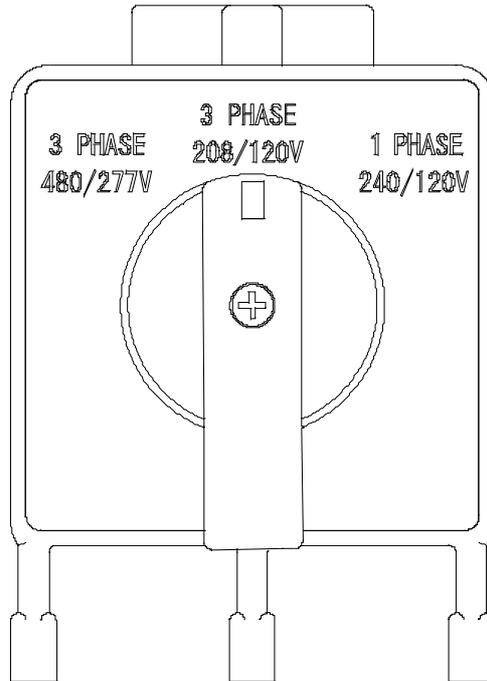
7. CONNECTING CABLES

7.1 Main Terminal Connections 480 Volt 3 Phase and 277 Volt Single Phase Position



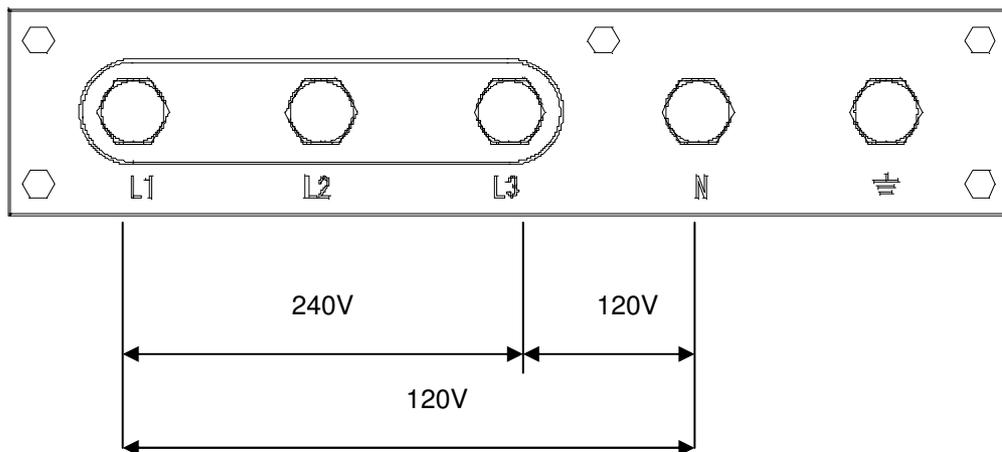
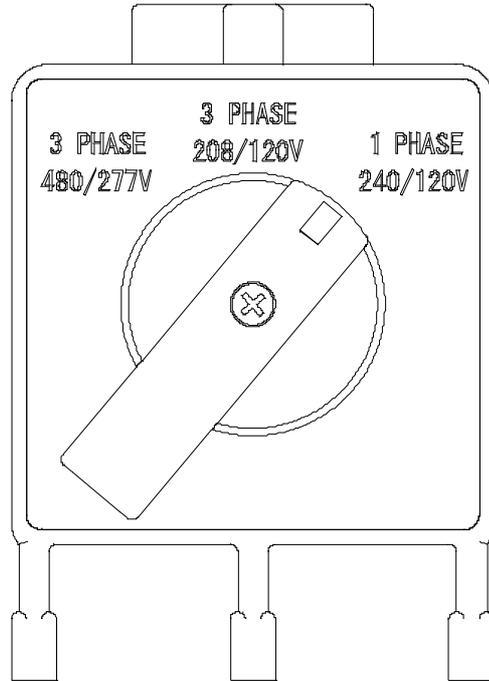
7. CONNECTING CABLES

7.2 Main Terminal Connections 208 Volt 3 Phase and 120 Volt Single Phase Position



7. CONNECTING CABLES

7.3 Main Terminal Connections 240/120 Volt Single Phase Position



Note: Place the voltmeter selector switch in the L3-L1 position and the ammeter selector switch in the L1 or L3 position when the voltage selector switch is in the 1 Phase 240/120V position.

8. GENERATOR

Technical Specifications

Items		Reference value	Notes	
Insulation	Armature winding	3MΩ or more	DC500V Mega ohm Tester	
	Exciter field	3MΩ or more		
Pre-heating time		15 to 1 seconds (it depends on engine coolant temperature.)	Automatic pre-heating system	
*High idling speed		50Hz: 1500 rpm	Within 0.25%	
		60Hz: 1800 rpm		
Lubricating oil pressure		49 to 100 PSI (340~690kpa)	—	
Coolant temperature		167 to 212° F(75~100°C)	—	
Protective device	Low oil press.	Working pressure	Below 14.5 PSI(100kpa)	[Closed] when activated
		Part no. (ISUZU)	897363-9360	
	High water temp.	Working temperature	Reaches 221° F(105°C)	[Closed] when activated
		Part no. (ISUZU)	898027-4560	

US EPA Tier 3 Emission certified at 1800 rpm only

9. INITIAL STARTUP and PRE-CHECKS



Electrical Shock

- Before performing any equipment checks or maintenance, stop the engine, and remove the engine key. The person performing the equipment checks or maintenance should always have possession of the key.



Burns

- To avoid sustaining burns from hot vapors, do not open the radiator cap while operating or immediately after stopping this equipment
- Due to extremely high temperatures, do not touch the engine or exhaust system while operating or immediately after stopping this equipment.
- When checking or changing the engine oil, always stop the engine, and wait until the engine cools down. Removing the engine oil level indicator or opening the oil fill cap during operation may cause injury due to hot oil.

Fire

- Always immediately wipe up and diesel fuel or engine oil that is spilled. Do not use this equipment if there are any leaks. If leaks are found, repair the leak before further use.

9. INITIAL STARTUP and PRE-CHECKS

9.1 Checking Engine Oil

(Also refer to the accompanying Engine Instruction Manual)

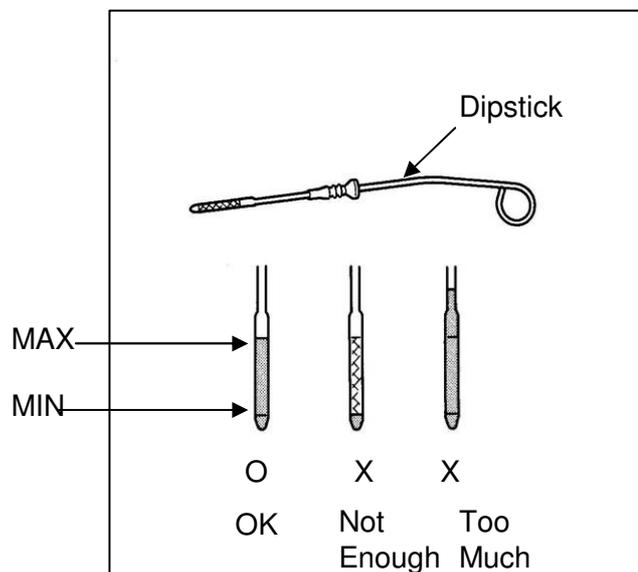
When checking the engine oil, be sure to keep the equipment level and insert the dipstick fully.

Prior to starting the engine, make sure to fill the engine oil to the MAX line through the oil filler opening

CAUTION

- If the equipment is not level, you can't obtain an accurate oil level reading.
- Do not overfill the engine oil as this can damage the engine.

1. Remove the dipstick from the crankcase and wipe it clean with a clean cloth.
2. Reinsert the dipstick fully and gently remove it again
3. Check the oil level on the dipstick. The level must be between the Max level mark and the Min level mark.
4. If the level is above the Max mark, drain oil out until the level is between the Max and Min marks.
5. If the level is at or below the Min level mark, add oil until the level is at the Max mark.

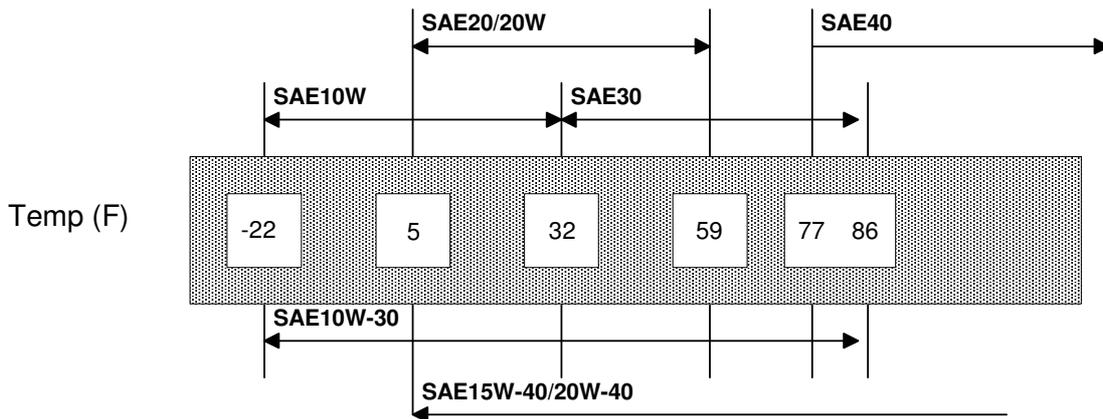


9. INITIAL STARTUP and PRE-CHECKS

9.2 Selecting the Proper Engine Oil

Use engine oil specifically designed for diesel engines. Use the chart below to determine the proper viscosity of oil to use for the anticipated ambient temperature the equipment will be operated in.

Engine Oil Viscosity Grade – Ambient Temperature



⚠ CAUTION

- Use only API class CD grade or higher

9.3 Check for Leaks

Prior to starting the engine, make sure a complete and thorough inspection is performed to check for any leaks.

⚠ CAUTION

- Do not use this equipment if a leak is detected. Repair the leak before further use.
- Always check around hoses and fitting for signs of leaks.

9. INITIAL STARTUP and PRE-CHECKS

9.4 Checking Engine Coolant

(Also refer to the accompanying Engine Instruction Manual)

WARNING

Injuries

- Before performing any equipment checks or maintenance, stop the engine, and remove the engine key. The person performing the equipment checks or maintenance should always have possession of the key.



CAUTION

Burns

- To avoid sustaining burns from hot vapors, do not open the radiator cap while operating or immediately after stopping this equipment
- Due to extremely high temperatures, do not touch the engine or exhaust system while operating or immediately after stopping this equipment.
- When checking or changing the engine oil, always stop the engine, and wait until the engine cools down. Removing the engine oil level indicator or opening the oil fill cap during operation may cause injury due to hot oil.

Fire

- Always immediately wipe up any diesel fuel or engine oil that is spilled. Do not use this equipment if there are any leaks. If leaks are found, repair the leak before further use.

Procedure for Checking Radiator Coolant Level

1. Remove the radiator access plate on top of the enclosure.
2. Loosen the thumb screw for the radiator cap access door
3. Remove the radiator cap and check the level of the coolant. The coolant level should be up to the filler neck. If the level is low, add a 50:50 mix of Long Life Coolant (GM SPEC 6277M or equivalent) until the level is at the filler neck.
4. Reinstall the radiator cap, install the radiator access door and reinstall the radiator access plate.

Procedure for Checking the Coolant Reservoir Level

1. Open the enclosure door to gain access to the reservoir.
2. The coolant level should be between the Min and Max line. If the coolant level is low, add a 50:50 mix of Long Life Coolant (GM SPEC 6277M or equivalent) until the level is between the Min and Max line.

CAUTION

- Always use potable water when mixing the coolant.
- Do not spill antifreeze on the exhaust or hot engine parts, as in some cases, coolant can combust.

9. INITIAL STARTUP and PRE-CHECKS

9.5 Checking the Fan Belt

(Also refer to the accompanying Engine Instruction Manual)

WARNING

Injuries

- Before performing any equipment checks or maintenance, stop the engine, and remove the engine key. The person performing the equipment checks or maintenance should always have possession of the key.
- To avoid injuries by unintentional contact with the cooling fan or fan belt, close and lock all doors while operating this equipment.

CAUTION

Burns

- Due to extremely high temperatures, do not come in contact with the engine and/or muffler while operating or immediately after stopping this equipment.

Procedure for Checking Fan Belt and Tension

1. Gain access to the alternator side of the engine.
2. The fan belt should have 0.24 to 0.31 inch of slack when applying finger pressure on the belt between the alternator and water pump pulley.
3. Check the condition of the belt. If the belt is cracked or damaged replace the fan belt before operating this equipment using the procedure in the Engine Instruction Manual.
4. If belt is loose refer to the Engine Instruction Manual for tightening procedure.

9. INITIAL STARTUP and PRE-CHECKS

9.6 Checking Fuel Level

Prior to starting the engine, check the fuel level in the tank that is supplying fuel to the engine. The fuel gauge on the control panel will only display the fuel level for the internal fuel tank. Always use the fuel strainer when refueling.

Fire



 **CAUTION**

- Always immediately wipe up any diesel fuel or engine oil that is spilled. Do not use this equipment if there are any leaks. If leaks are found, repair the leak before further use.
- Fill the fuel tank slightly below the Full mark to allow for expansion of the fuel.

 **CAUTION**

- The fuel injector pump, injectors and other parts of the fuel system and engine can be damaged if any fuel or fuel additives are used other than those specifically recommended by the engine manufacturer.
- Refer to the Engine Instruction Manual for the recommended fuels.
- Ensure the fuel strainer is installed in the neck of the fill spout.
- Fill the tank to slightly less than the FULL mark.

9.7 Battery Check

Procedure

1. Check the battery fluid level. If the level is near or at the Lower Level, add distilled water until the level reached the Upper Level.
2. Make sure the battery terminals are tight and free of corrosion.
3. Make sure the battery is securely mounted with the bracket.

Injury



 **CAUTION**

- Battery fluid contains diluted sulfuric acid. Avoid contact with eyes, skin or clothing. If contact with the acid does occur, especially with the eyes, immediately flush with large volumes of water and contact a physician immediately.

Fire



 **CAUTION**

- The battery may emit highly explosive gases. Never expose it or the surrounding area to flames or Spark producing devices.

10. OPERATION

10.1 Starting

WARNING

Suffocation from exhaust gases:

- Exhaust fumes from the engine contains many elements that are proven to be harmful to humans. Do not operate this equipment in poorly ventilated areas such as inside a building or in tunnels.
- Do not direct the exhaust fumes towards pedestrians or buildings.

CAUTION

Injuries

- Always place the equipment on a flat, hard level surface and at least 3 feet way from obstructions.
- Due to extremely high temperatures, do not touch the engine or exhaust system while operating or immediately after stopping this equipment.
- Before starting this equipment, turn off the connected equipment and turn the output circuit breakers to the OFF position.
- Do not move the equipment during operating.
- When performing equipment checks and/or maintenance, always stop the engine.

Fire

- Always immediately wipe up any diesel fuel or engine oil that is spilled. Do not use this equipment if there are any leaks. If leaks are found, repair the leak before further use.

Procedure

1. Turn the main output circuit breaker to the OFF position.
2. Turn the starter switch to the Preheat/Run position until the Glow lamp turns off.
3. Turn the starter switch to the Start position and release the starter switch as soon as the engine starts.

Note: Do not hold the key in the Start position for more than 10 seconds or damage to the starter system may occur.

if the engine does not start, wait at least 30 seconds before attempting to start again.

4. Once the engine starts, check to make sure all monitoring lamps remain off.
5. Allow the engine to run, with no load, for at least 10 minutes.

CAUTION

- Do not operate this equipment if it is being modified or if any parts have been removed.
- Do not crank the starter motor for more than 10 seconds at a time.

Note: If the generator is operated in cold climates, refer to ISUZU INSTRUCTION MANUAL and contact with your Shindaiwa dealer/ Shindaiwa Inc.

10. OPERATION

WARNING

Electric Shock:

- Before connecting or disconnecting the load cables from the output terminal, always turn the output circuit breakers to the OFF position, stop the engine, and remove the starter switch. The person performing the connection or disconnection should always have possession of the key.

10.2 Loading the Generator

Procedure

1. Set the required voltage using the voltage adjustment knob.
2. Turn the generator output circuit breaker to the ON position to supply power to the load.

10.3 Operating the Generator

1. Make sure all monitoring lights remain off.
2. Check and make sure all gauges and meters are working properly.
3. Check for any usual vibrations or noises.
4. Check for any unusual color from the exhaust.
5. **NEVER change the voltage selector switch while the generator is running.**
6. In the event the output circuit breakers trip, make the necessary corrections or repairs (or decrease the load) prior to resetting the breaker.
7. If a red monitoring light turns on, stop operation immediately and correct the fault before resuming operation.

10.4 Resetting the Main Circuit Breaker after Overload

1. Reduce the load on the generator.
2. Wait approximately 1 minute before attempting to reset the main breaker to allow the over-current relay to automatically reset.
3. Turn the breakers to the "OFF" position.
4. Turn the breakers to the "ON" position

10.5 Stopping the Generator

1. Turn the load circuit breakers to the OFF position.
2. Turn the generator output circuit breakers to the OFF position.
3. Allow the engine to run for at least 3 minutes.
4. Turn the starter switch to the Stop position.

CAUTION

- Fuel pump continues to operate with the starter switch in the run position regardless whether or not the engine is running.

11. MAINTENANCE

11.1 Engine Maintenance



Electrical Shock

- Before performing any equipment checks or maintenance, stop the engine, and remove the engine key. The person performing the equipment checks or maintenance should always have possession of the key.



Burns

- To avoid sustaining burns from hot vapors, do not open the radiator cap while operating or immediately after stopping this equipment
- Due to extremely high temperatures, do not touch the engine or exhaust system while operating or immediately after stopping this equipment.
- When checking or changing the engine oil, always stop the engine, and wait until the engine cools down. Removing the engine oil level indicator or opening the oil fill cap during operation may cause injury due to hot oil.

Fire

- Always immediately wipe up any diesel fuel or engine oil that is spilled. Do not use this equipment if there are any leaks. If leaks are found, repair the leak before further use.

To maximize the useful life of this generator, follow the recommended periodic maintenance schedule and maintenance checks according to the following table. The hour meter should be used as a guide to schedule the maintenance and checks.



- With the exception of pre-startup and operating checks, only qualified technicians should perform the equipment and maintenance checks.
- Maintenance items should be performed only by an authorized dealer or distributor.
- This chart covers only basic checks and maintenance for the engine. For more detailed maintenance information for the engine, refer to the engine Instruction Manual.
- For maximum performance and useful life, always use genuine replacement parts.

11. MAINTENANCE

Warning for ECM on Isuzu Tier 3 engine

Common rail system

Do Not disassemble and adjust the Injector.

Do Not re-use the injection pipe or other components which are subject to high fuel pressures (Refer to Isuzu Trouble Shooting Manual for the list of precautions).

Use only high quality fuel (Refer to engine owner's manual for fuel selection).

Keep engine well maintained.

Electrical control system by ECM

Remove the Battery in advance when performing welding on the machine.

Otherwise, the current during welding may cause system trouble or damage.

Cooled EGR

Use only approved Isuzu engine oil (Refer to engine owner's manual).

Use only high quality fuel (Refer to engine owner's manual for fuel selection).

Keep engine well maintained.

Shindaiwa generator DGK100D is equipped with Isuzu 4HK1 Tier3 engine.

This engine is controlled by electrical system, therefore follow ISUZU caution by

ISUZU TROUBLE SHOOTING MANUAL.

11. MAINTENANCE

PERIODIC MAINTENANCE TABLE

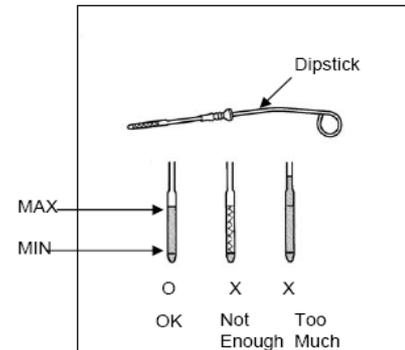
Description	Daily	First 50 hrs	Every 200 hrs	Every 400 hrs	Every 500 hrs	Every 1000 hrs
Engine						
Engine oil (Check/Add)	○					
Engine oil (Replace)(1 st time at 50hrs)		○	○			
Oil filter (Replace) (1 st time at 50hrs)		○		○		
Coolant (Check/Add)	○					
Coolant (Replace/ Radiator Flush)						○
Pre-filter outer case (Check/drain water)	○		○			
Main & Pre-Fuel filter (Clean/Replace)	○				○	
Electric Fuel Pump Filter (Clean)					○	
Fuel tank (Drain water)			○			
Fuel tank (Clean)						○
Fuel hose (Replace)						○
Check for leaks (Fuel/Oil/Coolant)	○					
Air cleaner element (Check)	○					
Air cleaner element (Clean)			○			
Air cleaner element (Replace)					○	
Battery fluid (Level/Gravity check)	○					
Fan belt tension (Check)	○					
Wiring and connection (Check)	○					
Radiator and fins (Clean)					○	
Fuel injector nozzle tip (Check)					○	
Exhaust color (Check)	○					
Valve clearance (Check/Adjust)						○
Compression (Check)						○
Fuel injection nozzle pressure (Check)				○		
Fuel injection timing (Check)						○
Generator						
Indicators, Gauges, Alarms (Check)	○					

11. MAINTENANCE

11.2 Oil Change

Frequency

First Time	50 Hours
Thereafter	Every 200 hours



Procedure

1. Wipe clean the area around the oil filler cap to prevent entry of foreign material.
2. Remove the oil filler cap.
3. Remove the engine oil drain plug and turn the ball valve inside the enclosure counterclockwise and allow the oil to drain completely.
4. Turn the oil drain valve clockwise and reinstall the oil drain plug and tighten.
5. Fill with new oil, through the oil filler opening, until the oil level is at the max line on the dipstick.
6. Reinstall the oil filler cap and tighten by hand.
7. Start the engine and check for any leaks.
8. Stop the engine for 20 minutes and then recheck the engine oil level, on the dipstick. Replenish the engine oil, if necessary, to the specified level.

CAUTION

- Use only engine oil designated API, CD grade or higher
Refer to Engine Instruction Manual for recommended oil viscosity.
- When checking or changing engine oil, always stop the engine, and wait until the engine cool down. Operating either the line to the oil gauge or the oil filter cap during operation may cause severe burns due to hot oil.

11. MAINTENANCE

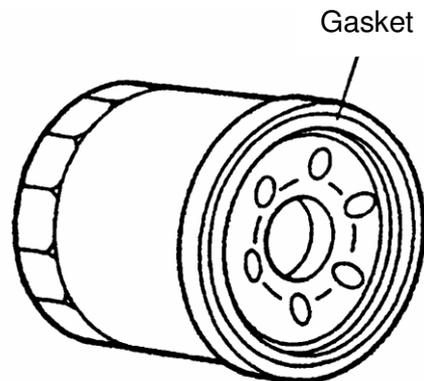
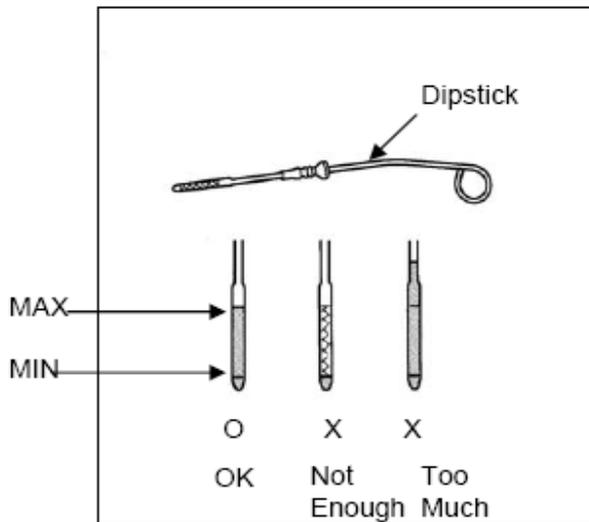
11.3 Oil Filter Replacing

Frequency

First Time	50 Hours
Thereafter	Every 400 hours

Procedure

1. Wipe clean the area around the oil filter and oil filler cap to prevent entry of foreign material.
2. Remove oil filler cap.
3. Remove the engine oil drain plug, turn the ball valve inside enclosure counterclockwise and allow the oil to drain completely.
4. Turn the ball valve clockwise and reinstall the oil drain plug and tighten.
5. Using an oil filter wrench, loosen and remove the oil filter.
6. Lightly coat the rubber gasket on the new oil filter with new engine oil.
7. Install the new oil filter until the rubber gasket makes contact with the sealing face.
8. Using an oil filter wrench to further turn in the cartridge by one full turn.
9. Fill with new oil, through the oil filler opening, until the oil level is at the max line on the dipstick.
10. Reinstall the oil filler cap and tighten by hand.



CAUTION

Use only engine oil designated API, CD grade or higher
Refer to Engine Instruction Manual for recommended oil viscosity

11. MAINTENANCE

11.4 Removal of water from the fuel.

Frequency

Check/drain water	Daily / 200hours
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Procedure

1. Loosen the air bleeding plug and then loosen the drain plug to drain the water.
2. Tighten the plugs and conduct the air bleeding of fuel.

11.5 Cleaning/Replacing the Fuel Filters

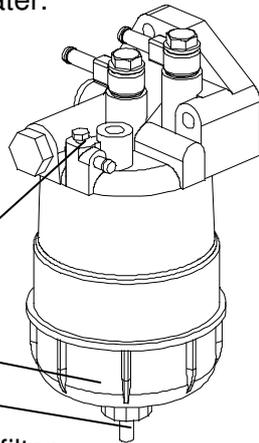
Frequency

Main/Pre Fuel Filter/ Replace	Every 500 hours
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Air breeding plug

Float

Drain plug



Procedure for Pre-Fuel / Main-Fuel Filter

1. Loosen the drain plug and air bleeding plug, and drain the fuel in the fuel filter.
2. Remove the outer case of the filter using a specified filter wrench.
3. Remove the fuel filter element and install the new fuel filter element.
4. Replace the O-ring of the outer case and drain plug.
5. Fill the case with clean diesel to help facilitate bleeding the fuel system upon completion.
6. Use a specified filter wrench and tighten.
Torque (outer case): 29.4Nm (3kgm)
Torque (drain plug): 1.5 to 2.5 Nm (0.15 to 0.25kgm)

CAUTION

- After changing fuel filter element, conduct fuel air bleeding.



CAUTION

Fire

- Always immediately wipe up any diesel fuel or engine oil that is spilled. Do not use this equipment if there are any leaks. If leaks are found, repair the leak before further use.

11. MAINTENANCE

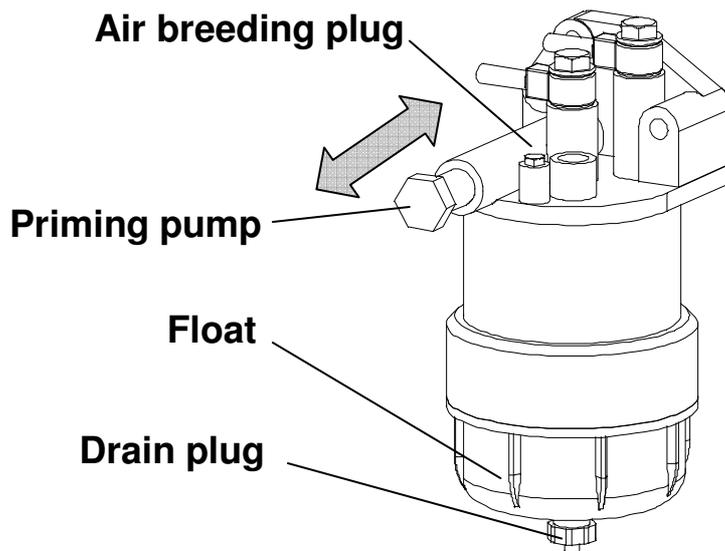
11.6 Fuel System Air Bleeding

The entry of air into the fuel system will cause hard engine starting or engine malfunction.

When performing maintenance such as emptying the fuel tank, draining for the water sediment, and the fuel filter element is done, be sure to conduct air bleeding procedure.

Procedure

1. Loosen the air bleeding screw located on top of the main fuel filter housing.
2. Turn the starter switch to the "RUN" position but do not start the engine to operate electric fuel transfer pump.
3. Operate the manual priming pump on fuel filter to bleed remaining air.
4. Tighten the air bleeding plug of fuel filter.
5. After tightening all the air bleeding plugs, operate the manual priming pump until resistance is felt.
6. Secure the priming pumps at the original position and then start the engine. If the engine does not start, repeat the procedure.



11. MAINTENANCE

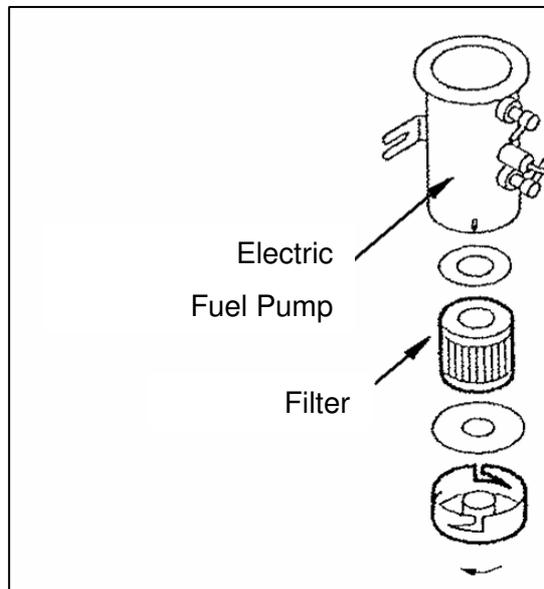
11.7 Cleaning Electric Fuel Pump Filter

Frequency

Clean	Every 500 hours
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Procedure

1. Turn the bottom cover of the pump counterclockwise to remove the end.
2. Clean the electric fuel pump filter.
3. Install the new filter and seals in the reverse order.
4. To bleed the air from the fuel system, turn the starter switch to the run position, but do not start the engine, for 30 seconds.



11.8 Draining Water from the Internal Fuel Tank

Frequency

Drain Water	Every 200 hours
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Procedure

1. Remove the fuel drain plug.
2. Turn the fuel drain valve located inside the enclosure counterclockwise.
3. After completely draining any water, turn the ball valve clockwise and reinstall the plug.

11. MAINTENANCE

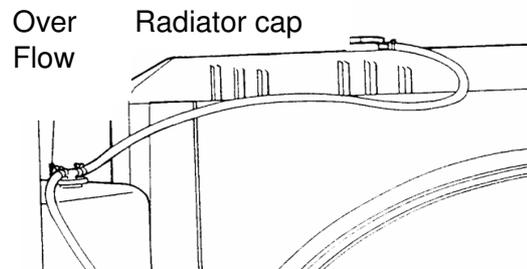
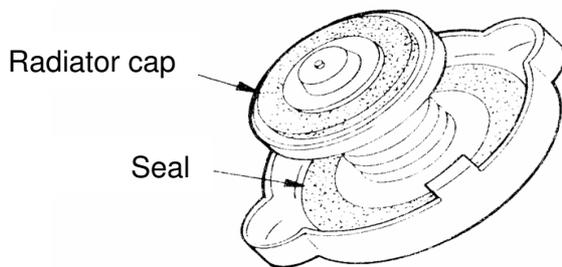
11.9 Replacing LLC Antifreeze (Long Life Coolant)

Frequency	Replace Antifreeze (LLC)	Every 1000 hours
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Procedure

1. Remove the radiator plate located on the top of the enclosure.
2. Remove the radiator cap cover.
3. Remove the radiator cap and check seal (replace if seal is damaged).
4. Loosen the radiator drain valve and drain plug on engine side and drain coolant completely.
5. Tighten the radiator drain valve.
6. Drain the coolant reservoir.
7. Install a mixture of 50:50 LLC and potable water into the reservoir to the full mark.
8. Fill the radiator slowly to avoid trapping any air, with a mixture of 50:50 LLC and potable water.
9. Reinstall the radiator cap tightly.
10. Close the radiator cap cover and install the radiator top plate.
11. Check for leaks, and if none, start the engine and let warm up.
12. Turn off the engine and let cool.
13. Check and replenish the coolant reservoir if needed.

Note: Use GM SPEC 6277M or equivalent long life coolant. Do Not mix different brands of coolant.



CAUTION

- To avoid sustaining burns from hot vapor, do not open the radiator cap while operating or immediately after stopping this equipment.

11. MAINTENANCE

11.10 Bleeding air from EGR cooler

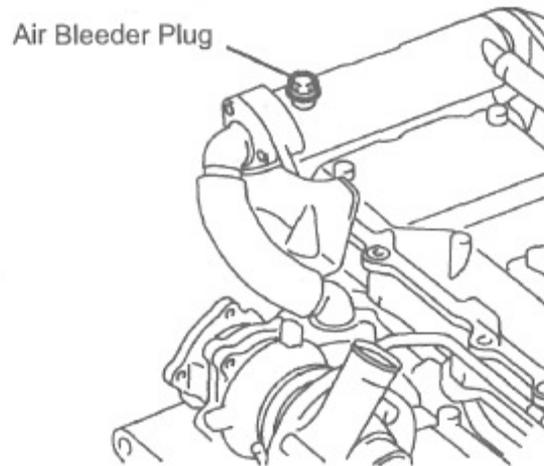
Frequency

Bleeding air	Every after coolant change
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Procedure

- 1: Loosen the air bleeder plug of the EGR cooler to bleed air from the EGR cooler.
- 2: Tighten the plug when the coolant spills over from the air bleeder plug.

Torque (Air bleeder plug) : 24.5 to 30.5 N.m (2.5 to 3.1 kgf.m)



11.11 Cleaning/Replacing the Air Cleaner Element

Frequency

Check/Clean	Daily/200 hours
Replace	Every 500 hours

Procedure

1. Unscrew the wing nut and remove the filter element.
2. Clean or replace the filter element, and reinstall it.

CAUTION

- In dusty or other harsh environments, increase the frequency of cleaning or replacing of filters

12. TROUBLE SHOOTING

Problem and corrective measure

12.1 Generator

Problem	Suspected cause	Inspection	Corrective measure
No output voltage	<ol style="list-style-type: none"> 1. Faulty voltmeter. 2. Faulty generator. 	<ol style="list-style-type: none"> 1. Check the voltage at the volt meter. 2. Verify the exciting amperage and the value of resistance. 	<ol style="list-style-type: none"> 1. Replace the voltmeter. 2. Replace the generator.
No voltage increase	<ol style="list-style-type: none"> 1. Faulty voltmeter. 2. Faulty generator. 3. Faulty AVR or voltage adjuster. 4. Slow rotation. 5. Faulty initial excitation. 	<ol style="list-style-type: none"> 1. Check the voltage of the volt meter 2. Verify the exciting amperage and the value of resistance. 3. Broken wire, loose or disconnected cable. 4. Check the rotation speed of the engine. 5. Broken or loose wiring. 	<ol style="list-style-type: none"> 1. Replace the voltmeter. 2. Replace the generator. 3. Repair or replace the parts. 4. Adjust the rotation speed of the engine properly. 5. Repair.
High output voltage	<ol style="list-style-type: none"> 1. Faulty voltmeter. 2. Faulty adjusting AVR. 3. Broken wire, loose or disconnected cable of the voltage adjuster circuit 	<ol style="list-style-type: none"> 1. Check the voltage at the volt meter 2. Check the Voltage Adjustment Rheostat. 3. Check wiring of voltage adjuster. 4. Check for broken or loose wiring 	<ol style="list-style-type: none"> 1. Replace the voltmeter. 2. Adjust the voltage Adjustment Rheostat properly. 3. Inspect and repair the cable.
Abnormal frequency or voltage drop when load is increased	<ol style="list-style-type: none"> 1. Unbalanced load. 2. Low engine RPM 3. Over load. 	<ol style="list-style-type: none"> 1. Check the amperage of each phase. 2. Check the engine RPM. 3. Check the amperage of each phase. 	<ol style="list-style-type: none"> 1. Balance the current. 2. Adjust to appropriate engine RPM. 3. Decrease the load.
Can't turn ON the Main Circuit Breaker	<ol style="list-style-type: none"> 1. The lever of the breaker is positioned between [ON] and [OFF] position. 2. Over load. 3. Terminal cover opened. 4. Over current (overload). 	<ol style="list-style-type: none"> 1. Check the position of the handle. 2. Check the load. 3. Check terminal cover is closed completely . 4. Check thermal relay. 	<ol style="list-style-type: none"> 1. Press the lever to the [OFF] position first, then set the lever to the [ON] position to reset. 2. Decrease the load. 3. Close terminal cover. 4. Wait approximately 1 minute before attempting to reset the main breaker to allow the over-current relay to automatically reset.

12. TROUBLE SHOOTING

12.2 Engine

Problem	Suspected cause	Inspection	Corrective measure
Unable to start the engine.	1. Starter does not engage.	<ol style="list-style-type: none"> 1. Check voltage, electrolyte level, specific gravity of the battery. 2. Check the starter relay. Confirm battery voltage at the starter relay when the starter switch is turned to [ON] position. 3. Check the starter. Confirm battery voltage at the starter when the starter switch is set to [Start] position. 	<ol style="list-style-type: none"> 1. Check battery fluid level and add if necessary then charge battery. 2. Replace the starter relay. 3. Repair the starter. Refer to the engine manual.
	2. Starter turns normally.	<ol style="list-style-type: none"> 1. Check pre-heating. Confirm battery voltage at the glow plug and glow indicator when the starter switch is set to [ON] position. 2. Check the fuel system. 	<ol style="list-style-type: none"> 1. Repair wiring, replace the glow timer. 2. Refer to the engine manual and the product manual.
Sudden stopping of the engine.	1. Activation of protective devices. Low oil pressure and/or high water temperature.	<ol style="list-style-type: none"> 1. Check oil level. Check overload, ventilation, coolant level. 	<ol style="list-style-type: none"> 1. Add oil as needed. Decrease load, improve ventilation, add coolant.
	2. Air or water is entering into fuel system, clogged fuel filter.	<ol style="list-style-type: none"> 2. Check fuel system. Refer to the engine service manual. 	<ol style="list-style-type: none"> 2. Repair the fuel /intake system.

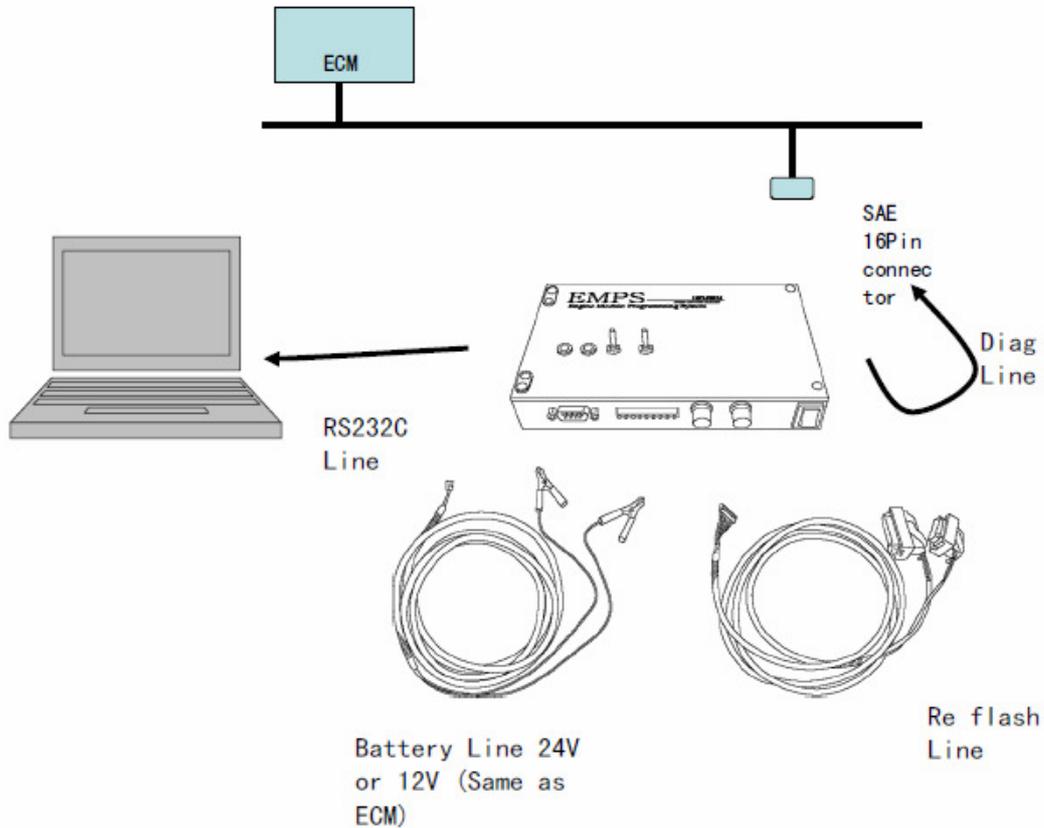
12. TROUBLE SHOOTING

12.3 EMPS3 Diagnostic System

The diagnostic lamp will be illuminated during engine operation in the event of an error with the electronic fuel injection system.

The EMPS^{III} diagnostic equipment will be required to properly diagnose and repair any problem with either the Engine Control Module or other components within the electronic fuel injection system.

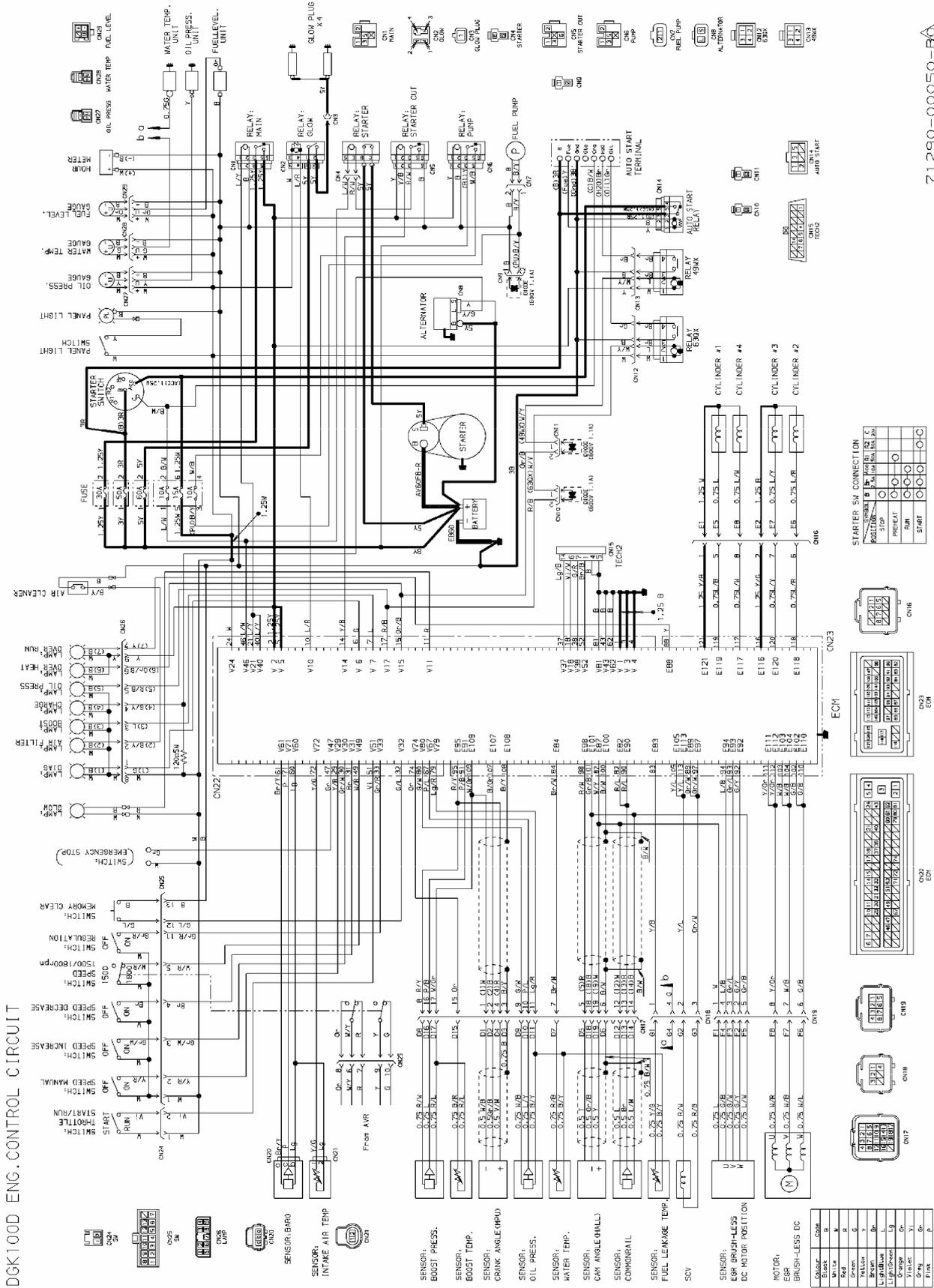
Contact your local Isuzu dealer or kWiet Power distributor if the diagnostic lamp is illuminated during operation of this equipment.



Warning for ECU on ISUZU Tier 3 engine

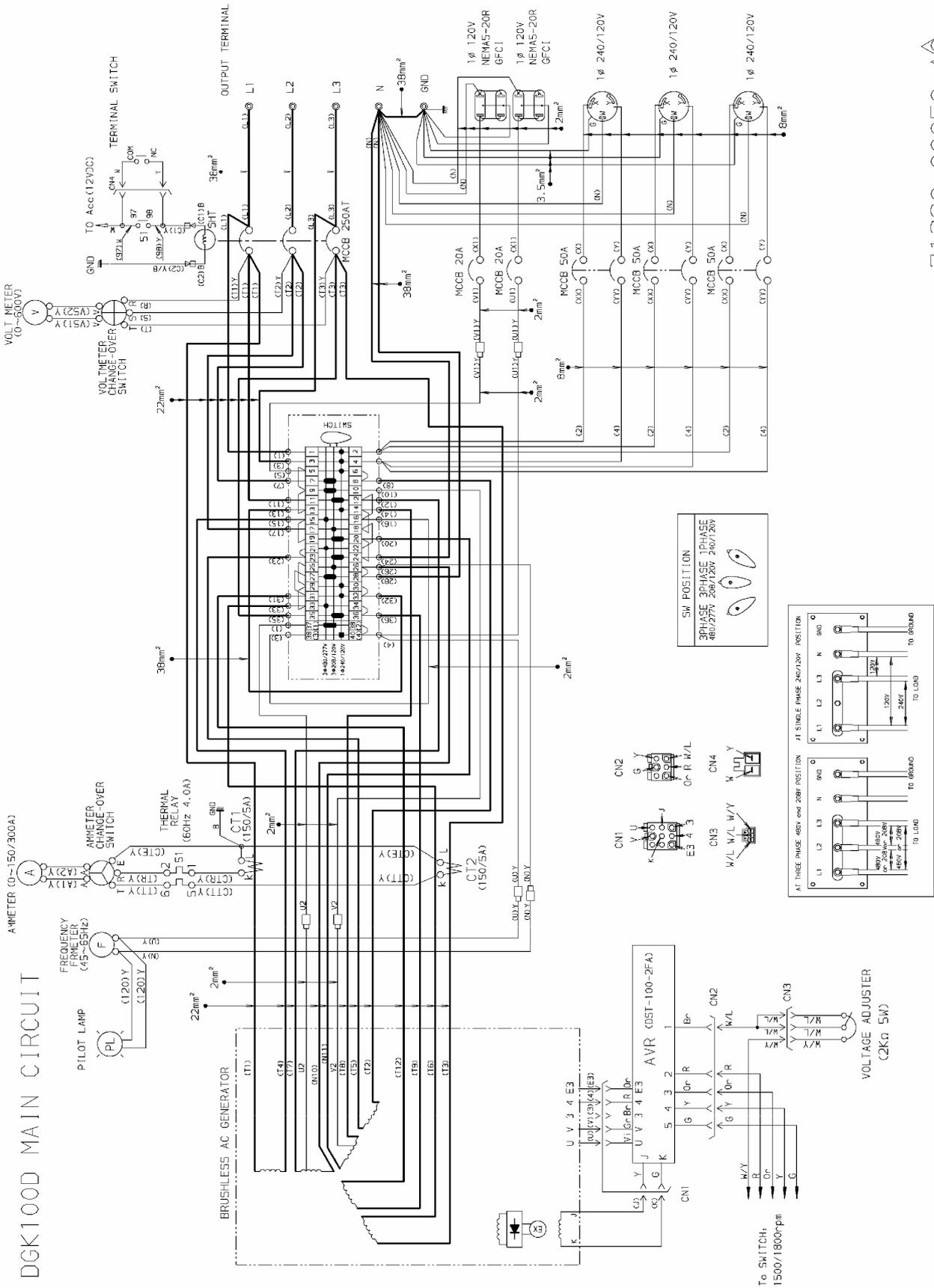
Shindaiwa generator DGK100D is equipped with Isuzu 4HK1 Tier3 engine. This engine is controlled by electrical system, therefore follow ISUZU caution by ISUZU TROUBLE SHOOTING MANUAL.

13. Engine Control Circuit



71290-0050-BA

14. Electrical Circuit



71290-00050-AD
