

G-33, G-37

# OPERATOR'S MANUAL KUBOTA DIESEL GENERATOR

# MANUAL DE INSTRUCCIONES KUBOTA DIESEL GENERADOR

操作者使用说明书

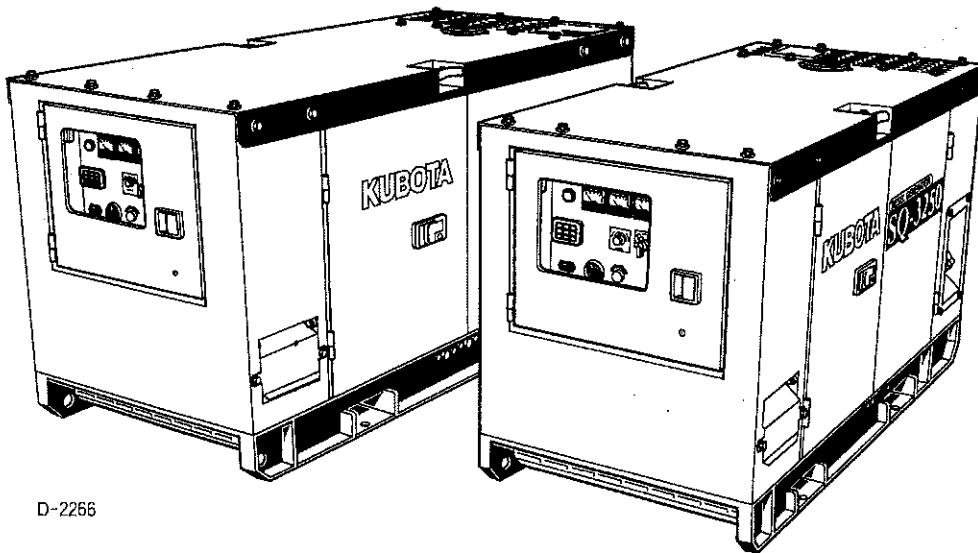
# KUBOTA柴油发电机组

ENGLISH

ESPAÑOL

中国语

SQ-1120-STD · SQ-1150-STD · SQ-3140-STD · SQ-3200-STD · SQ-3300-STD  
SQ-1140-STD · SQ-1200-STD · SQ-3170-STD · SQ-3250-STD · SQ-3350-STD  
SQ-1140-USA · SQ-1200-USA · SQ-3170-USA · SQ-3250-USA-SW · SQ-3350-USA-SW  
SQ-1120-AUS · SQ-1150-AUS · SQ-3140-AUS · SQ-3200-AUS · SQ-3300-AUS



D-2266

READ AND SAVE THIS MANUAL  
LEAN Y CONSERVEN ESTE MANUAL  
读并保存该使用说明

# CONTENTS

## **▲ SAFE OPERATION ..... 1**

SERVICING OF GENERATOR ..... 9

SPECIFICATIONS ..... 10

### **Operation Section**

**INSTRUMENT PANEL AND PART  
NAMES ..... 15**

**PREPARATION TO SUPPLY THE  
ELECTRIC POWER ..... 21**

**CONNECTING THE LOAD ..... 23**

**PRE-OPERATION CHECK ..... 30**  
DAILY CHECK ..... 30

**OPERATING THE GENERATOR ..... 33**  
SAFETY DEVICES ..... 33  
STARTING THE ENGINE ..... 34  
COLD WEATHER STARTING ..... 37  
STOPPING THE ENGINE ..... 37  
EMERGENCY STOP SWITCH  
[AUS MODEL ONLY] ..... 38

### **Maintenance Section**

**MAINTENANCE ..... 39**  
SERVICE INTERVALS ..... 40

**PERIODIC SERVICE ..... 42**  
FUEL ..... 42  
ENGINE OIL ..... 46  
RADIATOR ..... 48  
AIR CLEANER ..... 51  
BATTERY ..... 53  
ELECTRIC WIRING ..... 55  
FAN BELT ..... 55

**GROUND FAULT CIRCUIT INTERRUPTER  
(GFCI) RECEPTACLE ..... 56**

**TRANSPORTING /STORAGE ..... 57**  
STORAGE ..... 58

**OPERATION OF THE EMERGENCY  
RELAY ..... 59**

**TROUBLESHOOTING ..... 61**  
**WIRING DIAGRAM ..... 65**



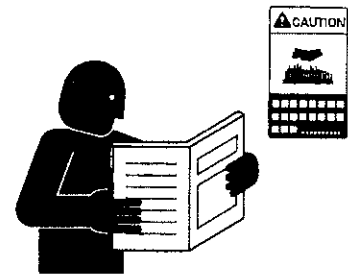
# SAFE OPERATION

Careful operation is your best insurance against an accident. Read and understand this operator's manual carefully before operating the generator. All operators, no matter how much experience they may have had, should read this manual and all labels on the generator before operating the generator. It is the owner's responsibility to instruct all operators in safe operation.

Be sure to observe the following for safe operation.

## OBSERVE SAFETY INSTRUCTIONS

- Read and understand carefully this OPERATOR'S MANUAL and LABELS ON THE GENERATOR before attempting to start and operate the generator.
- Learn how to operate and work safely. Know your equipment and its limitations. Always keep the generator in good condition.
- Before allowing other people to use your generator, explain to them how to operate and have them read this manual before operation.
- DO NOT modify the engine by yourself. UNAUTHORIZED MODIFICATIONS to the engine may impair the function and / or safety and affect engine life.



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## WEAR SAFETY CLOTHING

- DO NOT wear loose, torn or bulky clothing around the generator that may catch on working controls and projections causing personal injury.
- Use additional safety items, e.g. hard hat, safety protections, gloves, etc., as appropriate or required.
- DO NOT operate generator or any equipment attached to it while under the influence of alcohol, medication, or other substances, or while fatigued.
- DO NOT wear radio or music headphones while operating the generator.



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## CHECK BEFORE OPERATION & STARTING THE ENGINE

- Always turn off the circuit breaker and all switches for the electrical devices before starting the generator.
- Check the wiring and connections of the electrical devices before starting the generator.
- Be sure to check the engine before operation. If something is wrong with the engine, repair it immediately and before operation.
- Keep all guards and shields in place before operating the generator. Replace any that are damaged or missing.
- Check to see that bystanders are in a safe distance from the generator before starting.
- Always keep the generator at least 1 m (3 ft) away from buildings and other facilities.
- DO NOT allow children or livestock to approach the generator while the engine is running.
- DO NOT start the engine by shorting across starter terminals or bypassing normal starting circuit. The generator may start unexpectedly causing electric shock to others.



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### HANDLING ELECTRICAL COMPONENTS

Always exercise extra caution when handling electrical equipment. Careless handling of electrical components can cause serious personal injury, death by electrocution or property damage.

- DO NOT touch the electrical system during operation.
- Connect or disconnect the load to the AC receptacles or terminals only when the engine is stopped.
- Make certain that all power cables and wiring are in good condition. Bare wire or frayed insulation can cause dangerous electrical shock, burns or death.
- DO NOT use the generator in damp or wet conditions. Handling terminals and cables with wet hands can result in personal injury or death.
- Always shut the engine off and allow to cool before cleaning. Use water sparingly when cleaning the outside of the generator. Make sure that water does not splash onto the electrical system or into the generator.
- DO NOT touch the generator with wet hands. You may get an electric shock that can cause burns or death.
- DO NOT connect this generator to any building's electrical system unless an isolation switch has been installed by a licensed electrician.
- DO NOT run other generators in parallel.



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### KEEP THE AREA AROUND THE ENGINE CLEAN

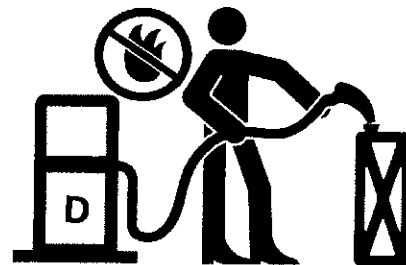
- Be sure to stop the engine before cleaning.
- Keep the engine clean and free of accumulated dirt, grease and trash to avoid a fire. Store flammable fluids away from sparks and fire.
- DO NOT stop the engine without idling. Sudden stops can cause temperatures around the engine to rise suddenly. Keep the engine idling for about 5 minutes before stopping.



B-1500

### SAFE HANDLING OF FUEL AND LUBRICANTS

- Always stop the engine before refueling and/or lubricating.
- DO NOT smoke or allow flames or sparks in the working area. Fuel is extremely flammable and explosive under certain conditions.
- Refuel only when the engine has cooled off. Refuel in a well ventilated and open place. When fuel and lubricants are spilled, clean them up before starting the engine.
- DO NOT mix gasoline or alcohol with diesel fuel. The mixture can cause a fire and damage engine components.
- Operate the generator on a firm and level surface only. DO NOT tilt or move the generator while it is running since this can cause fuel spillage.



B-1499

### EXHAUST GASES & FIRE PREVENTION

- Engine exhaust fumes can be very harmful if allowing them to accumulate. Be sure to run the engine in a well ventilated place and where there are no people or livestock near the generator.
- DO NOT operate the generator in a closed area such as inside houses, warehouses, tunnels, wells, ship holds, tanks, etc. or places without proper ventilation.
- DO NOT operate the generator where the building or other obstructions block off air circulation or where exhaust gas can accumulate.
- The exhaust gas from the muffler is very hot. To prevent a fire, DO NOT expose to dry grass, papers, oil and any other combustible materials to exhaust gas. Also, keep the engine and muffler clean at all times.
- To avoid fire, be alert for leaks of flammables from hoses and lines. Be sure to check for leaks from hoses or pipes, such as fuel and engine oil by following the maintenance check list.
- To avoid a fire, DO NOT short across power cables and wires. Check to see that all power cables and wiring are in good condition.
- Keep all power connections clean and tight. Bare wire or frayed insulation can cause a dangerous electrical shock and personal injury.



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### HANDS AND BODY AWAY FROM THE ROTATING PARTS

- DO NOT operate the generator with the side covers removed or open. Serious personal injury may result if fingers or clothing are caught in the rotating parts.
- Be sure to stop the engine before checking or adjusting belt tension and cooling fan.
- To avoid personal injury, keep your hands and body away from the rotating parts, such as cooling fan, V-belt, fan drive V-belt, pulleys or flywheel.
- DO NOT run the engine with installed safety guards detached. Install safety guards securely before operation.



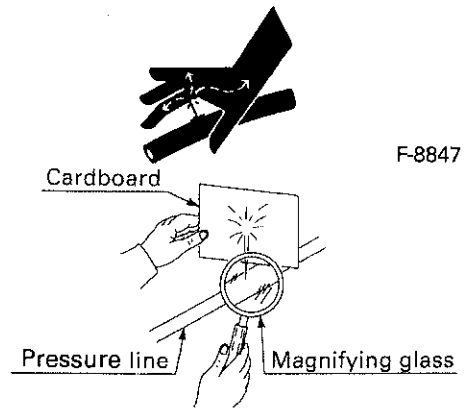
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B-1506

**ESCAPING FLUID**

- Relieve all pressure in the oil and the cooling systems before any lines, fittings or related items are removed or disconnected.
- Be alert for possible pressure when disconnecting any device from a system that utilizes pressure. DO NOT check for pressure leaks with your hand. High pressure oil or fuel can cause serious personal injury.
- Escaping hydraulic fluid under pressure has sufficient force to penetrate skin causing serious personal injury.
- Fluid escaping from pinholes may be invisible. Use a piece of cardboard or wood to search for suspected leaks: DO NOT use hands or body. Use safety goggles or other eye protection when checking for leaks.
- If injured by escaping fluid, see a medical doctor at once. This fluid can produce gangrene or severe allergic reaction.

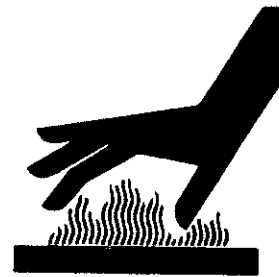


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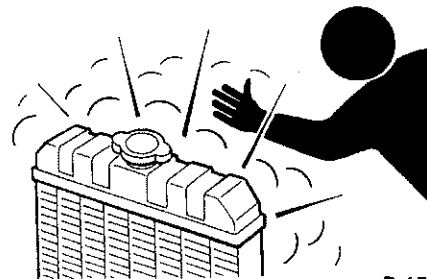
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**CAUTIONS AGAINST BURNS & BATTERY EXPLOSION**

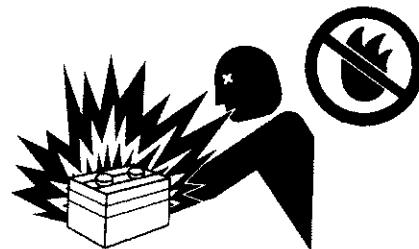
- To avoid burns, be alert for hot components, e.g. muffler, muffler cover, radiator, pipes, hoses, engine body, coolant, engine oil, etc. during operation and just after the engine has been shut off.
- DO NOT remove the radiator cap while the engine is running or immediately after stopping. Otherwise hot water from the radiator will escape under pressure causing injury by scalding. Wait for more than 10 minutes to allow the coolant to cool down, before removing the cap.
- Make sure to close the drain valve of coolant and engine oil, close radiator pressure cap and tighten hose clamps before operating. If any of these parts are taken off, or left loose, serious personal injury can result.
- The battery presents an explosive hazard. When the battery is being activated, hydrogen and oxygen gases are extremely explosive.
- Keep sparks and open flames away from the battery, especially when charging the battery. DO NOT strike a match near the battery.
- DO NOT check battery charge by placing a metal object across the terminals. Use a voltmeter or hydrometer.
- DO NOT charge battery if frozen can explode. When battery is frozen, allow the battery to warm up to 16°C (61°F) before charging.
- DO NOT use or charge the battery if its fluid level is below the LOWER (lower limit level) mark (refillable type battery only). Otherwise, the component parts may deteriorate earlier than expected, which may shorten the service life or cause an explosion. Add distilled water until the fluid level is between the UPPER and LOWER levels.



B-1502



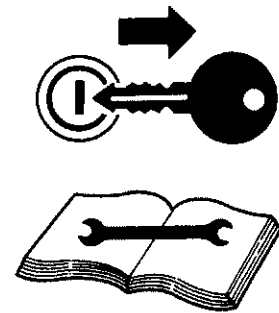
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## CONDUCTING SAFETY CHECKS & MAINTENANCE

- Know how to stop the generator quickly, and understand operation of all the controls. DO NOT permit anyone to operate the generator without proper instruction.
- When checking engine or servicing, place the generator in an open area and level ground. DO NOT work on anything that is supported ONLY by lift jacks or a hoist. Always use blocks or safety stands to support the generator before servicing.
- Detach the battery from the generator before conducting service. Put a "DO NOT OPERATE!" tag on the key switch and remove the key to avoid accidental starting.
- To avoid sparks from an accidental short circuit, always disconnect the battery's ground cable  $\ominus$  first and connect it last.
- Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skins and clothing and cause blindness if splashed into eyes. Keep electrolyte away from eyes, hands and clothing. If you spill electrolyte on yourself, flush with water, and get medical attention immediately.
- Be sure to stop the engine and remove the key when conducting daily and periodic maintenance, servicing and cleaning.
- Check or conduct maintenance after the engine, coolant, muffler, or muffler cover have cooled off completely.
- Always use the appropriate lifting equipment and make sure safety stands are in good condition when performing any service work. Make sure that you understand how to use the equipment before servicing.
- Use ONLY the correct engine flywheel rotating techniques for manually rotating the engine. DO NOT attempt to rotate the engine by pulling or prying on the cooling fan or V-belt. This practice can cause serious personal injury or premature machine damage to the cooling fan.
- Replace fuel, lubricant and coolant hoses with their hose clamps every 2 years or earlier if required. They are made of rubber and deteriorate over time whether used or not.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Keep first aid kit and fire extinguisher handy at all times.



B-1509

**DANGER, WARNING AND CAUTION LABELS**

Pay special attention to all labels on the generator.

Refer to following representations for labels used on the SQ-Series Generator. Labels are available individually from your KUBOTA Dealer.

(1) Part No. G3700-8851-0

 **CAUTION**

TO AVOID PERSONAL INJURY OR EQUIPMENT DAMAGE BEFORE STARTING ENGINE

- (1) TURN OFF GENERATOR CIRCUIT BREAKER.
- (2) TURN OFF ALL SWITCHES ON ELECTRICAL LOAD.
- (3) MAKE CERTAIN LOAD CONNECTIONS AND POWER CABLES ARE IN GOOD CONDITION.

(5) Part No. G3810-8832-0

 **CAUTION**

TO AVOID PERSONAL INJURY:

- DO NOT REMOVE RADIATOR CAP WHILE COOLANT IS HOT.
- WHEN COOL, ROTATE CAP SLOWLY TO THE FIRST STOP TO ALLOW EXCESS PRESSURE TO ESCAPE.
- THEN REMOVE CAP COMPLETELY.

(2) Part No. G3810-8824-0

 **DANGER**

TO AVOID SERIOUS INJURY OR DEATH:

- DO NOT OPERATE OR IDLE IN NONVENTILATED AREAS. CARBON MONOXIDE GAS IS COLORLESS, ODORLESS AND DEADLY.
- DO NOT OPERATE IN WET OR DAMP CONDITIONS.

(6) Part No. G3810-8836-0

 **CAUTION**

TO AVOID PERSONAL INJURY:

1. DO NOT SWING WHILE LIFTING.
2. NEVER USE THE HOOK WHEN THE BONNET IS REMOVED OR WHEN ANY BOLTS ARE LOOSE.

(3) Part No. G3700-8827-0


 **CAUTION**

**HOT EXHAUST**

(7) Part No. G3810-8830-0

 **DANGER**


TO AVOID SERIOUS INJURY OR DEATH:

- HAZARDOUS VOLTAGE WILL SHOCK, BURN OR CAUSE DEATH.

(4) Part No. 18901-5090-0

**NO. 2  
Diesel fuel**



(8) Part No. G3810-8831-0

 **DANGER**

TO AVOID SERIOUS INJURY OR DEATH:

- DO NOT CONNECT THIS GENERATOR TO ANY BUILDING'S ELECTRICAL SYSTEM UNLESS AN ISOLATION SWITCH HAS BEEN INSTALLED BY A LICENSED ELECTRICIAN.
- REFER TO THE OPERATOR'S MANUAL FOR DETAILS.



(9) Part No. G3700-8806-0



(10) Part No. G3810-8822-2

**⚠ DANGER**

TO AVOID SERIOUS INJURY OR DEATH:

- CONNECT OR DISCONNECT THE LOAD TO THE AC RECEPTACLES OR TERMINALS ONLY WHEN THE ENGINE IS STOPPED.

(11) Part No. G3844-8828-2

**⚠ DANGER**

TO AVOID SERIOUS INJURY OR DEATH:

- SET THE VOLTAGE SELECTOR SWITCH TO THE PROPER POSITION BASED THE LOAD TO BE CONNECTED.
- BE SURE TO STOP THE ENGINE BEFORE TURNING THE VOLTAGE SELECTOR SWITCH.

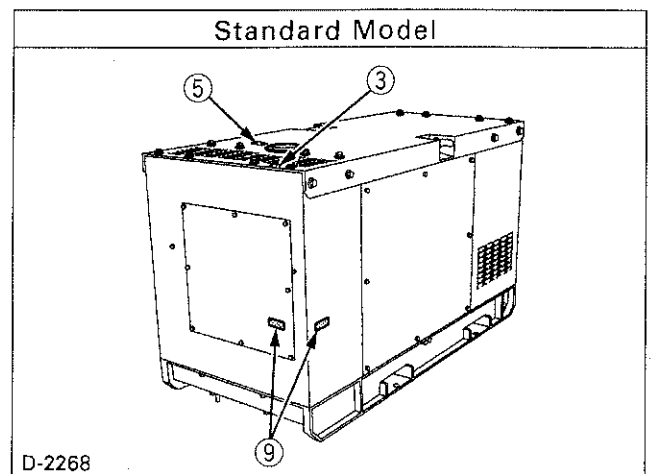
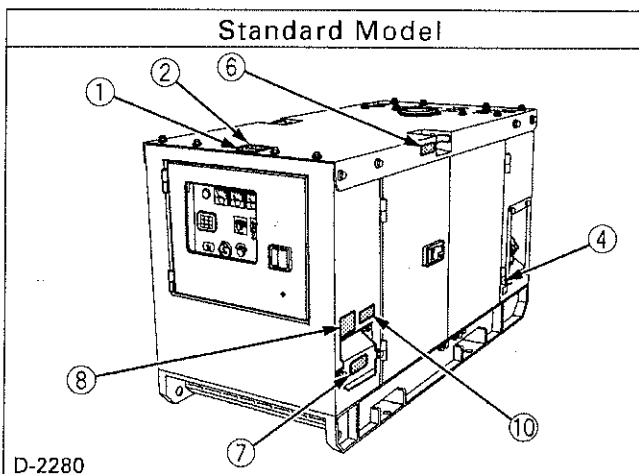
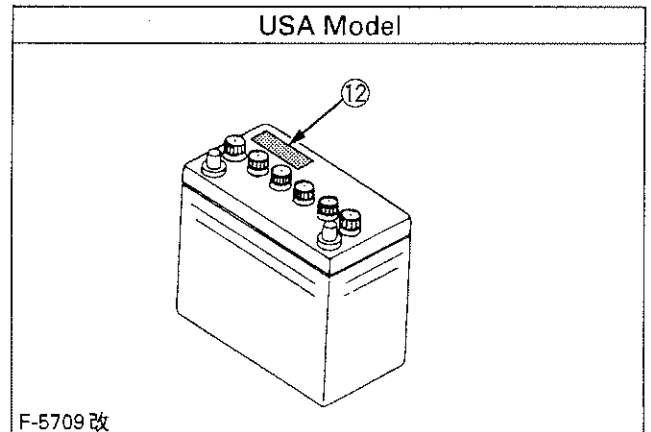
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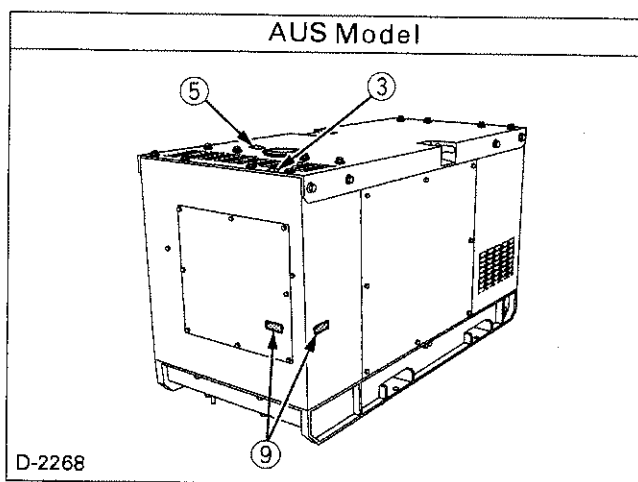
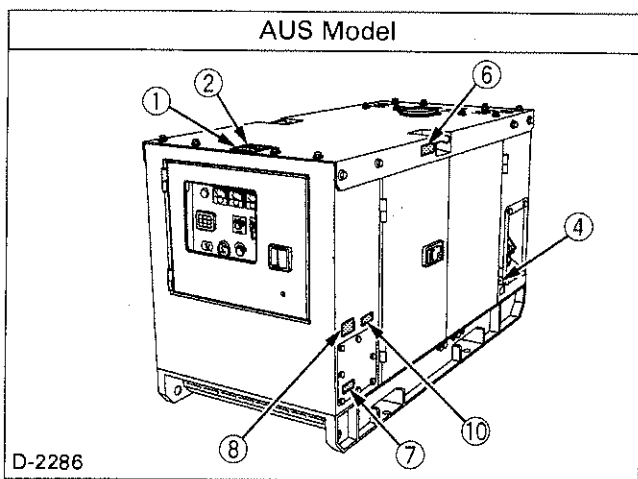
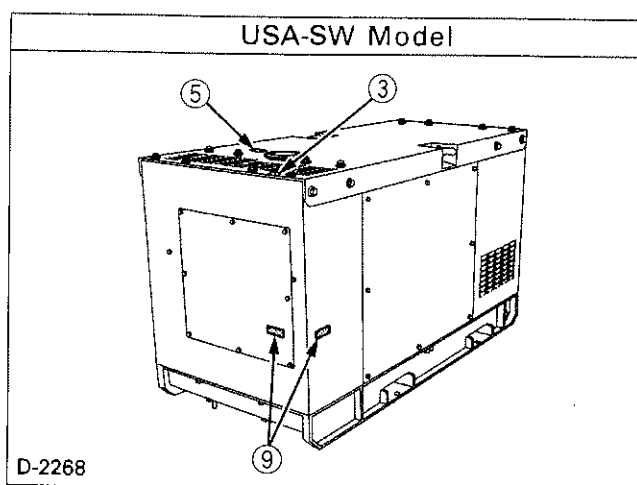
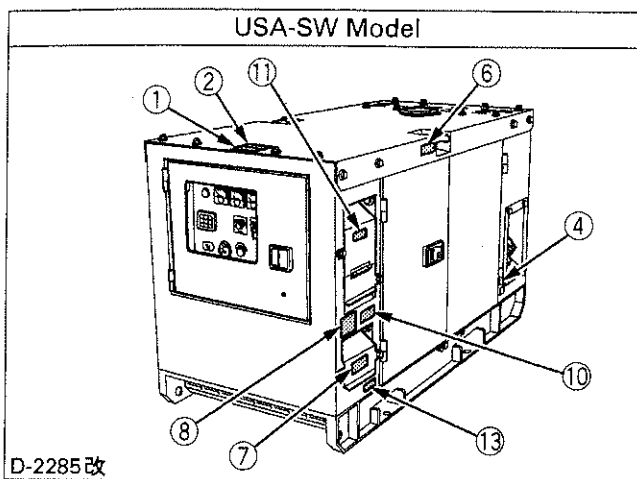
**DANGER EXPLOSIVE GASES**  
 Cigarettes, flames or sparks could cause battery to explode. Always shield eyes and face from battery. Do not charge or use booster cables or adjust post connections without proper instruction and training.  
**KEEP VENT CAPS TIGHT AND LEVEL**  
**POISON CAUSES SEVERE BURNS**  
 Contains sulfuric acid. Avoid contact with skin, eyes or clothing. In event of accident flush with water and call a physician immediately.  
**KEEP OUT OF REACH OF CHILDREN**

(13) Part No. G3844-8858-0

**⚠ WARNING**

TO AVOID ELECTRICAL SHOCK:  
 CONNECT GROUND WIRE BEFORE USING.





**CARE OF DANGER, WARNING AND CAUTION LABELS**

1. Keep danger, warning and caution labels clean and free from obstructing material.
2. Clean danger, warning and caution labels with soap and water, dry with a soft cloth.
3. Replace damaged or missing danger, warning and caution labels with new labels from your local KUBOTA Dealer.
4. If a component with danger, warning and caution label(s) affixed is replaced with new part, make sure new label(s) is (are) attached in the same location(s) as the replaced component.
5. Mount new danger, warning and caution labels by applying on a clean dry surface and pressing any bubbles to outside edge.

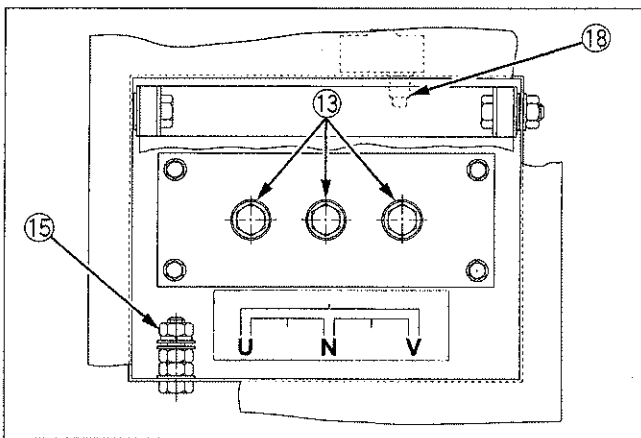
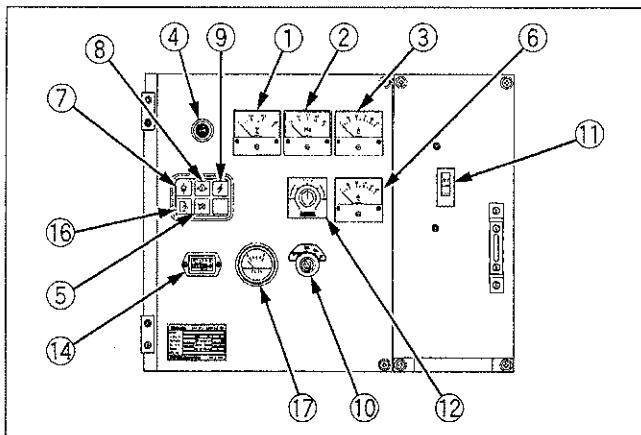
# INSTRUMENT PANEL AND PART NAMES

## Control Panel

### Standard Model

#### 1 Phase Type

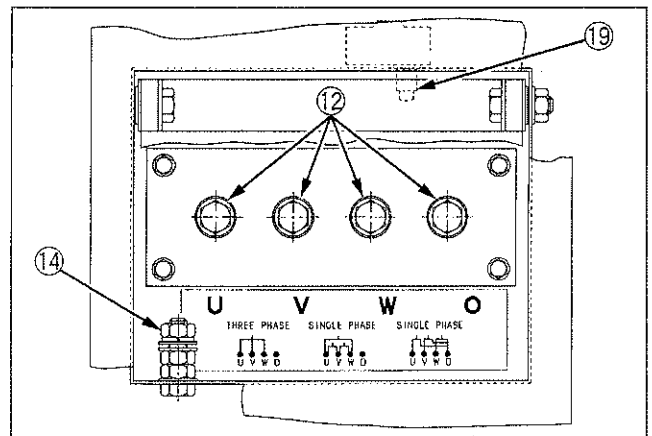
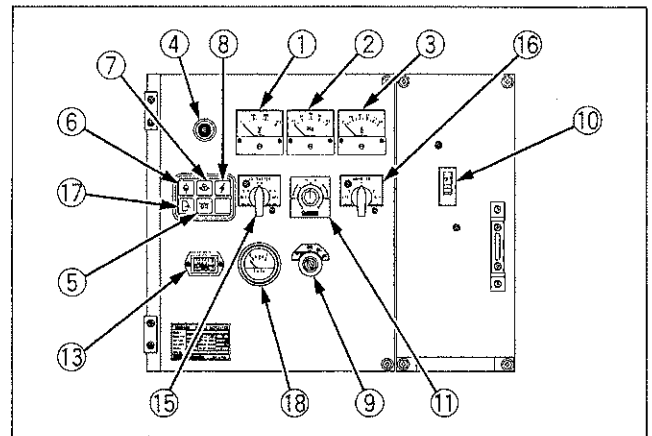
[SQ-1120-STD, SQ-1140-STD, SQ-1150-STD, SQ-1200-STD]



- (1) A.C. Voltmeter
- (2) Frequency meter
- (3) A.C. Ammeter
- (4) Pilot lamp (Green lamp)
- (5) Glow plug lamp
- (6) A.C. Ammeter
- (7) Water temperature lamp
- (8) Oil pressure lamp
- (9) Battery charge lamp
- (10) Main switch (key)
- (11) Circuit breaker
- (12) Voltage adjuster
- (13) Terminals (output)
- (14) Hour meter
- (15) Ground terminal
- (16) Load center cover or door open lamp
- (17) Fuel gauge
- (18) Safety switch

### 3 Phase Type

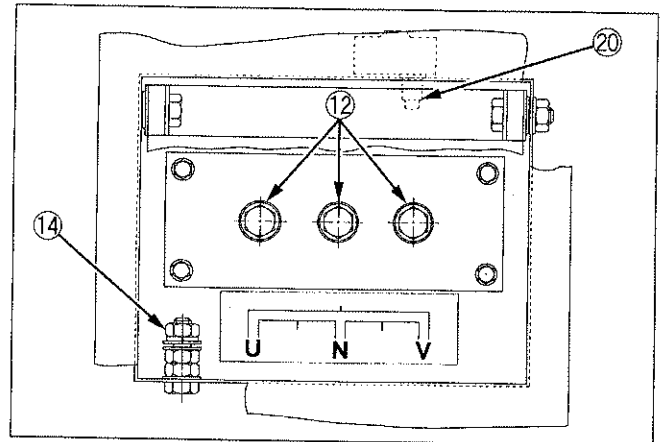
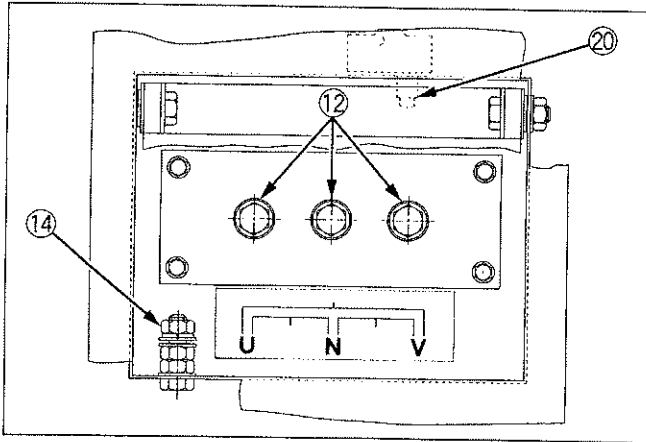
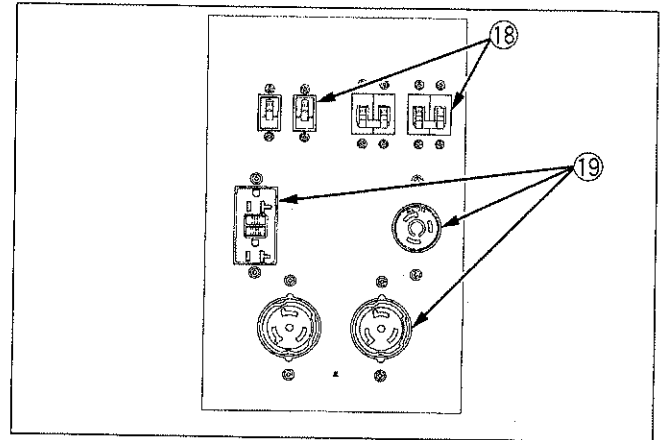
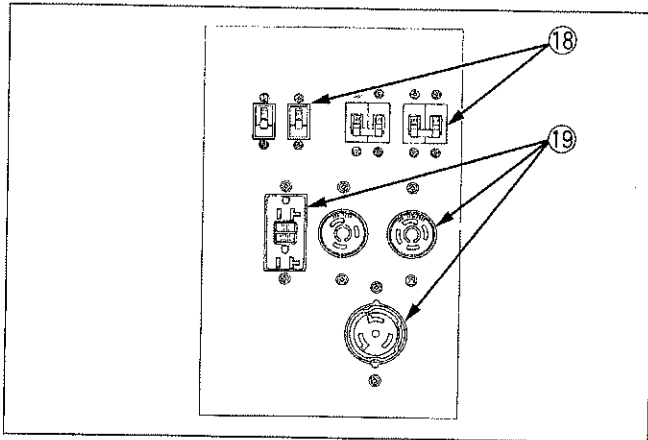
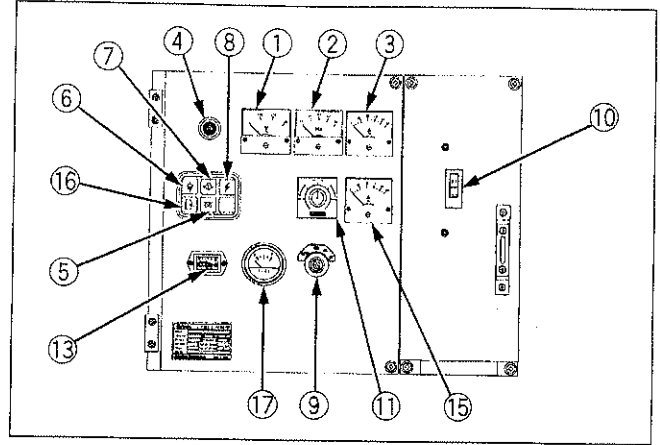
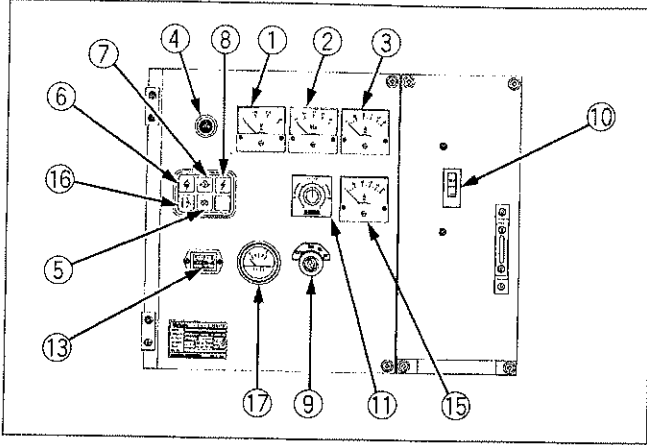
[SQ-3140-STD, SQ-3170-STD, SQ-3200-STD, SQ-3250-STD, SQ-3300-STD, SQ-3350-STD]



- (1) A.C. Voltmeter
- (2) Frequency meter
- (3) A.C. Ammeter
- (4) Pilot lamp (Green lamp)
- (5) Glow plug lamp
- (6) Water temperature lamp
- (7) Oil pressure lamp
- (8) Battery charge lamp
- (9) Main switch (key)
- (10) Circuit breaker
- (11) Voltage adjuster
- (12) Terminals (output)
- (13) Hour meter
- (14) Ground terminal
- (15) Voltmeter change-over switch
- (16) Ammeter change-over switch
- (17) Load center cover or door open lamp
- (18) Fuel gauge
- (19) Safety switch

**USA Model  
1 Phase Type  
[SQ-1140-USA]**

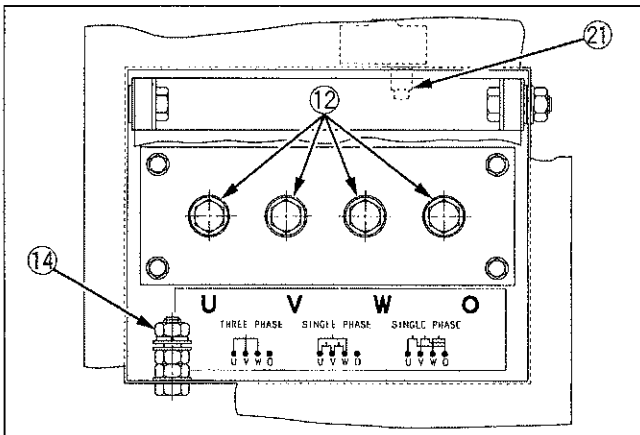
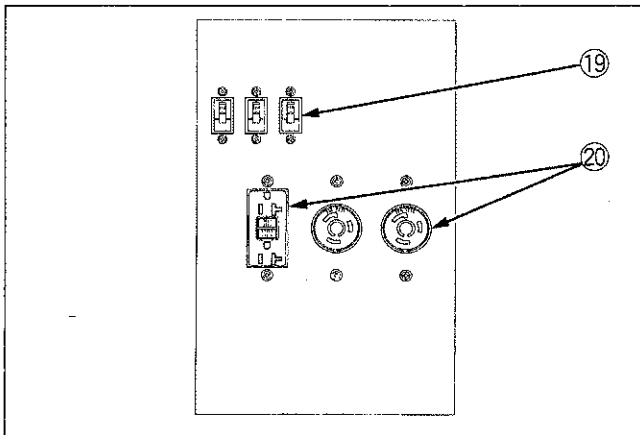
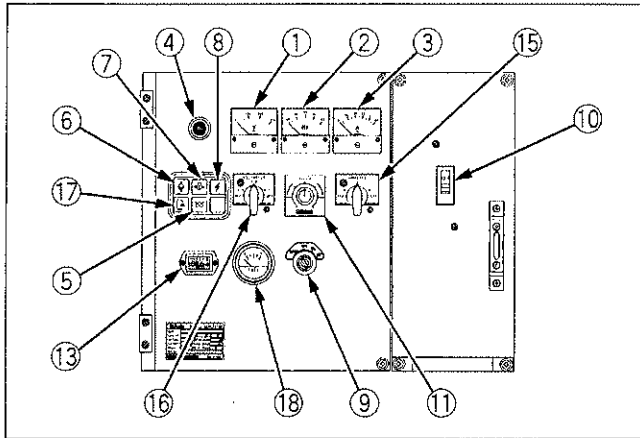
**[SQ-1200-USA]**



- (1) A.C. Voltmeter
- (2) Frequency meter
- (3) A.C. Ammeter
- (4) Pilot lamp (Green lamp)
- (5) Glow plug lamp
- (6) Water temperature lamp
- (7) Oil pressure lamp
- (8) Battery charge lamp
- (9) Main switch (key)
- (10) Circuit breaker

- (11) Voltage adjuster
- (12) Terminals (output)
- (13) Hour meter
- (14) Ground terminal
- (15) A.C. Ammeter
- (16) Load center cover or door open lamp
- (17) Fuel gauge
- (18) Circuit breaker for receptacles
- (19) Receptacles (output)
- (20) Safety switch

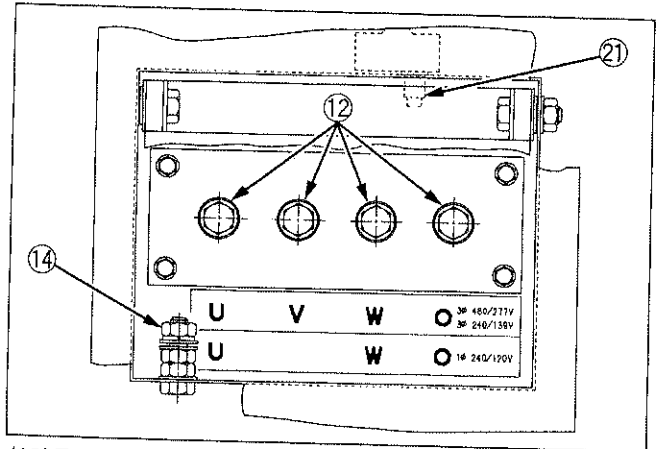
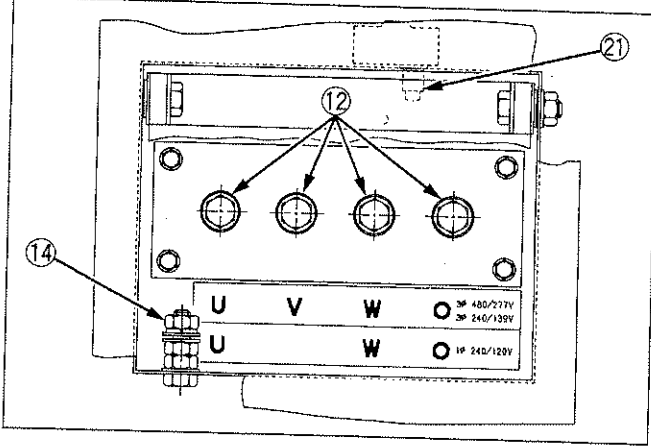
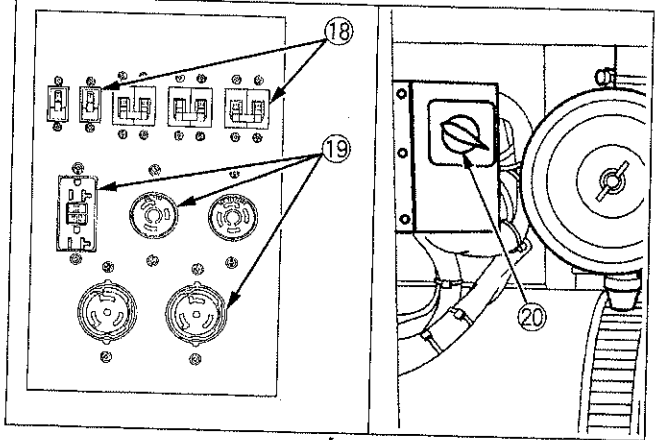
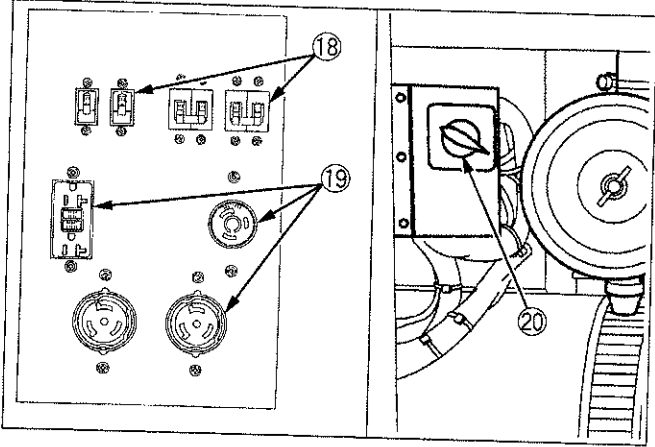
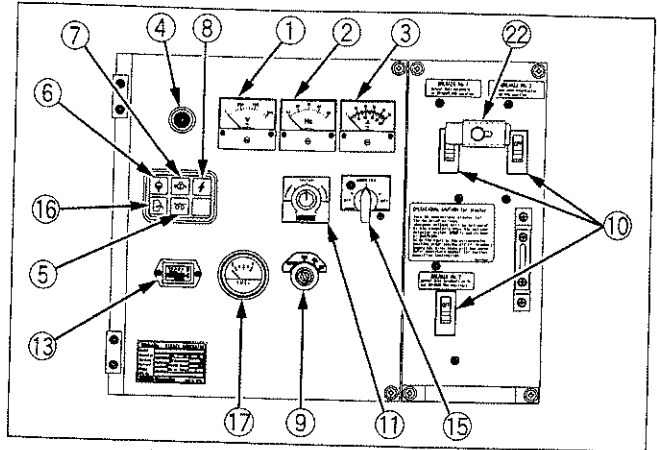
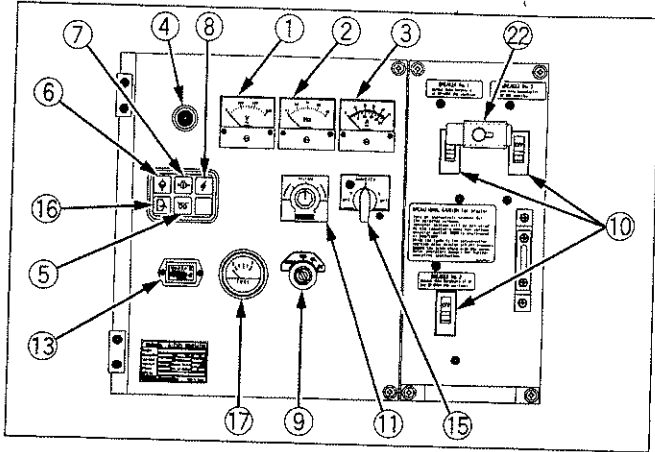
**3 Phase Type  
[SQ-3170-USA]**



- (1) A.C. Voltmeter
- (2) Frequency meter
- (3) A.C. Ammeter
- (4) Pilot lamp (Green lamp)
- (5) Glow plug lamp
- (6) Water temperature lamp
- (7) Oil pressure lamp
- (8) Battery charge lamp
- (9) Main switch (key)
- (10) Circuit breaker
- (11) Voltage adjuster
- (12) Terminals (output)
- (13) Hour meter
- (14) Ground terminal
- (15) Ammeter change-over switch
- (16) Voltmeter change-over switch
- (17) Load center cover or door open lamp
- (18) Fuel gauge
- (19) Circuit breakers for receptacles
- (20) Receptacles (output)
- (21) Safety switch

[SQ-3250-USA-SW]

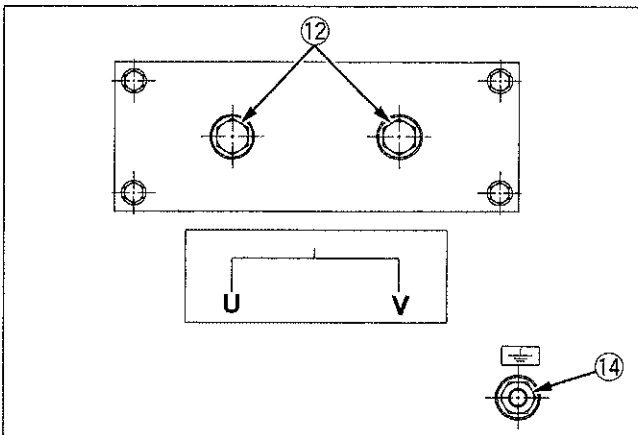
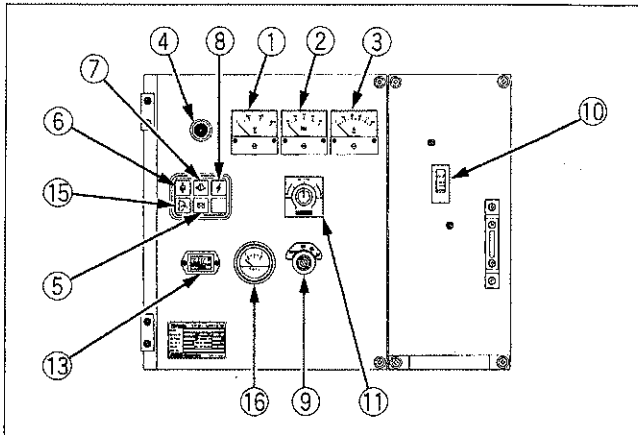
[SQ-3350-USA-SW]



- (1) A.C. Voltmeter
- (2) Frequency meter
- (3) A.C. Ammeter
- (4) Pilot lamp (Green lamp)
- (5) Glow plug lamp
- (6) Water temperature lamp
- (7) Oil pressure lamp
- (8) Battery charge lamp
- (9) Main switch (key)
- (10) Circuit breaker
- (11) Voltage adjuster

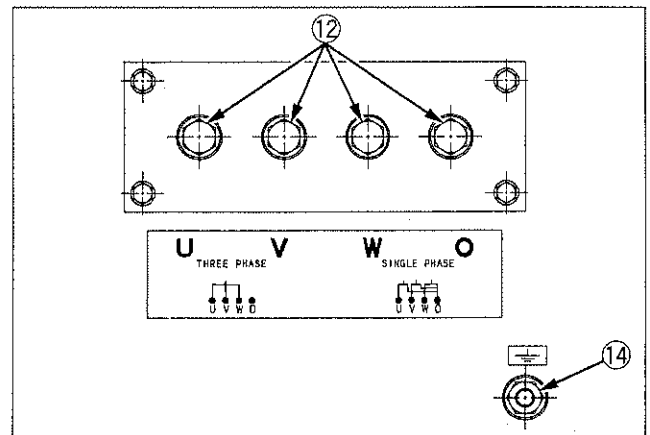
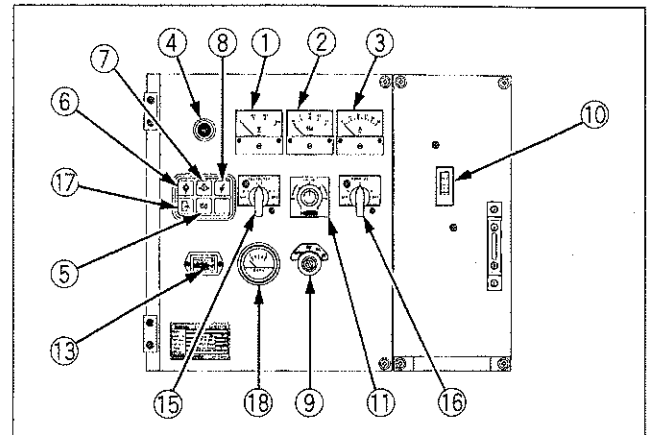
- (12) Terminals (output)
- (13) Hour meter
- (14) Ground terminal
- (15) Ammeter change-over switch
- (16) Load center cover or door open lamp
- (17) Fuel gauge
- (18) Circuit breaker for receptacles
- (19) Receptacles (output)
- (20) Voltage selector switch
- (21) Safety switch
- (22) Mechanical interlock

**AUS Model**  
**1 Phase Type**  
**[SQ-1120-AUS, SQ-1150-AUS]**



- (1) A.C. Voltmeter
- (2) Frequency meter
- (3) A.C. Ammeter
- (4) Pilot lamp (Green lamp)
- (5) Glow plug lamp
- (6) Water temperature lamp
- (7) Oil pressure lamp
- (8) Battery charge lamp
- (9) Main switch (key)
- (10) Circuit breaker
- (11) Voltage adjuster
- (12) Terminals (output)
- (13) Hour meter
- (14) Ground terminal
- (15) Door open lamp
- (16) Fuel gauge

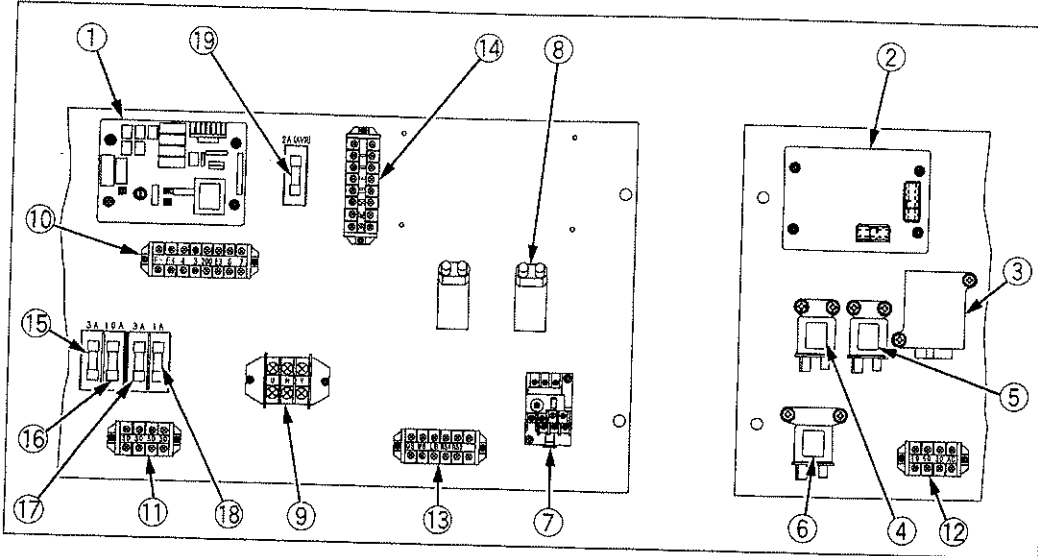
**3 Phase Type**  
**[SQ-3140-AUS, SQ-3200-AUS, SQ-3300-AUS]**



- (1) A.C. Voltmeter
- (2) Frequency meter
- (3) A.C. Ammeter
- (4) Pilot lamp (Green lamp)
- (5) Glow plug lamp
- (6) Water temperature lamp
- (7) Oil pressure lamp
- (8) Battery charge lamp
- (9) Main switch (key)
- (10) Circuit breaker
- (11) Voltage adjuster
- (12) Terminals (output)
- (13) Hour meter
- (14) Ground terminal
- (15) Voltmeter change-over switch
- (16) Ammeter change-over switch
- (17) Door open lamp
- (18) Fuel gauge

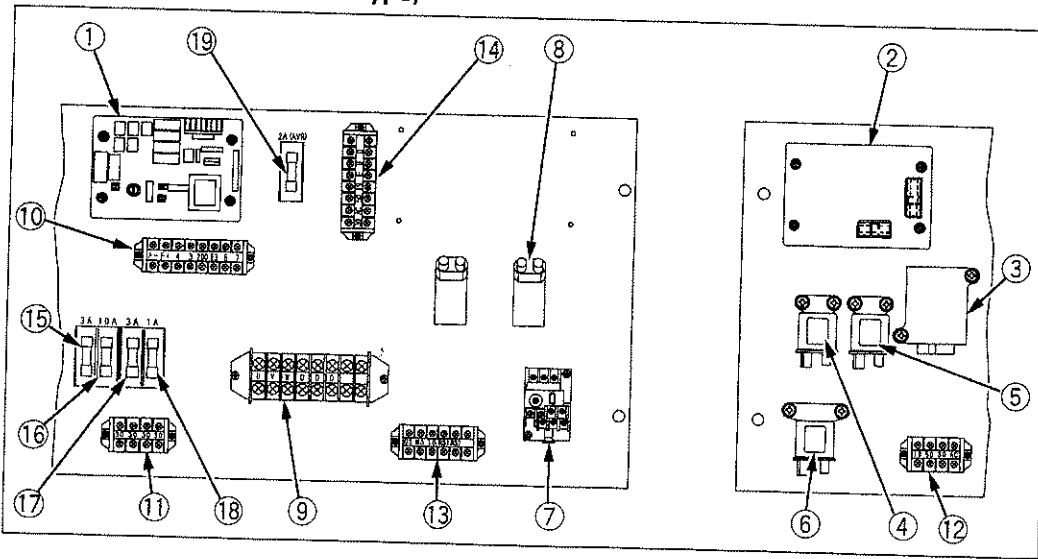
**Control Box**

**Standard Model (1 Phase Type)**

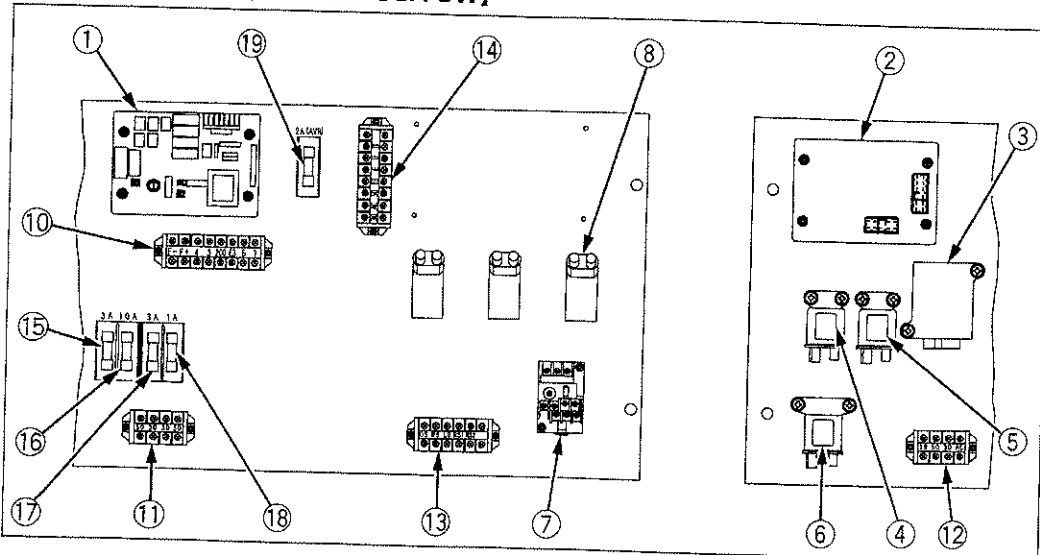


- (1) AVR  
(Automatic voltage regulator)
- (2) Relay unit
- (3) Emergency relay
- (4) Starter relay
- (5) Solenoid relay
- (6) Glow relay
- (7) Thermal relay  
(Over current relay)
- (8) CT  
(Current transformer)
- (9) Terminal (Generator)
- (10) Terminal (AVR)
- (11) Terminal (Battery) TB3
- (12) Terminal  
(Main switch) TB2
- (13) Terminal  
(Auxiliary output) TB1
- (14) Terminal  
(Auto-start unit) TB4
- (15) Fuse (3A, F1)
- (16) Fuse (10A, F2)
- (17) Fuse (3A, F3)
- (18) Fuse (1A, F4)
- (19) Fuse (2A, AVR)

**Standard Model (3 Phase Type)**



**[SQ-3250-USA-SW, SQ-3350-USA-SW]**





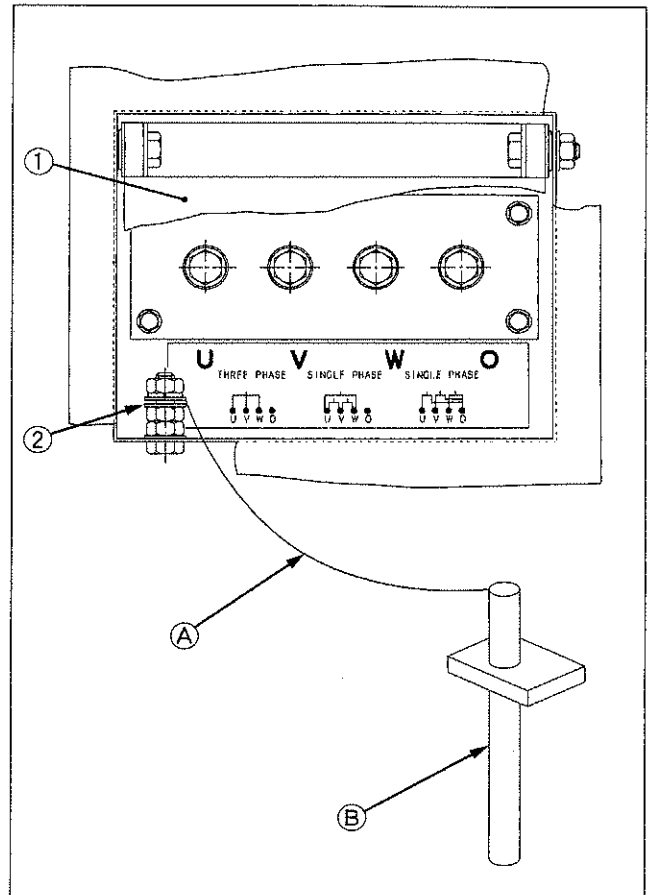
# PREPARATION TO SUPPLY THE ELECTRIC POWER

## 1. Generator Grounding

The end user, equipment owner or operator must contact his local, state, county or municipal electric code department to determine the approved generator grounding method to be used in his application or location.

Recommendations in the NEC(National Electrical Code), NFPA(National Fire Protection Association), AUSTRALIAN STANDARDS and OSHA (Occupational Safety and Health Administration) regulations must be followed to assure compliance and safe operation. Always be sure to ground (earth) the generator terminals to comply with the local, state, national or OSHA requirements.

One possible connection method for construction site use is as follows:




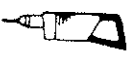

(1) Load center cover  
(2) Generator ground terminal

(A) #6AWG Flexible copper ground connection  
(B) Metal ground rod or building cold water pipe system per N.E.C. code

## 2. Recommended capacity of Electrical Devices

### APPLICATION RANGE

You can operate the SQ-series generator in the following range.

Typical Apparatus	 Light and heaters	 Commutator motor	 Induction motor
SQ-1120	11.2 kVA (11.2 kW)	7.0 kVA (5.6 kW)	—
SQ-1150	15.0 kVA (15.0 kW)	9.5 kVA (7.6 kW)	—
SQ-3140	11.2 kVA (11.2 kW)	8.5 kVA (6.8 kW)	5.5 kW (7.5 HP) 3 Phase
SQ-3200	16 kVA (16 kW)	12.5 kVA (10.0 kW)	7.5 kW (10 HP) 3 Phase
SQ-3300	24 kVA (24 kW)	19.0 kVA (15.2 kW)	11 kW (15 HP) 3 Phase
SQ-1140	13.6 kVA (13.6 kW)	8.5 kVA (6.8 kW)	—
SQ-1200	20 kVA (20 kW)	12.5 kVA (10.0 kW)	—
SQ-3170	13.6 kVA (13.6 kW)	10.0 kVA (8.0 kW)	5.5 kW (7.5 HP) 3 Phase
SQ-3250	20 kVA (20 kW)	15.5 kVA (12.4 kW)	7.5 kW (10 HP) 3 Phase
SQ-3350	28 kVA (28 kW)	22.0 kVA (17.6 kW)	11 kW (15 HP) 3 Phase

### NOTE:

- Keep an inverter load below 40% of the generator capacity.
- Keep a mercury lamp load below 60% of the generator capacity.
- Make sure that total active mercury lamp load is below 30% or so of the generator capacity. Turn on the mercury lamps one by one. Be careful not to turn off the lamps and on again immediately. The generator voltage may rise to extremely high levels and the AVR may get damaged.
- Before turning on the lamps again, wait for 10 minutes or so until the lamps cool down enough.
- The data shown above is only a guideline to approximate load capacities and may vary from generator model to generator model, with different types of loads at rated outputs. These values may be different from actual applications because of the input characteristics peculiar to each load.

### • Connecting a motor.

When connecting to a line starting motor, these generators may be used to start a submerged pump of 5.5kW, 7.5kW, 11.0kW (three phase). When starting the motor, the voltage drops immediately. The circuit may be opened if an electromagnetic switch is connected to the same circuit. When connecting two motors or more, make sure the total current capacity of the motors does not exceed the total rated current.

### • Connecting to lights and electric heaters.

When connecting to lights or electric heaters, the generator can be used up to the rated capacity. When using a single phase, it can be used up to the rated current.

### • Power factor calculations.

The power factor calculation is used to determine input of the electrical devices.

AC devices

Electric power (W)

$$= \text{Voltage (V)} \times \text{Current (A)} \div \text{Power factor}$$

Power factors of commonly used devices are listed in the following table.

Load type	Power factor
Single-phase induction motors	0.4 to 0.75
3-phase induction motors	0.65 to 0.85
Electric heaters, incandescent lamps	1.0
Commutator motor	0.8 to 0.95
Fluorescent lamps, mercury lamps	0.4 to 0.9
AC arc welder	0.4 to 0.6

- Ordinarily, a motor is rated in kW. This does not refer to motor output.

Motor input (kVA)

$$= \frac{\text{Motor output (kW)}}{\text{Motor efficiency} \times \text{power factor}}$$

### NOTE:

- If a lighting system is employed together with some types of computers and inverter air-conditioners and/or the regulated power supply for TV sets, the lights might suffer flickering. This phenomenon does not indicate a fault of the generator: it is caused by poor matching between the above-mentioned regulated power supply and the generator's automatic voltage regulator. In such a case, modify the load combination to eliminate the flickering.

# CONNECTING THE LOAD

## Connection Notes



### WARNING

To avoid personal injury:

- Before the generator can be connected to a building's electrical system, a licensed electrician must install an isolation (transfer) switch in the building's main fuse box. The switch is the connection point for generator power and allows selection of generator or main line power to the building. This will prevent the generator from charging the main power line (backfeeding) when the main power supply has failed or has been turned off for line repair. Backfeeding can electrocute or injure line maintenance personnel. Also, generator and building electrical system damage can occur when normal operating power returns if unit is used without an isolation switch.

1. Avoid connecting the generator to commercial power outlet.
2. Avoid connecting the generator in parallel with any other generator.

## Connecting the Load (Standard Model)

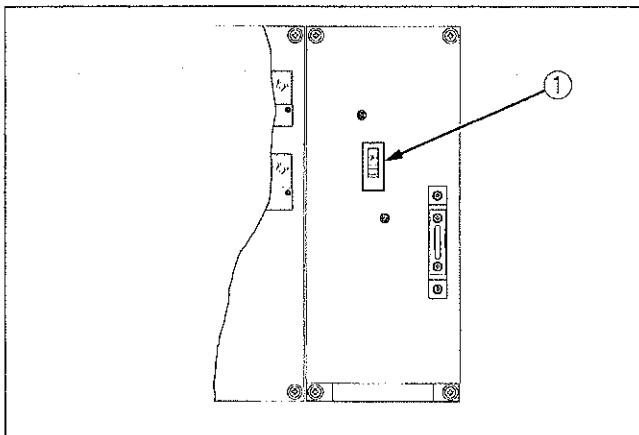


### WARNING

To avoid personal injury:

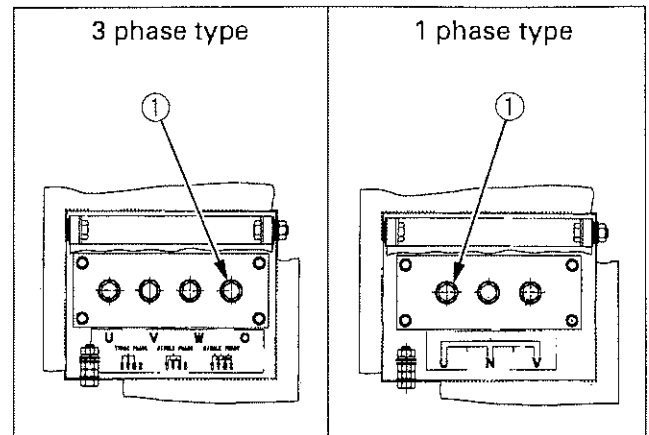
- Connect or disconnect the load to the AC receptacles or terminals only when the engine is stopped.

1. Turn OFF the circuit breaker on the control panel.



(1) Circuit breaker

2. Connect the load to the A.C. output terminals.

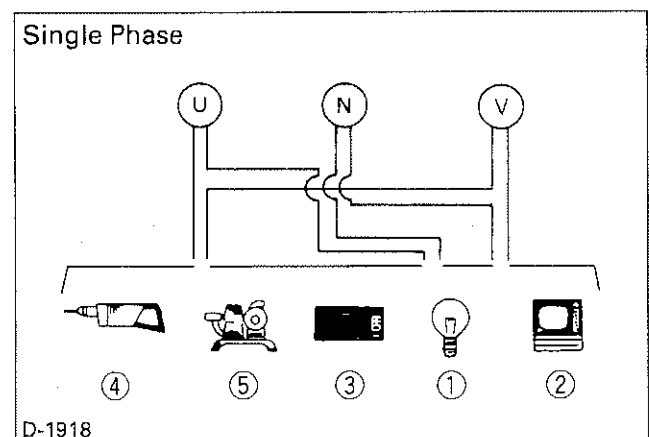


(1) Terminals (output)

3. Finally be sure to close the cover and tighten up the lock screws.

### Single phase 3 terminals type

- i) SQ-1120-STD, SQ-1150-STD  
50Hz 110V Use U-N, V-N
- 50Hz 220V Use U-V
- ii) SQ-1140-STD, SQ-1200-STD  
60Hz 110V Use U-N, V-N
- 60Hz 220V Use U-V

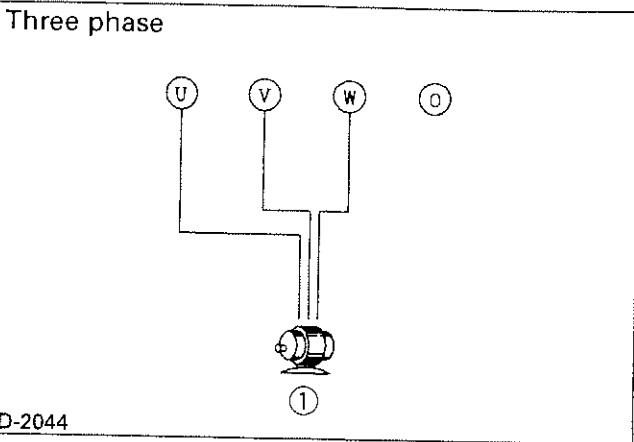


D-1918

- (1) Light
- (2) Television
- (3) Air conditioner
- (4) Electric Drill
- (5) Motor Pump

**◆ 3 phase and single phase 4 terminals type**  
**● For 3 phase power source**

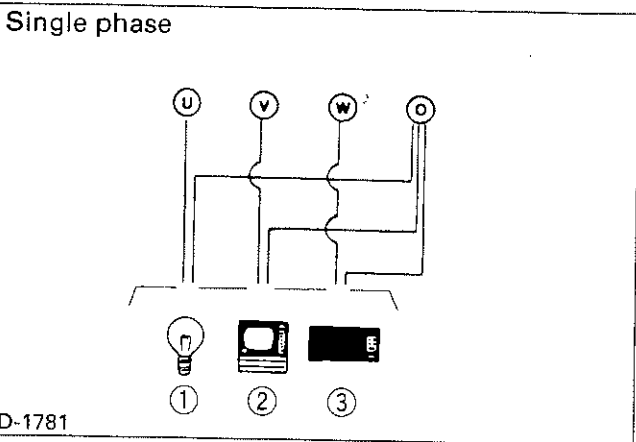
- i) SQ-3140-STD, SQ-3200-STD, SQ-3300-STD  
50Hz 380V Use  $\text{W-V-U}$
- ii) SQ-3170-STD, SQ-3250-STD, SQ-3350-STD  
60Hz 220V, 380V Use  $\text{W-V-U}$



(1) Motor

**● For single phase power source:**

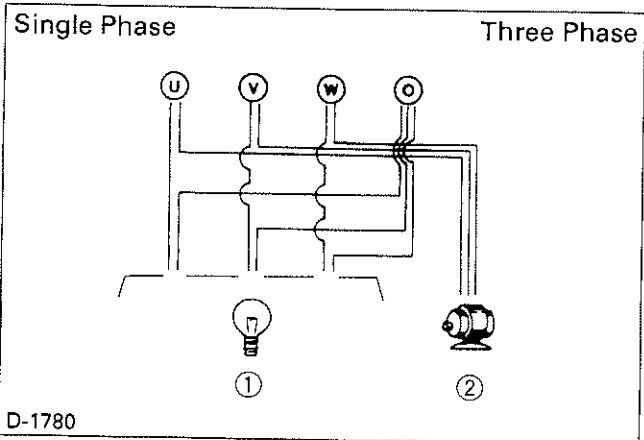
- i) SQ-3140-STD, SQ-3200-STD, SQ-3300-STD  
50Hz 220V Use  $\text{O-U}$   
 $\text{O-V}$   
 $\text{O-W}$
- ii) SQ-3170-STD, SQ-3250-STD, SQ-3350-STD  
60Hz 127V, 220V Use  $\text{O-U}$   
 $\text{O-V}$   
 $\text{O-W}$



(1) Light  
 (2) Television  
 (3) Air conditioner

**● Connecting 3 phase power source to single phase load.**

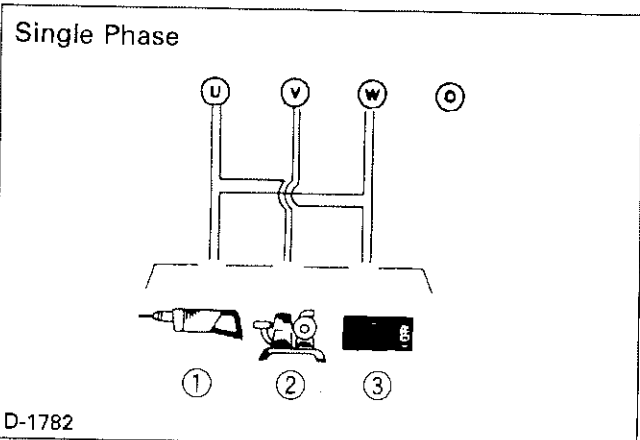
- i) SQ-3140-STD, SQ-3200-STD, SQ-3300-STD  
50Hz 220V single phase Use  $\text{U-O}$   
 $\text{V-O}$   
 $\text{W-O}$
- 50Hz 380V 3 phase Use  $\text{U-V-W}$
- ii) SQ-3170-STD, SQ-3250-STD, SQ-3350-STD  
60Hz 127V, 220V single phase Use  $\text{U-O}$   
 $\text{V-O}$   
 $\text{W-O}$
- 60Hz 220V, 380V 3 phase Use  $\text{U-V-W}$



(1) Light  
 (2) Motor

**● For single phase power source:**

- i) SQ-3140-STD, SQ-3200-STD, SQ-33000-STD  
50Hz 380V single phase Use  $\text{U-V}$   
 $\text{V-W}$   
 $\text{W-U}$
- ii) SQ-3170-STD, SQ-3250-STD, SQ-3350-STD  
60Hz 220V, 380V single phase Use  $\text{U-V}$   
 $\text{V-W}$   
 $\text{W-U}$



(1) Electric Drill  
 (2) Motor Pump  
 (3) Air conditioner

**Connecting the Load (USA Model)**



**WARNING**

To avoid personal injury:

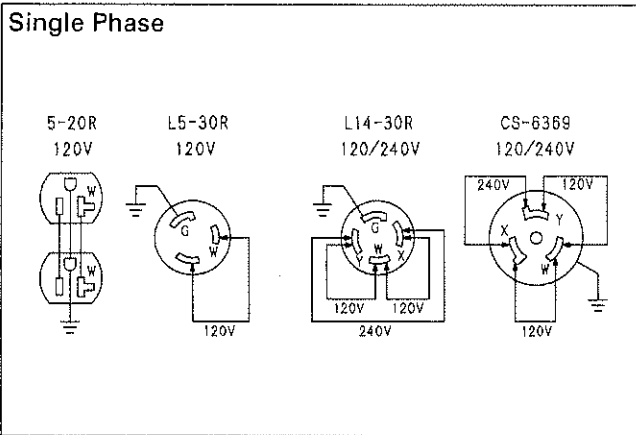
- Connect or disconnect the load to the AC receptacles or terminals only when the engine is stopped.
- For the SW type, make sure that the voltage selector switch is set to the same as devices being used.

1. Turn OFF all circuit breakers on the control panel and the load center.
2. Connect the load to the A.C. receptacles or terminals.

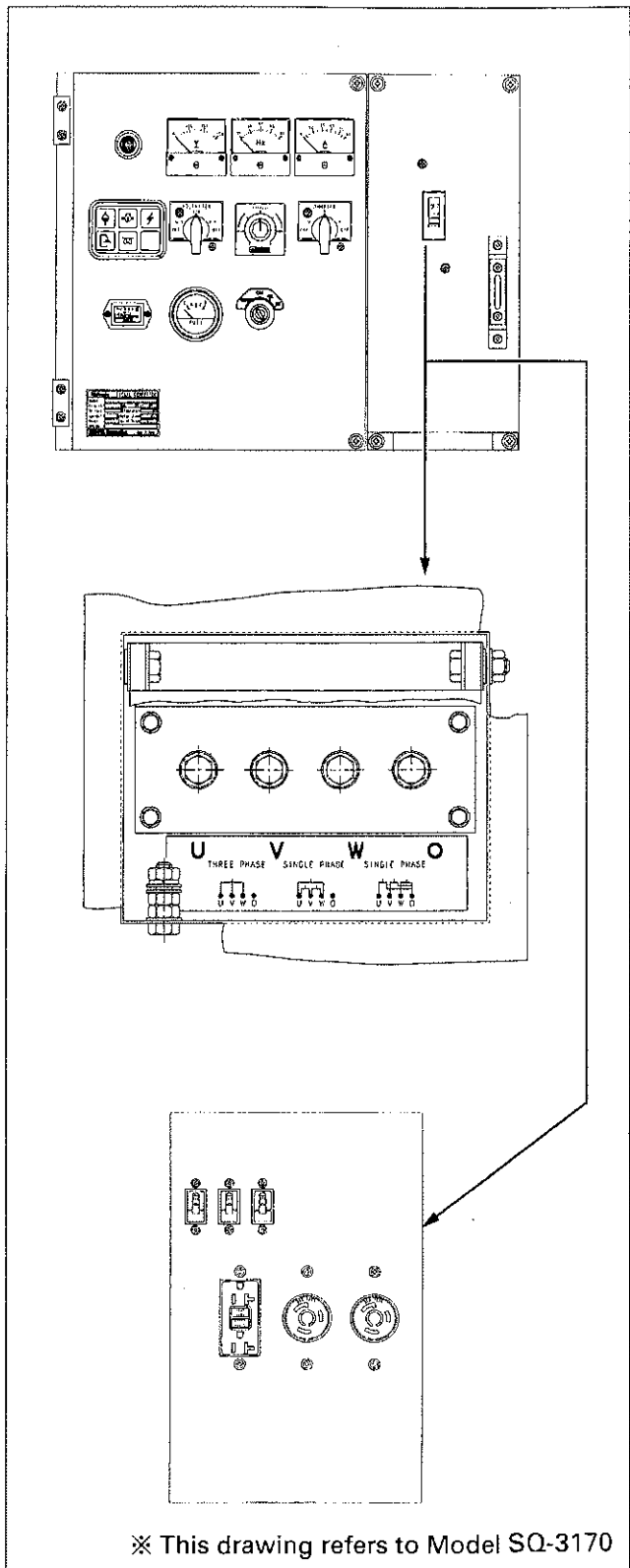
[A list of receptacles]

Model	5-20R (GFCI)	L5-30R	L14-30R	CS-6369
SQ-1140-USA	1	1	1	1
SQ-1200-USA	1	1	0	2
SQ-3170-USA	1	2	0	0
SQ-3250-USA-SW	1	1	0	2
SQ-3350-USA-SW	1	1	1	2

**Receptacles use**



**[SQ-1140-USA, SQ-1200-USA, SQ-3170-USA]**



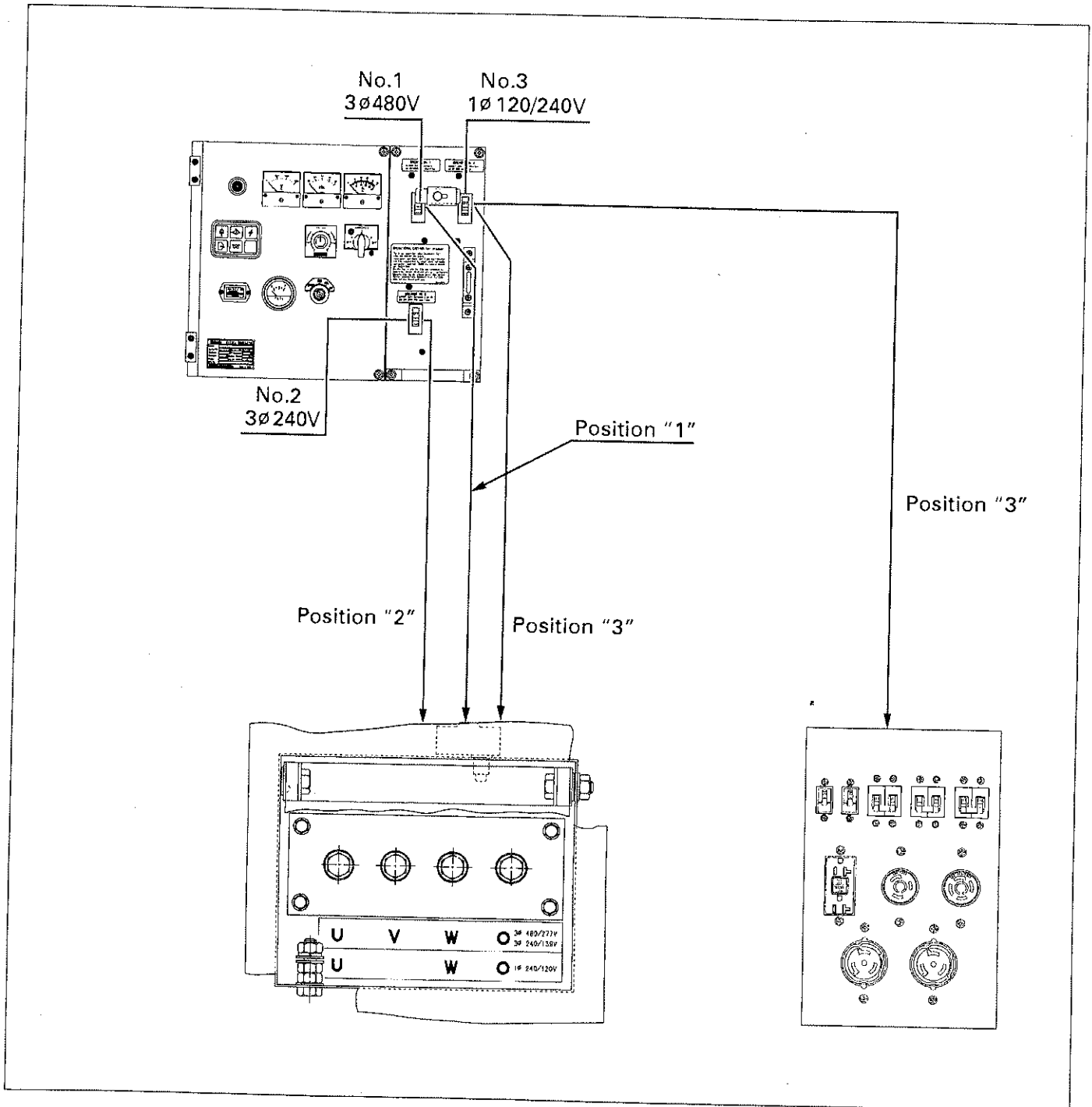
※ This drawing refers to Model SQ-3170

- Both terminals and receptacles can be utilized at the same time through circuit breaker.

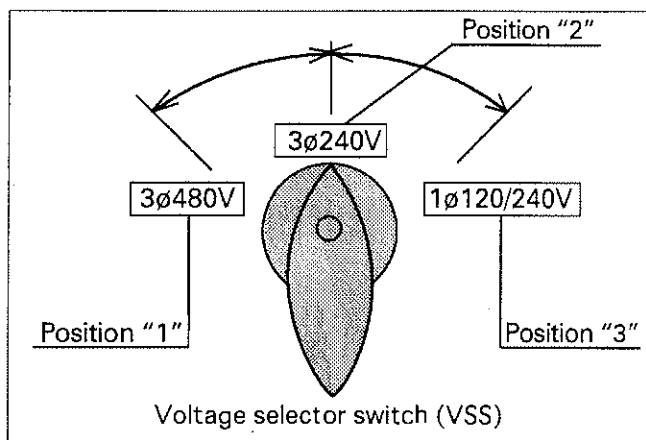
**NOTE:**

- The same number receptacle as circuit breaker can be turned ON and OFF.

[SQ-3250-USA-SW, SQ-3350-USA-SW]



◆ Voltage selector switch (VSS)



1. When VSS is placed in the Position "1" electric power is supplied to the terminal through the No. 1 circuit breaker. (Voltage 3φ 480V)
2. When VSS is placed in the Position "2" electric power is supplied to the terminal through the No. 2 circuit breaker. (Voltage 3φ 240V)
3. When VSS is placed in the Position "3" electric power is supplied to the receptacle through the No. 3 circuit breaker. (Voltage 1φ 120/240V)

**NOTE:**

- The same number receptacle as circuit breaker can be turned ON and OFF.
- VSS stands for Voltage Selector Switch.

**IMPORTANT:**

- When the VSS has been repositioned, be sure to readjust the voltage adjuster to the specified voltage.
- The Ammeter reading range can be varied by placing the VSS position as the below table.

Model	VSS position	
	3φ480	3φ240V, 1φ120/240V
SQ-3250-USA-SW	0-50A	0-100A
SQ-3350-USA-SW	0-75A	0-150A

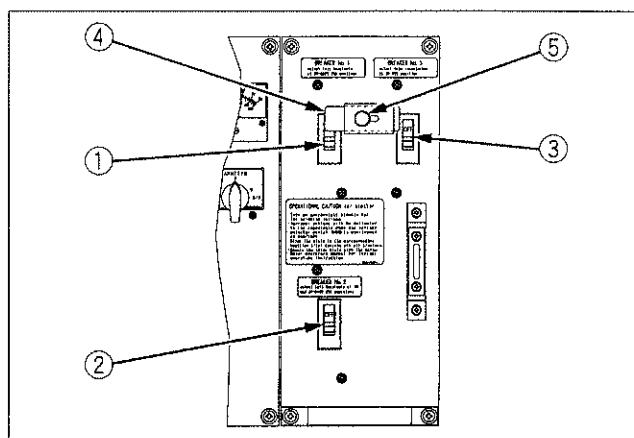
- When VSS is placed in the "3" position the Ammeter change-over switch must be placed in the "U" and "W" position.

◆ Mechanical interlock

The mechanical interlock is provided in order to keep the circuit breakers No. 1 and No. 3 from getting activated at the same time.

Take the following steps in handling the circuit breakers.

1. Turn off all the circuit breakers.
2. Loosen the knob ⑤ and move the sliding plate to the right (or left).
3. Tighten up the knob ⑤ to fix the sliding plate in place.
4. Now the circuit breaker No.1 (or No. 3) can be turned on and off.



- (1) Breaker No. 1
- (2) Breaker No. 2
- (3) Breaker No. 3
- (4) Sliding plate
- (5) Knob

**NOTE:**

- Stop the engine before handling the circuit breakers.
- Do not turn on any other circuit breakers than the VSS (Voltage Selector Switch)-related one, as mentioned earlier.
- Do not turn on the circuit breaker No. 3 while the VSS is in the "2" position. Otherwise an inappropriate voltage (139/240 V) would be applied to the receptacle.

◆ Voltage Selector Switch  
[SQ-3250-USA-SW, SQ-3350-USA-SW]

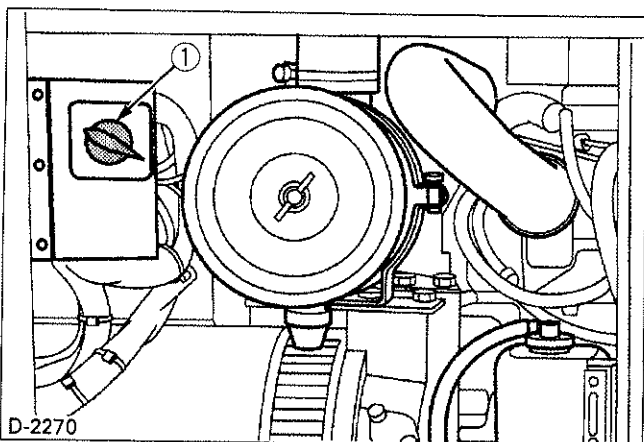


**DANGER**

To avoid serious injury or death:

- Be sure to stop the engine before turning the voltage selector switch.

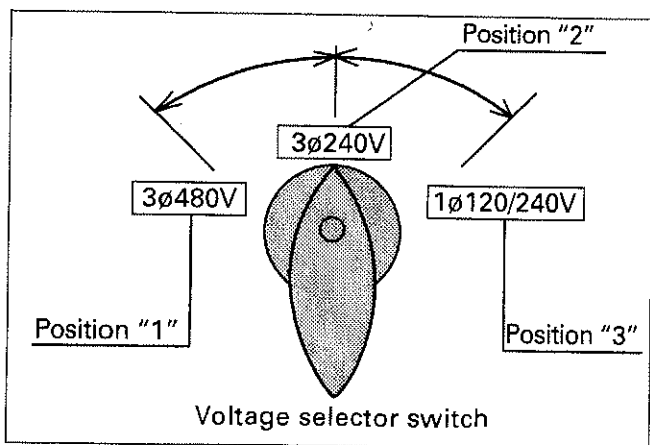
Voltage regulation can be achieved by turning the voltage selector switch placed on the back side of the control panel in clockwise or counterclockwise direction.



D-2270

(1) Voltage selector switch

1. Turn off all circuit breakers on the control panel then shut off the engine.
2. Open the inspection door and position VSS (Voltage Selector Switch) to the desired output.



(1) VSS (Voltage Selector Switch)

3. Readjust the voltage adjuster to the specified voltage.

◆ G.F.C.I. Receptacles



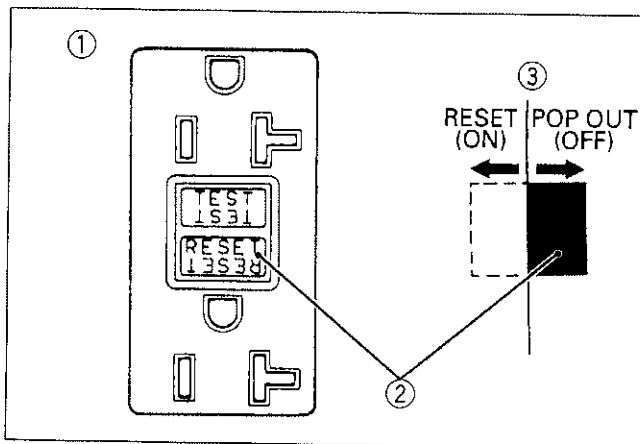
**WARNING**

To avoid serious injury or death from electrical shock:

- DO NOT attempt to operate equipment if the ground fault circuit interrupter reset button pops out repeatedly during use.
- Test the ground fault circuit interrupter during the pre-operation checks according to the maintenance instructions. (See "MAINTENANCE" section)
- Remember that only receptacles shown below have ground fault circuit interrupter protection.

The G.F.C.I. (Ground Fault Circuit Interrupter) ① shuts off power to the protected receptacles if a ground fault (electrical leak) is detected.

If the reset button ② pops out ③, the equipment plugged into the receptacle may be faulty. If this happens, check the equipment carefully. If the equipment appears to be in good condition, press the reset button firmly until a click is heard. This will restore power. If the reset button pops out again, unplug the equipment immediately. Have the equipment inspected and repaired by a qualified repairperson before attempting to use it again.



- (1) G.F.C.I. (Ground Fault Circuit Interrupter)
- (2) Reset button
- (3) RESET (ON) / POP OUT (OFF)

◆ Terminal use

Same to the Standard Model.



### ■ Connecting the Load (AUS Model)

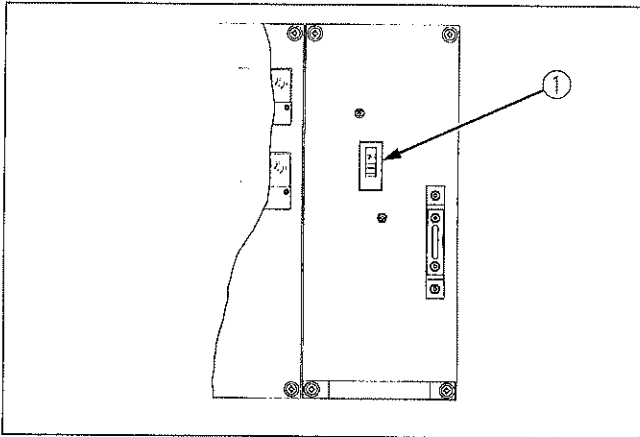


**WARNING**

To avoid personal injury:

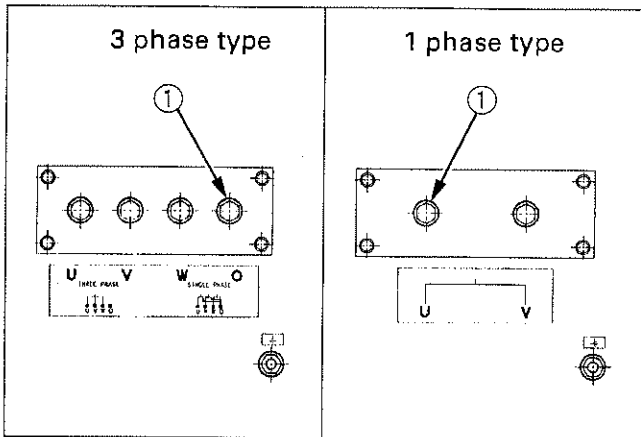
- Connect or disconnect the load to the AC receptacle only when the engine is stopped.

1. Turn OFF the circuit breakers on the control panel.



(1) Circuit breaker

2. Connect the load to the A.C. output terminals.

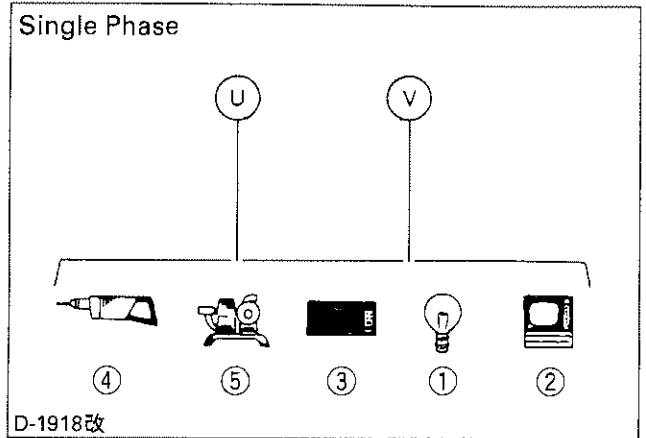


(1) Terminals (output)

3. Finally be sure to close the cover and tighten up the lock screws.

### ◆ Single phase 2 terminals type

Use  $\text{U-V}$



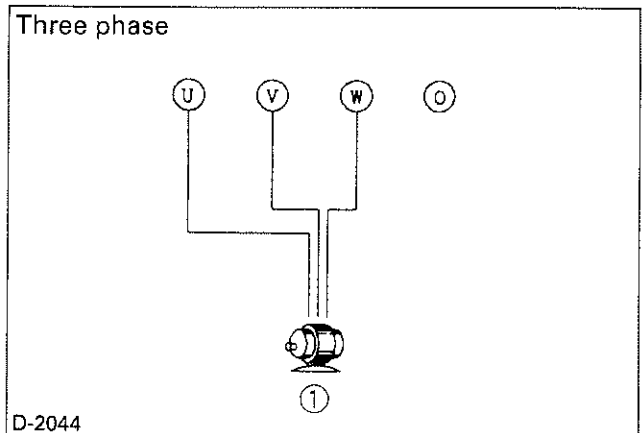
D-1918改

- (1) Light (2) Television (3) Air conditioner  
(4) Electric Drill (5) Motor Pump

### ◆ 3 phase and single phase 4 terminals type

- For 3 phase power source

Use  $\text{U-V-W}$

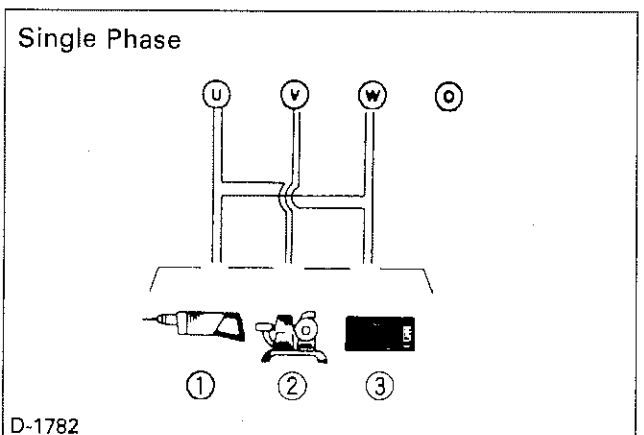


D-2044

- (1) Motor

- For single phase power source:

Use  $\text{O-U}$   
 $\text{O-V}$   
 $\text{O-W}$



D-1782

- (1) Electric Drill (2) Motor Pump (3) Air conditioner

# PRE-OPERATION CHECK

## DAILY CHECK

To prevent problems from occurring, it is important to know the condition of the generator. Always perform the following check items before starting the generator.



### CAUTION

To avoid personal injury:

- Before checking or servicing the generator, make sure it is on a level surface with the engine shut off.

### ◆ Check items

- Check for oil and coolant leakage
- Check cooling air inlet and outlet for obstructions or clogging
- Check radiator fins for clogging
- Check fan belt tension
- Check engine oil level
- Check coolant level
- Check generator grounding
- Refuel  
(See "FUEL" in "MAINTENANCE" in periodic service section.)
- Care of danger, warning and caution labels  
(See "DANGER, WARNING AND CAUTION LABELS" in "SAFE OPERATION" section.)
- Check G.F.C.I. receptacle (USA Model)  
(See "GROUND FAULT CIRCUIT INTERRUPTER (GFCI) RECEPTACLE" in "MAINTENANCE" section.)



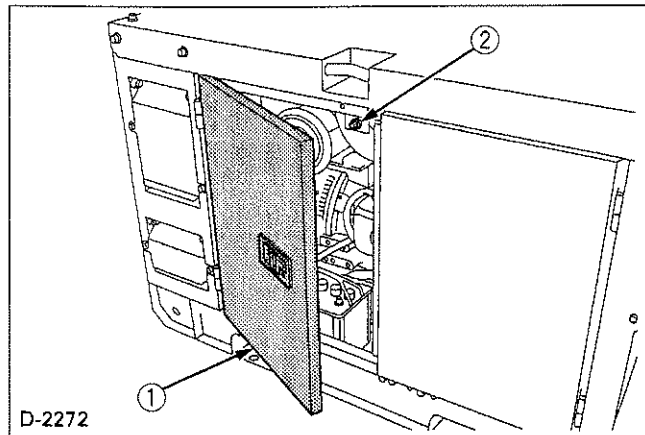
### CAUTION

To avoid personal injury from contact with moving parts;

- DO NOT open the door or generator side cover while the engine is running.
- Do not touch muffler or exhaust pipes while they are hot; Severe burns could result.

### ■ How to Open the Door

Insert the door key and turn clockwise and open the machine doors. The doors open together on hinges. The door of the generator is equipped with a safety switch. Safety switch automatically shuts off the engine when door is opened.



D-2272

(1) Door

(2) Safety switch

### ■ Battery

The battery is shipped in dry, charged condition without electrolyte.

The battery must be charged properly before using for the first time.



### DANGER

To avoid the possibility of battery explosion: The battery comes in two types: refillable and non-refillable. For using the refillable type battery, follow the instructions below.

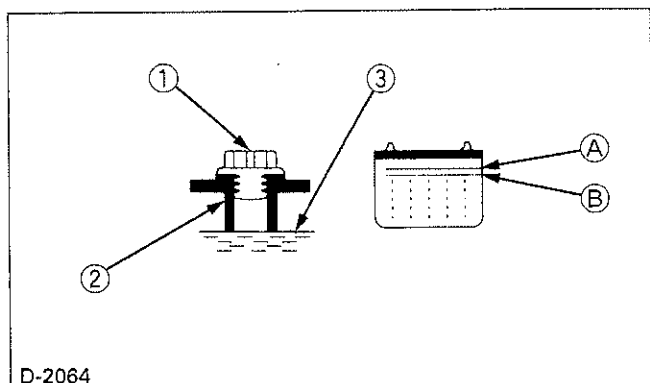
- DO NOT use or charge the battery if the fluid level is below the LOWER (lower limit level) mark.

Otherwise, the battery component parts may deteriorate prematurely, shorten the battery's service life; which may cause an explosion.

Immediately, add distilled water until the battery's fluid level comes somewhere between the UPPER and LOWER levels.

- Keep all sparks and flames away from the battery and fuel tank. A battery, especially when charging, will give off hydrogen and oxygen gases which can explode and cause serious personal injury.

1. Remove the vent plugs.
2. Fill cells up to the upper level with electrolyte. [Specific gravity of sulfuric acid 1.270 to 1.290 (at 20°C=68°F)]
3. Allow the battery to sit for about one hour after filling.
4. If the electrolyte level is dropped, refill with electrolyte up to the upper level.
5. Replace the vent plugs.
6. Charge the battery at the normal charging rate of 6.0 amperes.
7. Wash off any electrolyte which may have spilled.



(1) Vent plug opening (A) Upper level  
 (2) Electrolyte level indication tube (B) Lower level  
 (3) Indicated level

**NOTE:**

- The duration of dry charged efficiency, will decrease in proportion to the period of time elapsed after shipment and during storage. To obtain the longest service life of the battery, it is necessary for the battery to be charged for a sufficient period of time. Continue to charge until all cells are gassing freely, and the voltage and specific gravity reading in all cells remain constant for 3 or more successive readings taken at 30 minute intervals.
- When the battery has been charged fully, the specific gravity of electrolyte should be 1.270 to 1.290 (at 20°C=68°F).

**Engine Oil**

**The generator has been shipped without engine oil. Fill with oil to the correct level before attempting to start the engine.**

1. Place the machine on a level surface.
2. Remove the oil cap.
3. Add engine oil of grade CD or higher, up to the upper mark on the oil level gauge.

**NOTE:**

- See "ENGINE OIL" in MAINTENANCE section for engine oil capacity and checking engine oil level.

**Coolant**



**CAUTION**

**To avoid personal injury:**

- Place the machine on a level surface.
- **DO NOT** remove the radiator cap while coolant is hot. When cool, rotate the radiator cap slowly to the first stop to allow excess pressure to escape. Then remove cap completely.

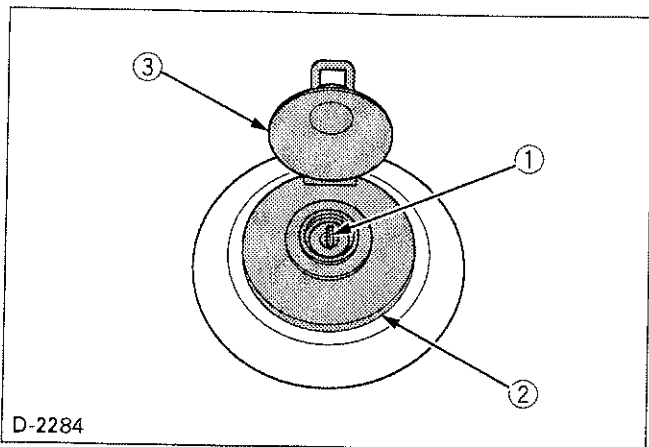
1. Remove the radiator cap and fill with specified coolant until the coolant level is just below the port.
2. Fill with coolant to the "FULL" mark on the reserve tank.
3. Securely tighten radiator cap and reserve tank cap.

**NOTE:**

- See "RADIATOR" in MAINTENANCE section for changing coolant.

## Opening and Closing of the Fuel Tank Cap

1. Open the tank cap cover, insert the tank cap cover key and turn clockwise. Then turn the tank cap counterclockwise to open.



D-2284

There are three types of key. Select the key as necessary.

- (1) Key
- (2) Fuel tank cap
- (3) Tank cap cover

2. To close the tank cap, turn clockwise and the tank cap cover key in the opposite direction. Then close the tank cap cover.

## Fuel

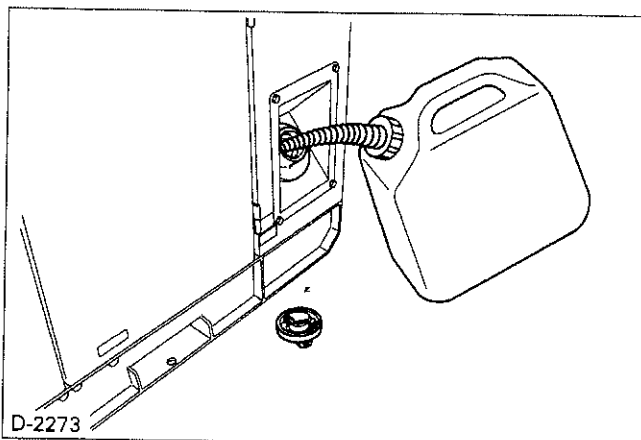


### WARNING

To avoid personal injury:

- DO NOT refuel when engine is running or hot.
- Always shut off the engine before refueling.
- DO NOT overfill fuel system. If any fuel overflows, wipe it up completely before starting operation.
- When refueling, keep all flames, sparks and cigarettes away from generator.

1. Always fill the fuel through the fuel tank strainer.
2. Make sure that dirt or water does not enter the fuel tank.
3. Fill with Diesel fuel No.2-D (ASTMD975).
4. Below 0°C (32°F) a mix of No.1-D and No.2-D is acceptable.



D-2273

5. Fuel level is read by fuel gauge placed on the control panel.  
Fuel gauge is activated with the main switch key "ON".

### NOTE:

- If the fuel tank should empty completely causing the engine to stop, then the fuel system requires air bleeding after filling the tank and before restarting the engine.  
(See "Air Bleeding the Fuel System" in "MAINTENANCE" section.)

# OPERATING THE GENERATOR



**CAUTION**

To avoid personal injury:

- Read "SAFE OPERATION" in the front of this manual.
- Read the danger, warning and caution labels located on the generator.
- To avoid the danger of exhaust fume poisoning, do not operate the engine in a closed building without proper ventilation.
- Always turn OFF the circuit breaker before starting the generator.
- Turn OFF all switches on the electrical devices.
- Check the wiring and connections of the electrical devices before starting the machine.
- DO NOT touch the charging section during operation.

## SAFETY DEVICES

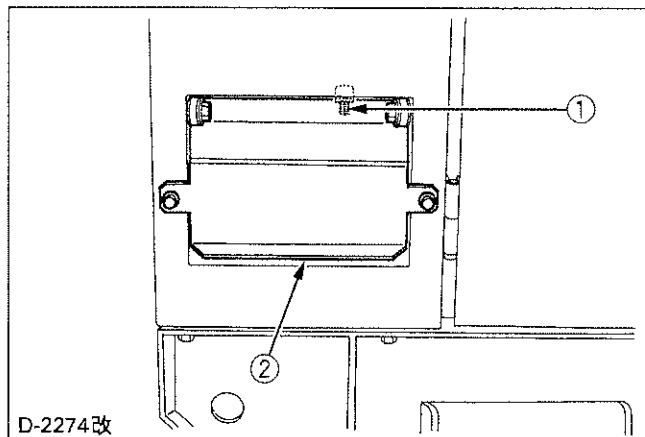


**DANGER**

To avoid serious injury or death:

- DO NOT modify or remove the safety devices. Unauthorized modification or removal may affect the function and safety of the machine, which may result in serious injury or death.

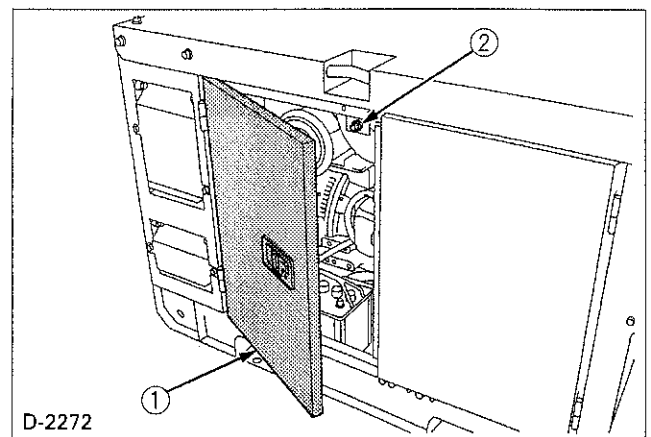
1. Load center cover and access door are equipped with safety devices to detect the opening and/or closing condition of cover and door.



D-2274改

- (1) Safety switch
- (2) Load center cover

2. The door safety switch ② is located on the load center cover and on the access door. If you turn the key switch to "ON" with the load center cover and access door open, the starter of engine will not activate. (While the fuel pump solenoid can be activated.)
3. Turn the key switch to "OFF" to close the load center and access door and then restart the engine.



D-2272

- (1) Access door
- (2) Safety switch

4. If you open the load center cover and access door while the engine is running, the emergency stop system will stop the engine. To maintain the battery's life as much as possible, turn the key switch to "OFF" position. (For detail on the emergency unit, see "OPERATION OF THE EMERGENCY RELAY" on page 59, 60.)

## STARTING THE ENGINE



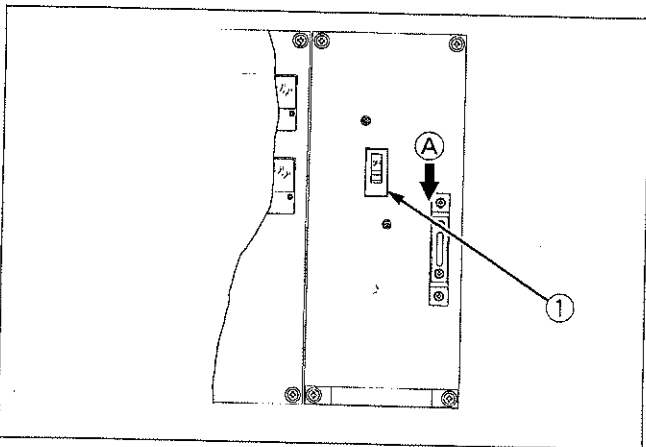
### CAUTION

To avoid personal injury:

- To prevent contact with live components or rotating parts, the engine automatically stops when load center cover or access door is opened.
- While the load center cover or access door remains open, the starter will not activate.
- Be sure to stop the engine according to proper procedure before you open the load center cover or access door. Otherwise the power supply will be shut down instantaneously.
- DO NOT apply any tape or anything else that would keep the safety switch inactive.

1. Turn OFF all switches on the electrical devices.

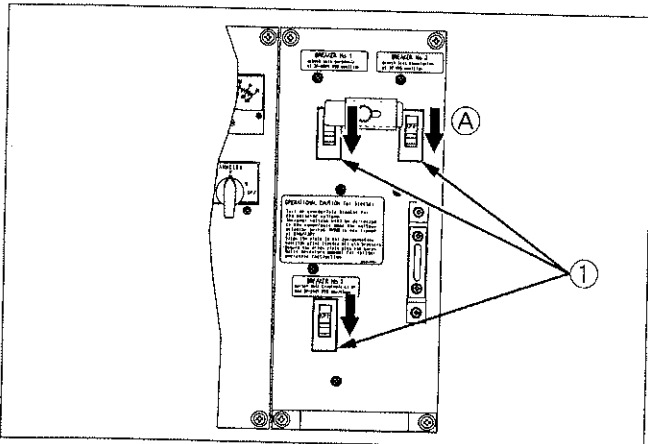
2. Turn OFF the circuit breakers on the control panel.



(1) Circuit breaker

(A) "OFF"

[SQ-3250-USA-SW, SQ-3350-USA-SW]



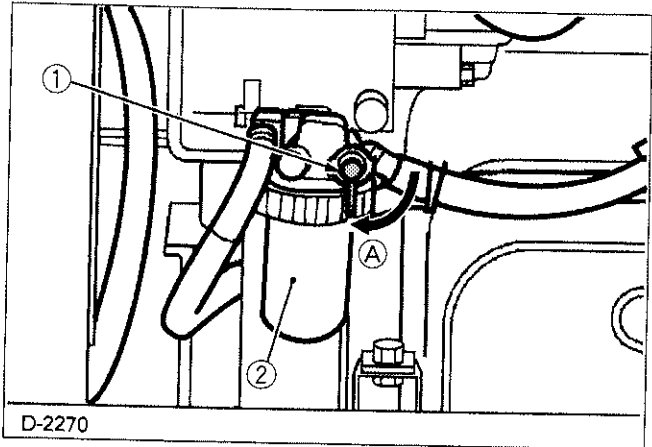
(1) Circuit breaker

(A) "OFF"

### NOTE :

- For the USA and AUS specified models, also turn OFF the load center circuit breaker.

3. Set the fuel lever to "OPEN" Position .



D-2270

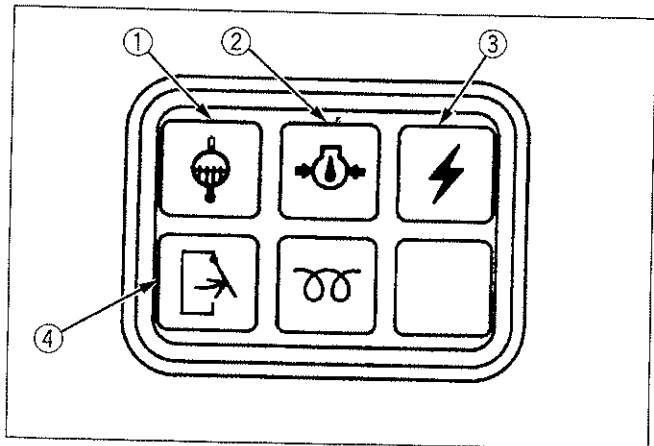
(1) Fuel lever

(A) "OPEN"

(2) Water separator

4. Insert the key into the main switch and turn it "ON".

5. Check the battery charge lamp and oil pressure lamp are ON.



(1) Water temperature lamp

(2) Oil pressure lamp

(3) Battery charge lamp

(4) Load center cover or door open lamp

### IMPORTANT:

- Do not use ether or any starting fluid for starting the engine, or severe engine damage will occur.
- To protect the battery and the starter, make sure that the starter is not continuously turned for more than 10 seconds.
- When there is a severe overload or short circuit in the wiring of the generator, the circuit breaker turns OFF. If this happens, eliminate the cause and then turn the circuit breaker ON again.

### NOTE:

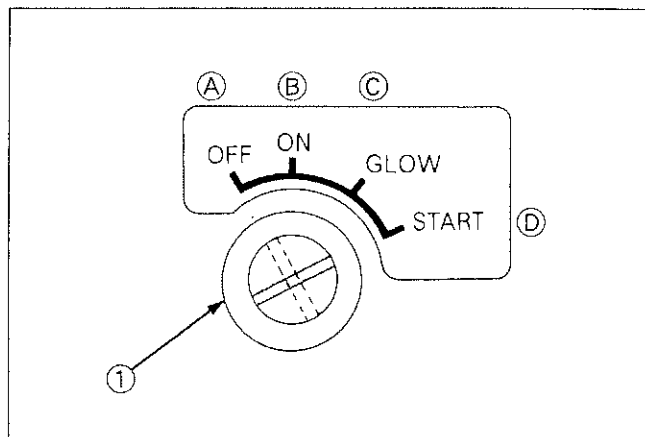
- The thermal relay does not work if the battery voltage falls below the prescribed level, which will detect overload on the meter. Therefore, be aware of the battery condition.

**6. Turn the key to "GLOW" position.**

**NOTE:**

- See "COLD WEATHER STARTING" in Operation section as to the preheating times.

**7. Turn the key to the "START" position and release when the engine starts.**



(1) Main switch (Key)

- (A) "OFF"
- (B) "ON"
- (C) "GLOW"
- (D) "START"

**IMPORTANT:**

- Do not run the starter motor continuously for more than 10 seconds at a time, or it may damage the starter. If the engine fails to start, wait for about 30 seconds and try again. When the engine starts to generate electric power, the green lamp will light up.

**8. Check to see that the battery charge lamp, oil pressure lamp, water temperature lamp and load center cover or door open lamp are OFF.**

**9. Check the warning lamps.**

Whenever the engine stops automatically during operation, correct the problem before restarting the engine.

**IMPORTANT:**

- Be sure to warm up the engine, not only in winter, but also in warmer seasons. An insufficiently warmed-up engine can shorten its service life.

**Warm-up in the Low Temperature Range**

In cold weather, the engine oil may be cold with increased viscosity. This can delay oil circulation or abnormally low oil pressure for some time after engine start-up. This can result trouble in the lubrication circuit or damage to the engine moving parts.

To prevent the above problems, perform the following instructions:

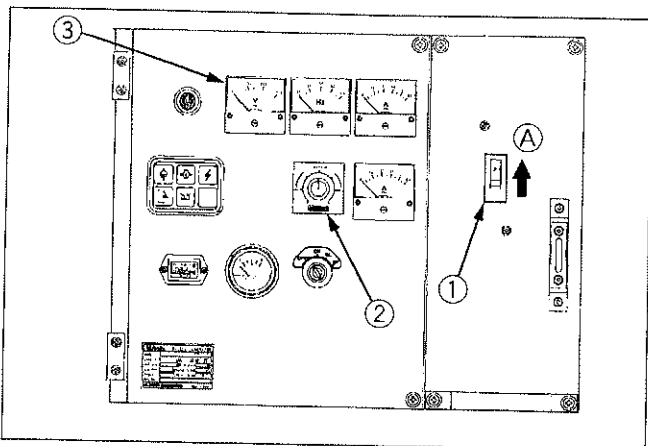
Warm up the engine at rated revolution with no load.

Ambient temperature	Warm-up time requirement
Above 0°C (32°F)	At least 10 minutes
0°C (32°F) to -10°C (14°F)	10 to 20 minutes
Below -10°C (14°F)	More than 20 minutes

### 10. Check the voltage on the meters.

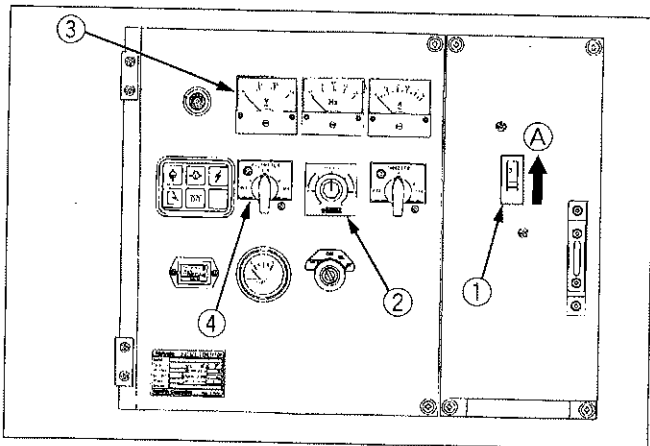
- Voltage regulation can be achieved by turning the voltage adjuster in clockwise or counterclockwise direction.
- Set voltage to the same as the devices being used.
- In case of the SW type, check to see that the voltage selector switch is set to the same voltage as the devices being used.

#### Single Phase Type



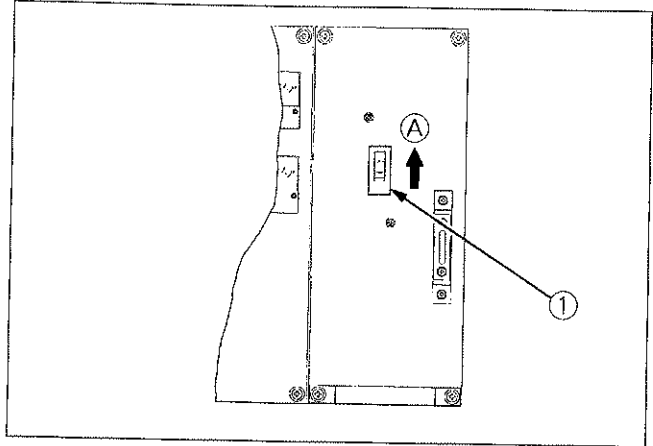
(1) Circuit breaker (A) "ON"  
 (2) Voltage adjuster (Potentiometer)  
 (3) AC Volt meter

#### 3 Phase Type



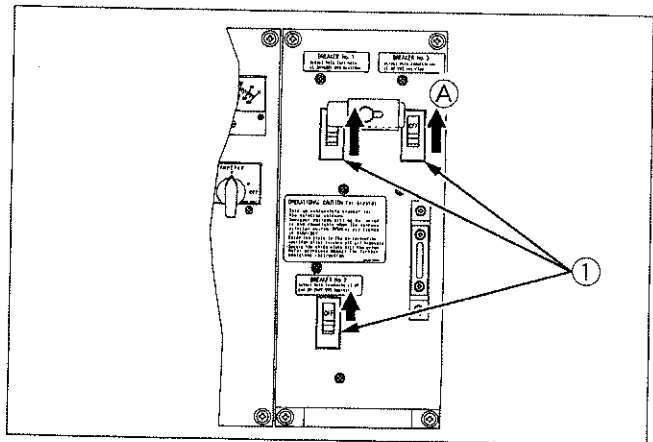
(1) Circuit breaker (A) "ON"  
 (2) Voltage adjuster (Potentiometer)  
 (3) AC Volt meter  
 (4) Voltmeter Change-Over switch

### 11. Turn ON the circuit breaker on the control panel.



(1) Circuit breaker (A) "ON"

[SQ-3250-USA-SW, SQ-3350-USA-SW]



(1) Circuit breaker (A) "ON"

Turn ON the circuit breaker that corresponds to the voltage selected with the voltage selector.

**NOTE :**

- For the USA and AUS specified models, turn ON the load center circuit breaker that corresponds to the receptacle being used.

### 12. Turn ON the electrical device switches for the connections.



## COLD WEATHER STARTING

If the ambient temperature is below \*  $-5^{\circ}\text{C}$  ( $23^{\circ}\text{F}$ ) and the engine is very cold, start it in the following manner:

Take steps (1) through (5) in "STARTING THE ENGINE" section.

### 6. Turn the main switch (key) to the "GLOW" position until the glow plug indicator goes off.

**NOTE:**

- If the ambient temperature is low, the preheating time will take longer.

**IMPORTANT:**

- Shown below are the standard preheating times for various temperatures. This operation, however, is not required, when the engine is warmed up.

Ambient temperature	Preheating time
Above $10^{\circ}\text{C}$ ( $50^{\circ}\text{F}$ )	NO NEED
$10^{\circ}\text{C}$ ( $50^{\circ}\text{F}$ ) to $-5^{\circ}\text{C}$ ( $23^{\circ}\text{F}$ )	Until glow lamp goes off
*Below $-5^{\circ}\text{C}$ ( $23^{\circ}\text{F}$ )	Approx. 5 seconds after the glow lamp goes off
Limit of continuous use	20 seconds

### 7. Turn the key to "ST" ("START") position and the engine should start.

(If the engine fails to start after 10 seconds, turn off the key for 30 seconds. Then repeat steps (6) and (7) above.)

**IMPORTANT:**

- Do not allow the starter motor to run continuously for more than 10 seconds.
- Be sure to warm up the engine, not only in winter, but also in warmer seasons. An insufficiently warmed-up engine can shorten its service life.
- When there is possibility of temperature drops below  $-15^{\circ}\text{C}$  ( $5^{\circ}\text{F}$ ) detach the battery from the machine, and keep it indoor in a safe area. Reinstalled the battery before the next operation.

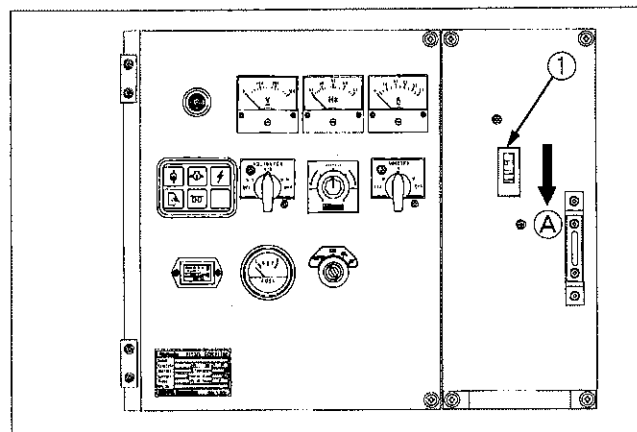
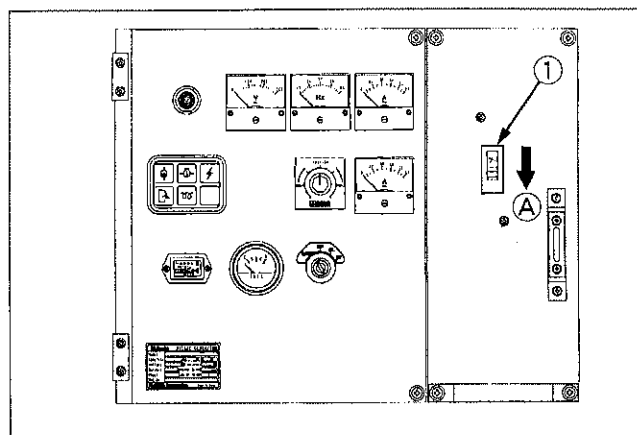
## STOPPING THE ENGINE

### 1. Turn OFF all electrical device switches for connected loads.

**NOTE:**

- For the USA and AUS models, also turn OFF the load center circuit breaker.

### 2. Turn OFF the circuit breakers.

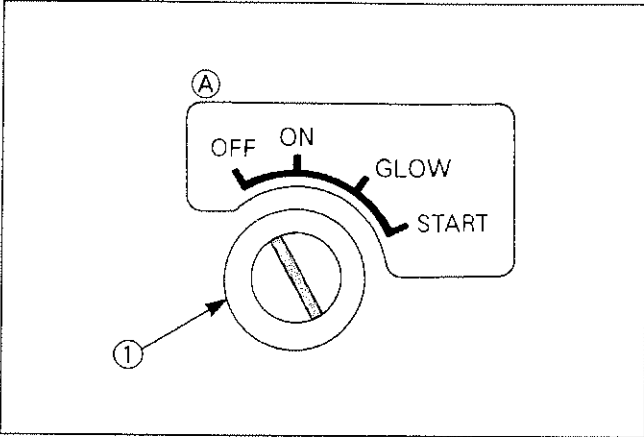


(1) Circuit breaker

(A) "OFF"

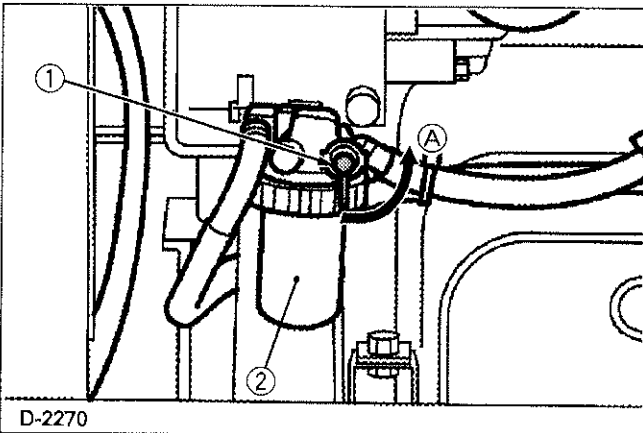
### 3. Allow the engine to run with no load for about 5 minutes before stopping the engine completely.

**4. Turn the main switch (key) to the "OFF" position.**



(1) Main switch (Key) (A) "OFF"

**5. Turn the fuel lever to the "CLOSE" position.**

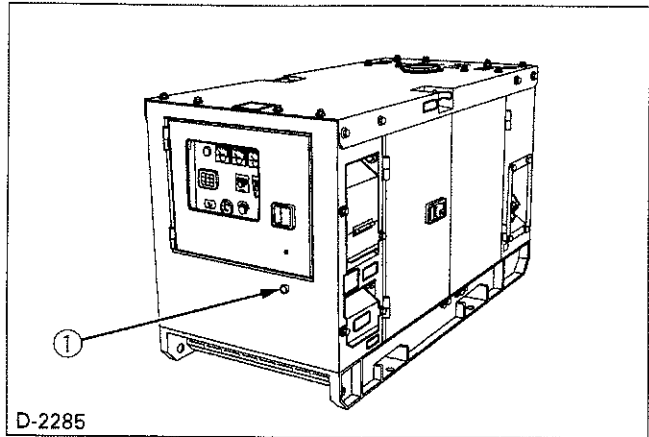


D-2270  
(1) Fuel lever (A) "CLOSE"  
(2) Water separator

## EMERGENCY STOP SWITCH [AUS MODEL ONLY]

**NOTE:**

- If the emergency stop switch is pressed, the battery power is turned off and the engine is interrupted. Do not press this switch except for an emergency.



D-2285

(1) Emergency stop switch

1. If anything unusual occurs, press the switch ① and the engine must be stopped immediately.
2. In this case, be sure to turn off the main switch.
3. Press this switch again to release the switch ① and it will be back to the original position.

# MAINTENANCE

## ANTI-FREEZE & DISPOSAL OF FLUIDS

- DO NOT run the engine with installed safety guards detached.
- Anti-freeze contains poison. Wear rubber gloves to avoid personal injury. In case of contact with skin, wash it off immediately.
- DO NOT mix different types of Anti-freeze. The mixture can produce chemical reaction causing harmful substances. Use approved or genuine KUBOTA Anti-freeze.
- Be mindful of the environment and the ecology. Before draining any fluids, find out the correct way of disposing of them. Observe the relevant environmental protection regulations when disposing of oil, fuel, coolant, filters and batteries.
- When draining fluids from the engine, place a suitable container underneath the engine body.
- DO NOT pour waste onto the ground, down a drain, or into any water source.



B-1508



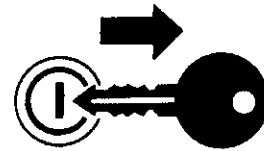
B-1507



### CAUTION

To avoid personal injury:

- Be sure to conduct daily checks, periodic maintenance, refueling or cleaning on a level surface with the engine shut off and the key removed.
- Before allowing other people to use your generator, explain how to operate, and have them read and understand this manual before operation.
- When cleaning any parts, do not use gasoline. Use a regular cleanser.
- Always use proper tools that are in good condition. Make sure you understand how to use them before performing any service work.
- When installing, be sure to tighten all nuts and bolts lest they should be loose. Tighten the nuts and bolts to the specified torque.
- DO NOT put any tools on the battery, or battery terminals may short out. Severe burns or fire could result. Detach the battery from the engine before maintenance.
- DO NOT touch muffler or exhaust pipes while they are hot; severe burns could result.



B-1509



B-1497

## STORAGE



### CAUTION

To avoid personal injury:

- **DO NOT** clean the machine with engine running.
- To avoid the danger of exhaust fume poisoning, do not operate the engine in a closed building without proper ventilation.
- When storing the generator just after running, let the engine cool off.

Before storing the generator for more than a few months, remove any dirt on the machine, and:

1. Remove dirty engine coolant, fill with new coolant and run the engine for about 5 minutes. When coolant is added, coolant level drops the first time the engine is started, stop the engine and add more coolant.
2. Remove dirty engine oil, fill with new oil and run the engine for about 5 minutes to let the oil penetrate to all the parts.
3. Check all the bolts and nuts, and tighten if necessary.
4. Remove the battery from the generator, adjust the electrolyte level, and recharge it. Store the battery in a dry and dark place.
5. When the engine is not used for a long period of time, run it for about 5 minutes under no load every 2 to 3 months to keep it free from rust. If the engine is stored without any running, moisture in the air may condense into dew over the sliding parts of the engine, resulting in rust.
6. If you forget to run the engine for longer than 5 to 6 months, apply enough engine oil to the valve guide and valve stem seal and make sure the valves work smoothly before starting the engine.
7. Store the generator in a flat place and remove the key.
8. Do not store the generator in a place where flammable materials such as dry grass or straw are present.
9. When covering the generator for storage, let engine and muffler cool off completely.
10. Operate the engine after checking and repairing damaged wiring or pipes, and clearing flammable materials carried by rodents, insects or birds.

# OPERATION OF THE EMERGENCY RELAY

The SQ series generator is equipped with an emergency unit (EG-20) that is designed to detect trouble and stop the engine automatically.

## 1. What to detect

Trouble	Detection	Method
Oil pressure fall	Oil pressure switch (ON at below 49 kpa (7 psi))	*The oil pressure switch stays ON after the start delay period.
Water temperature rise	Water temperature switch (ON at above 115±3°C (239±5°F))	*The water temperature switch stays ON after the start delay period.
Belt broken	Voltage of alternator terminal L ( Charge lamp ON: Stop or trouble ) ( Charge lamp OFF : Normal )	*The alternator terminal L stays at "L" after the start delay period.
Load center cover or door open	Safety switch ( ON : Open ) ( OFF : Closed )	*The door limit switch comes ON when the key switch is set from "START" to "ON" position at starting. ( *The door limit switch is located on the load center cover and on the access door. *The door limit switch is activated when the load center cover or the access door is opened. )

### NOTE :Start-up delay time

- All the alarms but the door-related one are kept inactive for a certain period of time (7 to 14 seconds) after the key switch is set from "START" to "ON" position.

### Start delay period.

This interval is necessary to prevent the engine from shutting down while oil pressure is still low after engine start-up.

## 2. Method at start-up

- Set the key switch to "ON" position, and the electric fuel feed pump turns ON.
- Set the key switch to "GLOW" position, and the solenoid turns ON.
- Set the key switch to "START" position, and the starter is activated. Turn it back to "ON" position, and the emergency unit starts automatic detecting.

### NOTE :

- If the starter is activated but the engine fails to start, the oil pressure switch stays ON. If the key switch is turned and left at "ON" position in this state, the solenoid and fuel electric feed pump will turn OFF after the start delay period. To have the engine restarted, turn the key switch back to "OFF" position again.

## 3. Method with an alarm

- If any of the warning lamps is ON, turn OFF the solenoid and electric fuel feed pump and the engine stops.
- To restart the engine, turn the key switch back to "OFF" position then start again.

### IMPORTANT :

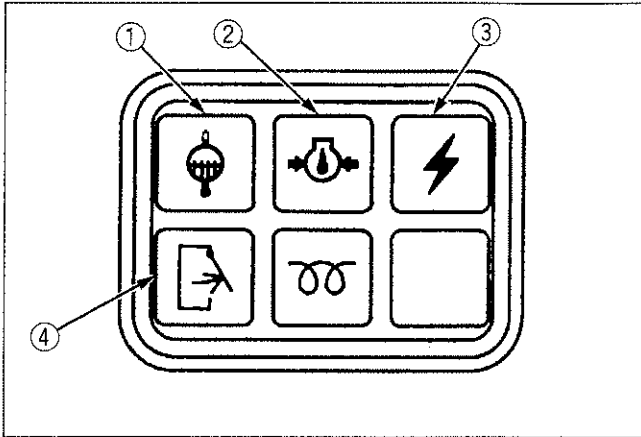
- When this device stops the engine, it may be that a malfunction and some minor damage to the engine has occurred. To limit engine damage as much as possible, please do not make the assumption that shut down was a false alarm. Check unit thoroughly prior to restarting.

### NOTE :

- Be sure to turn the key switch back to "OFF" position, or the battery will be dead.

#### 4. Alarms and Corrective Measures

If a trouble occurs during operation, a corresponding indicator lamp lights up and the engine stops. Determine at which lamp is ON, and pinpoint and correct the cause of trouble.



- (1) Water temperature lamp  
Lights up if the engine is overheating.
- (2) Oil pressure lamp  
Lights up if engine oil pressure is too low.
- (3) Battery charge lamp  
Lights up if there is a battery problem or if the belt is broken.
- (4) Load center cover or access door open lamp  
Lights up if the load center cover or the access door is opened.

Light-up	Possible Causes	Countermeasures
Lamp (1)	Engine overheating.	*See "Precaution Overheating" in "MAINTENANCE" section. (See page 50)
	Water temperature sensor faulty.	*Replace the water temperature sensor.
	Water temperature sensor wiring faulty.	*Repair the wiring.
Lamp (2)	Insufficient engine oil.	*Add engine oil.
	Lubricating system in trouble.	*Check the system.
	Oil pressure sensor faulty.	*Replace the sensor.
	Oil pressure sensor wiring faulty.	*Repair the wiring.
Lamp (3)	Fan belt loose or damaged.	*Readjust belt tension or replace the belt.
	Alternator terminal in poor contact.	*Connect tightly.
	Alternator problem.	*Check the alternator.
Lamp (4)	Load center cover or access door opened.	*Close the cover or the door.
	Limit switch faulty.	*Replace the limit switch.
	Limit switch wiring faulty.	*Repair the wiring.

# TROUBLESHOOTING

If the engine does not function properly, use the following chart to identify and correct the cause.

## ■ When it is difficult to start the engine.

Cause	Countermeasures
<b>Fuel is thick and doesn't flow.</b>	*Check the fuel tank and fuel filter. Remove water, dirt and other impurities. *As all fuel will be filtered by the filter, if there should be water or other foreign matters on the filter, clean the filter with kerosene or replace the filter.
<b>Air or water mixed in fuel system.</b>	*If air is in the fuel filter or injection lines, the fuel pump will not work properly. To attain proper fuel injection pressure, check carefully for loosened fuel line coupling, cap nut and etc. *Loosen joint bolt atop fuel filter and air vent screws of fuel injection pump to eliminate all the air in the fuel system.
<b>Thick carbon deposits on orifice of injection nozzle.</b>	*This is caused when water or dirt is mixed in the fuel. Clean the nozzle injection piece, being careful not to damage the orifice. *Check to see if nozzle is working properly or not. If not, install a new nozzle.
<b>Valve clearance is wrong.</b>	* [Engine model: D1703-EBG, V2203-EBG] Adjust valve clearance to 0.145 to 0.185 mm (0.0057 to 0.0072 in.) when the engine is cold. [Engine model: V3300-EBG] Adjust valve clearance to 0.18 to 0.22 mm (0.0070 to 0.0087 in.) when the engine is cold.
<b>Leaking valves</b>	*Grind valves.
<b>Fuel injection timing is wrong.</b>	*Adjust injection timing * [Engine model: D1703-EBG, V2203-EBG] The injection timing 16.5° before top dead center. [Engine model: V3300-EBG] The injection timing 18.0° before top dead center.
<b>Engine oil becomes thick in cold weather and engine cranks slow.</b>	*Change grade of oil according to the weather (temperature).
<b>Low compression</b>	*Bad valve or excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts.
<b>Battery is discharged and the engine will not crank.</b>	*Charge battery. *In winter, always remove battery from machine, charge fully and keep indoors. Install in machine at time of use.

### NOTE:

- If the cause of trouble cannot be found, contact your local KUBOTA Dealer.

## ■ When starter does not start.

Cause	Countermeasures
<b>Battery discharges too much</b>	*Recharge battery.
<b>Load center cover or inspection door are opened.</b>	*Close the load center cover and door.
<b>Defect of contact point or shortage of alternator L-shaped coupler</b>	*Check wiring and repair.
<b>Alternator defect</b>	*Replace.
<b>Fuse blows.</b>	*Replace.

### When output is insufficient

Cause	Countermeasures
Carbon stuck around orifice of nozzle piece	*Clean orifice and needle valve, being very careful not to damage the nozzle orifice. *Check nozzle to see if good. If not, replace with new parts.
Compression is insufficient. Leaking valves	*Bad valve and excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts. *Grind valves.
Fuel is insufficient.	*Check fuel system.
Overheating of moving parts	*Check lubricating oil system. *Check to see if lubricating oil filter is working properly. *Filter element deposited with impurities would cause poor lubrication. Change element. *Check that bearing clearances are within factory specs. *Check injection timing.
Valve clearance is wrong.	[Engine model : D1703-EBG, V2203-EBG] *Adjust valve clearance to 0.145 to 0.185 mm (0.0057 to 0.0072 in.) with the engine is cold. [Engine model : V3300-EBG] *Adjust valve clearance to 0.18 to 0.22 mm (0.0070 to 0.0087 in.) with the engine is cold.
Air cleaner is dirty	*Clean the element every 250 hours of operation.
Fuel injection pressure is wrong.	*Adjust to proper pressure. 13.7 Mpa (140 kg/cm <sup>2</sup> , 1991 psi)
Injection pump wear	*Do not use poor quality fuel as it will cause wear of the pump. Only use No.2-D diesel fuel. *Check the fuel injection pump element and delivery valve assembly and replace as necessary.

### When engine suddenly stops

Cause	Countermeasures
Lack of fuel	*Check the fuel tank and refill the fuel, if necessary. *Also check the fuel system for air or leaks.
Bad nozzle	*If necessary, replace with a new nozzle.
Moving parts are overheated due to shortage of lubrication oil or improper lubrication.	*Check amount of engine oil with oil level gauge. *Check lubricating oil system. *At every second oil change, oil filter cartridge should be replaced. *Check to see if the engine bearing clearances are within factory specs.

#### NOTE:

- When the engine has suddenly stopped, decompress the engine by the decomp and turn the engine lightly by pulling on the fan belt. If the engine turns easily without abnormalities, the cause of the trouble is usually lack of fuel or bad nozzle.

### When color of exhaust smoke is black and excessive

Cause	Countermeasures
Fuel governing device bad	*Contact dealer for repairs.
Fuel is of extremely poor quality.	*Select good quality fuel Use No.2-D diesel fuel only.
Nozzle is bad.	*If necessary, replace with new nozzle.
Combustion is incomplete.	*Cause is poor atomization, improper injection timing, etc. Because of trouble in injection system or in poor valve adjustment, or compression leakage, poor compression, etc. Check for the cause.
Engine is operating in overload condition.	*Diagnose and eliminate reason for overload.



### ■ When engine must be stopped immediately

Cause	Countermeasures
Engine revolution suddenly decreases or increases.	*Check the adjustments, injection timing and the fuel system.
Unusual sound is heard suddenly.	* Check all moving parts carefully.
Color of exhaust suddenly turns dark.	*Check the fuel injection system, especially the fuel injection nozzle. *Check for overload condition.
Bearing parts are overheated.	*Check the lubricating system.
Oil lamp lights up during operation.	*Check lubricating system. *Check, if the engine bearing clearances are within factory specs. *Check the function of the relieve valve in the lubricating system. *Check pressure switch. *Check filter base gasket.

### ■ When engine overheats

Cause	Countermeasures
Engine oil insufficient	*Check oil level. Replenish oil as required.
Fan belt broken or elongated	*Change belt or adjust belt tension.
Coolant insufficient	*Replenish coolant.
Excessive concentration of antifreeze	*Add water only or change to coolant with the specified mixing ratio.
Radiator net or radiator fin clogged with dust	*Clean net or fin carefully.
Inside of radiator or coolant flow route corroded	*Clean or replace radiator and parts.
Fan or radiator or radiator cap defective	*Replace defective part.
Thermostat defective	*Check thermostat and replace if necessary.
Temperature gauge or sensor defective	*Check temperature with thermometer and replace if necessary.
Overload running	*Reduce load.
Head gasket defective or water leakage	*Replace parts.
Incorrect injection timing	*Adjust to proper timing.
Unsuitable fuel used	*Use the specified fuel.

**Generator Troubleshooting**

Trouble	Possible causes	Correction
<b>Unusual noise or vibration</b>	Single-phase load applied beyond allowable level (on three phase models).	*Lower the load to acceptable level.
	Bearing deteriorated.	*Replace the bearing.
	Coupling damaged.	*Replace the coupling.
<b>Frame overheated.</b>	Cooling fan inlet or outlet blocked.	*Unblock the inlet or outlet.
	Voltage too high.	*Readjust the voltage.
	Overloaded.	*Reduce the load.
<b>Voltage failure to rise.</b>	Voltage maladjusted.	*Readjust using the voltage control.
	AVR excitation output cable broken.	*Repair the cable.
	AVR itself in trouble.	*Replace the AVR.
	Exciter's winding short-circuited or broken.	*Replace the generator.
	AVR excitation input cable broken.	*Repair the cable.
	Generator's winding broken.	*Replace the generator.
<b>Voltage too high.</b>	AVR excitation output fuse blown out.	*Replace the fuse.
	Voltage maladjusted.	*Readjust using the voltage control.
	AVR voltage detection cable broken.	*Repair the cable.
	AVR itself in trouble.	*Replace the AVR.
<b>Voltage hunting</b>	Mercury arc lamp or such conductive load connected.	*Disconnect such load.
	Inverter or such switching load connected.	*Disconnect such load.
<b>Circuit breaker turned OFF.</b>	AVR itself in trouble.	*Replace the AVR.
	Connected cable or load short-circuited.	*Contact a qualified electrical engineer for inspection.
<b>Pilot lamp failure to light up</b>	Overloaded.	*Reduce the load.
	Lamp bulb broken.	*Replace the bulb.
	Generator voltage too low.	*See "Voltage failure to rise" above.