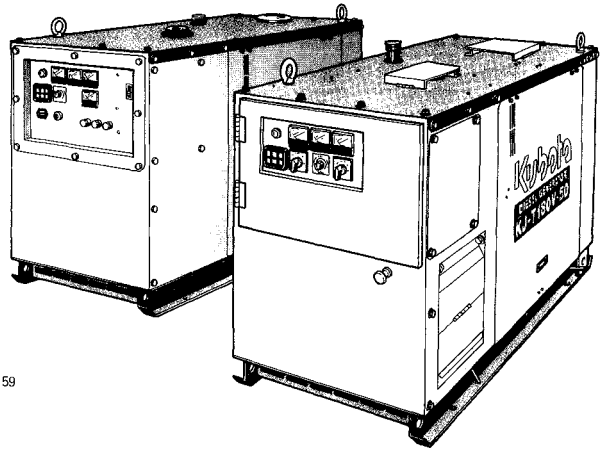
OPERATOR'S MANUAL

ENGLISH

KUBOTA
DIESEL GENERATOR

KJ-S130VX-AUS·KJ-T130DX-AUS·KJ-T180VX-AUS
KJ-S240-AUS·KJ-T300-AUS
KJ-S130VX·KJ-T130DX·KJ-T180VX·KJ-T300
KJ-S150VX·KJ-T160DX·KJ-T210VX



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READ AND SAVE THIS MANUAL

Kubota

⚠ WARNING

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.

FOREWORD

You are now the proud owner of a KUBOTA Diesel Engine Generator. This generator is a product of KUBOTA quality engineering and manufacturing. It is made of fine materials, under a rigid quality control system. And will give you long, satisfactory service. To obtain the more (productive) use of your generator, please read this manual carefully. It will help you become familiar with the operation of the generator, and contains many helpful hints about generator maintenance. It is KUBOTA's policy to utilize as quickly as possible every advance in our research. The immediate use of new techniques in the manufacture of products may cause some small parts of this manual to be outdated. KUBOTA distributors and dealers will have the most up-to-date information. Please do not hesitate to consult with them.

⚠ SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use this unit.

⚠ **DANGER** :	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ **WARNING** :	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ **CAUTION:**	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
IMPORTANT :	Indicates that equipment or property damage could result if instructions are not followed.
NOTE :	Gives helpful information.

ENGLISH

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⚠ 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 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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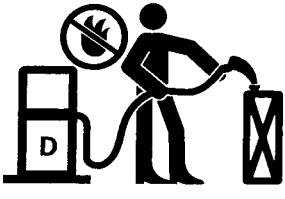
KEEP THE AREA AROUND THE ENGINE CLEAN

B-1500

- 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.

SAFE HANDLING OF FUEL AND LUBRICANTS



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- 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.

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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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 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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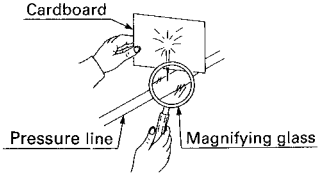

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CAUTIONS AGAINST BURNS & BATTERY EXPLOSION

- 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, there is a risk of explosion. 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.

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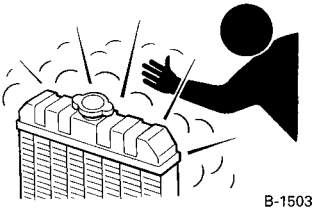

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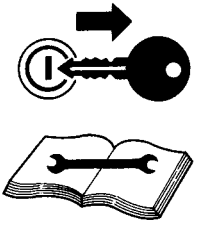
CONDUCTING SAFETY CHECKS & MAINTENANCE

- 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 ⊖ 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.



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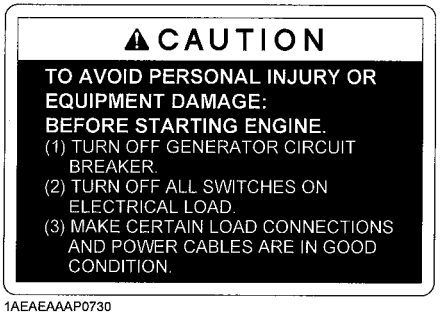
DANGER, WARNING AND CAUTION LABELS

Pay special attention to all labels on the generator.
Refer to following representations for labels used on the KJ-Series Generator. Labels are available individually from your KUBOTA Dealer.

(1) Part No. G3341-8851-0



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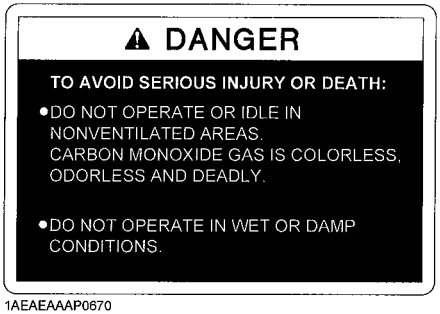
(2) Part No. G3341-8824-0



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(3) Part No. 18620-8806-0

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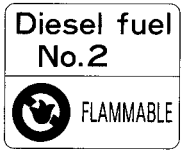
(4) Part No. 18901-5090-0



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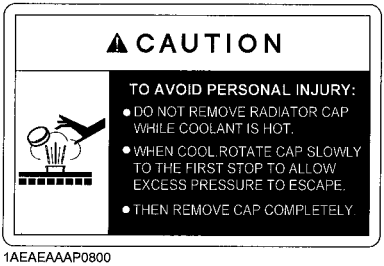

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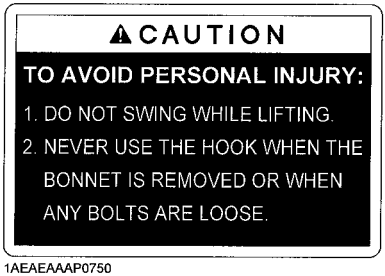
(6) Part No. G3352-8836-0



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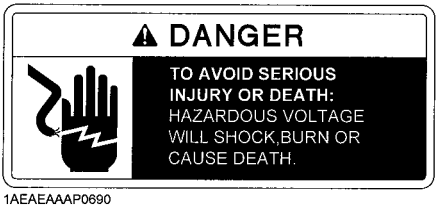

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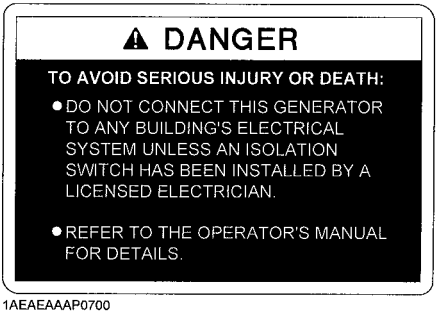
(8) Part No. G3341-8831-0



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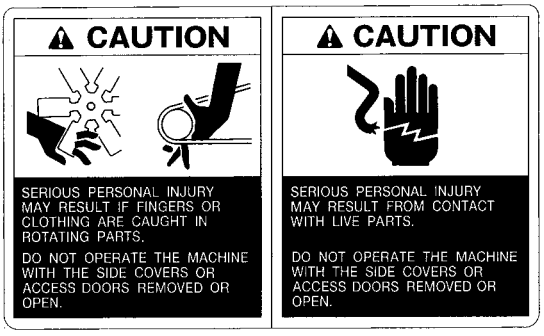
(9) Part No. G3781-8825-0



(10) Part No. G3102-8806-0

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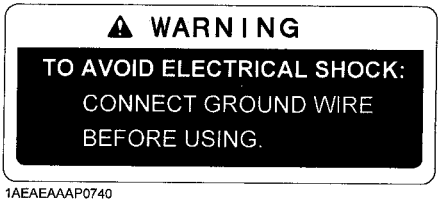
(11) Part No. G3341-8895-0



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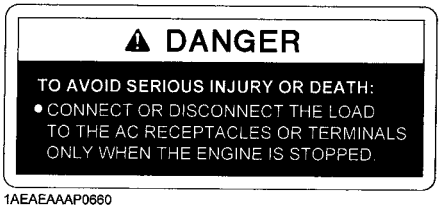

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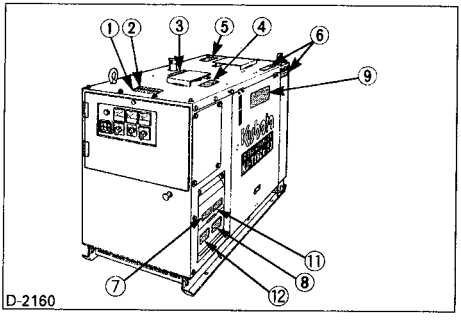
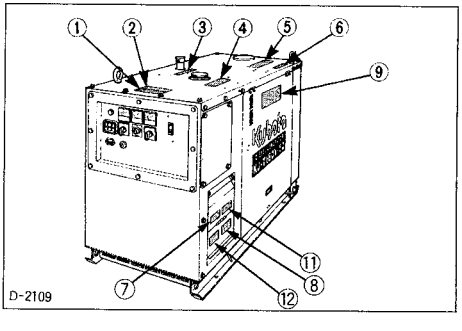
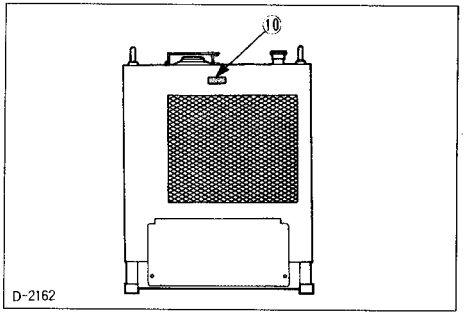
【For AUS Type】



【For General Type】





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.

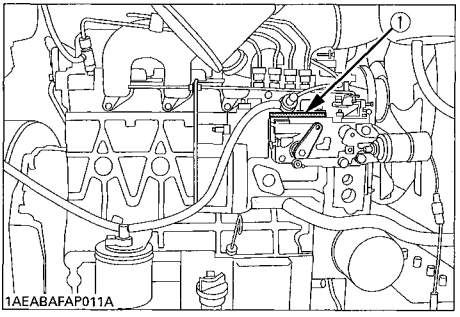
SERVICING OF GENERATOR

Your dealer is interested in your new generator and has the desire to help you get the most value from it. After reading this manual thoroughly, you will find that you can do some of the regular maintenance yourself.
However, when in need of parts or major service, be sure to see your KUBOTA dealer.
For service, contact the KUBOTA Dealership from which you purchased your generator or your local KUBOTA dealer.
When in need of parts, be prepared to give your dealer the generator and engine serial numbers.
Locate the serial numbers now and record them in the space provided below.

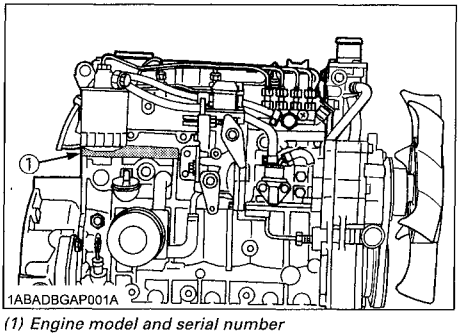
	model	Serial No.
generator	_____	_____
Engine	_____	_____
Date of Purchase	_____	
Name of Dealer	_____	

(To be filled in by purchaser)

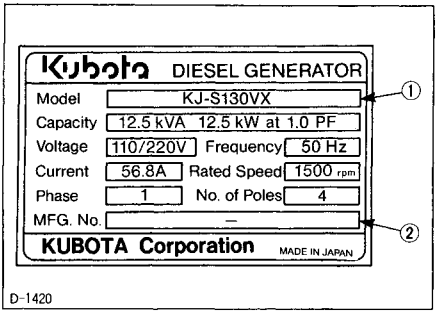
[Engine model : D1703-EBG, V2203-EBG]



[Engine model : V3300-EBG]



(1) Engine model and serial number



(1) Generator model
(2) Generator serial number

ENGLISH

SPECIFICATIONS

General Type (50Hz)

Model	Unit	KJ-S130VX	KJ-T130DX	KJ-T180VX	KJ-T300
Generator					
Generator type		PX-316KU1	PX-312KU3	PX-316KU3	PX-322KE3
Type		Revolving field, self-excited brushless AC generator			
Rated output	kVA	12.5	12.5	18.0	30.0
	kW	12.5	10.0	14.4	24.0
No. of phase		1 Phase 3 wires	3 Phases 12 wires		
Power factor	%	100	80		
Rating		Continuous			
Rated voltage	V	110/220	380 415	380 415	380
Current	A	56.8	19.0 17.4	27.3 25.0	45.6
Rated frequency	Hz	50			
Insulation class		H			
Excitation		Self-excitation			
No. of poles		4			
Drive		Direct drive			
Engine speed	rpm	1500			
Ambient temperature range	°C	–15 to 40			
Length x Width x Height	mm	1488 x 650 x 971	1393 x 650 x 971	1488 x 650 x 971	1717 x 824 x 1046
Mass	kg	505	450	505	710
Engine					
Model		V2203	D1703	V2203	V3300
Type		Vertical water cooled 4 cycle diesel			
Cylinders – Bore x Stroke	mm	4 – 87 x 92.4	3 – 87 x 92.4	4 – 87 x 92.4	4 – 98 x 110
Displacement	mL	2197	1647	2197	3318
Rated output	kW (PS)	16.9 (23.0)	12.7 (17.2)	16.9 (23.0)	26.8 (36.4)
Fuel		Diesel fuel No. 2-D (ASTM D975)			
Fuel consumption	L/h	5.3	4.0	5.3	7.7
Fuel tank capacity	L	37			60
Engine oil grade		API service class CD or higher			
Engine oil capacity	L	7.6	5.6	7.6	13.2
Coolant capacity ※	L	9.0	8.0	9.0	9.5
Battery capacity	(V x AH/5Hr)	95D31R (12 x 64)			130E41R (12 x 92)
Emergency stop system		In case of abnormal Oil Pressure or water temperature			

※ Including the reserve tank

■ General Type (60Hz)

Model	Unit	KJ-S150VX	KJ-T160DX	KJ-T210VX
Generator				
Generator type		PX-316KU1	PX-312KU3	PX-316KU3
Type		Revolving field, self-excited brushless AC generator		
Rated output	kVA	15.0	15.6	21.0
	kW	15.0	12.5	16.8
No. of phase		1 Phase 3 wires	3 Phases 12 wires	
Power factor	%	100	80	
Rating		Continuous		
Rated voltage	V	110/220 120/240	220 380	220 380
Current	A	68.2 62.5	40.9 23.7	55.1 31.9
Rated frequency	Hz	60		
Insulation class		H		
Excitation		Self-excitation		
No. of poles		4		
Drive		Direct drive		
Engine speed	rpm	1800		
Ambient temperature range	°C	–15 to 40		
Length x Width x Height	mm	1488 x 650 x 971	1393 x 650 x 971	1488 x 650 x 971
Mass	kg	515	450	490
Engine				
Model		V2203	D1703	V2203
Type		Vertical water cooled 4 cycle diesel		
Cylinders – Bore x Stroke	mm	4 – 87 x 92.4	3 – 87 x 92.4	4 – 87 x 92.4
Displacement	mL	2197	1647	2197
Rated output	kW (PS)	19.9 (27.1)	14.9 (20.3)	19.9 (27.1)
Fuel		Diesel fuel No. 2-D (ASTM D975)		
Fuel consumption	L/h	6.3	4.7	6.2
Fuel tank capacity	L	37		
Engine oil grade		API service class CD or higher		
Engine oil capacity	L	7.6	5.6	7.6
Coolant capacity ※	L	9.0	8.0	9.0
Battery capacity	(V x AH/5Hr)	95D31R (12 x 64)		
Emergency stop system		In case of abnormal Oil Pressure or water temperature		

※ Including the reserve tank

■ AUS Type (50Hz)

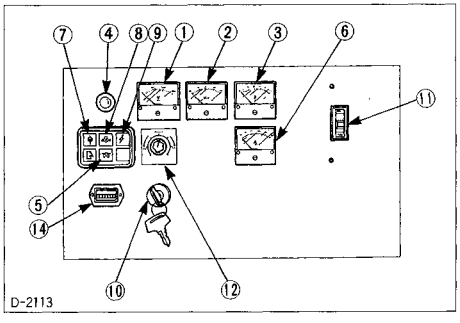
Model	Unit	KJ-S130VX-AUS	KJ-T130DX-AUS	KJ-T180VX-AUS	KJ-S240-AUS	KJ-T300-AUS
Generator						
Generator type		PX-316KU1	PX-312KU3	PX-316KU3	PX-322KE1	PX-322KE3
Type		Revolving field, self-excited brushless AC generator				
Rated output		12.5	12.5	18.0	24	30
	kVA	12.5	10.0	14.4	24	
No. of phase	kW	1 Phase 3 wires	3 Phases 12 wires		1 Phases 4 wires	3 Phases 12 wires
Power factor	%	100	80		100	80
Rating		Continuous				
Rated voltage	V	240	240/415		240	240/415
Current	A	52.1	17.4	25.0	100	41.7
Rated frequency	Hz	50				
Insulation class		H				
Excitation		Self-excitation				
No. of poles		4				
Drive		Direct drive				
Engine speed	rpm	1500				
Ambient temperature range	°C	–15 to 40				
Length x Width x Height	mm	1518 x 650 x 971	1423 x 650 x 971	1518 x 650 x 971	1735 x 805 x 1046	
Mass	kg	505	470	505	715	
Engine						
Model		V2203	D1703	V2203	V3300	
Type		Vertical water cooled 4 cycle diesel				
Cylinders – Bore x Stroke	mm	4 – 87 x 92.4	3 – 87 x 92.4	4 – 87 x 92.4	4 – 98 x 110	
Displacement	mL	2197	1647	2197	3318	
Rated output	kW (PS)	16.9 (23.0)	12.7 (17.2)	16.9 (23.0)	27.6 (37.5)	
Fuel		Diesel fuel No. 2-D (ASTM D975)				
Fuel consumption	L/h	5.3	4.0	5.3	6.9	
Fuel tank capacity	L	37			60	
Engine oil grade		API service class CD or higher				
Engine oil capacity	L	7.6	5.6	7.6	13.2	
Coolant capacity ※	L	9.0	8.0	9.0	9.5	
Battery capacity	(V x AH/5Hr)	95D31R (12 x 64)			130E41R (12 x 92)	
Emergency stop system		In case of abnormal Oil Pressure or water temperature				

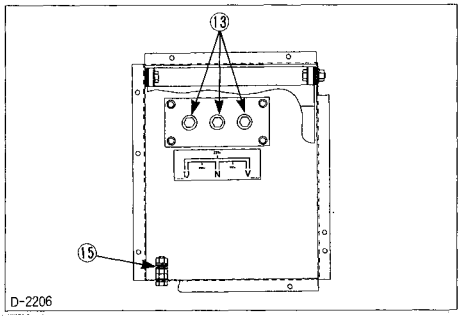
※ Including the reserve tank

INSTRUMENT PANEL AND PART NAMES

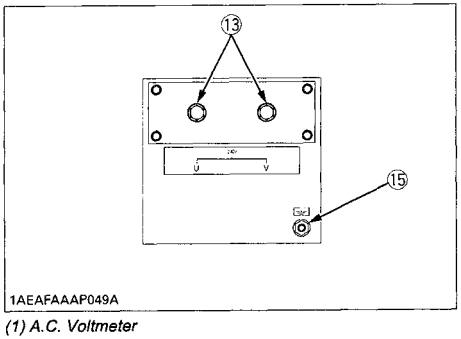
Control Panel

1 Phase Type
[KJ-S130VX, KJ-S150VX]



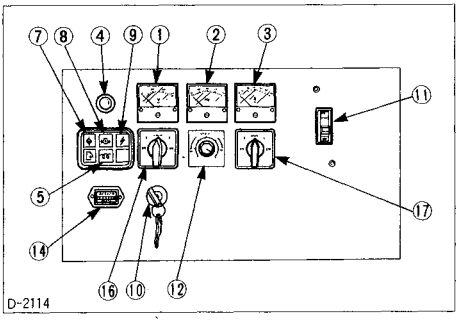


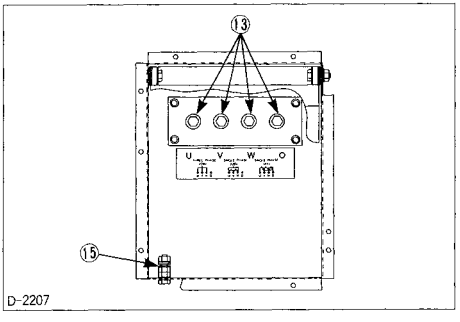
[KJ-S240-AUS]



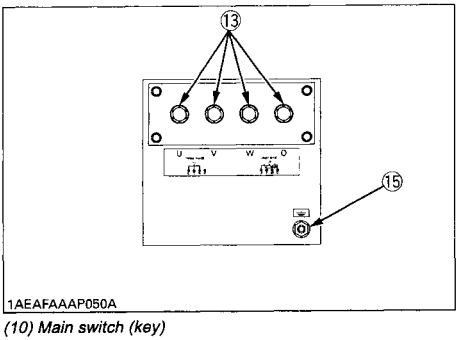
(1) A.C. Voltmeter
(2) Frequency meter
(3) A.C. Ammeter
(4) Pilot lamp
(5) Glow plug lamp
(6) A.C. Ammeter
(7) Water temperature lamp
(8) Oil pressure lamp
(9) Battery charge lamp

3 Phases Type
[KJ-T130DX, KJ-T180VX, KJ-T300, KJ-T160DX, KJ-T210VX]



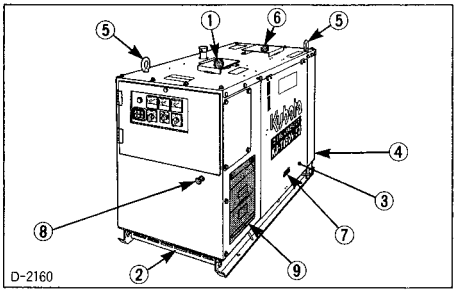


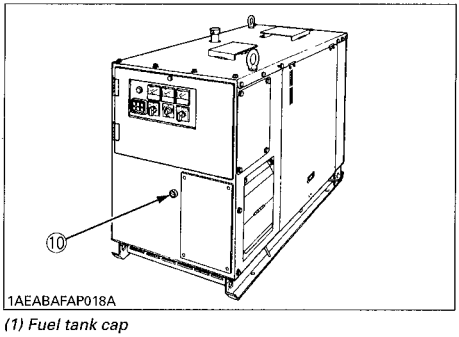
[KJ-T300-AUS]



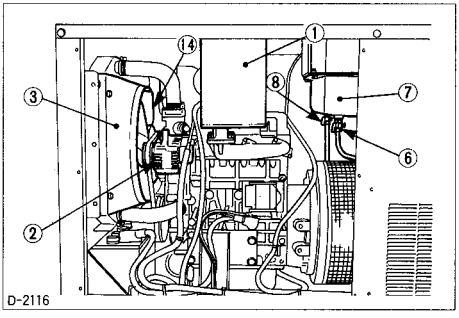
(10) Main switch (key)
(11) Circuit breaker
(12) Voltage adjuster
(13) Terminals
(14) Hour meter
(15) Ground terminal
(16) Voltmeter change-over switch
(17) Ammeter change-over switch

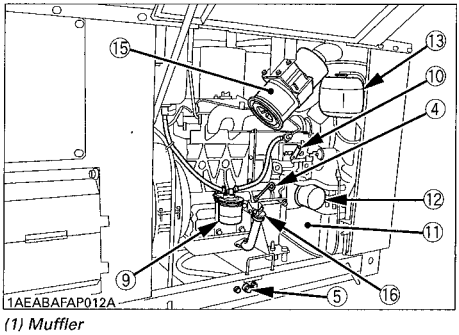
Part Names





(1) Fuel tank cap
(2) Cooling air inlet
(3) Door
(4) Cooling air outlet
(5) Handling hook
(6) Radiator top cover
(7) Door handle
(8) Stop knob (for KJ-S130VX, KJ-T130VX, KJ-T180VX)
(9) Load center cover
(10) Stop switch (for KJ-S240, KJ-T300)





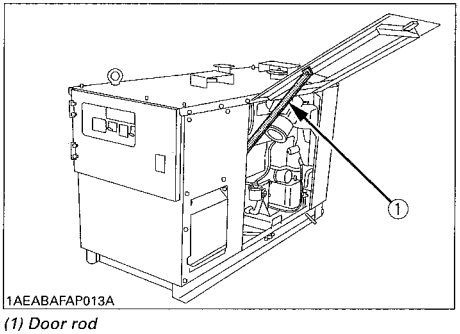
(1) Muffler
(2) Alternator
(3) Radiator
(4) Oil dipstick
(5) Engine oil drain plug
(6) Fuel tank drain tap
(7) Fuel tank
(8) Fuel tank tap
(9) Fuel filter cartridge
(10) Stop lever
(11) Battery
(12) Oil filter cartridge
(13) Reserve tank
(14) Fan
(15) Air cleaner
(16) Engine oil port

PREPARATION FOR FIRST OPERATION

CAUTION:
To avoid personal injury:
- **To avoid personal injury from contact with moving parts;**
- **Never 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

Open the machine door and hold it open with the door rod ①.



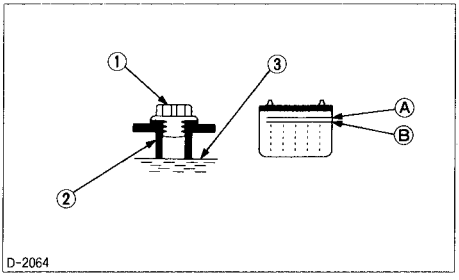
(1) Door rod

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 stands below the LOWER (lower limit level) mark. Otherwise, the battery component parts may get deteriorated earlier than expected, which may shorten the battery's service life or 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. Charge the battery at the normal charging current of 6.0 amperes.
6. Replace the vent plugs, and wash off any electrolyte which may have spilled.



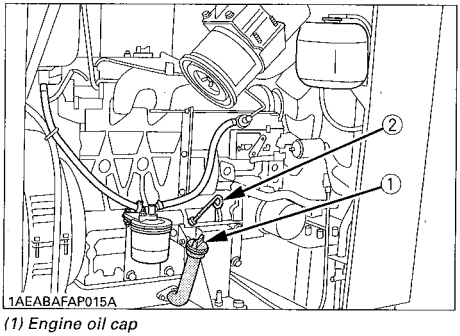
(1) Vent plug opening
(2) Electrolyte level indication tube
(3) Indicated level
(A) Upper level
(B) Lower level

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).
  TEMPERATURE CORRECTION FOR HYDROMETER READING
  S20=St+{0.0007 (t-20)}
  S20 ..... Sp. Gravity at 20°C (After temperature correction)
  St ..... Sp. Gravity at t°C (Hydrometer reading)
  0.0007 ..... Temperature correction factor
  t ..... Observed temperature of electrolyte

Engine Oil

The generator has been shipped without engine oil. Fill with oil or it will not start.

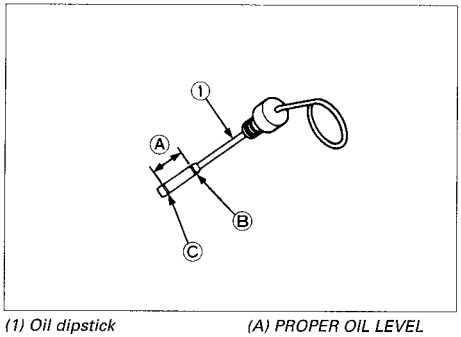
1. Place the machine on a level surface.
2. Remove the oil cap.
3. Add engine oil of grade CD or higher, up to the upper mark on the oil dipstick.



(1) Engine oil cap
(2) Oil dipstick

Engine oil capacity liters.

Model	Capacity
KJ-T130DX, KJ-T160DX, KJ-T130DX-AUS	5.6
KJ-S130VX, KJ-S150VX, KJ-T180VX, KJ-T210VX, KJ-S130VX-AUS, KJ-T180VX-AUS	7.6
KJ-T300, KJ-S240-AUS, KJ-T300-AUS	13.2



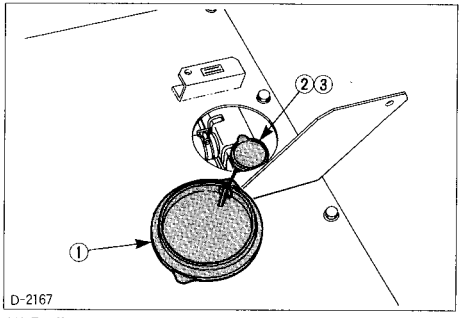
(1) Oil dipstick
(A) PROPER OIL LEVEL
(B) Upper level
(C) Lower level

Coolant

CAUTION:
To avoid personal injury:

- **DO NOT remove the radiator cap while coolant is hot. When cool, rotate the radiator cap to the first stop to allow excess pressure to escape. Then remove cap completely.**
- **Place the machine on a level surface.**
- **Keep the machine at least 1m away from any structures to provide ample space for the cooling air inlet and outlet.**

To add coolant to the radiator, remove the radiator top cover and remove the radiator pressure cap. Add coolant until the water covers the radiator core tubes. Next, open the door of machine on the right side and add coolant to the specified level (punched line) of the reserve tank. Thereafter, add water only to the reserve tank.
Always use antifreeze and anti-boil to prevent cooling system damage from freezing or overheating.
Pre-mix antifreeze before adding to the radiator.
Use permanent type 50/50 mix anti-freeze.
Do not intermix different brands.

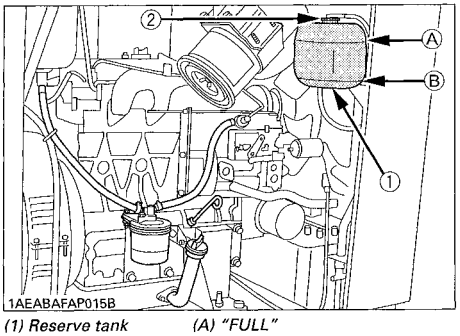


(1) Radiator top cover
(2) Radiator cap
(3) Coolant filling port

Coolant capacity liters.

Model	Capacity
KJ-T130DX, KJ-T160DX, KJ-T130DX-AUS	8.0
KJ-S130VX, KJ-S150VX, KJ-T180VX, KJ-T210VX, KJ-S130VX-AUS, KJ-T180VX-AUS	9.0
KJ-T300, KJ-S240-AUS, KJ-T300-AUS	9.5

Including the reserve tank



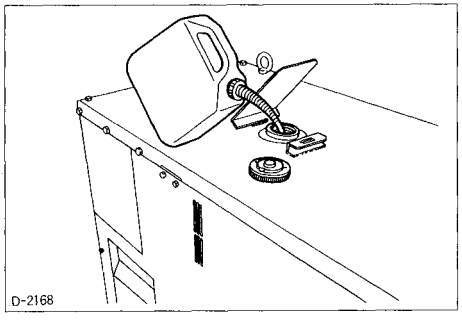
(1) Reserve tank *(A) "FULL" Upper line 1.1L*
(2) Cap *(B) "LOW"*

Fuel

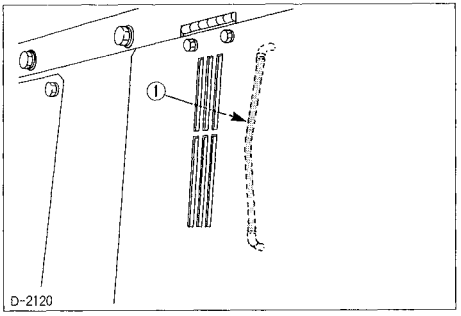
WARNING:
To avoid personal injury:

- **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 enters 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.



5. The fuel level can be checked on the fuel gauge.



(1) Fuel gauge

Fuel tank capacity liters

Model	Capacity
KJ-S130VX, KJ-T130DX, KJ-T180VX, KJ-S150VX, KJ-T160DX, KJ-T210VX, KJ-S130VX-AUS, KJ-T130DX-AUS, KJ-T180VX-AUS	37
KJ-T300, KJ-S240-AUS, KJ-T300-AUS	60

NOTE:
No.2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service.
(SAE J313 JUN87)
Grade of Diesel Fuel Oil According to ASTM D975

Flash Point, °C (°F)	Water and Sediment, volume %	Carbon Residue on, 10 percent Residuum, %	Ash, weight %
Min	Max	Max	Max
52 (125)	0.05	0.35	0.01

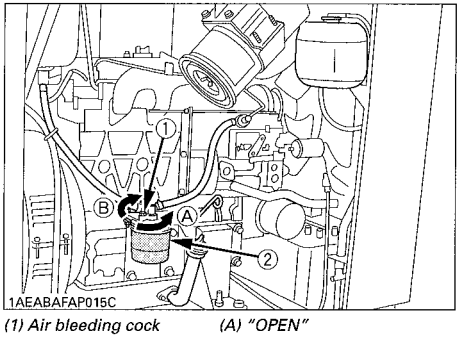
Distillation Temperatures, °C(°F) 90% Point		Viscosity Kinematic cSt or mm^2/s at 40 °C		Viscosity Saybolt, SUS at 37.8 °C (100°F)		Sulfur, weight %	Copper strip Corrosion	Cetane Number
Min	Max	Min	Max	Min	Max	Max	Max	Min
282 (540)	338 (640)	1.9	4.1	32.6	40.1	0.50	No.3	40

■ Bleeding Air from the Fuel Lines

CAUTION:
To avoid personal injury:
- **Always keep the air bleeding plug on the fuel filter closed except when bleeding the air.**
- **DO NOT perform bleeding operation when engine is hot.**

NOTE:
Always bleed the air completely in the following circumstances.
- When adding fuel into an empty tank.
- When refueling after the engine stops after running completely out of fuel.
- Whenever the fuel system is drained for fuel filter cleaning or other fuel system servicing.

1. Fill the fuel tank with fuel.
2. Turn the fuel tank tap open.
3. Open the air bleeding plug on the fuel filter.
4. If a clear flow of fuel from the plug, close it immediately.



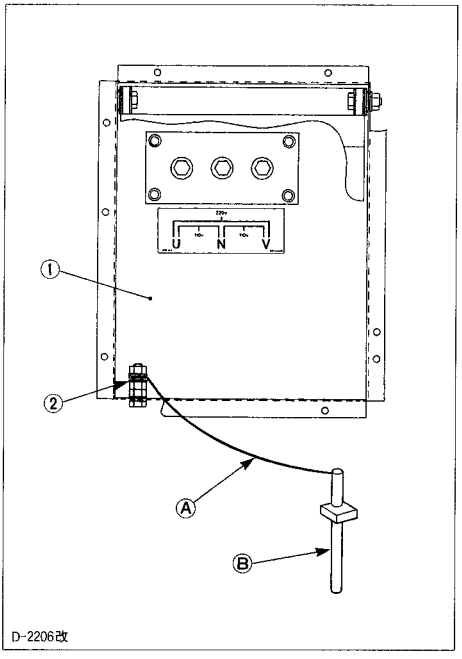
(1) Air bleeding cock *(A) "OPEN"*
(2) Fuel filter cartridge *(B) "CLOSE"*

5. Rotate the engine for about 30 seconds, and then stop the engine.
6. Wipe up any spilled fuel immediately.

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, NFPA AUSTRALIAN STANDARDS and OSHA regulations must be followed to assure compliance and safe operation.
A grounding lug is provided on the Kubota generator frame for earth grounding depending on 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. Capacity of Electrical Devices Possible

APPLICATION RANGE

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

Typical Apparatus	Light and heaters	Commutator motor	Induction motor
KJ-S130VX	12.5 kVA (12.5 kW)	8.0 kVA (6.4 kW)	—
KJ-S240	24.0 kVA (24.0 kW)	15.0 kVA (12.0 kW)	—
KJ-T130DX	10.0 kVA (10.0 kW)	7.5 kVA (6.0 kW)	5.5 kW 3 Phases
KJ-T180VX	14.4 kVA (14.4 kW)	10.5 kVA (8.4 kW)	7.5 kW 3 Phases
KJ-T300	24.0 kVA (24.0 kW)	19.0 kVA (15.2 kW)	11.0 kW 3 Phases
KJ-S150VX	15.0 kVA (15.0 kW)	9.5 kVA (7.6 kW)	—
KJ-T160DX	12.5 kVA (12.5 kW)	9.5 kVA (7.6 kW)	5.5 kW 3 Phases
KJ-T210VX	16.8 kVA (16.8 kW)	12.5 kVA (10.0 kW)	7.5 kW 3 Phases

NOTE:

- The data shown above is only a guideline for approximate load capacities, 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 output characteristics peculiar to each load. Note that the starting current is not taken account of in these approximate values.
- 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.
- The power factor is used to determine input of the electrical devices.

AC devices

Electric power (W)

= Voltage (V) × Current (A) ÷ Power factor

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

	Power factor
Single-phase induction motor	0.4 to 0.6
Fluorescent lighting and indoor incandescent lighting	0.4 to 0.6
Outdoor incandescent light and heaters	1.0
AC arc welder	0.4 to 0.6

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

$$\text{Motor input kVA} = \frac{\text{Motor output (HP)}}{\text{Motor efficiency x power factor x 1.34}}$$

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 is not a trouble 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 and make sure no flickering appears any longer.

PRE-OPERATION CHECK

DAILY CHECK

To prevent problems from occurring, it is important to know the conditions of the generator well. 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 water 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 "DAILY CHECK" in periodic service section.)
-Care of danger, warning and caution labels
(See "DANGER, WARNING AND CAUTION LABELS" in safe operation section.)

OPERATING THE ENGINE

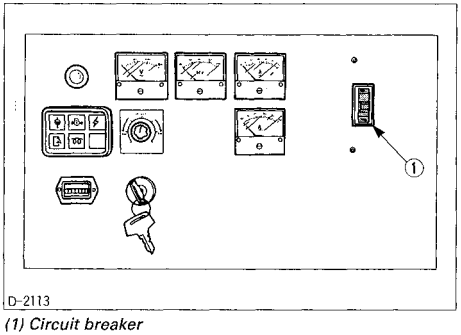
CAUTION:
To avoid personal injury:
- **Read "Safe Operation" in the front of this manual.**
- **Read the danger, warning and caution labels located on the generator.**
- **To avoid the danger of exhaust fume poisoning, do not operate the engine in a closed building without proper ventilation.**
- **Always 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.**

IMPORTANT:
- Do not use ether or any starting fluid for starting the engine, or a severe damage will occur.
- To protect the battery and the starter, make sure that the starter is not continuously turned for more than 10 seconds.

STARTING THE ENGINE

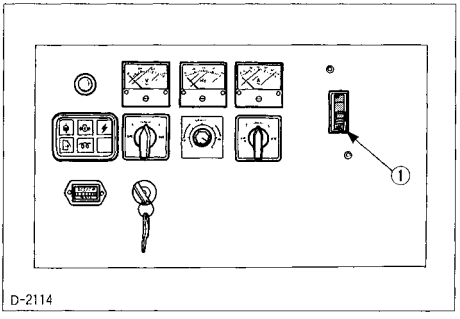
1. Turn OFF the circuit breaker on the control panel.

[KJ-S130VX, KJ-S150VX]



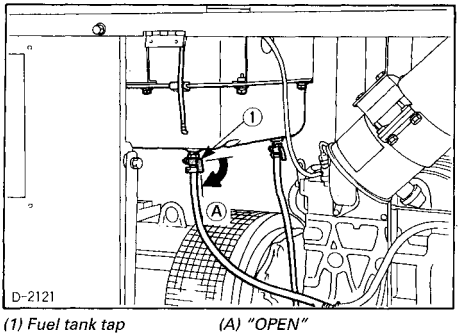
(1) Circuit breaker

[KJ-T130DX, KJ-T180VX, KJ-T300, KJ-T160DX, KJ-T210VX]



(1) Circuit breaker

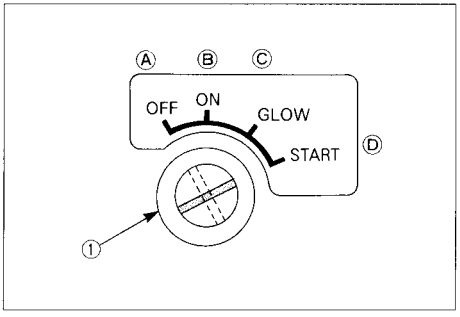
2. Turn OFF all switches for the electrical devices.
3. Turn the fuel tank tap to the "OPEN" position.



(1) Fuel tank tap *(A) "OPEN"*

CAUTION:
To avoid personal injury:
- **Never open the door or generator side cover while the engine is running.**

4. Insert the key into the key switch.
5. Turn the key to the "START" position and release when the engine starts.

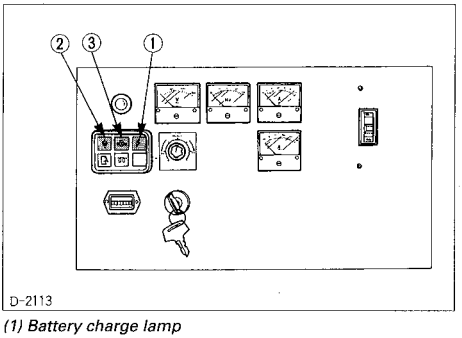


(1) Main switch (Key)
(A) "OFF"
(B) "ON"
(C) "GLOW"
(D) "START"

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.

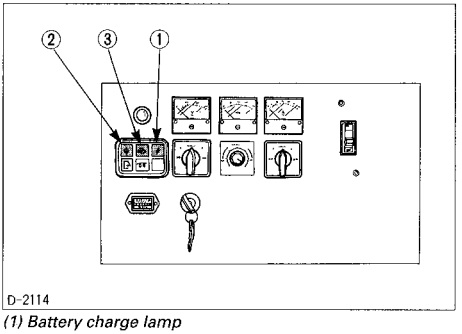
6. Check to see that the battery charge lamp, oil pressure lamp and water temperature lamp are OFF.

[KJ-S130VX, KJ-S150VX]



(1) Battery charge lamp
(2) Water temperature lamp
(3) Oil pressure lamp

[KJ-T130DX, KJ-T180VX, KJ-T300, KJ-T160DX, KJ-T210VX]



(1) Battery charge lamp
(2) Water temperature lamp
(3) Oil pressure lamp

7. Check the warning lamps.

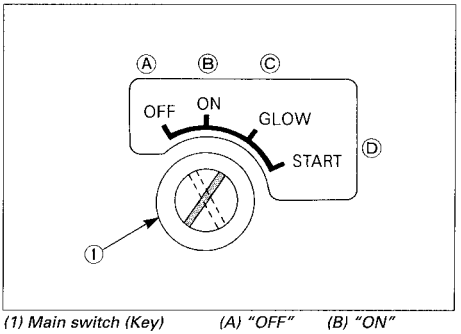
If engine oil pressure drops below 78 to 108 kPa (11.38 to 15.65 psi, 0.8 to 1.1 kgf/cm²) or the coolant temperature rises above 112 to 118°C (234 to 244°F), the emergency relay activates the fuel controller to cut fuel flow to the pump, stopping the engine, and illuminating the warning lamp.
Whenever the engine stops automatically during operation, repair the problem before restarting the engine.

COLD WEATHER STARTING

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

Shown below are the standard preheating times for low temperatures.

Ambient temperature	Preheating time
Above 10°C (50°F)	NO NEED
10°C (50°F) to –5°C (23°F)	Approx. 5 seconds
*Below –5°C (23°F)	Approx. 10 seconds
Limit of continuous use	20 seconds



(1) Main switch (Key)
(A) "OFF"
(B) "ON"
(C) "GLOW"
(D) "START"

2. Turn the key to the "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 (5) and (6). To protect the battery and the starter, make sure that the starter is not continuously turned for more than 10 seconds.)

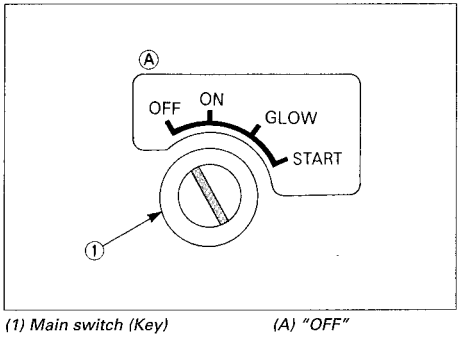
PRECAUTION OVERHEATING

Take the following actions in the event the coolant temperature is nearly or more than the boiling point, which is called "Precaution Overheating". Take these actions if the engine's the alarm lamp lights up.

1. Turn off all output circuit breakers and keep the engine running without load.
2. Do not stop the engine suddenly. Stop it after about 5 minutes of unloaded idling.
3. If the engine stops within about 5 minutes of running under no load, immediately leave and keep yourself away from the machine. Do not open the hood and any other part.
4. Keep yourself and others well away from the engine for an additional 10 minutes or while the steam continues to blow out.
5. Checking that there is no danger of being burned eliminate the causes of overheating according to the manual, see "TROUBLESHOOTING" section. And then restart the engine.

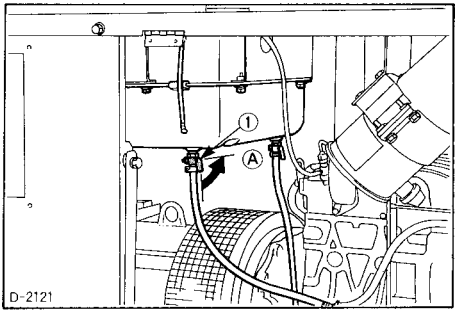
STOPPING THE ENGINE

1. Turn the key to the "OFF" position.



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

2. Close the fuel tank tap.



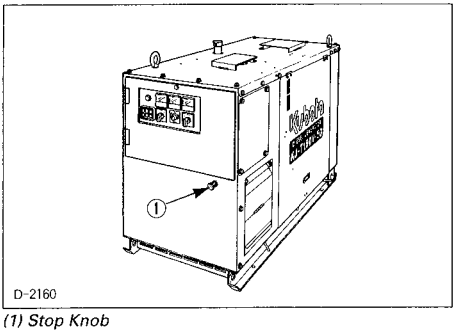
(1) Fuel tank tap *(A) "CLOSE"*

■ Stop Knob (AUS type)

[Engine model : D1703-EBG, V2203-EBG]

CAUTION:
To avoid personal injury:
- **Pull the stop knob and hold it until the engine stops in case of emergency.**

The engine stops when the key's turned off (counterclockwise).
If the engine does not stop, pull the stop knob and hold it until the engine stops.



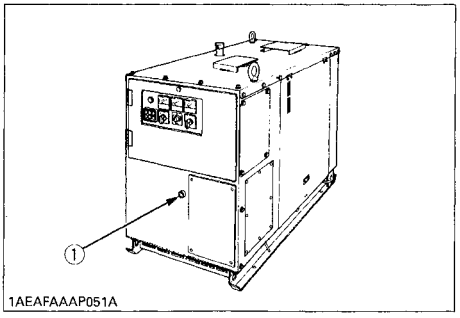
(1) Stop Knob

■ Stop Switch (AUS type)

【Engine model : V3300-EBG】

CAUTION:
To avoid personal injury:
- **Push the stop switch in case of emergency.**

The engine stops when the key's turned off (counterclockwise).
If the engine does not stop, push the stop switch.



(1) Stop switch

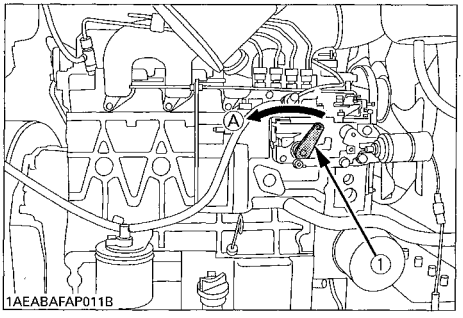
■ Stop Lever (General type)

CAUTION:
To avoid personal injury:
- **Turn the stop lever to the left and hold it until the engine stops in case of emergency.**

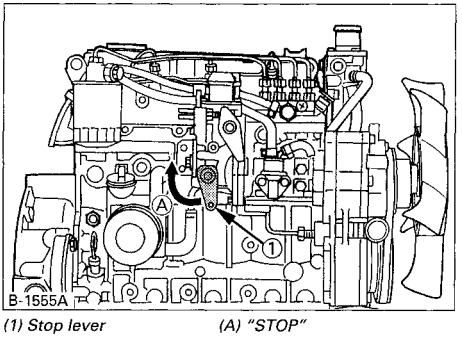
The engine stops when the key is turned off (counterclockwise).
If the engine does not stop, turn the stop lever to the left and hold it until the engine stops.

NOTE:
- If the main switch (key) can not stop the engine, consult your local KUBOTA dealer.

【Engine model : D1703-EBG, V2203-EBG】



【Engine model : V3300-EBG】



(1) Stop lever *(A) "STOP"*

WARMING UP

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

PREPARATION TO SUPPLY THE ELECTRIC POWER

■ Connection Notes

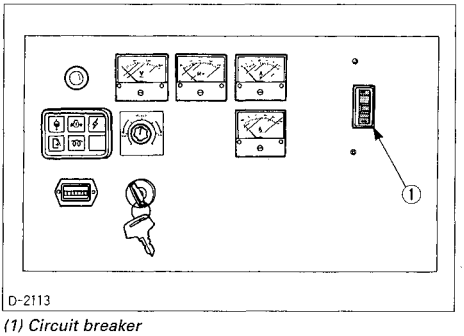
WARNING:
To avoid personal injury:
- **Before the generator can be connected to a building's electrical system, a licensed electrician must install an isolation (transfer) switch in the building's main fuse box. The switch is the connection point for generator power and allows selection of generator 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.

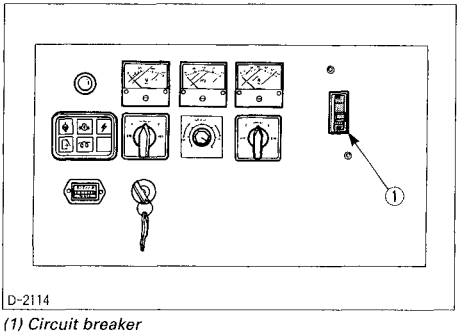
■ Connecting the Load (General type)

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



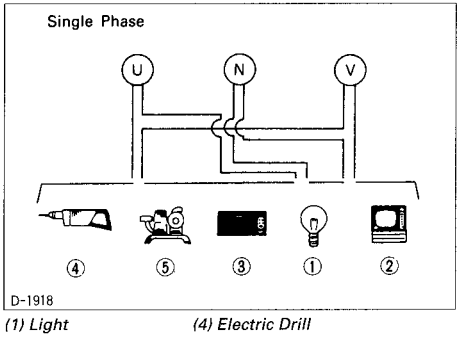
(1) Circuit breaker

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

◆ Single phase 3 terminal type

i) KJ-S130VX
50Hz 110V Use Ⓤ-Ⓝ
Ⓥ-Ⓝ
50Hz 220V Use Ⓤ-Ⓥ

ii) KJ-S150VX
60Hz 110V Use Ⓤ-Ⓝ
Ⓥ-Ⓝ
60Hz 220V, 240V Use Ⓤ-Ⓥ



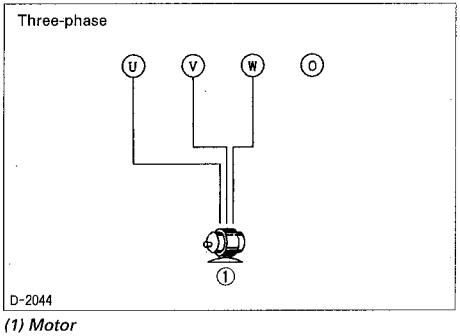
(1) Light *(4) Electric Drill*
(2) Television *(5) Motor Pump*
(3) Air conditioner

◆ 3 phase and single phase 4 terminals type

• For 3 phase power source

i) KJ-T130DX, KJ-T180VX, KJ-T300
50Hz,380,415V Use Ⓦ-Ⓥ-Ⓤ

ii) KJ-T160DX, KJ-T210VX
60Hz 220,380V Use Ⓦ-Ⓥ-Ⓤ

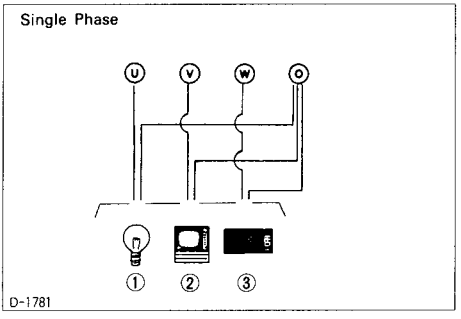


(1) Motor

• For single phase Power Source:

i) KJ-T130DX, KJ-T180VX, KJ-T300 Use Ⓞ-Ⓤ
50Hz 220,240V Ⓞ-Ⓥ
Ⓞ-Ⓦ

ii) KJ-T160DX, KJ-T210VX Use Ⓞ-Ⓤ
60Hz 127,220V Ⓞ-Ⓥ
Ⓞ-Ⓦ

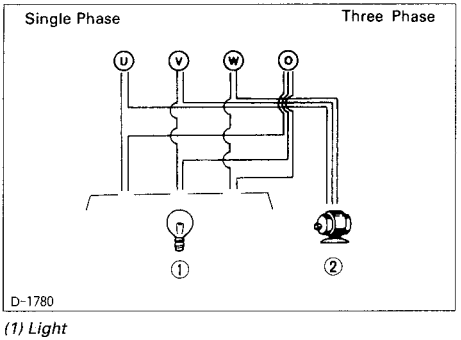


(1) Light
(2) Television
(3) Air conditioner

• Connecting 3 phase Power Source to Single Phase Load.

i) KJ-T130DX, KJ-T180VX, KJ-T300 Use Ⓤ-Ⓞ
50Hz 220,240V single phase Ⓥ-Ⓞ
Ⓦ-Ⓞ
50Hz 220,380,415V 3 phase Use Ⓤ-Ⓥ-Ⓦ

ii) KJ-T160DX, KJ-T210VX Use Ⓤ-Ⓞ
60Hz 127,220V single phase Ⓥ-Ⓞ
Ⓦ-Ⓞ
60Hz 220,380V 3 phase Use Ⓤ-Ⓥ-Ⓦ

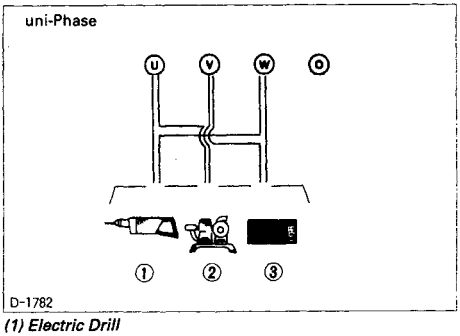


(1) Light
(2) Motor

- **For Single Phase Power Source:**

i) KJ-T130DX, KJ-T180VX, KJ-T300 Use Ⓤ-Ⓥ
50Hz 220,380,415V single phase Ⓥ-Ⓦ
Ⓦ-Ⓤ

ii) KJ-T160DX, KJ-T210VX Use Ⓤ-Ⓥ
60Hz 220,380V single phase Ⓥ-Ⓦ
Ⓦ-Ⓤ

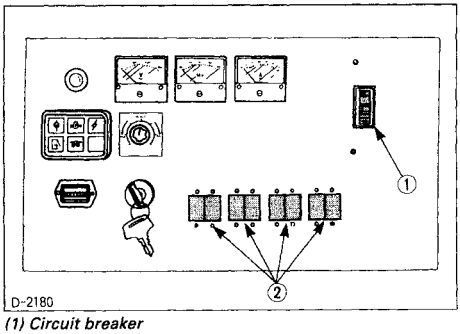


(1) Electric Drill
(2) Motor Pump
(3) Air conditioner

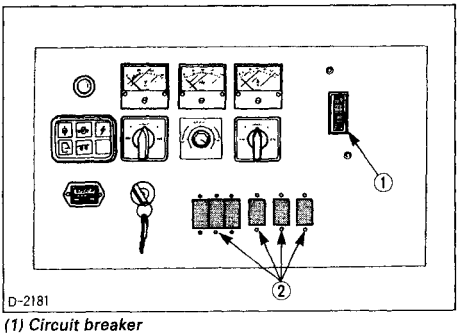
Connecting the Load (AUS type)

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 all circuit breakers on the control panel.

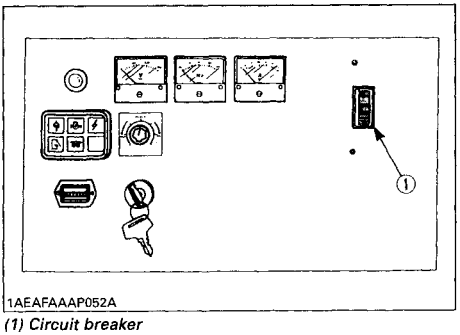


(1) Circuit breaker
(2) Circuit breakers for sockets



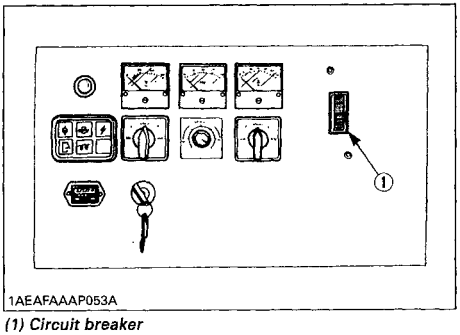
(1) Circuit breaker
(2) Circuit breakers for sockets

[KJ-S240-AUS]



(1) Circuit breaker

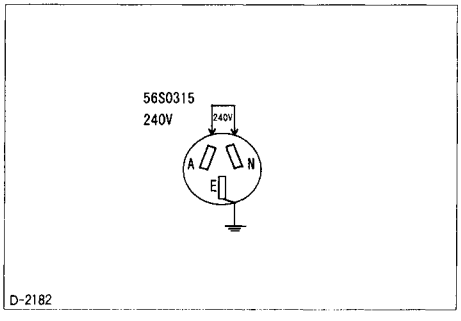
[KJ-T300-AUS]



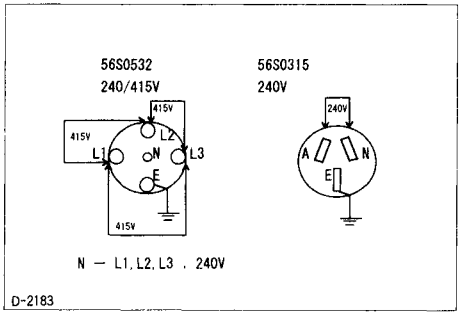
(1) Circuit breaker

2. Connect the load to the A.C. sockets.

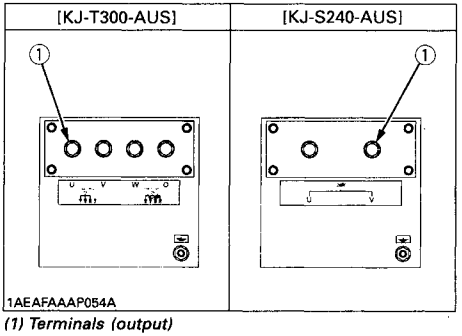
i) KJ-S130VX-AUS
50Hz 240V



ii) KJ-T130DX-AUS, KJ-T180VX-AUS
50Hz 240/415V



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

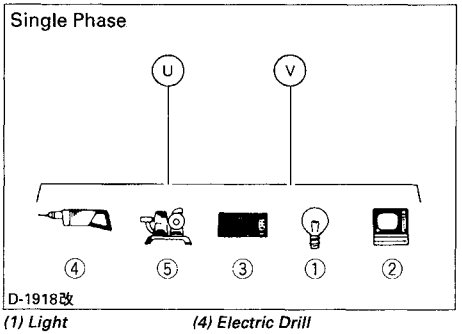


(1) Terminals (output)

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

◆ KJ-S240

Use Ⓤ-Ⓥ

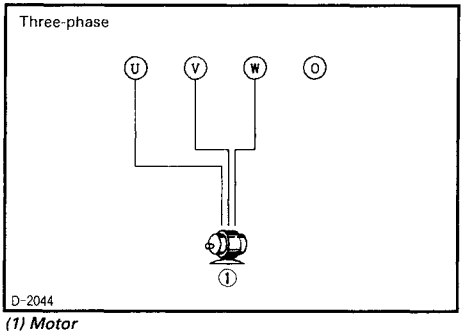


(1) Light
(2) Television
(3) Air conditioner
(4) Electric Drill
(5) Motor Pump

◆ KJ-T300

• For 3 phase power source

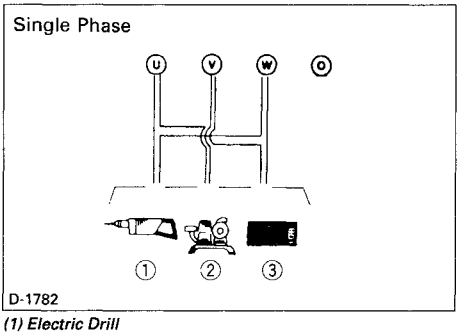
Use Ⓤ-Ⓥ-Ⓦ



(1) Motor

• For single phase power source:

Use Ⓞ-Ⓤ
Ⓞ-Ⓥ
Ⓞ-Ⓦ



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

OPERATING THE GENERATOR

OPERATING PROCEDURE TO SUPPLY THE ELECTRIC POWER

1. Start the engine according to the "OPERATING THE ENGINE"
2. Warm the engine with section load.
3. Turn ON the circuit breaker.

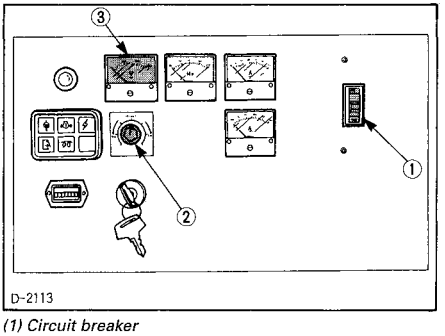
IMPORTANT:
- When there is a severe overload or single phase short circuit in the wiring of the three phase generator, the circuit breaker turns OFF. If this happens, eliminate the cause and turn the circuit breaker ON again.
- When there is three phase short circuit in the wiring of the three phase generator, after the excitation current rises to ceiling level during 10 seconds the electronic protection circuit of the A.V.R. decreases the excitation current to about 1A then the generator voltage becomes very low. (The circuit breaker dose not trip in this case). If this happens, turn the circuit breaker OFF and eliminate the cause, then turn the circuit breaker ON again.
- When there is a severe overload or short circuit in the wiring of the single phase generator, the thermal relay turns the circuit breaker to OFF. If this happens, eliminate the cause and turn the circuit breaker ON again.

NOTE:
- The thermal relay dose not work if the battery voltage falls below the prescribed level. Be aware of good battery care.

■ Voltage

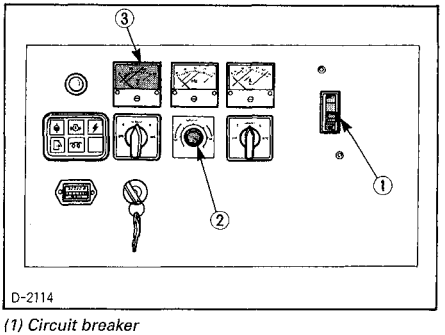
Check the voltage on the meters.
- Voltage regulation can be achieved by turning the voltage adjuster in clockwise or counterclockwise direction.
- Set voltage to the same as devices being used.

[KJ-S130VX, KJ-S240, KJ-S150VX]



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

[KJ-T130DX, KJ-T180VX, KJ-T300, KJ-T160DX, KJ-T210VX]



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

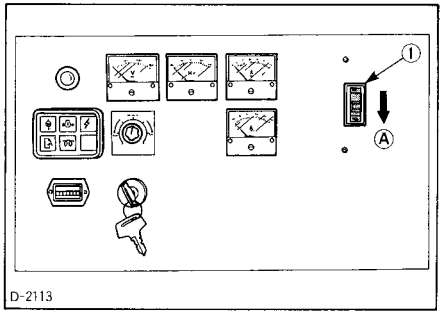
4. Turn ON the electrical device switches for the connections.
5. Adjust the voltage and frequency.

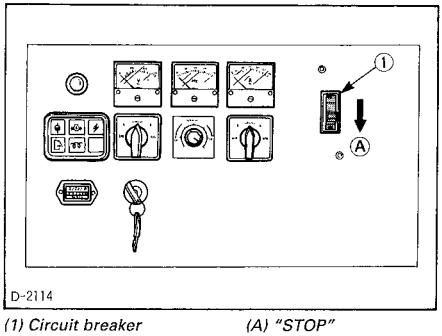
■ Frequency

Check the frequency on the meters.
50 to 54Hz [50Hz type]
60 to 65Hz [60Hz type]

OPERATING PROCEDURE TO STOP SUPPLYING THE ELECTRIC POWER

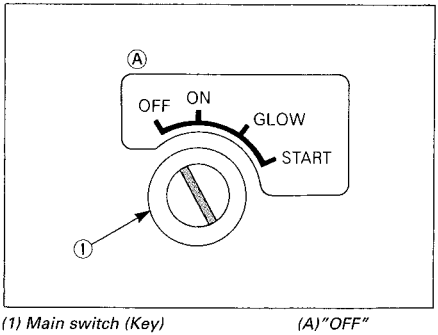
1. Turn OFF all electrical device switches for connected loads.
2. Turn OFF the circuit breaker.





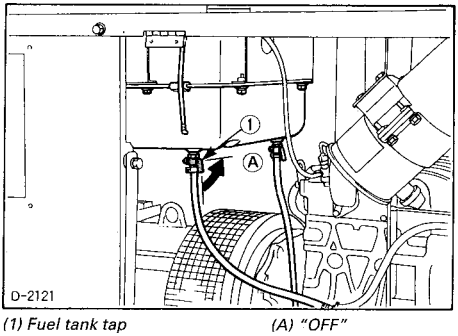
(1) Circuit breaker *(A) "STOP"*

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 tank tap to the "OFF" position.



(1) Fuel tank tap *(A) "OFF"*

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 harm. 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.

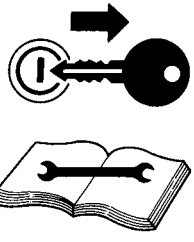
B-1508

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

SERVICE INTERVALS

Observe the following for service and maintenance.
The lubricating oil change intervals listed in the table below are for Classes CF, CE and CD lubricating oils of API classification with a low-sulfur fuel in use. If the CF-4 or CG-4 lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals than recommended in the table below depending on the operating condition.

No.	Check point	Interval										Ref. page		
		First 50 hours	Every day	Every 100 hours	Every 250 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Every 3000 hours	Every 1 year	Every 2 years			
1	Check of fuel pipes and clamp bands			○								–		@
2	Change of engine oil	◎	Level check		○							29	◎	
3	Cleaning of air cleaner element			○								27	*1	@
4	Check of battery electrolyte level			○								29		
5	Check of fan belt tightness	◎			○							30	◎	
6	Check of radiator hoses and clamp bands				○							30		
7	Check of intake air line				○							–		@
8	Replacement of oil filter cartridge	◎										31	◎	
9	Replacement of fuel filter cartridge					○						31		@
10	Cleaning of sedimenter (water separator)				○							32		
11	Cleaning of water jacket (radiator interior)						○					–		
12	Replacement of fan belt						○					–		
13	Check of valve clearance						○					–		
14	Replacement of air cleaner element									○		27	*2	@
15	Check of damage in electric wiring and loose connections				○							–		
16	Check of fuel injection nozzle injection pressure							○				–	*3	@
17	Check of injection pump								○			–	*3	@
18	Replacement of fuel pipes, fuel gauge and clamp bands										○	–	*3	@
19	Replacement of radiator hoses and clamp bands										○	30		
20	Replacement of battery										○	33		
21	Change of radiator coolant (L.L.C.)		Level check								○	8		
22	Replacement of intake air line										○	–	*4	@

IMPORTANT

- The jobs indicated by ◎ must be done after the first 50 hours of operation.

*1 Air cleaner should be cleaned more often in dusty conditions than in normal conditions.
*2 After 6 times of cleaning.
*3 Consult your local KUBOTA Dealer for this service.
*4 Replace earlier if necessary.

- The items listed above (@ marked) are registered as emission related critical parts by KUBOTA in the U.S. EPA non-road emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.
  Please see the Warranty Statement in detail.
- When the battery is used for less than 100 hours in a year, check its electrolyte yearly. (for refillable battery's only)

NOTE:

Lubricating oil

With the emission control now in effect, the CF-4 and CG-4 lubricating oils have been developed for use of a low-sulfur fuel for on-road vehicle engines. When an off-road vehicle engine runs on a high-sulfur fuel, it is advisable to employ the CF, CD or CE lubricating oil with a high total base number. If the CF-4 or CG-4 lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals.

- **Lubricating oil recommended when a low-sulfur or high-sulfur fuel is employed.**

○ : Recommendable X : Not recommendable

Fuel / Lubricating oil class	Low-sulfur	High-sulfur	Remarks
CF	○	○	※TBN≧10
CF-4	○	X	
CG-4	○	X	

※ TBN : Total Base Number

DAILY CHECK

For your own safety and maximum service life of the machine, make a thorough daily inspection before starting the engine.

CAUTION:
To avoid personal injury:
- **Be sure to check or service the generator on a flat place with the engine shut off .**

■ Walk around Inspection

Look around and under the generator for such items as loose bolts, trash build-up, oil or coolant leaks, broken or worn parts.

■ Checking Engine Oil Level

CAUTION:
To avoid personal injury:
- **Be sure to stop the engine before checking the oil level.**

1. Make sure the machine is on a flat surface.
2. Check engine oil before starting the engine or 5 minutes or more after the engine has stopped.
3. To check the oil level, draw out the dipstick, wipe it clean, replace it, and draw it out again. Check to see that the oil level lies between the two notches.
   If the level is too low, add new oil to the prescribed level.
   (See "Adding Engine Oil" in PREPARATION FOR FIRST OPERATION Section)

IMPORTANT:
- When using an oil of different maker or viscosity from the previous one, remove all of the old oil. Do not mix two different types of oil.
- If oil level is low, do not run engine.

■ Checking Coolant Level

WARNING:
To avoid personal injury:
- **DO NOT remove the radiator pressure cap or reserve tank cap while the engine is running under heavy load or immediately after it has been stopped, or hot water may gush out, scalding people nearby. Remove the radiator cap more than 10 minutes after the engine has been stopped.**

1. Check to see that the coolant level is between the "FULL" and "LOW" marks of reserve tank.
2. When the coolant level drops due to evaporation, add water only up to the full level.
   In case of leakage, add anti-freeze and water in the specified mixing ratio up to the full level.
   (See "If Coolant Leaks" in EVERY 250 HOURS)

IMPORTANT:
- If the radiator cap has to be removed, follow the caution above and securely retighten the cap.
- Use clean, fresh water and anti-freeze to fill the reserve tank.
- If coolant should be leak, consult your local KUBOTA dealer. Do not mix brands.

■ Checking Fuel Level and Refueling

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

IMPORTANT:
- Do not permit dirt or trash to get into the fuel system.
- Be careful not to let the fuel tank become empty, or air can enter the fuel system, necessitating bleeding before next engine start.
- Be careful not to spill during refueling. If should spill, wipe it off at once, or it may cause a fire.

1. The fuel level can be checked on the fuel gauge. (See "Fueling" in PREPARATION FOR FIRST OPERATION.)
2. Always fill the fuel through the fuel tank strainer.
3. Make sure that dirt or water does not enters the fuel tank.
4. Use grade No.2-Diesel fuel at temperatures above 4℃.
   Use grade No.1-Diesel fuel at temperatures below 4℃. Check Australian standards.
5. Always bleed the air completely in the following circumstances.(See "Bleeding Air from the Fuel Lines" in PREPARATION FOR FIRST OPERATION.)
   - When adding fuel into an empty tank.
   - When refueling after the engine stops after running completely out of fuel.
   - Whenever the fuel system is drained for fuel filter cleaning or other fuel system servicing.

INITIAL 50 HOURS

■ Changing Engine Oil Initially (See Changing Engine Oil in EVERY 250 HOURS)

EVERY 100 HOURS

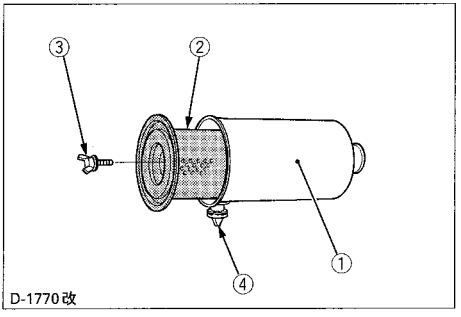
■ Cleaning Air Cleaner Element

Since the air cleaner employed on this engine is a dry type, never apply oil to it.

1. Open the evacuator valve once a week under ordinary conditions — or daily when used in severe or dusty conditions. This will get rid of large particles of dust and dirt.
2. Wipe the inside air cleaner clean with cloth if it is dirty or wet.
3. Avoid touching the element except when cleaning.
4. When dry dust adheres to the element, blow compressed air from the inside turning the element. Pressure of compressed air must be under 205 kPa (2.1 kgf/cm², 30 psi).

【Engine model : D1703-EBG, V2203-EBG】

5. Replace the element every year or every 6 cleanings.



(1) Air cleaner body
(2) Element
(3) Wing bolt
(4) Evacuator valve

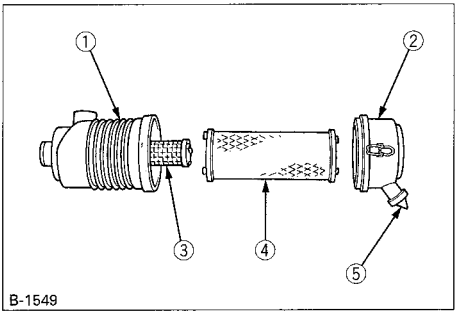
IMPORTANT:

- Make sure the wing bolt for the element is tight enough. If it is loose, dust and dirt may be sucked into the engine, causing premature wearing down the cylinder liner and piston ring earlier, and thereby resulting in poor power output and need for engine repair.

【Engine model : V3300-EBG】

If the air cleaner is equipped with the secondary element, start it in the following manner :
Take steps (1) through (4) foregoing.

5. Replace the primary element every year or every 6 cleanings. If the primary element is heavily stained, replace it sooner. At this time, also replace the secondary element.
6. The secondary element should be removed only if it is to be replaced.
7. To protect the engine, do not remove the secondary element in normal servicing of the primary element.



(1) Air cleaner body
(2) Cover
(3) Secondary element
(4) Primary element
(5) Evacuator valve

IMPORTANT:

- Make sure hooking clip is tight enough. If it is loose, dust and dirt may be sucked into the engine, causing excessive wear or premature engine failure and need for engine repair.

■ Cleaning Primary Air Filter Element

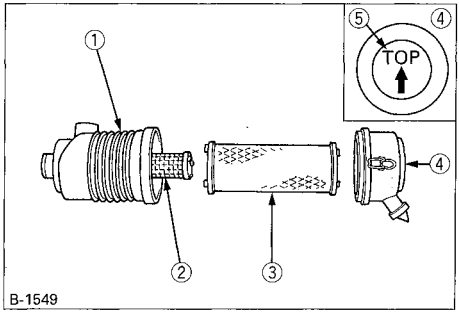
To clean the element, use clean dry compressed air on the inside of the element.
Air pressure at the nozzle must not exceed 205 kPa (2.1 kgf/cm², 30 psi).
Maintain reasonable distance between the nozzle and filter.

Evacuator Valve

Open the evacuator valve once a week under ordinary conditions - or daily when used in dusty condition - to get rid of large particles of dust and dirt.

IMPORTANT:

- If the dust cup is mounted incorrectly, dust or dirt will not collect in the cup and allow the dust to come into direct contact with the element and thus require the element be replaced prematurely.



(1) Air cleaner body
(2) Secondary element
(3) Primary element
(4) Dust cup
(5) "TOP" mark

Air Cleaner with Dust Cup

Remove and clean out the dust cup once a week under normal conditions or daily in extreme conditions.
Do not allow the dust cup to fill above half way regardless of conditions.
Install the air cleaner dust cup with "TOP" indicated on the rear of the cup in the upward position with horizontally mounted air cleaner bodies or vertically mounted air cleaner bodies, the cup may be mounted in any direction.

Inspection Fuel Line

Check and retighten the fuel line clamps	Every 100 hours
Replace the fuel filter	Every 500 hours
Replace the fuel line	Every two years

IMPORTANT:

- After bleeding the air, make sure that the fuel injection pump cock is closed.
- Wipe any spilled fuel off generator.
- Always shut off the engine and allow it to cool before inspecting the fuel system.

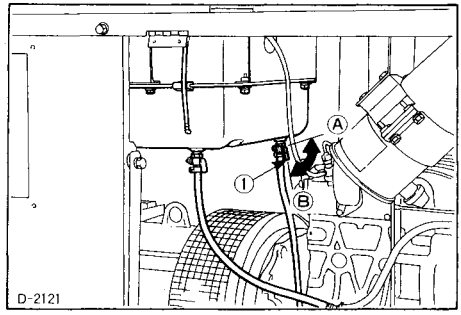
Checking Fuel Line

Check the fuel line clamps after every 100 hours of operation.

1. If the clamp is loose, tighten it securely after coating the clamp screws with oil.
2. The fuel line will deteriorate even if the generator is not used. Replace it every two years.
   When replacing the line, replace the line clamp also.
3. If the fuel line or clamp is damaged in less than two years, replace it.

Draining Water in the Fuel Tank

The water in the tank can be drained by opening the tap, as shown in the illustration.



(1) Fuel tank drain tap
(A) "OPEN"
(B) "CLOSE"

NOTE:

- After replacing or repairing any parts in the fuel injection system, bleed the air.
- When assembling any part of the fuel injection system, make sure that dirt does not enter the fuel line.

■ Fuel Line Air Bleeding

1. Fill the fuel tank with fuel.
2. Open the fuel tank tap.
3. Turn the plug counterclockwise on the filter two or three times.
4. If there is no air in the fuel, tighten the plug.
5. Wipe up spilled fuel immediately.
   (See "Bleeding Air from the Fuel Lines" in PREPARATION FOR FIRST OPERATION.)

■ Checking Battery Electrolyte

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 its fluid level stands below the LOWER (lower limit level) mark.**
  Otherwise, the battery component parts may get deteriorated earlier than expected, which may shorten the battery's service life or cause an explosion.
  Immediately, add distilled water until the battery's fluid level comes somewhere between the UPPER and LOWER levels.

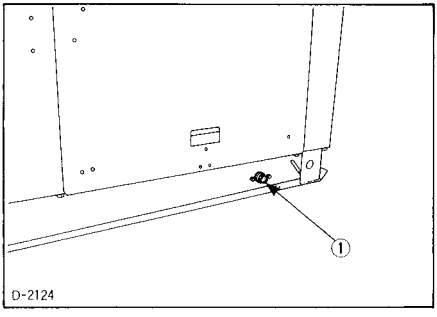
1. Keep the battery clean and dry. Keep terminals and holes of vent plugs free from corrosion and dirt.
2. Check the electrolyte level frequently when the battery is in service. Add distilled water only to the upper level when electrolyte diminishes. Do not add diluted sulfuric acid.
3. Make sure to charge the battery once a month, because the capacity is decreased by discharge even when it is not in service.
4. Keep sparks and flame away, because battery produces explosive gases.

EVERY 250 HOURS

■ Changing Engine Oil

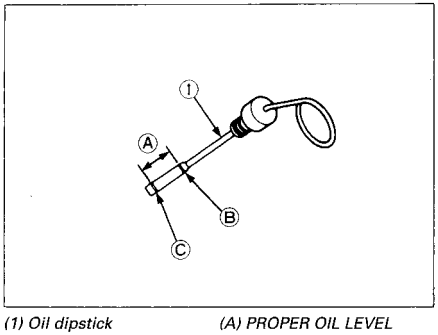
IMPORTANT:
- The job must be done initial 50 hours and next every 250 hours

1. Change oil after the initial 50 hours of generation and every 250 hours thereafter.
2. Remove the drain plug to drain the engine oil. Drain all the old oil, drain oil easier and completely while the engine is hot. Inspect drain plug gasket. Replace if damaged.



(1) Engine oil drain plug

3. Install oil drain plug and gasket.
4. Add new engine oil up to the upper line of the oil dipstick.



(1) Oil dipstick
(A) PROPER OIL LEVEL
(B) Upper level
(C) Lower level

Engine oil capacity L

Model	Capacity
KJ-T130DX, KJ-T160DX [Engine model : D1703]	5.6
KJ-S130VX, KJ-S150VX, KJ-T180VX, KJ-T210VX [Engine model : V2203]	7.6
KJ-S240, KJ-T300 [Engine model : V3300]	13.2

IMPORTANT:

- Engine oil should be MIL-L-2104C or have properties of API classification CD grades or higher.
  Change the type of engine oil according to the ambient temperature.

above 25°C (77°F)	SAE30 or	SAE10W-30 SAE10W-40
0 to 25°C (32 to 77°F)	SAE20 or	SAE10W-30 SAE10W-40
below 0°C (32°F)	SAE10W or	SAE10W-30 SAE10W-40

- When using oil of different brands from the previous one, be sure to drain all the previous oil before adding the new engine oil.

Radiator Hose Inspection

1. Check to see if radiator hoses are properly fixed every 250 hours of operation or six months, whichever comes first.
   - If clamp bands are loose or water leaks, tighten bands securely.
   - Replace hoses and tighten clamp bands securely, if radiator hoses are swollen, hardened or cracked.
2. Replace hoses and clamp bands every 2 years or earlier if checked and found that hoses are swollen, hardened or cracked.

If coolant leaks

If steam or water comes out of the overflow line, stop the engine immediately, and carry out the following inspection and maintenance procedure.

CAUTION:

- **Stop the engine and wait until it becomes cool to touch. Then remove the radiator cap carefully.**

1. Check for the leakage and coolant levels.
2. Check the cooling air inlet and outlet for obstructions.
3. Check the radiator fins for clogging. When cleaning the radiator, never use a scraper. Blow air through, or clean with a water spray.
4. Check the radiator water tubes for corrosion.

Checking Fan Belt Tension

CAUTION
To avoid personal injury:

- **Be sure to stop the engine and remove the key before checking the belt tension.**
- **Be sure to reinstall the detached safety shield after maintenance or checking.**

[Engine model : D1703-EBG, V2203-EBG]

Proper fan belt tension	A deflection of between 7 to 9 mm when the belt is pressed in the middle of the span.

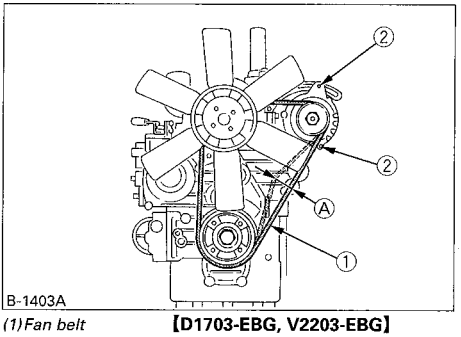
[Engine model : V3300-EBG]

Proper fan belt tension	A deflection of between 10 to 12 mm when the belt is pressed in the middle of the span.

1. Stop the engine and remove the key.
2. Apply moderate thumb pressure to belt between pulleys.
3. If tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine block, pull the alternator out until the deflection of the belt falls within acceptable limits.
4. Replace fan belt if it is damaged.

IMPORTANT:

- If belt is loosen or damaged and the fan is damaged, it could result in overheating or insufficient charging. Adjust correctly or replace the belt.



(1)Fan belt
(2)Bolt and nut

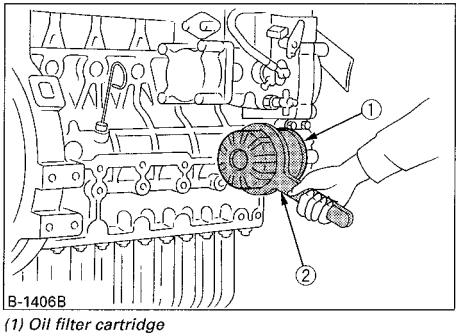
[D1703-EBG, V2203-EBG]
(A) 7 to 9 mm (under load of 98 N)
[V3300-EBG]
(A) 10 to 12 mm (under load of 64 N)

EVERY 500 HOURS

■ Replacing Oil Filter Cartridge

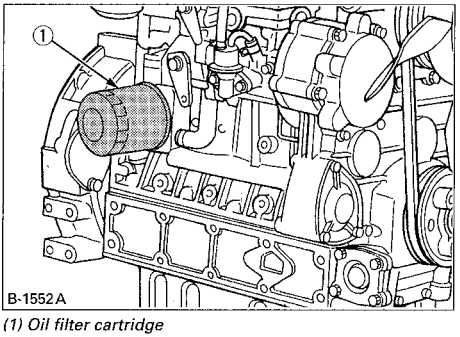
1. Replace the oil filter cartridge every 500 hours of use. (Every second oil change.)
2. Coat the new filter gasket lightly with clean oil.
3. Tighten it securely by hand.
4. When the filter is replaced, the engine oil level will drop. Run the engine for a few minutes, and check for oil leaks. Re-check the oil level. If the oil level is too low, add engine oil up to the specified level.

【Engine model : D1703-EBG, V2203-EBG】



(1) Oil filter cartridge
(2) Remove with a filter wrench
(Tighten with your hand)

【Engine model : V3300-EBG】

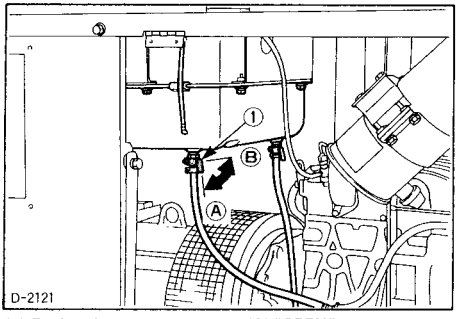


(1) Oil filter cartridge

■ Replacing Fuel Filter Cartridge

Replace the fuel filter cartridge every 500 hours of use, using the following procedure.

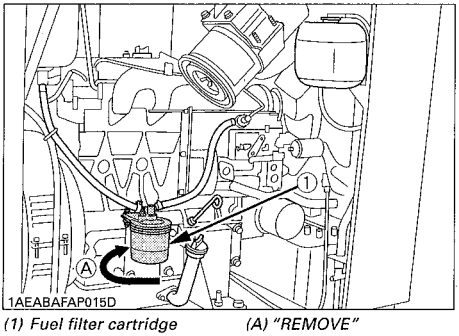
1. Close the fuel tank tap.



(1) Fuel tank tap *(A) "OPEN"*
(B) "CLOSE"

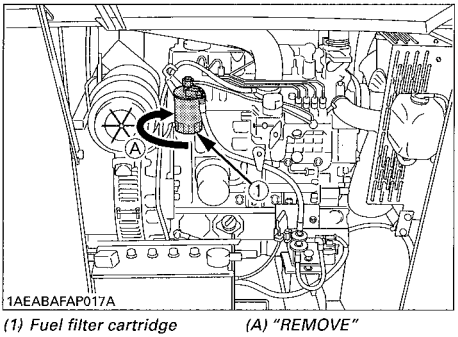
2. Remove the fuel filter by using ring spanner.

【Engine model : D1703-EBG, V2203-EBG】



(1) Fuel filter cartridge *(A) "REMOVE"*

【Engine model : V3300-EBG】



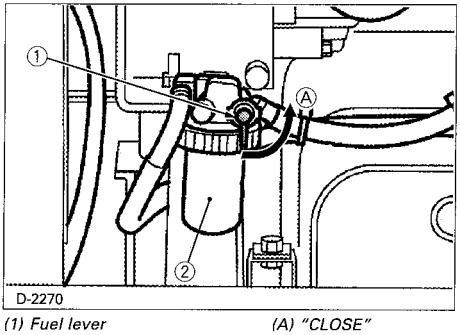
(1) Fuel filter cartridge *(A) "REMOVE"*

3. Tighten it securely by hand.

■ Cleaning the Water Separator (Sedimenter)
[Engine model : V3300-EBG]

- Every 250 hours of operation, clean the fuel filter in a clean place to prevent dust contamination.
- When the marker comes close to the drain out level, remove the screw ring and let water flow out of the filter bowl.

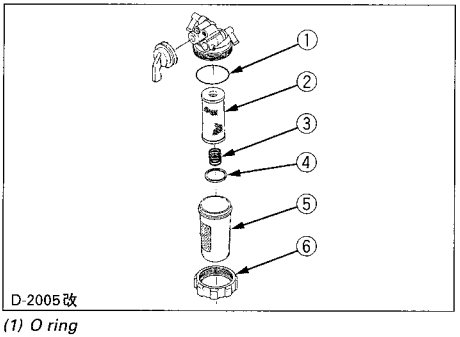
1. Turn the fuel lever to the "CLOSE" position.



(1) Fuel lever *(A) "CLOSE"*
(2) Water separator

2. Remove the filter bowl, and rinse the inside with diesel fuel.
3. Take out the element, and rinse it with diesel fuel.
4. After cleaning, reinstall the fuel filter to keep out dust and dirt.
5. Air-bleed the fuel line.

IMPORTANT:
- Entrance of water, dust and dirt can cause a malfunction of the fuel injection pump and the injection nozzle. Wash the fuel filter cup periodically.



(1) O ring
(2) Filter element
(3) Spring
(4) Marker
(5) Filter bowl
(6) Screw ring

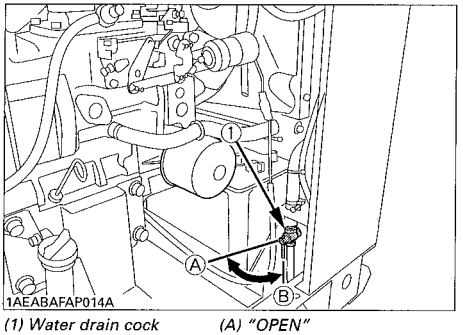
EVERY 1000 HOURS

■ Replacing Air Cleaner Element
(See "Cleaning Air Cleaner Element" in every 100 hours maintenance.)

■ To drain coolant
Coolant to be changed at 1000 hour intervals.

IMPORTANT:
- Let the engine cool before draining the radiator coolant.

1. Remove radiator cap and open the drain cock to drain the coolant.



(1) Water drain cock *(A) "OPEN"*
(B) "CLOSE"

2. After draining the coolant, close the drain cock.

■ Refilling
1. Remove the radiator pressure cap to add coolant to the radiator.
2. Pour coolant into the reserve tank.
3. Close the pressure cap and reserve tank cap. For coolant, use a 50/50 mixture.

NOTE:
- Premix the 50/50 mix antifreeze solution before adding to the radiator.
- Do not mix different brands.

■ Replacing Fan Belt
(See "Checking Fan Belt Tension" in every 250 hours maintenance.)

BATTERY

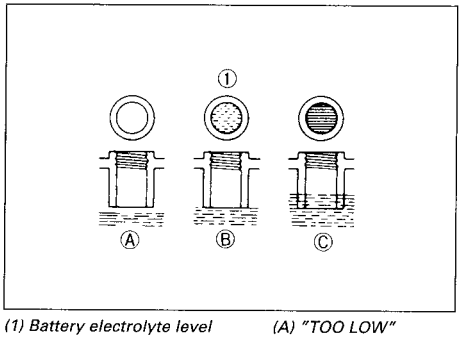
WARNING
To avoid personal injury.
- **Be careful not to let the battery electrolyte contact your body or clothing.**
- **Wear eye protection and rubber gloves, since the diluted sulfuric acid solution burns skin and eyes, and eats holes in clothing. Should this occur, immediately wash it off with running water and get medical attention.**

Mishandling of the battery shortens the service life and adds to maintenance costs. Obtain the maximum performance and the longest life of the battery by handling properly and with care.
Engine starting will be difficult, if the battery charge is low. Be sure to keep the battery in a fully charged state for best performance and battery life.

Battery Charging

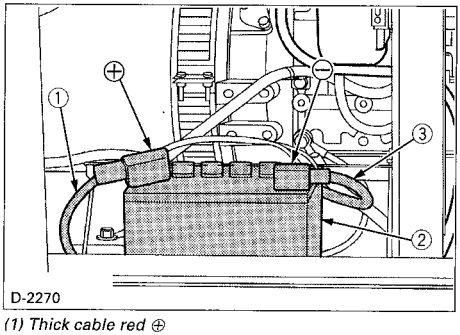
DANGER
To avoid the possibility of battery explosion:
The batteries come in two types: refillable and non-refillable. For using the refillable type battery, follow the instructions below.
- **DO NOT use or charge the battery if the fluid level is below the LOWER (lower limit level) mark.**
  Otherwise, the battery component parts may deteriorate prematurely, which will shorten the battery's service life or may cause an explosion.
  Immediately, add distilled water until the battery's fluid level comes somewhere between the UPPER and LOWER levels.
- **When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging the battery.**
- **When charging the battery, ensure the vent caps are securely in place (if equipped).**
- **When disconnecting the cable from the battery, start with the negative terminal, and when connecting them, start with the positive terminal first.**
- **DO NOT check the battery charge by placing a metal object across the terminals. Use a voltmeter or hydrometer.**

1. Make sure that each electrolyte level is to the bottom of vent wells, if necessary, add only distilled water in a well-ventilated place.

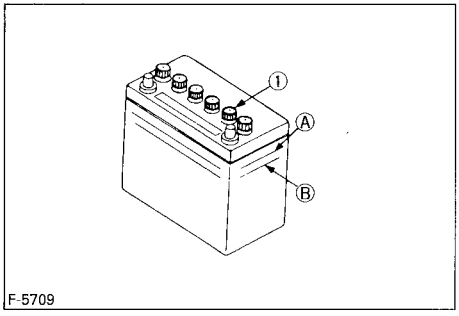


(1) Battery electrolyte level *(A) "TOO LOW"* *(B) "PROPER"* *(C) "TOO HIGH"*

2. To slow charge the battery, connect the charger positive terminal to the battery positive terminal, and the negative to the negative, then recharge in the normal manner.
3. Quick recharging charges the battery at a high rate in a short time. This is only for emergencies.
4. Recharge the battery as early as possible, or battery life will be extremely shortened.
5. When exchanging an old battery for a new one, use a battery of equal specifications shown in page 2 to 4.



(1) Thick cable red ⊕
(2) Battery case
(3) Negative / ground cable black ⊖



(1) Plug
(A) "HIGHEST LEVEL"
(B) "LOWEST LEVEL"

IMPORTANT:
- Connect the charger positive terminal to the battery positive terminal, and negative to the negative.
- When disconnecting the cable from the battery, start with the negative terminal first.
  When connecting the cable to the battery, start with the positive terminal first.
  If reversed, the contact of tools on the battery may cause a shortage.

■ Direction for Long Term Storage

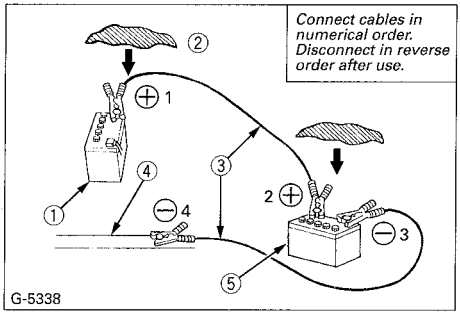
1. When storing the generator for long periods of time, remove the battery, adjust the electrolyte to the proper level, and store in a dry and dark place.
2. The battery naturally discharges while it is stored. Recharge it once a month in summer, and every 2 months in winter.

■ Battery Boost Starting

DANGER
To avoid serious personal injury.
- **Battery gases can explode. Keep cigarettes, sparks, and flames away from battery.**
- **If generator battery is frozen, do not battery boost start engine.**
- **DO NOT connect other end of negative ⊖ jumper cable to negative ⊖ terminal of generator battery.**

When battery boost starting engine, follow the instructions below to safely start the engine.

1. Bring helper battery of the same voltage as disabled generator within easy cable reach.
2. Put on safety goggles and rubber gloves.
3. Ensure the vent caps are securely in place. (if equipped)
4. Cover vent caps with damp rags. Do not allow the rag to touch the battery terminals.
5. Attach the red clamp to the positive (red, ⊕ or pos.) terminal of the dead battery and clamp the other end of the same cable to the positive (red, ⊕ or pos.) terminal of the helper battery.



(1) Dead battery
(2) Lay a damp rag over vent caps.
(3) Jumper cables
(4) Engine block or frame
(5) Helper battery

6. Clamp the other cable to the negative (black, ⊖ or neg.) terminal of the helper battery.
7. Clamp the other end to the engine block or frame of the generator as far from the dead battery as possible.
8. Start the disabled generator.
9. Disconnect the jumper cables in the exact reverse order of attachment. (Steps 7, 6 and 5).
10. Remove and discard the damp rags.

IMPORTANT:
- This machine has a 12 volt negative ⊖ ground starting system.
- Use only same voltage for jump starting.
- Use of a higher voltage source on generators electrical system could result in severe damage to generators electrical system.

TRANSPORTING/STORAGE

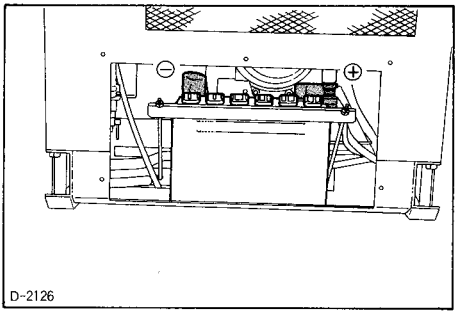
■ Transporting

CAUTION:
To avoid personal injury:
- **When transporting the generator, remove the negative ⊖ battery cable, close the fuel tank tap, and keep the generator level to prevent from fuel spillage.**

■ Checking Before Storage

CAUTION:
To avoid personal injury:
- **DO NOT cover the engine with a cover until it is cool to touch.**

1. Remove the negative ⊖ cable of the battery.

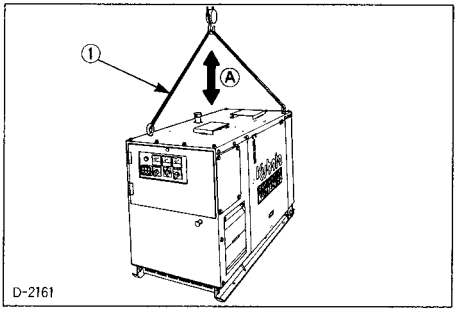


2. Close the fuel tank tap.
3. Drain the coolant from the radiator or change antifreeze solution.
4. Cover the generator with a sheet and store in a dry and clean area.

■ Lifting Procedure

CAUTION:
To avoid personal injury:
- **Use hangers and wire ropes which are strong enough to withstand the weight of the machine.**
- **The apex of the wire rope (distance "A") must be a minimum of 127 cm. Or use a spreader bar.**

When lifting the generator for loading it onto a truck or a ship, follow the method shown below.



(1) Wire Rope *(A) Minimum of 127 cm*

TROUBLESHOOTING

CAUTION:
To avoid personal injury:
- **Always perform all checks with engine stopped and cool to the touch except for those checks in which operation is required.**
- **DO NOT touch the charging section during operation.**
- **Avoid any contact with rotating fan during operation.**

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

■ Generator Troubleshooting

Trouble	Possible causes	Correction
Unusual noise or vibration	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.
Frame overheated.	Cooling fan inlet or outlet blocked.	*Unblock the inlet or outlet.
	Voltage too high.	*Readjust the voltage.
	Overloaded.	*Reduce the load.
Voltage failure to rise.	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.
	AVR excitation output fuse blown out.	*Replace the fuse.
Voltage too high.	Voltage maladjusted.	*Readjust using the voltage control.
	AVR voltage detection cable broken.	*Repair the cable.
	AVR itself in trouble.	*Replace the AVR.
	Mercury arc lamp or such conductive load connected.	*Disconnect such load.
Voltage hunting	Inverter or such switching load connected.	*Disconnect such load.
	AVR itself in trouble.	*Replace the AVR.
Circuit breaker turned OFF.	Connected cable or load short-circuited.	*Contact a qualified electrical engineer for inspection.
	Overloaded.	*Reduce the load.
Pilot lamp failure to light up	Lamp bulb broken.	*Replace the bulb.
	Generator voltage too low.	*See "Voltage failure to rise" above.

When it is Difficult to Start the Engine

Cause	Countermeasures
Fuel is thick and doesn't flow.	*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.
Air or water mixed in fuel system.	*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.
Thick carbon deposits on orifice of injection nozzle.	*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.
Valve clearance is wrong.	*[Engine model:D1703-EBG,V2203-EBG] Adjust valve clearance to 0.18 to 0.22 mm when the engine is cold. **[Engine model:V3300-EBG]** Adjust valve clearance to 0.23 to 0.27 mm when the engine is cold.
Leaking valves	*Grind valves.
Fuel injection timing is wrong.	*Adjust injection timing ***[Engine model:D1703-EBG]** The injection timing 15.5° before top dead center. **[Engine model:V2203-EBG]** The injection timing 17.0° before top dead center. **[Engine model:V3300-EBG]** The injection timing 10.0° before top dead center.
Engine oil becomes thick in cold weather and engine cranks slow.	*Change grade of oil according to the weather (temperature).
Low compression	*Bad valve or excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts.
Battery is discharged and the engine will not crank.	*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
Battery discharges too much	*Recharge battery.
Load center cover or inspection door are opened.	*Close the load center cover and door.
Defect of contact point or shortage of alternator L-shaped coupler	*Check wiring and repair.
Alternator defect	*Replace.
Fuse blows.	*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 0.18 to 0.22 mm with the engine is cold. **[Engine model : V3300-EBG]** *Adjust valve clearance to 0.23 to 0.27 mm 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 kgf/cm^2, 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.

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.

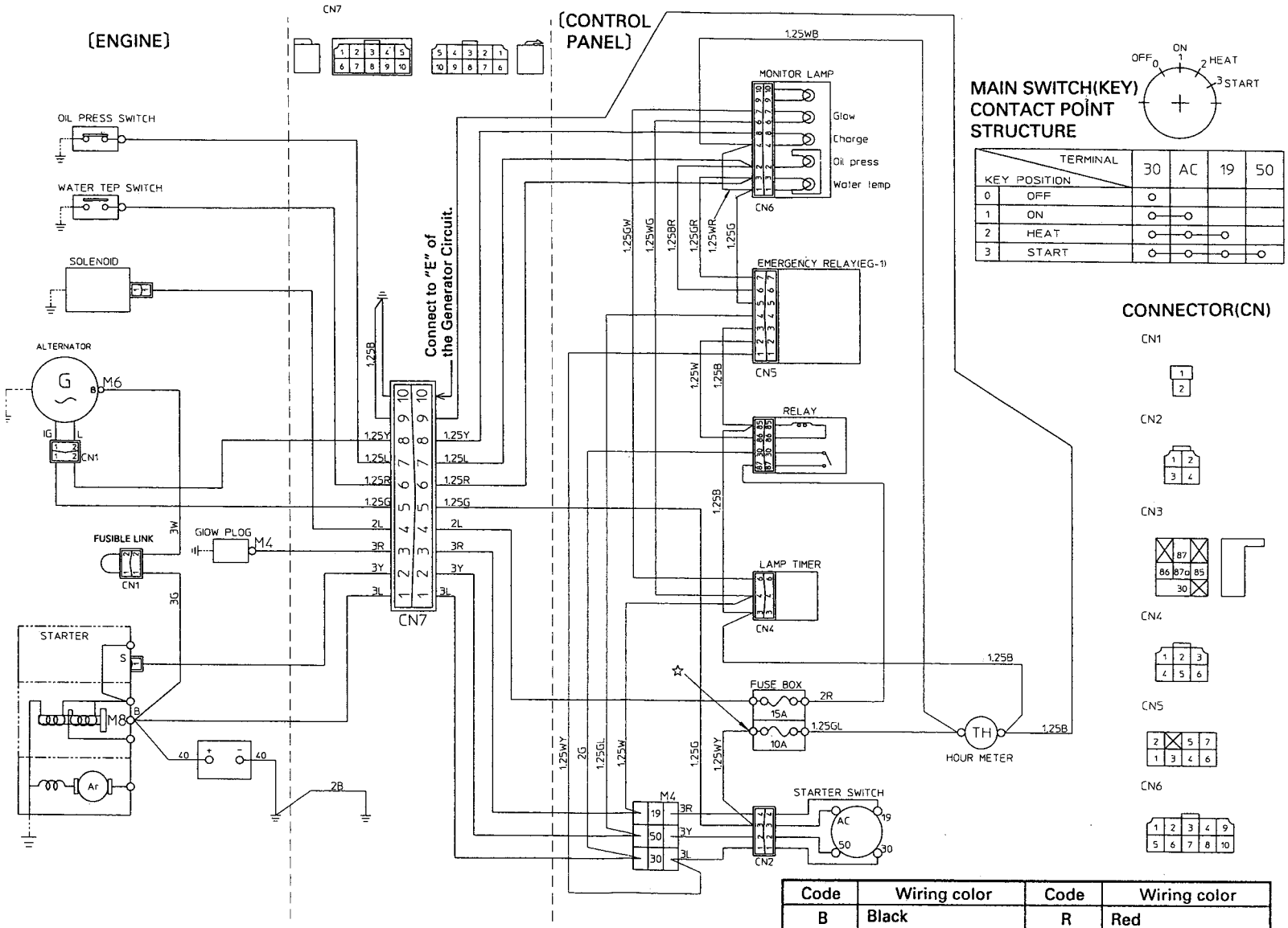
When Engine must be Stopped Immediately

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

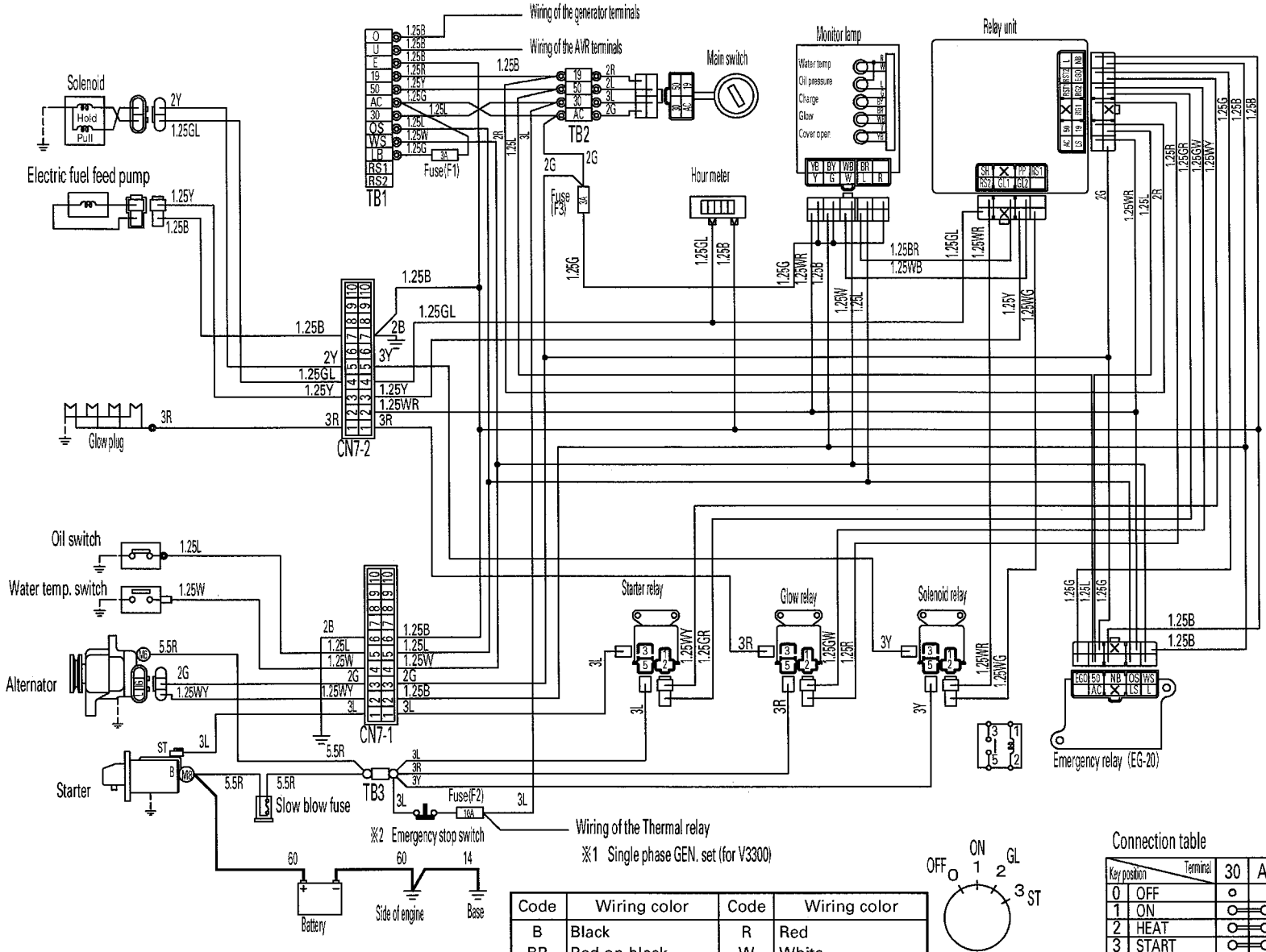
Cause	Countermeasures
Engine oil insufficient	*Check oil level. Replenish oil as required.
Fan belt broken or elongated	*Change belt or adjust belt tension.
Coolant insufficient	*Replenish coolant.
Excessive concentration of antifreeze	*Add water only or change to coolant with the specified mixing ratio.
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.

■ Engine Circuit Diagram for D1703, V2203



Code	Wiring color	Code	Wiring color
B	Black	R	Red
BR	Red on black	W	White
G	Green	WB	Black on white
GL	Blue on green	WG	Green on white
GW	White on green	WR	Red on white
GR	Red on green	WY	Yellow on white
L	Blue	Y	Yellow

Engine Circuit Diagram for V3300



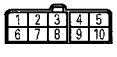
Code	Wiring color	Code	Wiring color
B	Black	R	Red
BR	Red on black	W	White
G	Green	WB	Black on white
GL	Blue on green	WG	Green on white
GW	White on green	WR	Red on white
GR	Red on green	WY	Yellow on white
L	Blue	Y	Yellow

Connection table

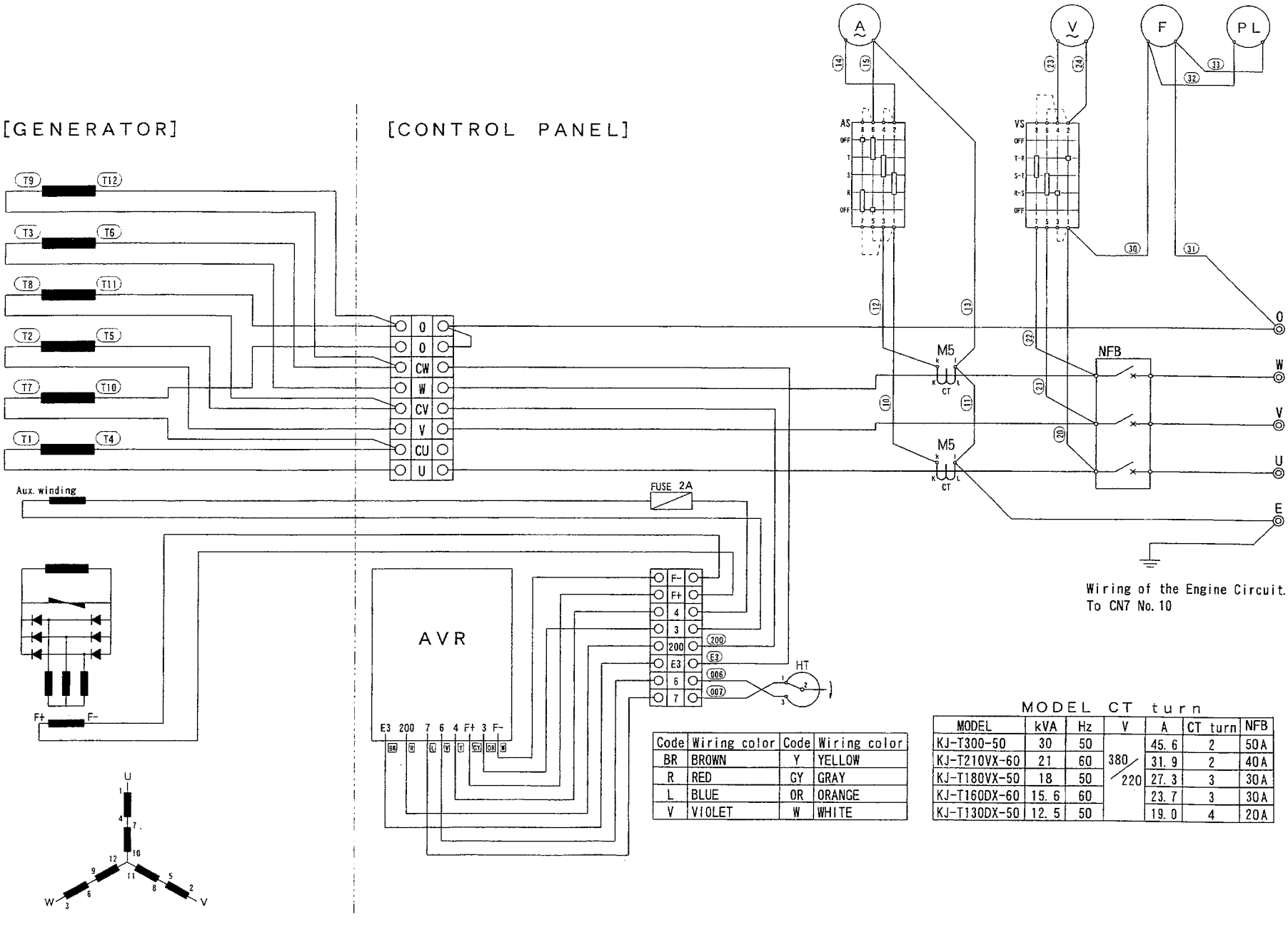
Key position \ Terminal	30	AC	19	50
0 OFF	○			
1 ON	○	○		
2 HEAT	○	○	○	
3 START	○	○	○	○

----- Wiring not required
CN7-1 and CN7-2(Panel side)

※1 KJ-S240 series
※2 AUS model only



■ Generator Circuit Diagram KJ-S130VX (220/110V) 50Hz, KJ-S150VX (240/120V) 60Hz, KJ-S150VX (220/110V) 60Hz



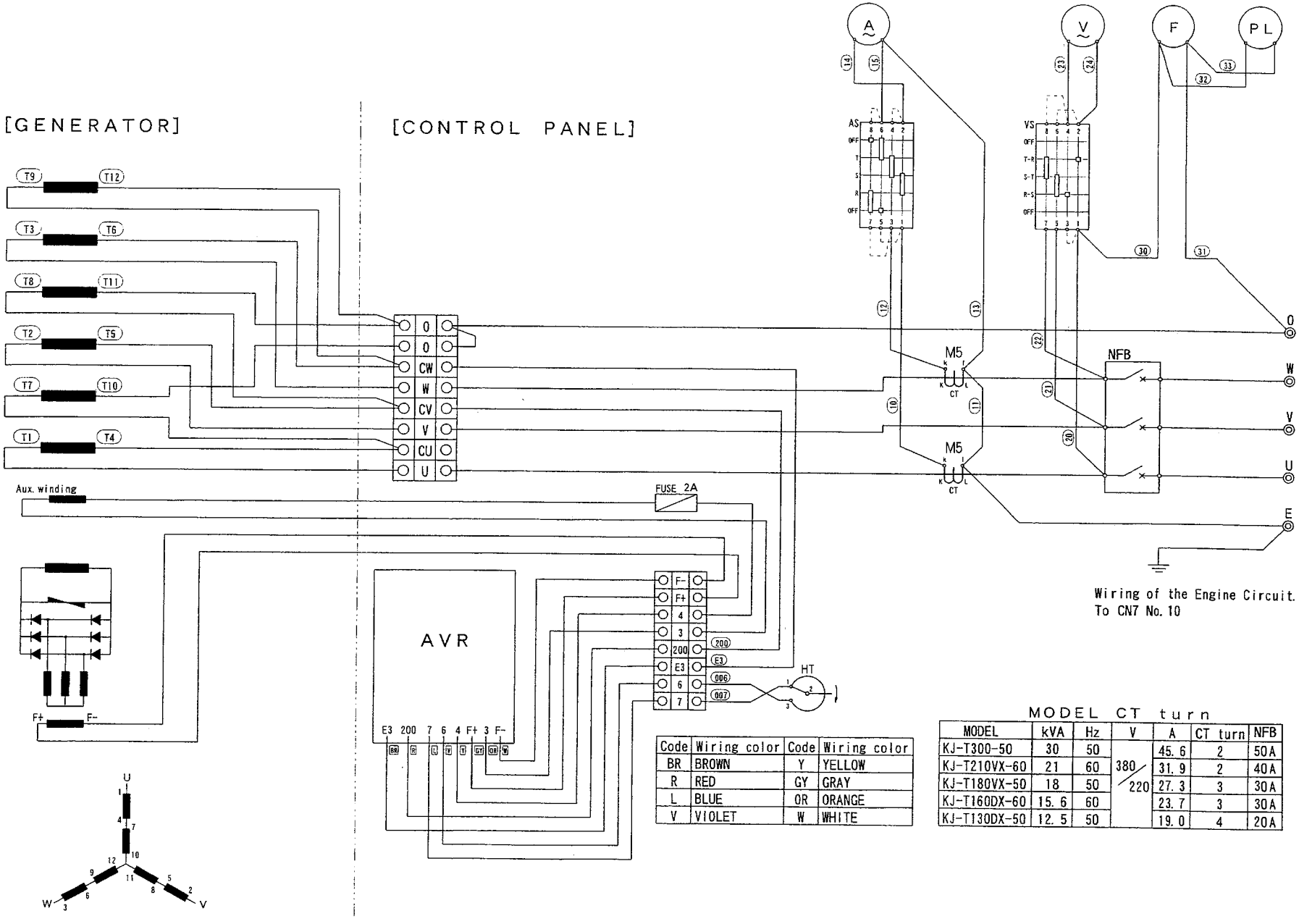
Wiring of the Engine Circuit.
To CN7 No. 10

Code	Wiring color	Code	Wiring color
BR	BROWN	Y	YELLOW
R	RED	GY	GRAY
L	BLUE	OR	ORANGE
V	VIOLET	W	WHITE

MODEL CT turn

MODEL	kVA	Hz	V	A	CT turn	NFB
KJ-T300-50	30	50	380/220	45.6	2	50A
KJ-T210VX-60	21	60		31.9	2	40A
KJ-T180VX-50	18	50		27.3	3	30A
KJ-T160DX-60	15.6	60		23.7	3	30A
KJ-T130DX-50	12.5	50		19.0	4	20A

■ Generator Circuit Diagram KJ-T130DX (380/220V) 50Hz, KJ-T160DX (380/220V) 60Hz
KJ-T180VX (380/220V) 50Hz, KJ-T210VX (380/220V) 60Hz, KJ-T300 (380/220V) 50Hz



Wiring of the Engine Circuit.
To CN7 No. 10

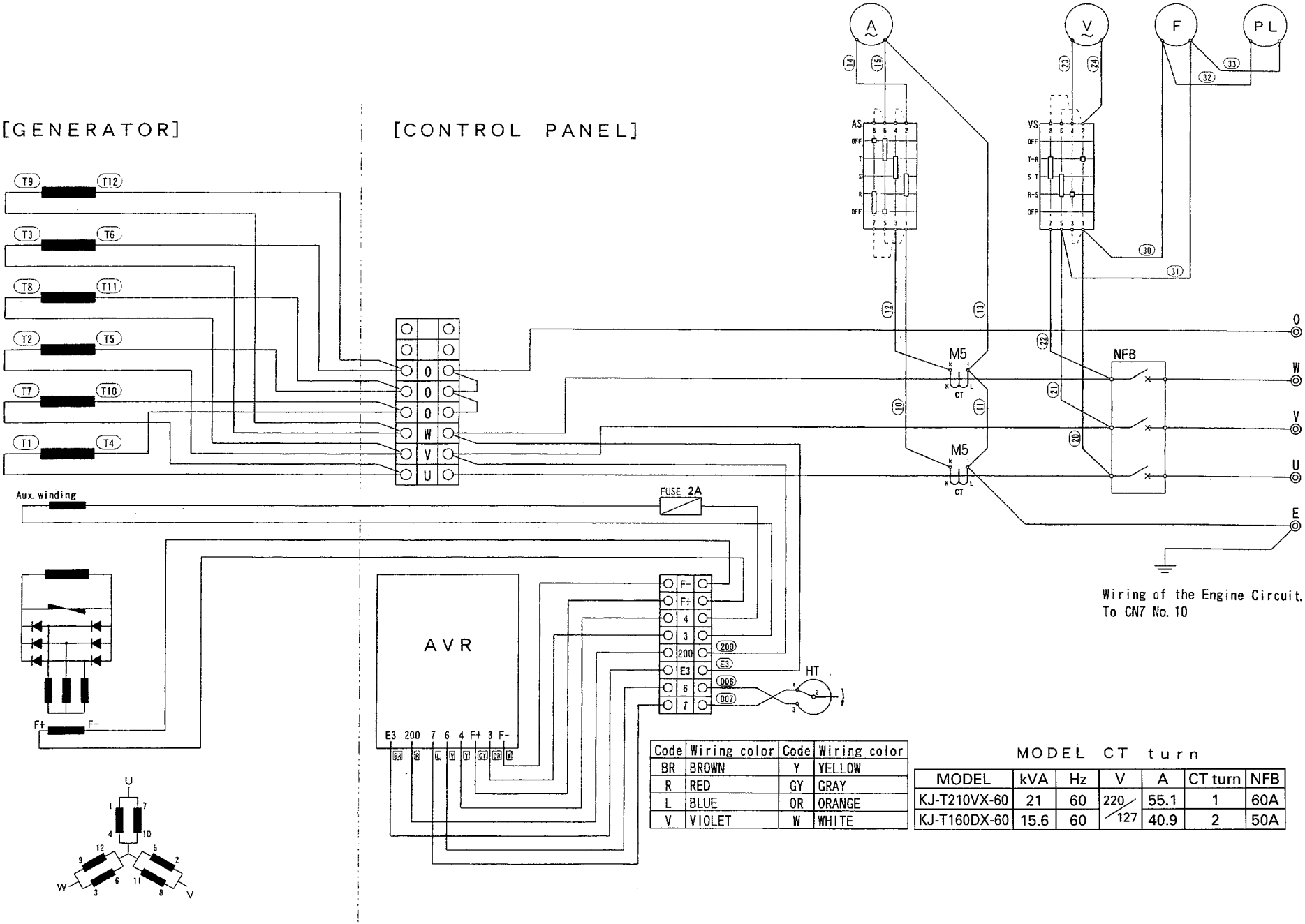
Code	Wiring color	Code	Wiring color
BR	BROWN	Y	YELLOW
R	RED	GY	GRAY
L	BLUE	OR	ORANGE
V	VIOLET	W	WHITE

MODEL CT turn

MODEL	kVA	Hz	V	A	CT turn	NFB
KJ-T300-50	30	50	380/220	45.6	2	50A
KJ-T210VX-60	21	60		31.9	2	40A
KJ-T180VX-50	18	50		27.3	3	30A
KJ-T160DX-60	15.6	60		23.7	3	30A
KJ-T130DX-50	12.5	50		19.0	4	20A

ENGLISH

■ Generator Circuit Diagram KJ-T160DX (220/127V) 60Hz, KJ-T210VX (220/127V) 60Hz



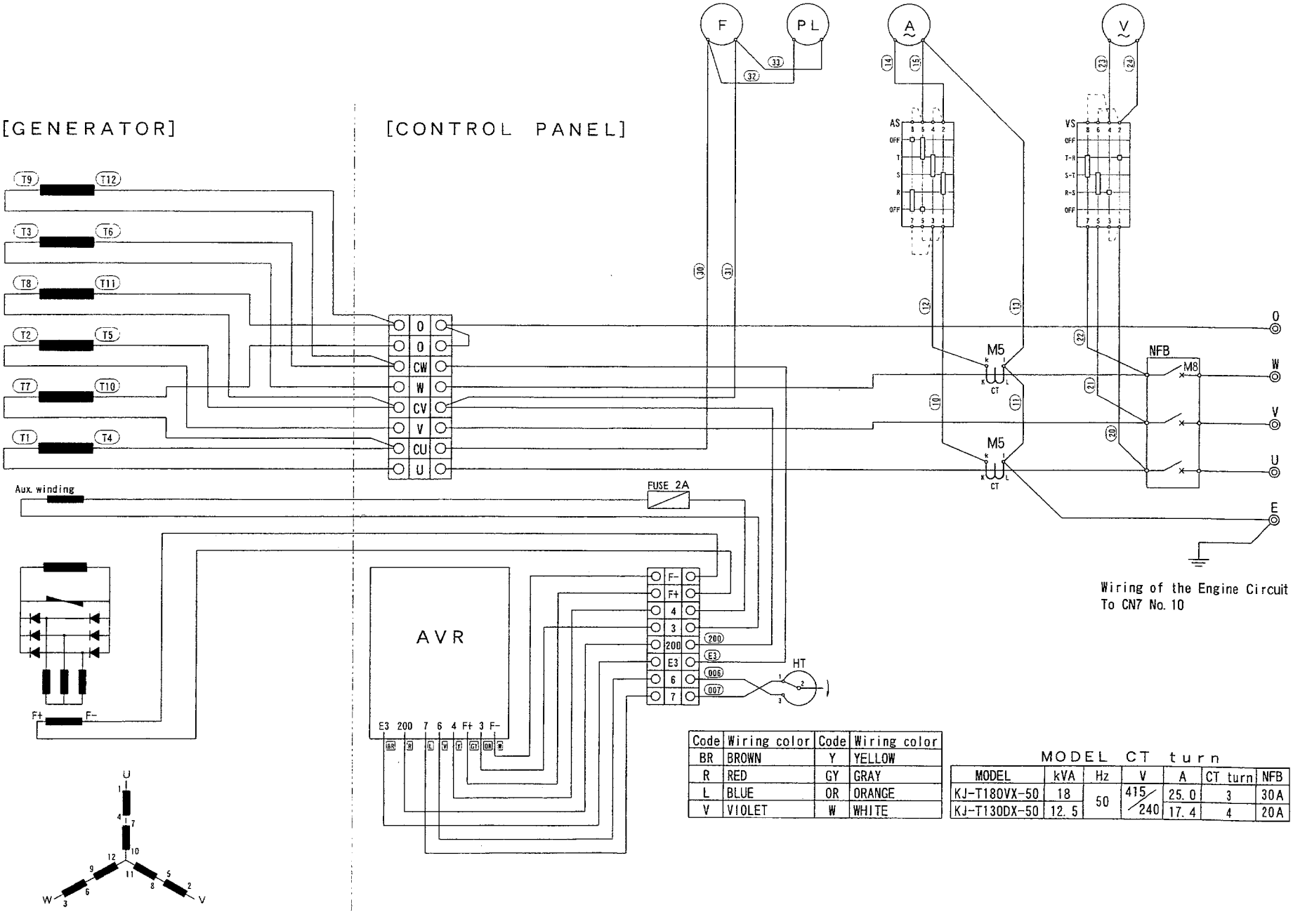
Wiring of the Engine Circuit.
To CN7 No. 10

Code	Wiring color	Code	Wiring color
BR	BROWN	Y	YELLOW
R	RED	GY	GRAY
L	BLUE	OR	ORANGE
V	VIOLET	W	WHITE

MODEL CT turn

MODEL	kVA	Hz	V	A	CT turn	NFB
KJ-T210VX-60	21	60	220 / 127	55.1	1	60A
KJ-T160DX-60	15.6	60		40.9	2	50A

Generator Circuit Diagram KJ-T130DX (415/240V) 50Hz, KJ-T180VX (415/240V) 50Hz

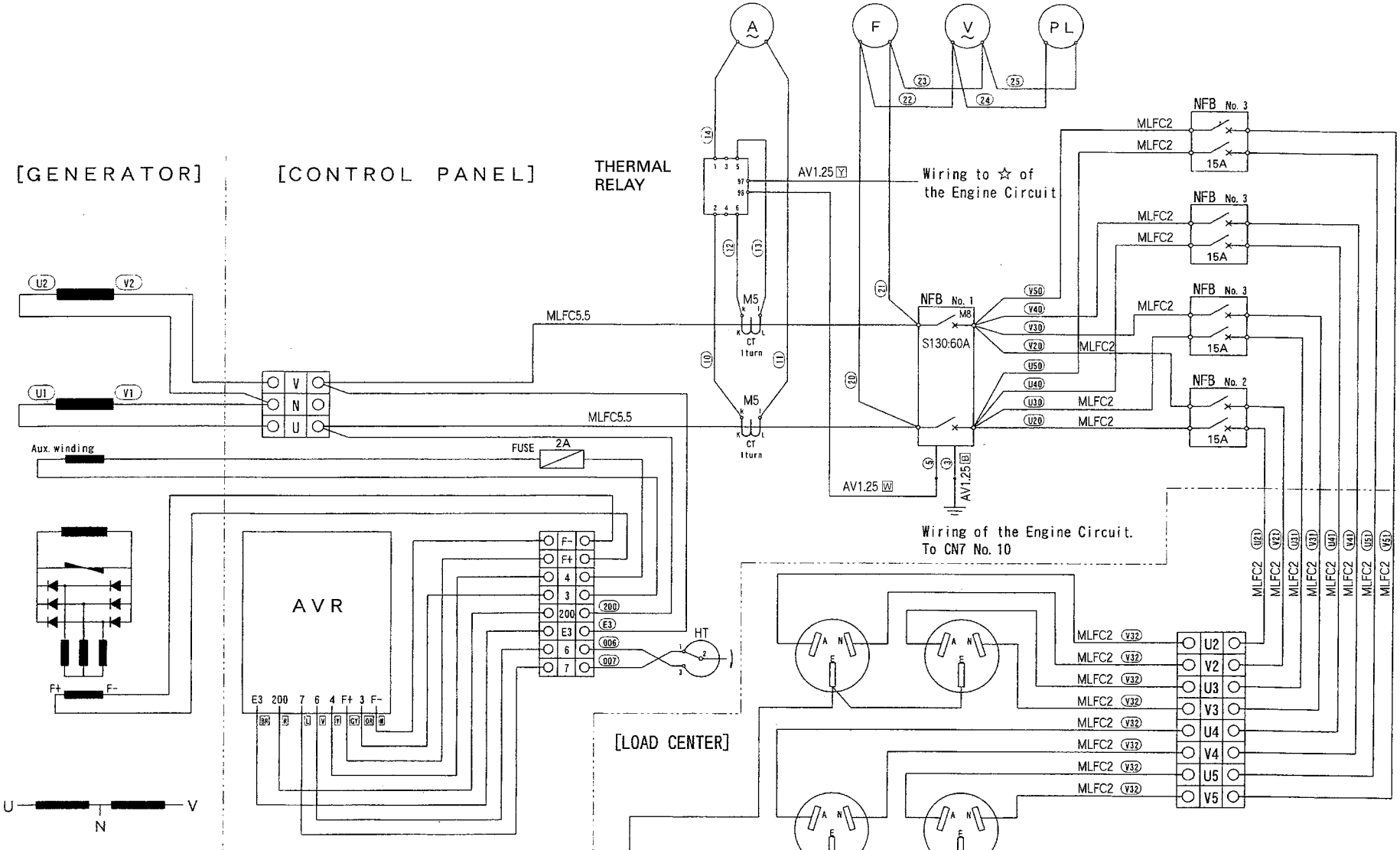


Code	Wiring color	Code	Wiring color
BR	BROWN	Y	YELLOW
R	RED	GY	GRAY
L	BLUE	OR	ORANGE
V	VIOLET	W	WHITE

MODEL CT turn

MODEL	kVA	Hz	V	A	CT turn	NFB
KJ-T180VX-50	18	50	415/240	25.0	3	30A
KJ-T130DX-50	12.5			17.4	4	20A

■ Generator Circuit Diagram KJ-S130VX-AUS (240V) 50Hz



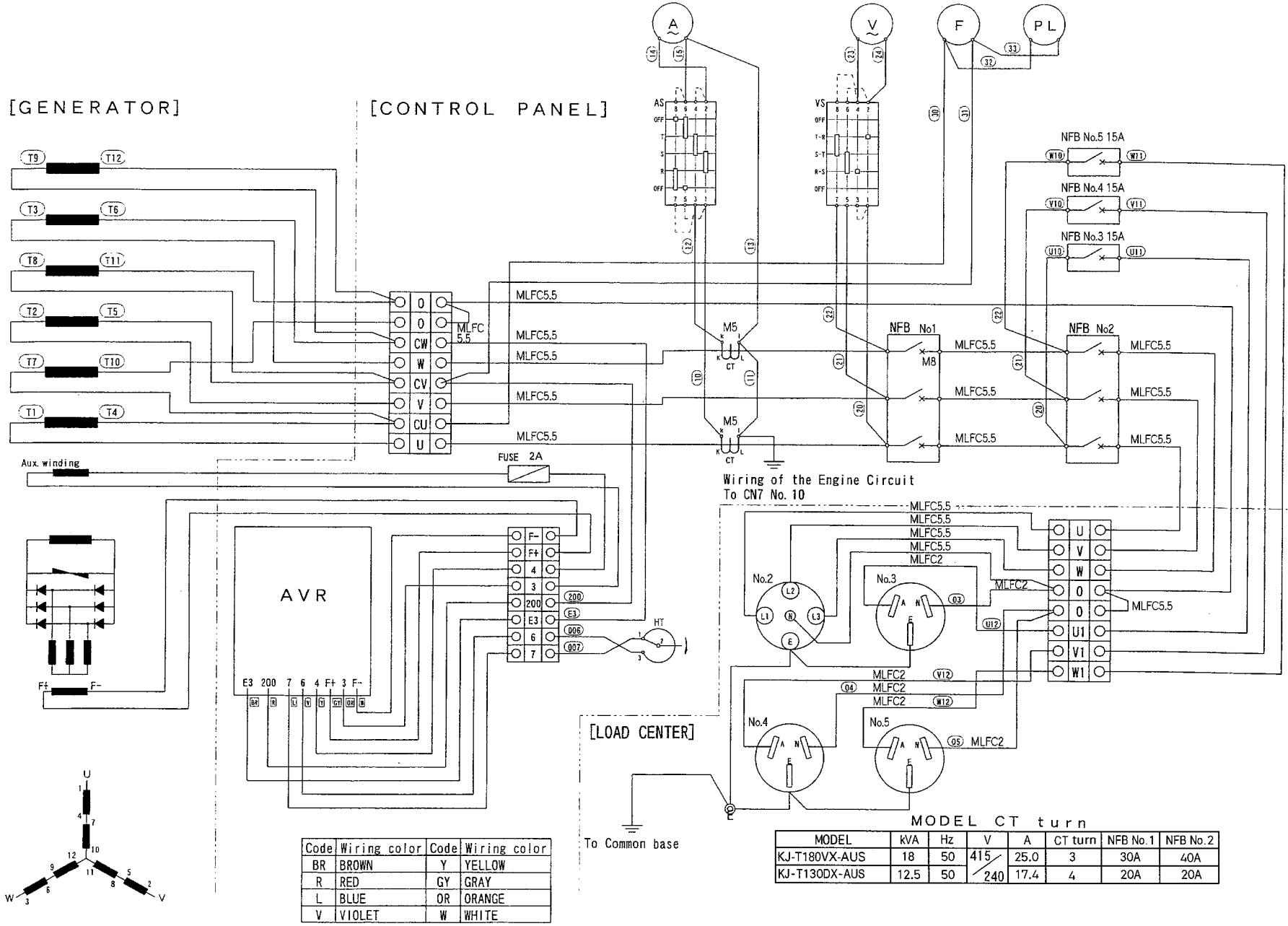
Code	Wiring color	Code	Wiring color
BR	BROWN	Y	YELLOW
R	RED	GY	GRAY
L	BLUE	OR	ORANGE
V	VIOLET	W	WHITE

MODEL CT turn

MODEL	kVA	Hz	V	A	CT turn	NFB
KJ-S130VX-AUS	12.5	50	240	52.1	1	60A

ENGLISH

Generator Circuit Diagram KJ-T130DX-AUS (415/240V) 50Hz, KJ-T180VX-AUS (415/240V) 50Hz

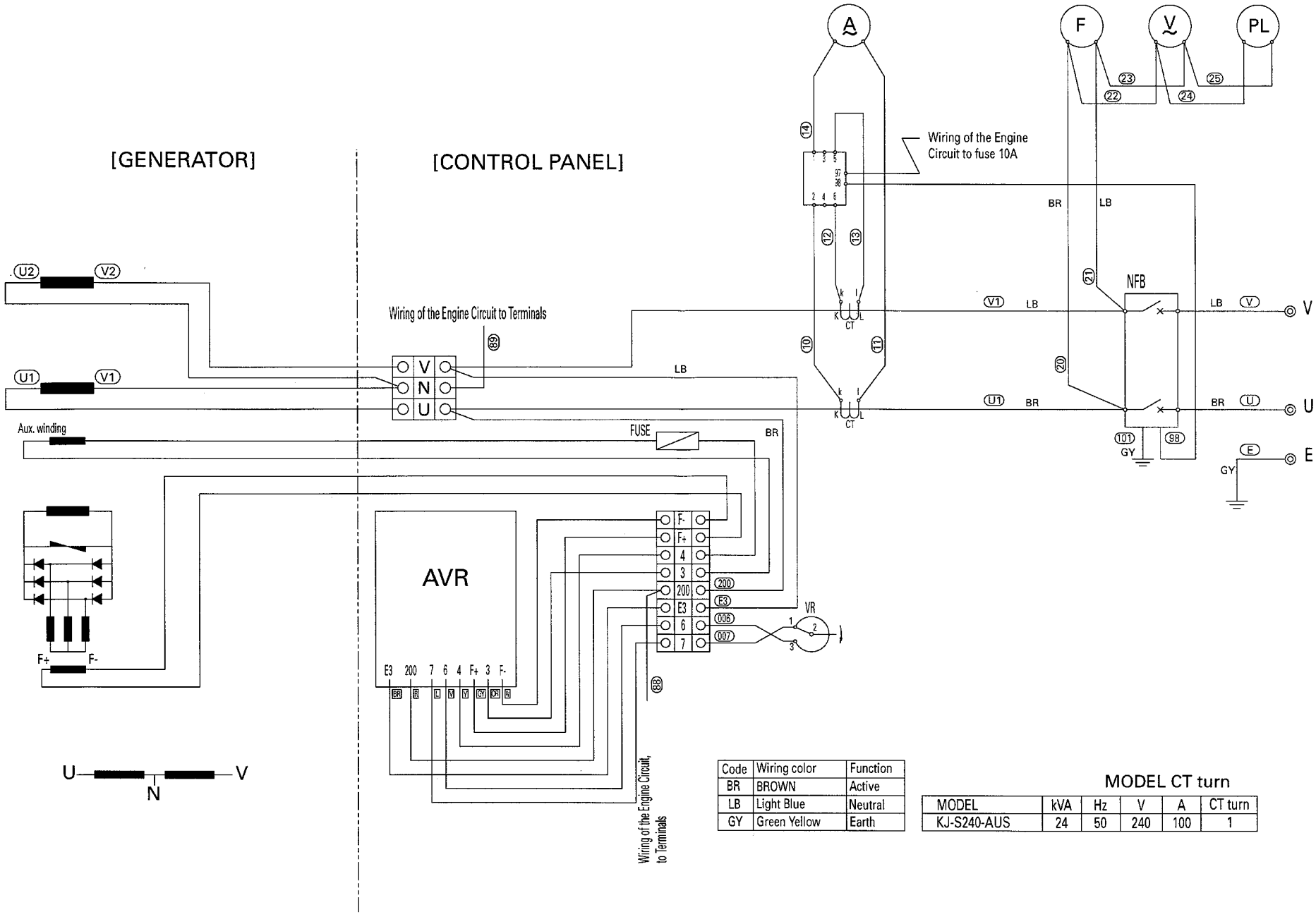


Code	Wiring color	Code	Wiring color
BR	BROWN	Y	YELLOW
R	RED	GY	GRAY
L	BLUE	OR	ORANGE
V	VIOLET	W	WHITE

MODEL CT turn

MODEL	kVA	Hz	V	A	CT turn	NFB No.1	NFB No.2
KJ-T180VX-AUS	18	50	415/240	25.0	3	30A	40A
KJ-T130DX-AUS	12.5	50		17.4	4	20A	20A

Generator Circuit Diagram KJ-S240-AUS (240V) 50Hz

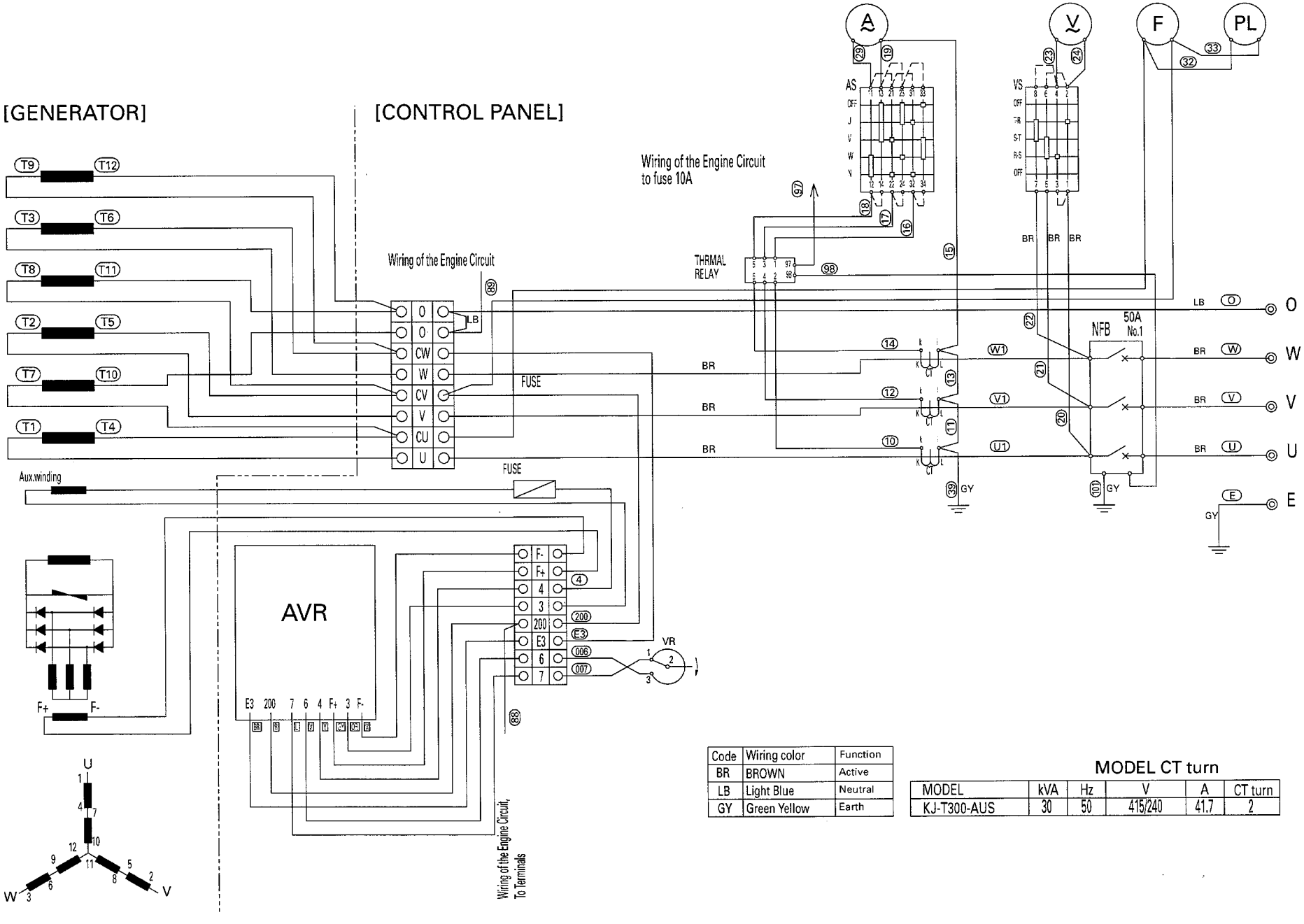


Code	Wiring color	Function
BR	BROWN	Active
LB	Light Blue	Neutral
GY	Green Yellow	Earth

MODEL CT turn

MODEL	kVA	Hz	V	A	CT turn
KJ-S240-AUS	24	50	240	100	1

Generator Circuit Diagram KJ-T300-AUS (415/240V) 50Hz



Code	Wiring color	Function
BR	BROWN	Active
LB	Light Blue	Neutral
GY	Green Yellow	Earth

MODEL CT turn

MODEL	kVA	Hz	V	A	CT turn
KJ-T300-AUS	30	50	415/240	41.7	2

OPERATION AND INSPECTION OF THE EMERGENCY RELAY

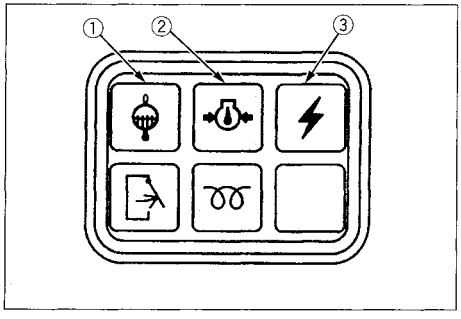
This is an automatic engine stopping device in case of abnormal oil pressure or water temperature.
This device senses any abnormal oil pressure or water temperature occurring during engine operation, and activates the stop solenoid to cut off fuel to the fuel injection pump and stop the engine.
This relay has two independent timer functions, a start relay and a stop relay.
The start relay does not activate this relay for a specified time period after the engine has started. The stop relay maintains conditions for a specified time period after activating this relay and the stop solenoid.

IMPORTANT:

- When this device stops the engine, it may be that some minor damage to the engine has occurred. To limit engine damage as much as possible, please do not make the faulty assumption that it is a perfectly safe device. Check unit prior to re-starting.

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.

Light-up	Possible Causes	Countermeasures
Lamp (1)	Engine overheating.	*See "PRECAUTION OVERHEATING" in "OPERATION" section. (See page 15)
	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.