Operator Manual

Cummins **Onan**

Performance you rely on.™

50 Hz Commercial Portable Generator Set

EGMBP / PX12000e

English 10–2008 914–0124 (Issue 1)

FOREWORD

Thank you for purchasing a Cummins generator.

This manual covers operation and maintenance of the Cummins generators. All information in this publication is based on the latest production information available at the time of approval for printing.

Pay special attention to statements preceded by the following words:

⚠ WARNING

Indicates a strong possibility of severe personal injury, loss of life and equipment damage if instructions are not followed.

[CAUTION]

Indicates a possibility of personal injury or equipment damage if instructions are not followed.

NOTE:

Gives helpful information.

If a problem should arise, or if you have any questions about the generator, consult an authorized dealer or factory service center.

⚠ WARNING

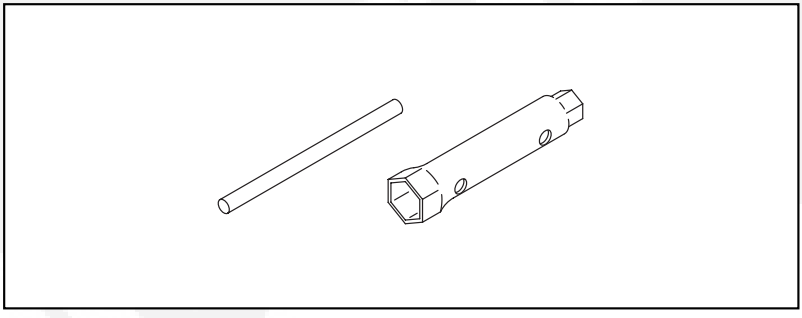
- **The generator is designed to give safe and dependable service if operated according to instructions.**
- **Do not operate the generator before you have read and understood the instructions. Failure to do so could result in death, personal injury or equipment damage.**

■ **Check that following accessories come with your Cummins Generator.**

(1) Instruction for use

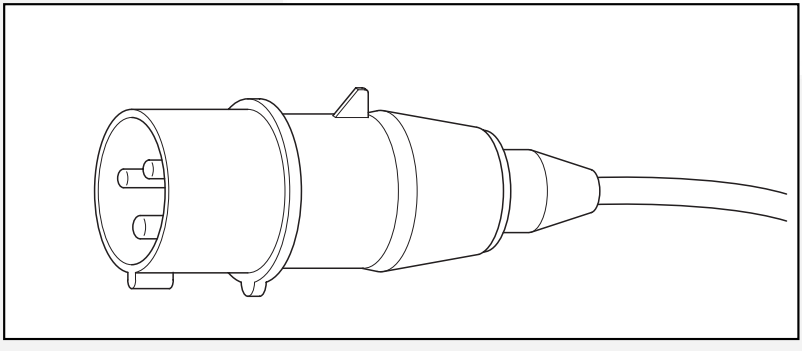
(2) Wheel mounting parts (See page 27.)

(3) Servicing tools



(4) Battery mounting bracket
(See page 8 and 9.)

(5) Plug for AC receptacle



■ **Be sure to replenish with engine oil.**
(See page 6 for details.)

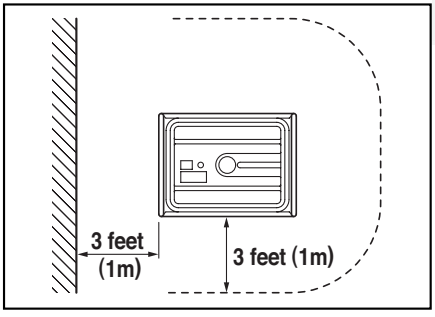
CONTENTS

1. SAFETY PRECAUTIONS

⚠ Do not operate the generator near gasoline or gaseous fuel because of the potential danger of explosion or fire.
Do not fill the fuel tank with fuel while the engine is running. Do not smoke or use open flame near the fuel tank. Be careful not to spill fuel during refueling. If fuel is spilt, wipe it off and let dry before starting the engine.

⚠ Do not place inflammables near the generator.
Be careful not to place fuel, matches, gunpowder, oily cloths, straw, trash, or any other inflammables near the generator.

⚠ Do not operate the generator inside a room, cave, tunnel, or other insufficiently ventilated area. Always operate it in a well-ventilated area, otherwise the engine may become overheated, and the poisonous carbon monoxide gas contained in the exhaust gases will endanger human lives. Keep the generator at least 3 feet (1 meter) away from any structure or building during use.



If the generator must be used indoors, the area must be well-ventilated and extreme caution must be taken regarding the discharge of exhaust gases.

⚠ Do not enclose the generator nor cover it with a box.
The generator has a built-in forced air cooling system, and may become overheated if it is enclosed. If generator has been covered to protect it from the weather during non use, be sure to remove it and keep it well away from the area during generator use.

⚠ Operate the generator on a level surface.
It is not necessary to prepare a special foundation for the generator. However, the generator will vibrate on an irregular surface, so choose a level place without surface irregularities.
If the generator is tilted or moved during operation, fuel may spill and/ or the generator may tip over, causing a hazardous situation.
Proper lubrication cannot be expected if the generator is operated on a steep incline or slope. In such a case, piston seizure may occur even if the oil is above the upper level.

⚠ Pay attention to the wiring or extension cords from the generator to the connected device.
If the wire is under the generator or in contact with a vibrating part, it may break and possibly cause a fire, generator burnout, or electric shock hazard. Replace damaged or worn cords immediately.

⚠ Do not operate in rain, in wet or damp conditions, or with wet hands.
The operator may suffer severe electric shock if the generator is wet due to rain or snow.

⚠ If wet, wipe and dry it well before starting. Do not pour water directly over the generator, nor wash it with water.

⚠ Be extremely careful that all necessary electrical grounding procedures are followed during each and every use. Failure to do so can be fatal.

⚠ Do not contact the generator to a commercial power line. Connection to a commercial power line may short circuit the generator and ruin it or cause electric shock hazard. Use the transfer switch for connecting to domestic circuit.

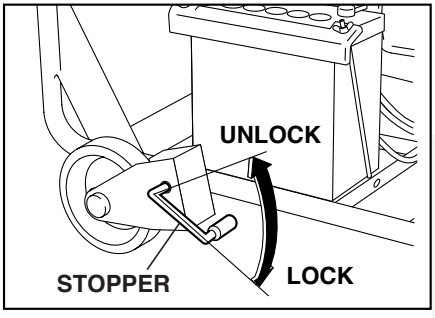
⚠ No smoking while handling the battery. The battery emits flammable hydrogen gas, which can explode if exposed to electric arcing or open flame.
Keep the area well-ventilated and keep open flames/sparks away when handling the battery.

⚠ Engine becomes extremely hot during and for some time after operation. Keep combustible materials well away from generator area.
Be very careful not to touch any parts of the hot engine especially the muffler area or serious burns may result.

⚠ Keep children and all bystanders at a safe distance from work areas.

⚠ It is absolutely essential that you know the safe and proper use of the power tool or appliance that you intend to use. All operators must read, understand and follow the tool/appliance owners manual. Tool and appliance applications and limitations must be understood. Follow all directions given on labels and warnings. Keep all instruction manuals and literature in a safe place for future reference.

Notes on installation



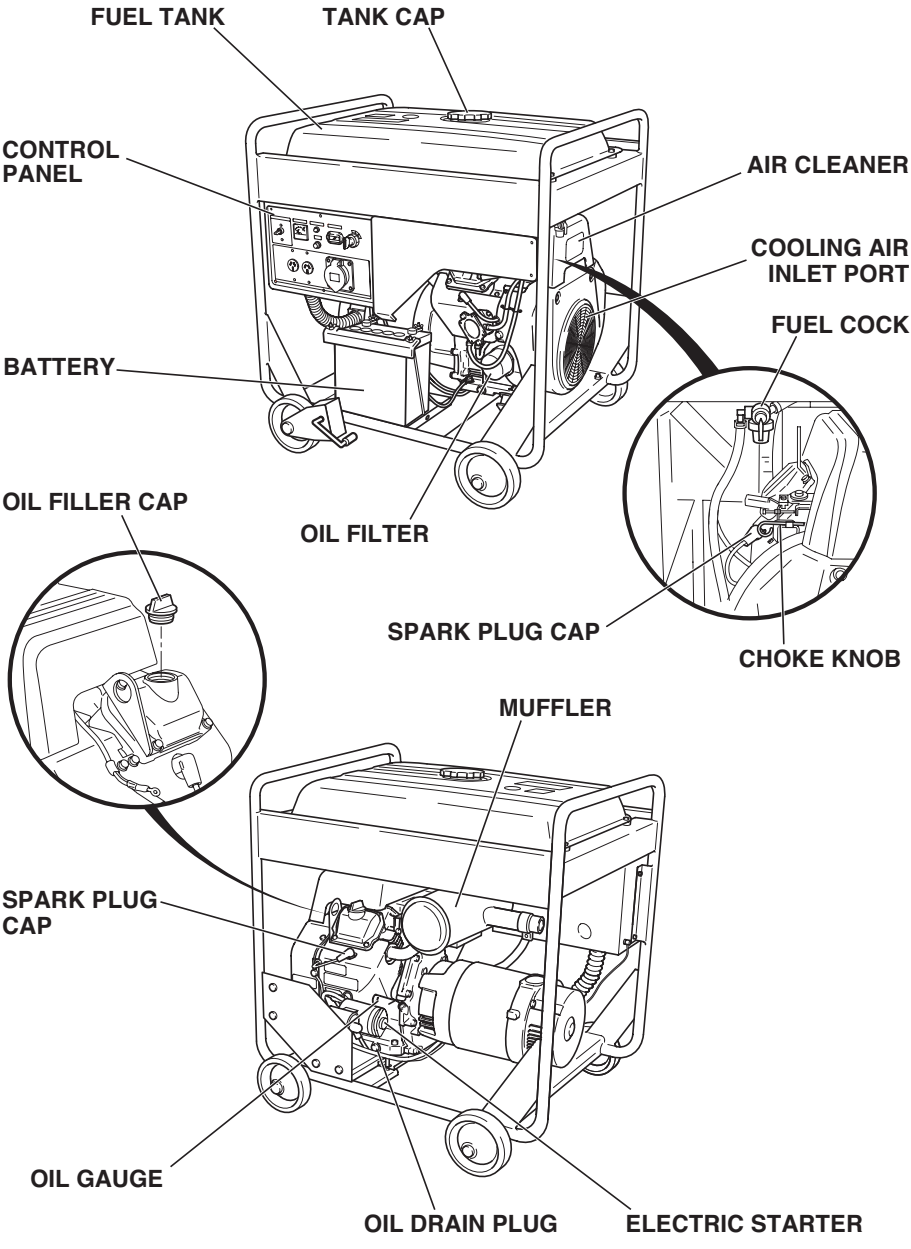
1. If you provide the generator with wheels, always be sure to place the generator on a level surface, locking the wheel with the stopper and/or chocking the wheels.
2. Select a place which allows you to maintain and inspect the generator, which is not exposed to contamination caused by exhaust gas.
   If you are planning to install the generator without its wheels attached, consider the work efficiency in terms of an oil change.
3. In ground connection, be sure to use the designated ground terminal.
   (A grounding cable is not included in the set of accessories.)
4. During use, be sure not to disconnect the battery.
5. While the power is on, do not unplug the unit or disconnect cables from the terminals.

2. SPECIFICATIONS

Model			PX12000e
Alternator	Type		Brush, Self-exciting, 2-pole, Single-phase
	Rated frequency		50 Hz
	Rated voltage		240 V
	Maximum output		10000 VA
	Rated output		8500 VA
	Power factor		1.0
	Voltage regulator		A.V.R type
Engine	Model		EH65D
	Type		Twin cylinder, Air-cooled, 4-stroke, Overhead valve engine
	Displacement		653 cm^3
	Fuel		Unleaded automobile gasoline
	Oil capacity		1.55 liters
	Starting system		Electric starter
Fuel tank capacity			44 liters
Rated continuous operation per a tankful of fuel		Rated	Approx. 8.9 hours
Dimension	Length		826 mm
	Width		611 mm /766 mm *1
	Height		771 mm /856 mm *1
Dry weight			141 kg (149 kg) *2

*1: ( ) shows dimensions with castors.
*2: ( ) shows dry weight with castors installed.

3. COMPONENTS

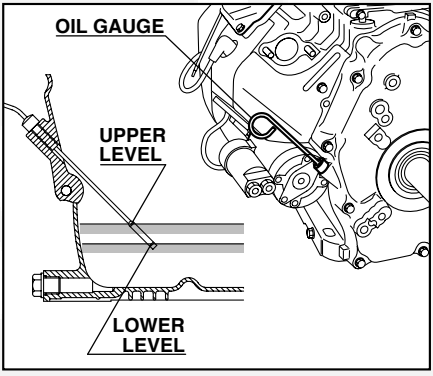


4. PRE-OPERATION CHECKS

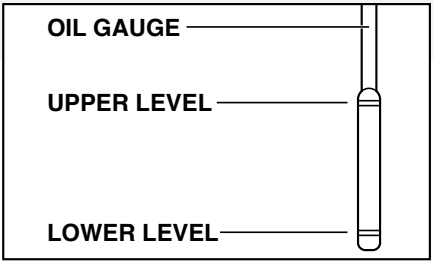
CHECK ENGINE OIL

Before checking or refilling oil, be sure generator is located on stable and level surface with engine stopped.

1) Remove oil level gauge and check the engine oil level.
2) If oil level is below the lower level line on the oil gauge, refill with suitable oil (see table) to upper level after removing the engine oil filler cap.
3) Change oil if contaminated. (See "How-To" Maintenance.)

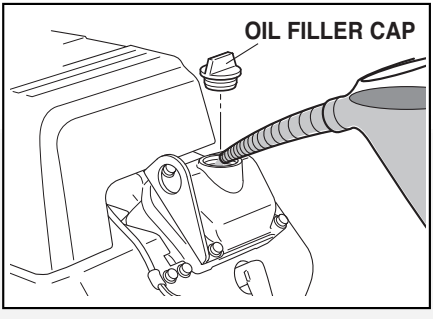


Oil capacity · · · · · 1.55 liters (Upper level)



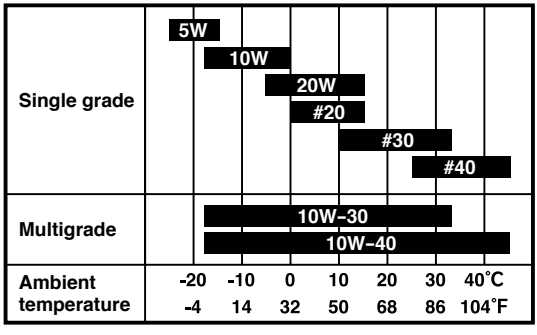
NOTE :

- The engine is equipped with an oil sensor unit (hydraulic pressure detection type) that will automatically stop the engine if oil in the crank case is reduced below the specified level. Should the engine be automatically stopped, be sure to check the amounts of fuel and oil.
- When the oil is reduced below the specified level, add new oil to the upper limit. Since the oil sensor will not detect the deterioration of oil, visually check the quality or determine it by the specified time and then change the oil if necessary. (Refer to page 20.)



Recommended engine oil :

Use class **"SE"** (API classification) oil or a higher grade oil according to the table below. **SAE 10W-30** is recommended for general, all-temperature use. If single viscosity oil is used, select the appropriate viscosity for the average temperature in your area.

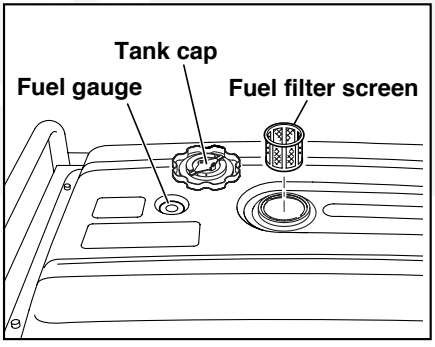


CHECK ENGINE FUEL

⚠ WARNING

Do not refuel while smoking or near open flame or other such potential fire hazards. Otherwise fire accident may occur.

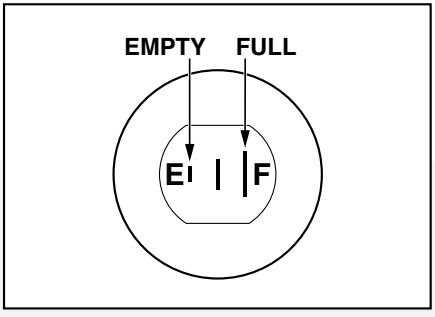
1) Check fuel level at fuel level gauge.
2) If fuel level is low, refill with unleaded automotive gasoline.
3) Be sure to use the fuel filter screen on the fuel filter neck.



Recommended fuel :

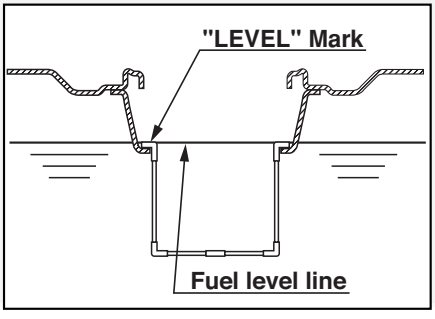
Unleaded automotive gasoline of octane rating RON87 or higher.

Fuel tank capacity : 44 liters



NOTE :

■ The full level of fuel is the upper surface of the fuel filter.



Continuous operation time in normal use (rated load)	
PX12000e	Approx. 8.9 hours (50 Hz)

⚠ WARNING

Make sure you review each warning in order to prevent fire hazard.

- **Do not refill tank while engine is running or hot.**
- **Close fuel cock before refueling with fuel.**
- **Be careful not to admit dust, dirt, water or other foreign objects into fuel.**
- **Do not fill above the top of the fuel filter (marked "LEVEL") or the fuel may overflow when it heats up later and expands.**
- **Wipe off spilt fuel thoroughly before starting engine.**
- **Keep open flames away.**

BATTERY INSTALLATION

Recommended Battery

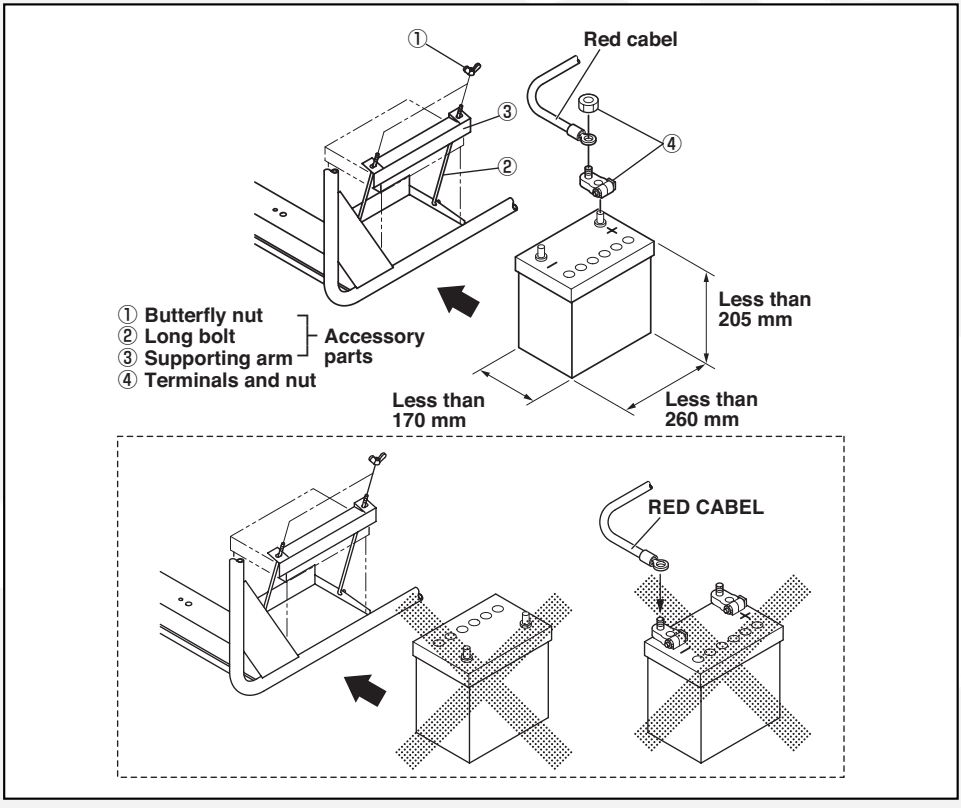
Lead-acid battery : A capacity of 12V-32A·h or larger.
For the generators used in low temperature (below -5℃),
12V-40A·h or larger battery is recommended.

1) Attach terminals to a lead-acid battery already charged. Mount the battery onto the position as specified below, with its terminals facing inward.
2) Insert each long bolt through the specified hole, its tip pointing outward.
3) Put the supporting arm on the long bolts and tighten with the butterfly nuts. (Push the lead-acid battery all the way inward.)
4) Arrange the wiring so that it won't be damaged by possible vibration caused by the engine.
5) Only after checking that the engine's starter key is in the "OFF" position, securely connect the red cable, to the positive (+) terminal. And then connect the other cable to the negative (-) terminal.

Red cable : to the (+) terminal
Black cable : to the (-) terminal

[CAUTION]

Should the connection be made in incorrect manner, the engine will be broken.



⚠ WARNING

Death, personal injury and/ or property damage may occur unless instructions are followed carefully.

- **Disconnect battery cables when charging battery.**
- **Use battery of specified capacity listed in the owner's manual.**
- **Turn the starter switch to the "STOP" position when mounting or dismounting battery. Connect positive (+) terminal first when mounting battery, and disconnect negative (-) terminal first when dismounting.**

  RED CABLE : To positive (+) terminal
  BLACK CABLE : To negative (-) terminal

CHECK COMPONENT PARTS

Check following items before starting engine:

- Fuel leakage from fuel hose, etc.
- Bolts and nuts for looseness.
- Components for damage or breakage.
- Generator not resting on or against any adjacent wiring.

CHECK GENERATOR SURROUNDINGS

⚠ WARNING

Make sure you review each warning in order to prevent fire hazard.

- **Keep area clear of inflammables or other hazardous materials.**
- **Keep generator at least 3 feet (1 meter) away from buildings or other structures.**
- **Only operate generator in a dry, well ventilated area.**
- **Keep exhaust pipe clear of foreign objects.**
- **Keep generator away from open flame. No smoking!**
- **Keep generator on a stable and level surface.**
- **Do not block generator air vents with paper or other material.**

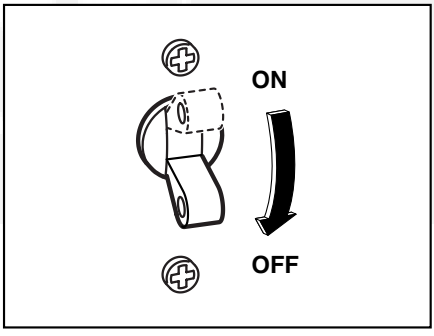
5. OPERATING PROCEDURES

STARTING THE ENGINE

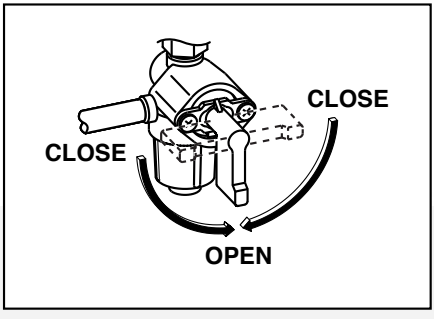
[CAUTION]

- **Check the oil level before each operations. (See page 6)**
- **Perform the specified Daily Inspection to see if it is in normal condition.**

(1) Make sure that the AC circuit breaker is off.



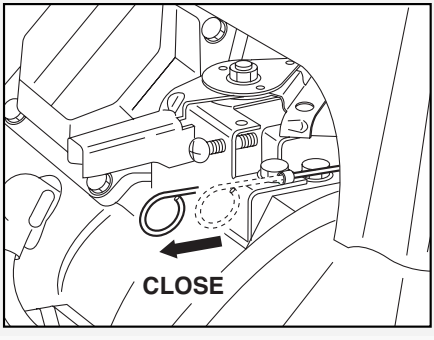
(2) Turn the fuel cocks to the vertical (open) position



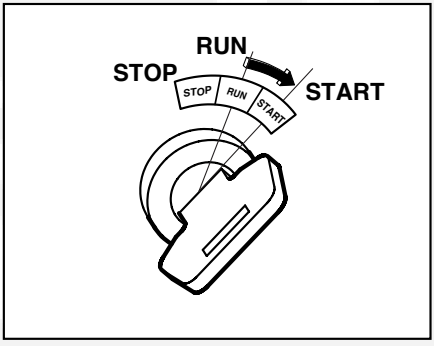
(3) Pull the choke knob to the fully closed position.

NOTE :

Be sure to pull the choke even if the engine is warm.



(4) Turn the starter switch to the "START" position.
If the engine won't start, turn the switch back to "ON" position and then wait for approximately 10 seconds to try it again.



NOTE :

- You might have to keep the starter running for at least 3 to 5 seconds, since the engine incorporates the mechanism in it where the ignition circuit is activated by the increase of hydraulic pressure.
- In the following occasion, two or three trials may be required for starting the engine :

(1) The very first starting of a new generator.

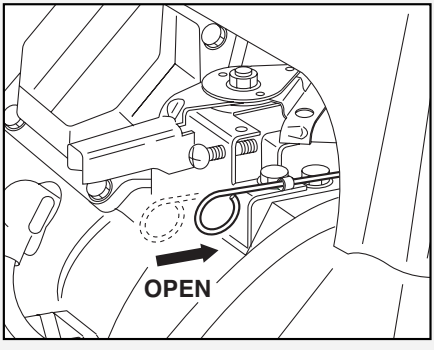
(2) After the refueling of the engine which has been stopped due to fuel shortage.

(3) Starting after the oil filter change.

- Even if the engine has already been warmed, be sure to pull the choke knob.

(4) Return the starter switch to **"ON"** position soon after the engine has started and then push the choke knob. In cold weather, be sure to push it gradually.

(5) Warm the engine up for a minute or two. Longer time would be needed in cold weather.



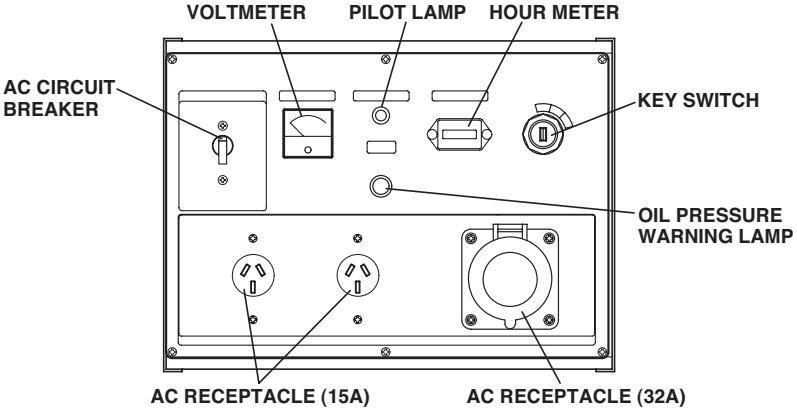
USING ELECTRIC POWER

⚠ WARNING

- **Make sure that the appliance is switched OFF before connecting it to the generator.**
- **Do not move the generator while it is running.**
- **Be sure to ground the generator if the connected appliance is grounded. Failure to ground unit may lead to electrical shock.**

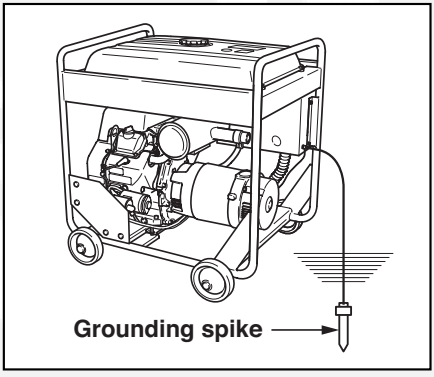
CONTROL PANEL

(PX12000e)

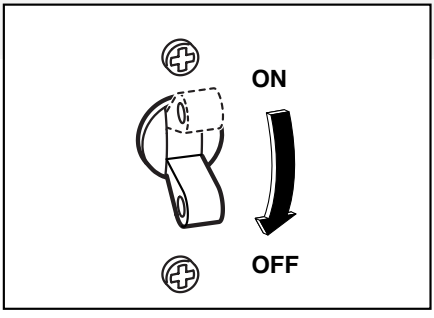


(1) AC APPLICATION

(a) Ground the generator, using the ground terminal located at the side of the panel.

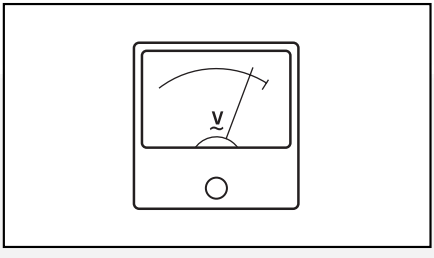


(b) Before starting the engine, check that the AC circuit breaker of the generator and the power switches of the appliances are turned off.

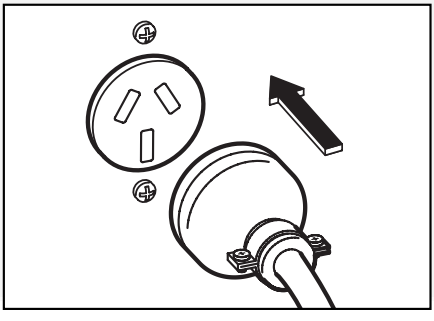


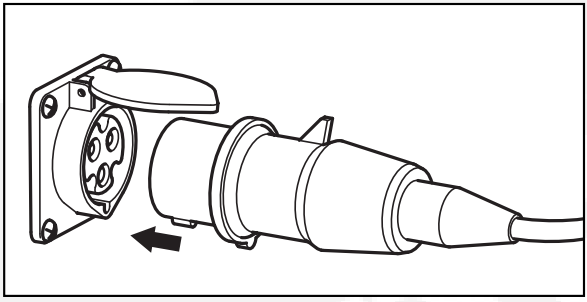
(c) Connect the plugs of the appliances to the receptacles before starting the engine. If you wish to use for a long period of time, connecting to the output terminal is recommended.

(d) Start the engine and check that the voltage meter is indicating correct voltage.



- Check the amperage of the receptacles used referring to **TABLE 1**, and be sure not to take a current exceeding the specified amperage.
- Be sure that the total wattage of all appliances dose not exceed the rated output of the generator.





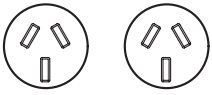
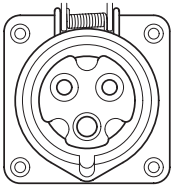
Style	Ampere	Receptacle	AC plug	Description
	up to 15A	CLIPSAL 415/15A	Available on market	Locking Receptacle (REC1)
	up to 32A	SCAME S21-6H	SCAME PM234-6	Locking Receptacle (REC2)

TABLE 1

⚠ WARNING

- **Be sure to ground the generator if the connected electrical device Is grounded.**

NOTE :

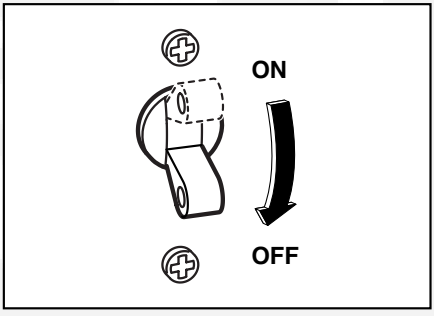
When the AC circuit breaker turns off during operation, the generator is over loaded or the appliance is defective. Stop the generator immediately, check the appliance and / or generator for overloading or detect and have repaired as necessary by Cummins dealer or service shop.

STOPPING THE GENERATOR

(1) Turn off the power switch of the electric equipment.

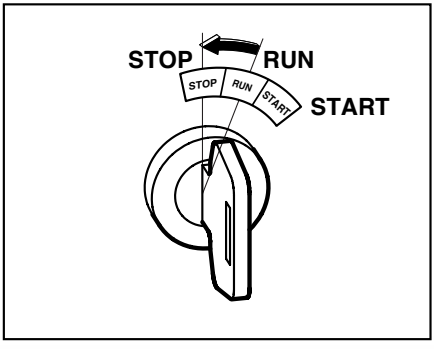
(2) Turn the AC circuit breaker to off.

(3) Unplug the cord from receptacle of the generator.

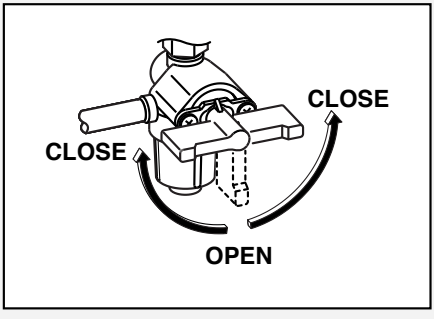


(4) Allow the engine to run at no-load for about 3 minutes to cool down before stopping.

(5) Turn the starter switch to the STOP position.



(6) Close the fuel cock.



6. WATTAGE INFORMATION

Some appliances need a "surge" of energy when starting.
This means that the amount of electrical power needed to start the appliance may exceed the amount needed to maintain its use.
Electrical appliances and tools normally come with a label indicating voltage, cycles/Hz, amperage (amps) and electrical power needed to run the appliance or tool.
Check with your nearest dealer or service center with questions regarding power surge of certain appliances or power tools.

- Electrical loads such as incandescent lamps and hot plates require the same wattage to start as is needed to maintain use.
- Loads such as fluorescent lamps require 1.2 to 2 times the indicated wattage during start-up.
- Loads for mercury lamps require 2 to 3 times the indicated wattage during start-up.
- Electrical motors require a large starting current. Power requirements depend on the type of motor and its use. Once enough "surge" is attained to start the motor, the appliance will require only 50% to 30% of the wattage to continue running.
- Most electrical tools require 1.2 to 3 times their wattage for running under load during use. (For example, a 9,000 watt generator can power a 3,200 to 7,000 watt electrical tool.)
- Loads such as submersible pumps, air conditioners and air compressors require a very large force to start. They need 3 to 5 times the normal running wattage in order to start. (For example, a 5,000 watt generator would only be able to drive a 1,800 to 3,100 watt pump.)
- If the power consumption of electrical appliances exceeds the operating range or if there is short circuit or other problems in the appliances, the AC breaker could trip "OFF" or the rotation of the generator could be abnormally reduced. In this case, stop the generator to see if the power consumption of the appliances is too large and if there is a problem in the appliances.
- The frequency (the number of the generators rotation) was adjusted before the time of shipment. Changing the frequency could result in the generators breakdown, so refrain from changing it.

To determine the total wattage required to run a particular electrical appliance or tool, multiply the voltage figure of the appliance/tool by the amperage (amps) figure of same. The voltage and amperage (amps) information can be found on a name plate which is normally attached to electrical appliances and tools.

Applications	Applicable Wattage (W)
	50 Hz
Incandescent lamp, Heater	8,500
Fluorescent lamp, Electric tool	4,000
Pump, Compressor	2,000

NOTE :

- The above wattage chart is general guide only. Refer to your specific appliance for correct wattage.
- When you use two or more alternating current outlets at a time, be careful that the sum of the appliances' power consumption does not exceed the value specified in the above chart.

VOLTAGE DROP IN ELECTRIC EXTENSION CORDS

When a long electric extension cord is used to connect an appliance or tool with the generator, a certain amount of voltage drop occurs in the extension cord which lessens the effective voltage available to the appliance or tool.
The chart below has been prepared to illustrate the approximate voltage loss when an extension cord of 300 feet (approx. 100 meters) is used to connect an appliance or tool to the generator.

Nominal cross section	A.W.G.	Allowable current	No.of strands / strands dia.	Resistance	Current Amp.							
mm^2	No.	A	No./mm	Ω/100m	1A	3A	5A	8A	10A	12A	15A	
0.75	18	7	30/0.18	2.477	2.5V	8V	12.5V	—	—	—	—	Voltage drop
1.27	16	12	50/0.16	1.486	1.5V	5V	7.5V	12V	15V	18V	—	
2.0	14	17	37/0.26	0.952	1V	3V	5V	8V	10V	12V	15V	
3.5	12 to 10	23	45/0.32	0.517	—	1.5V	2.5V	4V	5V	6.5V	7.5V	
5.5	10 to 8	35	70/0.32	0.332	—	1V	2V	2.5V	3.5V	4V	5V	

7. MAINTENANCE SCHEDULE

DAILY INSPECTION

(1) Amount of fuel (See page 7)

(2) Water on fuel strainer (See page 22)

(3) Amount of engine oil (See page 6)

(4) Amount of electrolyte in lead-acid battery
(Not supplied ; Refer to the instruction for use.)

(5) Dust in intake port

(6) Looseness of each fastened point

(7) Abnormal vibration and noise

(8) Leakage of fuel and oil (See page 6-7.)

PERIODICAL MAINTENANCE

EVERY 25 HOURS	■ Cleaning of outer element of air cleaner.
50 HOURS	■ Changing of air cleaner element.(inner and outer) ■ Changing of engine oil.(*)
200 HOURS	■ Changing of oil filter. ■ Cleaning of fuel strainer. ■ Adjustment of spark plug gap.
500 HOURS	■ Check and replace carbon brushes.
EVERY 1,000 HOURS	■ Engine overhaul. ■ Checking of bearings in generator. ■ Changing of rubber mounts.
EVERY 2 YEARS	■ Cleaning of engine's cooling air intake port and generators cover. ■ Changing of fuel pipes.

* : Initial oil change should be performed after first twenty (20) hours of use.
Thereafter change oil every 50 hours or six (6) months whichever comes first.

[CAUTION]

Before changing the oil, check for a suitable way to dispose of the old oil. Do not pour it down sewage drains, onto garden soil or into open streams. Your local zoning or environmental regulations will give you more detailed instructions on proper disposal.

8. "HOW-TO" MAINTENANCE

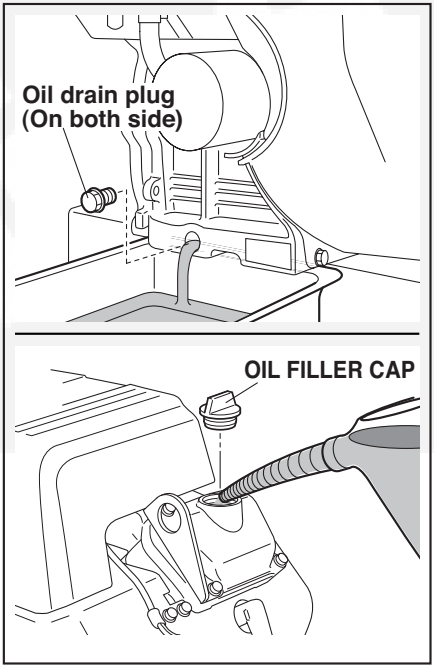
ENGINE OIL CHANGE

■ Initial oil change
・・・・・After 20 hours of operation

■ Thereafter
・・・・・Every 50 hours of operation

1. When changing oil, stop the engine and loosen the drain plug.
2. Re-install the drain plug before refilling oil.
3. Refer to the recommended oil table on page 6.
4. Always use the best grade and clean oil. Contaminated oil, poor quality oil and shortage of oil cause damage to engine or shorten the engine life.

Oil capacity ・・・・・1.55 liters (Upper level)

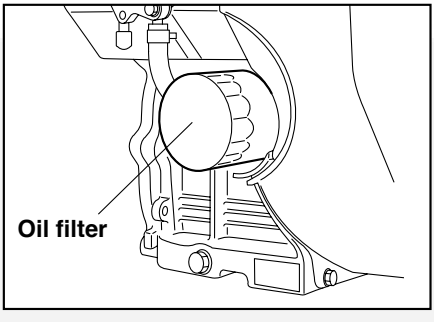


ENGINE OIL FILTER REPLACEMENT

■ Initial engine oil filter replacement should be performed after 20 hours of operation. Thereafter replace the engine oil filter every 200 hours.

■ When installing a new oil filter, apply oil to O-ring, attach the oil filter in position and tighten 2/3 turns by hand or with wrench after touching the O-ring to the sealing surface of engine.

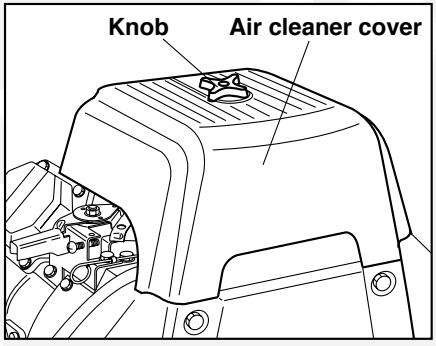
■ Run the engine for a minute ; stop the engine and check for oil leakage around the oil filter and recheck the oil level.



[CAUTION]

To prevent injury, pay attention to the spilled hot engine oil when replacing engine oil filter.

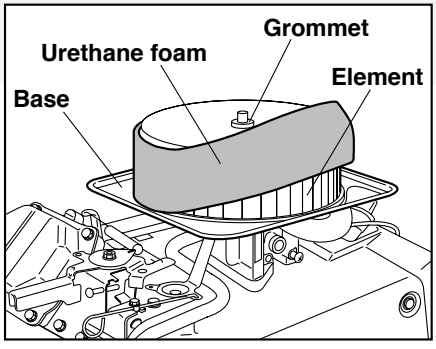
SERVICING AIR CLEANER



A dirty air cleaner element will cause starting difficulty, power loss, engine malfunctions, and shorten engine life extremely.

Always keep the air cleaner element clean. Replaced the air cleaner element set more often in dusty environments.

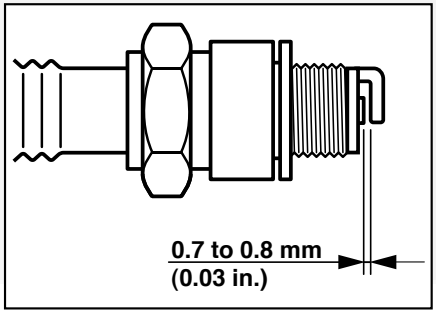
The air cleaner paper inner element and urethane foam outer element can be removed after removing knob and air cleaner cover. When installing, set the paper element and urethane foam on the air cleaner base. Check that the grommet is in position, and then install the cover with knob tightened securely.



■ Urethane Foam cleaning
Wash and clean the urethane foam in kerosene. Saturate in a mixture of 3 parts kerosene and 1 part engine oil, and then squeeze to remove excess oil.
Clean or replace the urethane foam element every 50 hours. (more often in dusty environments)

■ Paper element
Clean by tapping gently to remove dirt and blow off dust. Never use oil.
Clean or replace the paper element every 50 hours of operation, and replace element set every 200 hours or once a year.

CLEANING AND ADJUSTING SPARK PLUG



(a) Unplug the high-voltage cables (located at the outlet panel and lead-acid battery).

(b) Using the supplied plug wrench and handle, turn it counterclockwise until it comes off.

(c) Clean the area around the mounting hole.

(d) Clean the electrodes if they are dirty. Adjust the clearance to 0.03 in. (0.7-0.8 mm). Replace it with a new one if the abrasion has developed to the degree where a flat surface cannot be obtained on its projection.
If the electrodes turn black, also inspect the air cleaner.

(e) Attach and tighten the plug with the specified torque : 25 to 30 Nm (2.5 to 3.0 kg-m).

(f) After checking that the contact area inside the plug cap is not corroded, connect the high-voltage cables.

Spark plug
NGK BPR6ES (CHAMPION RN9YC)

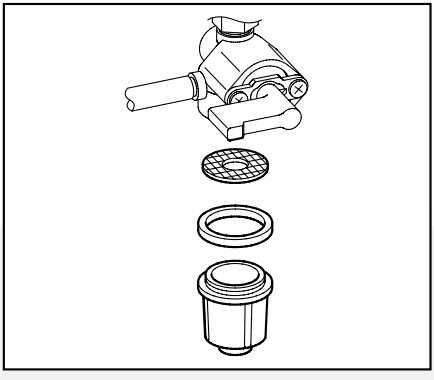
CLEANING FUEL STRAINER

Dirt and water in the fuel are removed by the fuel strainer.

(a) Remove the strainer cup and throw away water and dirt.

(b) Clean the screen and strainer cup with gasoline.

(c) Tightly fasten the cup to main body, making sure to avoid fuel leak.



FUEL HOSE REPLACEMENT

⚠ WARNING

Take extreme caution when replacing fuel hose ; gasoline is flammable.

Replace the fuel hose every 1,000 hours or every year.
If fuel hose leak is found, replace the fuel hose immediately.

CHECKING CARBON BRUSH

If the brush become excessively worn, its contact pressure with the slip ring changes and causes a roughened surface on the slip ring, resulting in irregular generator performance.

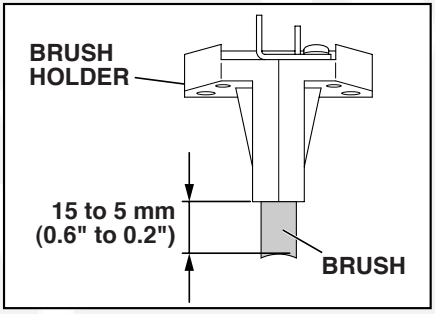
Check the brush every 500 hours or if generator performance is irregular.

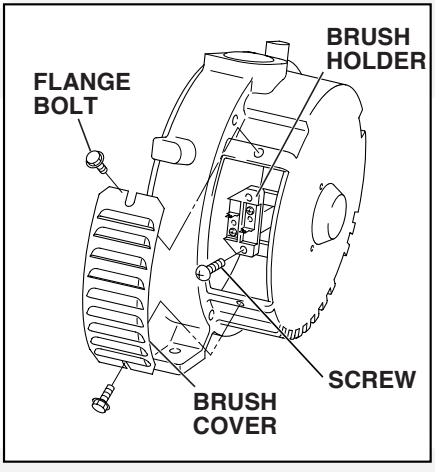
If the brush is 5 mm (0.2 in.) long or less, replace it with a new one.

(a) Remove the brush cover.

(b) Disconnect the wire connector and remove the brush.

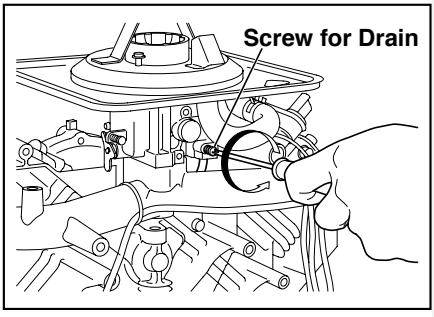
(c) Carefully note the brush direction and relative position with the slip ring when installing new brush.





9. PREPARATION FOR STORAGE

The following procedures should be followed prior to storage of your generator for a period of 6 months or longer.



- Drain fuel from fuel tank and strainer (cup) carefully by disconnecting the fuel line. Gasoline left in the fuel tank will eventually deteriorate making engine-starting difficult.
- In order to remove the fuel in the carburetor, run the engine at no-load until it stops.
- Disconnect the terminal of the battery.
- Change engine oil.
- Check for loose bolts and screws, tighten them if necessary.
- Clean generator thoroughly with oiled cloth. Spray with preservative if available. NEVER USE WATER TO CLEAN GENERATOR !
- Store generator in a well ventilated, low humidity area.

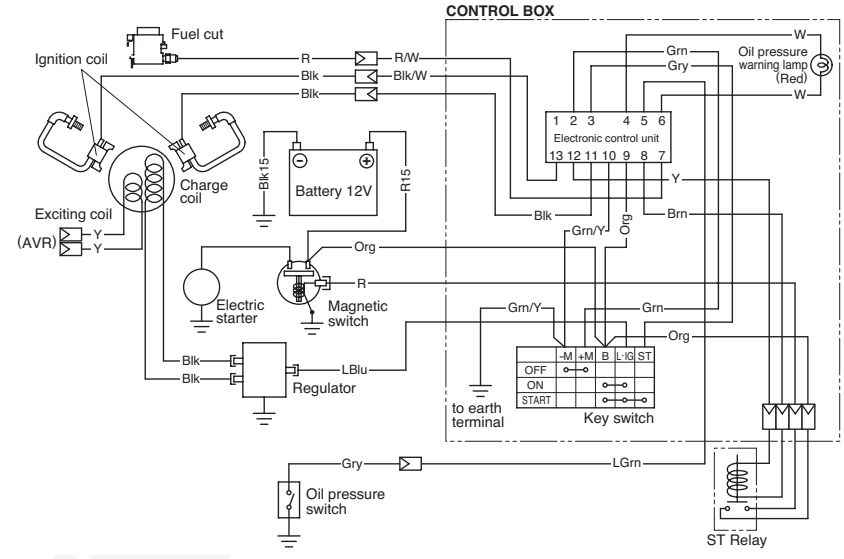
10. TROUBLESHOOTING

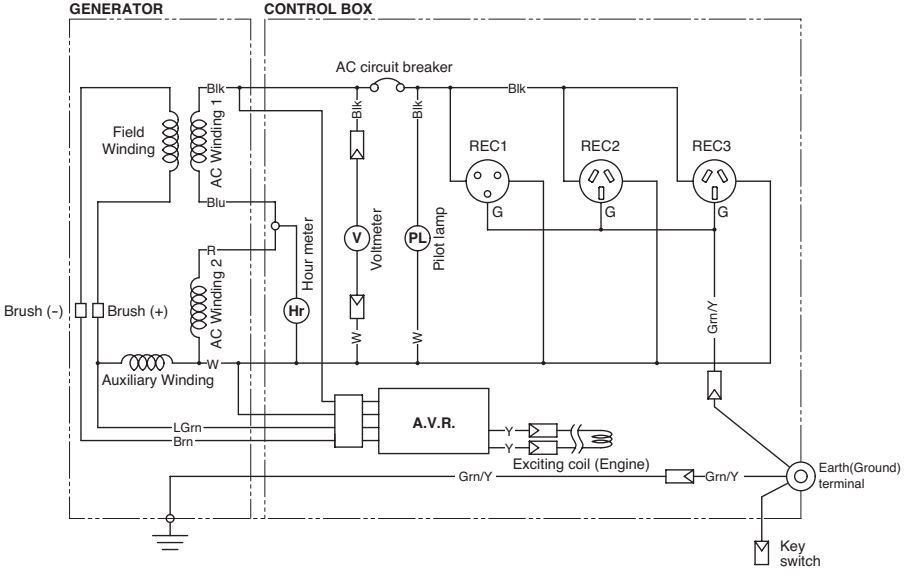
When generator engine fails to start after several attempts, or if no electricity is available at the output receptacles, check the possible causes in accordance with the following table. If your generator still fails to start or generate electricity, contact your nearest Cummins dealer or authorized service center for further information or corrective procedures.

Problem \ Possible causes		Low battery	Blown fuse	Deteriorated fuel	Fuel piping: Leakage	Fuel piping: Clogging	Clogging of Air cleaner	Clogging of Cooling air intake	Low oil level	Faulty spark plug	Overload by connected appliance	Incorrect or poor connection of wires	Insufficient capacity of extension cable	Carbon brushes are excessively worn
Starter won't run		×	×											
Starter runs, but Engine won't start.				×	×		×		×	×				
During operation	Rotation decreased			×	×		×	×	×	×	×			
	Unstable rotation			×	×		×	×		×				
	Breaker turned off										×	×		
	Low power			×	×		×	×		×	×	×	×	×

11. WIRING DIAGRAM

PX12000e (50Hz-240V)





Wiring color cord

Blk	:	Black	Brn/W	:	Brown/White	R	:	Red	Blk/R	:	Black/Red
Blk/W	:	Black/White	Grn	:	Green	W	:	White	R/W	:	Red/White
Blu	:	Blue	Grn/W	:	Green/White	Y	:	Yellow	LGrn	:	Light green
LBlu	:	Light blue	Org	:	Orange	Pik	:	Pink			
Brn	:	Brown	Gry	:	Gray	Grn/Y	:	Green/Yellow			

12. OPTIONAL PARTS

"HOW-TO" INSTALL THE WHEEL

(1) Checking of supplied accessories

(2) Tool preparation

- ■ Hoist or square bar (100mm by 100mm, length : 700mm)
- ■ Plier
- ■ Spanner or socket wrench (12mm), 2 units

(3) Installation procedures

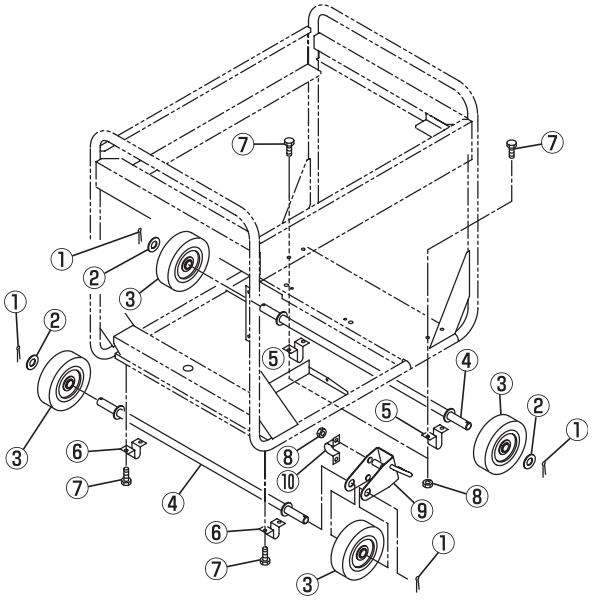
(a) Raise the generator by about 100 mm, with hoist or with square bar put under the bottom panel.

(b) Attach wheel mounting parts ① ,② ,stopper ⑨ , using clamp ⑩, ⑧ and wheel ③, to wheel shaft ④.
Then check that wheel ③ is rotated smoothly. If moving turns out to be too complicated, assemble them together using grease. (4 locations / 2 pieces)

(c) Bend the tip of ① according to the shape of wheel shaft ④ as possible.

(d) Attach the assembled shaft to the foundation plate of the engine, using ⑤, ⑦, and ⑧.

(e) Attach the other shaft to the foundation plate of the generating unit, using ⑥ and ⑦. (⑧ is not used.)
The tightening torque of bolts should be 20 to 25 Nm (2.0 to 2.5 kg-m).



Notes:

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Notes:

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