



ALPINE POWER

S O L U T I O N S I N C .

User Manual



PD20REG-DB

PD20REG-DB-3

Please read these instructions before operation

Please save these instruction

INTRODUCTION

Thank you for purchasing this high performance, liquid-cooled, automobile engine-driven generator. The generator set is approved for use in stationary applications in locations served by a reliable utility power source.

Read this manual and carefully follow all procedures and safety precautions to ensure proper equipment operation and to avoid bodily injury. Read and follow the Safety Precautions and Instructions section at the beginning of this manual.

For professional advice on generator set power requirements and conscientious service, please contact Alpine Power Solutions Inc

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Chapter One Technical Feature

I. Technical Features

This gas generator is designed to run on multiple types of fuel and operates using an optimized dedicated multi-fuel engine. We've made it simple, environmentally friendly, and user-friendly based on our standards.

1. Speed Control:

- We've equipped this generator with an internally designed electronic speed control system. This system allows for quick and easy adjustments to the engine speed, which can be stabilized to specific speed ranges. This feature ensures smooth engine operation and quick responses to changes in required engine speeds.

2. Quiet Air Intake:

- The housing enclosure of this generator has extra-large air intake cross-sections to ensure ample air flow for the engine. This unique structure significantly reduces operating noise, making the generator quieter during operation.

3. Efficient Cooling System:

- We've incorporated a large liquid coolant radiator reservoir, similar to those used in larger automobile engines. This design allows for more engine coolant and a larger radiator coil surface, ensuring efficient cooling even in the hottest weather. This feature contributes to the long-term reliability and performance of your gas generator.

4. Automatic Transfer Switch:

- Our generators are compatible with Automatic Transfer Switches. This means that, without any manual involvement, the generator will automatically start and provide the necessary power when needed.

5. Intelligent Hazard Control System:

- Our Intelligent Hazard Control System is designed to warn of potential engine or generator issues. This system continuously monitors the unit's operating conditions and can automatically shut down the generator to prevent costly damage. The system uses a visual control panel that can be customized according to the user's preferences.

II . Specifications

Item	Unit	PD20REG-DB/PD20REG-DB-3
rated power (kW)	LPG	20
	NG	18
frequency(hz)		60
speed (rpm)		3600
rated volt (v)		120/240/(277/480)
rated current (a)	LPG	83.3/30
	NG	75/27
phase		SINGLE/THREE
power factor		1.0/0.8
protection level		IP23M
insulation		F
pole		2

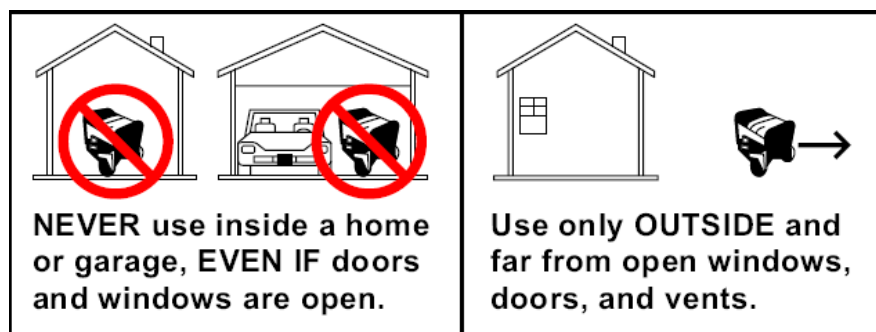
Chapter Two Important Safety Instructions


I . Precautions

Safety Guidelines

1. Operating the Generator Set:


- Carbon monoxide is a silent danger. It can cause nausea, fainting, or even death. Never run the generator set indoors or in areas where exhaust fumes might enter buildings. Keep a safe distance from exhaust openings, windows, and air vents.



⚠ WARNING	
	<p>Toxic Fumes Hazard. Running engines give off carbon monoxide, an odourless poisonous gas that can cause nausea, fainting, or death. Do not start or run engine indoors or in an enclosed area, even if windows and doors are open.</p>

2. Fuel System Safety:

- Handle fuel with care. Explosive fuel vapors can be deadly. Store fuels in a well-ventilated place away from sparks and out of children's reach. Refuel with the engine off to avoid ignition risks. No smoking near spilled fuel or vapors. Ensure tight fuel line connections.

⚠ WARNING

<p>Hot engine and exhaust system. Can cause severe injury or death.</p> <p>Do not work on the generator set until it cools.</p>




3. Exhaust System and Engine Heater:

- Hot engine parts can cause harm. Avoid touching them. Install the heater before connecting to power to prevent burns. Disconnect and cool the heater before servicing. Maintain a 2m (6ft) distance between the generator and other devices.

⚠ DANGER
Hot surface - To reduce the risk of burns- Do not touch.

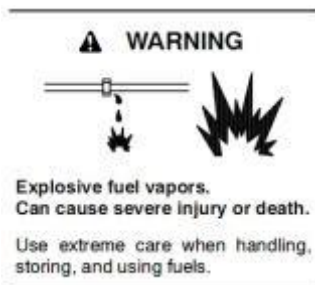
4. Grounding Electrical Equipment:

- Hazardous voltage can be deadly. Follow codes and standards. Ground the generator set, transfer switch, Neutral and circuits according to local codes. Turn off main breakers before servicing. Never touch electrical leads in water or on wet ground. Ground the enclosure according to local codes.

⚠ WARNING

<p>Hazardous voltage. Backfeed to the utility system can cause property damage, severe injury, or death.</p> <p>If the generator set is used for standby power, install an automatic transfer switch to prevent inadvertent interconnection of standby and normal sources of supply.</p>

5. Gas Fuel Leaks:

- Fuel leaks can lead to explosive vapors. Address any fuel leakage promptly to prevent dangerous situations.



6. Engine Noise:

- High noise levels can cause hearing loss. Wear hearing protection when close to an operating generator set without sound enclosures.

7. Short Circuits and Electrical Back Feed:

- Hazardous voltage can be lethal. Avoid contact with electrical connections during adjustments or repairs. Install a transfer switch to prevent back feed into utility systems.

8. Moving Parts:

- The cooling fan rotates during operation. Do not open the maintenance cover while the generator is running. Shut down the engine before maintenance or operation. Close the cover promptly after starting.

9. Caution for Standby Service:

- Connect the generator output to a suitably rated transfer switch following the Canadian Electrical Code, Part I.

10. Key Lock and Contact Information:

- Lock the top cover with the key and keep it secure. If you encounter issues, contact your retailer for assistance.



II . Operating System Functions and Definitions

Depending on the generator model, control button functions may vary. Refer to the following functions for your specific unit:



1. Control panel
2. Power switch
3. Fuel switch
4. Stop
5. Manual
6. Start
7. Data check
8. Data check

1. Power Switch and Fuel Switch:

Power Switch Function:

- Controls the entire generator set control system.
- OFF (O pushed down): No electrical power to the unit.
- ON (I in the up position): Enables starting, testing, and running the control system.

Fuel Switch Function:

- Allows fuel flow to the engine when ON (I in the up position).
- Turns off fuel flow when OFF (O pushed down).

2. Emergency Stop Switch:



Emergency Stop Function:

- Located on the front face of the generator unit.
- Depressing stops all control systems, including the engine and generator end.
- Use during unexpected emergencies to minimize potential harm.

Use:

- In emergencies, press the Emergency Stop Switch to immediately stop the unit.
- To restart, rotate clockwise 90° to pop up into the normal operational position after the emergency has passed.

3. Circuit Breaker:**Function:**

- Controls ON/OFF functions of electrical power output.
- UP (ON): Normal power production.
- DOWN (OFF): Power output is turned off.
- Safety feature: Automatically switches to OFF in case of excessive electrical load or a short circuit to protect the generator.

Use:

- Start the generator before placing the circuit breaker in the ON position when starting manually.
- When manually operating, set the circuit breaker to OFF before shutting down the generator.
- If the circuit breaker switches to OFF during operation, identify and correct the issue before restarting the generator.

Always refer to your specific model's manual for accurate information on control functions.

III. Prestart Preparation

For your safety and optimal performance, only authorized personnel should handle all installation and maintenance tasks.

Before starting the generator for the first time, follow these steps:

1. Engine Oil:

- Check the engine oil level.
- If needed, add the recommended oil. Make sure to use the suggested viscosity and grade.
- Incorrect oil can damage the engine, use the recommended oil or an equivalent alternative.

If you have any questions or need assistance, contact Alpine Power Solutions Inc. for guidance.

Ambient temperature	Oil grade (optional)
-30°C~0°C	5W/30 10W/30
0°C~30°C	10W/30 15W/40
30°C above	15W/40

- Use a funnel to add oil
- Up to 4L may be needed to top up oil level
- Check the oil dip stick, the oil level should be to the top/middle range of the two dots



2. Coolant: For proper cooling system care, follow these guidelines:

- Only use coolant in the radiator; avoid other liquids, including 100% water.
- Choose clean, antifreeze coolant pre-mixed or mix 50/50 for the cooling system. Ensure proper coolant is used to prevent scale buildup. Scale can impact cooling efficiency and lead to faults.
- Neglecting maintenance of fuel, lubricant, coolant, and related systems can accelerate wear, shorten the machine's lifespan, or cause faults. Pay close attention to these aspects.

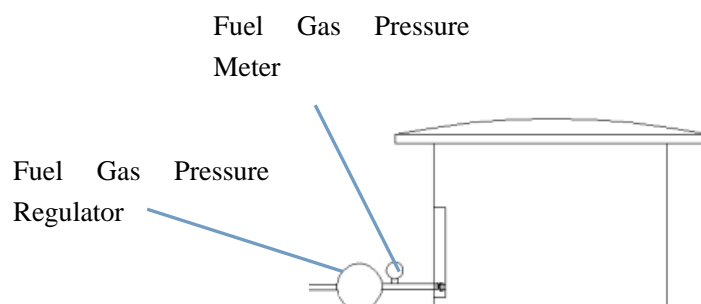
When your genset leaves the factory, there's no coolant in the engine. After installing the genset, fill the radiator and piping system with the recommended coolant. After the first filling and a minute of genset operation, add coolant a second time.

3. Liquid Propane (LP Vapor)

For engines set up to run on Propane, consider the following:

- Verify the fuel supply pressure; deviations from the recommended range can lead to equipment failure.
- Maintain an inlet pressure between 1.7kPa to 3.5kPa.
- Keep the gas pipe length under 5m, with an inner diameter not less than 16mm.

Adhering to these guidelines ensures proper functioning and longevity of your generator set. If you have questions or need assistance, contact Alpine Power Solutions Inc. for support.



Warning: Never remove the high-pressure pipe during maintenance. Before using the unit, ensure there are no leaks. If you don't have special equipment, you can use soap bubbles to check gas pipe joints. Observe for at least 1 minute.

Gas Pressure Considerations: Fuel gas line must be installed by a professional and in accordance with local legislation. Check and confirm the natural gas pressure, natural gas regulators are not supplied.

4. Natural Gas Engines:

- For engines set up for natural gas, check fuel pressure and flow. If your fuel supply has higher pressure, consider getting a pressure regulator.

CAUTION: After installation, users should not change the gas type. If you wish to switch gas types (NG or LPG), please contact Alpine Power Solutions Inc.

5. Electrical Connections

Standby Power Usage: For standby power use, install the automatic transfer switch (ATS) provided by Alpine Power Solutions Inc. This prevents accidental interconnection of standby and normal power sources.

- Shut down the generator set before servicing to avoid electrical hazards.
- Never touch electrical leads or appliances while standing in water or on wet ground to reduce the risk of electrocution.

6. Battery

Connection Steps: Connect battery positive (+) and negative (-) to the corresponding wire sides. Connect the negative (-) last. Avoid starting issues and circuit board damage by ensuring correct battery polarity.

Battery Use: Before using the maintenance-free battery, ensure the tested voltage is $\geq 12.6V$. Charge if it's below this value.

First-Time Use:

- Follow these steps:
 - Remove the red cap from the positive battery.
 - Check voltage with a multi-meter ($\geq 12.6V$). Charge if needed.
 - Attach the positive battery clip, adjust its direction, and secure it with a nut.
 - Cover with the red battery clip rubber.



Battery Servicing:

- Battery servicing should be done by knowledgeable personnel.
- Keep unauthorized persons away from the battery.
- When replacing batteries, use the same type: 12V battery.

CAUTIONS:

- Disposal: Do not dispose of batteries in a fire; they can explode.
- Handling Precautions: Do not open or mutilate the battery. Released electrolyte can be harmful to the skin and eyes.
- Safety Measures When Working on Batteries:
 1. Remove metal objects.
 2. Use tools with insulated handles.
 3. Wear rubber gloves and boots.
 4. Do not place tools or metal parts on top of batteries.
 5. Disconnect before working.

7. Grounding

Ground the generator set. Connect the grounding strap to the generator set ground terminal.

IV. Startup



Follow these steps to start your generator:

1. Ensure the emergency stop switch is reset.
2. Turn on the power switch (Switch 2).
3. Turn on the fuel switch (Switch 3).
4. Press the MANUAL button (Button 5) on the control panel.
5. Press START (Button 6) to initiate the start sequence.
6. Press UP/DOWN arrows (Buttons 7/8) to observe frequency, voltage, speed, battery voltage, and operation time.
7. Once the unit has started, it can enter automatic generation mode (When installed with ATS).

Important:

- Keep the emergency stop switch, power switch, and fuel switch in the ON position.
- Ensure the charger remains in charging condition.

V. Inspection of the Generator while operating.

When operating the generator, inspect the following parts regularly:

1. Radiator (Coolant)
 - Allow the engine to cool down before proceeding. Remove the radiator cap.
 - If coolant runs into the rubber hose after running at high temperature, shut down the generator to resolve the issue.

Checklist:

- Check for coolant leaks.
- Inspect the inside and outside of the radiator to ensure it's not excessively dirty or dusty.
- Ensure the radiator is clean, free from dust, dirt, or foreign substances.
- Check the hose to make sure it's not blocked.

2. Fault Indicator Lamp

The red lamp signals the operator to shut down the generator for troubleshooting.

Troubleshooting Steps:

- If the generator won't start, press the emergency stop switch. Rotate clockwise to pop up. After waiting for 30 seconds, try starting again.
- If the generator still won't start, carefully check for loose wires, battery voltage, gas flow to the lines and generator, etc.
- If, after restarting, the fault indicator light remains red, the generator will shut down. Identify and correct the fault, then restart the generator.
- If the fault indicator light remains off, the generator is operating normally.

Confirm, after starting, that the normal electrical output range is not exceeded, as this could damage the generator.

Regular checks ensure smooth generator operation. If you encounter issues or have questions, consult the manual Alpine Power Solutions Inc

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3. Exhaust Color

Ensure the generator engine operates smoothly within the rated output range:

- a) Normal Condition: The exhaust should be colorless.
- b) Signs of a Problem: If the exhaust appears dark grey or black after running for 60 seconds or more, it indicates an issue. - Shut down the engine until the problem is corrected.

4. Generator Shutdown Scenarios

Shut down the generator if you encounter the following circumstances:

- The engine speed is hunting (inconsistently speeding up and down).
- Unusual noises are heard from the generator.
- The engine exhaust suddenly turns dark grey or black.
- The fault indicating light is illuminated.

Regular checks and prompt actions ensure proper generator performance. If you observe any of these issues, shut down the generator and address the problem before resuming operation.

VI. Shutting Down the Generator

If you need to shut down the generator:

1. While the generator is running, press the STOP button.
2. Wait for the unit to cool down and come to a complete stop.
3. After the engine has stopped, open the AC breaker.
4. Isolate the battery as needed.

Chapter Three Storage of the Generator

I . Long-Term Storage Guidelines for the Generator

1. Clean the Generator: Remove any dirt from the generator if it's going to be stored for an extended period.
2. Coolant Draining: Drain the coolant from the engine.
3. Engine Condition: Ensure the engine is in good technical condition and keeps its surface clean.
4. Spark Plug Maintenance: Remove all spark plugs, pour about 30g of engine oil into the inlet, turn the crankshaft about 20 turns, and then reinstall the spark plugs.
5. Contact Surfaces Protection: Apply dehydrating Vaseline (heated to 100-200°C) to the contactor and unpainted metal surfaces.
6. Lubrication Points: Add lubrication oil to each lubrication point.
7. Covering and Protection: Use protective materials (Canvas, waterproof cloth, or oil paper) to cover the engine and keep it dust-free.
8. Storage Environment: Store the generator in a clean, warm, shady place with a temperature between 5-35°C, and the relative humidity should ideally be between 40-70%.
9. Check and Secure: Check all nuts and screws, tighten any loose ones, and seal the generator by shutting down the gas inlet valve and pressing the emergency button.
10. Battery Care: Disconnect the battery, remove the battery, keep it in a dark and dry place, and recharge it slowly every three months.
11. Fuel Gas Piping: Cap the fuel gas pipe to prevent dust from entering.
12. Dust-Proof Cover: Cover the generator with a dust-proof cover and store it in a dry, clean place.
13. Safe Storage: Keep the generator in a well-ventilated, dry, clean, rainproof, shady place, away from flammable and explosive materials.

II . Start-up after long term storage.

1. Dust-Proof Oil Removal: Remove any dust-proof oil from the generator.
2. Spark Plug Maintenance: Remove the spark plug and pour about 30g of engine oil into the inlet.
3. Coolant Addition: Add coolant to the generator.
4. Engine Oil Top-Up: Add engine oil to the recommended level.
5. Wires and Pipes Check: Inspect the connections of wires and pipes.
6. Fuel Gas Pipe Leak Check: Check for any leaks in the fuel gas pipe.
7. Engine Test: Run the engine to ensure it operates normally.
8. Lubrication Application: Apply lubrication to all necessary points.
9. Belt Tightening: Tighten the engine oil pump belt.
10. Electrical Parts Inspection: Check the working condition of electrical components.
11. Overall Check: Before starting the generator, inspect the entire unit, including nuts and screws.