Your diesel generator

Operation and maintenance guide — Perkins 10 to 150 kW and Kubota 40 kW

Read this guide before operating or servicing the generator. Electrical connections, engine adjustments and repairs are done by a qualified technician.

Questions? Solution NRJ: 438-350-6979 · ventes@solutionnrj.com (Mon-Fri 9 a.m.-4 p.m.).

1. Your generator

All our generators are built for heavy-duty use, 24/7, as standby or as a prime power source. Each one is load-bank tested for 2 hours, from 10% to 110%, adjusted and ready to use.

Item	Your generator
Engine	Perkins diesel (Kubota V3600 for the Kubota 40 kW). The exact model is on the engine plate and the spec sheet.
Alternator	Genuine Stamford, brushless, with automatic voltage regulator (AVR).
Controller	Deep Sea DSE6120 MKIII: manual or automatic start, alarms and protective shutdowns.
Starting	12 V battery (24 V on the 200 kW).
Electronic engines	30, 80, 100 and 150 kW: the controller also shows engine codes (SPN/FMI). 10, 15, 20, 40, 50 and 60 kW: mechanical engines, controller alarms only.
Included	Block heater, glow plugs, smart battery charger, preparation with oil and Prestone coolant.
Certifications	CSA · EPA Tier 3
Warranty	1 year or 1,500 hours, whichever comes first. Write down the serial number (nameplate): it will be required for any service.

2. Safety

- Before any maintenance: stop the generator, set the controller to Stop and disconnect the negative (–) battery terminal. In automatic mode, the generator can start on its own at any time.
- Exhaust gases are toxic: never in a garage, basement or closed room without venting outside.
- No smoking, sparks or open flames near the battery and fuel tank. Keep an ABC fire extinguisher nearby.
- Keep hands, hair, jewelry and loose clothing away from the fan, belts and rotating parts; never remove the guards.
- Do not open the radiator cap on a hot engine (steam and scalding coolant). Beware of burns when draining the oil.
- Wear gloves, safety glasses and hearing protection. Avoid skin contact with oil, fuel and coolant.
- The connection to the building (transfer switch, cables, grounding) is done by an electrician, according to the Electrical Code. The generator must be grounded.
- Never attach a welder's ground clamp to the generator: welding current damages the electronics and bearings.

3. Installation

Location

- About 1 to 1.5 m of clearance all around for ventilation and service, away from the building's doors, windows and air intakes.
- No combustible material nearby; protected from snow building up in front of the air inlets and outlets.

- Flat, level concrete pad (about 100 to 200 mm) able to carry the generator with a full tank. Secure the base through its anchor holes.
- Lift the generator by its steel base or the enclosure lifting points, with a forklift or crane; never by the engine or alternator lifting eyes.

Air and exhaust

- Hot air from the radiator must exit without returning to the air inlet. In a room, the inlet and outlet openings must be at least 25% larger than the radiator; intake air must stay below 40 °C.
- Do not extend or modify the exhaust without calculating back pressure: too much back pressure reduces power and overheats the engine. On a long run, install a drain near the engine.
- Every connection to the outside (exhaust, fuel, cables) must be flexible so vibration is not transmitted.

Fuel

- Diesel that meets standards and suits the season (winter diesel in Quebec).
- An external tank must be steel, stainless steel or aluminum, never galvanized or painted inside, with a vent, a gauge and a drain valve at the bottom.
- The fuel return goes to the top of the tank, never into the supply line. There must be no leaks.

4. Operation

Before starting (each operating day)

- oil level and coolant level;
- air filter indicator;
- enough fuel, valve open; drain water from the fuel filter water separator;
- no leaks, nothing on or around the engine; air inlets and outlets clear;
- battery cables tight; block heater plugged in during cold weather.

Starting and running

- Automatic mode (standby): leave the DSE6120 controller in Auto mode. It starts the generator during an outage and stops it when power returns, after a cool-down period.
- Manual mode: press the Manual button, then Start. The controller handles preheating and start attempts.
- Do not crank the starter for more than 30 seconds at a time; let it cool for 2 minutes before trying again (Perkins).
- Apply the load once voltage and frequency are stable. On a turbo engine, avoid applying more than half the rated power at once; start large electric motors one at a time.
- Watch the controller display: never ignore an alarm. Record running hours for maintenance.

Stopping

Remove the load first, let it run with no load for about 3 to 5 minutes to cool the engine and turbo (Perkins), then press Stop. In Auto mode, the controller does this cool-down itself. The emergency stop button is only for emergencies.

Keep the generator working

- A standby generator should run at least once a month, ideally under load (at least 30% of its rating), to keep the engine, battery and transfer switch in good condition.
- Avoid running it for long periods with little or no load: poorly burned diesel builds up in the exhaust and turbo (smoke, oil leaks). At least once a year, run it for a few hours at high load.
- Do not run it overloaded for long periods: overheating and premature wear.

Winter

- Keep the block heater plugged in at all times: a cold engine starts poorly and makes white smoke.
- Winter diesel in the tank before the cold sets in; keep the tank full to limit condensation.

- Clear snow and ice from the air inlets, outlets and exhaust.
- The included battery charger keeps the battery charged; a cold, weak battery is the leading cause of failure to start.

5. Maintenance schedule

Our rule comes first: first break-in service at 60 hours (oil and oil filter), then oil and oil filter every 250 hours, fuel filter every 500 hours, or at least once a year if the generator runs little. Other work follows the engine manual. Use genuine filters and parts (Perkins filter numbers: generatricediesel.com/en-ca/technical-support/).

> Why 250 h for the oil? Perkins allows up to 500 h or 1 year, and Kubota specifies 250 h. We use 250 h on every model as a precaution: a generator often works long hours at high load.

All our generators

Interval	Work
Oil to use	15W-40 diesel oil: API CK-4 for the Perkins engines (from −10 °C to +50 °C at start-up); API CI-4 (or CF to CI-4) for the Kubota 40 kW, per its manual. In winter, keep the block heater plugged in. Without a block heater below −10 °C, use a 5W-40 (a synthetic 0W-40 below −30 °C).
Each operating day	Oil level · coolant level · air filter indicator · drain water from the water separator · walk-around inspection (leaks, belts, cables)
Every 50 h or each week of operation	Drain water and sediment from the bottom of the fuel tank
Every month	Test run under load (standby generator) · check the battery and its terminals · check that the block heater heats
At 60 h (break-in)	First service: change engine oil and oil filter (Solution NRJ rule)
Every 250 h or 1 year	Engine oil and oil filter: change (Solution NRJ rule)
Every 500 h or 1 year	Fuel filter(s) and water separator element: replace · air filter: inspect, replace as needed (more often in dusty conditions) · radiator: clean · hoses and clamps: inspect · battery electrolyte level (if not sealed)
Stamford alternator	Keep the air screens clean; remove dust with a vacuum (never with a pressure washer). After a long period of humidity or storage, have a technician check the insulation.

By engine (Perkins manuals)

Interval	Perkins 400D — 10, 15, 20, 30 kW (SEBU8311)	Perkins 1104D — 40, 50, 60, 80, 100 kW (1104D family, SEBU9066)	Perkins 1106 — 150 kW (SEBU8728)
250 h or 6 months	Alternator and fan belts: inspect, adjust	—	—
400 h	—	Aftercooler core: clean, test (if the engine has one)	—
500 h (first time)	—	Valve lash: check	Valve lash: check
500 h or 1 year	—	Crankcase breather element: replace · fan clearance: check	Crankcase breather: replace · fan clearance: check
1,000 h	Belts: replace · valve lash: check, adjust · turbocharger: inspect	Belts and tensioner: check · valve lash: check · water pump: inspect	Valve lash: check · water pump: inspect
2,000 h	Charging alternator, starter, engine mounts: inspect · breather: replace	Starter, engine mounts, turbocharger: inspect	Charging alternator, starter, mounts, turbocharger: inspect
3,000 h	Injectors: test · water pump: inspect	Charging alternator: inspect · belts: replace	—
Coolant	Commercial: 6,000 h or 3 years · extended life (ELC): 12,000 h or 6 years	Commercial: 3,000 h or 2 years · extended life (ELC): 6,000 h or 3 years	Commercial: 3,000 h or 2 years · extended life (ELC): 12,000 h or 6 years

Oil, oil filter and fuel filter: our 250 h and 500 h rule applies to all these engines (it replaces the 500 h oil interval in the Perkins manuals). Your generator's engine is shown on its nameplate and on the spec sheet.

Kubota 40 kW (V3600 engine)

- Engine oil and filter: first break-in service at 60 hours, then every 250 hours (Kubota interval). Oil capacity: 13.2 L. 15W-40 oil, API CI-4 (the Kubota manual advises against CJ-4).
- Daily checks, fuel filter every 500 h and alternator care: same as all our generators (table above).
- For other work (valves, belts, coolant), follow the Kubota engine manual or contact us.

Maintenance log

Record each service (date, hours, work, parts). This log is required for the warranty.

Date	Hours	Work done / parts replaced	By

6. Troubleshooting

You can safely: read the controller alarm, check the fuel, oil, coolant, battery, block heater and breaker. Everything else (electrical, engine adjustments, injection, repairs) is done by a qualified technician. Need help? 438-350-6979.

Symptom	Possible cause	What to do
Will not start, nothing happens	Weak battery or loose / dirty terminals	Recharge, clean and tighten the terminals; replace the battery if needed
	The controller shows low voltage (3 to 7 V) although the battery is good	Voltage drop on the negative or ground, often at the battery disconnect switch: have it checked (Solution NRJ field case)
	Controller off	Check the controller fuse and the battery supply
	Emergency stop pressed, or alarm not reset	Release the emergency stop, read the alarm, fix the cause, reset
The starter cranks but the engine does not start	No smoke at the exhaust: fuel is not getting through	Fuel level, valve open, clogged filter, air in the system (to be bled), fuel solenoid
	White smoke: fuel is not igniting (engine too cold)	Block heater plugged in and working, preheat, battery strong enough
	Water or wrong fuel	Drain the water separator; replace the fuel
Starts then stops	Protection alarm (oil pressure, temperature, overspeed, underspeed)	Read the controller message; check oil and coolant levels; do not restart without fixing the cause
	Air or water in the fuel; clogged filter	Drain the water, bleed the air, replace the filter
	Electronic engine: engine code displayed (SPN/FMI)	Write down the code and call us
Black smoke	Overload	Keep the load below the rated power
	Clogged air filter	Replace the air filter
	Intake air too hot	Improve ventilation (intake air below 40 °C)
	Injectors, turbo or injection timing	Check by a technician
White or blue smoke	Cold engine at start-up (white, a few minutes)	Block heater plugged in; check that it heats (engine block warm)
	Long running with no load (poorly burned diesel)	Run the generator under load
	Burning oil (blue): turbo, rings, valves; or too much oil	Check the level; have a technician check it
	Persistent white smoke with a warm engine	Possible coolant leak inside the engine: stop it and call us
Loss of power, voltage or frequency drops	Overload or a large electric motor starting	Reduce the load; start large motors one at a time
	Clogged fuel or air filter; water in the fuel	Replace the filters; drain the water
	Blocked exhaust or too much back pressure	Clear the exhaust
	Fuel or intake air too hot	Ventilate; fuel below 60 °C at the pump inlet
Uneven running or vibration	Air or water in the fuel	Bleed the air, drain the water
	Load varies a lot	Stabilize the load if possible
	Damaged mounts, base or fan	Check the mounts and the base anchoring
	Speed governor out of adjustment	Adjustment by a technician

Symptom	Possible cause	What to do
Low oil pressure alarm	Low oil level	Stop, add oil of the correct grade
	Oil or filter too old, clogged filter	Oil and filter change (250 h)
	Faulty sensor or wiring	Check by a technician
	Internal wear	Do not run it: call us
High temperature alarm	Low coolant	Let it cool, then top up with the same coolant
	Dirty radiator or hot air recirculating	Clean the radiator; clear the air inlets and outlets
	Loose or broken belt; water pump or thermostat	Check the belt; have a technician check it
	Overload	Reduce the load
High oil or fuel consumption	Leak	Find and fix the leak
	Clogged air filter, overload	Replace the filter; reduce the load
	Wear (turbo, rings) or adjustments	Check by a technician
No power at the output	Generator breaker open or tripped	Find the cause (overload, short circuit), then reset it
	Auto mode: the transfer switch does not transfer	Check the controller mode and the transfer switch; electrician
	No voltage at the alternator	Voltage regulator (AVR) or diodes: check by a technician
Does not stop when power returns	Cool-down period in progress	Normal: the controller stops the generator after a few minutes
	The transfer switch start signal stays active	Have the transfer switch and its wiring checked
	Faulty fuel shutoff solenoid	Emergency stop, then have a technician check it

Long-term storage

- Change the oil, keep the tank full and the generator dry, protected from the weather.
- Keep the battery charged (charger plugged in, or a full charge every 5 to 8 weeks).
- Before returning to service: no leaks or loose connections, alternator dry and clean, then a test run under load.

Sources: Solution NRJ maintenance rules; Perkins operation and maintenance manuals SEBU8311 (400D), SEBU9066 (1104D) and SEBU8728 (1106); Kubota V3600 engine data sheet; Deep Sea DSE6120 MKIII controller manual; Solution NRJ field experience. If anything differs, our 250 h / 500 h rule applies, then the engine manual for your model. October 2026.