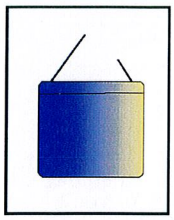
E.5 Generator provides no Voltage

E.5.1 Rotor Magnetism Loss and "Re-magnetizing"

.ATTENTION! See "Safety Precautions" on Page 11.

With asynchronous generators it can be the fact that the generator can not build up independently voltage after longer service lives, or, if it were switched off under full load. The cause lies in the fact that the rotor lost its remainder magnetism.



This remainder magnetism can be restored in a simple manner by a DC battery. In addition the „shore power" must be switched off and any connection to a AC-source must be interrupted.

Likewise the genset must be switched off, i.e. also the starter may not be operated. The power source selector is switched to "generator". Only the plug socket must be connected with the generator.

Now the two poles of a 9V battery are connected with the plug socket or held to the appropriate contacts in the on-board current distribution. Use not a battery bank or the generator starter battery, this could damage the coil. The DC voltage may be applied only for a short time (1-2 seconds). In the coil the remainder magnetism is restored by the short current pulse, and the generator can be normally started.

E.6 Starting Problems

E.6.1 Fuel Solenoid Valve

The fuel solenoid valve is located in front of the injection pump. It opens automatically, if the „START"-button is pressed on remote control panel. If the generator is switched to "OFF", the solenoid valve closes. It takes some seconds, before the generator stops.

If the generator fails to start, runs rough, does not reach the proper RPM, or does not stop properly, the first item to suspect in most cases is the fuel solenoid valve and should be inspected first.

A check of the fuel solenoid valve by removing the plug from the fuel solenoid valve for a short period whilst in operation (first remove the small retention screw) and replace it immediately. The motor should "react immediately" by revving high. If the motor does not react sharply to the reconnection of the solenoid wire, it is a sign that the solenoid valve could be faulty.

1. Fuel solenoid valve
2. Injection nozzle
3. De-aerating screw

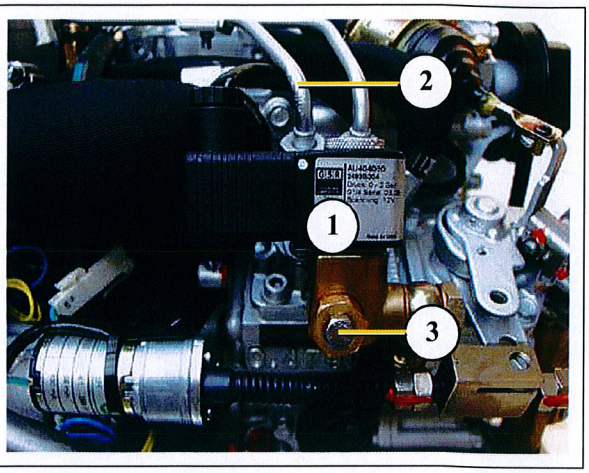


Fig. E.6.1-1: Fuel solenoid valve

E.6.2 Stop solenoid

There are two different variations:

A. Energized to stop

By pressing the „OFF"-button on the remote control panel the stop solenoid is supplied with voltage and operate, through this the injection nozzles resets to zero position and the generator stops.

B. Energized to run

This version is equipped with two solenoids an actuating and a stop solenoid. After being fed with current, the actuating solenoid attracts the adjusting lever of the fuel injection pump, through which the fuel can flow. The actuating solenoid is switched off once the final position has been reached, which is maintained by the stop solenoid for as long as the generator is running

.ATTENTIONT

When starting the "START"-button may not be pressed longer than 5 sec., because the stop solenoid pulls too much current over the starter. Otherwise the stop solenoid must be disconnected.

Stop solenoid

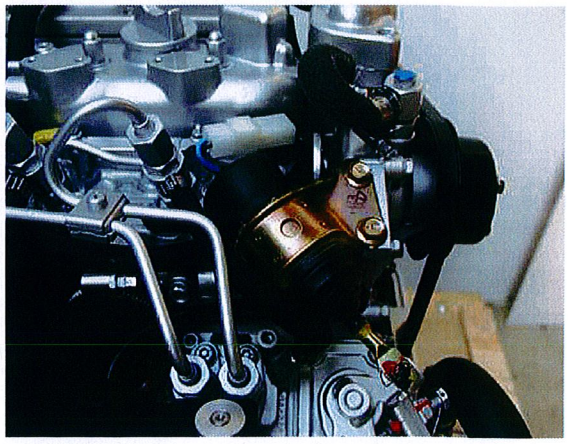


Fig. E.6.2-1: Stop solenoid

Damage to starter motor

The starter is fitted with a free wheel or axial rotating spring cog, which prevents the starter being driven externally by means of the motor. The free wheel will be heavily worn, if the starter still operates, thereby causing damage to the springs, roller bearings or cog teeth. This could lead to complete destruction of the starter.

It is important that every person who operates the generator is informed of this situation. This is practically the only handling error that can be made on board that can lead to fatal consequences for both generator and operator.

E.6.3 Dirty fuel filter

If the fuel filter is dirty change the filter element.

For replacing the filter element see section D.4.2, "Replacing fuel filter" on page 92.

01. Fuel filter element

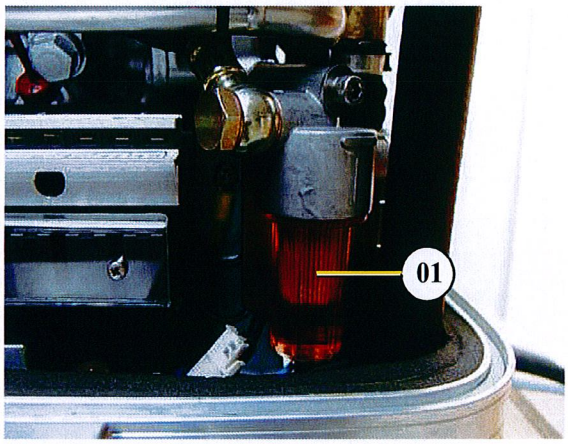


Fig. E.6.3-1: Fuel filter

E.6.4 Failure Bypass Switch

The start-failure bypass switch enables an immediate restart facility of the generator, should it cut out, even if this was caused by over-heating. There is normally a requirement to wait until the motor has cooled down to the correct temperature. This can last for several hours in certain circumstances, since the generator is enclosed in a sound-insulated casing, which prevents heat loss.

Failure bypass switch

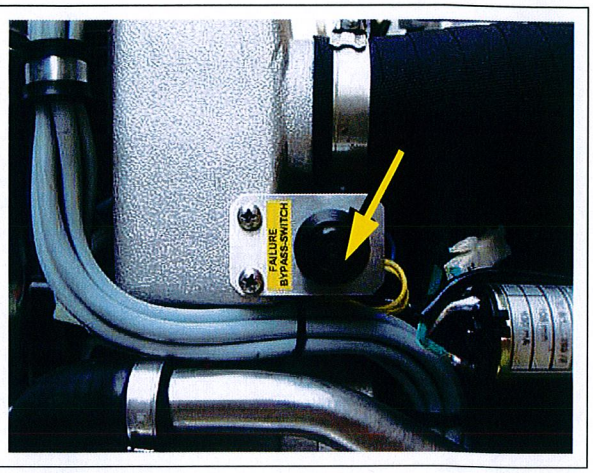


Fig. E.6.4-1: Failure bypass switch

To prevent such a shut down period the generator can be started in the normal way while pressing the Failure bypass button is depressed. This by-passes any faults thus allowing the generator to run.

Before pressing the bypass button and starting the generator, a manual check of the engine oil level must be carried out as it is possible that the oil pressure switch caused the generator to cut out. Once it has been ascertained that the reason for the engine cutting out is over- heating and not lack of oil, the generator can be started and run for several minutes without load, so that the engine is returned to normal operating temperature.

CAUTION:

If temperature is the reason for the generator cutting out when it is running under load, then an immediate investigation should be made to determine the cause. It could be a fault with the internal cooling system, the fan, the radiator air-intake or dirty radiator.

Repeated use of the failure bypass switch should be avoided, if the generator repeatedly cuts out during operation without determining the cause of the engine cut-outs.

The generator should always be run without load for several minutes before being switched off, so that temperature stabilisation occurs. Residual heat can cause the generator to overheat, even after it has been switched off.

Should the overheating alarm be activated after the generator has been switched off, then this can also be bypassed using the switch.

E.6.5 Troubleshooting Table

For Troubleshooting see section F.1, "Troubleshooting" on page 123.

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F. Tables

F.1 Troubleshooting

GENERATOR OUTPUT VOLTAGE TOO LOW For 50Hz versions: less than 200V For 60Hz versions: less than 100V	
Cause	Solution
Generator is overloaded.	Reduce the electrical load. (Switch off load)
Motor is not reaching the rated rpm.	Refer to "motor faults" section.
Defective capacitor(s).	Check capacitors and replace if necessary.

GENERATOR VOLTAGE TOO HIGH (MORE THAN 240V-50Hz / 135V-60Hz) If the generator is providing excessively high voltage, the following potential causes should be investigated:	
Cause	Solution
Over-energizing due to wrong capacitors.	Check capacitors type and replace if necessary.
Measurering voltage on the VCS circuit board is missing.	Check VCS System, check cable connections.

GENERATOR VOLTAGE FLUCTUATES	
Cause	Solution
1. Disturbances on the electrical system/user side. 2. Motor disturbances.	1. Check if electrical load is fluctuating. 2. Refer to section: "Motor runs irregular".

GENERATOR NOT ABLE TO START ELECTRIC MOTOR	
Cause	Solution
If the generator is unable supply enough power to start an electric motor (120V-60Hz), it is usually because the motor draws too much current during starting process.	Check the motor's current draw required for starting (switch to 380V if possible). This could be remedied by providing stronger capacitors or installing an optional "Easy Start Booster Set". Enquire at your nearest Panda dealer or directly at the manufacturer.

DIESEL MOTOR FAILS TO START	
Cause	Solution
Starter battery switched "OFF".	Check position of battery switch and switch "ON" (if installed).
Starter battery voltage insufficient (battery too weak).	Inspect battery terminals and cables for a good electrical connection (Inspect against corrosion, tattered wires, etc.).
Starting current disrupted.	During the normal starting process, the battery voltage drops to 11V with a fully charged battery. If the voltage does not drop during starting, the electrical connection is faulty. If the battery voltage drops lower than 11V, then the battery has been discharged.

STARTER IS TURNING MOTOR, BUT FAILS TO START	
Cause	Solution
Fuel inlet solenoid valve not opening.	Check wire connections and circuitry to solenoid valve. (ref. DC wiring diagram)
Fuel pump not working.	Check fuel-filter and pump: clean if necessary.
Lack of fuel.	Check fuel supply.
Glow-plugs not working correctly.	Check glow plugs and heating time.
Too much air in fuel lines.	Test fuel system for leakage. Bleed air from fuel system (refer to section "Bleeding Air from Fuel System").
Fuel-filter blocked.	Replace fuel filter.

MOTOR DOES ACHIEVE ENOUGH SPEED DURING STARTING PROCESS	
Cause	Solution
Starter battery voltage insufficient.	Check battery.
Damaged bearing(s) piston (seized).	Repairs need to be carried out by Kubota-Service. (refer to Kubota motor-manual)
Cooling water in combustion chamber.	1. Turn generator "OFF" at control panel. 2. Remove the glow plug (see Kubota-manual). 3. Rotate the motor by hand carefully. 4. Check if there is water in the oil and change both oil and filter if necessary. 5. Determine cause for excess water in the combustion chamber. The excess water can be caused by a defective air vent in the cooling water system, which should be checked and cleaned, or replaced if faulty.

MOTOR RUNS IRREGULARLY	
Cause	Solution
Faulty centrifugal injector governor.	Have the centrifugal governor inspected by a Kubota-Service technician.
Too much air in fuel lines.	Bleed air from fuel system.

MOTOR SPEED DROPS	
Cause	Solution
Lack of fuel	Check fuel supply system: - fuel filter, renew if necessary - check fuel pump - check fuel lines (bleed if necessary)
Lack of intake air.	Check air intake paths. Check and clean air filter (and intake muffler if installed).
Generator overloaded by too many load.	Reduce the electrical load (switch off load).
Generator overloaded by over-energizing.	Check that the proper capacitor type is installed and that they are connected correctly.
Defective generator (windings, bearings, or other).	Generator must be sent to manufacturer for repair of damaged bearings or winding.
Damaged engine.	Repair of bearing damage, etc., by Kubota-Service.

MOTOR RUNS IN OFF POSITION	
Cause	Solution
Fuel inlet solenoid valve or throttle shut solenoid is not switching off.	Check wire connections to solenoid. Check valve functions as in the "Inlet Fuel Solenoid Valve" or in the trottle shut off solenoid sections. Replace if necessary.

MOTOR STOPS BY ITSELF	
Cause	Solution
Lack of fuel.	Check fuel supply system.

Excess heat in cooling system (thermo switch tripped)- lack of cooling water. Is indicated on the remote control panel.	Check cooling water system flow: water pump, inlet water filter, extra heat exchanger coolant flow.
Lack of oil (oil pressure sensor tripped). Is indicated on the remote control panel.	Check oil-level and if necessary top up. Check motor's oil-pressure and have repaired by Kubota-Service if necessary.

SOOTY, BLACK EXHAUST	
Cause	Solution
Generator is overloaded.	Check electrical load and switch off unnecessary load.
Insufficient intake air.	Check intake air filter; clean if necessary.
Fuel injector faulty.	Replace injector.
Valve clearance incorrect.	Readjust valve clearance to correct value (refer to Kubota-manual).
Poor fuel quality.	Use better quality diesel (recommended: 2-D Diesel).
Poor combustion.	Incorrect AFR (air/fuel ratio) due to motor timing adjustment. Have motor serviced by Kubota.

GENERATOR MUST BE SHUT OFF IMMEDIATELY IF:	
Cause	Solution
- motor rpm suddenly rises or drops - unusual noise comes from genset - exhaust colour suddenly becomes dark - leakage in the cooling water system.	Refer to respective section of manual and if necessary, have repaired by Kubota-Service, or Panda representative.

Tabelle 1: Voltage values stator coil

Terminal	Panda 8000
4 - 2 (60Hz)	~ 2-3 Volt
L - N (50Hz)	~ 2-3 Volt