Workspace Technology Limited

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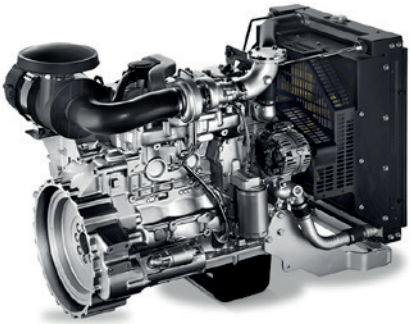
Low Load Profile
How does it negatively affect a generator set?



The endothermic engines used in generator sets have been designed to use as much power as possible, from 30 to 100% of the rated maximum.

The actual engine load depends on the power that the installation demands. The engine and its components are primarily designed to operate in the high load or power range rather than in continuous low load mode.

Consequences of operating uninterruptedly in low load mode.

Operating uninterruptedly in low load mode can lead to higher oil consumption and consequently to increase considerably the deposit of carbonized oil or oil residue in the engine, as well as in the suction and exhaust system.

The emergence and persistence of residue have a negative impact on the functional behavior and on the engine lifetime. Consequently, maintenance tasks tend to increase.

In addition, when an engine is operating in the low load mode, it cools down, which means that the fuel is only partially burned, which can, in turn, produce a white smoke with high hydrocarbon emissions.

Due to the low fuel temperature, the percentage of unburned fuel in the oil increases. These problems are due to the fact that the piston rings, and the piston itself also the cylinder do not dilate enough to ensure a good seal and therefore, the oil rises and is expelled through the exhaust valves. This means that diesel oil passes into the crankcase, degrading the quality and the properties of the lubricant.

Frequent and continued use of generator sets with power loads of less than 30% of the maximum power value can lead to the following failures over time:

- Increase of exhaust smoke.
- The presence of traces of fuel in the engine oil.
- Excessive wear of the turbocharger.
- Oil leaks in the body of the turbocharger.
- Increased pressure in the gearbox and the crankcase (Blowby).
- Excessive deposit of carbon residue on the surfaces of the valves, valve seats, pistons and the exhaust manifold.
- Hardening of the surfaces of the cylinder liners.
- If such a system exists, lower efficiency of the exhaust gas treatment system (ATS) which may activate the forced regeneration cycle of the DPF.

Recommended corrective measures

To avoid any incidents and ensure the correct use of the generator set, Workspace Technology recommends to avoid operating the gen-set uninterruptedly in the low load mode, or reduce such usage to minimum time periods. The use of generator sets in a low load condition for more than 15 minutes should be avoided.

During the weekly operation tests, the no-load operating time should be limited to 15 minutes' maximum, until the battery charge values have returned to normal levels.

The generator sets should be operated once a year for several hours at full load to clean up the engine, in other words, eliminate the carbonized oil deposits in the engine and exhaust system. This may require a resistive load. The load should be increased during four hours the course of the operation, starting from zero to full load.

If the failures mentioned above appear, along with long-term use of the generator with low energy load, operate the power generator at full rated load, if possible using a Resistive Load Bank to correct the problem before replacing any components.

Workspace Technology is dedicated to delivering industry leading mission critical data centre maintenance. Drawing upon our extensive knowledge and expertise of mission critical environments, technology and operations we can provide a collaborative approach to maintenance and support throughout the lifetime of your infrastructure.

Our Maintenance & Support Team delivers a comprehensive range of expert planned preventative maintenance, 24x365 emergency call-out, energy optimisation, facilities engineer and enhanced support services. We support a wide range of technology including air-conditioning, chilled water, UPS, generator, fire suppression, environmental monitoring, management and associated mission critical infrastructure.

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