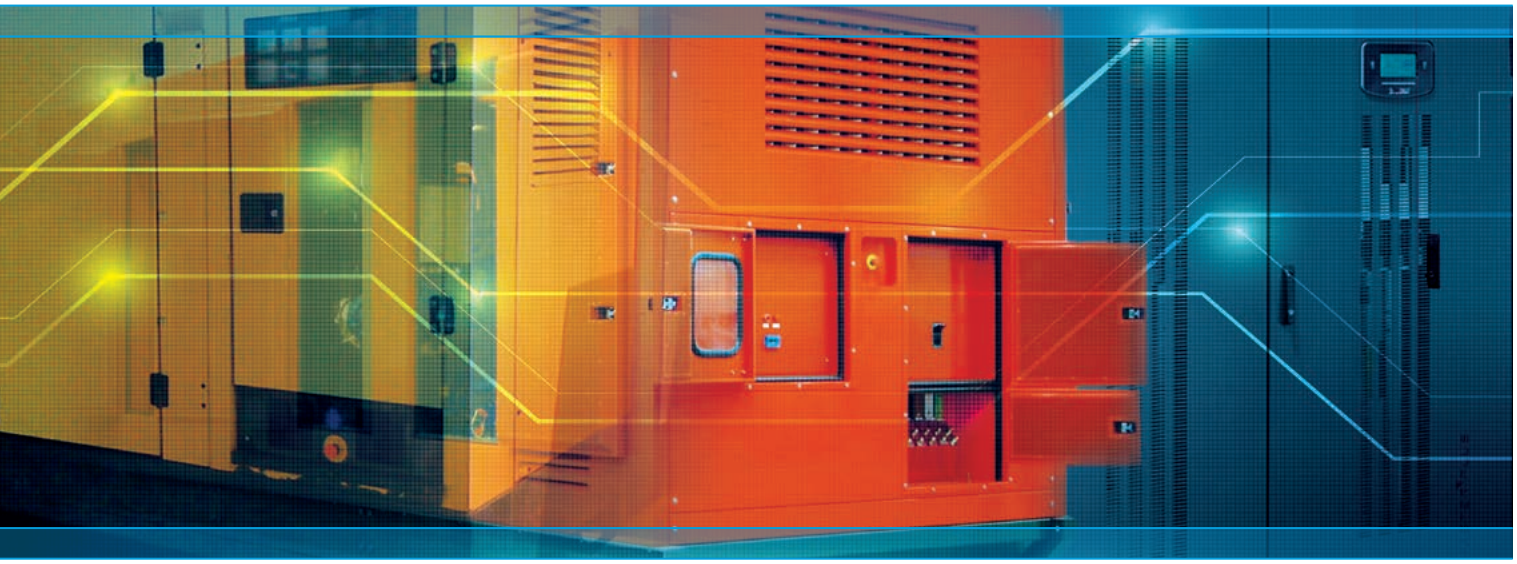
CHAUVIN ARNOUX®
CHAUVIN ARNOUX GROUP

ELECTRICAL GENERATOR SETS &
UNINTERRUPTIBLE POWER SUPPLIES



The purpose of electrical generator sets is to produce electricity in the event of a mains power outage. In industry in particular, they are used to ensure continuous production. For critical applications (IT, process, hospitals, etc.), the electrical generator set is often used alongside an uninterruptible power supply (UPS). The UPS provides good-quality energy without disturbances, but only for a limited time due to its finite battery life.

The inclusion of an electrical generator set upstream ensures there is a power supply available to take over from the UPS even if there is a prolonged power outage on the network.

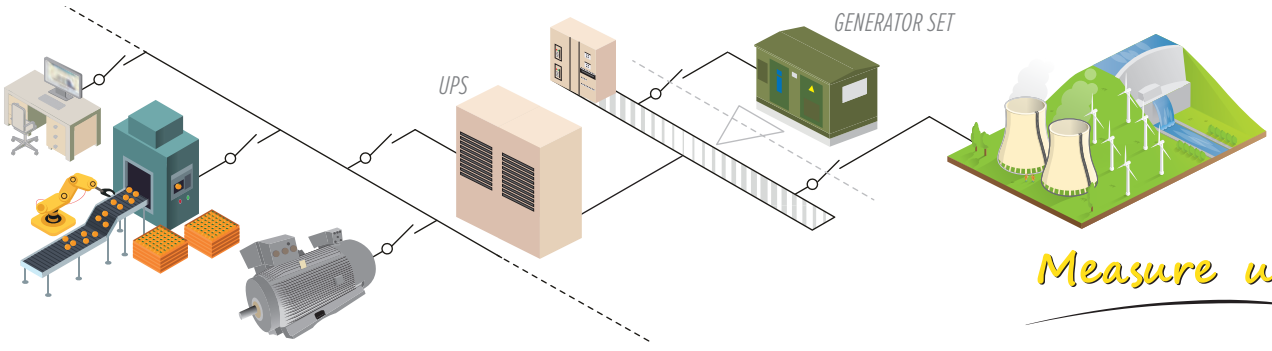
For installation and maintenance, certain features of such a configuration need to be taken into account: start-up time, inrush current and frequency stability.

Load start-up

Maintenance

Analysis of the currents

Simplified operating diagram of an electrical generator set used with an uninterruptible power supply



Measure up

Power outages on an electrical network

Electrical power distribution may be influenced by various disturbances (storms, equipment failure, etc.) which can cause power outages.

In 98% of cases, the outage only lasts a short time (less than 15 seconds). As it usually takes a generator set a few seconds to start up, the UPS ensures supply continuity on its own.

It should be noted that outage duration also depends on the type of network. With overhead distribution networks, there are frequent power outages lasting only a short time. With underground networks, outages are rarer but last longer.

These faults do not systematically cause power cuts; they often just involve voltage dips. Usually due to the quality of the power supplied, voltage variations may significantly affect equipment and loads connected to the network, leading to component malfunctions or even damage if there are voltage surges (see «Harmonics» Case Study).

You need to know the tolerance levels of the loads connected in order to define the correct trigger level for the back-up power sources, including the electrical generator set.

Frequency stability of the electrical generator set

The generator set includes a diesel or gas combustion engine which drives the alternator. The speed control of this motor, which determines the control of the alternator's voltage frequency, is not active instantaneously (it may take several seconds).

Frequency fluctuations occur when there are load impacts causing variations in the rotation speed of the motor and therefore of the alternator.

This phenomenon notably occurs in the following cases:

- during start-up of the generator set's motor, until it reaches its rated speed
- when the load is modified by the activation of momentary applications (lifts, air-conditioning)
- load shedding

Qualistar+ C.A 8336,
for checking the operation of your installation with an electrical generator set.

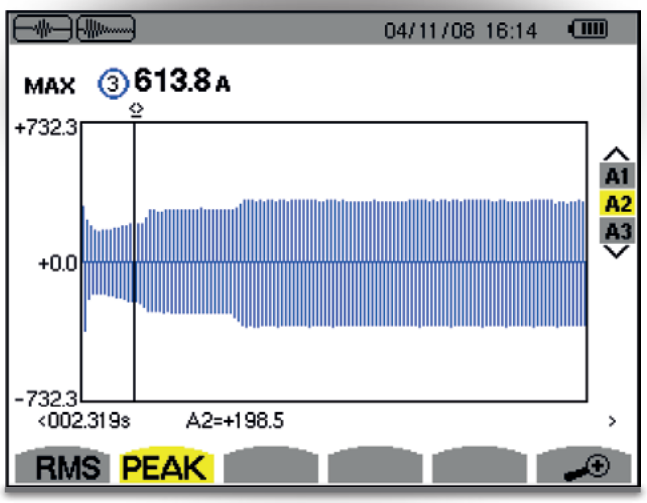
Start-up of the generator set

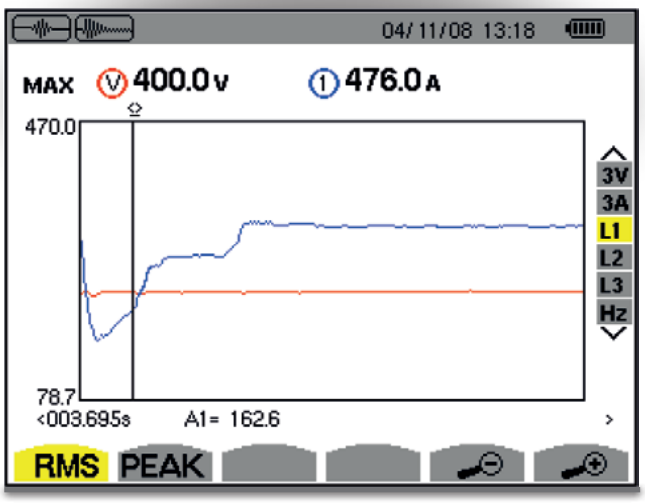
In the event of an outage, the generator set is not immediately operational. The start-up phase may take up to fifteen seconds before the generator set begins supplying its rated power.

In general, an electrical generator set can only supply one third of its power capacity during start-up.

For example, if there are several motors hooked up to the generator set, they should be restarted consecutively, rather than simultaneously, to reduce their impact on the generator set's start-up phase.

Examples of graphs showing the inrush current at start-up:





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