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Jenbacher gas engine sets make an important contribution to meet grid code requirements

European energy supply network

The liberalization of electricity markets involves moving from large thermal power plants to decentralized renewable power plants along with the implementation of technological developments in high-voltage direct current transmission. These trends require extensive adjustments to the grid code to help ensure a stable power supply.

In fulfilling grid code requirements for static and dynamic grid stabilization Jenbacher* gas engine sets from INNIO* support power grids worldwide.

In most industrialized countries, compliance with the applicable grid codes (network code requirements) is the basic prerequisite for the reliable supply of electrical energy into the grid. Each generating unit connected to the power grid must be able to react unconditionally to load fluctuations and transient events as well as to absorb frequency changes in the grid.

In the event of short circuits in supply networks, power plants must remain stably connected to the network for a period of up to 250 ms based on the requirements for corresponding voltage levels. This behavior protects the electrical distribution and transmission network from instability in the event of a fault. If generating units disconnect from the supply network before the fault is declared (disconnection of the fault location by the protection relay), this can have negative consequences on grid stability - including a possible blackout.

Grid code compliance with INNIO Jenbacher gas engine sets

For more than a decade, INNIO Jenbacher has been developing solutions to meet grid codes that define network code requirements and necessary electrical requirements for generating sets. For Germany, these rules are precisely defined in the VDE-AR-N 4110 Medium Voltage Directive and VDE-AR-N 4120 High Voltage Directive.

Extensive test runs conducted by authorized (independent) measuring institutes have validated the conformity of Jenbacher gas engine sets with German grid code directives. In fact, the TÜV Nord has issued a unit certificate confirming that all Jenbacher gas engine series meet the requirements of VDE-AR-M 4110 and that our series 6 and 9 engines also meet VDE-AR-N 4120. This is proof that our technology is making a significant contribution to grid stability and grid security in Germany. And, our efforts to secure grid stability have a much broader reach. INNIO Jenbacher gas engine sets comply with the European standard EN 50549-2, too.
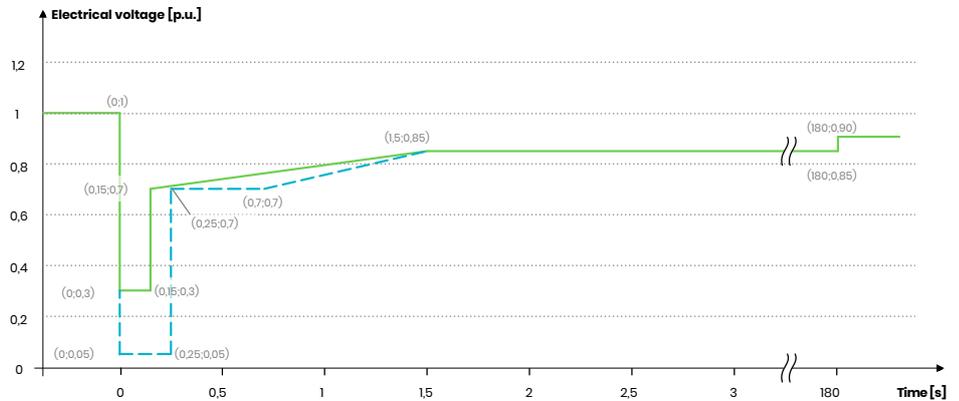
INNIO Jenbacher generating sets meet:
- Voltage range: +/- 10% nominal voltage
- Frequency range: + 4%/- 6% line frequency
- Transient voltage dips: up to 5% Un for 0-250 ms
- Frequency stability through Frequency Sensitive Mode (FSM)
- Power adjustments for frequency changes: LFSM-O, LFSM-U
- Active reactive power control

Grid code requirements defined by the latest guidelines of the Network Code Requirements for Generators (NC RfG) are applicable to all European Union countries as well as in Switzerland, Norway and Iceland. In addition, INNIO Jenbacher meets country-specific extended requirements such as those in Italy, Great Britain, Belgium, Denmark, Austria, Poland, Greece and many other countries.

ENERGY SOLUTIONS.
EVERYWHERE, EVERY TIME.

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Extensive customer benefits with Jenbacher gas engine sets

- Certified according to medium-voltage and high-voltage guidelines of:
  - German VDE AR-N-4110 and VDE AR-N-4120
  - European Standard EN 50549-2
- Verification of grid stability using simulation models[1]
- Grid stability protection during mains fluctuations (no disconnection of gas engine sets in the transient time range of 0-250 ms)
- Greater plant availability and reliability during mains fluctuations

Electrical voltage [p.u.]

(0;1)
(0,15;0,7)
(0,7;0,7)
(0,25;0,7)
(1,5;0,85)
(180;0,90)
(180;0,85)
(0;0,3)
(0,15;0,3)
(0;0,05)
(0,25;0,05)

Time [s]

«Drive through transient undervoltage» profiles (UVRT profiles), source: EN 50549-2

Additional advantages of static and dynamic grid support

- Enhanced grid stability with supply of renewable energies
- Eliminates domino effects caused by grid disturbance
- Removes possibility of grid collapse - and resulting blackouts
- More stable decentralized energy supply for the future

Without dynamic grid stabilization

With dynamic grid stabilization

INNIO* is a leading provider of renewable gas, natural gas, and hydrogen-based solutions and services for power generation and gas compression at or near the point of use. With our Jenbacher* and Waukesha* gas engines, INNIO helps to provide communities, industry and the public access to sustainable, reliable and economical power ranging from 200 kW to 10 MW. We also provide life-cycle support and digital solutions to the more than 53,000 delivered gas engines globally, through our service network in more than 100 countries. We deliver innovative technology driven by decarbonization, decentralization, and digitalization to help lead the way to a greener future. Headquartered in Jenbach, Austria, the business also has primary operations in Welland, Ontario, Canada, and Waukesha, Wisconsin, U.S.

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SILVER
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