Solar® Turbines

A Caterpillar Company

Powering the Future Through Sustainable, Innovative Energy Solutions

SYNCHRONOUS CONDENSING FOR GRID STABILITY

ESSENTIAL FOR GRID STABILITY

Synchronous condensers are essential to grid stability because they provide **rotating inertia** and fast dynamic **reactive power support**, which helps hold system frequency and voltage steady during disturbances like grid faults, large load steps or sudden renewable output swings. They also increase short-circuit strength and improve voltage regulation, giving protection and control systems a stronger grid to work with, which is critical on networks with high levels of inverter-based generation.

MAIN FEATURES

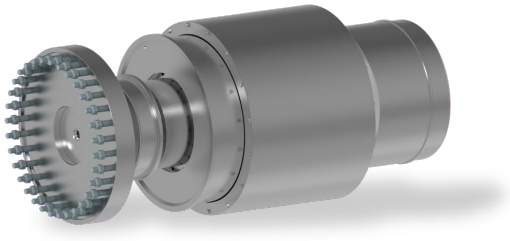
- Frequency Ride-Through
- Grid Code Compliance
- Reactive Power Support
- Grid Stability Support
- Voltage Control
- Voltage Ride-Through
- Spinning Reserve
- Non-Spinning Reserve
- Fast Restart for Peak Loads

SYNCHRONOUS CONDENSING OPERATION

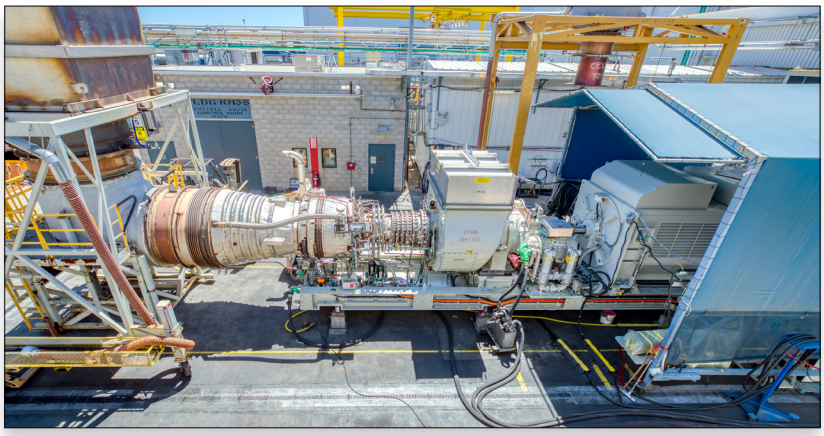
While operating in synchronous condensing mode, the gas turbine and gearbox are decoupled from the generator, which allows the generator to synchronize with the power grid to provide reactive power and voltage control. The mechanical synchronizing clutch allows a seamless transition between active and reactive power generation.

Mechanical Synchronizing Clutch

- Available for the Titan family
- Tested and validated in San Diego



Synchronizing Clutch Model



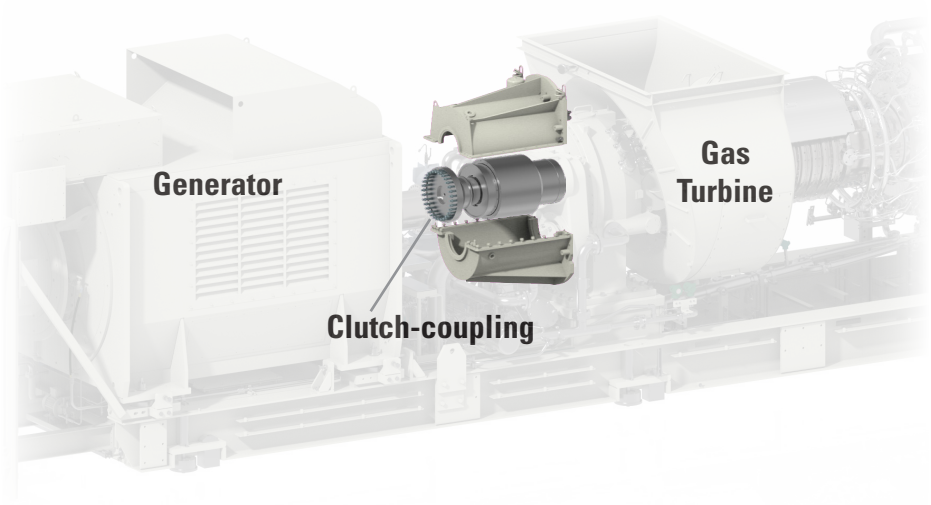
Testing Facility in Kearny Mesa, San Diego, CA

WHAT IS SYNCHRONOUS CONDENSING?

In synchronous condensing mode, a grid-connected generator operates without producing real power (MW) and instead supplies or absorbs reactive power (MVAR) as needed. This operating mode provides grid-strengthening services, such as short-circuit power contribution, rotating inertia, reactive power control and fault ride-through capability.

SYSTEM COMPONENTS

- Mechanical synchronizing clutch-coupling
- Clutch-coupling covers
- Lube oil system upgrade
- Controls system upgrade



TECHNICAL DATA

Reactive Power[1]	Up to +44 /-20 MVAR
Short Circuit Power	Up to 518 MVA
Inertia Constant[2]	Up to 1.51 seconds
Terminal Voltage	Up to 15 kV

1 - at generator terminals
2 - higher values obtainable by configuration

Corporate Contact Information
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