TURBOGENERATOR PRODUCT SOLUTIONS

GIGATOP 2-pole
Hydrogen and water-cooled turbogenerator

GIGATOP 2-pole is not only powerful, it is also modular and flexible in design, so that each machine meets your needs with optimum efficiency.

Optimum efficiency for the largest steam turbine power plants

Alstom’s hydrogen- and water-cooled GIGATOP 2-pole turbogenerator delivers the power you need. The range of GIGATOP 2-pole is covered by standardised sizes, with different capabilities and performances to match.

The GIGATOP 2-pole is constantly improved with the continuous incorporation of feedback from operational experience and the application of the latest computing tools and modern manufacturing techniques.

The result is a reliable, high-tech turbogenerator with a proven track record. The GIGATOP 2-pole is thus robust in design, while meeting all requirements comprehensively.

Customer benefits

OUTSTANDING POWER
With output ranges up to 1,400 MW, the GIGATOP 2-pole is ready to operate within a wide variety of power plants.

EFFICIENT AND FLEXIBLE
The water & hydrogen cooling system sustains the GIGATOP 2-pole’s high level of efficiency from full load to part load.

A TECHNOLOGY YOU CAN TRUST
GIGATOP 2-pole benefits from a proven, robust design as well as trustworthy components, making it a solid investment for the future.

HIGH STANDARDS
Quality processes and focused methods are implemented to provide great reliability as well as mechanical integrity.

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GIGATOP 2-pole – Shidongkou, China
GIGATOP 2-pole: High-tech features for best performances

**HYDROGEN AND WATER-COOLING SYSTEM**
**PROVIDING OPTIMUM RELIABILITY**

The GIGATOP 2-pole is cooled with pressurised hydrogen gas in a closed circuit to remove heat from the rotor and stator. The heat is removed via hydrogen/water heat exchangers located within the casing. The stator casing is fully sealed to minimise hydrogen consumption.

De-ionised water flows through the stainless-steel cooling tubes to remove the heat dissipated by the stator winding.

This contributes to optimising efficiency and power output.

**STATOR CORE**
**DESIGNED FOR LITTLE MAINTENANCE**

The specific design of the core end plates enables the stator core to be maintained under a constant axial pressure.

As a result, there is no loosening of the laminations expected over the entire lifetime of the machine.

The stator core is made of high-end materials, reducing magnetic losses and raising efficiency.

**STATOR WINDING AND SLOT WEDGING**
**KEY TECHNOLOGIES FOR GREAT RESULTS**

The use of Roebel bars for the dual-layer stator windings minimises the eddy-current losses and maximises efficiency.

The windings are held in the stator slots by double tapered, concave-convex wedges. This prevents the slot filling from loosening and compensates the initial settling and thermal expansion of the bars during operation.
**STATOR END-WINDING SUPPORT STRUCTURE**
**UNIQUE FEATURE FOR INCREASED AVAILABILITY**

This structure is axially flexible to allow thermal expansion; it is also stiff in the radial and tangential directions to withstand high electromagnetic forces. The end-winding can easily be tightened during maintenance.

**MICADUR® INSULATION SYSTEM**
**BOOSTING GIGATOP 2-POLE RELIABILITY**

The insulation consists of a glass-fibre tape incorporating mica flakes. The taped bars are vacuum impregnated, thermally cured and surface protected.

MICADUR® is the result of continuous development since the 1950s, meeting all requirements and showing an intrinsic safety margin for reliable operation.

**ROTOR**
**GOING THE EXTRA MILE**

The rotor has been designed to withstand all of the forces it could be subjected to.

Mechanical integrity is proven by extensive material testing, the performance and durability are established with sensitivity tests.

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The result of continuous, evolutionary development has pushed the limits of power output while maximising efficiency, and is characterised by simplicity and ease of operation and maintenance.
Leading experience **for outstanding energy production**

Over the last 5 years, Alstom has received **35 orders for GIGATOP 2-pole**, demonstrating its many customer advantages and operating capabilities.

**GIGATOP 2-POLE – A SUCCESS STORY**

**Outstanding reliability**
The GIGATOP 2-pole has demonstrated extremely high reliability in operation – for example, a unit in the USA boasted 607 days uninterrupted operation before a scheduled shutdown.

**Optimised for rail and road transport**
Only a small number of parts are transported, which translates into short delivery and faster erection time, meaning that your power plant gets into operation faster.

**Best industrial practice**
The GIGATOP 2-pole is the world’s most powerful 50 Hz single unit, with Neurath turbogenerators showing exceptional results: 1,440 MVA, 27 kV, E.ON.

**Highly reliable products**
The Amos power plant has been benefiting from the GIGATOP 2-pole technology since 1973, providing 1,300 MW at full speed, showing unbeatable availability since its starting operation.

**REDUCING COST OF ELECTRICITY**

**99% efficiency**
The GIGATOP 2-pole product family has demonstrated outstanding results. This means our customers get the best from our products, maximising power and revenue.

For more information, please contact your local Alstom Power representative.

Visit us online: [www.alstom.com](http://www.alstom.com)

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