

T155 DUAL GAS

420 kV (63 kA, 5,000 A) Gas-Insulated Substation Compatible with SF₆ or g³ gas

Grid Solutions, a GE Vernova business, has more than five decades of experience in the design, material selection, development, engineering, manufacturing and servicing of gas-insulated substations (GIS).

The design of our B105 Dual Gas GIS is grounded in more than 50 years of field experience in SF₆ and more than eight years in g³ technology as insulating and switching medium. Our T155 Dual Gas GIS bay – compatible with either SF₆ or g³ gas – meets the challenges of networks up to 420 kV for onshore and offshore power generation and transmission, as well as energy-intensive industry applications.

Future-proofed for flexibility

This dual-gas equipment is available with either SF₆ or g³ gas. Because of its identical foundational design, transmission system operators can implement the SF₆ version today and easily make the switch to our g³ solution later to decarbonize their substations.

All bay components, except the circuit breaker, are g³-or SF₆-compatible. They have been type-tested to demonstrate the same performances and ratings with both gases.

Reduced carbon footprint

The T155g is available in a fully SF₆-free version using our g³ technology, one of the company's alternative technologies to SF₆, allowing for a 99% CO₂eq reduction of the gas contribution to global warming. While it has the same dimensions, performance and ratings as SF₆, the T155g advanced sealing system and improved tightness reveal a significantly lower carbon footprint compared to its SF₆ equivalent.

The integration of low-power instrument transformers (LPITs), also known as digital voltage and current transformers, further contributes to decarbonize the T155 Dual Gas GIS and reduce strategic raw material consumption.

Low Cost of Land and Civil Works

- The T155 Dual Gas GIS is very compact and accessible, with a bay footprint equivalent to the previous SF₆ T155 model
- Complete bays including digital devices, and the low voltage control cabinet are assembled, wired, factory-tested and shipped
- The standardized digital native T155 GIS allows for an easier and faster supply chain process, shorten delivery, erection and commissioning times.



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The SF₆-free T155g GIS interrupter development was co-funded by the European Union.

The path to Decarbonization

- The T155g SF₆-free GIS is part of our GRIDEA portfolio of solutions designed to accelerate the decarbonization of the grid
- Lower carbon footprint over a 40-year substation life cycle compared to the use of SF₆ products
- Improved tightness due to sealing length divided by two, compared to the previous version
- The gas contribution to global warming is reduced by 99% using g³ gas instead of SF₆
- Reduction of strategic raw material consumption, thus their carbon footprint, thanks to low power instrument transformers

Digital Native GIS

- Mechanically engineered to reach the accuracy required with advanced monitoring and control solutions
- Digital power sensing using low-power instrument transformers

Easy Upgrades

- Bays are completely factory-assembled, wired and tested before shipment
- Easily make the switch to SF₆-free whenever you're ready
- Compact design that's common to all substation applications, including extension of existing substations
- State-of-the-art maintenance isolating device

Specifications (*)

| GIS TYPE | g ² T155g 420 kV | COMBINED g ² BAY-SF ₆ CB T155 420 kV | SF ₆ T155 420 kV |
|--|----------------------------------|---|----------------------------------|
| Reference electrotechnical standards | IEC | IEC/IEEE | IEC/IEEE |
| Rated voltage | 362-420 kV | 362-420 kV | 362-420 kV |
| Withstand voltages | Rated insulation level | | |
| Short-duration power-frequency, phase-to-earth/ across open switching device | 650/815 kV | 650/815 kV | 650/815 kV |
| Switching impulse, phase-to-earth / across isolating distance | 1050/900(+345) kVp | 1050/900(+345) kVp | 1050/900(+345) kVp |
| Lightning impulse, phase-to-earth / across open switching device | 1425/1425(+240) kVp | 1425/1425(+240) kVp | 1425/1425(+240) kVp |
| Frequency | 50 Hz | 50/60 Hz | 50/60 Hz |
| Continuous current | up to 5000 A | up to 5000 A | up to 5000 A |
| Short-time withstand current | 63 kA | 63 kA | 63 kA |
| Peak withstand current | 170 kAp | 170 kAp | 170 kAp |
| Duration of short-circuit | 3s | 3s | 3s |
| Installation | indoor/outdoor | indoor/outdoor | indoor/outdoor |
| Circuit Breaker Ratings | | | |
| First-pole-to-clear factor | 1.3-1.5 | 1.3-1.5 | 1.3 - 1.5 |
| Short-circuit breaking current | 63 kA | 63 kA | 63 kA |
| Short-circuit making current | 170 kAp | 170 kAp | 170 kAp |
| Operating sequence | O-0.3s-CO-3 min-CO/ CO-15s-CO | O-0.3s-CO-3 min-CO/ CO-15s-CO | O-0.3s-CO-3 min-CO/ CO-15s-CO |
| Drive type | Pure-spring | Pure-spring | Pure-spring |
| Mechanical endurance | M2 class | M2 class | M2 class |
| Capacitive switching | C2 class | C2 class | C2 class |
| Disconnecter and Low-speed Earthing Switch Ratings | | | |
| Capacitive current switching | 0.5 A | 0.5 A | 0.5 A |
| Bus-transfer current switching capability | 3000 A / 25 V | 3000 A / 25 V | 3000 A / 25 V |
| Mechanical endurance | M2 class | M2 class | M2 class |
| Make-proof Earthing Switch Ratings | | | |
| Making current capability | 170 kAp | 170 kAp | 170 kAp |
| Switching capability-electromagnetic coupling | 160 A / 10 kV | 160 A / 10 kV | 160 A / 10 kV |
| Switching capability-electrostatic coupling | 18 A / 20 kV | 18 A / 20 kV | 18 A / 20 kV |
| Mechanical endurance | M1 class | M1 class | M1 class |

(*) typical ratings, other values on request

Gas Data*

The functioning of this equipment relies upon SF₆ or a gas mixture based on CO₂/O₂ and 5% of an additive, C₄F₇N (also known as C₄-FN or Iso-C₃F₇CN), a fluorinated greenhouse gas, which helps preserve dimensions and performance equivalent to those of SF₆ equipment while reducing the gas carbon footprint.

| | SF ₆ version | g ³ | |
|--|-------------------------|--|----------------------------|
| | | C ₄ F ₇ N additive** | g ³ gas mixture |
| Average mass of gas/mixture in the equipment (kg)* | 233.7 | 30.5 | 149.8 |
| GWP ₁₀₀ of gas/mixture (CO ₂ -equivalent) | 24,300 | 2,750 | 560 |
| CO ₂ -eq of gas/mixture in the equipment (t _{co2-eq}) * | 5,678.9 | 83.9 | 83.9 |

*For information purposes only considering a typical GIS arrangement (double busbar cable bay). It varies depending on the equipment considered.

** This component's physical properties are essential to g³.

For more information
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