Grid Solutions

# T155 DUAL GAS

## 420 kV (63 kA, 5,000 A) Gas-Insulated Substation Compatible with $SF_6$ or $g^3$ gas

The design of our T155 Dual Gas GIS is grounded in more than 60 years of field experience in $SF_6$ and more than ten years in $g^3$ technology as insulating and switching medium. Our T155 Dual Gas GIS bay – compatible with either $SF_6$ or $g^3$ gas – meets the challenges of networks up to 420 kV for onshore and offshore power generation and transmission, as well as energy-intensive applications.

### Future-proofed for flexibility

This dual-gas equipment is available with either $SF_6$ or $g^3$ gas. Because of its identical foundational design, transmission system operators can implement the $SF_6$ version today and easily make the switch to our $g^3$ solution later to decarbonize their substations.

All bay components, except the circuit breaker, are $g^3$-or $SF_6$-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 $SF_6$-free version using our $g^3$ technology, one of the company's alternative technologies to $SF_6$, allowing for a 99% $CO_2$eq reduction of the gas contribution to global warming. While it has the same dimensions, performance and ratings as $SF_6$, the T155g advanced sealing system and improved tightness reveal a significantly lower carbon footprint compared to its $SF_6$ 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 $SF_6$ 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.

The $SF_6$-free T155g GIS interrupter development was co-funded by the European Union.

### The path to Decarbonization

- The T155g $SF_6$-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 $SF_6$ 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 $g^3$ gas instead of $SF_6$
- 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

- Easily make the switch to $SF_6$-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

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# Specifications (*)

| GIS TYPE | $g^3$ T155g 420 kV | $SF_6$ T155 420 kV |
|---|---|---|
| Reference electrotechnical standards | IEC/IEEE | IEC/IEEE |
| Rated voltage | 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 |
| Switching impulse, phase-to-earth / across isolating distance | 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 |
| Frequency | 50/60** Hz | 50/60 Hz |
| Continuous current | up to 5000 A | up to 5000 A |
| Short-time withstand current | 63 kA | 63 kA |
| Peak withstand current | 170 kAp | 170 kAp |
| Duration of short-circuit | 3s | 3s |
| Installation | indoor/outdoor | indoor/outdoor |
| **Circuit Breaker Ratings** | | |
| First-pole-to-clear factor | 1.3-1.5 | 1.3 - 1.5 |
| Short-circuit breaking current | 63 kA | 63 kA |
| Short-circuit making current | 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 |
| Drive type | Pure-spring | Pure-spring |
| Mechanical endurance | M2 class | M2 class |
| Capacitive switching | C2 class | C2 class |
| **Disconnector and Low-speed Earthing Switch Ratings** | | |
| Capacitive current switching | 0.5 A | 0.5 A |
| Bus-transfer current switching capability | 3000 A / 25 V | 3000 A / 25 V |
| Mechanical endurance | M2 class | M2 class |
| **Make-proof Earthing Switch Ratings** | | |
| Making current capability | 170 kAp | 170 kAp |
| Switching capability-electromagnetic coupling | 160 A / 10 kV | 160 A / 10 kV |
| Switching capability-electrostatic coupling | 18 A / 20 kV | 18 A / 20 kV |
| Mechanical endurance | M1 class | M1 class |

(*) typical ratings, other values on request
(**) 60 Hz at 362 kV (IEEE)

# Gas Data*

The functioning of this equipment relies upon $SF_6$ or a gas mixture based on $CO_2/O_2$ and 5% of an additive, $C_4F_7N$ (also known as $C_4$-FN or Iso-$C_3F_7CN$), a fluorinated greenhouse gas, which helps preserve dimensions and performance equivalent to those of $SF_6$ equipment while reducing the gas carbon footprint.

| | $SF_6$ version | $g^3$ | |
|---|---|---|---|
| | | $C_4F_7N$ 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 ($t_{co2\text{-}eq}$) * | 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 $g^3$.

For more information, visit
**gevernova.com/grid-solutions**



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