

# B105 DUAL GAS

## Gas-Insulated Substations 245 kV, up to 63 kA, 4000 A Compatible with SF<sub>6</sub> or g<sup>3</sup> gas

Grid Solutions, a GE Vernova company, 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 SF<sub>6</sub> and eight years in g<sup>3</sup> technology as insulating and switching medium. Our B105 Dual Gas GIS bay – compatible with either SF<sub>6</sub> or g<sup>3</sup> gas – meets the challenges of networks up to 245 kV for onshore and offshore power generation and transmission, as well as energy-intensive industry applications.

### Future-proofed for flexibility

Anticipating future SF<sub>6</sub> regulations, this dual gas equipment is available with either SF<sub>6</sub> or g<sup>3</sup> gas. Because of its identical foundational design, transmission system operators can implement the SF<sub>6</sub> version today and easily make the switch to our g<sup>3</sup> solution later to decarbonize their substations.

All bay components, except the circuit breaker, are g<sup>3</sup>- or SF<sub>6</sub>-compatible. They have been type-tested to demonstrate the same performances and ratings with both gases.

### Reduced carbon footprint

The B105g is available in a fully SF<sub>6</sub>-free version using our g<sup>3</sup> technology, one of the company's alternative technologies to SF<sub>6</sub>, allowing for a roughly 99% CO<sub>2</sub>eq reduction of the gas contribution to global warming. While it has the same dimensions, performance and ratings as SF<sub>6</sub>, the B105g advanced sealing system and improved tightness reveal a significantly lower carbon footprint compared to its SF<sub>6</sub> equivalent.

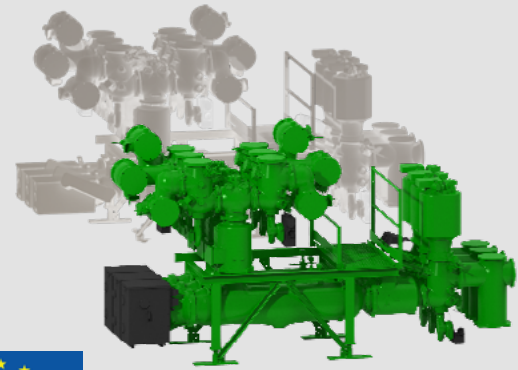
The integration of low-power instrument transformers (LPITs), also known as digital voltage and current transformers, further contributes to decarbonize the B105 Dual Gas GIS and reduce strategic raw material consumption.

### Low Cost of Land and Civil Works

- One of the most compact 245 kV GIS
- Complete bays including digital devices and the low voltage control cabinet are assembled, wired, factory-tested and shipped
- The standardized digital native B105 GIS allows for an easier and faster supply chain process, shorten delivery, erection and commissioning times.



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The SF<sub>6</sub>-free B105g development is being co-funded by the European Union

### The path to Decarbonization

- The B105g SF<sub>6</sub>-free GIS is part of GRIDEA, our portfolio of solutions designed to accelerate the decarbonization of the grid
- Lower carbon footprint during a 40-year substation life cycle
- Improved tightness due to sealing length divided by two, compared to the previous version
- The gas contribution to global warming is reduced by about 99% using g<sup>3</sup> gas instead of SF<sub>6</sub>
- Reduction of strategic raw material consumption, and thus their carbon footprint, thanks to low power instrument transformers

### Digital Native GIS

- Mechanically engineered to reach the accuracy required by 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 SF<sub>6</sub>-free whenever you're ready
- Similar operational and maintenance procedures as with SF<sub>6</sub> GIS for simple integration
- Compact design that applies to all substation applications, including extension of existing substations
- State-of-the-art maintenance isolating device

## SPECIFICATIONS

### General Ratings

| Reference electrotechnical standards | IEC            | IEC/IEEE        |
|--------------------------------------|----------------|-----------------|
| Voltages                             | up to 245 kV   | up to 245 kV    |
| Insulating and switching gas         | g <sup>3</sup> | SF <sub>6</sub> |

### Withstand voltages

|                                                                                                                                |                |                |
|--------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|
| <ul style="list-style-type: none"> <li>Short-duration power-frequency, phase-to-earth/ across open switching device</li> </ul> | 460/530 kV     | 460/530 kV     |
| <ul style="list-style-type: none"> <li>Lightning impulse, phase-to-earth / across open switching device</li> </ul>             | 1050/1200 kVp  | 1050/1200 kVp  |
| Frequency                                                                                                                      | 50 Hz          | 50/60 Hz       |
| Continuous current                                                                                                             | 4000 A         | 4000 A         |
| Short-time withstand current                                                                                                   | 50 kA          | 50/63 kA       |
| Peak withstand current                                                                                                         | 135 kAp        | 135/170 kAp    |
| Duration of short-circuit                                                                                                      | 3s             | 3s             |
| Installation                                                                                                                   | indoor/outdoor | indoor/outdoor |

### Circuit Breaker Ratings

|                                          |                                  |                                  |
|------------------------------------------|----------------------------------|----------------------------------|
| Short-circuit breaking current           | 50 kA                            | 50/63 kA                         |
| Short-circuit making current             | 135 kAp                          | 135/170 kAp                      |
| Operating sequence                       | O-0.3s-CO-3 min-CO/<br>CO-15s-CO | O-0.3s-CO-3 min-CO/<br>CO-15s-CO |
| Drive type (three-phase or single-phase) | Pure-spring                      | Pure-spring                      |
| Breaking time                            | <50 ms                           | <50 ms                           |
| Mechanical endurance                     | M2 class                         | M2 class                         |

### Disconnecter and Low-speed Earthing Switch Ratings

|                                           |               |               |
|-------------------------------------------|---------------|---------------|
| Capacitive current switching              | 0.25 A        | 0.25 A        |
| Bus-transfer current switching capability | 2400 A / 25 V | 2400 A / 25 V |
| Mechanical endurance                      | M2 class      | M2 class      |

### Make-proof Earthing Switch Ratings

|                                               |             |             |
|-----------------------------------------------|-------------|-------------|
| Making current capability                     | 135 kAp     | 135/170 kAp |
| Switching capability-electromagnetic coupling | 80 A / 2 kV | 80 A / 2 kV |
| Switching capability-electrostatic coupling   | 3 A / 12 kV | 2 A / 12 kV |
| Mechanical endurance                          | M1 class    | M1 class    |

## Gas Data

The functioning of this equipment relies upon SF<sub>6</sub> or a gas mixture based on CO<sub>2</sub>/O<sub>2</sub> and 5% of an additive, C<sub>4</sub>F<sub>7</sub>N (also known as C4-FN or Iso-C<sub>3</sub>F<sub>7</sub>CN), a fluorinated greenhouse gas, which helps preserve dimensions and performance equivalent to those of SF<sub>6</sub> equipment while reducing the gas carbon footprint.

|                                                                             | SF <sub>6</sub> | g <sup>3</sup>                             |                            |
|-----------------------------------------------------------------------------|-----------------|--------------------------------------------|----------------------------|
|                                                                             |                 | C <sub>4</sub> F <sub>7</sub> N additive** | g <sup>3</sup> gas mixture |
| Average mass of gas/mixture in the equipment (kg)*                          | 127.9           | 12.8                                       | 62.9                       |
| GWP <sub>100</sub> of gas/mixture (CO <sub>2</sub> -equivalent)             | 24,300          | 2,750                                      | 560                        |
| CO <sub>2</sub> -eq of gas/mixture in the equipment (t <sub>co2-eq</sub> )* | 3,108           | 35.2                                       | 35.2                       |

\*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<sup>3</sup>.

For more information  
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