

F35-170kV DUAL GAS

170 kV, 63 kA, 4000 A GIS compatible with SF₆ or g³ gas

GE Vernova has more than six decades of experience in design, material selection, development, engineering, manufacturing, and servicing of SF₆ gas-insulated substations (GIS).

The design of the F35 Dual Gas GIS leverages this experience, along with more than ten years of experience with g³ technology as an insulating and switching medium, and a total installed base of more than 10,000 F35 bays.

Our F35-170kV Dual Gas GIS bay is compatible with SF₆ and g³ gas. It is built to meet the challenges of electricity networks up to 170 kV, 63 kA with one of the most compact footprints on the market. It is suitable for onshore and offshore power generation, transmission, as well as energy-intensive applications.

Future-proofed with Flexibility

Anticipating future SF₆ regulations, this dual gas equipment is available with either SF₆ or g³ gas. Because of its identical core design, transmission and distribution system operators can finalize the choice of the gas just few months before delivery, securing more time to organize the transition.

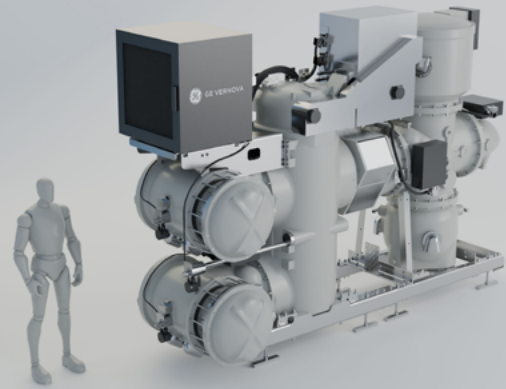
All bay components, except the circuit breaker, are g³ - or SF₆ -compatible. They have been type-tested to demonstrate the same performances and ratings with both gases.

Reduced Carbon Footprint

The F35g-170kV is a fully SF₆-free version using our g³ technology, one of the company's alternative technologies to SF₆ for metal enclosed switchgear. By maintaining the same compact dimensions, performance and ratings as SF₆, F35g-170kV significantly reduces its gas-related carbon footprint compared with the equivalent SF₆ solution.

Lowest cost of land and civil works

- One of the most compact GIS solutions up to 170 kV helps reduce land use and civil works costs thanks to its modular arrangement, high level of device compatibility, and strong standardization.
- Bays are completely factory-assembled, wired, and tested before shipment.



The Path to Decarbonization

- The F35g-170kV SF₆-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
- First-in-class new gas sealing system compatible with very low leakage rates. Tightness improved by more than 4 times in comparison to the previous generation.
- The gas global warming potential is reduced by about 99% using g³ instead of SF₆

Flexibility

- Flexibility between SF₆-free and conventional SF₆ equipment
- Similar operational and maintenance procedures as with SF₆ GIS for simple integration
- Compact design that applies to all substation applications, including extension of existing substations

High Availability and Operational Safety

- Proven pure-spring circuit-breaker drives, whose reliability has been recognized by the CIGRE experts
- The current transformer cores are located outside of the gas compartment, offering protection against contact with arced gas from the circuit-breaker



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Specifications

GENERAL RATINGS	F35-170KV	F35g-170KV
Reference electrotechnical standards	IEC 62271-203 / IEEE C37.122	
Insulating and switching gas	SF ₆	g ³
Rated voltage	up to 170 kV	
Withstand voltages		
- Short-duration power-frequency, phase-to-earth / across isolating distance	up to 325 / 375 kV	
- Lightning impulse, phase-to-earth / across isolating distance	up to 750 / 860 kV _{peak}	
Frequency	50 / 60 Hz	
Continuous current	up to 4,000 A	
Short-time withstand current and duration	up to 63 kA	
Duration of short-circuit	3s	
Peak withstand current	up to 170 kA _{peak}	
Installation	indoor/outdoor	
Ambient temperature range	-30...40°C	-25...40°C

CIRCUIT-BREAKER RATINGS		
Short-circuit breaking current	up to 63 kA	
Short-circuit making current	up to 170 kA _{peak}	
First-pole-to-clear factor	1.3 / 1.5	
Operating sequence	O-0.3s-CO-3 min-CO / CO-15s-CO	
Drive type (three-phase)	Pure spring	
Mechanical endurance	Class M2	
Capacitive currents switching	Class C2	

DISCONNECTOR AND LOW-SPEED EARTHING SWITCH RATINGS		
Capacitive current switching	0.1 A	
Bus-transfer current switching capability	Up to 2,000 A / Up to 20 V	
Mechanical endurance	Class M2	

MAKE-PROOF EARTHING SWITCH RATINGS		
Making current capability	up to 170 kA _{peak} , Class E1	
Switching capability - electromagnetic coupling	up to 80 A / 2 kV	
Switching capability - electrostatic coupling	up to 3 A / 6 kV	
Mechanical endurance	Class M1	

Gas Data*

The function of this equipment relies upon SF₆ or a gas mixture based on CO₂-O₂ and few percents of an additive, C₄F₇N (also known as C4-FN or Iso-C3 F7 CN), a fluorinated greenhouse gas, which helps preserve dimensions and performance equivalent to those of SF₆ equipment while reducing the carbon footprint.

	UNITS	SF ₆	C ₄ F ₇ N**	g ³ MIXTURE
Average mass of gas / mixture in the equipment	kg lbs.	127.8 279.9	12.9 26.5	63.4 138.9
GWP100 of gas/mixture	CO ₂ e	24,300	2,750	560
CO ₂ e of gas/mixture in the equipment *	tCO ₂ e	3,105.1	35.5	35.5

* 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.

Weight Data

At GE Vernova, our commitment to supporting the decarbonization of electrical networks is anchored in absolute transparency. This material CO₂e emission score illustrates our commitment to measuring the environmental impact of our solutions as precisely as possible, providing the fact-based, verifiable data necessary to assist you in your energy transition projects.

PERFORMANCE INDICATOR	UNITS	
Dimensions: * Width x Height x Depth	mm inch.	960 × 3,000 × 4,300 37.7 × 118.9 × 169.9
Total product mass	t	5.5
Material CO ₂ e emission **	tCO ₂ e	53.7

Other data available on request

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

** The material CO₂e emissions are calculated according to Life Cycle Assessment (LCA) principles, encompassing the full environmental impact of the production and forming processes for all primary materials, including aluminum, copper, steel, epoxy, PTFE, and stainless steel.

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