



# B 105

170 – 300 kV

The increasing demand for electrical power in cities and industrial centers necessitates the installation of a compact and efficient distribution and transmission network. High voltage gas insulated switchgear (GIS) is ideal for such applications.



The B105 is a single phase, SF<sub>6</sub> gas insulated, high voltage metal enclosed switchgear, which is continuously being upgraded to state of the art technology.

The B105 complements the existing range of GIS products.

AREVA has been actively involved in SF<sub>6</sub> technology for several decades and since 1965 our GIS has been in use worldwide, with proven success.

Excellent field experience confirms the soundness of our technical concept.



## Customer benefits

- Minimum floorspace requirements
- Insulated system unaffected by environmental conditions
- Modular design
- Almost unlimited extension and modification possibilities
- High operational reliability
- Simple maintenance
- Long service life expectancy



# A highly reliable module design

## FIELD PROVEN DESIGN CONCEPTS

B105 modular switchgear consists of components which permit the realization of both simple and complex station layouts.

The reliable operation of our SF<sub>6</sub> GIS is based on field proven design principles, purely mechanical drives, up to date computer aided design methods, comprehensive development and type testing, of which all are governed by our ISO 9001 and ISO 14001 certified quality control system.

The busbars arranged over the circuit breaker permit easy access to all station components. Any maintenance of the circuit breaker can be easily performed from the front ground-level walkway.

Standardized flanges, telescopic couplings and bay-by-bay compartments allow for planned or unplanned extensions and servicing, with minimal impact on the operational availability of the station.

Each phase of the B105 is divided into several gas compartments using closed gas barriers. Each gas compartment is individually monitored and contains moisture absorbing desiccant and a pressure relief device.

## PROVEN SYSTEM ADVANTAGES

The extensive use of aluminum results in low system weights and floor loadings. Light duty hoisting equipment is sufficient for the installation and maintenance of the switchgear.

Installation is based on site assembly of standard transportation components which are factory tested for functionality, dielectric strength and leaktightness. The modular design of the GIS facilitates erection, even when space is limited and without extraordinary precautions.

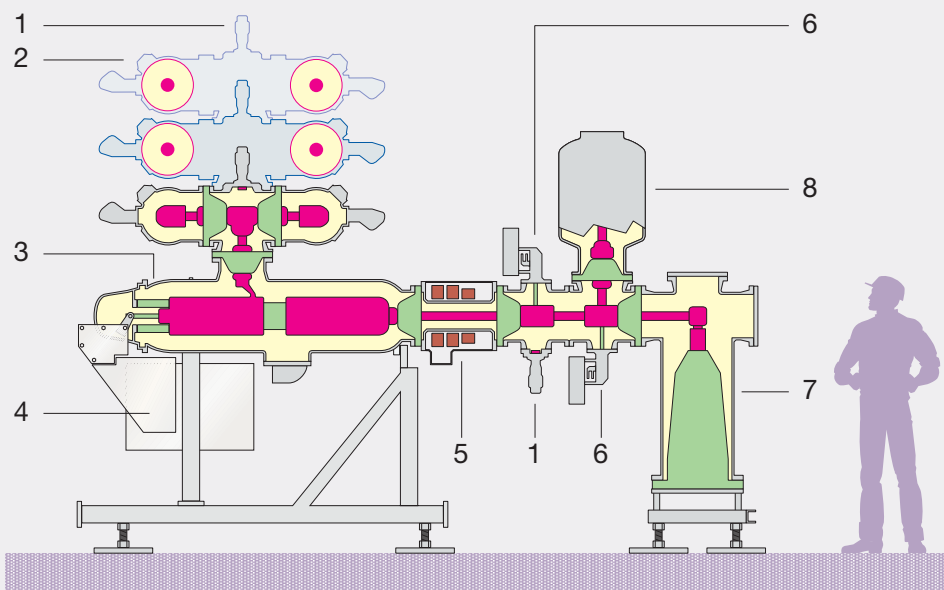
The cast aluminum enclosures (used successfully by AREVA for many years) are dielectrically optimized and comply with relevant pressure vessel codes.

In conjunction with the pressure relief system, they assure maximum safety for operating personnel and equipment. Minimum gas leakage is guaranteed during the service life of the GIS by the use of a mechanically and chemically resistant sealing system together with comprehensive quality control methods.

The metallic continuous enclosure connected to the station earthing grid guarantees that the electromagnetic field strength in the switchgear room is harmless to both personnel and auxiliary equipment. The transient overvoltages that may be coupled into the control and instrumentation circuits comply with the latest IEC requirements.

## >> CROSS SECTION VIEW

Double busbar bay with outgoing cable feeder



- 1 Earthing switch
- 2 Busbar disconnector
- 3 Circuit breaker
- 4 Spring operating mechanism
- 5 Current transformer
- 6 Feeder disconnector
- 7 Cable termination enclosure
- 8 Voltage transformer

# GIS components

## ACCESSIBLE CIRCUIT BREAKERS

The development of the breaking element design is based on the following fundamental principles:

- Incorporation of the excellent operating reliability of the existing design, proven over many years in service.
- Consideration of the latest advances in plasma physics.
- Circuit breaker performance meeting all latest IEC and ANSI standards.

The circuit breaker with its mechanism underneath is installed within the GIS in a horizontal position.

## HIGH PERFORMANCE OPERATING MECHANISMS

Each circuit breaker pole is driven by a proven, purely mechanical motorwound spring operating mechanism. The mechanisms have only very few moving parts, require minimal maintenance and have extremely long service lives. The energy for two OPEN and one CLOSE operations is permanently stored in the tensioned springs in a loss free manner. The simple design of the operating mechanisms assures superior reliability.

## RELIABLE DISCONNECTORS

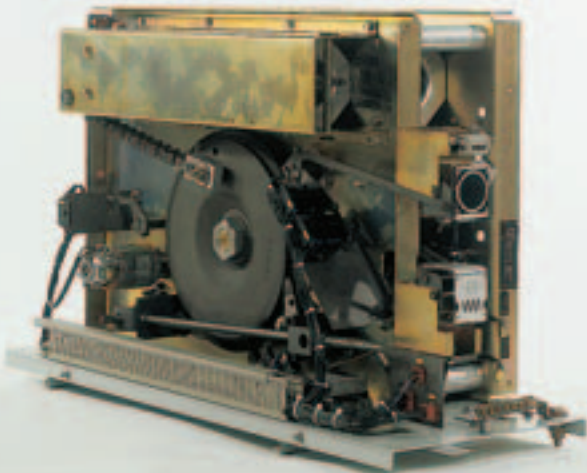
The contact element is installed in a disconnect enclosure. The three disconnecter poles are mechanically coupled to each other via an operating linkage and actuated by a common motor drive. They can switch capacitive currents encountered in the course of energizing or deenergizing portions of the GIS and loop currents when commutating currents from one busbar to another.

Clear and safe indication of main contacts position is provided by a reliable indicator directly fitted to the linkage. This indicator is clearly visible from the operating level.



## RELIABLE EARTHING SWITCHES

The earthing switches are compatible with various plant components. They are available in maintenance and make-proof versions and can be installed anywhere within the GIS in accordance with the user's protection concept. Additionally the maintenance and make proof earthing switch can be electrically insulated from the enclosures simply by removing external links. Thus enabling to conveniently perform current or voltage injection tests, for timing, resistance measurement or protection check purposes.



## CUSTOMIZED INSTRUMENT TRANSFORMERS

B105 switchgear is equipped with conventional or non-conventional electronic instrument transformers. They are always customized to the user's needs. The technical data therefore reflects the customer's distribution, protection and instrumentation configuration.

The active elements of the transformers are installed in standard enclosures which can be mounted practically anywhere in the GIS layout.



## STANDARD TERMINATIONS

Cables, overhead lines and transformers can all be connected to their respective GIS interface components. These include outdoor SF<sub>6</sub> to air bushings, cable terminations and direct transformer connections.

All components comply with IEC recommendations.



## INTERCONNECTING COMPONENTS

The various components of the GIS are assembled together by means of standardized bolted flanges. Interconnecting components are comprised of aluminum enclosures with insulator-supported conductors.

Telescopic coupling elements (in busbars for example) are used to connect adjacent switchgear sections.

Expansion elements with metal bellows are used to compensate for thermal expansion/contraction cycles and positional tolerances in both lateral and longitudinal directions.







# Tests, assembly, maintenance

## RELIABLE TYPE AND ROUTINE TESTS

Type tests are carried out according to IEC standards latest issues.

For some features, IEC requirements are even supplemented by additional tests, or more severe test, conditions to match AREVA's own superior standard of quality.

Despite most modern workshops, among which a dust-free assembling hall, same policy is used for routine tests. For instance, partial discharge measurement is performed at quite a higher voltage than the one required by IEC standards.



## QUICK SITE ERECTION

The fixation of the GIS equipment is easily made with anchor bolts directly on to the foundation with no need of embeddet rails.

Holes are drilled directly in the foundation.

## SIMPLE TRANSPORT AND ON-SITE TESTS

Shipping units are filled with SF<sub>6</sub> or N<sub>2</sub> gas at a slight overpressure, to prevent moisture and dust ingress during transport.

After site erection, the equipment undergoes rigorous inspections to ensure all required performances. Thus, site tests include severe resistance measurements, mechanical and voltage withstand tests.

## MINIMAL MAINTENANCE

The B105 near-zero maintenance concept results in high reliability and availability with only occasional inspections and a guaranteed long-life expectancy for all mechanical and electrical parts.

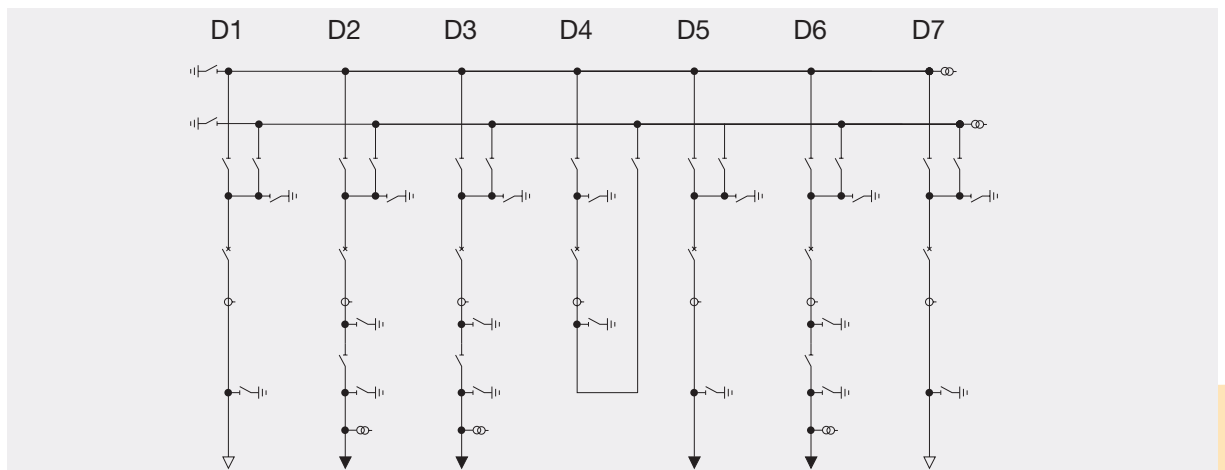
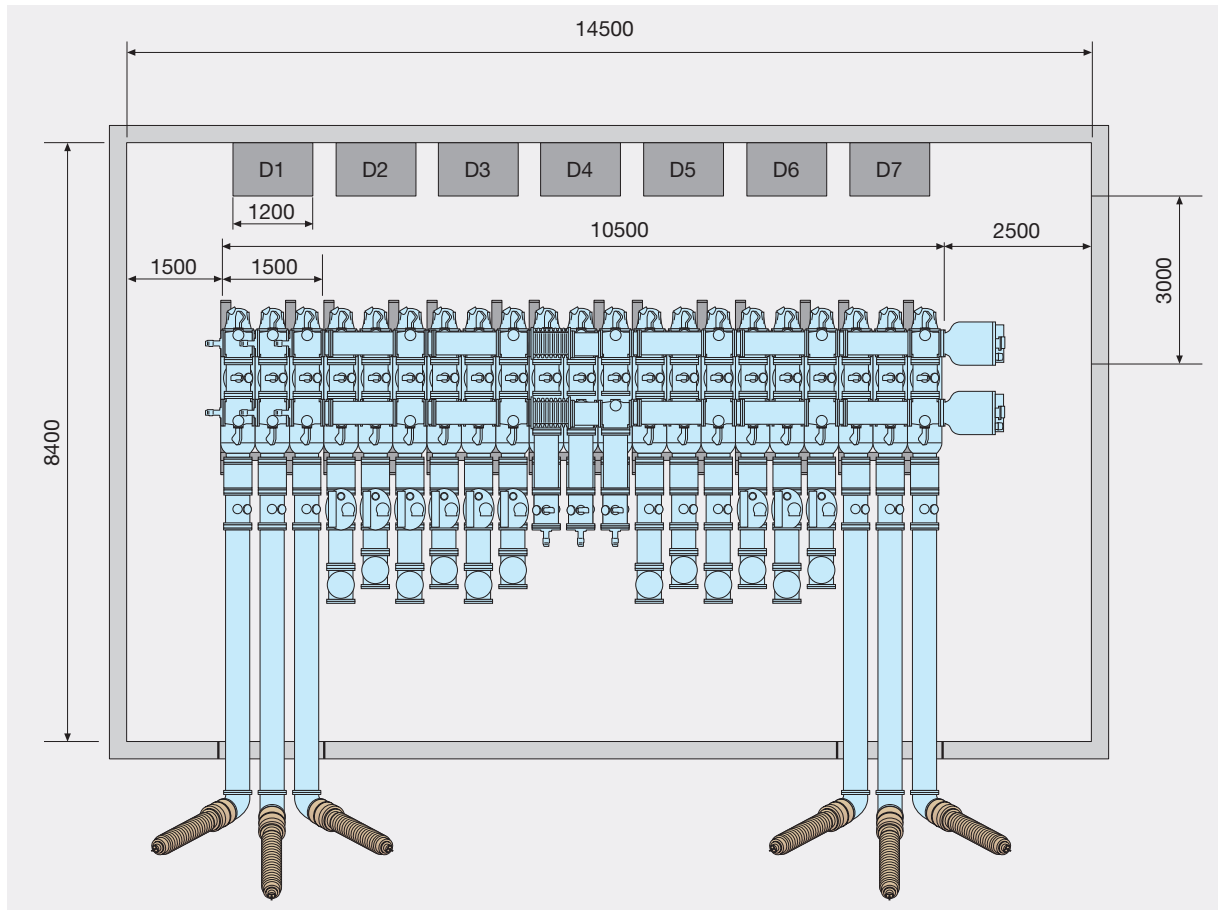
The AREVA service team remains at the customer's disposal for any assistance and service.

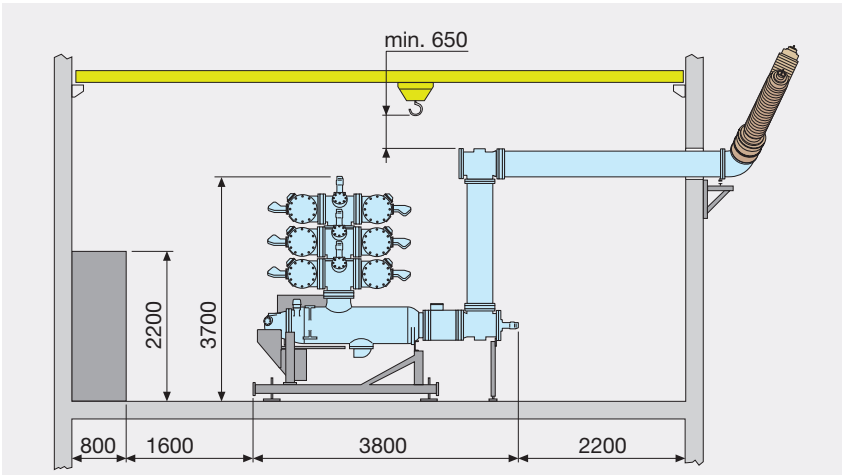
An inspection and maintenance plan can be made to support the equipment throughout its entire life cycle.



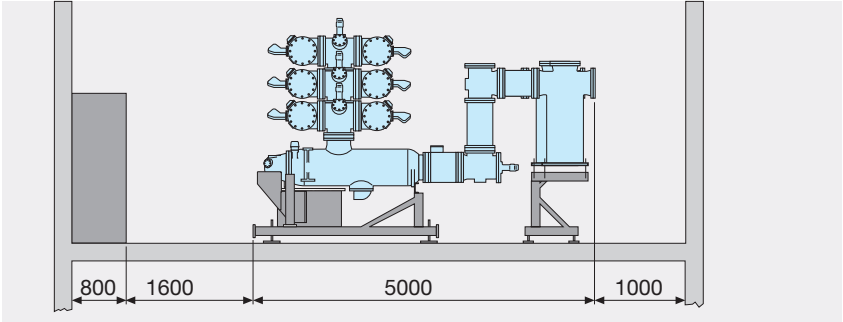


# Example of a double busbar GIS

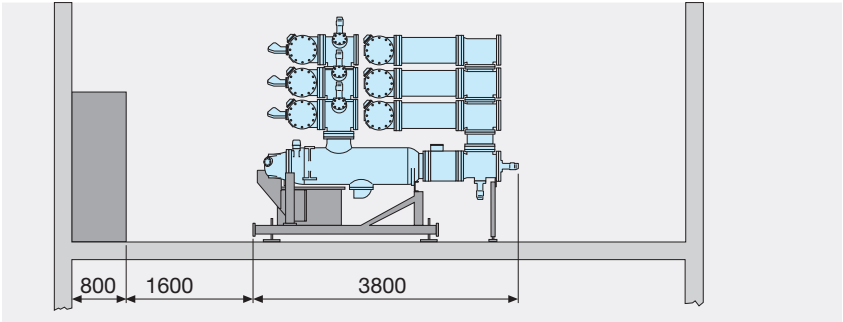




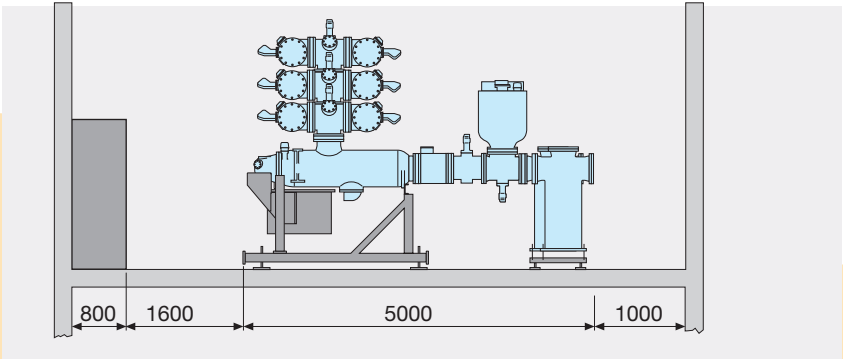
D1, D7  
Transformer bays with SF<sub>6</sub>  
to air bushings



D5  
Transformer bay with  
outgoing feeder



D4  
Coupler bay



D2, D3, D6  
Line bays



# Technical data

GENERAL			
>> Rated voltage	kV	up to 300	
>> Rated frequency	Hz	up to 60	
>> Rated lightning impulse withstand voltage, phase-ground	kV	up to 1050	
>> Rated lightning impulse withstand voltage across disconnecter contacts	kV	1220	
>> Rated power frequency withstand voltage, phase-ground	kV	up to 460	
>> Rated power frequency withstand voltage across disconnecter contacts	kV	595	
>> Rated current	A	up to 4000	
>> Rated peak withstand current	kA	up to 170	
>> Rated short-time current	kA	up to 63	
>> Min. gas operating pressure	- Switchgear	bar	4.5–5.5
	- Circuit breaker (gauge at 20 °C)	bar	5.5
>> Auxiliary voltage	V	110/220 DC	
>> Enclosure		single-phase	
>> Installation		indoor/outdoor	
>> Permissible ambient temperature	°C	-25/+40	
>> Bay dimensions (W x D x H)	m	1.5/1.85 x 5.0 x 3.7/4.2	
>> Bay weight approx.	kg	5800/6400	
CIRCUIT BREAKER			
>> Rated short-circuit breaking current	kA	up to 63	
>> Rated short-circuit making current	kA	up to 170	
>> Break time	ms	50	
>> Closing time	ms	115	
>> Type of operating mechanism		single-pole, spring-operated	
>> Power consumption of operating mechanism (spring winding)	W	3 x 800	
>> Rated operating sequence		O–0.3 s–CO–3 min–CO/CO–15 s–CO	
>> Power consumption of trip or closing coil, approx.	W	3 x 350	
EARTHING SWITCH			
>> Rated short-circuit making current	kA	up to 170	
>> Power consumption of operating mechanism (spring winding) approx.	W	150	
DISCONNECTOR AND MAINTENANCE EARTHING SWITCH			
>> Power consumption of motor drive, approx.	W	150	

Other values on request

**T&D Worldwide Contact Centre**  
**E-mail: [contactcentre@areva-td.com](mailto:contactcentre@areva-td.com)**  
**Telephone: +44 1 785 25 00 70**  
**[www.areva-td.com](http://www.areva-td.com)**

Our policy is one of continuous development. Accordingly the design of our products may change at any time. Whilst every effort is made to produce up to date literature, this brochure should only be regarded as a guide and is intended for information purposes only. Its contents do not constitute an offer for sale or advise on the application of any product referred to in it. We cannot be held responsible for any reliance on any decisions taken on its contents without specific advice.