

ZX1.2

Gas-insulated medium voltage switchgear



Power engineering from ABB.



A strong family for all seasons.

Equipped to master all requirements, the members of the ZX family provide solutions to every challenge. Clients in over 70 countries rely on gas-insulated switchgear from ABB. The selected references speak for themselves...



Solutions for the future.

As a technology group with global operations, ABB supplies the solutions of the future for the core areas of our economy: public and industrial electricity, heat, gas and water supply. In that context, our clients benefit from a comprehensive product, system and service range in power engineering. With a combination of experience and innovative power, we offer them turnkey implementation of projects of all sizes, from planning to commissioning, from low voltage to high voltage and from process control to corporate management.

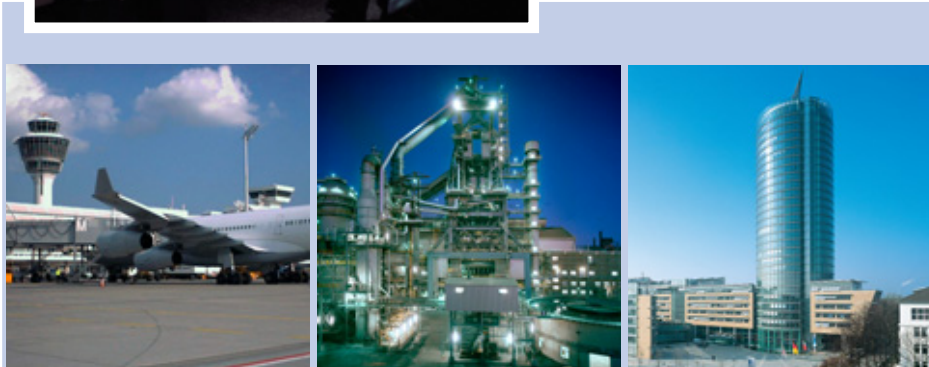
Our innovative and holistic concepts for modular structure systems enable you to make optimum, economical use of the equipment deployed and thus ensure the necessary security of investment in today's markets.

Gas-insulated switchgear from ABB.

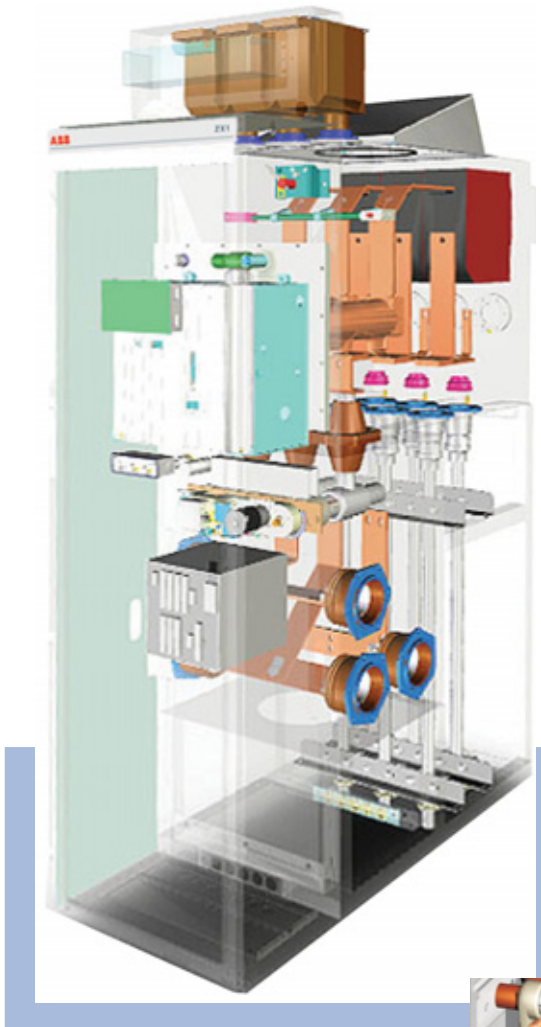
Flexible combination, reliability, availability and economy are the attributes that make it easy for our clients in industry and the public sector to decide in favor of this product series. The modular structure ensures that even unusual configurations can be economically implemented.

The use of digital protection and control technology, sensor systems and plug-in connections makes the products in the ZX family unrestrictedly fit for the future, and the primary function of reliable power distribution is fulfilled with no ifs and buts.

This is ensured by ABB's uncompromising approach to quality, which leaves no customer's wishes unfulfilled.



Plug-in technology at all ends.



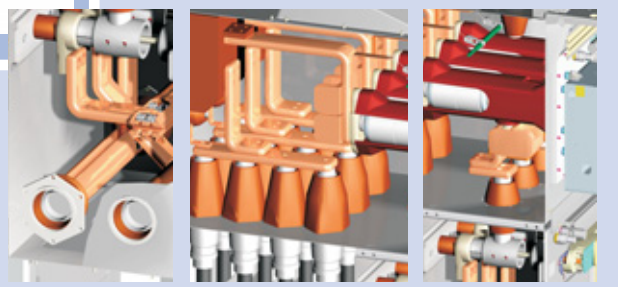
Every enclosure is hermetically sealed.

The factory-assembled, routine tested gas-insulated switchgear accommodates all the live components in a gas-tight stainless steel enclosure containing SF₆ gas. SF₆ stands for sulfur hexafluoride, an artificially manufactured gas molecule in which six fluorine atoms are arranged around one sulfur atom.

With its good chemical and physical properties (excellent insulating capacity) SF₆ provides optimum conditions for the handling of voltages over 1000 V.

Not only power cables, but also busbars and voltage transformers are connected to the panels at an installation-friendly height using our tried and tested plug-in technology.

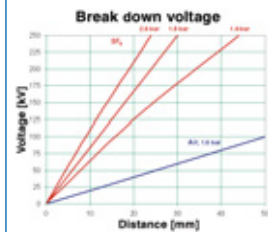
The result is a hermetically sealed panel which requires no work with SF₆ at site.



The advantages at a glance.

- Dielectrically safe, even at atmospheric pressure
- Sealed for life
- Space-saving

SF₆ is an inert, non-flammable, non-toxic and non-ozone depleting insulating medium.



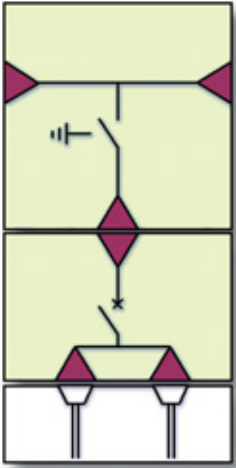
SF₆ has three times the dielectric strength of air at atmospheric pressure. This can be further increased by increasing the pressure.

SF₆ consists of very large molecules and can be enclosed without notable losses for the complete service life of a switchgear installation (approx. 40 years).

Focus on the details.



Plug-in components in the course of the busbar connect, insulate and conduct the current.



Functional compartments are partitioned off from each other. The high voltage compartments are designed as hermetically sealed pressure systems in accordance with IEC 62271-1. These are volumes which require no further gas or vacuum treatment during the expected service life.

Design

- Single busbar version
- Laser welded stainless steel enclosures
- Modular design
- Panels coupled by plug-in busbar connectors without SF₆ gas work
- Pressure relief optionally on every panel or by pressure relief duct
- High cable termination point of 1250 mm
- Inner cone cable plug system with sizes 2 and 3

Benefits

Highest safety for personnel

- All HV parts are shockproof encapsulated
- Very low fault rate caused by independency of ambient conditions
- Approved internal arc classification
- Additionally increased safety by external pressure relief possible

Lowest total costs

- Compact dimensions enable reduced building costs
- Maintenance-free due to constant conditions for all HV parts
- Extended life time of 40 years and more
- Recycling or reuse of all materials
- Reduced erection time due to plug-in technologies

Highest availability

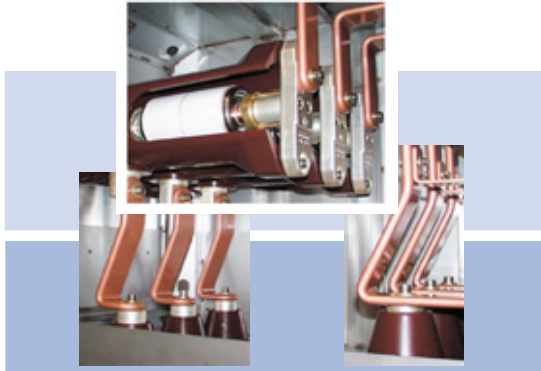
- Simple and safe erection due to busbar plug-in technology without any bolting
- In spite of low fault rate a fast repair is possible
- Earthing by circuit-breaker instead of fault making earthing switch

Metal-partitioned and gas-tight

- SF₆ gas-insulated
- Busbar compartment as hermetically sealed pressure system
- Circuit-breaker compartment as hermetically sealed pressure system
- Up to 40.5 kV
- Up to 2500 A and 31.5 kA



- generated,
- distributed and
- utilized.



Circuit-breaker VD4 X

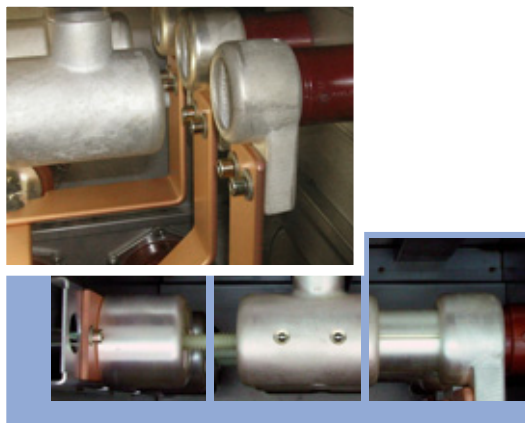
- Horizontal arrangement of circuit-breaker poles
- Operating mechanism outside the gas compartment
- Poles and mechanism connected via gas-tight thrust bushing
- Additional earthing function in combination with three position disconnector

Three position disconnector

- Motor-operated rod-type switch with three functions
 - Connecting
 - Disconnecting
 - Preparing and earthing
- Currentless preparation of any connection: Switching is performed exclusively by the circuit-breaker
- Only a few live switch components in the gas compartment
- Operating mechanism outside the gas compartment
 - Motor operated insulating spindle drives the moveable contact
 - Emergency manual operation optional with mechanical interlocking
 - Position detection by sensors or auxiliary switches
 - Mechanical position indicators

Advantages

- Circuit-breaker of higher quality than an earthing switch
- Higher number of switching cycles onto faults
- Causes no pollution of the SF₆ during switching operations



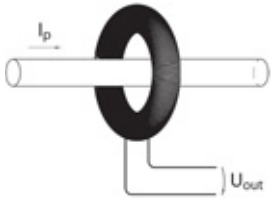
By merging 2 devices in a three position disconnector, mutual interlocking of the functions is integrated as part of the system and requires no further work.

Earthing by the circuit-breaker

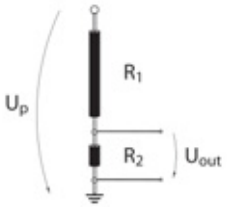
With lifelong freedom from maintenance and stationary mounting of the circuit-breaker, the opportunity arises to perform the most sensitive safety function in a panel with the highest quality device.

The peripherals.

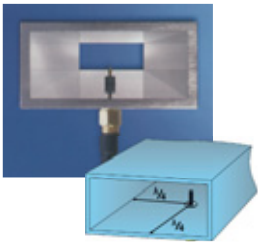
Innovations



Current sensor



Voltage sensor



Waveguide – a simple and reliable communication

It has been developed a simple and reliable wireless method of transmitting data in switchgear installations that is faster and easier to install and needs less maintenance than traditional cable-based switchgear communications.

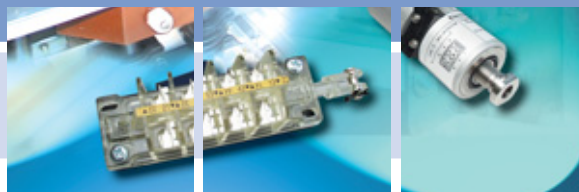
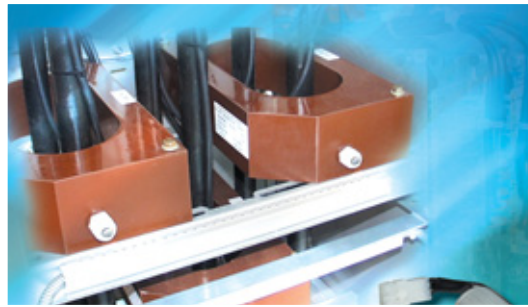
Control and operation via

- Multifunctional protection and control unit RE_ with dynamic single line diagram
- BCU (Bay Control Unit) with static single line diagram and illuminated LED bar position indicator
- Customized multifunctional device



Protection

- RE_ series cover everything from overcurrent protection to distance protection



Current/voltage detection

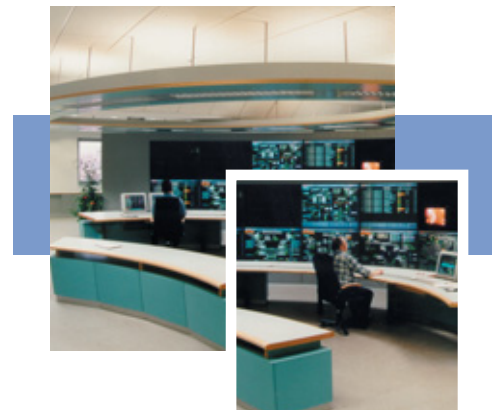
- Current transformers in the gas compartment
- Current transformers on cable
- Voltage transformers
 - fitted in air
 - shockproof
 - isolatable
- Sensors in the gas compartment
 - Rogowski coil and ohmic voltage divider

Connection to automation systems

Connection to a higher level automation system is possible, depending on the type of the protection and control device. Interfaces from SPA-Bus to IEC 61850 are available.

Communication

between panels or automation systems can be realised by accordingly equipped multifunctional protection and control units and waveguides through all panels.



Delivery

Complete panels

- Factory tested
- Individual panels as transport units
- With SF₆ at rated filling pressure
- Suitable for handling by crane or fork lift truck

Installation

- Easy and fast installation
- Suitable for room heights over 2.6 meters
- Erection on foundation frame or raised false floor
- Simple connection of panels via plug-in connectors
- Cable termination compartments with plug-in technology



Commissioning

- By trained skilled personnel
- Direct access to the conductors through a separate test socket is available for current and voltage tests on site
 - without removing the cable connection
 - without gas work
- Test socket can be used for cable tests or maintenance earthing

Inspection and maintenance

- No refill required under normal conditions due to sealed pressure system
- Gas compartments are maintenance-free under normal conditions
- Inspection predominantly comprises visual inspection and functional testing

In more than 40 years, ABB has acquired outstanding expertise in the design and construction of gas-insulated switchgear. ZX panels have been positioned successfully and reliably on the world market since 1995.

Technical Data.

Rated voltage	U_r	kV	12/17.5		
Maximum operating voltage		kV	17.5		
Rated power frequency withstand voltage	U_d	kV	28/38 ¹⁾		
Rated lightning impulse withstand voltage	U_p	kV	75/95		
Rated frequency	f_r	Hz	50/60		
Rated busbars current	I_r	A	...2500		
Rated feeder current	I_r	A	630	1250	...2500
Rated peak withstand current	I_p	kA	62.5	...80	...80
Rated short-time withstand current, 3s	I_k	kA	25	...31.5	...31.5
Rated short-circuit breaking current of circuit-breaker	I_{SC}	kA	25	...31.5	...31.5
Rated short-circuit making current of circuit-breaker	I_{MC}	kA	62.5	...80	...80
Rated operating sequence			O - 0.3 s - CO - 3 min - CO ²⁾		
Rated break-time		ms	approx. 60		
Closing-time		ms	approx. 60		
Insulating gas			SF ₆ ³⁾		
Rated filling level for insulation ⁴⁾	P_{re}	kPa	130	130	130
Alarm level for insulation ⁴⁾	P_{ae}	kPa	120	120	120
Minimum functional level for insulation ⁴⁾	P_{me}	kPa	100	100	100
Auxiliary voltage		V DC	60, 110, 220 ⁵⁾		
Degree of protection			IP 65		
High voltage live parts			IP 4X ⁶⁾		
Low voltage compartment					
Ambient temperature:					
Maximum value		°C	40		
Maximum value of 24 hour mean		°C	35		
Minimum value		°C	- 5		
Altitude for erection above sea level		m	...1000 ⁷⁾		
Dimensions:					
Height		mm	2100 ⁸⁾		
Depth		mm	1500	1300-1500	1800
Width		mm	2 x 400 ⁹⁾	600	800
Cable termination point:		mm	1250		

¹⁾ Higher values as per international standards on request

²⁾ Other sequences on request

³⁾ Insulating gas: sulphur hexafluoride

⁴⁾ All pressures stated are absolute pressures at 20°C; 100 kPa = 1 bar

⁵⁾ Other auxiliary voltages on request

⁶⁾ Higher values on request

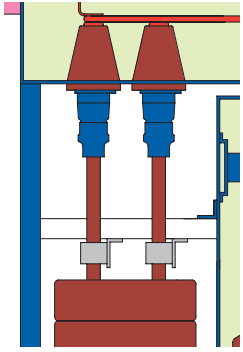
⁷⁾ Higher altitude on request

⁸⁾ Depending on panel features

⁹⁾ Double feeder panel

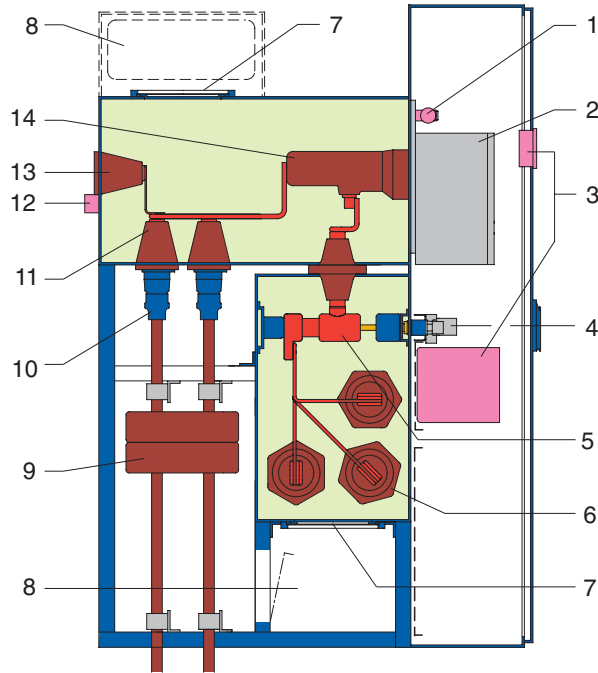
IEC Standard ratings				Special ratings			
24			36				
24			36			40.5	
50 ¹⁾			70			85	
125			170			185 ¹⁾	
50/60			50/60			50/60	
...2500			...2500			...2500	
630	1250	...2500	1250	...2500	1250	...2500	
62.5	...80	...80	...80			...80	
25	...31.5	...31.5	...31.5			...31.5	
25	...31.5	...31.5	...31.5			...31.5	
62.5	...80	...80	...80			...80	
O - 0.3 s - CO - 3 min - CO ²⁾			O - 0.3 s - CO - 3 min - CO ²⁾			O - 0.3 s - CO - 3 min - CO ²⁾	
approx. 60			approx. 60			approx. 60	
approx. 60			approx. 60			approx. 60	
SF ₆ ³⁾			SF ₆ ³⁾			SF ₆ ³⁾	
130	130	130	130			130	
120	120	120	120			120	
110	100	100	100			120	
60, 110, 220 ⁵⁾			60, 110, 220 ⁵⁾			60, 110, 220 ⁵⁾	
IP 65 IP 4X ⁶⁾			IP 65 IP 4X ⁶⁾			IP 65 IP 4X ⁶⁾	
40			40			40	
35			35			35	
- 5			- 5			- 5	
...1000 ⁷⁾			...1000 ⁷⁾			...1000 ⁷⁾	
1500	2100 ⁸⁾	1800	1300-1500	2100 ⁸⁾	1800	2100 ⁸⁾	
2 x 400 ⁹⁾	1300-1500	800	600	600	800	800	
1250			1250			1250	

Outgoing feeder, 1250 A



Cable termination compartment

The installation-friendly, 1.25 m high cable termination compartment accommodates the main earthing bar, the high voltage cables to be connected with their cable plugs fitted, cable mountings and, where appropriate, surge arresters.

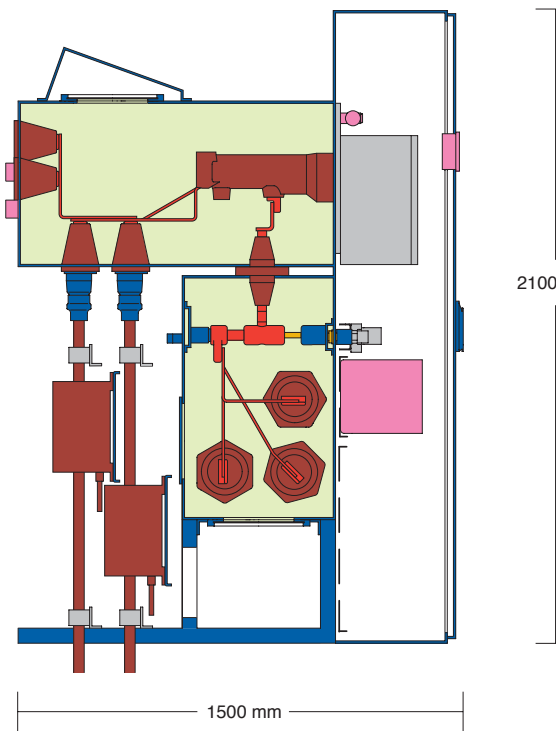


- 1 Density sensor
- 2 Circuit-breaker operating mechanism
- 3 Multifunctional protection and switchgear control unit
- 4 Three position disconnector operating mechanism
- 5 Three position disconnector
- 6 Busbar
- 7 Pressure relief disk
- 8 Pressure relief duct (optional)
- 9 Ring type current transformer
- 10 Cable plug
- 11 Cable socket
- 12 Measuring sockets for capacitive voltage indicator system
- 13 Test socket
- 14 Circuit-breaker

■ SF₆ Gas

Up to 24 kV and 25 kA, this variant features a feeder panel width of 400 mm – supplied as a double panel with a total width of 800 mm.

Double panels also leave the works as completely tested units, and are connected directly to the other ZX1.2 panels using our tried and tested plug-in technology without any additional gas work at site.



Properties

- Two 630 A feeders in one double panel
- Common busbar compartment for both outgoing feeders
- Separate circuit-breaker compartments
- Separate low voltage compartments
- Separate cable termination compartments
- Delivery unit: 2 feeders

Double panel with 2 outgoing feeders, 630 A each, up to 25 kA, 24 kV

Width of double panel 2 x 400 mm = 800 mm

Options

- 1 cables plus surge arrester per phase
- 2 cables per phase
- Mechanical interlocking of the switching devices for the feeder

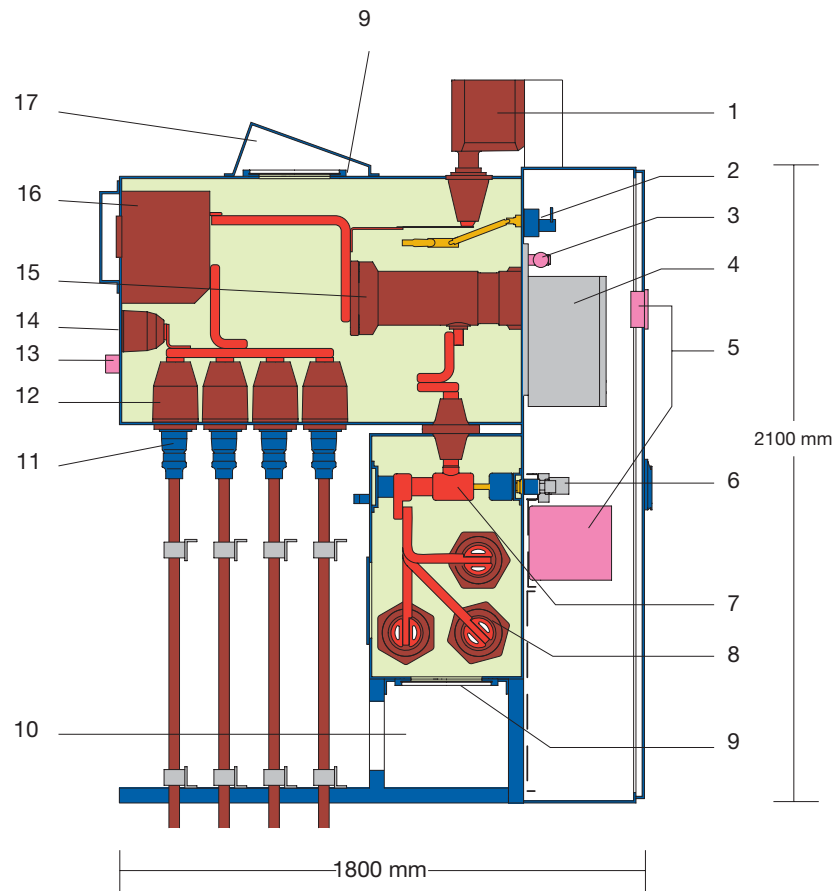


Incoming feeder, 2000 A



Combination sensor or current transformer

The standard block unit can be equipped with a complete combination sensor consisting of a Rogowski coil and ohmic voltage divider, with current transformer cores or with a combination of Rogowski coil and current transformer cores.

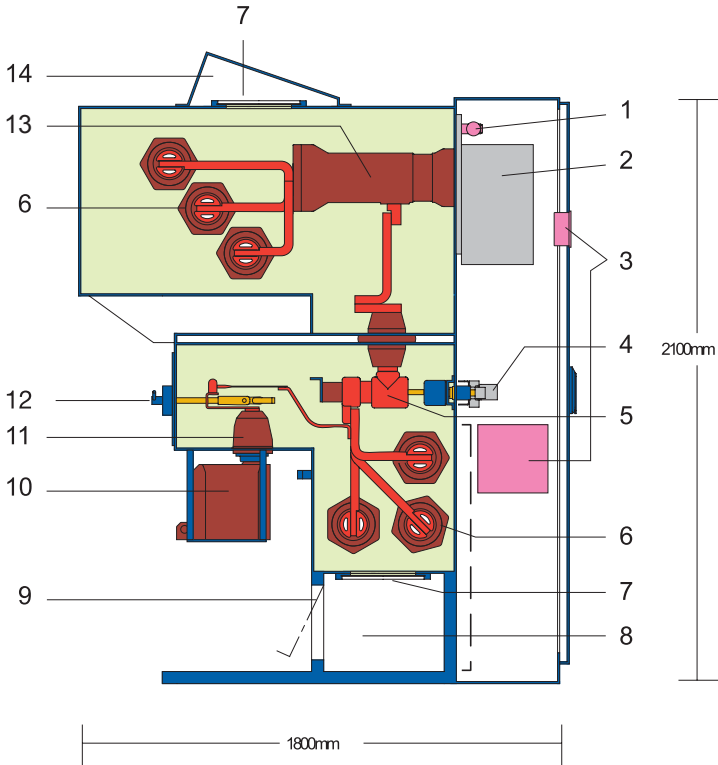


- 1 Plug-in voltage transformer
- 2 Disconnecting device for voltage transformers
- 3 Density sensor
- 4 Circuit-breaker operating mechanism
- 5 Multifunction protection and switchgear control unit
- 6 Three position disconnector operating mechanism
- 7 Three position disconnector
- 8 Busbar
- 9 Pressure relief disk
- 10 Pressure relief duct
- 11 Cable plug
- 12 Cable socket
- 13 Measuring sockets for capacitive voltage indicator system
- 14 Test socket
- 15 Circuit-breaker
- 16 Combined current and voltage sensor or current transformer
- 17 Plasma diverter
- SF₆

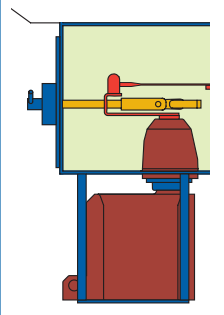
Bus sectionalizer and bus riser also with integrated metering

ZX1.2

Bus sectionalizer 2000 A

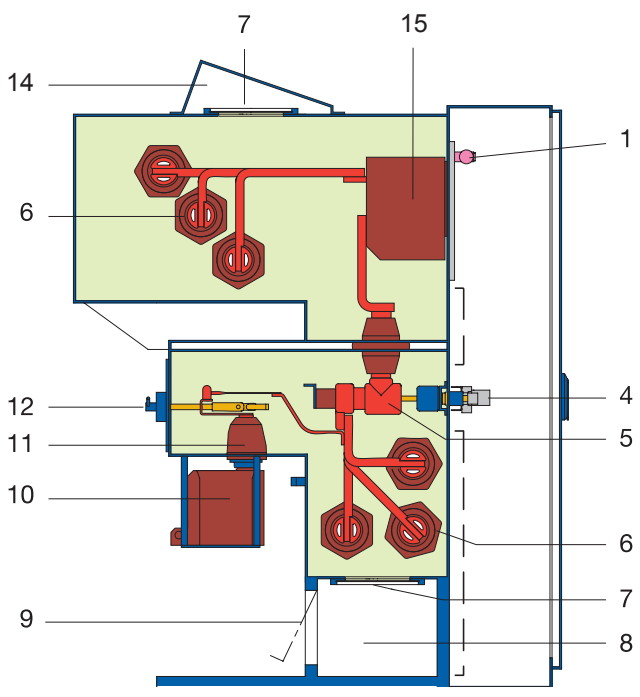


- 1 Density sensor
 - 2 Circuit-breaker operating mechanism
 - 3 Multifunction protection and switchgear control unit
 - 4 Three position disconnector operating mechanism
 - 5 Three position disconnector
 - 6 Busbar
 - 7 Pressure relief disk
 - 8 Pressure relief duct
 - 9 Pressure relief flap
 - 10 Plug-in voltage transformer
 - 11 Socket
 - 12 Disconnecting device for voltage transformers
 - 13 Circuit-breaker
 - 14 Plasma diverter
 - 15 Combined current and voltage sensor or current transformer
- SF₆



Integrated busbar metering
 The integrated metering system uses the space below the circuit-breaker or riser compartment and thus saves 2 panel widths for metering panels.

Bus riser 2000 A



Implementing customers' wishes.

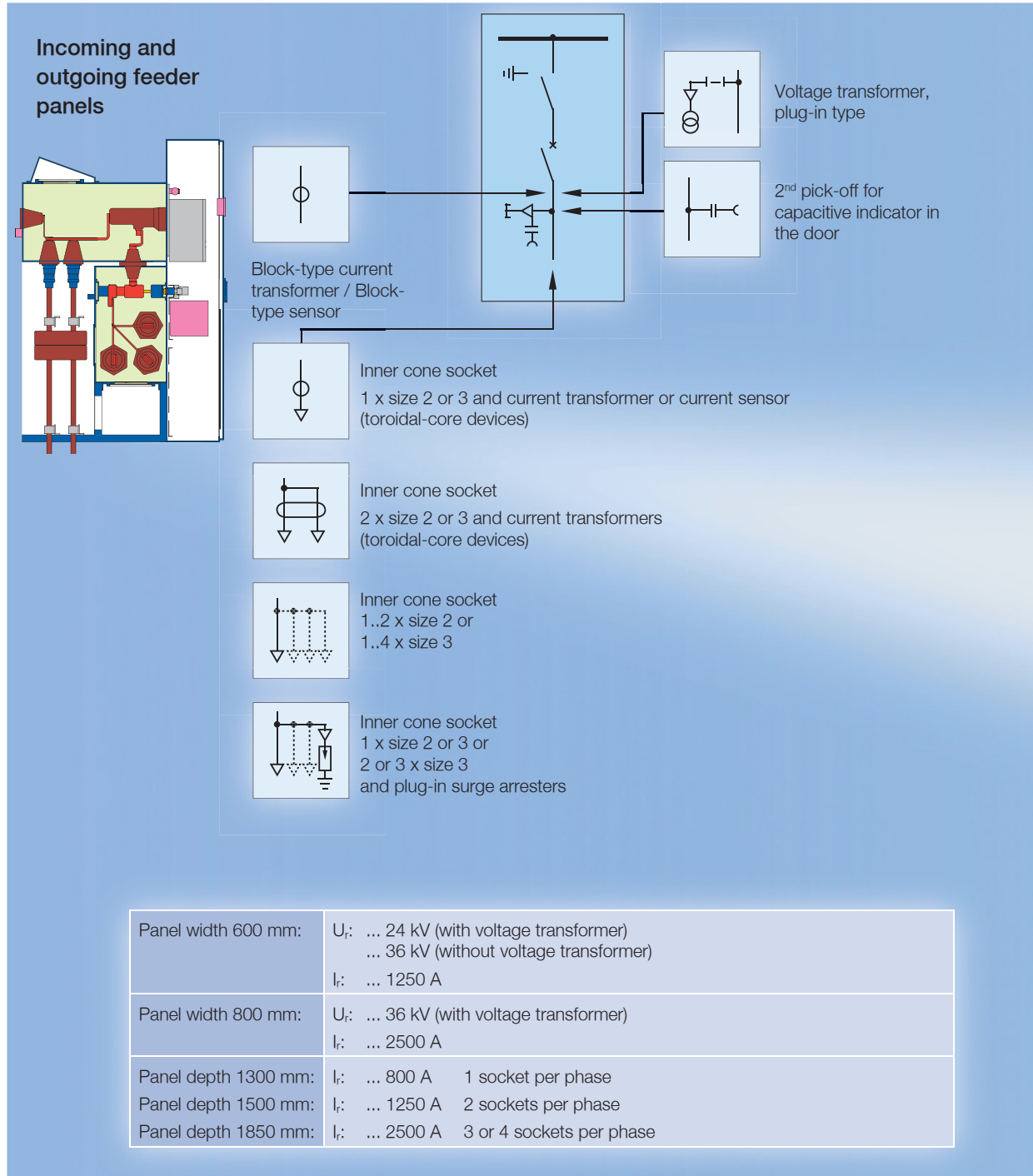


ZX1.2, successful in service with our customers:

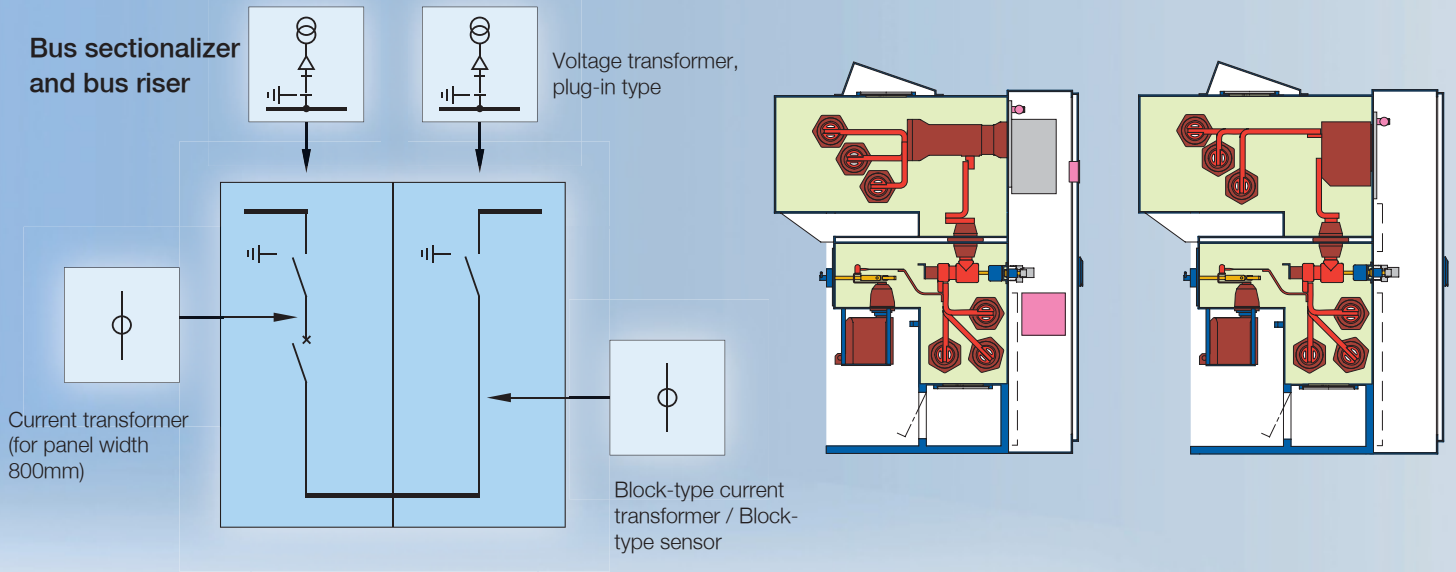
- BASF
- Bayer AG
- Ceylon Electricity Board
- Dow Chemical
- Dyckerhoff Zement
- e.on
- Electricidade de Mozambique
- Electricity Authority Cyprus
- Eneco
- ENEL
- Gold East Paper
- Hamerslay Iron
- Hidroelectra
- Mitsubishi
- MVV Energie AG
- Nan Ya Plastics
- Network Rail
- Northern Ireland Electricity
- OPEL
- PEA
- Petronas
- PUB
- RWE
- Shell
- StoraEnso
- ThyssenKrupp Nirosta
- TKN Krefeld
- Wacker Chemie
- Windpark Norderland

With the ZX1.2, all the variants of single busbar systems can be implemented.

ZX1.2 reflects the wishes of customers worldwide, no matter whether sensor systems or conventional instrument-transformers are installed. ZX1.2 always provides the right solution.

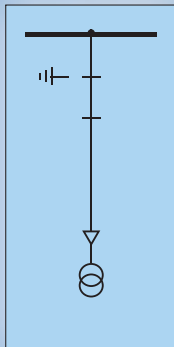


- Compact
- Flexible
- Universally usable
- Expandable
- Economical



Panel width 600 mm:	U _r : ... 24 kV (with voltage transformer) ... 36 kV (without voltage transformer) I _r : ... 1250 A
Panel width 800 mm:	U _r : ... 36 kV (with voltage transformer) I _r : ... 2500 A
Panel depth 1250 mm:	I _r : ... 1250 A (without voltage transformer)
Panel depth 1450 mm:	I _r : ... 1250 A (with voltage transformer)
Panel depth 1750 mm:	I _r : ... 2500 A

Metering panels



Panel width 600 mm:	U _r : ...24 kV
Panel width 800 mm:	U _r : ...36 kV
Panel depth 910 mm:	all variants

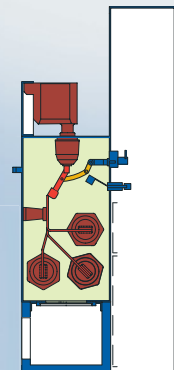




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