



# Gas-insulated medium-voltage switchgear

For the metal industry

Answers for energy.

**SIEMENS**



## Full power even under extreme conditions

All over the world, the demand for raw materials and energy is increasing dramatically. This development particularly hits the iron and steel producing industry, rolling mills, foundries and the aluminum industry. More companies, including those from newly industrialized countries, are pushing into this highly competitive market. Global competition forces enterprises to take measures to reduce their costs and raise productivity.

A cost-efficient and reliable electric energy supply contributes to productivity. In this respect, medium-voltage switchgear plays a significant role as an important node in the distribution network. This is where Siemens points the way. Operating with high efficiency and reliability, Siemens switchgear meets all requirements of the metal-working industry.





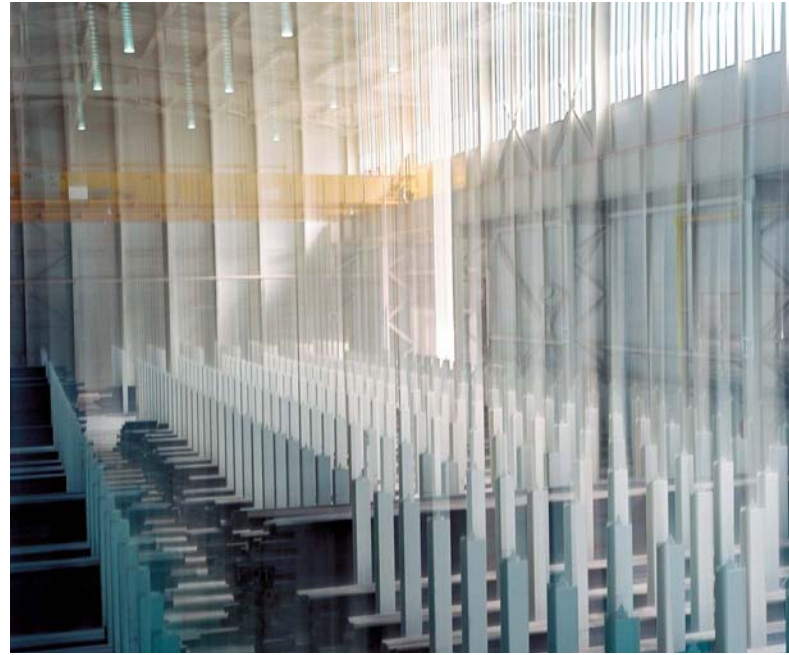
## Reliable

### **The challenge: maximum performance around the clock**

Energy supply for processes in metal facilities must operate reliably around the clock, as every outage has dramatic consequences and considerable follow-up costs brought by an outage. Even a short power failure could result in a standstill of a hot rolling mill. The partially-rolled slab would cool down in the rolling framework and would have to be removed with cutting torches. In the worst case, a power blackout could lead to the ruin of a blast furnace. The costs of such failures could even challenge the very existence of the whole iron works. This is why reliability is essential in medium-voltage switchgear in the metal industry.

### **The Siemens solution: reliable, proven technology**

With Siemens, you benefit from over 25 years of experience with gas-insulated medium-voltage switchgear and a degree of expertise only the market leader can provide. Siemens gas-insulated switchgear is designed for high reliability and availability.



## Robust

### **The challenge: reliable operation despite extreme environmental conditions**

The environmental conditions in iron and steel works, at smelting furnaces and in other metallurgic processes are extremely tough: the air contains dust and often also unbearably aggressive vapor; temperatures can by far exceed 122 °F (50 °C). Medium-voltage switchgear in metallurgic plants must withstand these continuous stresses for a long time and without difficulty.

### **The Siemens solution: protection from damaging environmental influences**

Reliable protection of the medium-voltage part of our gas-insulated medium-voltage switchgear is provided by a hermetically sealed primary enclosure and by insulation consisting of inert sulfur hexafluoride (SF<sub>6</sub>) gas. This makes the switchgear resistant to environmental effects such as humidity, saline air and dust, and also prevents ingress of small animals. Live parts of the primary circuit – busbar, three-position switch, vacuum circuit breaker, connecting bars, bushings and cable connection – fulfill the IP65 degree of protection.



## Integration compatible

### The challenge: integration of control and automation systems

Medium-voltage switchgear units are decisive network nodes and switching points in the complex power distribution networks of metal facilities. Therefore, they must be fully integrable in the control and automation environment of the complete system. The generator sets, for example, are started up or shut down by a power management system (PMS), which allows for load control of critical and non-critical consumers. Seamless interaction between the switchgear and the PMS is therefore indispensable.

### The Siemens solution: remote control and central monitoring

Siemens medium-voltage switchgear with Siemens protective relays can be fully controlled remotely – from the control room, as well as by the PMS. In connection with the combined protection and control devices, the switchgear panels can be integrated into power management systems and process control systems from different manufacturers.

## Efficient

### The challenge: maximum availability, minimum operating costs

Iron works, steel works, rolling mills, blast furnaces and electric arc furnaces need to operate continuously in order to achieve maximum efficiency. Each stoppage costs money. This is why maximum availability and a minimum need for maintenance are decisive quality criteria for medium-voltage switchgear used in the metals industry.

### The Siemens solution: high reliability and availability

Medium-voltage gas-insulated switchgear from Siemens features a sealed pressure system that minimizes the maintenance needed, even under tough operating conditions. Under normal operating conditions, types 8DA10 and 8DB10 equipment are designed to require opening of the gas enclosure at 20-year intervals. This allows for reduced operating costs and a higher return on investment.





## Durable

### The challenge: particularly high switching rates

The operation of electric arc furnaces places high demands on the supplying medium-voltage switchgear. High and intermittent inductive currents must be conducted and switched many times a day as requested by the process. The switching devices used must therefore feature a high number of operating cycles to ensure trouble-free and cost-efficient continuous operation. Similar demands on the switching rates of medium-voltage switchgear devices are made by the drives of compressors, boosters or conveyor systems, for example.

### The Siemens solution: vacuum switching technology

Circuit breakers from Siemens are exclusively equipped with vacuum interrupters. These extremely durable devices allow for up to 30,000 making and breaking operations. The operating mechanisms of the switching devices are located outside the medium-voltage area of the equipment. They are accessible from outside without reaching into the medium-voltage enclosure, and they can be inspected without interfering with operation.

## High performance

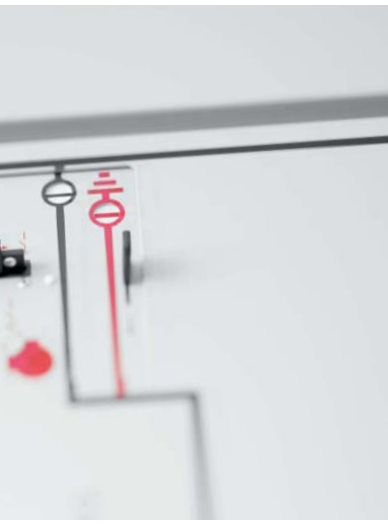
### The challenge: safe control of high currents

The metal industry requires extremely high-performance levels: total facility load of up to 300 MW is not unusual. In this respect, medium-voltage switchgear is particularly important to ensure smooth running processes, as it has to control and distribute enormous amounts of energy reliably. Distribution occurs at rated voltages between 4 kV and 34.5 kV, whereby the switchgear must be able to control extremely high short-circuit currents and continuous currents safely.

### The Siemens solution: a wide product range

Siemens offers a comprehensive range of gas-insulated medium-voltage switchgear. Whatever the requirements, there is almost certainly a suitable type of Siemens switchgear to meet them:

- **NXPLUS C**  
up to 15 kV, up to 31.5 kA, up to 2,500 A  
up to 24 kV, up to 25 kA, up to 2,500 A  
circuit breakers up to 2,500 A  
contactors up to 450 A
- **8DA10**  
up to 40.5 kV, up to 40 kA, up to 5,000 A  
circuit breakers up to 2,500 A.



Type NXPLUS C switchgear  
up to 15 kV, up to 31.5 kA, up to 2,500 A  
up to 24 kV, up to 25 kA, up to 2,500 A

## Type NXPLUS C - Superior technology for demanding tasks

High availability, low-maintenance, compact, robust: gas-insulated medium-voltage switchgear type NXPLUS C from Siemens provides a reliable solution, even under extreme conditions. A unique, hermetically welded stainless steel switch enclosure, vacuum switching technology and a digital protection system make it independent from environmental conditions and result in low maintenance and long life. On top of that, the SF<sub>6</sub> insulation enables an extremely compact construction.

The result: minimum operating costs, high performance and highest reliability in every respect.

### Reliability:

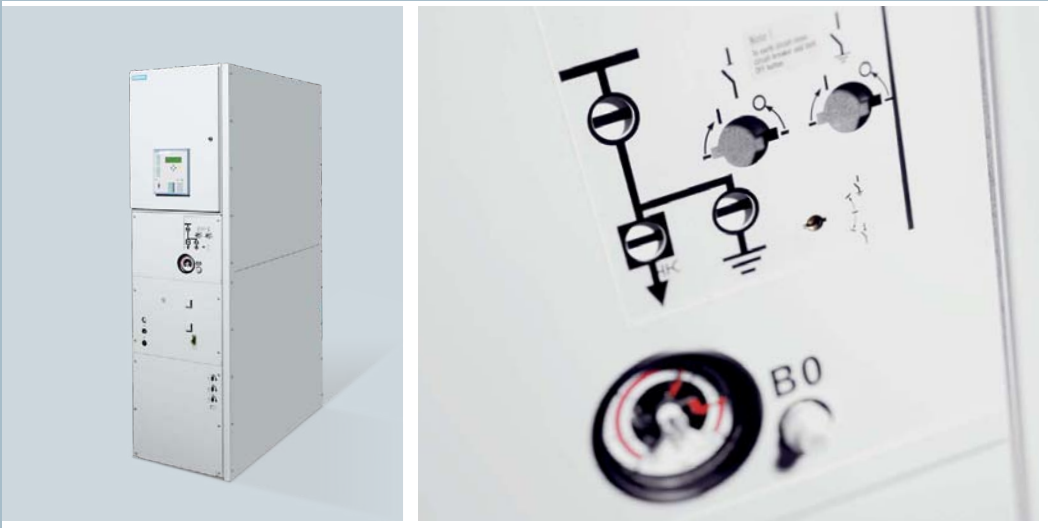
- Type and routine tests in accordance with IEC 62271-200
- Standardized, numerically controlled production processes
- Experience with more than 100,000 installed panels of all types
- Quality assurance in accordance with DIN EN ISO 9001.

### Operational safety:

- Hermetically welded stainless steel switch enclosures
- Low-maintenance operating mechanisms
- Optimum accessibility of current and voltage transformers
- Complete logical mechanical interlocks
- Minimum fire load.

### Personal safety:

- Safe-to-touch and hermetically welded primary enclosure
- Design tested for resistance to internal arcing faults
- Metallic partitions between switching device, cable termination area and main bus area
- Logical mechanical interlocks and capacitive voltage detecting system
- IP65 degree of protection for the high-voltage element.



Type 8DA10 switchgear  
up to 40.5 kV, up to 40 kA, up to 5,000 A

## Type 8DA10 - Superior technology for demanding tasks

High availability, low-maintenance, compact, robust: gas-insulated medium-voltage switchgear type 8DA10 from Siemens provides a reliable solution, even under extreme conditions. A unique, hermetically sealed pressure system in a corrosion-resistant aluminum alloy vessel, vacuum switching technology and a digital protection system make the high-voltage elements independent from environmental conditions and provide low maintenance operation for life. On top of that, the SF<sub>6</sub> insulation enables an extremely compact construction.

The result: minimum operating costs, high performance and highest reliability in every respect.

### Reliability:

- Type and routine tests in accordance with IEC 62271-200
- Standardized, CNC production processes
- Experience with more than 55,000 installed panels globally
- Quality assurance in accordance with DIN EN ISO 9001.

### Operational safety:

- Hermetically sealed switchgear housings
- Permanently low-maintenance operating mechanisms
- Optimum accessibility of current and voltage transformers
- Complete logical mechanical interlocks
- Minimum fire load.

### Personal safety:

- Safe-to-touch and hermetically sealed primary enclosure
- Design tested for resistance to internal arcing faults
- Single-phase (isolated-phase) construction eliminates phase-to-phase faults inside switchgear
- Logical mechanical interlocks and capacitive voltage detecting system
- IP65 degree of protection for the primary part.

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