



# Gas-insulated medium-voltage switchgear

for marine and offshore applications

Answers for energy.

**SIEMENS**



8DH10 switchgear  
up to 24 kV, up to 20 kA, up to 1,250 A  
up to 17.5 kV, up to 25 kA, up to 1,250 A

## Full power on the high seas

So much is for sure: whatever happens on the surface and the ground of the oceans and the seas has a decisive influence on our economy. Maritime navigation is the backbone of the international trade flows. Global economy and intercontinental exchange of goods on a large scale would be unthinkable without modern maritime navigation. Offshore technologies are equally significant for our economy, as they enable the extraction of mineral resources on the high seas.

Working conditions at sea are often harsh and inhospitable. Therefore, it is absolutely necessary for the technology in use to be safe and reliable, in the tropics as well as in the Arctic and the Antarctic.

Safe operation is secured by a reliable and consistent energy supply. This is where the gas-insulated medium-voltage switchgear from Siemens points the way. Compact, maintenance-free and climate-independent, our switchgear performs reliably even under extreme conditions. This makes it ideally suited for offshore and marine applications, as absolute operational safety and maximum performance on minimum space are essential on the high seas.



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

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

## Superior technology for demanding tasks

Highly available, maintenance-free, compact, robust: Gas-insulated medium-voltage switchgear from Siemens provides a convincing solution, even under the most extreme conditions. A worldwide unique, hermetically welded pressure system in a stainless-steel vessel, vacuum switching technology, and a digital protection system make it independent from environmental conditions, and provide maintenance-free operation for life. On top of that, the SF<sub>6</sub> insulation enables an extremely compact construction.

The result: minimum operating costs, maximum performance, and highest safety in every respect.

### Approvals,

for example, NXPLUS C:

- Lloyds Register of Shipping (LRS)
- Det Norske Veritas (DNV)
- Germanischer Lloyd (GL)

### Reliability

- Type and routine tests in accordance with IEC 62271-200
- Standardized, NC production processes
- Experience from more than 100,000 installed panels
- Quality assurance in accordance with DIN EN ISO 9001

### Operational safety

- Hermetically welded switchgear vessels
- Permanently maintenance-free 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 faults, metallic partitions, logical mechanical interlocks and capacitive voltage detecting system
- IP65 degree of protection for the primary part





## Reliable

### The challenge: maximum performance around the clock

Energy supply on board ships and platforms must operate with absolute reliability around the clock, as every outage has dramatic consequences. A blackout on a dynamically positioned platform, for example, would force the platform to abandon the drill pipe. This would lead to enormous material damage, and to a great loss of precious time. Therefore, absolute reliability is the first and foremost requirement for switchgear on ships and platforms.

### The Siemens solution: extremely reliable technology

With gas-insulated medium-voltage switchgear from Siemens you benefit from 25 years of experience and a degree of expertise only the market leader can provide. The probability of an outage is reduced to the absolute minimum, which means maximum reliability and availability.

## Robust

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

Ships and platforms are in operation all over the world, in the tropics as well as in the polar sea – mostly under extremely rough conditions. The high air humidity at sea and the air salinity cause exceedingly fast corrosion, for example, and extreme temperatures put the materials to severe tests. The switchgear must withstand such permanent stress for a long time and without difficulty.

### The Siemens solution: consistent exclusion of damaging environmental influences

Reliable protection of the high-voltage part of our gas-insulated medium-voltage switchgear is provided by a hermetically sealed primary enclosure and by an insulation consisting of inert sulfur hexafluoride. This makes the switchgear resistant to environmental effects such as humidity, saline air and dust, but 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.



## Stress-resistant

**The challenge: maximum operational safety, even under oscillations and impacts**

Switchgear on ships and platforms is constantly subjected to oscillations and vibrations caused by running aggregates and propellers. At rough sea, the equipment is also affected by considerable horizontal and vertical accelerations – a real test for the dielectric strength of the switchgear, the solidity of the SF<sub>6</sub> enclosure, and for all mechanical components. Even so, the switchgear must be able to operate reliably at all times.

**The Siemens solution: intelligent engineering and consistent testing**

We use only hermetically welded stainless-steel vessels or single-pole enclosed cast light alloy housings for our medium-voltage switchgear. Fixed installation of all components eliminates the need for moving contacts, as they would be exposed to exceptional stress by vibration. A computer-controlled three-dimensional copper bending technique minimizes the number of screwed connections; the use of three-position switches as busbar disconnectors, as well as of feeder earthing switches, additionally contributes to the reduction of moving parts. To provide the highest degree of safety, all our switchgear is thoroughly and comprehensively tested before delivery.

## Compact

**The challenge: individual adjustment to all space requirements**

On ships and platforms, the available space is very limited and must be used as efficiently as possible. That is why switchgear is often installed in corners and nooks. Space-saving installations ask for a compact construction and minimum dimensions, without compromising on the safety of the switchgear.

**The Siemens solution: modular and compact construction**

Medium-voltage switchgear from Siemens provides the ideal solution for installations in confined spaces. Thanks to modular design and small dimensions, our switchgear can be flexibly adapted to situations where space is limited. It goes without saying that no compromises are made regarding safety. The protection against accidental contact and a maximum resistance to internal faults offer a high degree of personal safety.



## Integratable

### The challenge: perfect integration in control and automation systems

Medium-voltage switchgear units on board ships and platforms are decisive network nodes. Therefore they must be fully integratable 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 important and unimportant consumers. Seamless interaction between the switchgear and the PMS is therefore indispensable.

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

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

## Durable

### The challenge: particularly high switching rates

Supplying power for ships and offshore platforms is extremely demanding, as the operating conditions at sea are considerably different from those on shore. For example, the switching rate of generators or drives is significantly higher. Medium-voltage switchgear used at sea must feature a high number of operating cycles to ensure trouble-free and cost-efficient continuous operation.

### The Siemens solution: vacuum switching technology

Circuit-breakers and contactors from Siemens are exclusively equipped with vacuum interrupters. These extremely durable devices allow for up to 500,000 failure-free making and breaking operations. The operating mechanisms of the switching devices are located outside the high-voltage part. They are accessible from outside without reaching into the enclosure, and they can be inspected without interfering with operation.



## Efficient

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

For ships, laytime is not only unproductive, it also produces costs. Offshore platforms must extract mineral resources with as few interruptions as possible in order to operate cost-efficiently. Each standstill costs money. That is why a minimum need for maintenance is a decisive quality criterion for medium-voltage switchgear used in marine applications.

### The Siemens solution: highest reliability and availability

Medium-voltage switchgear from Siemens features a sealed pressure system, which makes the equipment maintenance-free, even under the hardest possible operating conditions. This allows for reduced operating costs and a higher return on investment.

## Highly performant

### The challenge: safe control of high currents

On more and more ships and dynamically positioned platforms, energy is increasingly generated diesel-electrically. This means that, given a certain number of electrical traction motors and thrusters, power ratings can quickly reach two-digit megawatt figures for propulsion alone. An appropriate number of diesel or gas turbine generators are therefore needed on board. The medium-voltage switchgear must reliably switch and distribute the total generated amount of energy – at voltage ratings up to 13.8 kV and current ratings up to 2,000 A.

### The Siemens solution: a wide product range

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

- **8DH10**  
up to 17.5 kV, up to 25 kA, up to 1,250 A  
up to 24 kV, up to 20 kA, up to 1,250 A
- **NXPLUS C**  
up to 15 kV, up to 31.5 kA, up to 2,500 A  
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- **8DA10**  
up to 40.5 kV, up to 40 kA, up to 5,000 A

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Siemens AG  
Energy Sector  
Freyeslebenstrasse 1  
91058 Erlangen, Germany

Siemens AG  
Energy Sector  
Power Distribution Division  
Medium Voltage  
Mozartstrasse 31 c  
91052 Erlangen, Germany

For more information, please contact  
our Customer Support Center.  
Phone: +49 180 524 70 00  
Fax: +49 180 524 24 71  
(Charges depending on provider)  
E-mail: [support.energy@siemens.com](mailto:support.energy@siemens.com)

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