



 BROCHURE

# **Products and Solutions for the evolution of direct current systems**

## Marine Applications

# Empowering your success

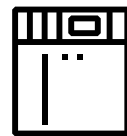
At ABB, we are committed to addressing the world's energy challenges. We are leading the development of high-quality solutions for Direct Current (DC) power, pushing boundaries to bring to market breakthrough products which deliver more for our customers.

These include the first fully-integrated circuit breaker with embedded DC protection and the first switch-disconnector designed specifically for DC applications. More recently, we introduced our revolutionary solid-state circuit breaker concept, which meets the highest demands of next-generation power applications as they enter the digital age.

## Our Direct Current offering



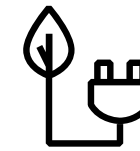
**Solid state circuit-breaker**  
Knowledge and breakthrough technology to support you



**Widest DC portfolio**  
On the market



▶ **Safety and protection**  
With the widest DC portfolio on the market to protect people and equipment to support safety in the most productive way.



▶ **Maximum efficiency**  
Whether it is through lower energy consumption, improved power management or better material, improving energy efficiency is a core competence for ABB.



▶ **Increased productivity**  
At ABB, we are committed to addressing the world's energy challenges. We are leading the development of high quality solutions for DC power, ensuring increased productivity to your business.



## Marine

GENERAL

### General

The role of direct current (DC) in the marine industry is maturing, driven by the need for improved sustainability and the potential for greater energy and fuel savings.

At ABB, we are perfectly positioned to support all marine stakeholders with high-quality DC solutions. Our portfolio, the widest on the market, is comprised of breakthrough products that deliver more for our customers.

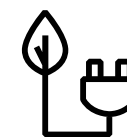
We'll work together with you to select the right solutions for maximum efficiency, minimum emissions, continuous operation, and enhanced safety and protection.

#### DC advantages



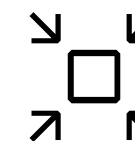
##### Continuous operation

Enhance the performance of your vessels thanks to our reliable solutions that ensure continuous operation and efficiency.



##### Minimize environmental impact

Strike your sustainability targets while meeting the latest energy regulations thanks to our solutions that enable 20% of fuel savings and reduce CO2 and NOx emissions.



##### Space savings

Save up to 40% of space for electrical equipment and increase the space for payload thanks to our compact, light, and easy-to-install Low Voltage Direct Current solutions.

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## Overview





## Marine

OFFERING [Miniature Circuit Breakers](#) | | | | |

### Offering: Miniature Circuit Breakers

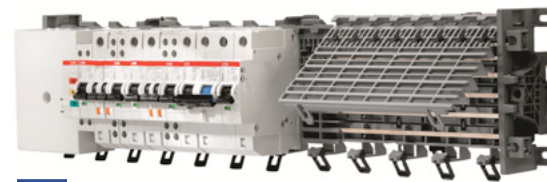


#### S200 M UC range

ABB's Universal Current MCB for DC and AC applications

The S200 M UC range of miniature circuit-breakers features permanent magnets on the internal arcing chutes able to extinguish an electric arc of up to 500 V DC with  $I_{cu} = 10 \text{ kA}$ , thus ensuring flexible control of both direct and alternating currents. Ideal for industry application because of the high breaking capacity of 10 kA.

System Voltage	Current ratings
up to 500 VDC	up to 63 A



#### SMISSLINE TP

Smisline TP is a pluggable socket system that allows load-free devices and components to be plugged on and off under voltage with no need for additional personal protective equipment to guard against electrical hazards.

S400 M UC MCB for a direct current pluggable solution on the socket system.

System Voltage	Current ratings
up to 440 VDC	MCCB up to 250 A MCB up to 63 A



#### S800S-UC AND S804U-UCZ

Non polarized high performance Direct Current MCB with breaking capacity of 50kA and 10kA respectively, are suitable in a wide range of DC applications

System Voltage	Current ratings
up to 1000 VDC	up to 125 A



## Marine

OFFERING

| [Breakers](#) |

### Offering: Breakers



**SACE Infinitus Solid State Circuit Breaker**  
A technological breakthrough by ABB, enables novel DC systems architectures by the ultimate protection of people and assets thanks to the ultrafast fault interruption. Thus it facilitates the sustainable energy transformation in marine applications.

System Voltage	Current ratings
up to 1000 VDC	2500 A



**SACE Tmax T**  
A complete range of moulded case circuit-breakers.

All the circuit-breakers, both three-pole and four-pole, are available in the fixed version; sizes T4 and T5 in the plug-in version and T4, T5, T6 also in the withdrawable one.

System Voltage	Current ratings
up to 1000 VDC	250-800 A

Type	System Voltage	Current ratings
T4N-PV/E	up to 1500 VDC	250 A



**SACE Tmax XT**  
The SACE Tmax XT series of Moulded Case Circuit Breakers (MCCBs) are designed to maximize ease of use, integration and connectivity while reliably delivering safety and quality. With three different sizes from XT4 to XT6, the range ensures the best reliability and protection up to 1600 A.

System Voltage	Current ratings
500-750 VDC Range	up to 800A



**SACE Emax DC Low voltage Direct Current air circuit breaker**  
SACE Emax DC is able to protect a DC plant up to 5000 A at 1000 V DC with integrated electronic trip units, including measuring and communication functions.

System Voltage	Current ratings
up to 1000 VDC	800-5000 A Range



**SACE Tmax VF and Emax VF for Variable Frequency applications**  
The main advantage of these ranges of circuit breakers is the optimal protection of generators and users against overload and short-circuit over the whole range of frequencies, from 1 to 200Hz.

System Voltage	Current ratings
up to 1000 VDC	5000 A



## Marine

OFFERING

| [Switch-disconnectors](#) |

1 2

### Offering: Switch-disconnectors

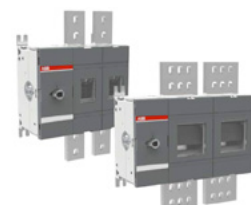


#### OTDC Switch-disconnectors 16...1000A

If operation under load is required, OTDC switch-disconnectors have a robust and high switching performance from 16A to 1000A, up to 1500 Vdc. The utilization categories covered are from DC-21B up to DC-22B and DC-PV2. OTDC Switches allow multi-circuit switching with a small footprint. Electrical interlock available as an accessory.

OTDC Switches have a high I<sub>cw</sub> up to 63kA, and have been tested with fuses up to 100kA. They are certified according to DNV GL.

System Voltage	Current ratings
up to 1500 VDC	up to 1000 A



#### OT Disconnectors 1600...4000A

OT disconnectors are suitable for applications in DC-20/AC-20 utilization category that do not require operation under load and where reliable isolation is needed. OT Disconnectors have a high I<sub>cw</sub> up to 100kA and impressive max. let-through peak currents. An electrical interlock enables safe operation for users.

OT disconnectors are certified according to the DNV GL.

System Voltage	Current ratings
up to 1500 VDC	up to 4000 A



#### Manual and motor operated OT Switch-disconnectors 16...1250A

OT switch-disconnectors are designed, built and tested for the best possible performance for utilization categories from DC-20 up to DC-23A. They are designed to be virtually maintenance-free across their entire extended lifespan and offer reliable performance in any and all possible circumstances. Durability has been ensured by testing switches against the IEC60947-3, UL508, UL98 and CSA standards.

They are certified according to DNV GL.

System Voltage	Current ratings
up to 1000 VDC	up to 1250 A



#### Manual and Motorized Change-over switches 16...3200A

Manually and remotely operated change-over and bypass switches from 16 to 3200 Amperes range for utilization categories from DC-20 up to DC-23A. A marine certified range of products available for demanding applications such as secondary source transfer, load transfer or any critical component maintenance bypass arrangement.

System Voltage	Current ratings
up to 1000 VDC	up to 3200 A



## Marine

OFFERING

| [Switch-disconnectors](#) |

1 2

### Offering: Switch-disconnectors



#### Tmax XT Breaker based switch-disconnectors

A based switch-disconnectors allows remote trip, remote operations and a full offers of accessories.

System Voltage	Current ratings
up to 750 VDC	up to 1250 A



#### Tmax T and Emax Breaker based switch-disconnectors

A based switch-disconnectors allows remote trip, remote operations and a full offers of accessories.

System Voltage	Current ratings
up to 1000 VDC	up to 6300 A



#### SACE Tmax T for special applications

The SACE Tmax PV range of switch-disconnectors for photovoltaic applications offers an increasingly comprehensive, leading-edge solution that anticipates the market trends.

System Voltage	Current ratings
up to 1500 VDC	1600 A



#### Emax 2 switch disconnecter

SACE Emax 2 MS/DC-E is the new Air Switch-disconnector at 1500V DC, available with IEC, UL and CCC approvals.

The E4.2 MS/DC can manage up to 1500V DC and 4000 A, with short-time withstand current (Icw) up to 100 kA.

System Voltage	Current ratings
up to 1500VDC	4000 A



## Marine

OFFERING

| [Switch-Fuses and Fusegear](#) |

### Offering: Switch-Fuses and Fusegear



#### Fuse bases OFA\_ 160...630A

The fuse bases can be used in combination with NH fuse-links according to IEC 60269-2 and DIN VDE 0636-2 and solid links for DC-20 applications.

Fuse bases offer a compact and simple solution for protection against short-circuit and over-currents. Fuses as protective elements are characterized by galvanically silver plated contacts providing reliable and high performing contact characteristics. OFAZ and OFAX fuse bases are available as open types or fully protected IP20 versions.

System Voltage	Current ratings
up to 1000 VDC	up to 1250 A



#### Manual operated OS Switch fuses 16...1250A

OS switch fuses offer a world-class performance for demanding marine applications. The OS range includes switch fuses from 16 to 1250 Amperes for utilization category from DC-20 to DC-23A, available for most common fuses: DIN, BS, NFC, CC, JJ and L types.

OS switch fuses are DNV GL Marine certified and come with a wide range of different accessories such as interlocking and fuse monitoring devices.

System Voltage	Current ratings
up to 1000 VDC	up to 1250 A



#### EasyLine - XLP Fuse switch-disconnectors 160...630A

EasyLine range of fuse switch-disconnectors ensures high protection and reliable operation from 160A to 630A for utilization category DC-22B. Variants up to 440Vdc are available as 1- or 2-pole design.

System Voltage	Current ratings
up to 440 VDC	up to 630 A



#### SlimLine XR Gold (XRG) 125...630A

The SlimLine XRG, switch-disconnector fuse drives exceptional energy efficiency, reducing temperature rise and enabling higher performance across the panel board. For utilization categories from DC-21B to DC-23B.

System Voltage	Current ratings
up to 500 VDC	up to 630 A



## Marine

OFFERING

| [Contactors](#) |

### Offering: Contactors



BV, ABS, DNV, Lloyds available for GF Contactor

#### Contactors for DC switching

For a compact and efficient way of DC switching GF, GAF and GA contactors are specifically designed for switching DC circuits up to 1500 V. Thanks to the efficient breaking of DC circuits, the product range is one of the most compact on the market.

Type	System Voltage	Current ratings
GF	up to 1500 VDC	875-1325 A Range
GAF	up to 1000 VDC	250-2050 A Range
GA	up to 1000 VDC	35-120 A Range



#### Motor protection and control

ABB's standard AF contactor range can also be used for switching DC from 850 V DC and below. To keep it running, you need Control ABB's motor protection and control offering is among the widest on the market our comprehensive range of motor starting solutions, products and services delivers the certainty of consistent quality and performance.

System Voltage	Current ratings
220-850 VDC Range	16-2650 A Range



#### Installation contactors

ABB's hum-free installation contactor designs offer a wide range of ratings from 16 A to 100 A. Widely used in buildings for switching and controlling lighting, heating, ventilation, motor and pumps, the installation contactors take noise reduction to a new level. With an innovative AC/DC design that eliminates hum, a selection of tool-free accessories as well as manual and automatic versions.

System Voltage	Current ratings
up to 220 VDC	up to 100 A



#### Contactor relays for auxiliary circuit switching

ABB's contactor relays offering features products of technological advancement as well as products with specific purposes. NF contactor relays allow use in all parts of the world and in all network conditions. The mini contactor relays range offer various contact combinations and specific connection possibilities. The AS contactor relays are efficient and allow you to optimize your equipment design applications.

System Voltage	Current ratings
up to 600 VDC	up to 1 A



## Marine

OFFERING

Electronic Relays and Controls

### Offering: Electronic Relays and Controls



**CP-C.1 & CP-S.1 power supplies**  
 ABB's high-performance ranges - universal CP-C.1 power supplies for demanding industrial applications and automation CP-S.1 power supplies. Delivering high efficiency, high reliability and innovative functionality. These advanced ranges of power supplies have an integrated power reserve of up to 150% continuously, respectively for 5s with the CP-S.1 range and operate at an efficiency of up to 94 %.

System Voltage	Current ratings
Input: CP-C.1: 90-300VDC	5 A/10 A/20 A
Input: CP-S.1: 100-277 VDC	3A/5 A/10 A/ 20 A/40 A
output: 24 VDC	



**CP-B power supplies**  
**Ultracapacitor-based buffering units**  
 ABB's ultra-capacitor based CP-B buffer modules serve to ensure a shortterm uninterrupted power supply system with a voltage of 24 V DC by buffering the load in case of power loss.

The buffer modules feature a new technology of storing energy by using ultra-capacitors which entirely obviate the need for maintenance and exempt deep discharge in comparison to batteries.

System Voltage	Current ratings
Input: 24 V DC	3 A / 10 A / 20 A
output: 24 VDC	



**Insulation monitoring relays for IT systems**

ABB's CM-IWx insulation monitoring relays for IT systems provide continuous, reliable monitoring. The devices recognize insulation faults as they develop, tripping as soon as the value falls below minimum set thresholds. This makes systems more reliable and prevents interruptions caused by severe secondary insulation faults. Make your monitoring more secure and your maintenance smarter with CM-IWx insulation monitoring relays.

System Voltage	System leakage capacitance
up to 1500 VDC	monitoring up to 3000 µF

Marine certification up to 1000 VDC monitoring up to 20 µF



**Voltage and current monitoring relays**

ABB's CM range offers a wide selection of powerful, compact devices for the monitoring of currents and voltages in single-phase AC/DC systems. All come in a housing that is just 22.5 mm wide. This product range includes current and voltage monitoring relays for over- and undercurrent protection, over- and undervoltage protection and phase loss monitoring – from 3 mA to 15 A and from 3 V to 600 V. ABB's CM range gives your electric installation the highest safety and reliability.

System Voltage	Current ratings
up to 600 VDC	Up to 15 A direct



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