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**ABB SACE Infnitus**  
Get the Infinite Perspective



# Content





# What does your grid of the future look like?

**Whether you're working in infrastructure or e-mobility, designing for buildings or marine vessels for the future, the question of sustainable power distribution is one being asked on a global scale.**

As industry collectively works towards carbon neutrality, the need for electrification has accelerated. New, highly efficient direct current (DC) solutions have become key to powering the future, integrating battery storage and renewables into the grid and increasing overall energy efficiency. The possibilities seem infinite. But there is a key challenge: meeting modern DC applications' stricter demands requires circuit breakers with advanced power protection technology.

Enter ABB's revolutionary new concept: ABB SACE Infnitus - the world's first solid-state, IEC 60947-2 certified circuit breaker. Founded in over a century of experience in electrical innovation, it's designed to help you build the energy solutions of tomorrow.

**Are you ready to define the future of electrical distribution?**

**Let's explore the Infnitus perspective.**



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# Meet ABB SACE Infnitus

**The world's first IEC 60947-2 certified solid-state circuit breaker**

Designed to help meet your sustainable electrical distribution challenges, ABB SACE Infnitus goes way beyond maximizing system efficiency, service continuity and cost-savings.

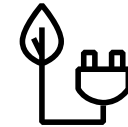
The compact all-in-one design provides, ultrafast protection for DC networks up to 1kVDC. The result? A seismic shift in sustainable electrical distribution.

**Click on the areas below to find out more**



**Optimize availability**

**1000X faster**  
**fault clearance** than  
traditional breakers



**Drive sustainability**

With **best-in-class**  
**resiliency** for your  
DC system



**Maximize efficiency**

**70% less power loss**  
than other solid-state breaker

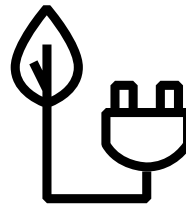
# The Infinitus possibilities

Enabling sustainable DC architecture

## Drive sustainability

Up to  
**20%** energy  
savings

when you switch from AC to DC.



**Reduced cost of ownership**

thanks to smaller footprint, integrated monitoring and lower losses than any other solid-state breaker.

**Enable large MW battery storage and EV charging**

with power flow control and effective management of high, fast-rising DC currents.

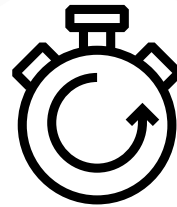
## — Optimize availability

**Clear faults  
1000X faster**

than traditional circuit  
breakers.

**Selective fault  
zone isolation**

helps prevent full  
system shutdown.



**Ultra high-speed  
current protection**

Near-instant breaking time  
of < 25 microseconds.

**True arc flash  
mitigation**

fault protection for people  
and assets with near zero  
exposure to arc energy.

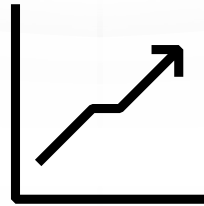
## — Maximize efficiency

### Lower total cost of ownership

with lower losses and improved resilience, all in one multifunctional, compact solution.

### Easy integration

thanks to simplified all-in-one design.



### 100x more endurance

outstanding electrical life, compared to standard breakers.

### Up to 70% less power loss

than any other solid-state breaker, thanks to semiconductor technology tailored to your application.

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# Imagine the possibilities

Four innovative use cases  
for ABB SACE Infitus

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## Smart buildings

The design of electrical distribution networks will become even more challenging in future due to the variety and complexity of demand placed upon the the AC grid.

Integrating a DC network creates an opportunity to reduce your operation's impact on the grid by simplifying the onsite integration of renewables and battery storage, while supplying new loads as EV chargers and heat pumps. By adopting a DC system in manufacturing environments, in this way, you can improve efficiency by making use of a recuperation system.

### **Challenge:** reliable electrical protection for industrial buildings

From office buildings to storage facilities, industrial buildings never really switch off. The highest priority for DC distribution is 24/7 safe, continuous power, which requires electrical protection and grid stability.



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**The Infitus perspective**

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## The Infinitus perspective

Designed for optimal integration into DC and wider electrical systems, ABB SACE Infinitus comes with smart technology that provides protection and control with low losses. It achieves this through digital metering and communication functions that optimize energy management across any building's connected subsystem, including your automation system.

It's fully IEC 60947-2 certified and its superior current interruption speed, ensures **optimal grid resilience**.

From a safety standpoint, the ABB SACE Infinitus offers advanced electrical protection in all situations. If a fault should occur, arc fault mitigation reduces energy release to almost zero, with integrated galvanic isolation providing protection for maintenance personnel.



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# Renewables

For renewables producers, integrating variable energy sources like photovoltaic or wind means there's an increasing need to deploy large battery energy storage systems.

Whether they are meeting demand when there's a lack of grid capacity or deployed for load shifting, DC battery storage systems are crucial for providing increased flexibility, supporting critical system operation and storing excess energy.

## **Challenge: protecting large battery storage systems**

As battery energy systems increase in storage capacity reaching MWh (Megawatt-hour), traditional devices reach their limit and are unable to handle faults from very high (>100kA) and fast rising currents.

Without reliable protection, selective disconnection of faulty zones is often not possible, so full operational shutdown is required.

The resulting financial losses often far outweigh the cost of repair.



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**The Infinitus perspective**



## The Infinitus perspective

ABB SACE Infinitus's **25 microsecond breaking time** and immediate fault isolation could mean **up to \$100kUSD\* cost savings** for a 4MW renewables plant, based on typical power interruption and system recovery costs over a 10-year period.

Not only are the maintenance requirements heavily reduced, the SACE Infinitus all-in-one design continues to ensure optimized protection while all servicing work is going on. The integrated full galvanic isolation makes these benefits possible thanks to fewer components and complications.

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## Smart transportation

As transport infrastructure evolves to meet the needs of eMobility, DC distribution is becoming the solution of choice to reduce losses, save material and simplify connection of roadside photovoltaics.

### **Challenge: ensuring 360° safety**

Optimizing an investment in electric vehicle (EV) infrastructure requires ultra-reliable protection to ensure the safety of people and charging equipment.

Electrical safety becomes especially key in the event of a road accident, where everyone – from stranded drivers to mechanics and emergency services – depends on near-instant fault clearance to protect them from harm.

These important concerns must also be balanced with keeping everyone moving, maximizing overall power efficiency and minimizing service interruptions.



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## The Infinitus perspective



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## The Infinitus perspective

ABB SACE Infinitus's solid-state technology disconnects charging segments in microseconds, ensuring complete electrical safety for all road users.

The additional benefits of safely managing elevated DC voltages also mean **reduced energy consumption**, optimized **cost savings** and a **lower cost of ownership**.

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# Marine

The maritime industry was an early adopter of DC distribution, with onboard DC grids helping vessels from tugboats to cruise ships achieve **energy savings up to 20%**. An on-board grid can also facilitate battery storage to further improve efficiency, and reduce emissions.

## **Challenge: optimizing cost-savings**

Creating opportunities to conserve fuel is always top of mind for any maritime business. Innovative opportunities to maximize efficiency are key.

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## The Infinitus perspective



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## The Infinitus perspective

With the promise of **up to 70% less power loss** than any other solid-state circuit breaker, ABB SACE Infinitus is creating new possibilities for optimizing control and power storage for marine vessels.

Meeting **DNV regulations**, ABB SACE Infinitus delivers a supreme level of resistance and reliability, with a near-instant breaking time of < 25 microseconds.

Designed for easy integration, ABB SACE Infinitus can be simply and efficiently added to a vessel's existing systems, and is fully compatible with standard cooling systems. Its compact, all-in-one design also **reduces footprint by up to 50%**.

## Why choose ABB?

When you partner with ABB to protect your networks, you're also choosing a partner in innovation.

- **Over 100 years specialization in electrical protection**
- **Industry leader in low voltage circuit breaker technologies**
- **Comprehensive portfolio of DC protection devices**
- **Global service network**
- **Committed to customer collaboration and continued innovation**



**Ready to find your Infinite perspective?**



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# Appendix pages

## Technical details

### Selecting the right model

Unlike traditional circuit breakers, the performance of ABB SACE Infinitus is not classified by the rated short circuit current (kA).

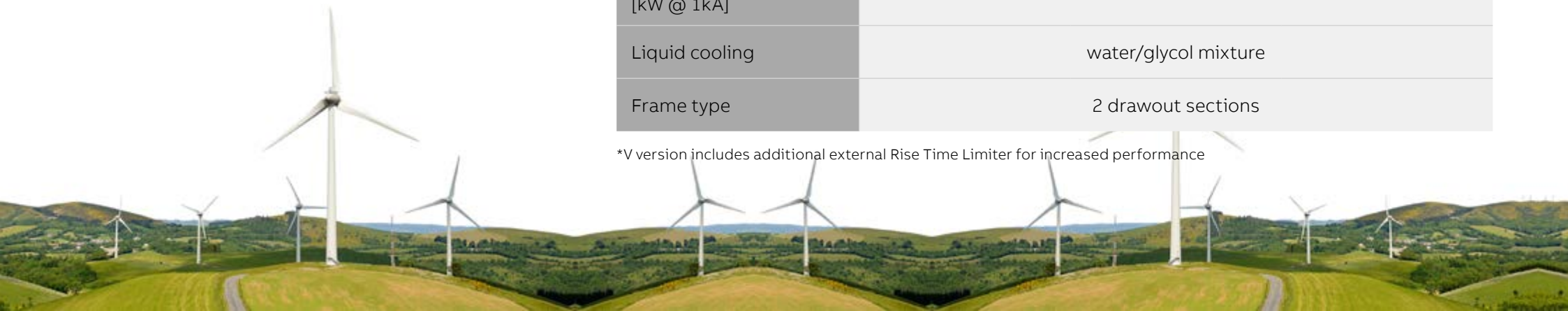
Instead, ABB SACE Infinitus is offered at three performance levels (S, H and V), categorized by the fastest short circuit rise-rate, or current rate-of-change ( $di/dt$ ) that can be safely interrupted. This is measured in amperes per microsecond ( $A/\mu s$ ).

Within that the maximum admissible current slope, the magnitude of the prospective short circuit current could be, in principle, any value from 50kA to 500kA and beyond.

**Choose your ABB SACE Infinitus model based on your application's current rate-of-change speeds.**

Performance rating	S	H	V*
Rated voltage (Ue) [Vdc]	1000		
Rated insulation voltage DC (Ui) [Vdc]	1250		
Rated current (Iu) [A]	2500		
Weight [kg]	285	335	635
Nominal current [A]	800, 1000, 1250, 1600, 2000, 2500		
Withstand capability Icw@1s [kA]	3.8		
Max current slope admissible ( $di/dt$ ) [A/ $\mu s$ ]	<80	<100	No limit
Number of switching poles	1p and 2p		
Bidirectional	Yes		
Number of isolating poles	1p (2p configuration possible)		
Power losses [kW @ 1kA]	1.3		
Liquid cooling	water/glycol mixture		
Frame type	2 drawout sections		

\*V version includes additional external Rise Time Limiter for increased performance



## Advanced protection functions

### Overload and overcurrent current protection

- Overload L I2t, I4t, 255-51,
- Overtemperature OT
- Load control LC x2
- Short-time overcurrent protection S x2
- Directional protection D,
- Instantaneous protection I x2,
- Voltage dependent overcurrent protection S(V) x2
- Making closing release MCR
- Self-protection Override
- Earth-fault protection G

### Voltage and power protection

- Undervoltage protection (UV) x2
- Overvoltage protection (OV) x2
- Over-power protection (OP)
- Under-power protection (UP)

## Communication features

- EKIP Link
- MODBUS TCP

Available upon request

- MODBUS (RS485), Profibus, Profinet, Ethernet/IP, Devicenet\*\*

## Measuring functions

- Current
- Voltage
- Power
- Fault
- Load current direction

## Software features

- DI/DO programmable
- PLC-like programming
- Loads control

## Certification

- IEC 60947-2
- DNV marine certification

## Software Applications

- Ekip Connect -programming and commissioning software
- EPiC - mobile app (Android, iPhone)



\*V version includes additional external Rise Time Limiter for increased performance

