

BROCHURE

SACE Emax 2

The all-in-one innovation



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The world of electrical power distribution changes fast and major new trends such as renewables, energy storage and microgrids are now crowding onto the stage. These trends lead to new customer and application demands.

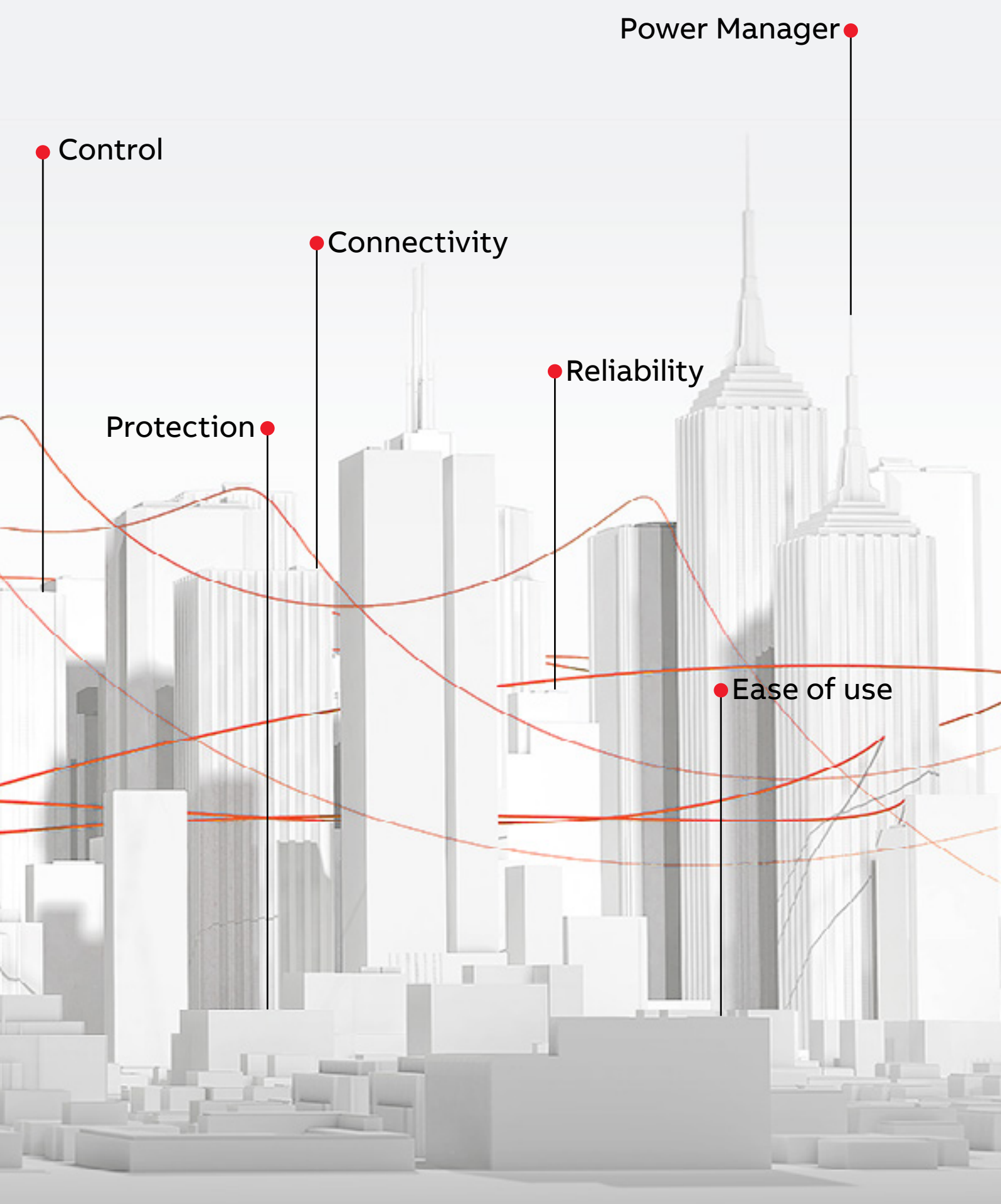
To meet these demands, ABB has now unveiled the innovative Emax 2 all-in-one, the evolution of the Emax 2 into a multifunctional platform that is able to manage the next generation of electrical distribution systems such as microgrids.

Emax 2 all-in-one is the first circuit breaker that meets new grid requirements. It enables a direct communication to the new energy management cloud-computing platform ABB Ability™ Electrical Distribution Control System.

Smart plug and play architecture makes Emax 2 all-in-one easy to use. Leveraging also unmatched electrical performances, Emax 2 sets a new circuit breaker benchmark for the needs of today and tomorrow.

SACE Emax 2, the all-in-one solution to manage "low-voltage distribution systems".





Power Manager ●

● Control

● Connectivity

● Reliability

Protection ●

● Ease of use

Efficiency and control

The power needed, when needed

Efficiency

Achieving maximum efficiency of an electrical installation requires intelligent management of power supplies and energy use. For this reason, the new technologies used in the SACE Emax 2 circuit breakers allow the productivity and reliability of installations to be optimized, and at the same time, power consumption to be reduced while fully respecting the environment.

New advanced functionalities, together with Protection trip units, Communication and system devices contribute to make SACE Emax 2 the circuit breaker that maximizes efficiency in all low-voltage electrical installation.

Control

SACE Emax 2 circuit breaker is the first single device ready to manage all the dynamics of a low-voltage electrical installation.

Managing loads in any condition is now possible thanks to Advanced Functionalities such as:

- **Adaptive load shedding.**
Fast load shedding to guarantee continuity for critical loads during black-outs. Typical scenario is when LV distribution is disconnected from the grid (MV).
- **Predictive load shedding.**
Slow load shedding to avoid overloads, giving the possibility to modulate loads consumption.
- **Power controller.**
Patented algorithm to reduce the peak of power consumed, allowing savings on electricity bills. Managing different power sources and connecting them to main grid is also crucial, so that service continuity is maximized.
- **Embedded ATS functions.**
An automatic transfer switch system used in all application where continuity is essential and where there are multi source supplies.
- **Synchro-reclosing.**
Synchronization and automatic reconnection of the Microgrid to the main grid when the power is back. Emax 2 is able to act as a controller of Main grid condition, disconnecting a plant when necessary and also to adapt protection to on-grid or off-grid conditions.
- **Interface protection system and Interface Device.**
Check of grid-connected operation that shall be immediately and automatically interrupted in case of outage of the distribution grid or when the voltage and frequency values of the grid itself are out of the range of values defined by the Distribution System Operator (DSO).
- **Adaptive protection.**
Network changes recognition and automatic set of thresholds to guarantee protection and coordination in on-grid and off-grid conditions.





Connectivity

Integration is easy. Even from afar

SACE Emax 2 series circuit breakers can be integrated perfectly into all automation and energy management systems to improve productivity and energy consumption and to carry out remote service.

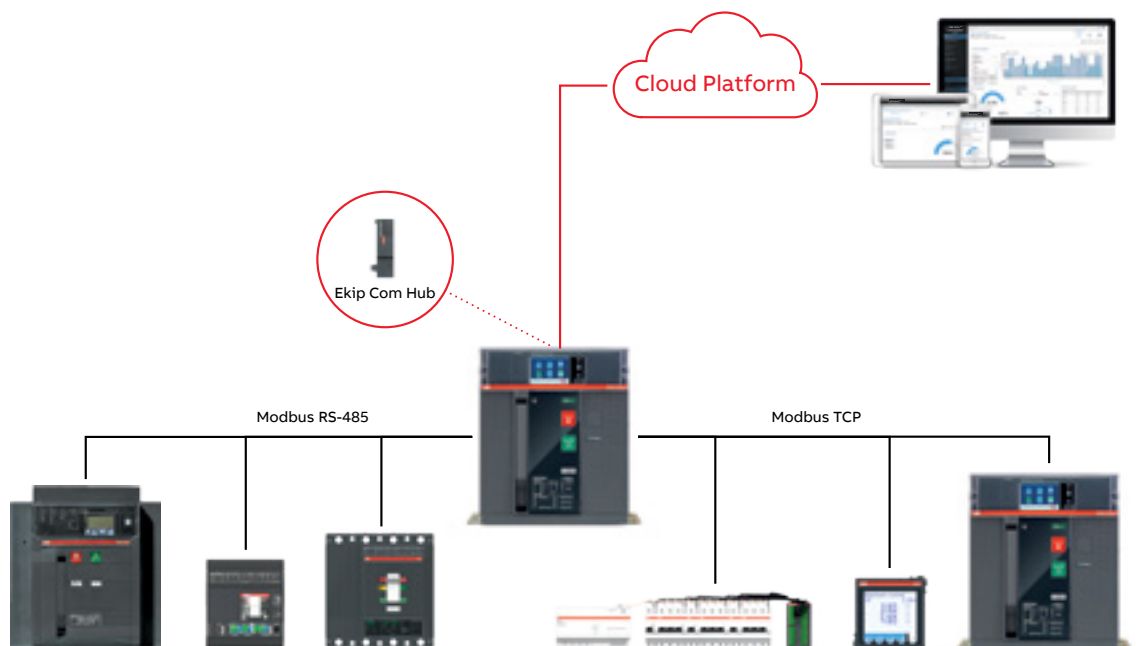
All circuit breakers can be equipped with communication units for use with Modbus, Profibus, and DeviceNet™ protocols as well as the modern Modbus TCP, Profinet, EtherNet/IP™ and Open ADR.

The cartridge-type modules can be easily installed directly on the terminal box, even at a later date. Furthermore, the integrated IEC61850 communication module enables connection to automation systems widely used in medium voltage power distribution to create intelligent networks (Smart Grids).

All circuit breaker functions are also accessible via the Internet, in complete safety, through the **Ekip Link** switchgear supervision system and the **Ekip Control Panel**.

Furthermore with an easy connection thanks to the Ekip Com Hub module, SACE Emax 2 can be integrated into an energy management system, **ABB Ability™ Electrical Distribution Control System**. The power and auxiliary connections are optimized to simplify connection to the switchgear.

The power terminals, which can be oriented horizontally or vertically, have been designed for the most common busbars, while the push-in connections of the auxiliaries ensure immediate and safe wiring.





Performance

A size for every requirement

The SACE Emax 2 range is made up of 4 sizes: E1.2, E2.2, E4.2 and E6.2 up to 6300A, which enable switchgear of compact dimensions and high ratings to be built with busbars of reduced length and cross-section.

The protection trip units, auxiliary connections and main accessories are the same throughout the range to simplify design and installation. Furthermore, the sizes from E2.2 to E6.2 have the same height and depth.

The rating levels are updated and standardized throughout the sizes to meet the demands and needs of today's installations, from 42kA to 150kA, and to standardize switchgear projects. High short-time currents, together with the efficiency of the protection functions, guarantee complete selectivity in all situations.

Accurate design and choice of materials enable optimization of the overall dimensions of the circuit breaker. In this way switchgear of compact dimensions can be built and outstanding savings at the same performance can be obtained.

The SACE Emax 2 range is available with UL certification, IEC certification, and now with UL, IEC, and CCC triple certification up to 5000A.



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E1.2



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E2.2



—
E4.2



—
E6.2





Ease of use

Everything under control and problem free

The entire range is available in fixed and withdrawable versions, with double insulation between the front of the switchgear and the live parts. The circuit breakers can be powered indifferently from the lower terminals or the upper terminals.

All essential information is available in the central area of the front shield and enables immediate identification of the status of the circuit breaker: open, closed, ready to close, charged and discharged springs.

Maintenance is simple and safe. Thanks to the new front shield design, the main accessories can be installed without completely removing it.

The withdrawable circuit breaker is inserted and removed via dedicated guide rails that simplify movement. The correct movement from racked-in, test isolated, to racked-out position is guaranteed by a lock in each position.

As a further guarantee of safety, the shutters of the fixed part can be locked from the front when the circuit breaker is removed. The shutters of the upper terminals are independent of those of the lower terminals to facilitate checking and maintenance operations.

The **Ekip Touch protection trip units** are equipped with a large color touch-screen display which enables safe and intuitive operation. Furthermore the Ekip units can be programmed and consulted from a tablet, smart phone or portable PC via the Ekip Connect application and all the advanced functionalities can be easily programmed thanks to predefined logic templates.

The trip units are easily interchangeable from the front of the circuit breaker, and all communication units can be installed directly on the terminal box with a few simple operations, making the complex system ready for a new digital experience.



Product conformity

Approvals and certification

The SACE Emax 2 circuit breakers and their accessories conform with ANSI C37.13, C37.16, C37.17 and C37.50 standards and are UL 1066 certified.

The UL 1066 certification allows Emax 2 to be used in UL 1558 switchgear, UL 891 switchboards and CSA C22.2 no. 31 switchgear assemblies.

In addition, SACE Emax 2 also consists of a line that is compliant with the international IEC 60947, EN 60947 (harmonized in 30 CENELEC countries), CEI EN 60947 and IEC 61000 Standards, and conforms to EC “Low Voltage Directives” (LVD) and “Electromagnetic Compatibility Directive” (EMC).

The main versions of the IEC devices are approved by the following shipping registers: RINA, Lloyd’s Register of Shipping, ABS Germanischer Lloyd, Bureau Veritas, Det Norske Veritas, Russian Maritime Register of Shipping, CCS and NKK.

The SACE Emax 2 IEC line also includes certification by the Russian certification body GOST (Russia Certificate of Conformity) and has achieved China CCC Certification (China Compulsory Certification).

For the types of certified circuit breakers, certified ratings and corresponding validity, please contact ABB.



SACE Emax 2

Electrical characteristics

Common data		
Rated service voltage Ue	[V]	690
Rated insulation voltage Ui	[V]	1000
Rated impulse withstand voltage Uimp	[kV]	12
Frequency	[Hz]	50 - 60
Number of poles		03-apr
Version		Fixed - Withdrawable
Suitable for isolation according to		IEC 60947-2

SACE Emax 2

Performance levels

		[A]
		[A]
		[A]
Rated uninterrupted current Iu @ 40°C		[A]
		[A]
		[A]
Neutral pole current-carrying capacity for 4-pole CBs		[%Iu]
	400-415 V	[kA]
	440 V	[kA]
Rated ultimate short-circuit breaking capacity Icu	500-525 V	[kA]
	690 V	[kA]
Rated service short-circuit breaking capacity Ics		[%Icu]
Rated short-time withstand current Icw	(1s)	[kA]
	(3s)	[kA]
Rated short-circuit making capacity (peak value) Icm	400-415 V	
	440 V	[kA]
	500-525 V	[kA]
	690 V	[kA]
Utilization category (according to IEC 60947-2)		[kA]
Breaking	Breaking time for I<Icw	
	Breaking time for I>Icw	[ms]
Dimensions	H - Fixed/Withdrawable	[ms]
	D - Fixed/Withdrawable	[mm]
	W - Fixed 3p/4p/4p FS	[mm]
	W - Withdrawable 3p/4p/4p FS	[mm]
Weights (CB with trip unit and current sensor)	Fixed 3p/4p	[mm]
	Withdrawable 3p/4p/4p FS	kg

1) ICS : 50KA FOR 400V...440V VOLTAGE; 2) ICS: 125KA FOR 400V...440V VOLTAGE; 3) E4.2H 3200A: 66 ICW (3S)

SACE Emax 2

Mechanical and electrical life with regular ordinary		[Iu]
maintenance prescribed by the manufacturer		[No. cycles x 1000]
	Frequency	[Oper./Hour]
Electrical life	440 V	[No. cycles x 1000]
	690 V	[No. cycles x 1000]
	Frequency	[Oper./Hour]



E1.2				E2.2					E4.2					E6.2			
B	C	N	L	B	C	N	S	H	C	N	S	H	V	H	V	X	
630	630	250	630	1600	1600	800	250	800	3200	3200	3200	3200	2000	4000	4000	4000	
800	800	630	800	2000	2000	1000	800	1000	4000	4000	4000	4000	2500	5000	5000	5000	
1000	1000	800	1000		2500	1250	1000	1250					3200	6300	6300	6300	
1250	1250	1000	1250			1600	1250	1600					4000				
1600	1600	1250				2000	1600	2000									
		1600				2500	2000	2500									
							2500										
100	100	100	100	100	100	100	100	100	100	100	100	100	100	50-100	50-100	50-100	
42	50	66	150	42	66	66	85	100	66	66	85	100	150	100	150	150	
42	50	66	130	42	66	66	85	100	66	66	85	100	150	100	150	150	
42	42	50	100	42	50	66	66	85	50	66	66	85	100	100	130	130	
42	42	50	60	42	50	66	66	85	50	66	66	85	100	100	100	100	
100	100	100 1)	100	100	100	100	100	100	100	100	100	100	100 2)	100	100	100	
42	42	50	15	42	50	66	66	85	55	66	66	85	100	100	100	120	
24	24	30	-	42	42	50	50	66	50	50	66	75 3)	75	100	100	100	
88	105	145	330	88	145	145	187	220	145	145	187	220	330	220	330	440	
88	105	145	286	88	145	145	187	220	145	145	187	220	330	220	330	440	
88	88	105	220	88	105	145	145	187	105	145	145	187	220	220	286	286	
88	88	105	132	88	105	145	145	187	105	145	145	187	220	220	220	264	
B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	
40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
25	25	25	10	25	25	25	25	25	25	25	25	25	25	25	25	25	
296/363.5	296/363.5	296/363.5	296/363.5	371/425	371/425	371/425	371/425	371/425	371/425	371/425	371/425	371/425	371/425	371/425	371/425	371/425	
183/271	183/271	183/271	183/271	270/383	270/383	270/383	270/383	270/383	270/383	270/383	270/383	270/383	270/383	270/383	270/383	270/383	
210/280				276/366					384/510					762/888/1014			
278/348				317/407					425/551					803/929/1069			
14/16				41/53					56/70					109/125/140			
38/43				84/99					110/136					207/234/260			

E1.2				E2.2					E4.2					E6.2			
≤ 1000	1250	1600	1250 L	< 1600	1600	2000	2500	< 2500	2500	3200	4000	4000	5000	6300			
20	20	20	20	25	25	25	20	20	20	20	15	12	12	12			
60	60	60	60	60	60	60	60	60	60	60	60	60	60	60			
8	8	8	3	15	12	10	8	10	8	7	5	4	3	2			
8	6,5	6,5	1	15	10	8	7	10	8	7	4	4	2	2			
30	30	30	30	30	30	30	30	20	20	20	20	10	10	10			



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