



Technical catalog - 2017 Edition

Retrofit kits for Low Voltage circuit-breakers

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ABB SACE Service: the next generation service level

With continuous market growth and increasing demands, unexpected outage must be strongly avoided. As production advances and improves over the years, it is normal for systems to change, loads to increase and harsh environments to impair vital equipment.

So much so, air circuit-breakers put into service many years ago might not provide the reliability and safety assurances required today. Making certain that people, equipment and processes are properly protected is a growing concern. When maintenance is no longer sufficient owing to lack of materials or when components are out of production, retrofit kits are the best solution. ABB Low Voltage Service offers a unique way to upgrade ABB hardware and software to the next generation, by changing the worn or outdated parts while maintaining the original plant and equipment configuration. The kits are tested in the ABB SACE Division Lab, accredited by ACCREDIA and acknowledged by important international certification bodies such as ACAE / LOVAG, ANCE, ASTA, ETL SEMKO, UL, CSA and Naval Registers. The lab offers a qualified certification test service for low- and medium-voltage electrical devices and equipment.

Benefits of retrofit kits

- Fast and economic solutions to suit any budget: the cost of labor is kept to the minimum as changes to parts are only made where absolutely necessary. On the long term, new circuit-breakers are less likely to cause disruptive shutdowns. If faults occur, solutions are likely to be more cost effective than if the breaker were old.
- Shorter downtimes.
- Newer technologies provide:
 - Energy efficiency/ monitoring functions
 - Additional, more powerful capabilities and protection functions
 - Enhanced safety: With ever-increasing focus on safety, new technologies and advanced materials, new breakers are designed for improved performance and enhanced protection.
 - Readily available spare parts and services: old breakers are now classified as "classic", "limited" or "obsolete", while newly retrofitted breakers are in the "active" phase of their life-cycle.

ABB's Low Voltage Breaker Service offers a comprehensive range of services able to support customers throughout all phases of a product's life: repairs, replacements, spare parts, retrofitting solutions and all types of corrective and advanced maintenance.

By working with the customer, ABB SACE Service acquires all the requests for assistance and maintenance. This means that ABB services are always immediate and of the highest level.

Technical support

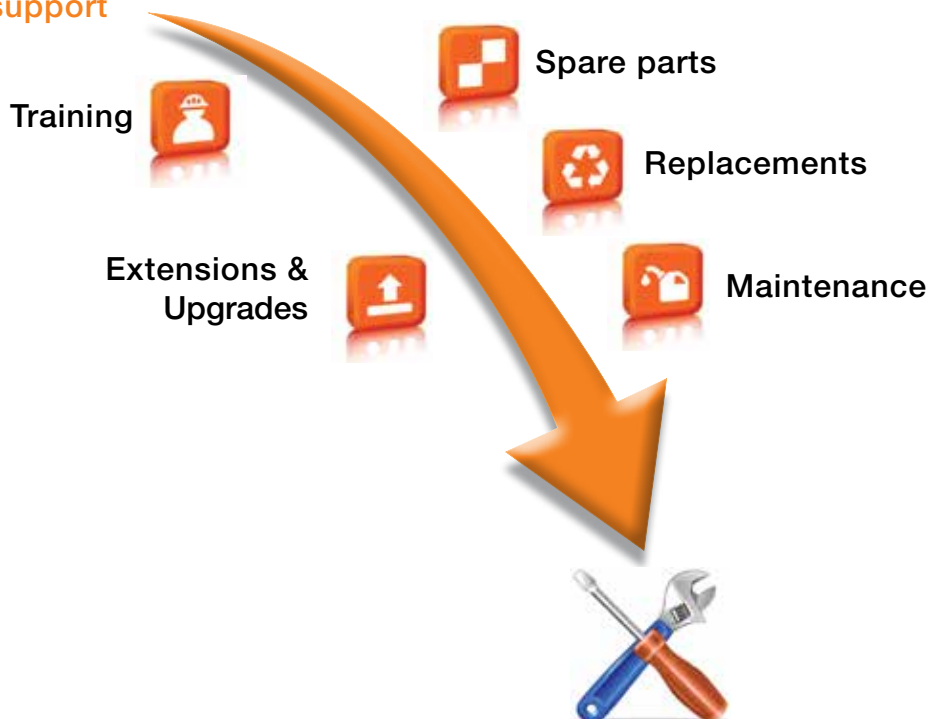


ABB Low Voltage Products Service



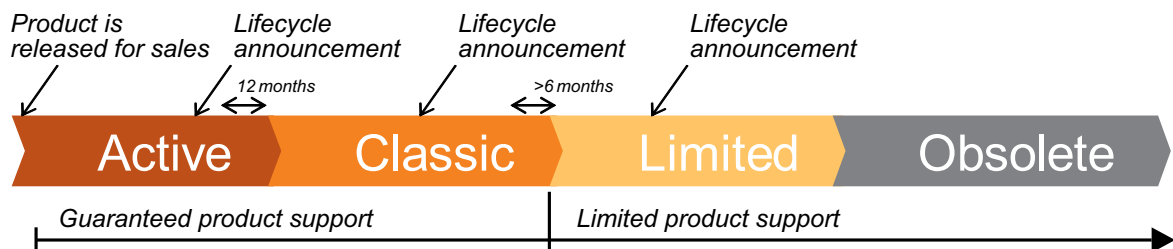
From development to after-sales service, ABB defines the Product Life Cycle Management model (LCM) for each low voltage product. The aim is to provide proactive services able to maximize both availability and performance.

The model divides the life cycle of each product into four phases: active, classic, limited and obsolete. Each phase has different implications for the end user in terms of services provided. LCM represents ABB's ability to effectively and efficiently manage and innovate its products and related services during each of the four phases of their life-cycle. Product LCM is updated yearly by ABB SACE.

Companies are responsible for managing information about Product LCM and for promptly communicating it to both customers and suppliers.

For more details, visit www.abb.com and follow the path:

- offers
- low voltage products
- service for low voltage products
- service for breakers and switches
- replacements.



"Active" phase

The "active" phase begins when a product is launched. The end user benefits from different warranty options during the "active" phase, as well as other services such as training and technical support for optimum performance. Complete life cycle services from spare parts to advanced maintenance (preventive and predictive) and service contracts are also provided. The "active" phase of a product ends when its mass production ceases because it has been replaced by a new "active" product. When this happens, ABB announces that the life cycle phase has changed.

"Classic" phase

ABB Low Voltage Products users continue to benefit from complete life cycle services throughout the "classic" phase. The "classic" phase is closely aligned with ABB's research and development work, whereby support for existing products continues to be provided while future product generations are being developed.

Even though the low voltage products in question are no longer promoted in the "classic" phase, complete products can still be purchased as accessories, spare parts and for plant extensions.

To ensure that complete life cycle services continue to be available, ABB advises customers to keep their low voltage products in the "active" or "classic" phases of their life cycles by upgrading, retrofitting or replacing.

"Limited" phase

The services are gradually faded out during the "limited" phase. Technical support (field service, phone support, etc) continues, but may diminish over time as the number of such installations decreases.

The availability of new apparatus may continue, but is not guaranteed. Spare parts continue to be available for as long as components and materials can be obtained. In addition to the annual life cycle status reviews, ABB issues a life cycle phase change announcement six months before a product becomes obsolete. This is the customer's last chance to transfer to a new technology before the product services end.

"Obsolete" phase








Low voltage products enter the obsolete phase when services can no longer be provided at a reasonable cost, when ABB can no longer support them technically, or when the old technology is unavailable.

These products are no longer manufactured as complete products, and only component spares, refurbished apparatus, retrofit kits and/or revamping solutions could be available.

ABB SACE History – Circuit-breakers

ABB SACE was founded almost 80 years ago. The company, which has always had very close ties with the area in which it operates and has always been a leader in the

electromechanical sector, boasts a “business history” that is both unique and well-established.

1918-1947	1947-1956	1960-1971	1975	1979-1989	1980	1989
SACE DM	Isol/Fusol	Otomax	Modul	Novomax	Limitor	Megamax
						

1918 The «first» company was established when Officina Fantini of Bergamo was turned into SACE. Little more than an artisan workshop, it soon acquired important customers, such as the Royal Naval Backyards and State Railways.

1934 On 7 July, SACE, after several entrepreneurial stages, was re-founded as Società Anonima Costruzioni Elettromeccaniche by four Italian shareholders: Leopoldo Ferrè, Lino Salghetti Drioli, Federico Mazzola and Agostino Eschini.

1947 The handover between the old and new SACE took place: Having survived the complex historical era marked by two World Wars, the company began to assert itself on the market and became a point of reference in the Italian electromechanical industry.

1952 From this year on, SACE R&D began to develop the first low voltage Moulded Case Circuit-breaker, Z2. It was an enormously pioneering step in the electrotechnical field and marked a milestone in the international market.

1956 The company began to renew its low voltage products and started to design new devices: Z150 and Fusol. Research in the field of air circuit-breakers was intensified and led to the development of the first Otomax prototype.

1960 Otomax became the first air circuit-breaker in the history of SACE to officially enter production. Designed to provide selective protection, it was suitable for protecting generators, large engines and outgoing feeders.

1971 Novomax G30 made its debut on the market and was presented as the most compact air circuit-breaker of its time. It soon became well-known for its sturdy construction and reliability.

1975 Modul, a new series of moulded case circuit-breakers, appeared on the market. Their key feature was their exceptional ability to limit the prospective fault current.

1979 SACE presented Novomax, a new, compact air circuit-breaker with optimized performance.

1980 SACE now proposed Limitor - state-of-the-art double-break per pole moulded-case circuit-breakers designed to rapidly break high short-circuit currents. The specially designed breaking parts brought the peak value of fault currents well below the expected values.

1988 ABB was founded as a major international electrotechnical group and SACE, following the merger between Swedish company Asea and Swiss company Brown Boveri, became ABB SACE.

1989 Launched a year after the establishment of ABB, Megamax was the first ABB SACE air circuit-breaker released onto the market. Meanwhile, the retrofit kit concept began to take root.

Innovation and a propensity for improvement have been key features of SACE right from the start.

The history of the company can be outlined through the evolution of its main products:

1993-2000	1996	2000	2004	2009	2013
Isomax	Emax	Tmax	New Emax	Tmax XT	Emax 2
					

1993 Isomax was one of the largest and most comprehensive families of innovative moulded case circuit-breakers on the market. It was designed to fulfil all installation requirements, from small users to large industrial electrical power distribution plants.

1996 Emax was launched and became much appreciated for its reliability and high performance: for the very first time, the protection functions were fully electronic. In addition, Emax was the first series of ABB SACE air circuit-breakers to bear the UL mark.

2000 Tmax, a complete moulded-case circuit-breaker family up to 1600A, was introduced. It featured a new electric arc interruption system allowing very high short-circuit currents to be rapidly interrupted. The opening speed of the contacts, structure of the arcing chambers and dynamic blasting action achieved by the magnetic field all helped to quench arcs within the shortest possible time.

2004 New Emax, an evolution of the previous Emax, was launched on the market. This new series of air circuit-breakers featured improved electro-technical performance and enhanced connectivity. Dialog between man and machine became easier and communication could even be remoted.

2006 Emax X1 made its debut. It was presented as the "great little" air circuit-breaker of the Emax family. It provided the performance of an air circuit-breaker with the dimensions of a moulded case breaker.

2007 The SACE Emax air circuit-breaker offer was enhanced by Emax DC, designed for direct current applications in compliance with IEC60947-2 standards.

2009 SACE introduced XT, the most extraordinary moulded-case circuit-breaker family featuring extremely high performance, compact dimensions, ease of installation and leading-edge electronics.

2010 The year in which Emax VF, specifically designed for the wind, mini-hydroelectric, wave and traction power sectors, was launched. It was an innovative solution for protecting variable frequency installations.

2012 SACE introduced Emax LTT (Low Temperature Technology), thereby completing the range of products for variable frequency applications. It was presented as the ideal solution for installations in extreme environmental conditions, with temperatures ranging from -40°C to +70°C.

2013 Emax 2: a new era, where circuit-breakers were no longer merely circuit-breakers but true power managers able to control every electrical system and optimize efficiency.

2015 XT UL and Emax 2 UL: the new technology was now available even for UL market.

2016

ABB SACE Retrofit kit solutions

Customer's problem

Although the old circuit-breakers still continue to operate properly, upgrades and replacements should be planned.

Today's reliability and safety requirements are not the same as in the past.

Routine maintenance may no longer be sufficient to satisfy customer needs, which include improving electrical and mechanical performance, extending the life of the system or complying with standards and regulations.

Functionality, safety and coordination may be key factors in the decision to replace obsolete or inadequate products.

ABB SACE solutions

ABB SACE offers advisory skills (identification of inadequate and/or obsolete equipment, planning interventions) and efficient service.

With just a few cost-effective modifications, retrofit kits are, in the majority of cases, the ideal solution for upgrading low-voltage switchgear.

Retrofit kits allow obsolete breakers to be replaced with latest generation products.

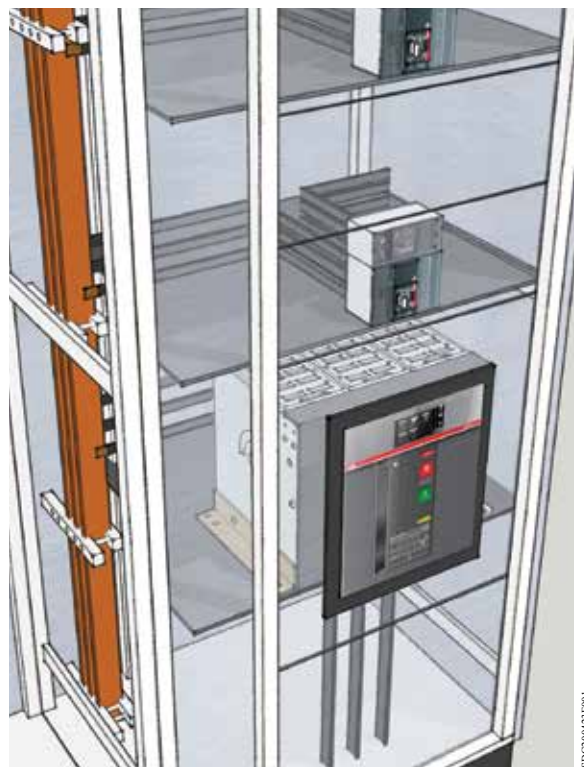
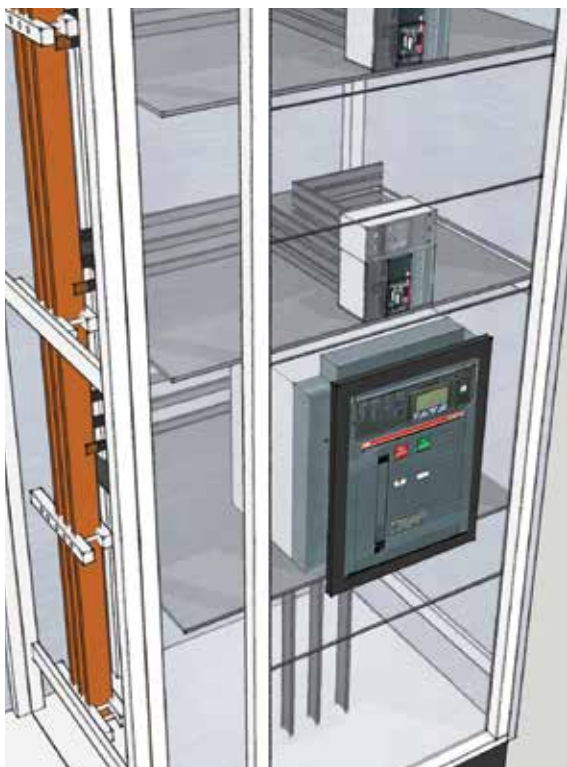
Thanks to the wide range of ABB SACE retrofit kits, customers can enhance the safety of their installations and ensure continuity of service without having to:

- replace the complete switchgear,
 - purchase expensive spare parts/ circuit-breakers
- In addition, high mechanical and electrical reliability and extreme flexibility are assured when retrofit kits are used with the New Emax, Emax 2 and Tmax XT circuit-breaker series.

Retrofit kits

Obsolete equipment can be replaced using retrofit kits, which are specifically designed by ABB SACE to preserve the existing frameworks and minimize downtime.

The kits allow the new apparatus to be adapted to the dimensional characteristics of the existing compartments. All the obsolete models are replaced with latest generation products. ABB has developed different retrofit kits to cover all customer requirements.





Advantages of retrofit kits

Use of retrofit kits is advantageous

Low cost

- the investment is much less that it would be if new switchgear were to be installed. In addition, the retrofitting solution maintains the original configuration of the switchgear equipment and installation
- planned scheduling and implementation with minimum downtime.

Easy, safe replacement

- no structural changes
- adaptation to auxiliary circuits
- anyone can install the replacement kits as they are supplied complete with assembly instructions and electric interconnection diagrams.

Safety improvements

- retrofit kits restore the life cycle status of the switchgear
- use of new technology focused on safety and reliability.

Performance

- full interconnectivity with existing distribution systems
- improved control over installations with new electronic protections: energy consumption, power control.

Maintenance and repairs

- ease of maintenance and improved functionality of the system
- cost reduction as spare parts for the new circuit-breaker continue to be available for much longer.

Quality

Result of experience and expertise acquired by the same designers who develop the circuit-breakers, these retrofit kits are only guaranteed by ABB after they have been tested under both standard and critical conditions (short-circuit currents).

ABB retrofit kits undergo the same tests as the whole range of ABB circuit-breakers and are certified in the ABB SpA Laboratory - ABB SACE Division.

Each retrofit kit is subjected by ABB SACE to the tests listed below, in accordance with IEC 60947-2 or IEC 60947-1:

- racking-in/out operations
- verification of signalling devices
- verification of the safety device that prevents racking-in and racking-out in the closed position
- verification in the disconnected position, to ensure that the specified clearances between isolating contacts cannot be inadvertently reduced
- verification of degree of protection
- dielectric properties (Impulse + Industrial frequency)
- verification of minimum clearances in air
- verification of minimum creepage distances
- temperature-rise test
- ultimate short circuit breaking capacity (240 / 415 / 690 V)
- rated short time withstand current
- maintenance manual (safety aspects).

ABB

To whom it may concern

LB-DT,LANG 027-030 April 27, 2008

We hereby confirm that following retrofitting kits and associated circuit-breakers:

Retrofitting kit part #	Associated CB	Replaced CB
18DA08879R1	Emax F10 1250 3P	MDLMAX F10 1250 3P
18DA08879R1	Emax F10 1250 4P	MDLMAX F10 1250 4P

complies with IEC 60947-2 standard requirements up to following ratings:

in 600 - 1750 - 1000A

for 230-415Vac 40kA, 550-615Vac 40kA, 690Vac 35kA

for 230-415Vac 40kA, 550-615Vac 40kA, 690Vac 35kA

for 35kA for 1s

ABB reference to internal technical file 100L0021190001 ver 01

ABB S.p.A. ABB SACE Division

ABB

To whom it may concern

LB-DT 06A,11D Bergamo, November 11th 2011

We hereby confirm that following retrofitting kit and associated circuit-breakers:

Retrofitting kit part #	Associated CB	Replaced CB
18DA08879R1	Emax XT2 S 125 EXIP L33 3P	MODUL SR 125-125 3P
18DA08879R1	Emax XT2 S 125 EXIP L33 4P	MODUL SR 125-125 4P

complies with IEC 60947-2 standard requirements up to following ratings:

in 100A-1250A

for 230-690Vac 30kA, 395-415Vac 30kA, 440Vac 25kA, 550Vac 15kA, upper supply only, 690Vac 15kA, upper supply only

for 230-690Vac 41.5kA, 395-415Vac 15kA, 440Vac 10kA, 550Vac 7.5kA, upper supply only, 690Vac 5kA, upper supply only

ABB reference to technical file 100L0021190001 ver 01

ABB S.p.A. ABB SACE Division

ABB

To whom it may concern

LB-DT,LANG 045-050 LB-DT Bergamo, June 30th 2009

We hereby confirm that following retrofitting kit and associated circuit-breakers:

Retrofitting kit part #	Associated CB	Replaced CB
18DA08879R1	Emax F10 1250 3P	MDLMAX F10 1250 3P
18DA08879R1	Emax F10 1250 4P	MDLMAX F10 1250 4P

complies with IEC 60947-2 standard requirements up to following ratings:

in 1250A

for 230Vac 40kA, 415Vac 40kA, 440Vac 40kA, 550-615Vac 40kA, 690Vac 35kA

for 230Vac 40kA, 415Vac 40kA, 440Vac 40kA, 550-615Vac 40kA, 690Vac 35kA

for 40kA 1s, 35kA 1s

ABB reference to technical file 100L0021190001 ver 01

ABB S.p.A. ABB SACE Division

ABB SACE Retrofit kit solutions

Retrofit kit solutions

Obsolete equipment can be replaced using retrofit kits, which are specifically designed by ABB SACE to preserve the existing frameworks and minimize downtime.

ABB has developed different retrofit kit versions:

- basic version for any type of circuit-breaker (fixed and withdrawable)
- advanced versions for withdrawable circuit-breakers only.

The advanced versions can only be used if the fixed part of the old breaker is in a good condition: there must be no

trace of damage, oxidation, short-circuiting, corroded copper or flaking silver-plating. The plastic support that houses the studs must not be cracked, broken or misshapen. The sliding contacts must also be in a good condition and free to move. ABB SACE Service has prepared a document to help customers to assess the conditions of the fixed part (1SDH001279R0002).

Retrofit kits are always complete with clear and detailed assembly instructions.

Retrofit kit solutions

BASIC (for fixed and withdrawable circuit-breakers)

ADVANCED (only for withdrawable circuit-breakers)

Hard Bus Retrofill (RF)

Cradle in Cradle (CiC)

Direct Replacement (DR)

Retrofit-kit selector

The Retrofit-kit selector is an easy online selector tool you can use to rapidly access the list of all the retrofit kits developed by ABB to replace old circuit-breakers:



Retrofit-kit selector

Choose the right solution using the eight filters below

The retrofit types are: **DR** = Direct Replacement, **CiC** = Cradle in Cradle, **RF** = Hard Bus Retrofill.
For additional information look in the [Retrofit](#) expandable area in the previous page.

Brand	Family	Frame	In
<input type="text" value="All"/>	<input type="text" value="All"/>	<input type="text" value="All"/>	<input type="text" value="All"/>
Version	Terminal	Poles	Standard
<input type="text" value="All"/>	<input type="text" value="All"/>	<input type="text" value="All"/>	<input type="text" value="All"/>

There are 0 results listed below [reset]

Type ▾	New CB ⇅	Availability ⇅	Notes ⇅	Ref.Doc. ⇅
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Hard Bus Retrofill (RF)

The existing circuit-breaker is completely disassembled (both fixed and moving parts in the case of withdrawable circuit-breakers) and replaced with a more modern ABB circuit-breaker and corresponding adapter kit.

The adapter kit contains specially designed, preconfigured busbars and covers for connecting the new circuit-breaker to the existing busbars.

The kit is complete with a transparent panel door template allowing the door to be cut to accommodate the new breaker.

Before ordering

Always check compliance with the new circuit-breaker's panel dimensions (see product catalog).

Remember that new electrical wiring is required.

What to order

For fixed circuit-breakers: order the circuit-breaker + RF kit.

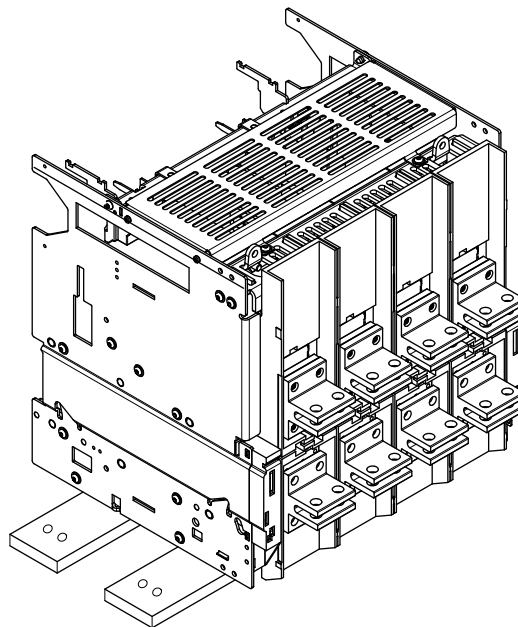
For withdrawable circuit-breakers: order both the moving part and fixed part of the new circuit-breaker + RF kit.

Benefits

Hard Bus Retrofill is the perfect solution:

- when a fixed circuit-breaker must be replaced;
- when the fixed part of the old breaker is damaged and can no longer be repaired;
- when time is not a priority: Hard Bus Retrofill retrofit kits usually take several hours to install (the old breaker must be disassembled and the new one installed);
- when the switchgear must be upgraded and this can be done thanks to the characteristics of the new circuit-breaker:
 - energy and power measurements,
 - power control,
 - communication protocols,
 - signalization,
 - etc...
- when some of the new circuit-breaker's accessories are required: all accessories are 100% compatible with the Hard bus Retrofill kit (RF);
- Retrofit kits can be easily installed thanks to the clear and easy-to-follow instructions supplied.

Fixed part of fixed version
of new generation circuit-breaker



Special terminals to connect new
generation circuit-breaker with old
product busbars

ABB SACE Retrofit kit solutions

Advanced solutions are available for withdrawable versions only:

Cradle in Cradle (CiC)

ABB SACE has developed Cradle in Cradle advanced retrofitting solutions for very large fixed circuit-breaker parts. A second fixed part of the new circuit-breaker can be fitted inside the fixed part of the old circuit-breaker. The 2 fixed parts become one single assembly. A new breaker moving part can then be racked-in, in the standard way. The fixed part of the new circuit-breaker is fully adapted and factory tested.

Before ordering

It is essential to make sure that the fixed part of the old circuit-breaker is in a good condition. ABB has issued guidelines to help you with a checklist of the inspections required: 1SDH001279R0002. The kit is not compatible with any of the accessories for the fixed part of either the new or old circuit-breaker. Once installed, the kit cannot be easily disassembled.

Benefits

Cradle in Cradle is the perfect solution:

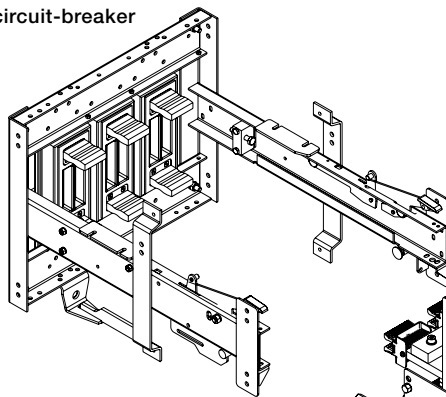
- when replacement must be performed quickly, as cradle in cradle is a fast solution. There is no need to disassemble the fixed part of the old circuit-breaker and the new breaker can be installed in just a few hours (installation and wiring);
- when safety is a priority: safety is automatically enhanced (key locks, etc...) thanks to all the new safety accessories available for the new breaker;
- when the switchgear must be upgraded and this can be done thanks to the characteristics of the new circuit-breaker:
 - energy and power measurements,
 - communication protocols,
 - signalization,
 - etc...

Retrofit kits can be easily installed thanks to the clear and easy-to-follow instructions supplied.

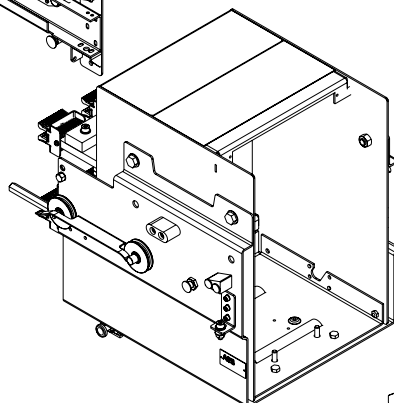
What to order

The kit includes the new fixed part of the circuit-breaker. Order the moving part of the new circuit-breaker.

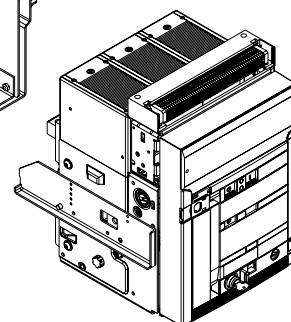
Old fixed part of circuit-breaker



New generation fixed part modified so that it fits into the fixed part of the old circuit-breaker



Standard moving part of new generation circuit-breaker



Direct Replacement (DR)

This is the most advanced and rapid solution: the moving part of the old circuit-breaker is removed and a special moving part of the new circuit-breaker is modified and tested so that it can be fitted into the existing fixed part.

Pre-assembled by ABB SACE, the kit upgrades the circuit-breaker by providing a specific moving part to be fitted into the existing fixed part.

Before ordering

The fixed part of the old circuit-breaker must be in a good condition. ABB has issued guidelines to help you with a checklist of the inspections required: 1SDH001279R0002. Some of the new accessories for the fixed part may not be compatible with the direct replacement kit. Check for more details in the next pages dedicated to products. Once installed, the kit can be easily disassembled.

Benefits

Direct replacement is the perfect solution:

- when there is not much time: there is no need to disassemble the fixed part. Only the panel door needs to be adapted;
- the new special moving part can be racked-in as quickly and easily as a standard old circuit-breaker moving part;
- all standard accessories are already precabled so no time is wasted while they are wired;
- when safety is a priority: safety is automatically enhanced (key locks, etc...) thanks to all the new safety accessories available for the new breaker;
- When the switchgear must be upgraded and this can be done thanks to the characteristics of the new circuit-breaker:
 - energy and power measurements,
 - power control,
 - communication protocols,
 - signalization,
 - etc...

What to order

The kit includes the new special moving part and installation instructions.

Special new generation circuit-breaker moving part



Old circuit-breaker fixed part

ACB retrofit kits

Cradle in Cradle: Otomax W → New Emax- IEC

Description

Using the Cradle in Cradle (CiC) retrofit kit, obsolete Otomax withdrawable (W) 3-pole air circuit-breakers from 800A to 3200A produced from 1965, can be replaced with the New Emax series.

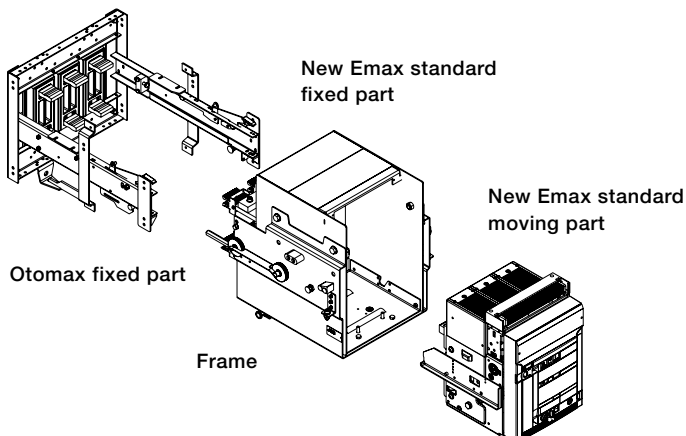
The kit comprises a dedicated frame with special jaw contacts designed to fit into the fixed part of Otomax circuit-breakers. The fixed part of New Emax fits perfectly into the frame. Assembly only requires a few simple operations:

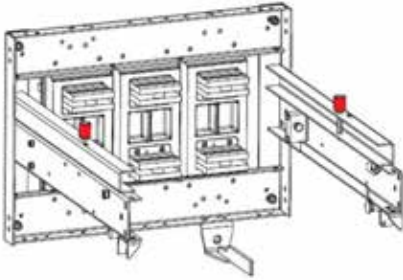
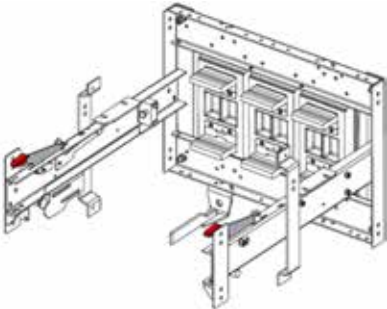
- First remove the moving part of Otomax
- Now insert the retrofit kit, which includes the special New Emax fixed part
- Insert the New Emax moving part

Special guides facilitate the racking-in phase and once the New Emax fixed part has been fitted into the Otomax fixed part, the two are permanently matched. The panel door must be modified to accommodate the New Emax front cover. The kit includes the New Emax flange and a transparent template to adapt the door to the new requirements. The solution is fast and efficient as the existing installation need not be adapted in any way. The fixed part of Otomax must be in a good condition, as described in the guidelines provided in document 1SDH001279R0002.

Benefits

- Guaranteed continuity of service
- Easy, tested installation
- No need to dismantle the fixed part of the Otomax circuit-breaker
- Enhanced safety thanks to New Emax improved technology
- Reduced maintenance costs. Product and its spare parts continue to be available for a long time
- New Emax can be equipped with a wide range of accessories
- Advanced maintenance activities thanks to New Emax trip units (i.e. predictive maintenance)
- Advanced monitoring system and communication with New Emax circuit-breaker.



Otomax versions	Retrofitting solution
Otomax produced before 1965 Otomax Fixed Part with pins	Hard Bus Retrofill
 Otomax Fixed part in bad condition (see document 1SDH001279R0002)	
Otomax Fixed Part with levers and in good condition	Cradle in Cradle
	

Accessories incompatible with New Emax

15 external O/C AUX

Homopolar toroid

All accessories mounted on fixed part of New Emax

Mechanical lock for compartment door

Mechanical interlock

Ordering codes

The following Part numbers refer to Otomax with levers (fig A) and include the fixed part of the New Emax and the kit. The standard New Emax moving part must be ordered separately:

Part Numbers

Otomax 3p with lever (Fig A)	Iu [A]	to	New Emax	Circuit-breaker version to order	+	CiC kit Fixed part already included 1SDA0...R1
P1A 800	800	→	E2S 800	MP	+	70222
P1B 800	800	→	E2S 800	MP	+	70222
P2A 800	800	→	E2S 800	MP	+	70222
P1B 1000	1000	→	E2N1000	MP	+	70223
P1C 1000	1000	→	E2N1000	MP	+	70223
P2B 1000	1000	→	E2N1000	MP	+	70223
P2C 1000	1000	→	E2N1000	MP	+	70223
P1B 1250	1250	→	E2N1250	MP	+	70223
P1C 1250	1250	→	E2N1250	MP	+	70223
P1A 1250	1250	→	E2N 1250	MP	+	70224
P2A 1250	1250	→	E2N 1250	MP	+	70224
P1B 1600	1600	→	E2N 1600	MP	+	70224
P1C 1600	1600	→	E2N 1600	MP	+	70224
P2B 1600	1600	→	E2N 1600	MP	+	70224
P1A 1600	1600	→	E3S 1600	MP	+	70225
P2A 1600	1600	→	E3S 1600	MP	+	70225
P1B 2000	2000	→	E3S 2000	MP	+	70225
P1C 2000	2000	→	E3S 2000	MP	+	70225
P2B 2000	2000	→	E3S 2000	MP	+	70225
P2C 2000	2000	→	E3S 2000	MP	+	70225
P2A 2000	2000	→	E3S 2000	MP	+	70226
P3A 1600	1600	→	E3S 1600	MP	+	70226
P3B 2000	2000	→	E3S 2000	MP	+	70226
P3C 2000	2000	→	E3S 2000	MP	+	70226
P3B 2500	2500	→	E3S 2500	MP	+	70226
P3C 2500	2500	→	E3S 2500	MP	+	70226
P1B 2500	2500	→	E3N 2500	MP	+	70231
P1C 2500	2500	→	E3N 2500	MP	+	70231
P2B 2500	2500	→	E3N 2500	MP	+	70231
P2C 2500	2500	→	E3N 2500	MP	+	70231
P2A 3000	3000	→	E4H 3200	MP	+	70232
P3B 3000	3000	→	E4H 3200	MP	+	70232
P3A 3000	3000	→	E4H 3200	MP	+	70232
P3B 3000	3000	→	E4H 3200	MP	+	70232
P2C 3200	3200	→	E4H 3200	MP	+	70232
P3C 3200	3200	→	E4H 3200	MP	+	70232

NOTE: Consult ABB in the case of Otomax fixed parts with pins (Fig. B)
MP = Moving part of circuit-breaker

ACB retrofit kits

Hard Bus Retrofill: Otomax → New Emax - IEC

Description

The Otomax air circuit-breaker made its debut in the 60's and soon became appreciated for its sturdy construction and reliability. Some are still working even today!

But technologies are ever-changing and communication is one of the milestones of modern life.

ABB SACE offers different types of retrofit kits allowing Otomax breakers to be replaced with New Emax versions.

When an advanced retrofitting solution is not available and the fixed part of the old product is no longer in a good condition, hard bus retrofill solutions are the best way to update the system.

Retrofill is a more complete retrofitting solution since there are no accessory limitations (only the mechanical interlock is available between same family circuit-breakers).

The retrofill solution now available is for the Otomax withdrawable 3-pole version.



The kit comprises

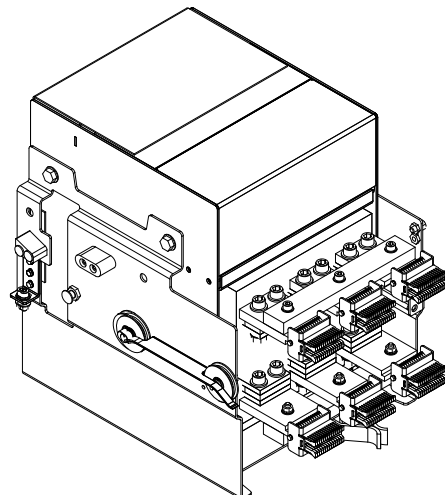
- special copper adapter kits to connect the new generation circuit-breaker terminals to the existing copper bars
- metallic support that matches the same Otomax fixing points
- door flange
- insulating spacers
- assembly instructions.

Benefits

- Guaranteed continuity of service
- Tested installation
- Enhanced safety thanks to New Emax improved technology
- Reduced maintenance costs. Product and its spare parts continue to be available for a long time
- New Emax can be equipped with a wide range of accessories
- Advanced monitoring system and communication with New Emax circuit-breaker.

Limitations

The compartment clearances must be checked before ordering (see page 52).



Ordering codes

The following part numbers refer to Otomax with three poles in the withdrawable version:

Part Numbers

Otomax	Version (terminals)	to	New Emax	In (A) rating plug	Circuit-breaker version to order	+	Retrofill kit 1SDA0...R1
Otomax P1A 800A	W (HR)	→	E1B 800		MP+FP(HR)	+	50748
Otomax P1A 1250A	W (HR)	→	E2N 1250		MP+FP(HR)	+	50750
Otomax P1A 1600A	W (HR)	→	E2B 1600		MP+FP(HR)	+	50751
Otomax P1A 2000A	W (HR)	→	E3N 2500	2000	MP+FP(HR)	+	50753
Otomax P1B 800A	W (HR)	→	E1B 800		MP+FP(HR)	+	50748
Otomax P1B 1000A	W (HR)	→	E1B 1000		MP+FP(HR)	+	50748
Otomax P1B 1600A	W (HR)	→	E2B 1600		MP+FP(HR)	+	50750
Otomax P1B 2000A	W (HR)	→	E2B 2000		MP+FP(HR)	+	50751
Otomax P1B 2500A	W (HR)	→	E3N 2500		MP+FP(HR)	+	50753
Otomax P1C 1250A	W (HR)	→	E1B 1250		MP+FP(HR)	+	50748
Otomax P1C 1600A	W (HR)	→	E2B 1600		MP+FP(HR)	+	50750
Otomax P1C 2000A	W (HR)	→	E2N 2000		MP+FP(HR)	+	50751
Otomax P2A 800A	W (HR)	→	E2N 1000	800	MP+FP(HR)	+	50749
Otomax P2A 1250A	W (HR)	→	E2N 1250		MP+FP(HR)	+	50750
Otomax P2A 1600A	W (HR)	→	E2N 1600		MP+FP(HR)	+	50751
Otomax P2A 2000A	W (HR)	→	E3N 2500	2000	MP+FP(HR)	+	50753
Otomax P2A 3000A	W (HR)	→	E4H 3200		MP+FP(HR)	+	50755
Otomax P2A 4000A	W (HR)	→	E6H 4000		MP+FP(HR)	+	68798
Otomax P2B 1000A	W (HR)	→	E2N 1000		MP+FP(HR)	+	50749
Otomax P2B 1600A	W (HR)	→	E2N 1600		MP+FP(HR)	+	50750
Otomax P2B 2000A	W (HR)	→	E2N 2000		MP+FP(HR)	+	50751
Otomax P2B 2500A	W (HR)	→	E3N 2500		MP+FP(HR)	+	50753
Otomax P2B 3000A	W (HR)	→	E4H 3200		MP+FP(HR)	+	50755
Otomax P2B 4000A	W (HR)	→	E6H 4000		MP+FP(HR)	+	68798
Otomax P2C 1000A	W (HR)	→	E2N 1000		MP+FP(HR)	+	50749
Otomax P2C 1250A	W (HR)	→	E2N 1250		MP+FP(HR)	+	50749
Otomax P2C 1600A	W (HR)	→	E2N 1600		MP+FP(HR)	+	50750
Otomax P2C 2000A	W (HR)	→	E2N 2000		MP+FP(HR)	+	50751
Otomax P2C 2500A	W (HR)	→	E3N 2500		MP+FP(HR)	+	50753
Otomax P2C 3000A	W (HR)	→	E4H 3200		MP+FP(HR)	+	50755
Otomax P2C 3200A	W (HR)	→	E4H 3200		MP+FP(HR)	+	50755
Otomax P2C 4000A	W (HR)	→	E6H 4000		MP+FP(HR)	+	68798
Otomax P2C 4500A	W (HR)	→	E6H 5000		MP+FP(HR)	+	76884
Otomax P3A 1600A	W (HR)	→	E3S 1600		MP+FP(HR)	+	50752
Otomax P3A 2000A	W (HR)	→	E3S 2000		MP+FP(HR)	+	50753
Otomax P3A 3000A	W (HR)	→	E4H 3200		MP+FP(HR)	+	50755
Otomax P3A 4000A	W (HR)	→	E6H 4000		MP+FP(HR)	+	68798
Otomax P3B 2000A	W (HR)	→	E3S 2000		MP+FP(HR)	+	50752
Otomax P3B 2500A	W (HR)	→	E3S 2500		MP+FP(HR)	+	50753
Otomax P3B 3000A	W (HR)	→	E4H 3200		MP+FP(HR)	+	50755
Otomax P3B 4000A	W (HR)	→	E6H 4000		MP+FP(HR)	+	68798
Otomax P3C 2000A	W (HR)	→	E3S 2000		MP+FP(HR)	+	50752
Otomax P3C 2500A	W (HR)	→	E3S 2500		MP+FP(HR)	+	50753
Otomax P3C 3200A	W (HR)	→	E4H 3200		MP+FP(HR)	+	50755
Otomax P3C 4000A	W (HR)	→	E6H 4000		MP+FP(HR)	+	68798

MP = Moving part of circuit-breaker in withdrawable version

FP (HR) = Fixed part of circuit-breaker in withdrawable version with horizontal rear terminals

ACB retrofit kits

Direct Replacement: Novomax G30 → Emax 2 E1.2 - IEC

Description

The old Novomax G30 circuit-breaker can be upgraded with the latest SACE Emax 2 E1.2 using the new type of direct replacement retrofit kit. A SACE Emax 2 E1.2 fixed circuit-breaker with rear horizontal terminals fitted with the SACE Ekip Dip LSI trip unit becomes a special moving part that can be easily racked into the existing G30 fixed part. Even different types of trip units can be supplied to suit the customer's specific requests. The kits allow the new apparatus to be adapted to the dimensional characteristics of the existing compartments. All the obsolete models are replaced with latest generation products. All G30-E1.2 kits are supplied complete with assembly instructions and electric interconnection diagrams. Thanks to this innovative solution, there is no need to disassemble the existing fixed part of Novomax G30. All that needs to be done is to install a device on the fixed part to ensure locking on racking-out, and a segregation to provide IP20 protection when the door is open.



The kit comprises

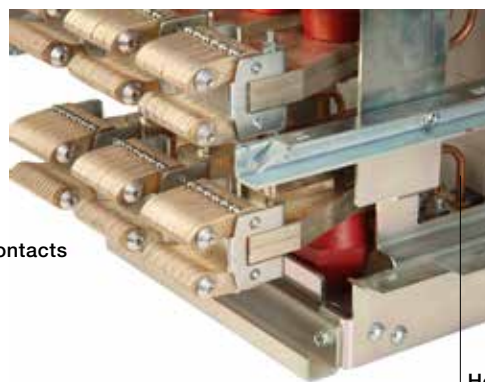
- Dedicated SACE Emax 2 E1.2 special moving part to replace the moving part of Novomax G30
- Fixed part adapter
- User-friendly instructions
- Electric interconnection diagrams

The special moving part of SACE Emax 2 consists of:

- A new withdrawable mechanism that reproduces the in/out positions of Novomax G30
- As the standard Emax 2 E1.2 is without many of the auxiliary contacts that G30 used to have, the kit includes an extra 15 AUX to complete the G30 installation
- G30 jaw contacts
- Heating pipes to maintain temperature within constant limits
- Dedicated racking in/out guides.

Benefits

- Less expensive than the investment required for installing brand-new switchgear
- Takes less time to install. Plant downtime can be planned over time, thereby improving continuity of service.
- Reduced maintenance and repair costs
- Investments in existing structures safeguarded
- Full interconnection with existing distribution systems
- Immediate, simple and safe replacement
- No structural changes
- Adaptations to auxiliary circuits
- Improved control over the installation thanks to the new electronic protections that enhance electrical plant efficiency and create a new standard of:
 - control: optimized power flow
 - connectivity: integration with other systems
 - performance: compliance with requirements
 - ease of use: efficient and simple operation.



Jaw contacts

Racking-in guides

Heating pipes

Limitations

Direct replacement kits can only be used if the fixed part is in a good condition. The customer should make sure it is not damaged and check the service conditions, auxiliary contact wear, cleanliness, etc.

More details are given in document: 1SDH001279R0002
The compartment clearances must be checked before ordering (see page 52). Emax 2 modules must be externally wired by the customer. IN/TEST/OUT positions cannot be indicated for any module.

Accessories incompatible with SACE Emax 2

External O/C AUX
ATS
Lock for in/test/out positions
Mechanical lock for compartment door
Mechanical interlock
All accessories for fixed part of Emax

Compatible accessories

Novomax G30	to	SACE Emax 2 E1.2
YO (shunt opening release)	→	E1.2 standard YO
YC (shunt closing release)	→	E1.2 standard YC
YU (undervoltage release)	→	E1.2 standard YU
D (pneumatic Delay for YU)	→	Replace the G30 pneumatic delay in switchgear with E1.2
M (spring loading motor)	→	E1.2 standard spring loading motor M
AUX spring loaded (S33M)	→	Standard E1.2
AUX Circuit-breaker tripped – S51	→	E1.2 standard changeover contacts
Qx (Open/Close AUX contacts)	→	E1.2 standard AUX
Key lock in open position	→	Standard E1.2
Padlock in open position	→	Standard E1.2
Mechanical operation counter	→	Standard E1.2
Transparent protective cover for O/C push-buttons	→	Standard E1.2
IP54 door protection	→	Standard E1.2

Compatible accessories

Novomax G30 Trip unit	to	E1.2 Trip units
K	→	Ekip Dip LI, or higher level
Ks	→	Ekip Dip LSI, or higher level
Ksi	→	Ekip Dip LSI, or higher level
KM	→	Ekip High Touch with L off rating plug (*)
KMs	→	Ekip High Touch with L off rating plug (*)
KMsi	→	Ekip High Touch with L off rating plug (*)
KE	→	Ekip Touch with L off rating plug, or higher level
KEs	→	Ekip Touch with L off rating plug, or higher level

(*) M protection requires Double S protection. Ekip Hi Touch includes a voltmeter module connected to lower terminals.

Ordering codes

The following part numbers include E1.2 equipped with Ekip DIP LSI, without accessories.

Part Numbers

Novomax G30	In [A]	to	Emax 2 E1.2	3 poles equipped with Ekip DIP LSI* 1SDA0...R1	4 poles equipped with Ekip DIP LSI* 1SDA0...R1
G30	800	→	E1.2N 800	81653	81654
G30	1250	→	E1.2N 1250	81655	81656
G30	1600	→	E1.2N 1600	81657	81658

* = if accessories or other trip units are required already installed, they can be ordered from your Local ABB Sales Organization.

ACB retrofit kits

Direct Replacement:

Novomax/Megamax (Open Door) → New Emax - IEC

Description

The old Novomax circuit-breaker series (G2 and LG) and Megamax circuit-breaker series (F1 and F2) in the open door, withdrawable version can be replaced with the recent New Emax circuit-breaker series using the direct replacement advanced retrofit kit.

A special moving part is created starting from the new circuit-breaker in the fixed version with horizontal rear terminals and a special conversion kit.

The result is a new New Emax moving part that can be racked into the existing fixed part of Megamax.

The old circuit-breaker's open door withdrawable mechanism is perfectly reproduced in the New Emax circuit-breaker so as to maintain the original system.

The kit comprises

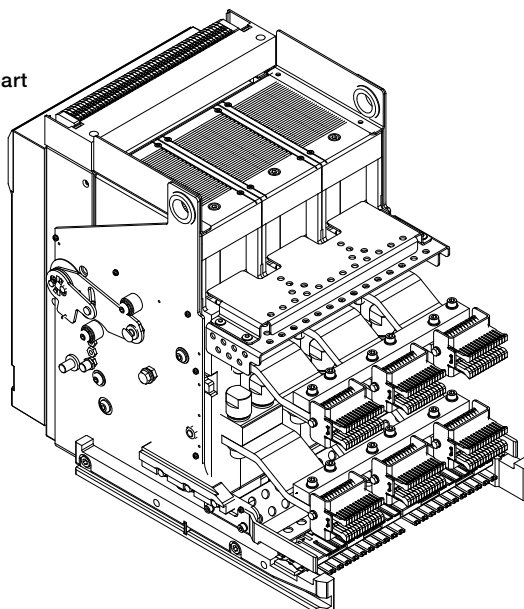
- Dedicated New Emax moving part to replace the moving part of Megamax.
- Metallic adapter plates for the new compartment door flange.
- User-friendly instructions.

The special moving part of New Emax consists of:

- A new withdrawable mechanism that reproduces the in/out positions of Novomax/Megamax OD by using the same Novomax in/out withdrawing lever. Even the Novomax/Megamax IN/OUT push-button is reproduced on the New Emax moving part.
- Novomax/Megamax standard male sliding contacts for connecting to the female part on the fixed part of Novomax/Megamax: all the wiring is included, so the customer can easily replace the moving part of Megamax with the special moving part of New Emax.
- the new breaker has levers for activating the Novomax/Megamax standard O/C AUX contacts installed on the fixed part.



New Emax special moving part preassembled in ABB



Insulating plate

Benefits

- No need to dismantle the fixed part of the Novomax/Megamax circuit-breaker
- Enhanced safety
- Guaranteed continuity of service
- Easy to install
- Reduced maintenance and spare parts costs
- Product and its spare parts continue to be available for a long time
- Conversion wiring included
- Guaranteed solution as tested
- New Emax can be equipped with a wide range of accessories
- Accessories pre-wired to suit the original trip unit:
 - for Novomax: S1, T or S2
 - for Megamax: PR1/P, AR1
- Advanced monitoring system
- Power measurement, monitoring and communication.

Limitations

Direct replacement kits can only be used if the existing fixed part is in a good condition. In the specific case of Megamax, the fixed part must be in the condition described in document 1SDH001279R0002.

The compartment clearances must be checked before ordering (see page 52).

Emax 2 modules must be externally wired by the customer. IN/TEST/OUT positions cannot be indicated for any module.



Accessories incompatible with New Emax

Internal and external O/C AUX
Remote reset command for tripped indication
ATS
Homopolar toroid
Lock for in/test/out positions
Mechanical lock for compartment door
Mechanical interlock
New Emax lift device
RRD
All accessories for fixed part of New Emax

Accessories compatible with New Emax that need external wiring

Electric TU reset
PR120/K
PR12/D-M
HMI030
EP010

ACB retrofit kits

Direct Replacement: Novomax/Megamax (Open Door) → New Emax - IEC

Compatible accessories

Novomax	to	New Emax
YO (shunt opening release)	→	New Emax standard YO
YC (shunt closing release)	→	New Emax standard YC
YU (undervoltage release)	→	New Emax standard YU
D (pneumatic Delay for YU)	→	Use standard New Emax version to be wired into switchgear
M (spring loading motor)	→	New Emax standard spring loading motor
AUX spring loaded (33M2)	→	Standard New Emax
AUX circuit-breaker tripped - Sr	→	Standard New Emax changeover contacts
AUX circuit-breaker connected/ isolated position - S75S-S75I	→	Included in the sliding contacts (standard supply)
Q1...Q25 (open/close AUX contacts)	→	Use same one as Novomax on fixed part
Novomax shutter padlock device	→	Use Novomax version
Current sensor for neutral conductor outside circuit-breaker (in switchgear)	→	Remove Novomax version and install standard New Emax version
Key lock in open position	→	Standard New Emax
Padlock in open position	→	Standard New Emax
Mechanical operation counter	→	Standard New Emax
IP54 door protection	→	Standard New Emax
Transparent protective cover for O/C push-buttons	→	Standard New Emax
SOR Test Unit	→	Standard New Emax version to be wired into switchgear

Compatible accessories

Megamax	to	New Emax
YO (shunt opening release)	→	New Emax standard YO
YC (shunt opening release)	→	New Emax standard YC
YU (undervoltage release)	→	New Emax standard YU
D (electronic delay for YU - in switchgear)	→	Remove Megamax version and install New Emax version
M (spring loading motor)	→	New Emax standard spring loading motor
AUX spring loaded (S33M)	→	Standard New Emax
AUX circuit-breaker tripped - S51	→	Standard New Emax changeover contacts
AUX circuit-breaker connected/ isolated position - S75S-S75I	→	Included in the sliding contacts (standard supply)
AUX YU (YU energized)	→	Standard New Emax
PR1/A (ammeter module)	→	Only with PR122/3
PR1/C (control module)	→	No longer available
PR1/D (Insum dialog module)	→	No longer available
Q1...Q25 (open/close AUX contacts)	→	Use same one as Megamax on fixed part
SD devices	→	No longer available
TV 051 (voltage transformer)	→	No longer available. Use internal PR120/V module
Megamax shutter padlock device	→	Use Megamax version
Current sensor for neutral conductor outside circuit-breaker (in switchgear)	→	Remove Megamax version and install standard New Emax version
Key lock in open position	→	Standard New Emax
Padlock in open position	→	Standard New Emax
Mechanical operation counter	→	Standard New Emax
IP54 door protection	→	Standard New Emax
Transparent protective cover for O/C push-buttons	→	Standard New Emax
SOR Test Unit	→	Standard New Emax

Ordering codes

The following part numbers include New Emax equipped with PR121/LSI, without accessories. If accessories or other trip units are required already installed, they can be ordered from your Local ABB Sales Organization.

Part Numbers

Novomax (trip unit)	In [A]	to	New Emax	In (Rating Plug) [A]	3 poles - equipped with PR121/LSI* 1SDA0...R1	4 poles - equipped with PR121/LSI* 1SDA0...R1
G2 (S2)	1250	→	E2N	1250	76626	76632
G2 (S2)	1600	→	E2N	1600	76627	76633
G2 (S2)	2000	→	E2N	2000	76628	76634
G2 (S1/T)	1250	→	E2N	1250	76629	76635
G2 (S1/T)	1600	→	E2N	1600	76630	76636
G2 (S1/T)	2000	→	E2N	2000	76631	76637
LG (S2)	1250	→	E2L	1250	76638	76642
LG (S2)	1600	→	E2L	1600	76639	76643
LG (S1/T)	1250	→	E2L	1250	76640	76644
LG (S1/T)	1600	→	E2L	1600	76641	76645

* = if accessories or other trip units are required already installed, they can be ordered from your Local ABB Sales Organization.

Megamax	In [A]	W (OD)	to	New Emax	In (Rating Plug) [A]	3 poles - equipped with PR121/LSI* 1SDA0...R1	4 poles - equipped with PR121/LSI* 1SDA0...R1
F1B	1250	OD	→	E2B	1250	76321	76338
F1B	1600	OD	→	E2B	1600	76324	76339
F1B	2000	OD	→	E2B	2000	76325	76340
F1N	1250	OD	→	E2N	1250	76326	76341
F1N	1600	OD	→	E2N	1600	76327	76342
F1N	2000	OD	→	E2N	2000	76328	76343
F1S	1250	OD	→	E2N	1250	76329	76344
F1S	1600	OD	→	E2N	1600	76330	76345
F1S	2000	OD	→	E2N	2000	76331	76346
F1H	1250	OD	→	E2S	1250	76332	76347
F1H	1600	OD	→	E2S	1600	76333	76348
F1V	1250	OD	→	E2L	1250	76334	76349
F1V	1600	OD	→	E2L	1600	76335	76350
F1L	1250	OD	→	E2L	1250	76336	76351
F1L	1600	OD	→	E2L	1600	76337	76352
F2H	2000	OD	→	E2S	2000	76353	76358

* = if accessories or other trip units are required already installed, they can be ordered from your Local ABB Sales Organization.

ACB retrofit kits

Hard Bus Retrofill: Novomax → New Emax - IEC

Description

Novomax and Megamax air circuit-breakers are obsolete and no longer produced. ABB supports customers by developing special adapter kits so that Novomax can be replaced by more modern technologies. The retrofit kits proposed by ABB SACE allow Novomax breakers to be replaced with New Emax versions.

The kit includes copper adapter bars to connect the new breaker terminals to the existing busbar terminals.

The kit comprises

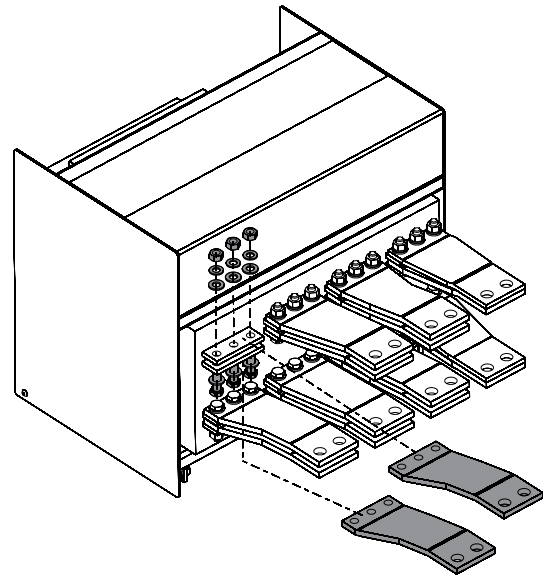
- special copper adapter kits to connect the new generation circuit-breaker terminals to the existing copper bars
- door flange
- assembly instructions.

Benefits

- Guaranteed continuity of service.
- Tested installation
- Enhanced safety thanks to New Emax improved technology.
- Reduced maintenance costs. Product and its spare parts continue to be available for a long time.
- New Emax can be equipped with a wide range of accessories.
- Advanced monitoring system and communication with New Emax circuit-breaker.

Limitations

Check compartment dimensions: see page 52.



Part Numbers

Novomax	Version (terminals)	to	New Emax	Derating Iu [A]	Circuit-breaker version to order	+	Retrofill kit	
							3 poles 1SDA0...R1	4 poles 1SDA0...R1
G30 800A	W (HR)	→	E1N 800A		MP + FP (HR)	+	50758	50760
G30 1250A	W (HR)	→	E1N 1250A		MP + FP (HR)	+	50758	50760
G30 1600A	W (HR)	→	E2N 1600A		MP + FP (HR)	+	50757	50759
G2 1250A	W (HR)	→	E2N 1250A		MP + FP (HR)	+	63819	63821
G2 1600A	W (HR)	→	E2N 1600A		MP + FP (HR)	+	66014	66015
G2 2000A	W (HR)	→	E2N 2000A	1800	MP + FP (HR)	+	63820	63822
G2 2500A	W (HR)	→	E3N 2500A		MP + FP (HR)	+	69046	69047
G3 2000A	W (HR)	→	E3S 2000A		MP + FP (HR)	+	69048	69049
G3 2500A	W (HR)	→	E3S 2500A		MP + FP (HR)	+	69048	69049
G4 3200A	W (HR)	→	E3S 3200A	2450	MP + FP (HR)	+	69050	69051

W (HR) = Circuit-breaker in withdrawable version with horizontal rear terminals

MP = Moving part of circuit-breaker in withdrawable version

FP (HR) = Fixed part of circuit-breaker in withdrawable version with horizontal rear terminals

ACB retrofit kits

Direct Replacement: Megamax (Closed Door) → Emax 2 - IEC

Description

The Megamax series of withdrawable circuit-breakers (F1 and F2) in the closed door version can be upgraded with the specially built moving part of Emax 2 already equipped with a dedicated conversion kit. The result is an Emax 2 E2.2 moving part that can be racked into the fixed part of the existing Megamax. Thanks to this solution, there is no need to dismantle any of the existing fixed parts of Megamax breakers or to rewire the auxiliary circuit to replace existing functionalities. Downtime is cut to the minimum and limited to the single load.

Even the racking-in and racking-out mechanism of the existing circuit-breaker is reproduced by the Emax 2 retrofitting solution so as to maintain the original switchgear configuration. The Emax 2 racking-in and -out device has a push button to unlock the mechanism in the 3 positions: Connected – Test – Disconnected.

The kit comprises

A special Emax 2 moving part to replace the moving part of Megamax that always comes equipped with:

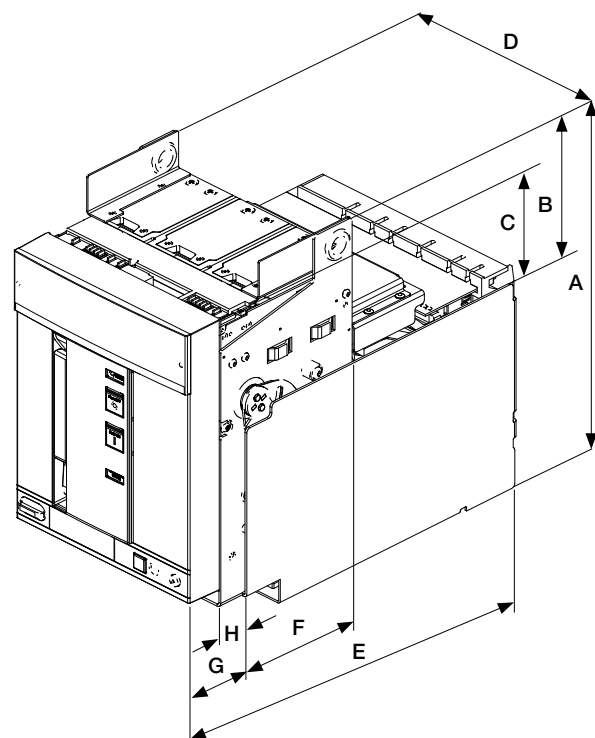
- Emax 2 breaker with dedicated jaw-type contacts to match the moving part of Megamax
- Emax 2 withdrawable mechanism that reproduces the in/test/out positions of Megamax by using the Emax 2 racking-in/out lever.
- Megamax standard male left- and right-side sliding contacts for connecting to the female contacts on the fixed part of Megamax: wiring is included.
- The new breaker has levers for activating the Megamax standard Open/Closed AUX contacts installed on the fixed part.
- Dedicated wiring solutions to suit the original trip unit installed on the Megamax circuit breaker
- An additional matching connecting device must be installed on the fixed part of Megamax
- Adhesive template for adaptation of compartment door
- Racking-in/out handle
- Door flange
- Lifting eyebolt
- Installation instructions.

Dimensions

DR Megamax - Emax 2	F1 - E2.2 3p	F1 - E2.2 4p	F2 - E2.2 3p	F2 - E2.2 4p
A [mm/in]	480/18.9	480/18.9	480/18.9	480/18.9
B [mm/in]	215/8.5	215/8.5	215/8.5	215/8.5
C [mm/in]	180/7.1	180/7.1	180/7.1	180/7.1
D [mm/in]	327/12.9	422/16.6	411/16.2	506/20
E [mm/in]	515/20.3	515/20.3	515/20.3	515/20.3
F [mm/in]	230/9.06	230/9.06	230/9.06	230/9.06
G [mm/in]	80/3.15	80/3.15	80/3.15	80/3.15
H [mm/in]	25/0.99	25/0.99	25/0.99	25/0.99

Benefits

- Enhanced safety
- Guaranteed continuity of service
- Easy installation
- Reduced maintenance and spare parts costs
- Product and its spare parts continue to be available for a long time
- Conversion wiring included
- Factory tested solution
- Wide range of mechanical and electrical accessories
- Advanced monitoring system
- Power measurement, monitoring and communication
- The circuit-breaker becomes a Power Manager
- SACE Emax 2 improves the efficiency of electrical plants and creates a new standard of:
 - control: Ekip PowerController for improving energy efficiency and saving
 - connectivity: integration into systems with integrated communication modules with different protocols: Modbus RS-485, Modbus TCP, Profibus, DeviceNet, EtherNet/IP, IEC61850, Bluetooth
 - power measurement with Emax 2 advanced trip units
 - easy maintenance; diagnosis and installation with Ekip Connect Software. Programmed signals remind the user to perform maintenance when due.



Accessories incompatible with Emax 2

- Internal and external O/C AUX
- Remote reset command for tripped indication
- ATS
- Homopolar toroid
- Mechanical lock for compartment door
- Mechanical interlock
- Lock for in/test/out positions
- All accessories for fixed part of Emax 2

Emax 2 accessories that are compatible but need to be externally cabled

- Electric remote Trip Unit reset
- Ekip Supply module
- Ekip Communication module
- Ekip Multimeter
- Ekip Control Panel
- Ekip Signaling module

IN/TEST/OUT positions cannot be indicated for any module.

Megamax Trip units installed in Megamax that can be replaced with the corresponding Emax 2 version:

AR1



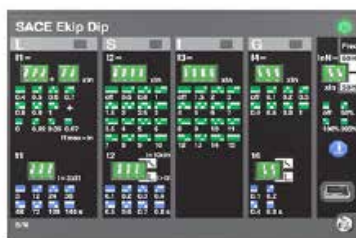
Ekip Dip



PR1/P LSIG



Ekip Dip



PR1/P LSIG with PR1/A



Ekip Touch



PR1/P LSIG with PR1/C and PR1/D



Ekip Hi-Touch with Ekip Measuring Pro



ACB retrofit kits

Direct Replacement: Megamax (Closed Door) → Emax 2 - IEC

Megamax	to	Emax 2
PR1/A (Ammeter module)	→	Only with Ekip Touch or Ekip Hi-Touch*
PR1/C (Control module)	→	Other measurements are available with: - Ekip Touch c/w Ekip Measuring Pro - Ekip Hi-Touch*
PR1/D (Insum dialog module)	→	Insum com module is not available. Other protocols are available. SCADA adaptation is required
Q1...Q25 (Open/Close AUX contacts)	→	Use same as Megamax on fixed part
SD devices	→	No longer available
Current sensor for neutral conductor outside circuit-breaker (in switchgear)	→	Remove Megamax version and install standard Emax 2 version
TV 051 (voltage transformer)	→	No longer available. Use internal Ekip Measuring Pro module

* In the case of Ekip Hi-touch, voltage module is connected to lower terminals. For connection to upper terminals, add the dedicated part number (see Emax 2 catalog).

Electrical and mechanical accessories installed in Megamax that can be replaced with the corresponding Emax 2 version:

Compatible accessories		
Megamax accessories	to	Emax 2
YO (shunt opening release)	→	Emax2 standard YO
YC (shunt closing release)	→	Emax2 standard YC
YU (undervoltage release)	→	Emax2 standard YU
D (electronic delay for YU - in switchgear)	→	Remove Megamax version and install standard Emax 2 version
M (spring loading motor)	→	Emax 2 standard spring loading motor
AUX spring loaded (S33M)	→	Included in standard Emax 2 motor
AUX CB tripped - S51	→	Emax2 standard changeover contacts
AUX CB connected/ isolated position - S75S-S75I	→	Included in the sliding contacts (standard supply)
AUX YU (YU energized)	→	Standard Emax 2
Q1...Q25 (Open/Close AUX contacts)	→	Use same as Megamax on fixed part
Megamax Shutter padlock device	→	Use Megamax version
Mechanical interlock between 2 or 3 circuit-breakers	→	Non compatible with DR
Key lock in open position	→	Standard Emax 2
Padlock in open position	→	Standard Emax 2
Key lock and Padlock devices for connected/test/isolated positions	→	Standard Emax 2
Mechanical signaling of circuit breaker tripped	→	Standard Emax 2 (standard supply)
Mechanical operation counter	→	Standard Emax 2
IP54 door protection	→	Remove Megamax version and install standard Emax 2 version
Transparent protective cover for O/C push-buttons	→	Standard Emax 2
SOR Test Unit	→	Remove Megamax version and install standard Emax 2 version

The following Emax2 accessories are not compatible with the Emax2 Direct Replacement kit:

Mechanical interlock between 2 or 3 circuit breakers (use Retrofill solution or double redundancy electrical interlock)
Mechanical lock for compartment door
Homopolar toroid
Internal and external O/C AUX (as already present in fixed part of Megamax)
All accessories for fixed part of New Emax

The following accessories can be installed but must be externally cabled from Emax Terminal Board at the customer's charge (wiring and Plug-Socket are not included):

Remote reset command for tripped indication
Ekip Supply, Communication and Signaling modules
Ekip Multimeter
Ekip Control Panel

Ordering codes

The following part numbers include Emax 2 equipped with Ekip Dip LSI, without accessories. If accessories or other trip units are required already installed, they can be ordered from your Local ABB Sales Organization.

Part Numbers

Megamax (CD)	W (OD)	to	Emax 2	In (Rating Plug) [A]	Derating [A]	3 poles - equipped with Ekip Dip LSI 1SDA0...R1	4 poles - equipped with Ekip Dip LSI 1SDA0...R1
F1B 1250	W (CD)	→	E2.2B 1600	1250		80716	80717
F1B 1600	W (CD)	→	E2.2B 1600			80718	80719
F1B 2000	W (CD)	→	E2.2B 2000			80720	80721
F1N 1250	W (CD)	→	E2.2N 1250			80760	80763
F1N 1600	W (CD)	→	E2.2N 1600			80761	80764
F1N 2000	W (CD)	→	E2.2N 2000			80762	80765
F1S 1250	W (CD)	→	E2.2N 1250			80722	80725
F1S 1600	W (CD)	→	E2.2N 1600			80723	80726
F1S 2000	W (CD)	→	E2.2N 2000			80724	80727
F1H 1250	W (CD)	→	E2.2H 1250			80728	80730
F1H 1600	W (CD)	→	E2.2H 1600			80729	80731
F2H 2000	W (CD)	→	E2.2H 2000			80732	80733
F2H 2500	W (CD)	→	E2.2H 2500		2400*	80734	80735
F2S 2500	W (CD)	→	E2.2N 2500		2400*	80736	80737
F1B/MS 1250	W (CD)	→	E2.2B/MS 1600			76334	76335
F1B/MS 1600	W (CD)	→	E2.2B/MS 1600			76334	76335
F1B/MS 2000	W (CD)	→	E2.2B/MS 2000			76349	76350
F1N/MS 1250	W (CD)	→	E2.2N/MS 1250			76354	76357
F1N/MS 1600	W (CD)	→	E2.2N/MS 1600			76355	76359
F1N/MS 2000	W (CD)	→	E2.2N/MS 2000			76356	76360
F1S/MS 1250	W (CD)	→	E2.2N/MS 1250			76354	76357
F1S/MS 1600	W (CD)	→	E2.2N/MS 1600			76355	76359
F1S/MS 2000	W (CD)	→	E2.2N/MS 2000			76356	76360
F2S/MS 2500	W (CD)	→	E2.2N/MS 2500		2400*	76361	76362

* = derating only with horizontal rear terminals. No derating with vertical terminals

W (CD) = withdrawable circuit-breaker in closed door version

ACB retrofit kits

Hard Bus Retrofill: Megamax → Emax 2 - IEC

Description

Production of Megamax air circuit-breakers ceases within the end of 2016. ABB supports customers with special adapter kits so that Megamax breakers can be replaced by more modern technologies. ABB SACE offers different types of retrofit kits allowing Megamax breakers to be replaced with Emax 2 versions.

Retrofill is a more complete retrofitting solution since there are no accessory limitations (only the mechanical interlock is available for the same family of circuit-breakers).

The kit comprises

- special fixed part already equipped with adapter terminals to connect the new circuit-breaker to the existing system of copper bars
- door flange
- assembly instructions.

Benefits

- Guaranteed continuity of service.
- Tested installation
- Enhanced safety thanks to Emax 2 advanced technology.
- Reduced maintenance costs. Product and its spare parts continue to be available for a long time.
- Emax 2 can be equipped with a wide range of accessories.
- Advanced monitoring system and communication with modern circuit-breakers.

Limitations

The compartment clearances must be checked before ordering. See page 52.

Part Numbers

Megamax	Version (terminals)	to	Emax 2	In (Rating Plug) [A]	Derating [A]	Circuit-breaker version to order	+	3 poles - Fixed part included 1SDA0...R1	4 poles - Fixed part included 1SDA0...R1
F1B 1250A	W (HR)	→	E2.2B 1600	1250	-	MP	+	82718	82719
F1B 1250A	W (VR)	→	E2.2B 1600	1250	-	MP	+	82720	82721
F1B 1250A	W (F)	→	E2.2B 1600	1250	-	MP	+	82722	82723
F1B 1600	W (HR)	→	E2.2B 1600	-	-	MP	+	82718	82719
F1B 1600	W (VR)	→	E2.2B 1600	-	-	MP	+	82720	82721
F1B 1600	W (F)	→	E2.2B 1600	-	-	MP	+	82722	82723
F1B 2000	W (HR)	→	E2.2B 2000	-	-	MP	+	82718	82719
F1B 2000	W (VR)	→	E2.2B 2000	-	-	MP	+	82720	82721
F1B 2000	W (F)	→	E2.2B 2000	-	-	MP	+	82722	82723
F1H 1250	W (HR)	→	E2.2H 1250	-	-	MP	+	82718	82719
F1H 1250	W (VR)	→	E2.2H 1250	-	-	MP	+	82720	82721
F1H 1250	W (F)	→	E2.2H 1250	-	-	MP	+	82722	82723
F1H 1600	W (HR)	→	E2.2H 1600	-	-	MP	+	82718	82719
F1H 1600	W (VR)	→	E2.2H 1600	-	-	MP	+	82720	82721
F1H 1600	W (F)	→	E2.2H 1600	-	-	MP	+	82722	82723
F1N 1250A	W (HR)	→	E2.2N 1250	-	-	MP	+	82718	82719
F1N 1250A	W (VR)	→	E2.2N 1250	-	-	MP	+	82720	82721
F1N 1250A	W (F)	→	E2.2N 1250	-	-	MP	+	82722	82723
F1N 1600	W (HR)	→	E2.2N 1600	-	-	MP	+	82718	82719
F1N 1600	W (VR)	→	E2.2N 1600	-	-	MP	+	82720	82721
F1N 1600	W (F)	→	E2.2N 1600	-	-	MP	+	82722	82723
F1N 2000	W (HR)	→	E2.2N 2000	-	-	MP	+	82718	82719
F1N 2000	W (VR)	→	E2.2N 2000	-	-	MP	+	82720	82721
F1N 2000	W (F)	→	E2.2N 2000	-	-	MP	+	82722	82723
F1S 1250	W (HR)	→	E2.2S 1250	-	-	MP	+	82718	82719
F1S 1250	W (VR)	→	E2.2S 1250	-	-	MP	+	82720	82721
F1S 1250	W (F)	→	E2.2S 1250	-	-	MP	+	82722	82723
F1S 1600	W (HR)	→	E2.2S 1600	-	-	MP	+	82718	82719
F1S 1600	W (VR)	→	E2.2S 1600	-	-	MP	+	82720	82721
F1S 1600	W (F)	→	E2.2S 1600	-	-	MP	+	82722	82723
F1S 2000	W (HR)	→	E2.2S 2000	-	-	MP	+	82718	82719
F1S 2000	W (VR)	→	E2.2S 2000	-	-	MP	+	82720	82721
F1S 2000	W (F)	→	E2.2S 2000	-	-	MP	+	82722	82723

Megamax	Version (terminals)	to	Emax 2	In (Rating Plug) [A]	Derating [A]	Circuit-breaker version to order	+	3 poles - Fixed part included 1SDA0...R1	4 poles - Fixed part included 1SDA0...R1
F2H 2000A	W (F)	→	E2.2H 2500	2000	-	MP	+	82724	82725
F2H 2000A	W (HR)	→	E2.2H 2500	2000	-	MP	+	82726	82727
F2H 2500A	W (F)	→	E2.2H 2500	-	-	MP	+	82724	82725
F2H 2500A	W (HR)	→	E2.2H 2500	-	-	MP	+	82726	82727
F2S 2000A	W (F)	→	E2.2S 2500	2000	-	MP	+	82724	82725
F2S 2000A	W (HR)	→	E2.2S 2500	2000	-	MP	+	82726	82727
F2S 2500A	W (F)	→	E2.2S 2500	-	-	MP	+	82724	82725
F2S 2500A	W (HR)	→	E2.2S 2500	-	-	MP	+	82726	82727
F3S 1250A	W (VR)	→	E2.2H 2500	1250	-	MP	+	82728	82729
F3S 1250A	W (HR)	→	E2.2H 2500	1250	-	MP	+	82730	82731
F3S 1600A	W (VR)	→	E2.2H 2500	1600	-	MP	+	82728	82729
F3S 1600A	W (HR)	→	E2.2H 2500	1600	-	MP	+	82730	82731
F3S 2000A	W (VR)	→	E2.2H 2500	2000	-	MP	+	82728	82729
F3S 2000A	W (HR)	→	E2.2H 2500	2000	-	MP	+	82730	82731
F3S 3000A	W (VR)	→	E4.2H 3200	-	-	MP	+	82732	82733
F4S 3200A	W (HR)	→	E4.2H 3200	-	-	MP	+	82734	82735
F4S 3600A	W (VR)	→	E4.2H 4000	-	-	MP	+	82736	82737
F5H 3200A	W (HR)	→	E4.2V 4000	-	-	MP	+	82738	82739
F5H 3200A	W (VR)	→	E4.2V 3200	-	-	MP	+	82740	82741
F5H 4000A	W (HR)	→	E4.2V 4000	-	3400	MP	+	82742	82743
F5H 4000A	W (VR)	→	E4.2V 4000	-	3920	MP	+	82744	82745
F5H 5000A	W (VR)	→	E6.2V 5000	-	-	MP	+	82746	82747
F6H 6300A	W (VR)	→	E6.2V 6300	-	-	MP	+	82748	-
F5S 3200A	W (HR)	→	E4.2H 4000	-	-	MP	+	82738	82739
F5S 3200A	W (VR)	→	E4.2H 3200	-	-	MP	+	82740	82741
F5S 4000A	W (HR)	→	E4.2H 4000	-	3400	MP	+	82742	82743
F5S 4000A	W (VR)	→	E4.2H 4000	-	3920	MP	+	82744	82745
F5S 5000A	W (VR)	→	E6.2H 5000	-	-	MP	+	82746	82747
F6S 6300A	W (VR)	→	E6.2H 6300	-	-	MP	+	82748	-

W (HR) = Circuit-breaker in withdrawable version with horizontal rear terminals

W (VR) = Circuit-breaker in withdrawable version with vertical rear terminals

W (F) = Circuit-breaker in withdrawable version with front terminals

MP = Moving part of circuit-breaker in withdrawable version

The availability of these kits will be communicated during 2017.

For more details visit the Webpage Retrofit-kit Selector



ACB retrofit kits

Direct Replacement: Emax → New Emax - IEC

Description

Emax withdrawable circuit-breakers E1 to E6 (IEC) can be easily replaced with the more recent series of New Emax breakers using the newly designed direct replacement retrofit kit. A dedicated moving part of New Emax (IEC) has been created based on the new circuit-breaker, so as to reproduce the main and auxiliary circuit of Emax.

The result is a special version of the New Emax moving part, which can be directly inserted into the fixed part of the old Emax, maintaining the original connections in the switchgear. Thanks to this solution, there is no need to dismantle any of the existing fixed parts of the Emax breakers or to rewire them. Downtime is reduced and limited to the single load.

The kit comprises

- special New Emax moving part
- dedicated wiring that reproduces the PR11x solutions
- withdrawing lever
- door flange
- mechanical signaling of circuit-breaker tripped
- dedicated anti-insertion lock as for old Emax fixed part
- lifting plates and withdrawing lever



Benefits

- Guaranteed continuity of service.
- Easy to install.
- Reduced maintenance and spare parts costs.
- Product and its spare parts continue to be available for a long time.
- Conversion wiring included.
- Guaranteed tested solution.
- New Emax can be equipped with a wide range of accessories.
- Accessories pre-wired to suit the original trip unit (PR111 → PR121, PR112 → PR122 and PR113 → PR123).
- Advanced monitoring system.
- Advanced communication with PR120 D-M, monitoring and power measurement capabilities are available with new circuit-breaker (PR122 and PR123).

The New Emax breaker comes with a new trip unit. Conversions are listed in the table below.



PR111/P-LI
PR111/P-LSI
PR111/P-LSIG

PR121-LI
PR121-LSI
PR121-LSIG

PR112/P-LSI
PR112/P-LSIG
PR112/PDM-LSI
PR112/PDL-LSI
PR112/PDL-LSIG

PR122-LSI with PR120/K
PR122-LSIG with PR120/K
PR122-LSI with PR120/K & PR120/D (*)
PR122-LSIG with PR120/K & PR120/D (*)
No replacement
No replacement



PR113/P-LSIG
PR113/PDM-LSIG

PR123-LSIG with PR120/K
PR123-LSIG with PR120/K & PR120/D (*)



(*) The New Emax Dialog unit has a different Modbus Protocol interface. Replacement requires modification of Scada systems for use of new parameters (not included)

ACB retrofit kits

Direct Replacement: Emax → New Emax - IEC

Compatible accessories

Emax	to	New Emax
YO (shunt opening release)	→	Same New Emax YO (shunt opening release)
YO2 (second shunt opening release)	→	YO2 (second shunt opening release)
YC (shunt closing release)	→	Same New Emax YC (shunt closing release)
YU (undervoltage release)	→	Same New Emax YU (undervoltage release)
D (electronic delay for YU - in switchgear)	→	D (electronic delay for YU - in switchgear)
M (spring loading motor)	→	Same New Emax M (spring loading motor)
AUX spring loaded (S33M)	→	AUX spring loaded (S33M)
AUX circuit-breaker tripped - S51	→	AUX circuit-breaker tripped - S51
AUX YU (YU energized) (not with PR113)	→	AUX YU (YU energized) (not with PR123)
Q1...Q4 (open/close AUX contacts)	→	Q1...Q4 (open/close AUX contacts)
Q1...Q10 (open/close AUX contacts - for PR111)	→	Q1...Q10 (open/close AUX contacts - for PR121)
Internal programmable contact with PR120/K (not with PR111)	→	Internal programmable contact with PR120/K (not with PR121)
SOR Test Unit	→	SOR Test Unit
Key lock in open position	→	Key lock in open position
Padlock in open position	→	Padlock in open position
Mechanical operation counter	→	Mechanical operation counter
Lock in/test/out position	→	Lock in/test/out position
Mechanical lock for compartment door	→	Mechanical lock for compartment door
IP54 door protection	→	IP54 door protection
Transparent protective cover for O/C push-buttons	→	Transparent protective cover for O/C push-buttons
Mechanical interlock with other Emax breakers	→	Mechanical interlock with other Emax breakers

(*) M protection requires Double S protection

Accessories incompatible with New Emax

Remote reset command for tripped indication
Homopolar toroid for residual current protection

Accessories compatible with New Emax that can be installed but externally cabled

SOR Test Unit
Current sensor for neutral conductor outside circuit-breaker (in switchgear)
TV (external voltage transformer)
New Emax Lift Device
PR120/D-M (*)
HMI030
EP010
RRD

(*) The New Emax Dialog unit has a different Modbus Protocol interface.
Replacement requires modification of Scada systems for use of new parameters (not included)

Ordering codes

The following part numbers include New Emax equipped with PR121/LSI, without accessories.

If accessories or other trip units are required already installed, they can be ordered from your Local ABB Sales Organization.

There are no deratings.

Part Numbers

Emax	Version	to	New Emax	3 poles equipped with PR121/P-LSI 1SDA0...R1	4 poles equipped with PR121/P-LSI 1SDA0...R1
E1B 800	W (MP)	→	E1B 800	81266	81300
E1N 800	W (MP)	→	E1N 800	81267	81301
E1B 1250	W (MP)	→	E1B 1250	81268	81302
E1N 1250	W (MP)	→	E1N 1250	81269	81303
E2N 1250	W (MP)	→	E2N 1250	81270	81304
E2L 1250	W (MP)	→	E2L 1250	81271	81305
E2B 1600	W (MP)	→	E2B 1600	81272	81306
E2N 1600	W (MP)	→	E2N 1600	81273	81307
E2L 1600	W (MP)	→	E2L 1600	81274	81308
E2B 2000	W (MP)	→	E2B 2000	81275	81309
E2N 2000	W (MP)	→	E2N 2000	81276	81310
E3S 1250	W (MP)	→	E3S 1250	81277	81311
E3H 1250	W (MP)	→	E3H 1250	81278	81312
E3S 1600	W (MP)	→	E3S 1600	81279	81313
E3H 1600	W (MP)	→	E3H 1600	81280	81314
E3S 2000	W (MP)	→	E3S 2000	81281	81315
E3H 2000	W (MP)	→	E3H 2000	81282	81316
E3L 2000	W (MP)	→	E3L 2000	81283	81317
E3N 2500	W (MP)	→	E3N 2500	81284	81318
E3S 2500	W (MP)	→	E3S 2500	81285	81319
E3H 2500	W (MP)	→	E3H 2500	81286	81320
E3L 2500	W (MP)	→	E3L 2500	81287	81321
E3N 3200	W (MP)	→	E3N 3200	81288	81322
E3S 3200	W (MP)	→	E3S 3200	81289	81323
E3H 3200	W (MP)	→	E3H 3200	81290	81324
E4H 3200	W (MP)	→	E4H 3200	81291	81325
E4S 4000	W (MP)	→	E4S 4000	81292	81326
E4H 4000	W (MP)	→	E4H 4000	81293	81327
E4S 4000	W (MP)	→	E4S 4000	-	82058*
E6H 5000	W (MP)	→	E6H 5000	-	81294*
E6H 6300	W (MP)	→	E6H 6300	-	81298*
E6V 4000	W (MP)	→	E6V 4000	81295	81329
E6H 5000	W (MP)	→	E6H 5000	81296	81330
E6V 5000	W (MP)	→	E6V 5000	81297	81331
E6H 6300	W (MP)	→	E6H 6300	81298	81332
E6V 6300	W (MP)	→	E6V 6300	81299	81333

W (MP) = Moving part of withdrawable version

* 4 poles full size

ACB retrofit kits

Hard Bus Retrofill: Emax/New Emax → Emax 2 - IEC

Description

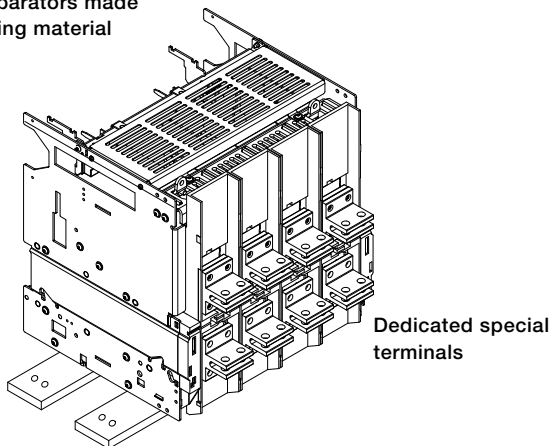
Built like a power controller instead of a 'mere' circuit-breaker, ABB SACE Emax 2 is the most technologically advanced low-voltage air circuit-breaker available on the market.

ABB ensures operating continuity between the previous series of breakers and those currently in production thanks to retrofit kits that are specially designed to upgrade existing switchgear by substituting IEC Emax/New Emax circuit-breakers with the latest family of SACE Emax 2 air circuit-breakers.

E1 to E6 3-pole and 4-pole fixed and withdrawable Emax and New Emax circuit-breakers can be replaced with the most recent series of Emax 2 circuit-breakers using these newly designed retrofit kits.



Phase separators made of insulating material



Dedicated special terminals

Bottom adapter fixing plates

The kit comprises

As Emax and Emax 2 circuit-breakers are dimensionally similar, there was not enough space to add standard terminals to Emax 2, just copper adapters.

ABB SACE has developed special retrofill solutions with dedicated sets of terminals instead of adapters.

A special fixed part for the withdrawable version comes equipped with:

- dedicated terminals.
- Phase separators made of insulating material.
- Bottom adapter fixing plates allowing Emax 2 to be installed in the same fixing points as Emax/New Emax.

– Assembly instructions.

– Template for adaptation of compartment door.

The kit for the fixed version includes:

- Special terminals.
- Phase separators made of insulating material.
- Bottom adapter fixing plates.
- Assembly instructions.
- Template for adaptation of compartment door.

Benefits

- Connecting plates easily installed in the fixing points of the original Emax.
- No need to redesign the switchgear: existing structures and busbars can be used for both Emax and Emax 2. Only a new cubicle door is required.
- Latest generation technology upgrades old systems without the need to modify the entire installation
- Compatible with a wide range of communication protocols:
 - IEC61850
 - Modbus TCP
 - Modbus S-485
 - EtherNet / IP
 - DeviceNet
 - Profibus
 - Profinet
 - Power management
- Monitoring system with Ekip Control panel
- Reduced cost of overall maintenance and spare parts since both product and spare parts continue to be available for a long time
- Wide range of accessories and modules.

		630	800	1000	1250	1600	2000	2500	3200	4000	5000	6300
X1B	→	E1.2B	E1.2B	E1.2B	E1.2B	E1.2B						
X1N	→	E1.2N	E1.2N	E1.2N	E1.2N	E1.2N						
X1L	→	E1.2L	E1.2L	E1.2L	E1.2L	-						
E2B	→		-	-	-	E2.2B	E2.2B					
E2N	→		E2.2N	E2.2N	E2.2N	E2.2N	E2.2N					
E2S	→		E2.2S	E2.2S	E2.2S	E2.2S	E2.2S					
E3N	→		-	-	-	-	-	E4.2V	E4.2V			
E3S	→		-	E4.2V	E4.2V	E4.2V	E4.2V	E4.2V	E4.2V			
E3H	→		E4.2V	E4.2V	E4.2V	E4.2V	E4.2V	E4.2V	E4.2V			
E3V	→		E4.2V	E4.2V	E4.2V	E4.2V	E4.2V	E4.2V	E4.2V			
E4S	→								-	E4.2S		
E4H	→								E4.2V 3200	E4.2V		
E4V	→								E4.2V 3200	E4.2V		
E6H	→									E6.2H	E6.2H	E6.2H
E6V	→									E6.2V	E6.2V	E6.2V

The availability of X1-E1.2 kits will be communicated during 2017.
For more details visit the Webpage Retrofit-kit Selector



ACB retrofit kits

Hard Bus Retrofill: Emax/New Emax → Emax 2 - IEC

Ordering codes

Part Numbers

Fixed version: only terminals to be ordered assembled on circuit-breaker

Emax/ New Emax	Iu [A]	Version (terminals)	to	Emax 2	Iu [A]	Rating plug [A]	Circuit-breaker version to order	+	1/2 kit terminals	3 poles 1SDA0... R1	4 poles 1SDA0... R1
X1 (B/N/L)	630	F (HR)	→	E1.2 (B/N/L)	630	-	F	+	UPPER LOWER	76824 76824	76825 76825
	800										
	1000										
	1250										
	1600										
E2 (B/N/S)	800	F (HR)	→	E2.2 (B/N/S)	800	-	F	+	UPPER LOWER	76829 76829	76830 76830
	1000										
	1250										
	1600										
	2000										
E3 (N/S/H/V)	800	F (HR)	→	E4.2 (V)	3200	800	F	+	UPPER LOWER	76839 76839	76840 76840
	1000										
	1250										
	1600										
	2000										
	2500										
3200											
E4 (S/H/V)	3200	F (HR)	→	E4.2 (S/V/V)	3200	-	F	+	UPPER LOWER	76843 76843	
	4000										

FP (HR) = Circuit-breaker in fixed version with horizontal rear terminals

Part Numbers

Withdrawable version: fixed part comes already equipped with special terminals

Emax/ New Emax	Iu [A]	Version (terminals)	to	Emax 2	Circuit-breaker version to order	+	3 poles - Fixed part included 1SDA0...R1	4 poles - Fixed part included 1SDA0...R1	4p/f - Fixed part included 1SDA0...R1
X1 (B/N/L)	Up to 1600	HR/VR	→	E1.2 (B/N/L)	MP	+	76784	76785	-
E2 (B/N/S)	Up to 2000	HR	→	E2.2 (B/N/S)	MP	+	76789	76790	-
E2 (B/N/S)	Up to 2000	VR	→	E2.2 (B/N/S)	MP	+	82694	82695	-
E3 (N/S/H/V)	Up to 3200	HR	→	E4.2 (V)	MP	+	76775	76797	-
E3 (N/S/H/V)	Up to 3200	VR	→	E4.2 (V)	MP	+	82696	82697	-
E4 (S/H/V)	Up to 4000	HR	→	E4.2 (S/V/V)	MP	+	76804	76805	-
E4 (S/H/V)	Up to 4000	VR	→	E4.2 (S/V/V)	MP	+	82698	-	-
E6 (H/V)	Up to 5000	HR	→	E6.2 (H/V)	MP	+	76776	76810	-
E6 (H/V)	Up to 5000	VR	→	E6.2 (H/V)	MP	+	82700	82701	82702
E6 (H/V)	Up to 6300	HR	→	E6.2 (H/V)	MP	+	76815	76816	-
E6 (H/V)	Up to 6300	VR	→	E6.2 (H/V)	MP	+	82704	82705	82703

W (HR) = Circuit-breaker in withdrawable version with horizontal rear terminals

W (VR) = Circuit-breaker in withdrawable version with vertical rear terminals

MP = Moving part of circuit-breaker in withdrawable version with vertical rear terminals

MCCB retrofit kits

Cradle in Cradle: Isol/Fusol → Tmax - IEC

Description

Isol and Fusol withdrawable circuit-breakers can be replaced with the more recent Isomax and Tmax series thanks to the advanced cradle in cradle retrofitting solutions available.

These retrofit kits include a special Isomax/Tmax adapter for the fixed part that can be installed on the fixed part of Isol/Fusol circuit-breakers. The result is a completely revamped fixed part that can house the standard moving part of Isomax or Tmax.

All that remains to be done is to adapt the panel door.

The kit can be rapidly installed and specific personnel are not required but it is essential for the fixed part to be in a good condition (1SDH001279R0002).

The kit comprises

- Adapter plate for the fixed part
- Panel adapter
- Installation instructions.



Benefits

- No need to disassemble the fixed part of Isol/Fusol.
- Enhanced safety
- Guaranteed continuity of service
- Easy, fast installation
- Reduced maintenance and spare parts costs
- Product continues to be available for a long time
- Accessories and spare parts also continue to be available for a long time.



MCCB retrofit kits

Cradle in Cradle: Isol/Fusol → Tmax - IEC

Accessories incompatible with Isomax/Tmax

Mechanical interlock

ATS

All fixed part accessories

Ordering codes

Part Numbers

Isol 3 poles	In [A]	Version	to	Isomax	In [A]	Circuit-breaker to order	+	Retrofit kit (fixed part included)
Z630	400	W	→	T6S 630	630	MP	+	1SDA082924R1
Z630	500	W	→	T6S 630	630	MP	+	1SDA082924R1
Z630	630	W	→	T6S 630	630	MP	+	1SDA082924R1
Z800	800	W	→	T6S 800	800	MP	+	1SDA082925R1

W = Circuit-breaker in withdrawable version

MP = Moving part of circuit-breaker in withdrawable version

Part Numbers

Fusol 3 poles	In [A]	Version	to	Tmax	In [A]	Circuit-breaker to order	+	Retrofit kit (fixed part included)
FZ630	400	W	→	T6V 630	630	MP	+	1SDA082926R1
FZ630	500	W	→	T6V 630	630	MP	+	1SDA082926R1
FZ630	630	W	→	T6V 630	630	MP	+	1SDA082926R1

W = Circuit-breaker in withdrawable version

MP = Moving part of circuit-breaker in withdrawable version

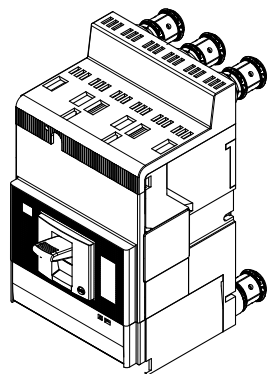
MCCB retrofit kits

Direct Replacement: Modul → Tmax /Tmax XT - IEC

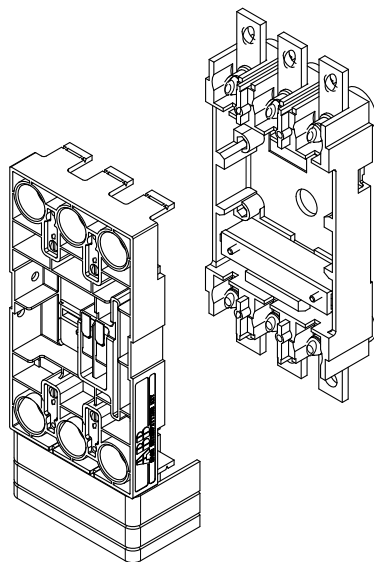
Description

Isol and Fusol withdrawable circuit-breakers can be replaced with the more recent Isomax, Tmax and Tmax XT series thanks to the advanced cradle in cradle retrofitting solutions available. These retrofit kits include a special Tmax/Tmax XT adapter for the fixed part that can be installed on the fixed part of Isol/Fusol circuit-breakers. The result is a completely revamped fixed part that can house the standard moving part of Tmax or Tmax XT. All that remains to be done is to adapt the panel door.

The kit can be rapidly installed and specific personnel are not required but it is essential for the fixed part to be in a good condition (1SDH001279R0002).



Tmax /Tmax XT
special moving part



Adapting kit
for the fixed part



Benefits

- No need to disassemble the fixed part of Modul
- Enhanced safety
- Guaranteed continuity of service
- Easy, fast installation
- Reduced maintenance and spare parts costs
- Product continues to be available for a long time
- Accessories and spare parts also continue to be available for a long time.

MCCB retrofit kits

Direct Replacement: Modul → Tmax /Tmax XT - IEC

	Motor	AUX (as an alternative) Modul AUX contacts are designed differently from those of Tmax. When ordering, please specify which AUX you have:		
		Q1	Q1+Q2	Q1+1SY
XT4	The motor is not installed and is without the adapter plug. It must be cabled.	-	2Q 400V → 1SDA066400R1	1Q + 1SY 400Vax → 1SDA066444R1
T5	-	-	2Q (O/C) 400V → 1SDA054913R1	Q1 (O/C)+ 1SY → 1SDA054912R1 (see images 22 and 23 of T5 catalog)

Different configurations require new cabling at the customer's charge

Accessories incompatible with Tmax/ Tmax XT

Mechanical interlock

ATS

All fixed part accessories

Ordering codes

Part Numbers

Modul	Iu [A]	Version	to	New circuit-breaker	Iu [A]	Circuit-breaker version to order	+	Retrofit kit	
								3 poles	4 poles
SN160	160	P	→	XT4S	250	FF	+	1SDA069459R1	1SDA069460R1
SN250	250	P	→	XT4S	250	FF	+	1SDA069459R1	1SDA069460R1
SN400	400	P	→	T5N	400	FF	+	1SDA069463R1	1SDA069464R1
SH100	100	P	→	XT4H	250	FF	+	1SDA069457R1	1SDA069458R1
SH125	125	P	→	XT4H	250	FF	+	1SDA069457R1	1SDA069458R1
SH160	160	P	→	XT4H	250	FF	+	1SDA069461R1	1SDA069462R1
SH250	250	P	→	XT4H	250	FF	+	1SDA069461R1	1SDA069462R1
SH400	400	P	→	T5H	400	FF	+	1SDA069465R1	1SDA069466R1
SN1250	1250	W	→	S7S	1250	FF*	+	UXAB149199101	UXAB149199102
SN1600	1600	W	→	S7S	1600	FF*	+	UXAB149199103	UXAB149199104
SH1250	1250	W	→	S7L	1250	FF*	+	UXAB149199101	UXAB149199102
SH1600	1600	W	→	S7L	1600	FF*	+	UXAB149199103	UXAB149199104

* = Order apparatus equipped with high upper terminal covers and front lever

W = Circuit-breaker in withdrawable version

P = Circuit-breaker in plug-in version

MP = Moving part of circuit-breaker in withdrawable version

FF = Circuit-breaker in fixed version with front terminals

FP = Fixed part of circuit-breaker in withdrawable version

FP (HR) = Fixed part of circuit-breaker in withdrawable version equipped with horizontal rear terminals

FP (VR) = Fixed part of circuit-breaker in withdrawable version equipped with vertical rear terminals

MCCB retrofit kits

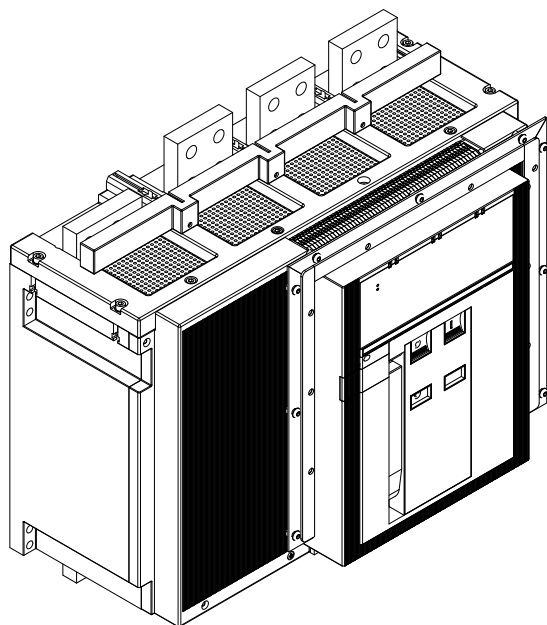
Hard Bus Retrofill: Isomax S8 → Tmax T8 - IEC

Description

Isomax S8 moulded case circuit-breakers have now entered the "Obsolete" phase and are no longer produced.

This is why ABB SACE has developed a newly designed retrofit version to support customers with S8 circuit-breakers. Isomax S8 can now be replaced with the most recent series of Tmax T8 circuit-breakers. The 3-pole versions of S8 and T8 are very similar as to size, so the retrofit kit mainly comprises a panel door adapter. The 4-pole version is a dedicated T8 special circuit-breaker where the 4th terminal must be adapted.

For automatic circuit-breakers, the kit includes the breaker already equipped with PR331/P LSI. Please contact your nearest ABB Local sales organization if a different trip unit is required.



Tmax T8 special terminal

Limitations

Before ordering, make sure that the S8 circuit-breaker was installed as indicated in the Isomax catalog. Different types of installation must be assessed.

Checks

Check panel dimensions (see page 52).

Benefits

- Enhanced safety
- Guaranteed continuity of service
- Reduced maintenance and spare parts costs
 - Product continues to be available for a long time
 - Accessories and spare parts also continue to be available for a long time.

MCCB retrofit kits

Hard Bus Retrofill: Isomax S8 → Tmax T8 - IEC

Accessories compatible with T8 for S8-T8 Retrofit kit

Electrical accessories

YO (Shunt opening release)

YO2 (second shunt opening release)

YC (shunt closing release)

YU (Undervoltage release)

SOR test unit

D (electronic delay for YU - in switchgear)

M (spring loading motor)

AUX open/closed auxiliary contacts

Trip reset

Mechanical accessories

Key lock in open position

Padlock in open position

O/C push-button protection

IP 54

Modules

Measuring module PR330/V

Communication module PR330/D-M

External wireless communication module BT030

Ordering codes

Part Numbers

S8	Iu	Version	Terminals	to	New circuit-breaker	Iu	The kits already include the circuit-breaker equipped with PR331/P LSI* 3 poles	The kits already include the circuit-breaker equipped with PR331/P LSI* 4 poles
	[A]					[A]		
S8H	2000	F	F	→	T8V	2000	1SDA079949R1	1SDA079939R1
S8H	2000	F	VR	→	T8V	2000	1SDA079950R1	1SDA079940R1
S8H	2500	F	F	→	T8V	2500	1SDA079951R1	1SDA079941R1
S8H	2500	F	VR	→	T8V	2500	1SDA079952R1	1SDA079942R1
S8H	3200	F	VR	→	T8V	3200	1SDA079953R1	1SDA079943R1
S8V	2000	F	F	→	T8V	2000	1SDA079954R1	1SDA079944R1
S8V	2000	F	VR	→	T8V	2000	1SDA079955R1	1SDA079945R1
S8V	2500	F	F	→	T8V	2500	1SDA079956R1	1SDA079946R1
S8V	2500	F	VR	→	T8V	2500	1SDA079957R1	1SDA079947R1
S8V	3200	F	VR	→	T8V	3200	1SDA079958R1	1SDA079948R1

* = Different Trip Units can be installed and retrofit kits are even available for switch disconnectors (S8D). Please ask your local ABB representative

F = Circuit-breaker in fixed version

F = Front terminals

VR = Vertical rear terminals

Retrofitting system

ATS 010 → ATS 022

Description

The ABB Low Voltage Breakers Service aims to provide customers with the best solutions for upgrading their low voltage equipment to the latest technologies, thereby guaranteeing maximum safety.

This is why the ABB LVB Service has created a new retrofit kit that easily replaces the ATS010 device with the new ATS022 unit without compromising on safety or switching features.

The ATS022 unit offers additional features and improved controls, all simplified by the user-friendly LCD display.

Using the kit, you can easily, quickly and safely convert your old ATS to the new version in a few simple steps.

The kits adapt the new apparatus to the dimensions of the existing compartments. All the obsolete components are replaced with latest generation products.



The kit comprises

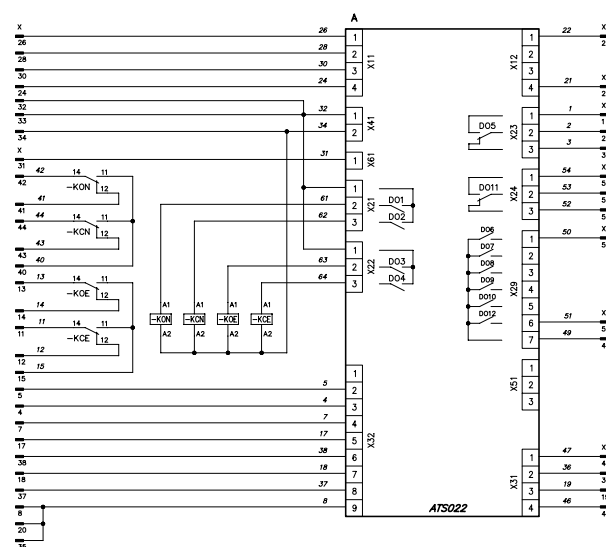
- ATS022 device
- Door adapter plates (A).
- A connector support plate (B) with prewired cable connections to facilitate the wiring operations. The connectors of the new connector support are located in the same positions as the ATS010 automatic transfer switch and have inserts that prevent them from being inserted incorrectly.
- Installation manual with detailed procedure for correct and safe installation.
- Instruction sheet allowing ATS010 settings to be easily converted to ATS022.

Benefits

- Reduced installation costs: less time required for disassembly and installation.
- Flexible solution, since it easily adapts to the new dimensions.
- No production loss – retrofitting is planned to match the plant's shutdown schedule.
- Rapid execution – modernizing one ATS section typically takes a short time.
- Flexible scheduling – Large installations can be planned in stages.
- No major structural changes. Only adaptation to size of previous installation.
- Simple to use thanks to easily understood manuals and clear instruction sheets.
- New advanced technology with a wider range of settings for the switchover function between utilities and emergency power supply. Can connect to a communication network (Modbus RS485). No need for extra power supply (other than communication usage) and Bus-tie Control.

Limitations

- ATS022 always functions as Strategy 2 (see chapter 3.2 of ATS010 manual RH0202002).
- The O/C Control function is not a priority in ATS022. Loads are still available by means of external releases.
- Digital Inputs:
 - ATS022 does not feature Gen set automatic operation – GEN. AUTO. (See chapter 3.4.7 of ATS010 manual RH0202002).
 - ATS022 offers the SW Enable function by default. The Remote Reset function can be programmed as an alternative to SW Enable.
- If ATS is connected to Isomax circuit-breakers with the direct action motor operating mechanism, the 4 contacts highlighted in red are required but not provided by ABB. Remember that the voltage value must be consistent.



Part Number

ATS	to	ATS	1SDA0...R1
010	→	022	70512

Other brands

Hard Bus Retrofill: Schneider Masterpact M → Emax 2

Description

ABB SACE ensures operating continuity between Masterpact M air circuit-breakers and the newest series of SACE Emax 2 circuit-breakers.

These retrofit kits are designed to preserve the performance specifications of the existing switchgear and reduce downtime to the minimum.

Special terminals can be fitted on the fixed part of SACE Emax 2 instead of standard terminals, so as to reproduce the copper bar connections of the Schneider breakers.

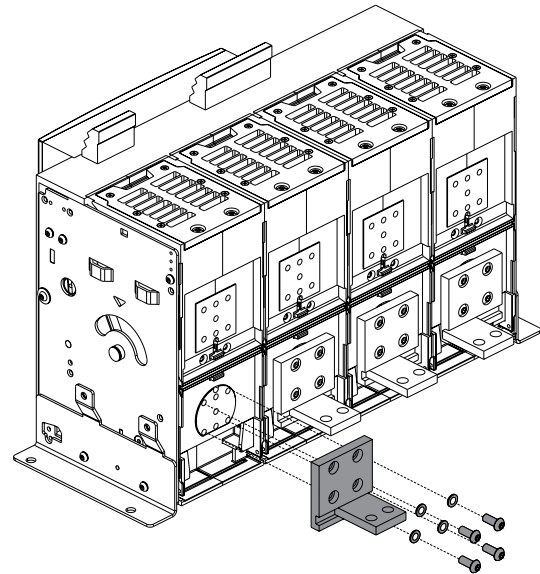
The result is a fully upgraded system with all the advantages of the new technology offered by SACE Emax 2 circuit-breakers.

The kit comprises

- dedicated plates for the fixed part, allowing the Emax 2 circuit-breaker to be easily installed
- special SACE Emax 2 adapter busbars to suit the size required on the fixed part
- adhesive template and metal adapters for adaptation of compartment door
- the Emax 2 fixed part is also included.

Benefits

- Tested solution that ensures continuity of service.
- Enhanced safety
- Easy installation.
- Reduced maintenance costs.
- Products and spare parts continue to be available for a long time.
- Tested solution.
- Wide range of mechanical and electrical accessories.
- Power measurement with Emax 2 advanced trip units.
- Programmed signal to remind users that maintenance is required.
- Advanced communication modules with different protocols:
 - Modbus RS-485
 - Modbus TCP
 - Profibus
 - DeviceNet
 - EtherNet/IP
 - IEC61850
 - Bluetooth.
- Diagnosis and installation with Ekip Connect Software.
- Ekip PowerController to improve energy efficiency and saving.
- All Emax 2 accessories are compatible with the retrofit kit (mechanical interlock and ATS are only available with Emax 2 circuit-breakers).



Limitations

The compartment clearances must be checked before ordering. See page 52.

The kits have been designed according to the Schneider dimensions given in the 1996 catalog edition.

Before ordering, make sure that this catalog includes your circuit-breaker, as these are the versions on which our design is based.

Ordering codes

Part Numbers

Withdrawable Masterpact M	Iu [A]	Version (terminals)	to	Emax 2	Iu [A]	Derating [A]	Circuit-breaker version to order	+	3 poles - Fixed part already included 1SDA0...R1	4 poles - Fixed part already included 1SDA0...R1
M08 (H1)	800	W (HR)	→	E4.2N 3200	800		MP	+	82270	82271
M10 (H1)	1000									
M12 (H1)	1250									
M16 (H1)	1600									
M08 (H2)	800	W (HR)	→	E4.2H 3200	800		MP	+	82270	82271
M10 (H2)	1000									
M12 (H2)	1250									
M16 (H2)	1600									
M08 (H1)	800	W (VR)	→	E4.2N 3200	800		MP	+	82272	82273
M10 (H1)	1000									
M12 (H1)	1250									
M16 (H1)	1600									
M08 (H2)	800	W (VR)	→	E4.2H 3200	800		MP	+	82272	82273
M10 (H2)	1000									
M12 (H2)	1250									
M16 (H2)	1600									
M20 (N)	2000	W (HR)	→	E4.2N 3200	2000		MP	+	82278	82279
M25 (N)	2500									
M20 (H1)	2000	W (HR)	→	E4.2H 3200	2000		MP	+	82278	82279
M25 (H1)	2500									
M20 (H2)	2000	W (HR)	→	E4.2H 3200	2000		MP	+	82278	82279
M25 (H2)	2500									
M20 (N)	2000	W (VR)	→	E4.2N 3200	2000		MP	+	82274	82275
M25 (N)	2500									
M20 (H1)	2000	W (VR)	→	E4.2H 3200	2000		MP	+	82274	82275
M25 (H1)	2500									
M20 (H2)	2000	W (VR)	→	E4.2H 3200	2000		MP	+	82274	82275
M25 (H2)	2500									
M32 (H1)	3200	W (HR)	→	E4.2H 3200	3200	3000	MP	+	82280	82281
M32 (H2)	3200									
M32 (H1)	3200	W (VR)	→	E4.2H 3200	3200		MP	+	82277	82276
M32 (H2)	3200									
M40 (H1)	4000	W (HR)	→	E4.2H 4000	4000	3450	MP	+	82260	-
M40 (H2)	4000									
M40 (H1)	4000	W (VR)	→	E4.2H 4000	4000	3900	MP	+	82261	-
M40 (H2)	4000									
M50 (H1)	5000	W (HR)	→	E6.2H 5000	5000		MP	+	82262	82263
M50 (H2)	5000	W (HR)		E6.2V 5000	5000					
M50 (H1)	5000	W (VR)	→	E6.2H 5000	5000		MP	+	82264	82265
M50 (H2)	5000	W (VR)		E6.2V 5000	5000					
M63 (H1)	6300	W (HR)	→	E6.2H 6300	6300	5900	MP	+	82266	82267
M63 (H2)	6300	W (HR)		E6.2V 6300	6300					
M63 (H1)	6300	W (VR)	→	E6.2H 6300	6300	5900	MP	+	82268	82269
M63 (H2)	6300	W (VR)		E6.2V 6300	6300					

W (HR) = Circuit-breaker in withdrawable version with horizontal rear terminals

W (VR) = Circuit-breaker in withdrawable version with vertical rear terminals

MP = Moving part of circuit-breaker in withdrawable version with vertical rear terminals

Other brands

Hard Bus Retrofill: Schneider Masterpact M → Emax 2

Ordering codes

Part Numbers

Fixed Masterpact M	Iu [A]	Terminals for fixed version	to	Emax 2 to be ordered	Additional rating plug to order [A]	Derating [A]	Circuit-breaker version to order	+	3 poles 1SDA0...R1	4 poles 1SDA0...R1
M08 N1	800	HR	→	E4.2N3200	800	-	F	+	82511	82526
M08 H1	800	HR	→	E4.2N3200	800	-	F	+	82509	82524
M08 H2	800	HR	→	E4.2H3200	800	-	F	+	82539	82552
M08 H1	800	VR	→	E4.2N3200	800	-	F	+	82510	82525
M08 H2	800	VR	→	E4.2H3200	800	-	F	+	82540	82553
M10 N1	1000	HR	→	E4.2N3200	1000	-	F	+	82514	82529
M10 H1	1000	HR	→	E4.2N3200	1000	-	F	+	82512	82527
M10 H2	1000	HR	→	E4.2H3200	1000	-	F	+	82541	82554
M10 H1	1000	VR	→	E4.2N3200	1000	-	F	+	82513	82528
M10 H2	1000	VR	→	E4.2H3200	1000	-	F	+	82542	82555
M12 N1	1250	HR	→	E4.2N3200	1250	-	F	+	82517	82532
M12 H1	1250	HR	→	E4.2N3200	1250	-	F	+	82515	82530
M12 H2	1250	HR	→	E4.2H3200	1250	-	F	+	82543	82556
M12 H1	1250	VR	→	E4.2N3200	1250	-	F	+	82516	82531
M12 H2	1250	VR	→	E4.2H3200	1250	-	F	+	82544	82557
M16 N1	1600	HR	→	E4.2N3200	1600	-	F	+	82518	82533
M16 H1	1600	HR	→	E4.2N3200	1600	-	F	+	82518	82533
M16 H2	1600	HR	→	E4.2H3200	1600	-	F	+	82545	82558
M16 N1	1600	VR	→	E4.2N3200	1600	-	F	+	82519	82534
M16 H1	1600	VR	→	E4.2N3200	1600	-	F	+	82519	82534
M16 H2	1600	VR	→	E4.2H3200	1600	-	F	+	82546	82559
M20 N1	2000	HR	→	E4.2H3200	2000	-	F	+	82520	82535
M20 H1	2000	HR	→	E4.2H3200	2000	-	F	+	82547	82560
M20 H2	2000	HR	→	E4.2H3200	2000	-	F	+	82547	82560
M20 N1	2000	VR	→	E4.2H3200	2000	-	F	+	82521	82536
M20 H1	2000	VR	→	E4.2H3200	2000	-	F	+	82548	82561
M20 H2	2000	VR	→	E4.2H3200	2000	-	F	+	82548	82561
M25 N1	2500	HR	→	E4.2H3200	2500	-	F	+	82522	82537
M25 H1	2500	HR	→	E4.2H3200	2500	-	F	+	82549	82562
M25 H2	2500	HR	→	E4.2H3200	2500	-	F	+	82549	82562
M25 N1	2500	VR	→	E4.2H3200	2500	-	F	+	82523	82538
M25 H1	2500	VR	→	E4.2H3200	2500	-	F	+	82550	82563
M25 H2	2500	VR	→	E4.2H3200	2500	-	F	+	82550	82563
M32 H1	3200	HR	→	E4.2H3200	-	-	F	+	82551	82564
M32 H2	3200	HR	→	E4.2H3200	-	-	F	+	82551	82564
M32 H1	3200	VR	→	E4.2H3200	-	-	F	+	82565	82565
M32 H2	3200	VR	→	E4.2H3200	-	-	F	+	82565	82565
M40 H1	4000	HR	→	E4.2H4000	-	3700	F	+	82566	-
M40 H2	4000	HR	→	E4.2H4000	-	3700	F	+	82566	-
M40 H1	4000	VR	→	E4.2H4000	-	-	F	+	82567	-
M40 H2	4000	VR	→	E4.2H4000	-	-	F	+	82567	-
M50 H1	5000	HR	→	E6.2H5000	-	-	F	+	82568	-
M50 H2	5000	HR	→	E6.2V5000	-	-	F	+	82570	-
M50 H1	5000	VR	→	E6.2H5000	-	-	F	+	82569	-
M50 H2	5000	VR	→	E6.2V5000	-	-	F	+	82571	-

(HR) = Circuit-breaker with horizontal rear terminals

(VR) = Circuit-breaker with vertical rear terminals

Other brands

Hard Bus Retrofill: Mitsubishi AE → New Emax

Description

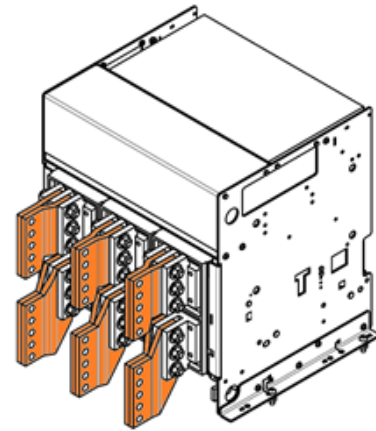
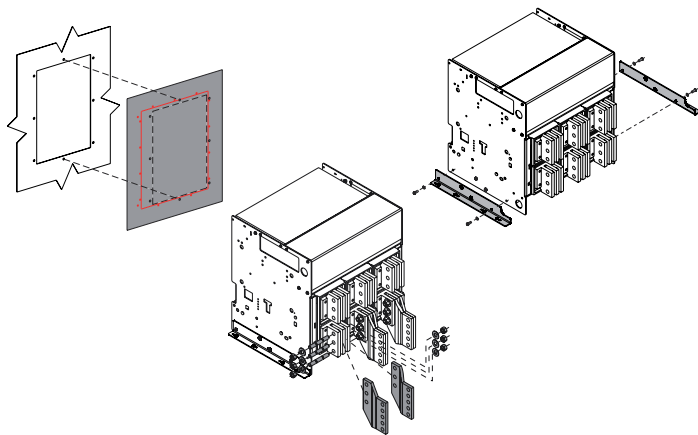
The old series of 3-pole Mitsubishi AE air circuit-breakers from 1250A to 2500A with vertical rear terminals can now be replaced with the recent series of New Emax circuit-breakers using a hard bus retrofill retrofit kit.

Special copper adapters are fitted on the standard New Emax terminals so as to reproduce the copper bar connections of the old circuit-breaker.

The kit is complete with dedicated plates allowing the new circuit-breaker to be fixed to the bottom part of the switchgear panel, and a cover flange for the panel door. The result is a fully upgraded system with all the advantages of the new technology offered by ABB New Emax circuit-breakers.

The kit comprises

- adhesive template for adaptation of compartment door
- special New Emax adapter busbars, depending on size
- dedicated plates for fixed part, so that the circuit-breaker can be fixed in the same place as the Mitsubishi version.



Benefits

- Enhanced safety.
- Guaranteed continuity of service
- Easy installation.
- Reduced maintenance and spare parts costs.
- Product and its spare parts continue to be available for a long time.
- Factory-tested, guaranteed solution.
- New Emax can be equipped with a wide range of mechanical and electrical accessories.
- Power measurement with advanced trip units (PR122 and PR123).
- Monitoring with PR120/K, internal electrical signaling module.
- Communication:
 - Modbus (PR120/D-M),
 - Wireless, (PR120/D-BT),
 - Profibus, DeviceNet or AS-I (EP 010 – FBP)
 - Diagnosis and installation with Ekip Connect Software.

Limitations

The compartment clearances must be checked before ordering (see page 52).

The kits have been designed according to the Mitsubishi dimensions given in the June 2007 catalog edition. Before ordering, make sure that your circuit-breaker version matches our design.

Part Numbers

Mitsubishi	Version (terminals)	to	New Emax	Circuit-breaker version to order	+ 3 poles 1SDA0...R1
AE 1250	W (VR)	→	E2N 1250	MP + FP(VR)	+ 80368
AE 1600	W (VR)	→	E2N 1600	MP + FP(VR)	+ 80367
AE 2500	W (VR)	→	E3N 2500	MP + FP(VR)	+ 80366

W (VR) = Circuit-breaker in withdrawable version with vertical rear terminals

Other brands

Hard Bus Retrofill: Siemens → New Emax

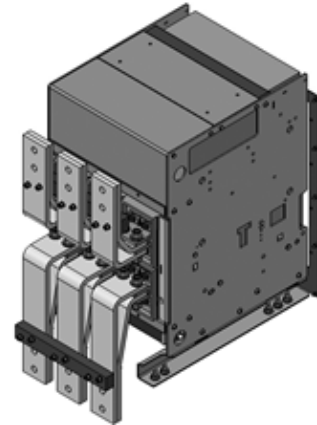
Description

ABB SACE ensures operating continuity between Siemens 3WN1 and 3WN6 air circuit-breakers and the recent series of New Emax circuit-breakers.

These retrofit kits are designed to preserve the existing switchgear and reduce downtime to the minimum.

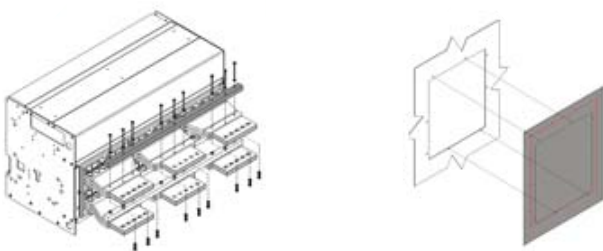
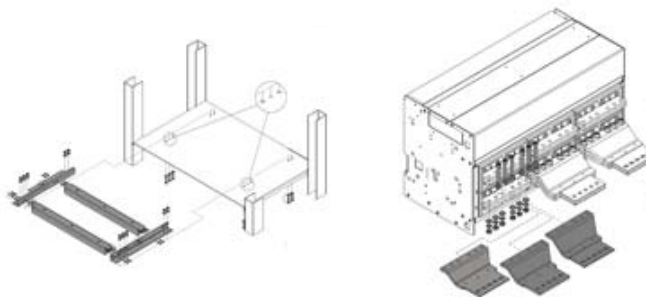
Special copper adapters can be installed on the standard New Emax terminals so as to reproduce the copper bar connections of the Siemens breakers.

The result is a fully upgraded system with all the advantages of the new technology offered by ABB New Emax circuit-breakers.



The kit comprises

- dedicated plates for fixed part, so that the circuit-breaker can be installed in the same place as the Siemens version.
- special New Emax adapter busbars, depending on size
- insulating material where necessary, to align terminals with the New Emax dimensions
- adhesive template for adaptation of compartment door.



Benefits

- Enhanced safety.
- Continuity of service.
- Easy installation.
- Reduced maintenance costs.
- Products and spare parts continue to be available for a long time.
- Tested solution.
- Wide range of mechanical and electrical accessories.
- Power measurement with advanced trip units (PR122 and PR123).
- Monitoring with PR120/K, internal electrical signaling module.
- Communication protocols:
 - Modbus (PR120/D-M),
 - Wireless, (PR120/D-BT),
 - Profibus, DeviceNet or AS-I (EP 010 – FBP).
- Diagnosis and installation with Ekip Connect Software.

Limitations

The compartment clearances must be checked before ordering (see page 52).

The kits have been designed according to the Siemens dimensions given in the 1997 manual edition.

Before ordering, make sure that your circuit-breaker version matches our design.

Compatible accessories

Electrical accessories

YO (shunt opening release)
YO2 (second shunt opening release)
YC (shunt closing release)
YU (undervoltage release)
D (electronic delay for YU - in switchgear)
M (spring loading motor)
AUX spring loaded (S33M)
AUX open/closed auxiliary contacts
AUX circuit-breaker connected/ isolated position
Closing spring loaded signaling – S33
Electric TU reset
SOR Test Unit
Overcurrent release trip indication
Contact for signaling undervoltage release de-energized

Mechanical accessories

Key lock in open position
Padlock in open position
Key lock in racked in/test/out position
Mechanical compartment door lock
Protection for sealable trip unit
Mechanical operation counter
IP54 door protection
O/C push-button protection
Mechanical interlock (only with another New Emax circuit-breaker)

Modules

PR120/K signaling module
PR120/V measuring module
PR120/D-M Modbus communication module
PR120/D-BT Bluetooth communication module

Other brands

Hard Bus Retrofill: Siemens → New Emax

Ordering codes

Part Numbers

Siemens 3WN1	Iu [A]	Version (terminals)	to	New Emax to order	In [A]	Derating [A]	+	3 poles - Fixed part already included 1SDA0...R1	4 poles - Fixed part already included 1SDA0...R1
3WN10	630	W (F)	→	E2S 800	RP=630	-	+	80902	-
		W (HR)	→	E2S 800	RP=630	-	+	80896	-
		W (VR)	→	E2S 800	RP=630	-	+	80900	-
3WN11	800	W (F)	→	E2S 800	800	-	+	80902	80914
		W (HR)	→	E2S 800	800	-	+	80896	80908
		W (VR)	→	E2S 800	800	-	+	80900	80912
3WN12	1000/1250	W (F)	→	E2S 1000/1250	1000/1250	-	+	80902	80914
		W (HR)	→	E2S 1000/1250	1000/1250	-	+	80896	80908
		W (VR)	→	E2S 1000/1250	1000/1250	-	+	80900	80912
3WN13	1250	W (F)	→	E2S 1250	1250	-	+	80903	80915
		W (HR)	→	E2S 1250	1250	-	+	80896	80908
		W (VR)	→	E2S 1250	1250	-	+	80900	80912
3WN14	1600	W (F)	→	E2S 1600	1600	-	+	80903	80915
		W (HR)	→	E2S 1600	1600	-	+	80897	80901
		W (VR)	→	E2S 1600	1600	-	+	80901	80913
3WN15	2000	W (F)	→	E3H 2000	2000	-	+	80904	80916
		W (HR)	→	E3H 2000	2000	-	+	80898	80910
3WN16	2500	W (F)	→	E3H 2500	2500	-	+	80904	80917
		W (HR)	→	E3H 2500	2500	-	+	80898	80910
3WN17	3200	W (F)	→	E3H 3200	3200	2900	+	-	80918
		W (HR)	→	E4H 3200	3200	-	+	80899	80911
3WN18	4000	W (F)	→	E4H 4000	4000	3700	+	80905	-
		W (HR)	→	E6H 4000	4000	-	+	-	80919
3WN19	5000	W (HR)	→	E6H 5000	5000	-	+	80906	80920
		W (HR)	→	E6H 6300	6300	5200	+	80907	-

W (VR) = Circuit-breaker in withdrawable version with vertical rear terminals

W (HR) = Circuit-breaker in withdrawable version with horizontal rear terminals

Part Numbers

Siemens 3WN6	Version (terminals)	to	New Emax Moving part to order	In [A]	Derating [A]	Circuit-breaker version to order	+	3 poles - Fixed part already included 1SDA0...R1	4 poles - Fixed part already included 1SDA0...R1
3WN60 630	W (HR)	→	E2S 800	Rating Plug=630	-	MP	+	80880	80881
	W (VR)	→	E2S 800	Rating Plug=630	-	MP	+	80888	80889
3WN61 800	W (HR)	→	E2S 800	800	-	MP	+	80880	80881
	W (VR)	→	E2S 800	800	-	MP	+	80888	80889
3WN62 1000	W (HR)	→	E2S 1000	1000	-	MP	+	80880	80881
	W (VR)	→	E2S 1000	1000	-	MP	+	80888	80889
3WN63 1250	W (HR)	→	E2S 1250	1250	-	MP	+	80882	80883
	W (VR)	→	E2S 1250	1250	-	MP	+	80890	80891
3WN64 1600	W (HR)	→	E2S 1600	1600	-	MP	+	80882	80883
	W (VR)	→	E2S 1600	1600	-	MP	+	80890	80891
3WN65 2000	W (HR)	→	E3H 2000	2000	-	MP	+	80884	80885
	W (VR)	→	E3H 2000	2000	-	MP	+	80892	80893
3WN66 2500	W (HR)	→	E3H 2500	2500	-	MP	+	80886	80887
	W (VR)	→	E3H 2500	2500	-	MP	+	80894	80895
3WN67 3200	W (HR)	→	E3H 3200	3200	2700	MP	+	80886	80887
	W (VR)	→	E3H 3200	3200	-	MP	+	80894	80895

W (VR) = Circuit-breaker in withdrawable version with vertical rear terminals

W (HR) = Circuit-breaker in withdrawable version with horizontal rear terminals

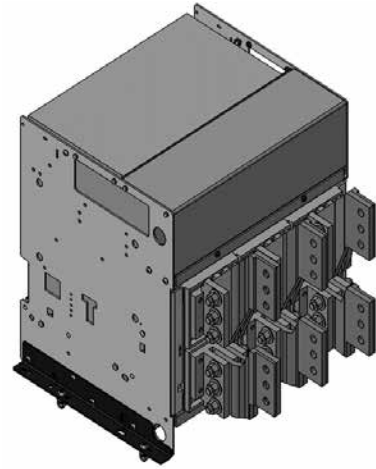
Other brands

Hard Bus Retrofill: Terasaki AT → New Emax

Description

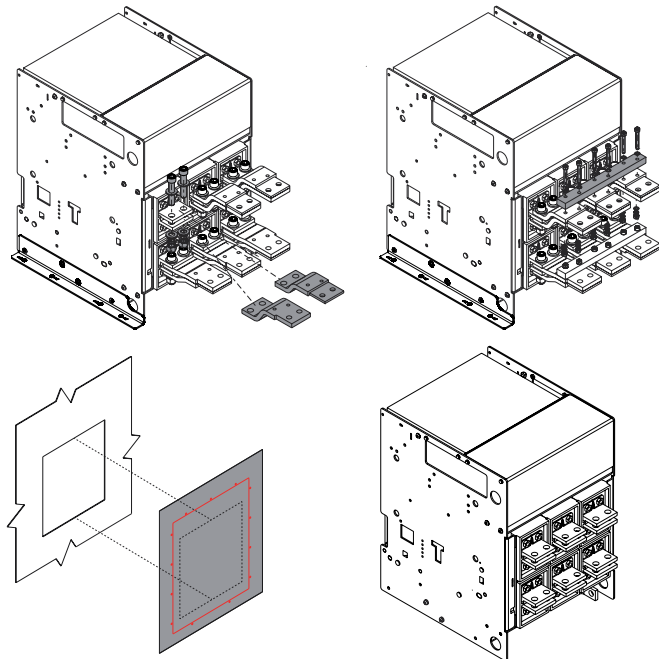
The old series of 3-pole Terasaki AT air circuit-breakers from 1250A to 2500A with vertical or horizontal rear terminals, can now be replaced with the recent series of New Emax circuit-breakers using the newly designed hard bus retrofill retrofit kit. Special copper adapters are fitted on the standard New Emax terminals so as to reproduce the copper bar connections of the old circuit-breaker.

The kit is complete with dedicated plates allowing the new circuit-breaker to be fixed to the bottom part of the switchgear panel, and a cover flange for the panel door. The result is a fully upgraded system with all the advantages of the new technology offered by ABB New Emax circuit-breakers.



The kit comprises

- special New Emax adapter busbars, depending on size
- insulating material to correctly align the terminals
- dedicated fixed part with same fixing points as the Terasaki circuit-breaker
- adhesive template for adaptation of compartment door to New Emax dimensions.



Benefits

- Enhanced safety.
- Guaranteed continuity of service.
- Easy installation.
- Reduced maintenance and spare parts costs.
- Product and its spare parts continue to be available for a long time.
- Guaranteed solution as tested.
- New Emax can be equipped with a wide range of mechanical and electrical accessories.
- Power measurement with advanced trip units (PR122 and PR123).
- Monitoring with PR120/K, internal electrical signaling module.
- Communication.

Limitations

The compartment clearances must be checked before ordering (see page 52). The kits have been designed according to the Terasaki dimensions given in the June 1997 catalog edition.

Before ordering, make sure that your circuit-breaker version matches our design.

Ordering codes

Part Numbers

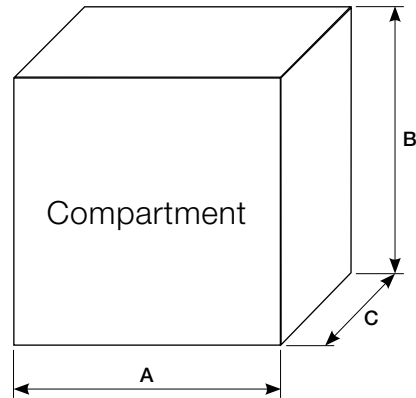
Terasaki	Version (Terminals)	to	New Emax	Circuit-breaker version to order	+	3 poles - Fixed part already included - 1SDA0...R1
AT 1250	W (HR)	→	E2N 1250	MP	+	79990
AT 1250	W (VR)	→	E2N 1250	MP	+	79991
AT 1600	W (HR)	→	E2N 1600	MP	+	79992
AT 1600	W (VR)	→	E2N 1600	MP	+	79993
AT 2500	W (HR)	→	E3N 2500	MP	+	79994
AT 2500	W (VR)	→	E3N 2500	MP	+	79995

Checks before ordering

Clearances

The compartment dimensions of the old and new circuit-breakers could be different. Make sure that you check the compartment dimensions of the new circuit-breaker before ordering:

Dimensions	T8 [mm/in]
A (3p)	600/23.62"
A (4p)	726/ 28.58"
B	1000/ 39.37"
C	300/ 11.81"

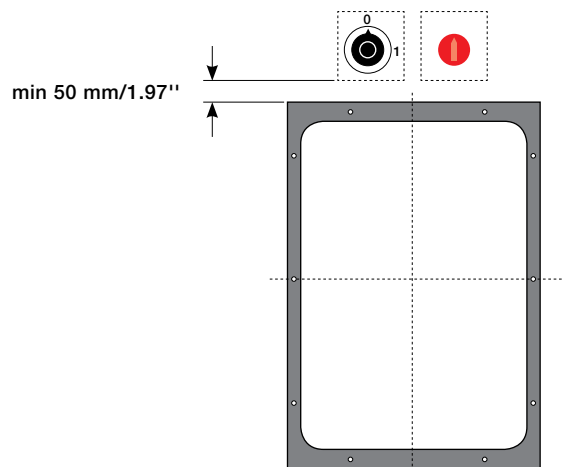


Dimensions	E1-E2 [mm/in]	E3 [mm/in]	E4 [mm/in]	E6 [mm/in]	T8 [mm/in]
A (3p)	400/15.8"	500/19.7"	700/27.6"	1000/39.4"	600/23.7"
A (4p)	490/19,3"	630/24.8"	790/31.1"	1130/44.5"	726/28.6"
A (4p/f)	-	-	880/34.65"	1260/ 49.61"	-
B	500/19.7"	500/19.7"	500/19.7"	500/19.7"	1000/39.4"
C	242/9.53"	242/9.53"	242/9.53"	242/9.53"	300/11.9"

Dimensions	E1.2 [mm/in]	E2.2 [mm/in]	E4.2 [mm/in]	E6.2 [mm/in]	T8 [mm/in]
A (3p)	280/11.02"	400/15.8"	500/19.7"	900/35.43"	-
A (4p)	350/13.79"	490/19.29"	600/23.62"	1000/ 39.37"	-
A (4p/f)	-	-	880/34.65"	1200/ 47.24"	-
B	440/ 17.32"	500/19.7"	500/19.7"	500/19.7"	-
C	252/ 9.92"	355/ 13.98"	355/ 13.98"	355/ 13.98"	-
D	-	-	-	-	200/7.87"
E	-	-	-	-	30/1.18"
F	-	-	-	-	120/4.72"

Minimum distance from external components

Certain external devices installed very close to the circuit-breaker could interfere with the new kit. ABB advises you to check the distances so as to avoid all possible interference.



Drilling template for compartment door

Order examples

1) Direct Replacement → G30-E1.2

i.e.: Breaker to replace: 3-pole G30 1600A in withdrawable version:

If you require the Ekip DIP LSI Trip Unit without specific accessories, the part number is available immediately:

POS 1: 1SDA081657R1 → DR G30-E1.2N 1600 3P Ekip Dip LSI

The G30-E1.2 Direct Replacement kit is pre-assembled in the ABB SACE plant

Novomax G30	In [A]	to	Emax 2	Iu [A]	3 poles 1SDA0...R1	4 poles 1SDA0...R1
G30	800	→	E1.2N	800	81653	81654
G30	1250	→	E1.2N	1250	81655	81656
G30	1600	→	E1.2N	1600	81657	81658

Please contact your ABB representative if you need a different Emax 2 Trip Unit and/or accessories.

2) Retrofill → Otomax – Emax

i.e.: Breaker to replace: 3-pole Otomax P1A 800A with horizontal rear terminals:

Choose the trip unit for New Emax from among the available versions: PR121/P, PR122/P and PR123/P, as well as all the required accessories: i.e. PR121/P LI:

Otomax 3p	Version (terminals)	to	New Emax	Iu/In [A]	Circuit-breaker version to order	Retrofill kit 1SDA0...R1
Otomax P1A 800A	W (HR)	→	E1B	800	MP+FP(HR)	+ 50748
			 B		 A C	 D

POS 1: 1SDA055616R1 → Moving part (B) of E1B 800A (A) PR121/LI 3p (+ accessories to be specified)

POS 2: 1SDA059666R1 → Fixed part with horizontal rear terminals for E1 (C) (+ accessories to be specified)

POS 3: 1SDA063122R1 → Retrofit kit (D)

3) Cradle in Cradle: Otomax – Emax

i.e.: Breaker to replace: 3-pole withdrawable Otomax P2A 2000A

Otomax P2A 2000A W CRADLE/CRADLE E3S 2000A W MP + 1SDA070226R1 (C)

Otomax 3p with lever (Fig A)	Iu [A]	to	New Emax	Circuit-breaker to order	CiC kit 1SDA0...R1
P2A 2000	2000	→	E3S 2000	MP	+ 70226
			 B	 A	 C

Choose the trip unit for New Emax from among the available versions: PR121/P, PR122/P and PR123/P, as well as all the required accessories: i.e. PR121/P LI:

POS 1: 1SDA056260R1 → Moving part (B) of E3S 2000A (A) PR122/LSI 3p (+ accessories to be specified)

POS 2: 1SDA070226R1 → Retrofit kit (the kit includes the fixed part with horizontal rear terminals)

4) Retrofill → Megamax – Emax 2

i.e.: Breaker to replace: 3-pole withdrawable Megamax F1B 1250A with horizontal rear terminals.

Megamax F1B 1250A W → E2.2B 1600A W MP 3p + 1SDA082718R1

Abbreviations

Abbreviations

CB =	Circuit-breaker
W =	Withdrawable circuit-breaker
P =	Plug-in circuit-breaker
MP =	Moving part of withdrawable circuit-breaker
FF =	Fixed circuit-breaker with front terminals
FP =	Fixed part of withdrawable circuit-breaker
FP(HR) =	Fixed part of withdrawable circuit-breaker with horizontal rear terminals
FP(VR) =	Fixed part of withdrawable circuit-breaker with vertical rear terminals
RF =	Hard Bus Retrofill
CiC =	Cradle in cradle
DR =	Direct Replacement

Visit the [ABB Service WebPage](#) and select Low Voltage Products and Systems (< ~1kV) to find your nearest ABB Service facility

Contacts

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