

2017

Retrofit kits 2017

For Low Voltage Circuit Breaker

Courtesy from ABB.

www.fengshengelectric.com.sg

Agenda

Time to upgrade?

- Reasons to modernize
- Available solutions
- New Switchgear vs Retrofit kit

Time to Retrofit

- ABB Circuit Breakers history
- Life Cycle Management
- 1. Hard Bus Retrofill
- 2. Cradle in Cradle
- 3. Direct replacement
- Choose ABB
- Retrofit kits Available for Sales
- Marketing Material (public and internal)

Retrofit kits

Time to upgrade?

Reasons to modernize

- **Safety:** Switchgear equipped with low voltage circuit breakers may be called into operation at any time. It's not an option to discover a failure at this stage !
- **Age** (service years)
- **Environment** (corrosion, high vibrations,...)
- **Worn** (many operations, number of trips,...)
- **Obsolescence phase**
- **Broken**
- **Maintenance** is no more effective
- **New features** needed



Retrofit kits

Time to upgrade?

Available solutions

- Change the complete switchgear
 - The complete switchgear is broken and/or no more serviceable

- Use Retrofit kit
 - When replacement is no more available or too much expensive
 - Modern Circuit breaker (features, performance, spares, maintenance, technical support, ...) at a reasonable cost

Retrofit kits

Time to upgrade?

New Switchgear vs Retrofit kit (1/2)

New Switchgear

Pros:

- Complete new products
- New Features

→ Modern result



Cons:

- Downtime
- Different footprint
- Installation Cost

Retrofit kit

Pros:

- Faster installation (Minimized downtime)
- Same footprint
- Low Cost
- New product
- New Features

Cons:

- ...



Retrofit kits

Time to upgrade?

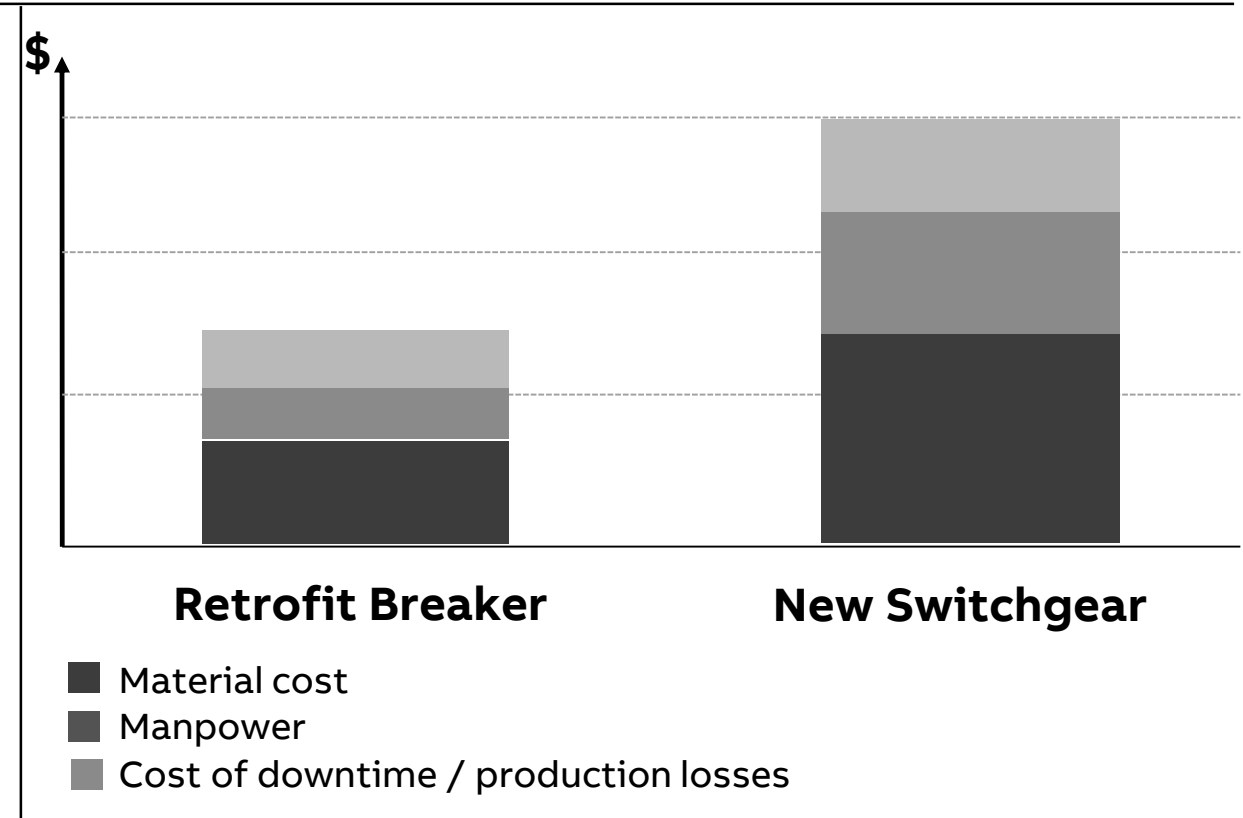
New Switchgear vs Retrofit kit (2/2)

1. New switchgear:

- Downtime
- Different footprint
- High Cost

2. Retrofit only the old breakers:

- Minimized downtime
- Same footprint
- Low Cost



Retrofit kits

Time to Retrofit

ABB Circuit Breakers history



Otomax
1961



Novomax G30
1970



Novomax
1980



Megamax
1990



Emax
1996



New Emax
2004



Emax 2
2013



Isol
1956



Fusol
1965



Modul
1970



Limiter
1980



Isomax
1993



Tmax
2000



Tmax XT
2009

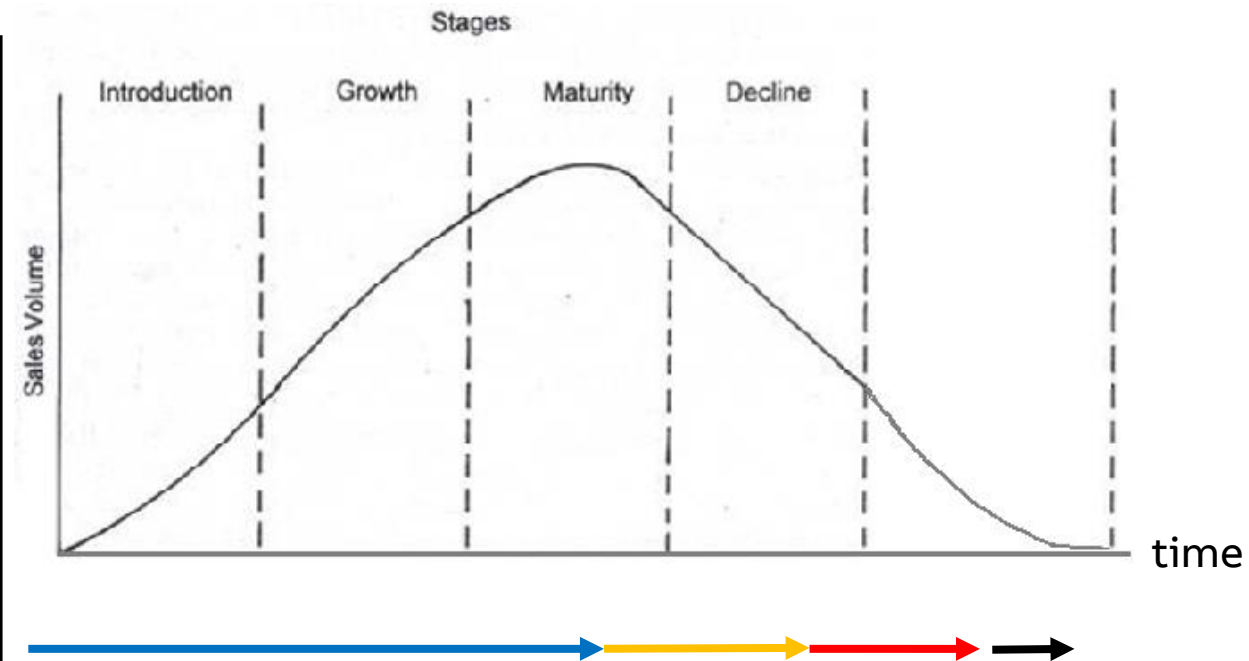
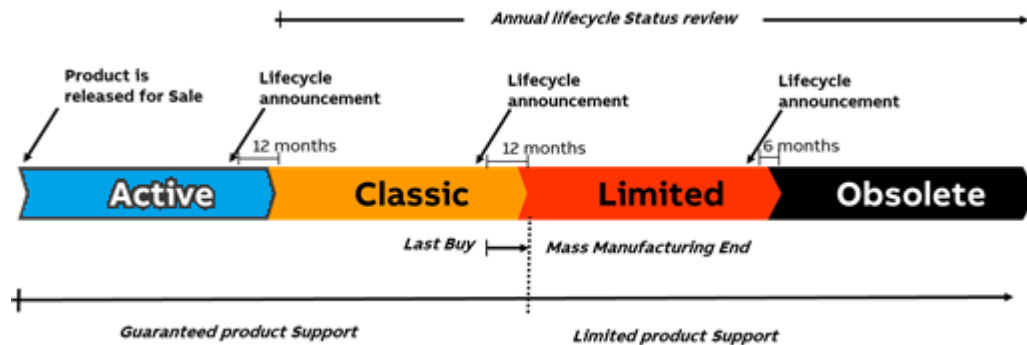


Retrofit kits

Time to Retrofit

Life Cycle Management

- Active** → Normal production, sales and development Phase
- Classic** → Product maintenance Phase
- Limited** → Limited production and guaranteed availability of spares
- Obsolete** → Reduced availability of components and Supports



Retrofit kits

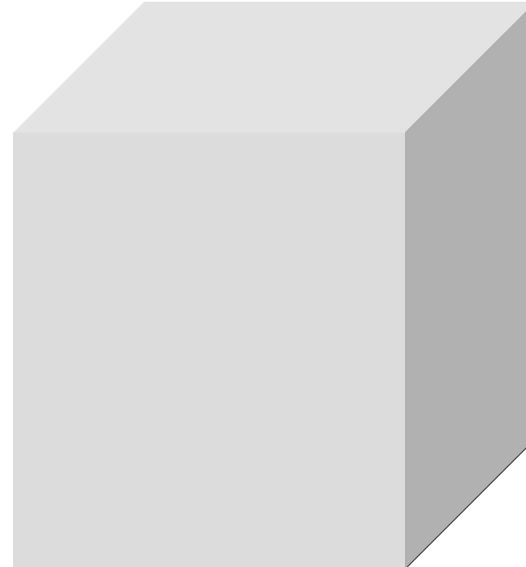
Time to retrofit

What is a retrofit?

Retrofit kit is a connection kit that lets the modern circuit breaker (usually smaller than the existing product) to be adapted to fit the existing switchgear

In particular there could be 3 different retrofit kit solutions:

- Hard Bus Retrofill (RF)
- Cradle in Cradle (CiC)
- Direct Replacement (DR)

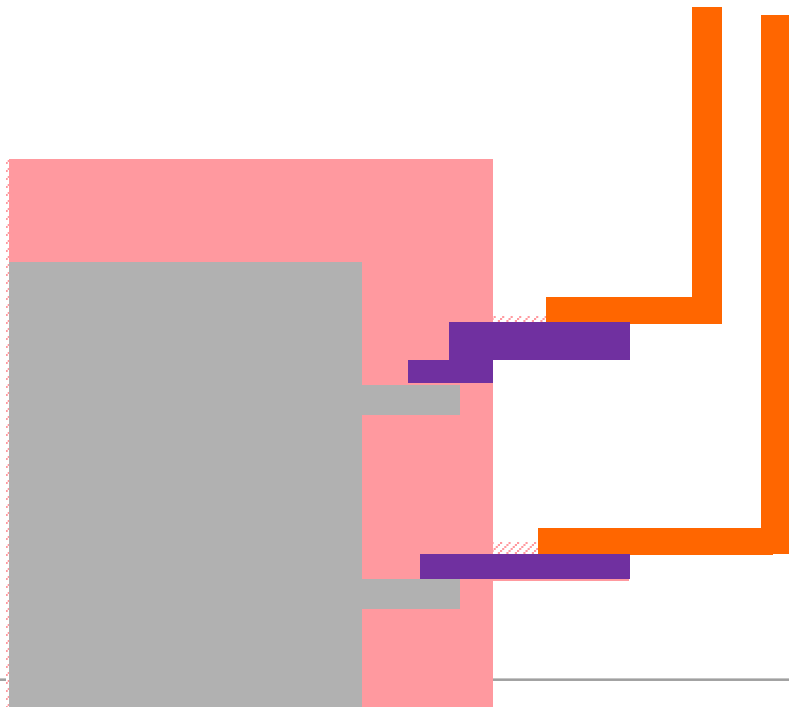


Retrofit kits

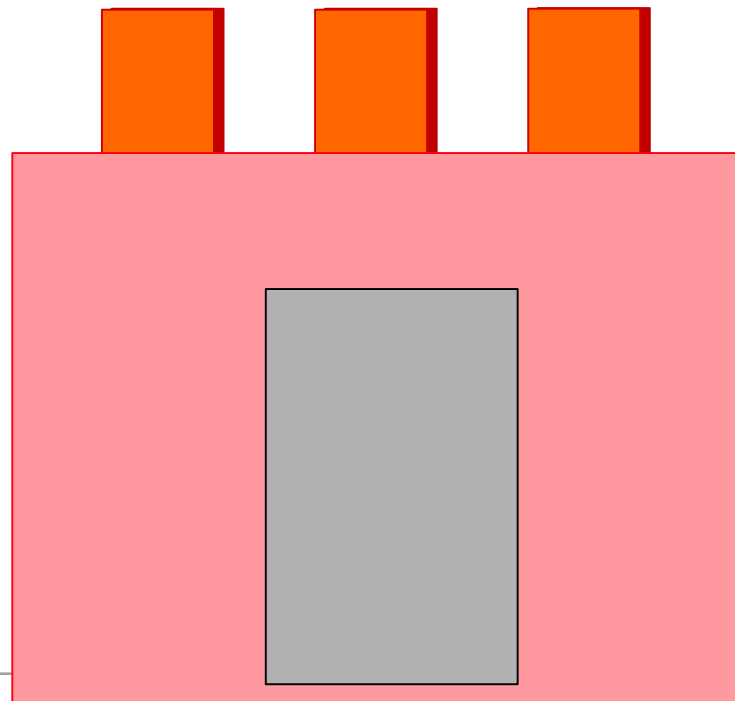
Time to retrofit

1. Hard Bus Retrofit

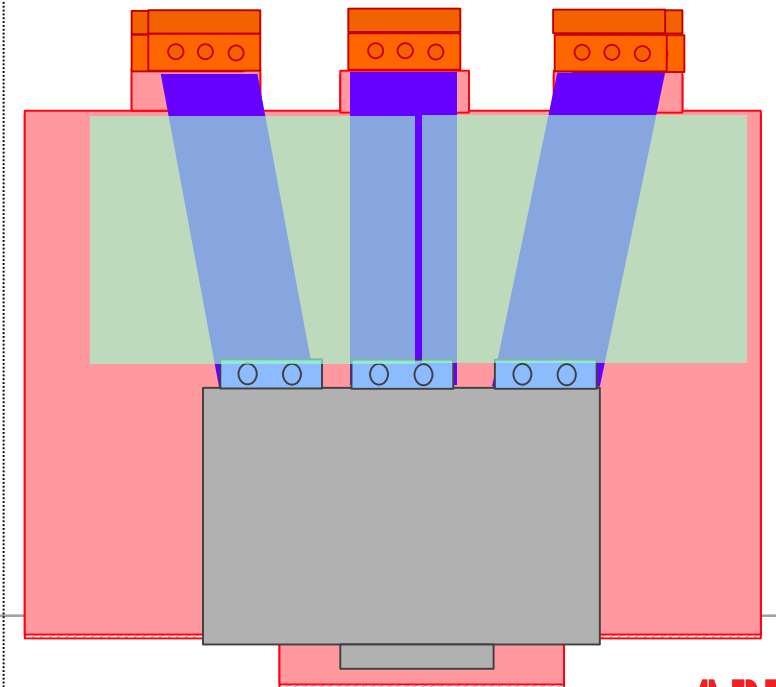
Side view



Front view



Top view



Retrofit kits

Time to retrofit

1. Hard Bus Retrofit

What: Hard bus retrofit consists of:

Pre-designed and cut bus bars to link new terminals to existing copper busbars.

Insulating shields prevent live parts from being exposed

Sticker drilling template to cut the door

Mounting instructions

When: for fixed circuit breaker version

The solution for withdrawable circuit breakers when the mounted fixed part of the old breaker is in bad conditions

How: The chassis of the old breaker has to be removed

Who: Anyone can do it (also customers)



Retrofit kits

Time to retrofit

1. Hard Bus Retrofit

Solutions:

ABB → **ABB**

Otomax → New Emax

Novomax → New Emax

→ Emax 2 (Q4 2017)

Megamax → New Emax

→ Emax 2 (different sales phases during 2017)

Emax → Emax 2

New Emax → Emax 2

Isomax S8 → Tmax T8

ATS 010 → ATS022

Competitors → ABB

Schneider Masterpact M

→ Emax 2

Mitsubishi AE

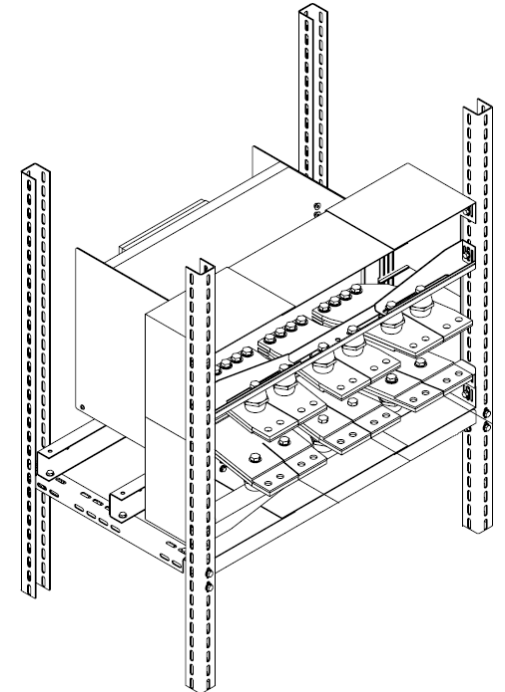
→ New Emax

Siemens 3WN1 and 3WN6

→ New Emax

Terasaki AT

→ New Emax

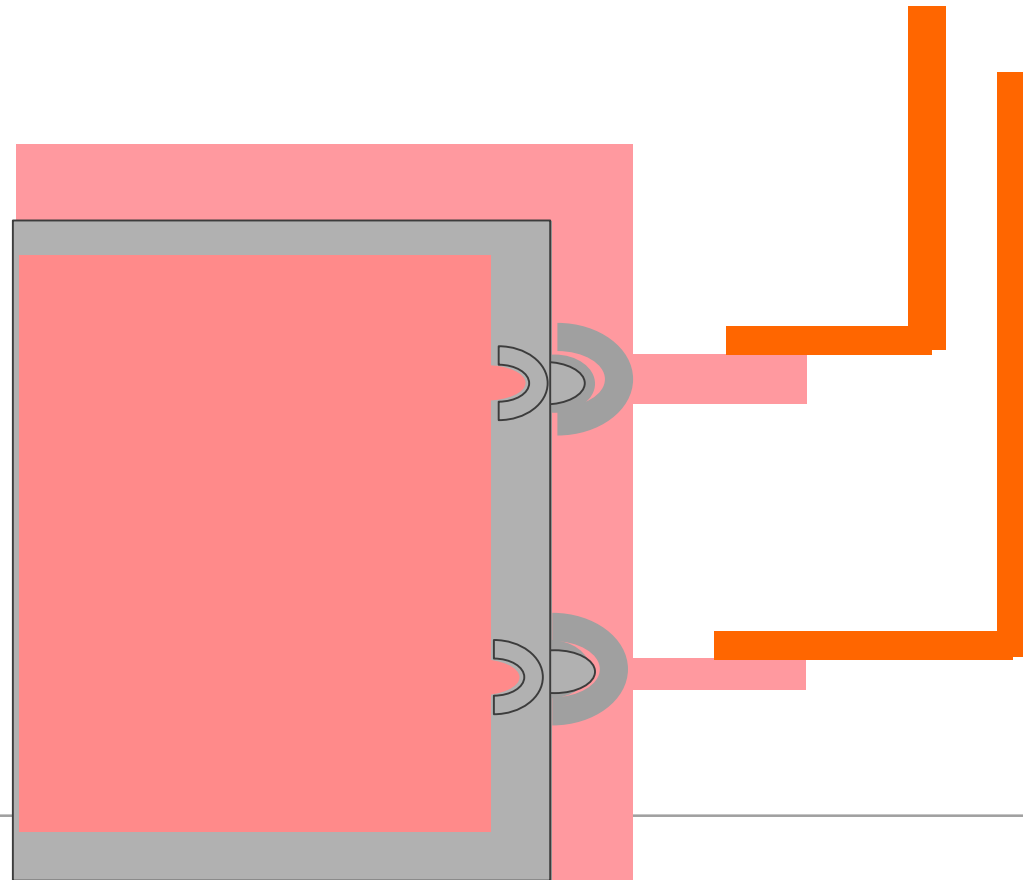


Retrofit kits

Time to retrofit

2. Cradle in Cradle

Side view



Retrofit kits

Time to retrofit

2. Cradle in Cradle

What: Cradle in Cradle consists of:

The cradle of the new circuit breaker is modified to fit into existing fixed part.

Adhesive drilling sheet to cut the front door

Electrical scheme comparison

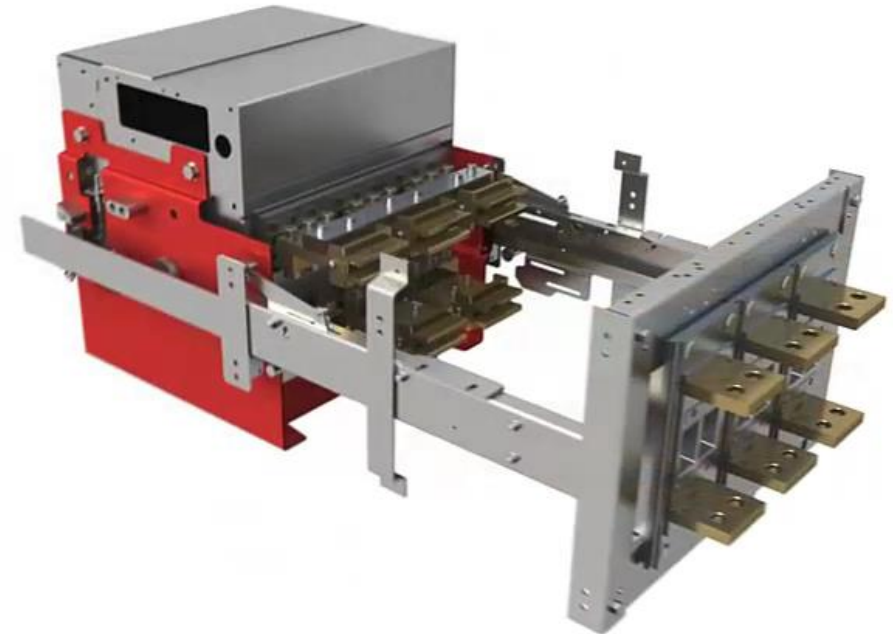
Mounting instructions

When: with withdrawable version only

How: only the moving part of the old circuit breaker must be removed

Who: Anyone can do it (also customers)

Benefit: no need to dismantle the Fixed part of the old circuit breaker. Faster than Hard bus solution



Retrofit kits

Time to retrofit

2. Cradle in Cradle

Solutions:

ABB → **ABB**

Otomax → New Emax

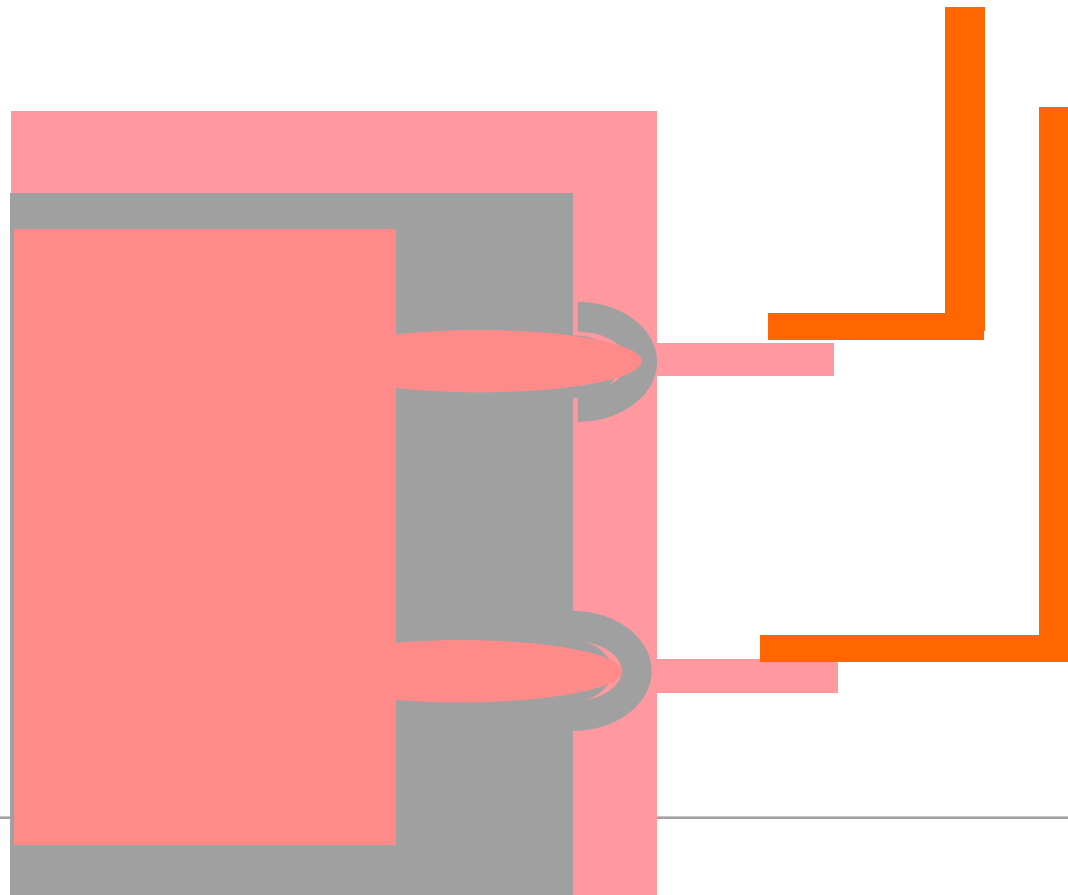
Isol/Fusol → Tmax

Retrofit kits

Time to retrofit

3. Direct Replacement

Side view



Retrofit kits

Time to retrofit

3. Direct Replacement

What: Direct Replacement consists of:

New circuit breaker already modified in order to be racked in/out the existing fixed part.

Accessories and connections are already pre-cabled.

Adhesive drilling sheet to cut the front door

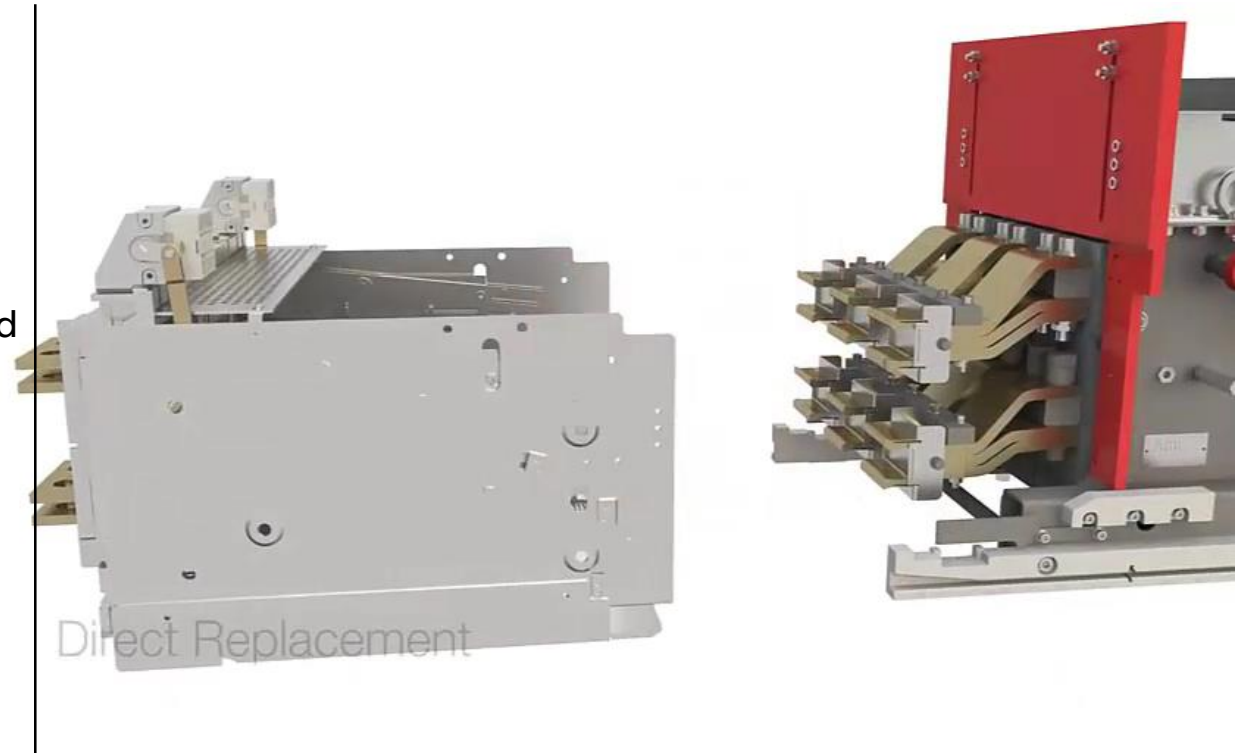
Installation instructions

When: with withdrawable version only and old Fixed part still in good conditions

How: only the moving part of the old circuit breaker must be removed

Who: Anyone can do it (also customers)

Benefit: only the load needs to be shut down during installation → Very fast solution!!



Retrofit kits

Time to retrofit

3. Direct Replacement

Solutions:

ABB

→ **ABB**

Megamax OD (F1 + F2)

→ New Emax

Megamax CD (F1 + F2)

→ Emax 2

Emax

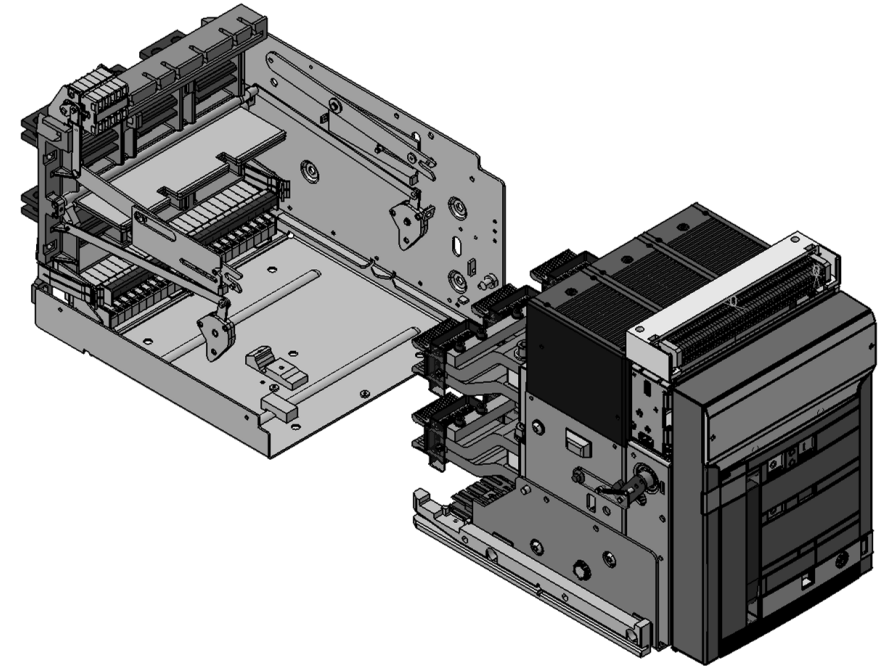
→ New Emax

Novomax (G2)

→ New Emax

Modul (no 630/800)

→ Tmax /Isomax S7



Retrofit kits

Time to retrofit

Choose ABB

Retrofit kits are not only “pieces of copper”.

Behind the kits there are studies to respect the Driving factors:

- Dielectric properties
- Thermal behavior
- Short circuit withstand current (I_{cw})
- Mechanical fits:
 - Installation
 - Compatibility
 - Auxiliary connections

$$\Delta\theta = \frac{I^2 t \cdot R_{el}}{C_{th}}$$

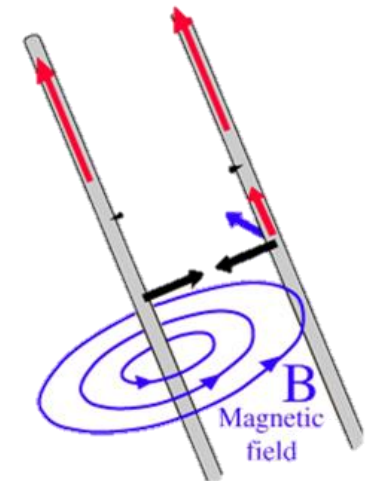
$\Delta\theta$: *overtemperature* · [K]

R_{el} : *electrical resistance* · [Ω]

C_{th} : *thermal capacity* · [J / K]

$I^2 t$: *let-throw energy* · [A²s]

$$\frac{F}{\Delta L} = \frac{\mu_0 I_1 I_2}{2\pi r}$$



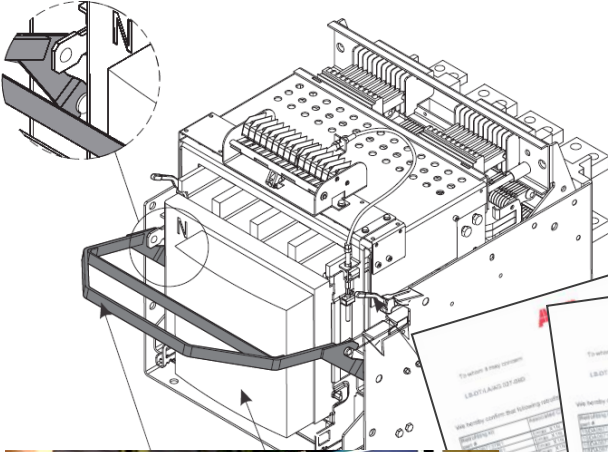
Retrofit kits

Time to retrofit

Choose ABB

ABB Retrofit kits are High quality as:

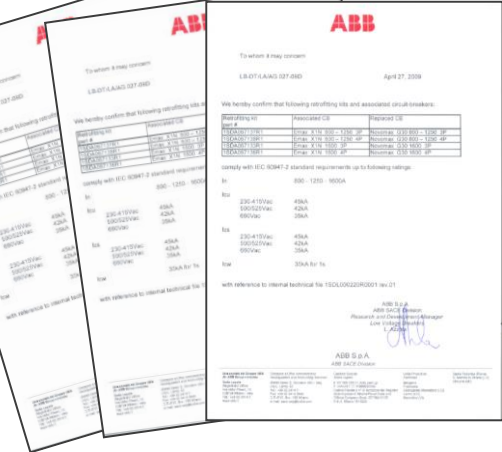

- Tested in accredited laboratory and completed with Compatibility declarations
- Developed by the same R&D team that has developed both old and new circuit breakers
- Same R&D team that has developed both old and new circuit breakers to guarantee the original integrity and specifications of original switchboard
- Equipped with clear mounting instruction



- *Retrofitting kit da sezionato prova a inserito. PRIMA PARTE.*
Ruotare verso il basso la due leve (1), inserire il più possibile il kit di retrofitting con Emax 2 E1.2 (A).
Inserire la leva (2), e passare alla SECONDA PARTE dell'istruzione spiegata in basso in questa pagina.

- *Retrofitting kit from isolated for testing to plugged in. PART ONE.*
Rotate the two levers (1) downwards, push in the retrofitting kit with Emax 2 E1.2 (A) as far as possible.
Insert the lever (2), and go on to PART TWO of this instruction, as explained below.

- *Nachrüstung von Prüfstellung nach Eingeschoben. ERSTER TEIL.*
Die zwei Hebel (1) nach unten drehen und den Nachrüstung mit Emax 2 E1.2 (A) so weit wie möglich einschieben.
Den Hebel (2) einsetzen und zum weiter unten auf diesser Seite beschriebenen ZWEITEN TEIL übergehen.



PRIMA PARTE.

Model	Rated current (In)	Rated voltage (Un)	Rated breaking capacity (Icu)	Rated short-circuit capacity (Isc)
EMAX 2 E1.2 (A)	100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500, 16000, 20000, 25000, 31500, 40000, 50000, 63000, 80000, 100000, 125000, 160000, 200000, 250000, 315000, 400000, 500000, 630000, 800000, 1000000, 1250000, 1600000, 2000000, 2500000, 3150000, 4000000, 5000000, 6300000, 8000000, 10000000, 12500000, 16000000, 20000000, 25000000, 31500000, 40000000, 50000000, 63000000, 80000000, 100000000, 125000000, 160000000, 200000000, 250000000, 315000000, 400000000, 500000000, 630000000, 800000000, 1000000000, 1250000000, 1600000000, 2000000000, 2500000000, 3150000000, 4000000000, 5000000000, 6300000000, 8000000000, 10000000000, 12500000000, 16000000000, 20000000000, 25000000000, 31500000000, 40000000000, 50000000000, 63000000000, 80000000000, 100000000000, 125000000000, 160000000000, 200000000000, 250000000000, 315000000000, 400000000000, 500000000000, 630000000000, 800000000000, 1000000000000, 1250000000000, 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Retrofit kits

Time to retrofit

Retrofit kits Available for Sales

ACB ABB		New ABB Circuit Breaker	Retrofit type	
Otomax	→	New Emax	CiC RF	+ +
Novomax G30	→	Emax 2 New Emax	DR RF	+ +
Novomax	→	New Emax	DR RF	+ +
Megamax	→	New Emax (OD) Emax 2 (CD)	DR RF DR RF*	+ +
Emax	→	New Emax Emax 2	DR RF	+ +
New Emax	→	Emax 2	RF	

*available during 2017

Retrofit kits

Time to retrofit

Retrofit kits Available for Sales

ACB ABB		New ABB Circuit Breaker	Retrofit type	
Isol/ Fusol	→	Tmax	CiC	+
Modul	→	Tmax XT/ Tmax	DR	+
Isomax (S8)	→	Tmax (T8)	RF	

ATS ABB		New ABB ATS	Retrofit type	
010	→	022	RF	+

Retrofit kits

Time to retrofit

Retrofit kits Available for Sales

Non ABB		New ABB Circuit Breaker	Retrofit type	
Schneider Masterpact M	→	New Emax Emax 2	RF	+
Siemens 3WN1 e 3WN6	→	New Emax	RF	+
Terasaki AT	→	New Emax	RF	+
AEG	→	New Emax	RF	
Mitsubishi AE SS	→	New Emax	RF	+
H&W	→	New Emax	RF	

Retrofit kits

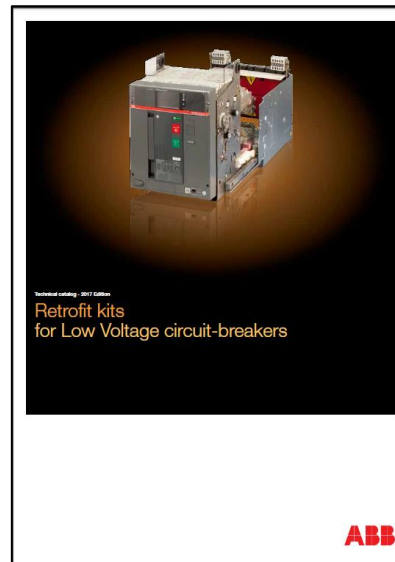
Time to retrofit

Public marketing material

ABB Retrofit kits have different marketing materials to support sales:

1. Web Page → [Link](#)
2. Retrofit kit Catalog ed 2017 → [Link](#)
3. On-line Retrofit kit selector → [Link](#)
4. Promoting videos → [Link](#) - [Link](#)
5. Service note (leaflet) for every Retrofit kit ([link](#))
6. Fixed Part evaluation → [Link](#)
7. This presentation

Public
Material



HOME > ... > LOW VOLTAGE PRODUCTS > SERVICE > SERVICE FOR LOW-VOLTAGE PRODUCTS > EXTENSION, UPGRADES AND RETROFITS > SELECTOR GLOBAL SITE Power and productivity for a better world™ ABB

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 Retrofit.
For additional information look in the [selector](#) expandable area in the previous page.

Brand	Family	Frame	In
ABB SACE x	Megamax x	F1H x	1250 x
Version	Terminal	Poles	Standard
W x	All	3 x	All

There are 3 results listed below [reset]

Type	New CB	Availability	Notes	Ref. Doc.
DR	DR ABB SACE F1H 1250 -> E2S 1200 PR121-LSI W MP (OD) 3p IEC	Available for sales	for other trip units use configurator	9AKK106103A2049
DR	DR ABB SACE F1H 1250 -> E2.2H 1250 EkipDipLSI W MP (CD) 3p IEC	Available for sales	for other trip units use configurator	1SDC001043L0201
RF	RF ABB SACE F1H 1250 -> E2S 1250 W HR 3p IEC	Available for sales		1SDC001008D0202

Retrofit kits

Time to retrofit

Internal material

PM portal (Service section) → Retrofit kit → [Link](#)
Configurator for fast quotation

ABB Low Voltage Breaker Service Retrofitting kit Solutions for Code Selector V3.4.2 Date : 13/12/2016 Priat: Validity upto 20151231

Direct Replacement retrofit kits

Emax old E1-E6		→	New Emax E1-E6		Click
Megamax F1-F2 Closed Door		→	Emax E2.2 <i>New</i>		Click
Megamax F1-F2 Open Door		→	New Emax E2		Click
Novomax G2 Open Door		→	New Emax E2		Click
Novomax G30		→	Emax E1.2		Click

Hard Bus Retrofit Solutions (RF):

Isomax S8		→	Tmax T8		Click
Emax or New Emax		↔	Emax 2 Withdrawable		Click
			Emax 2 Fixed		Click
Megamax Withdrawable		→	Emax 2 <i>New</i>		Click

Hard Bus Retrofit Solutions (RF) vs competitors:

Masterpact M		↔	Emax 2 Withdrawable		Click
			Emax 2 Fixed		Click

NOTE refer to Area Manager for the TP (2016 Retrofitting kit TP model v3.3.xls)



AABB

ACB Circuit Breaker history

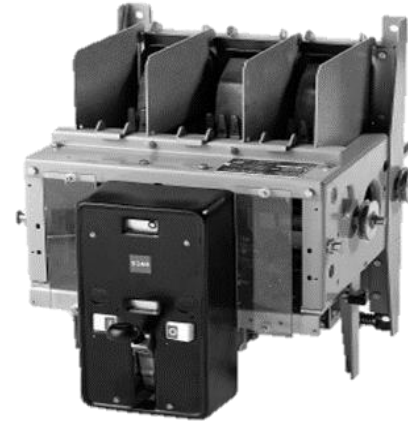
Otomax

Otomax

P2C	1000	2000	3200	4500	3p/4p	version	OD
	1250 1600	2500	4000	5000			
Icu @600-660 V	55	55	55	55	√	F/W	√
Icu @440-500 V	55	55	55	55	√	F/W	√
Icu @380 V	55	55	57	57	√	F/W	√

P3C	2000	3200	3p/4p	version	OD
	2500	4000 4500 5000			
Icu @ 440-500V	75	100	√	F/W	√
Icu @380V	75	100	√	F/W	√

Identification Card



Name: Otomax (P1, P2, P3)

Date of Birth: 1960

Circuit Breaker type: ACB up to 5000A

Life Cycle Phase: Obsolete

Service Solutions:

1. Hard Bus Retrofill with New Emax
2. Cradle in Cradle with New Emax

F= Fixed version

W= Withdrawable version

OD= Open Door version

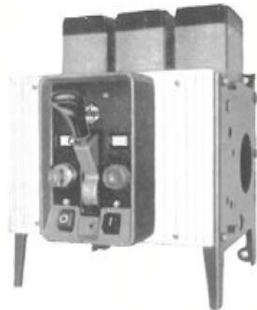
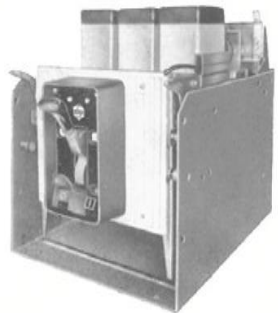


ACB Circuit Breaker history

Novomax G30

Novomax G30

G30	Icu [kA]	3p/4p	In [A]	version
@ 600V	22	x	800	F/W
@ 500V	40	x	1250	F/W
@ 380/415V	40	x	1600	F/W
@ 220V	42	x		F/W



F= Fixed version

W= Withdrawable version

OD= Open Door version

Identification Card



Name: Novomax G30

Date of Birth: 1971

Circuit Breaker type: ACB up to 1600A

Life Cycle Phase: Obsolete

Service Solutions:

1. Direct Replacement with Emax 2 E1.2
2. Hard bus retrofill with New Emax E1



ACB Circuit Breaker history

Novomax

Novomax G2...G6

G2	In=1250 1600 2000	Icu	3p/4 p	versi on	OD
V	660	45	x	F/W	x
	500	50	x	F/W	x
	440	50	x	F/W	x
	380/415	55	x	F/W	x
	220	55	x	F/W	x

G2	In=2500 3000	Icu	3p/4 p	versi on	OD
V	660	55	x	F/W	x
	500	60	x	F/W	x
	440	60	x	F/W	x
	380/415	60	x	F/W	x
	220	60	x	F/W	x

G3	In=1600 2000 2500 3000	Icu	3p/4 p	versi on	OD
V	660	65	x	F/W	x
	500	75	x	F/W	x
	440	75	x	F/W	x
	380/415	75	x	F/W	x
	220	75	x	F/W	x

G4	In=3600 4000	Icu	3p/4 p	versi on	OD
V	660	65	x	F/W	x
	500	75	x	F/W	x
	440	75	x	F/W	x
	380/415	80	x	F/W	x
	220	80	x	F/W	x

G5	In=3200 4000 4500 5000	Icu	3p/4 p	versi on	OD
V	660	75	x	F/W	x
	500	100	x	F/W	x
	440	100	x	F/W	x
	380/415	100	x	F/W	x
	220	100	x	F/W	x

G6	In=6300	Icu	3p	versi on	OD
V	660	75	x	W	x
	500	100	x	W	x
	440	100	x	W	x
	380/415	100	x	W	x
	220	100	x	W	x

Identification Card



Name: Novomax

Date of Birth: 1980

Circuit Breaker type: ACB up to 6300A

Life Cycle Phase: Obsolete

Service Solutions:

1. Direct Replacement for G2 with New Emax E2
2. Hard bus retrofill with New Emax



F= Fixed version

W= Withdrawable version

OD= Open Door version

ACB Circuit Breaker history

Megamax

Megamax F1...F6

F1	1250	1600	2000	Icu	Ics	Icw	3p/4p	version	OD/CD
B	x	x	x	40	40	40	x	F/W	x
N	x	x	x	50	40	40	x	F/W	x
T	x	x	x	55			x	F/W	x
H	x	x		85	85	20	x	F/W	x
V	x	x		130	130	20	x	F/W	x
L	x	x		130	130		x	F/W	x

F2	2000	2500	3000	Icu	Ics	Icw	3p/4p	version	OD/CD
H	x	x		85	85	25	x	F/W	x
V	x	x		130	130	25	x	F/W	x
L	x	x		130	130	-	x	F/W	x
T		x	x	65	65	65	x	F/W	x

F3	2000	2500	3000	Icu	Ics	Icw	3p/4p	version	OD/CD
T	x	x	x	75	75	75	x	F/W	x

F4	3200	3600	Icu	Ics	Icw	3p/4p	version	OD/CD
			75/8	75/8	75/8			
T	x	x	0	0	0	x	F/W	x

F5	3200	4000	5000	Icu	Ics	Icw	3p/4p	version	OD/CD
T	x	x	x	100	100	100	x	F/W	x
H	x	x	x	120	120	100	x	F/W	x

F6	6300	Icu	Ics	Icw	3p	version	OD/CD
T	x	100	100	100	3p	W	x
H	x	120	120	100	3p	W	x

F= Fixed version

W= Withdrawable version

OD= Open Door version



CD= closed Door



Identification Card



Name: Megamax

Date of Birth: 1990

Circuit Breaker type: ACB up to 6300A

Life Cycle Phase: Obsolete

Service Solutions:

1. Direct Replacement for F1 and F2 OD with New Emax E2
2. Direct Replacement for F1 and F2 CD with Emax 2 E2.2
3. Hard bus retrofill with New Emax
4. Hard bus retrofill with Emax 2 (during 2017)



ACB Circuit Breaker history

Emax

Emax E1...E6

E1	800		1250		Icu	Ics	Icw	3p/4p	version
B	x	x	42	42	36			x	F/W
N	x	x	50	50	36			x	F/W

E2	1250		1600		2000		Icu	Ics	Icw	3p/4p	version
B		x	x	42	42	42				x	F/W
N	x	x	x	65	65	55				x	F/W
L	x	x		130	130	10				x	F/W

E3	1250		1600		2000		2500		3200		Icu	Ics	Icw	3p/4p	version
N							x	x	65	65	65			x	F/W
T	x	x	x	x	x	x	75	75	75	75	75			x	F/W
H	x	x	x	x	x	x	100	85	75	75	75			x	F/W
L							x	x	130	130	15			x	F/W

E4	3200		4000		Icu	Ics	Icw	3p/4p	version
T		x	75	75	75			x	F/W
H	x	x	100	100	100			x	F/W

E6	4000		5000		6300		Icu	Ics	Icw	3p/4p	version
H		x	x	100	100	100				x	F/W
V		x	x	150	125	100				x	F/W

Identification Card



Name: Emax

Date of Birth: 1996

Circuit Breaker type: ACB up to 6300A

Life Cycle Phase: Obsolete

Service Solutions:

1. Direct Replacement with New Emax
2. Hard bus Retrofill with New Emax
3. Hard Bus Retrofill with Emax 2

F= Fixed version

W= Withdrawable version

CD= closed Door version



ACB Circuit Breaker history

New Emax

New Emax E1...E6

E1	800	1250	1600	2000	Icu	Ics	Icw	3p/4p	version
B	x	x	x	x	42	42	42	x	F/W
N	x	x	x	x	50	50	50	x	F/W

E2	800	1000	1250	1600	2000	Icu	Ics	Icw	3p/4p	version
B				x	x	42	42	42	x	F/W
N	x	x	x	x	x	65	65	55	x	F/W
S	x	x	x	x	x	85	85	65	x	F/W
L		x	x			130	130	10	x	F/W

E4	3200	4000	Icu	Ics	Icw	3p/4p	version
S	x	75	75	75		x	F/W
H	x	x	100	100	100	x	F/W
V	x	x	150	150	100	x	F/W

E3	800	1000	1250	1600	2000	2500	3200	Icu	Ics	Icw	3p/4p	version
N						x	x	65	65	65	x	F/W
S		x	x	x	x	x	x	75	75	75	x	F/W
H	x	x	x	x	x	x	x	100	85	75	x	F/W
V	x		x	x	x	x	x	130	100	85	x	F/W
L					x	x		130	130	15	x	F/W

E6	4000	5000	6300	Icu	Ics	Icw	3p/4p	version
H	x	x	x	100	100	100	x	F/W
V	x	x	x	150	150	100	x	F/W

F= Fixed version

W= Withdrawable version

CD= closed Door version

Identification Card



Name: New Emax

Date of Birth: 2004

Circuit Breaker type: ACB up to 6300A

Life Cycle Phase: Classic from July 2017

Service Solutions:

1. Hard Bus Retrofill with Emax 2



MCCB Circuit Breaker history

Fusol

Fusol

Fusol		FZ160/ 30	FZ160/ 100	FZ250/ 200	FZ630/ 400	FZ630/ 500
In [A]	V (~)	30	100	200	400	500
I _{cm} [kA]	500	250	250	250	250	250
I _u [kA]	500	100	100	100	100	100
Poles		3p/4p	3p/4p	3p/4p	3p/4p	3p/4p
version		P	P	P	F/W	F/W

Identification Card



Name: Fusol

Date of Birth: 1965

Circuit Breaker type: MCCB up to 500A

Life Cycle Phase: Obsolete

Service Solutions:

1. Direct Replacement with Tmax T6



F= Fixed version

W= Withdrawable version

P= Plug-in

MCCB Circuit Breaker history

Modul

Modul SN

Modul SN		SN100 SN125	SN160 SN250	SN400	SN630 SN800	SN1250 SN1600
In [A]	V (~)	100-125	160-250	400	630-800	1250-1600
I _u [kA]	230	85	85	85	85	85
	380/ 415	35	35	35	40	50
	440	30	30	30	35	35
	500	15	25	25	30	30
	690	10	18	18	18	20
I _{cs} (%I _{cu})	50	50	50	50	50	50
poles		3p/4p	3p/4p	3p/4p	3p/4p	3p/4p
version		F/P	F/P	F/P	F/P/W	F/P/W

Identification Card



Name: Modul SN

Date of Birth: 1970

Circuit Breaker type: MCCB up to 1600A

Life Cycle Phase: Obsolete

Service Solutions:

1. Direct Replacement with Tmax (not available for SN630/800)

F= Fixed version

W= Withdrawable version

P= Plug-in

MCCB Circuit Breaker history

Modul

Modul SH

Modul		SH100-250	SN630-800	SN1250-1600
In [A]	V (~)	100-125-160-250	630-800	1250-1600
Iu [kA]	230	100	100	100
	380/ 415	60	60	75
	440	35	45	60
	500	30	30	50
	690	20	20	35
Ics (%Icu)	50	50	50	50
poles		3p/4p	3p/4p	3p/4p
version		F/P	F/P/W	F/P/W

Identification Card



Name: Modul NH

Date of Birth: 1975

Circuit Breaker type: MCCB up to 1600A

Life Cycle Phase: Obsolete

Service Solutions:

1. Direct Replacement with Tmax (not available for SH630/800)



F= Fixed version

W= Withdrawable version

P= Plug-in

MCCB Circuit Breaker history

Limiter

Limiter LN

LN	LN 32	LN 63	LN 100	LN 125	LN 160	LN 200	LN 320	LN 500	LN 630	LN 800	LN 1000
6006											
90	6	6	40	40	50	50	75	75	75	75	75
500	40	40	70	70	125	125	125	125	125	125	125
440	50	50	170	170	170	170	170	170	170	170	170
380											
415	50	50	170	170	200	200	200	200	200	200	200
220	100	100	200	200	300	300	300	300	300	300	300

	LN 32	LN 63	LN 100	LN 125	LN 160	LN 200	LN 320	LN 500	LN 630	LN 800	LN 1000
Version	F/P	F/P	F/P	F/P	F/P/W	F/P/W	F/P/W	F/P/W	F	F/W	F
Pole	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4

F= Fixed version

W= Withdrawable version

P= Plug-in

Identification Card



Name: Limitor

Date of Birth: 1980

Circuit Breaker type: MCCB up to 1000A

Life Cycle Phase: Obsolete



MCCB Circuit Breaker history

Isomax

Isomax S

Isomax	S1	S2	S3	S4	S5	S6	S7	S8
V (ac) ^{I_{cu}} [kA]	B/N	B/N/S	N/H/L	N/H/L	N/H/L	N/S/H/L	S/H/L	H/V
600 - 690	- / -	6/8/10	14/18/20	18/22/30	20/25/30	20/22/25/30	20/25/35	40/50
500	8/12	8/12/15	25/40/50	25/40/65	25/40/65	25/35/40/65	35/45/70	50/70
440	10/110/20/2	30/50/6	30/50/80	30/50/80	30/45/50/80	40/55/80	70/100	
380 415	6	5	5	0	0	0	0	85/120
220	16/216/35/5	35/65/8	35/65/10	35/65/10	35/50/65/10	50/65/10		
	5	0	5	0	0	0	0	
	25/ 25/50/6	65/100/ 170	65/100/2 00	65/100/2 00	65/85/100/2 00	85/100/2 00	85/120	
version	F-P	F-P	F-P-W	F-P-W	F-P (400) - W	F-W	F-W	F
Poles	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4

Identification Card



Name: Isomax

Date of Birth: 1993

Circuit Breaker type: MCCB up to 3200A

Life Cycle Phase: Obsolete

Service Solutions:

1. Hard Bus Retrofill for S8 with Tmax T8



F= Fixed version

W= Withdrawable version

P= Plug-in

MCCB Circuit Breaker history

Tmax T1...T3

Tmax T1...T3

Tmax		T1	T2	T3
V (ac)	Icu [kA]	B/N	B/N/S	N/H/L
600 - 690		- / -	6/8/10	14/18/20
500		8/12	8/12/15	25/40/50
440		10/16	10/20/25	30/50/65
380 415		16/25	16/35/50	35/65/85
220		25/40	25/50/65	65/100/170
version		F-P	F-P	F-P-W
Poles		1-3-4	3-4	3-4

Identification Card



Name: Tmax T1, T2, T3

Date of Birth: 2000

Circuit Breaker type: MCCB up to 250A

Life Cycle Phase: Obsolete

F= Fixed version

W= Withdrawable version

P= Plug-in

MCCB Circuit Breaker history

Tmax

Tmax T4...T8

Tmax		T4	T5	T6	T7	T8
V (ac)	I _{cu} [kA]	N/H/L	N/H/L	N/S/H/L	S/H/L	H/V
600 - 690		18/22/30	20/25/30	20/22/25/30	20/25/35	40/50
500		25/40/65	25/40/65	25/35/40/65	35/45/70	50/70
440		30/50/80	30/50/80	30/45/50/80	40/55/80	70/100
380 415		35/65/100	35/65/100	35/50/65/100	50/65/100	85/120
220		65/100/200	65/100/200	65/85/100/200	85/100/200	85/120
version		F-P-W	F-P (400) - W	F-W	F-W	F
Poles		3-4	3-4	3-4	3-4	3-4

Identification Card



Name: Tmax T4...T8

Date of Birth: 2000

Circuit Breaker type: MCCB up to 3200A

Life Cycle Phase: Active

F= Fixed version

W= Withdrawable version

P= Plug-in



MCCB Circuit Breaker history

Tmax XT

Tmax XT

Tmax XT		XT1	XT2	XT3	XT4
V (ac)	I _{cu} [kA]	B/C/N/S/H	N/S/H/L/V	N/S	N/S/H/L/V
600 - 690		3/4/6/8/10	10/12/15/18/20	5/6	10/12/15/20/25
500		8/18/30/36/50	30/36/50/60/70	20/30	30/36/50/60/70
440		15/25/36/50/65	36/50/65/100/150	25/40	36/50/65/100/150
380 415		18/25/36/50/70	36/50/70/120/150	36/50	36/50/70/120/150
220		25/40/65/85/100	65/85/100/150/200	50/85	65/85/100/150/200
version		F-P	F-P-W	F-P	F-W-P
Poles		3-4	3-4	3-4	3-4

Identification Card



Name: Tmax XT: XT1...XT4

Date of Birth: 2009

Circuit Breaker type: MCCB up to 250A

Life Cycle Phase: Active

F= Fixed version

W= Withdrawable version

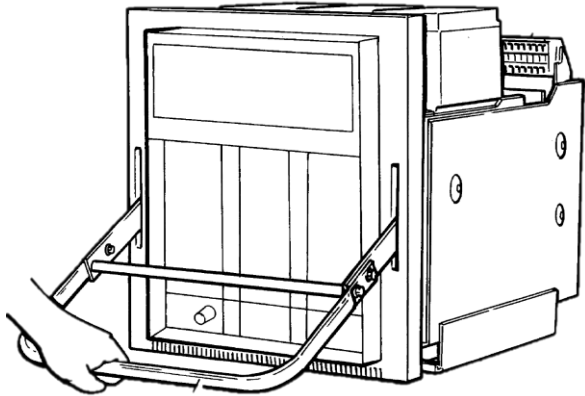
P= Plug-in



Closed Door vs Open Door

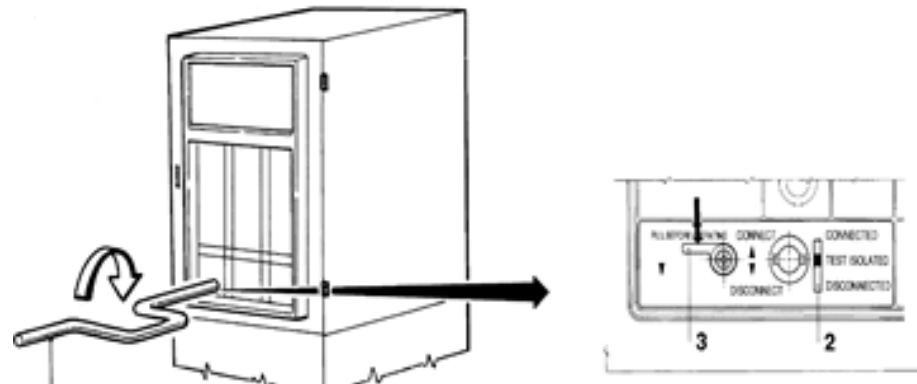
For Megamax and Novomax

OPEN DOOR (OD)



To rack in and out the moving part it's mandatory to open the panel door

CLOSE DOOR (CD)



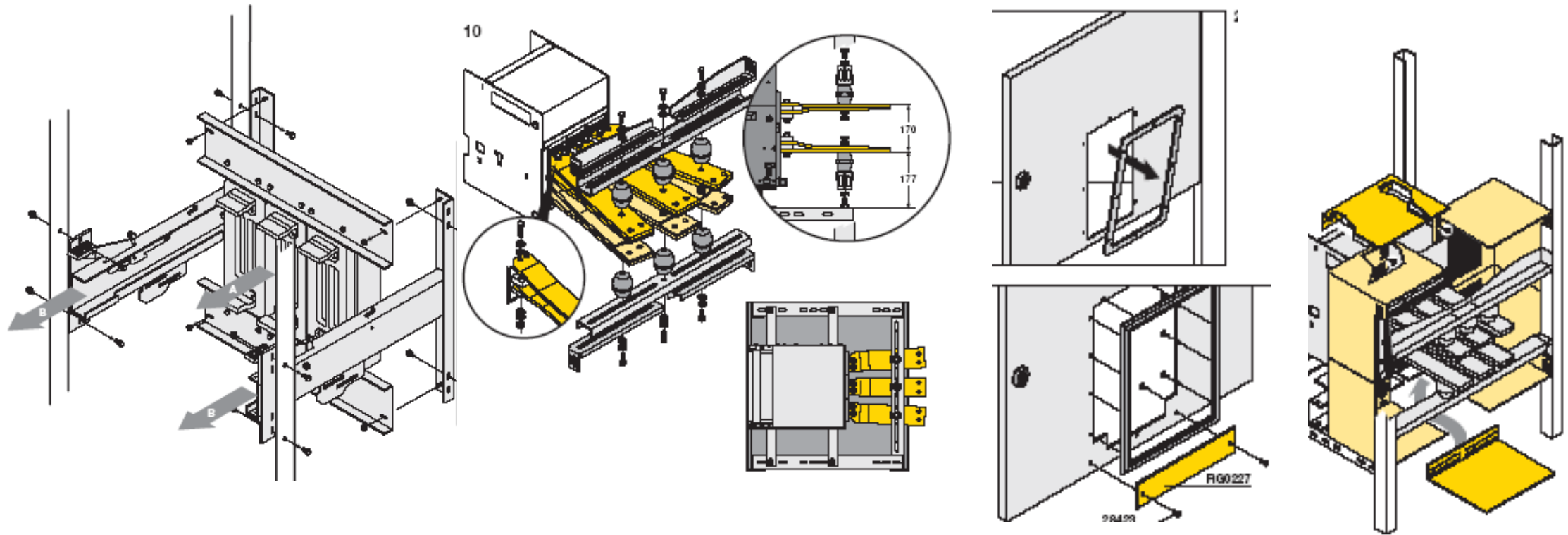
To rack in and out the moving part it's NOT necessary to open the panel door



Retrofit kits

Otomax → New Emax RF

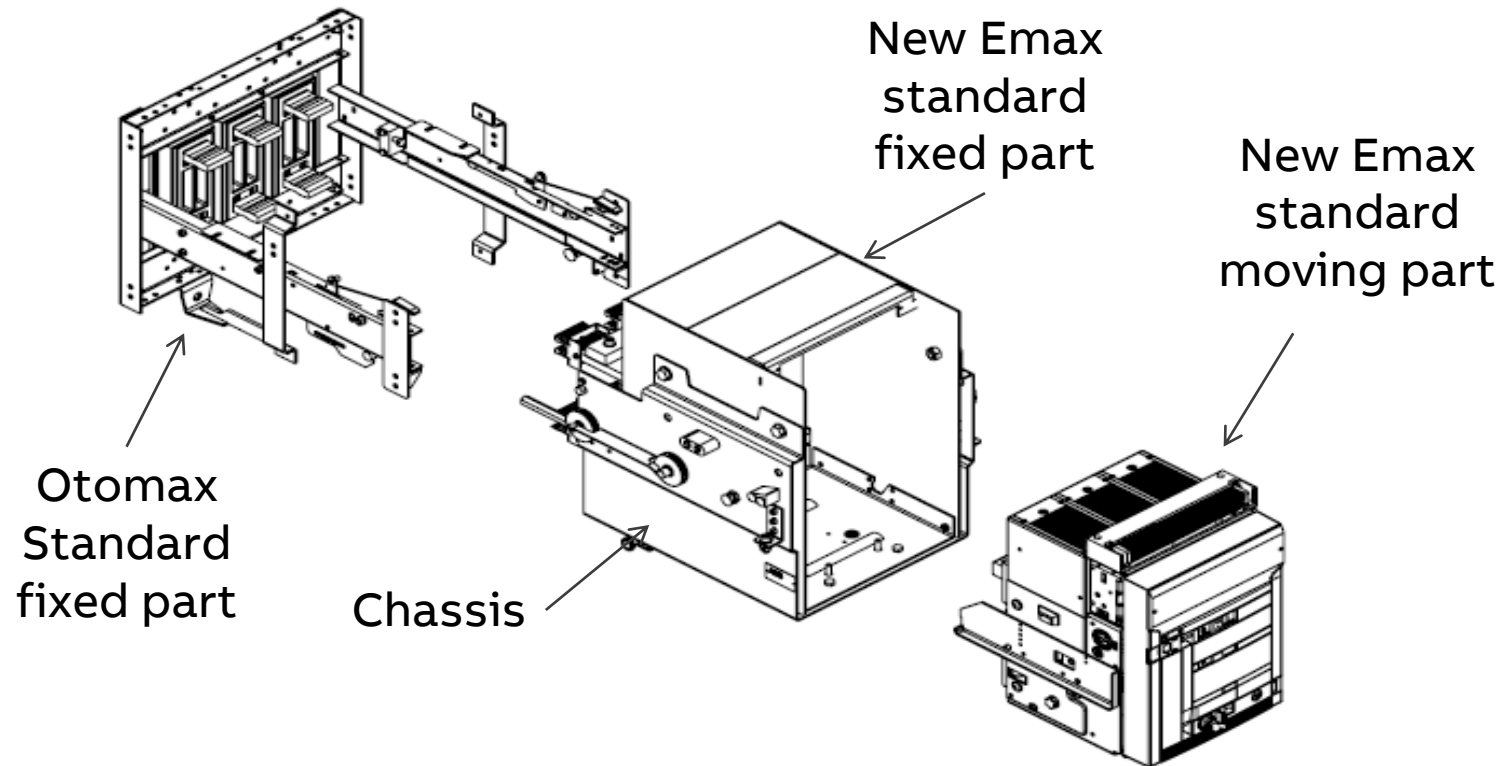
Otomax → New Emax RF



Retrofit kits

Otomax → New Emax CiC

Otomax → New Emax CiC



Retrofit kits

Novomax G30 → Emax 2 DR

Novomax G30 → Emax 2 DR

Auxiliary circuits
plugs

Trip Unit

Lock in open
position

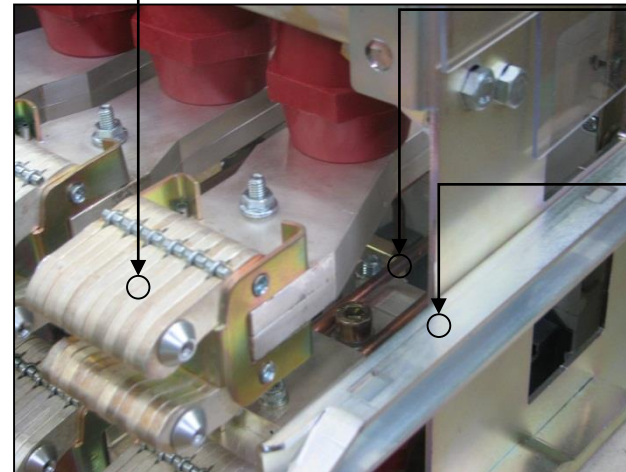
New Operating
mechanism



Jaw
contacts

Heat Pipes

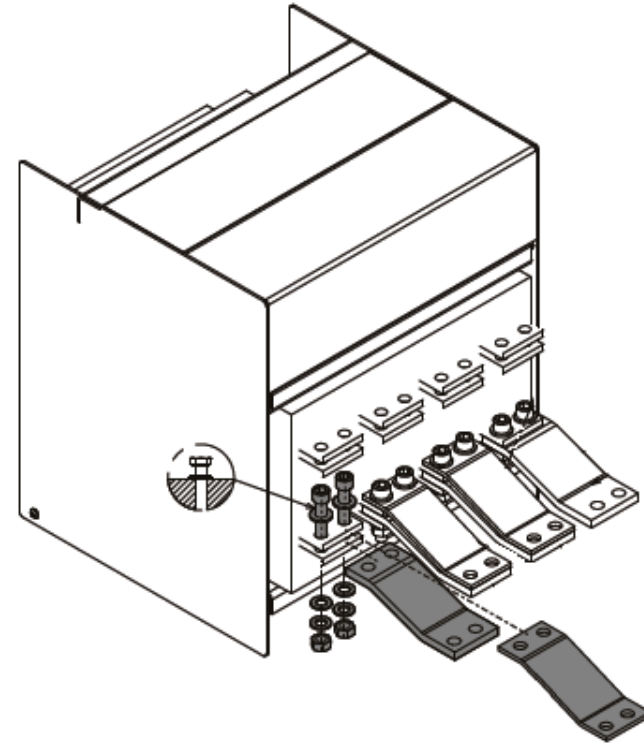
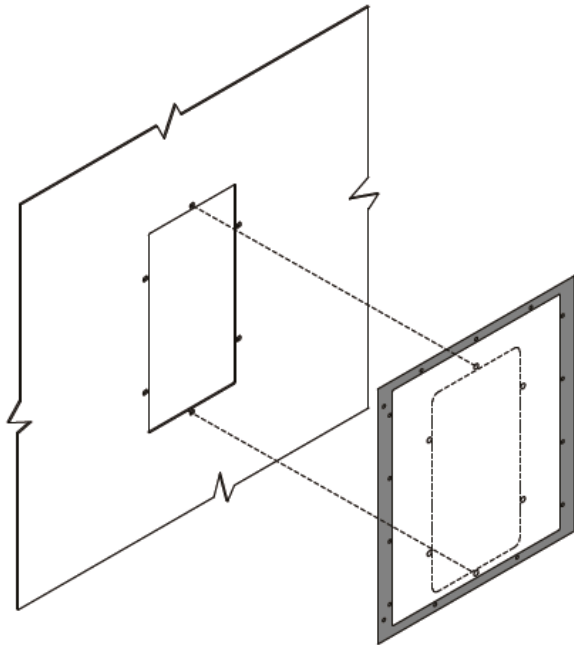
Insertion
guide



Retrofit kits

Novomax → New Emax

Novomax G30 → Emax 2 RF

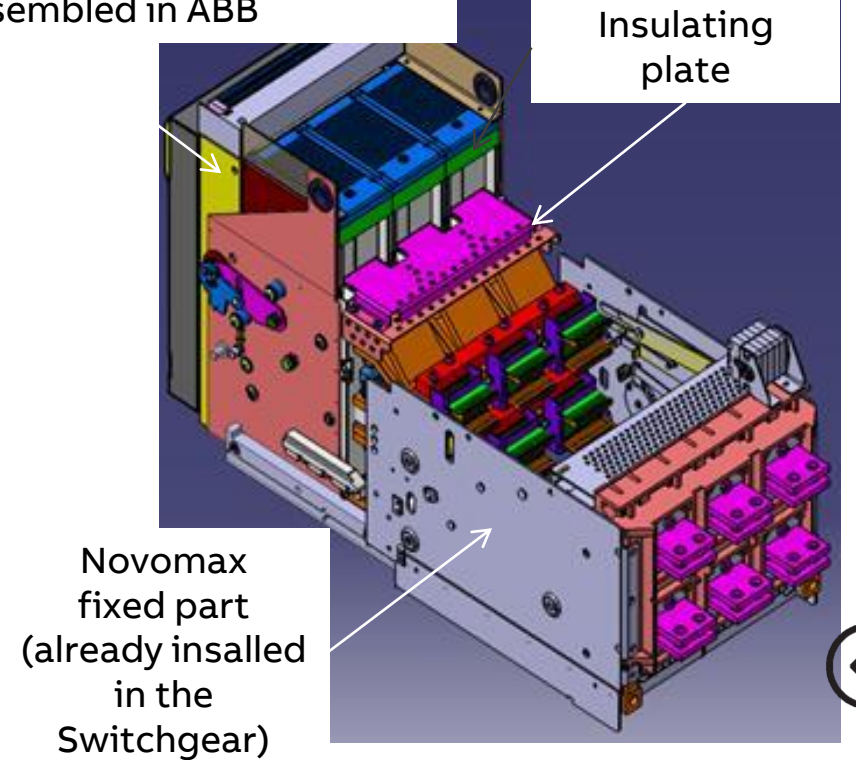
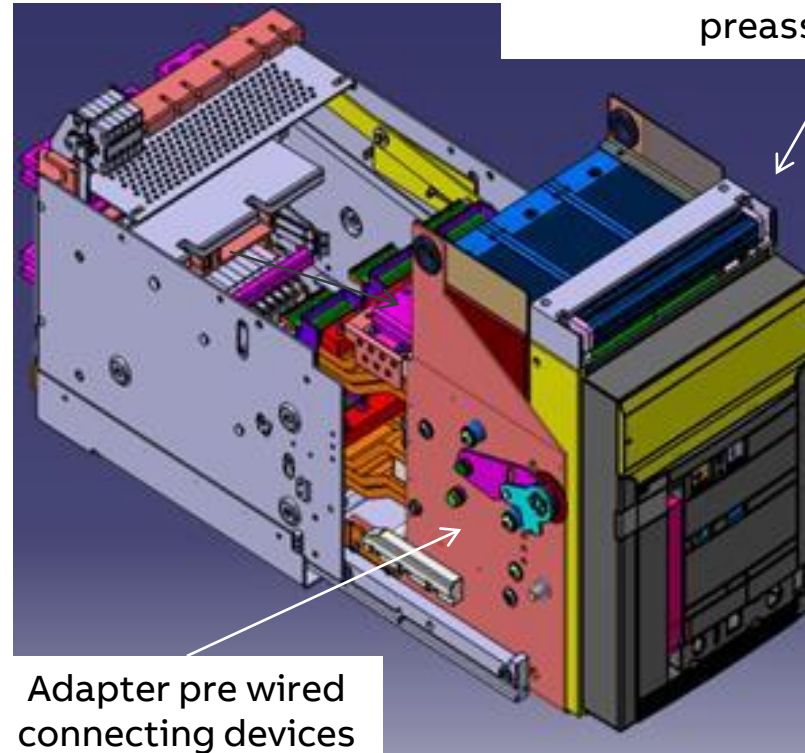


Retrofit kits

Novomax → New Emax DR

Novomax → New Emax DR

- Special New Emax moving part
- Standard Novomax sliding contacts (left and right) and dedicated wiring
- Draw out lever
- Door flange
- Coils support
- Mechanical signalling of circuit breaker tripped
- Anti-insertion locks
- Lifting golfare

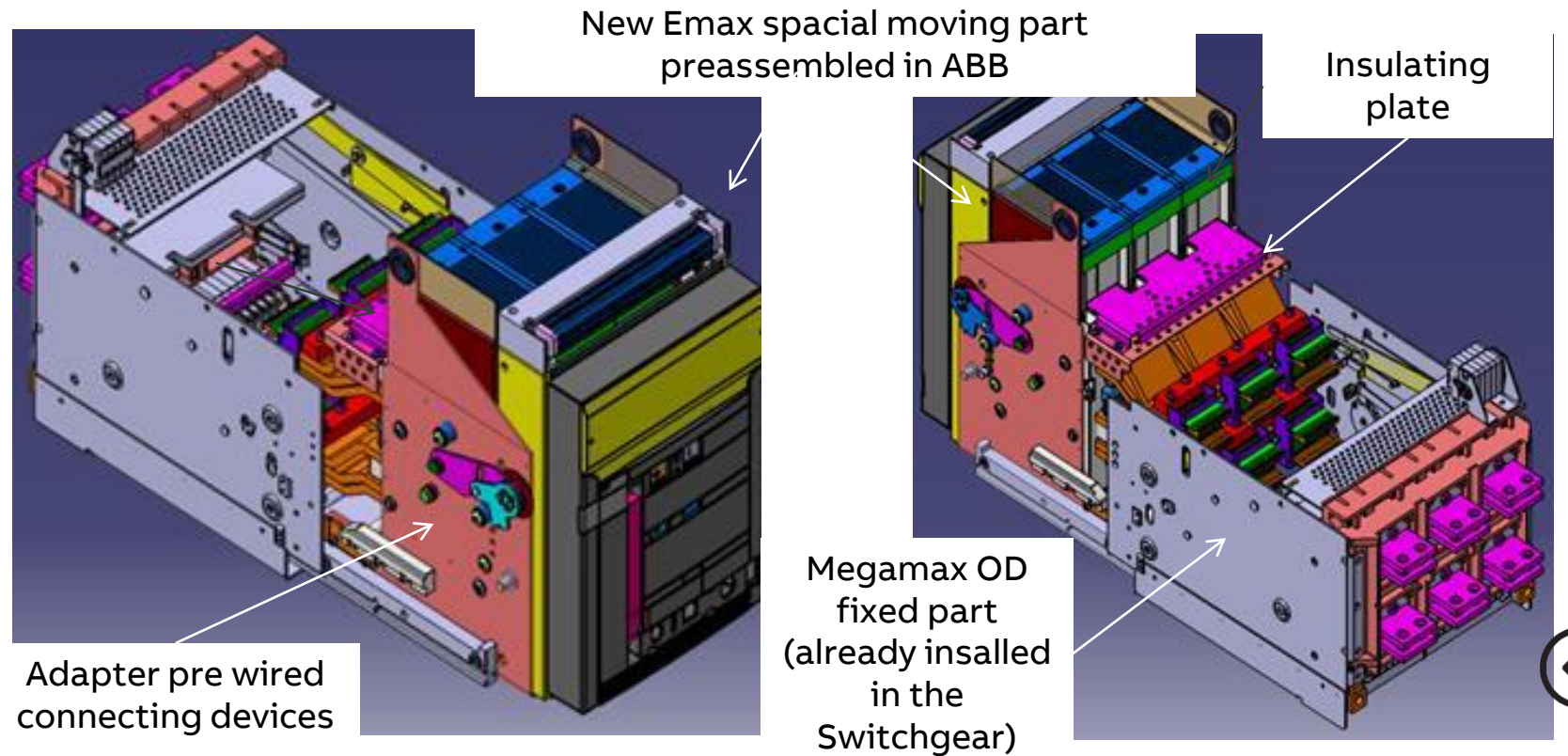


Retrofit kits

Megamax OD → New Emax DR

Megamax OD → New Emax DR

- Special New Emax moving part
- Standard Megamax OD sliding contacts (left and right) and dedicated wiring
- Draw out lever
- Door flange
- Coils support
- Mechanical signalling of circuit breaker tripped
- Anti-insertion locks
- Lifting golfare

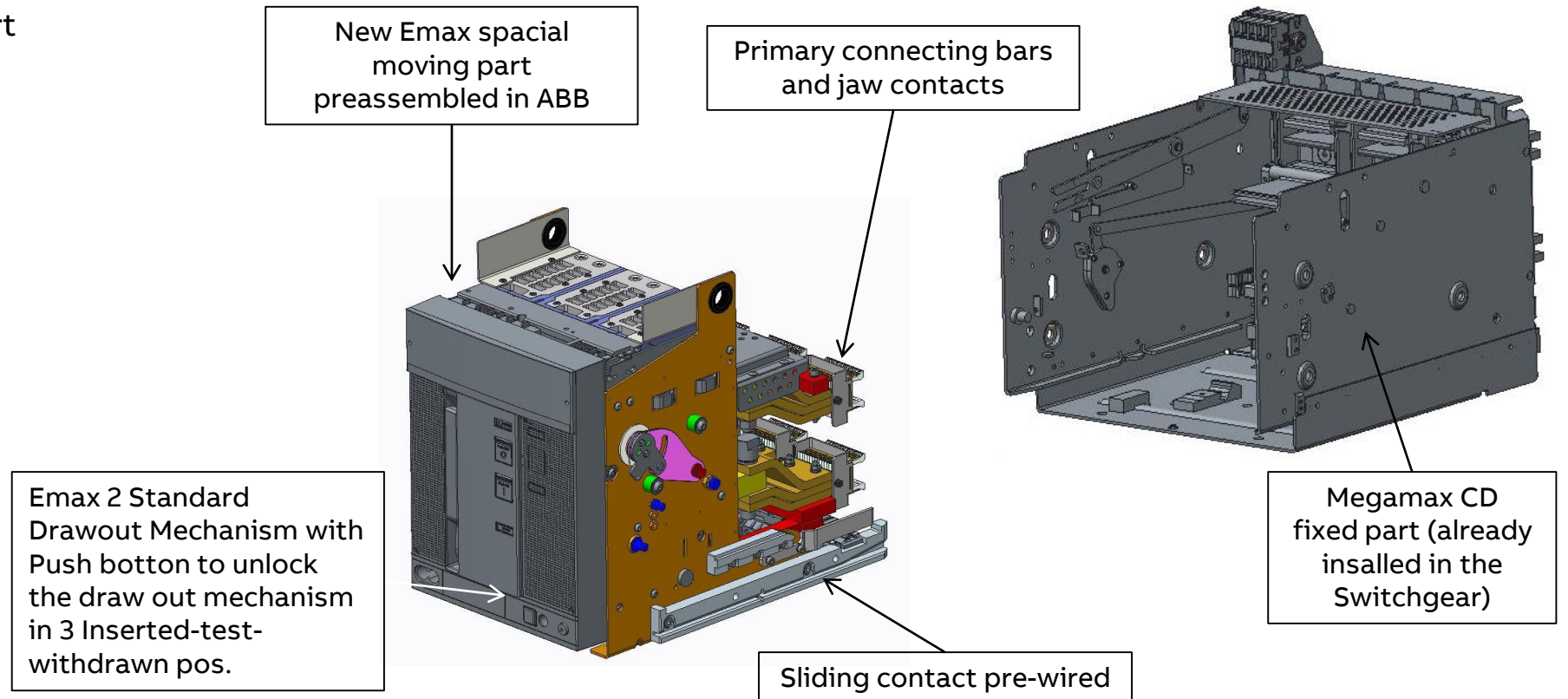


Retrofit kits

Megamax CD → Emax 2 DR

Megamax CD → Emax 2 DR

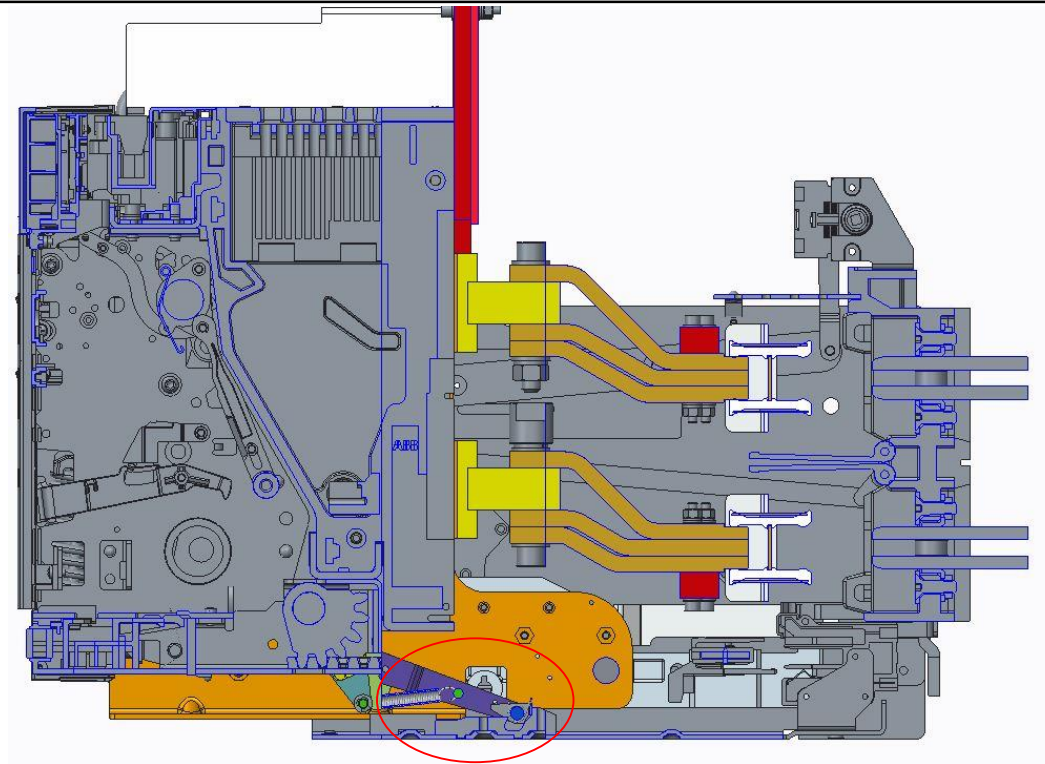
- Customized Emax 2 moving part
- Standard Megamax sliding contacts & wiring
- Draw out handle
- Door flange
- Mechanical signalling of circuit breaker tripped
- Anti-insertion locks
- Lifting golfare



Retrofit kits

Megamax CD → Emax 2 DR

Megamax CD → Emax 2 DR

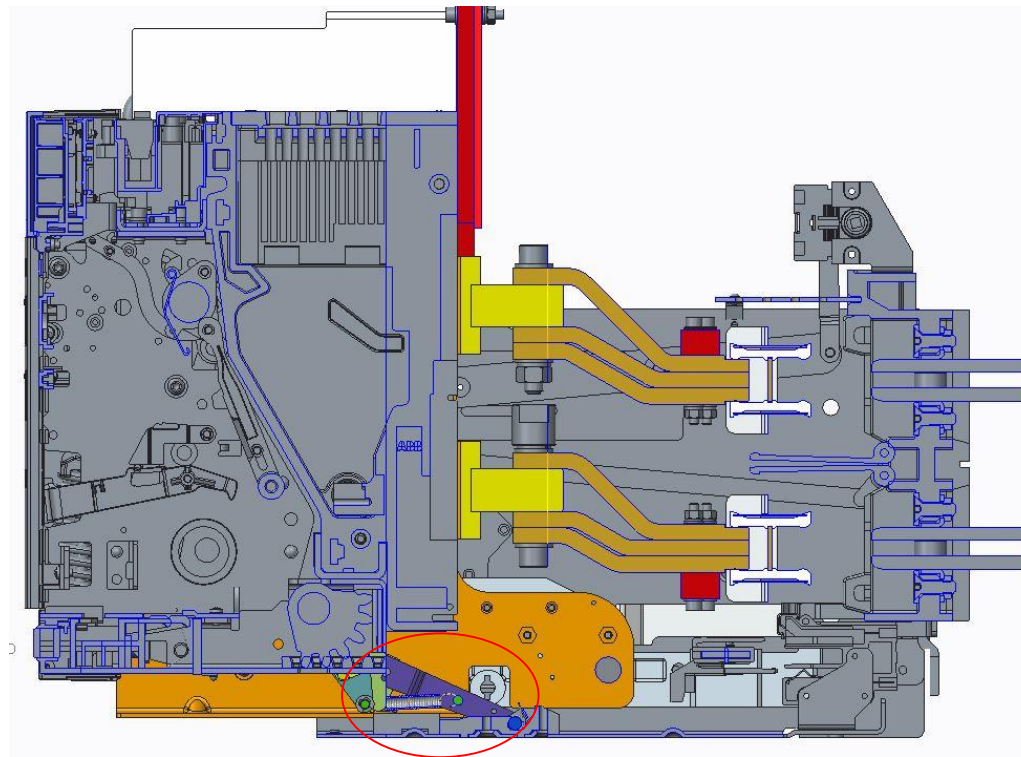


Breaker in racked-out position: hook disconnected

Retrofit kits

Megamax CD → Emax 2 DR

Megamax CD → Emax 2 DR

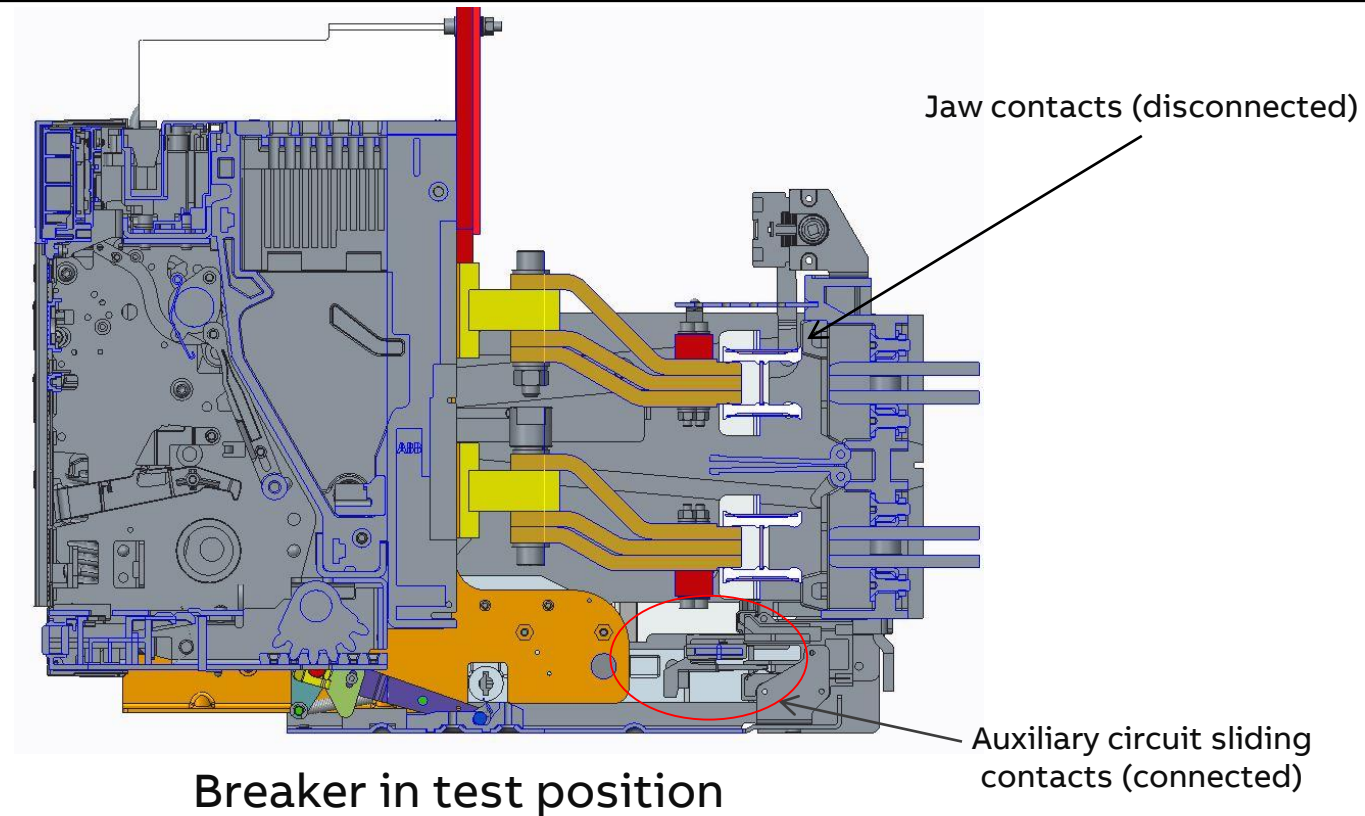


Breaker in racked-out position: hook connected

Retrofit kits

Megamax CD → Emax 2 DR

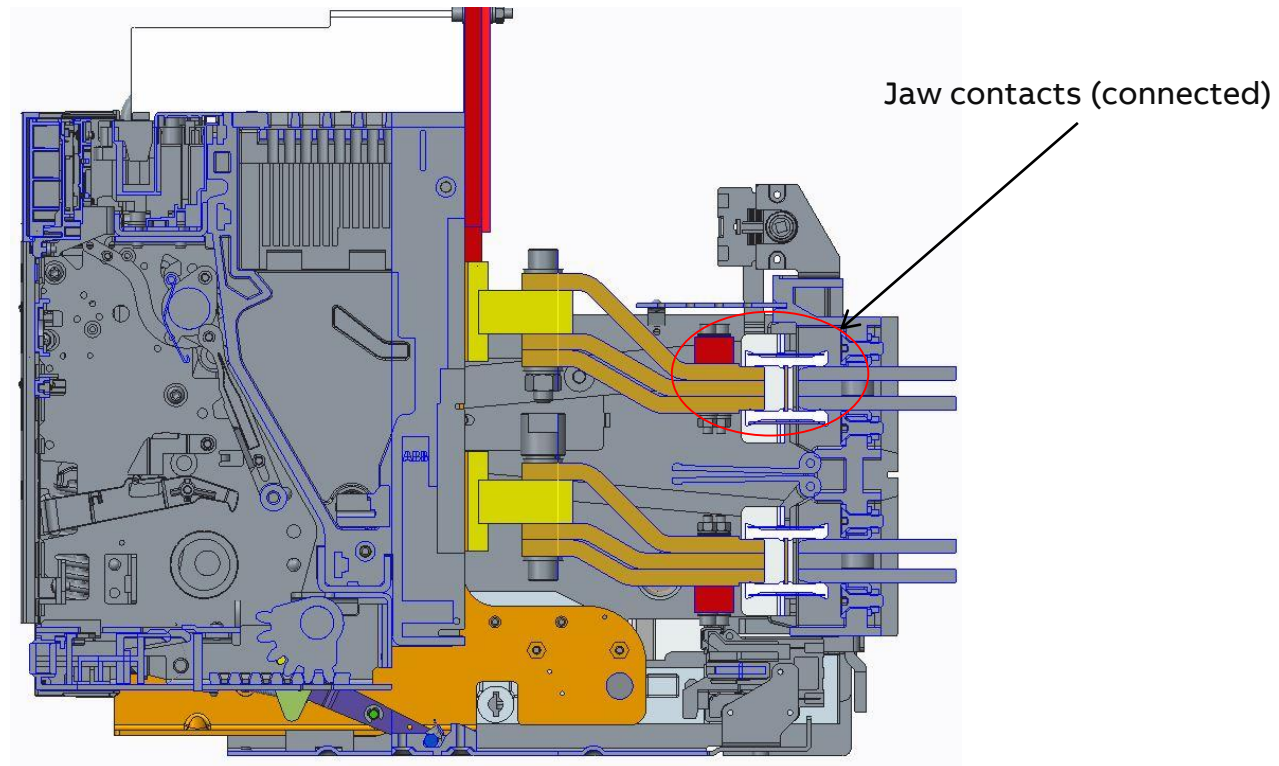
Megamax CD → Emax 2 DR



Retrofit kits

Megamax CD → Emax 2 DR

Megamax CD → Emax 2 DR



Breaker in Draw in position



Retrofit kits

Emax → New Emax DR

Emax → New Emax DR

- Special New Emax moving part with Emax wiring already available



Retrofit kits

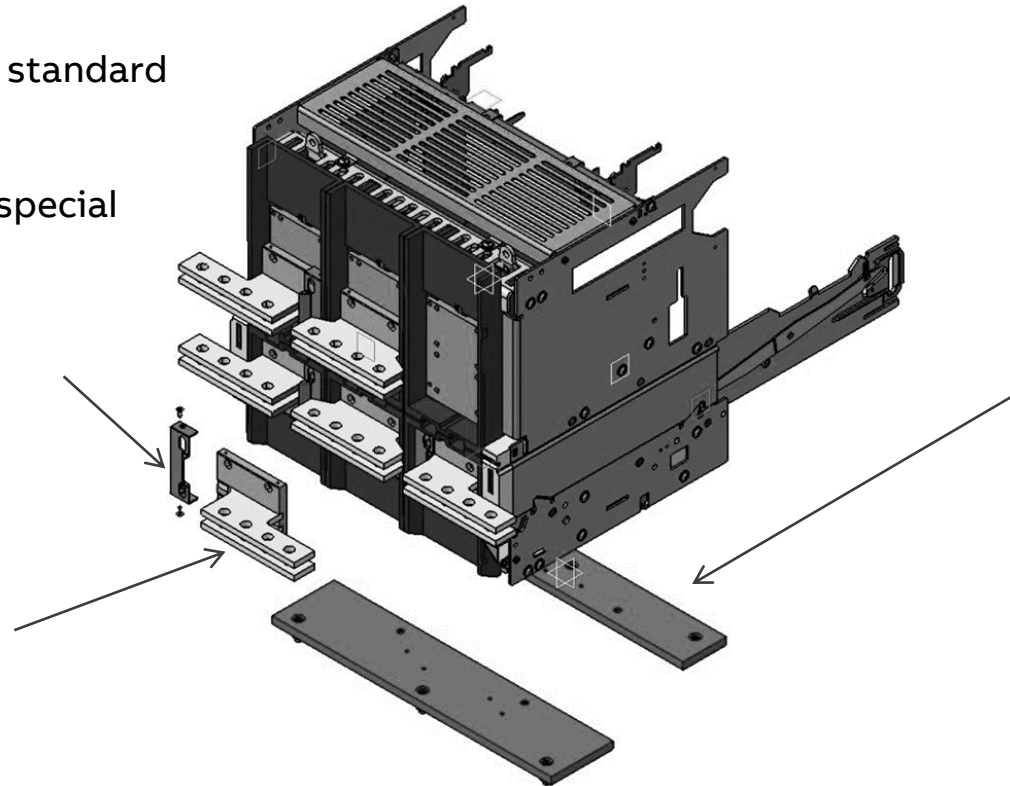
Emax/New Emax → Emax 2 RF

Emax/New Emax → Emax 2 RF

- For Fixed circuit breaker version:
dedicated terminals instead of standard Emax 2 terminals
- For Withdrawable breaker version:
Special Emax 2 fixed part with special terminals and fixing adapters

Insulating material
phase separators

Dedicated special
terminals



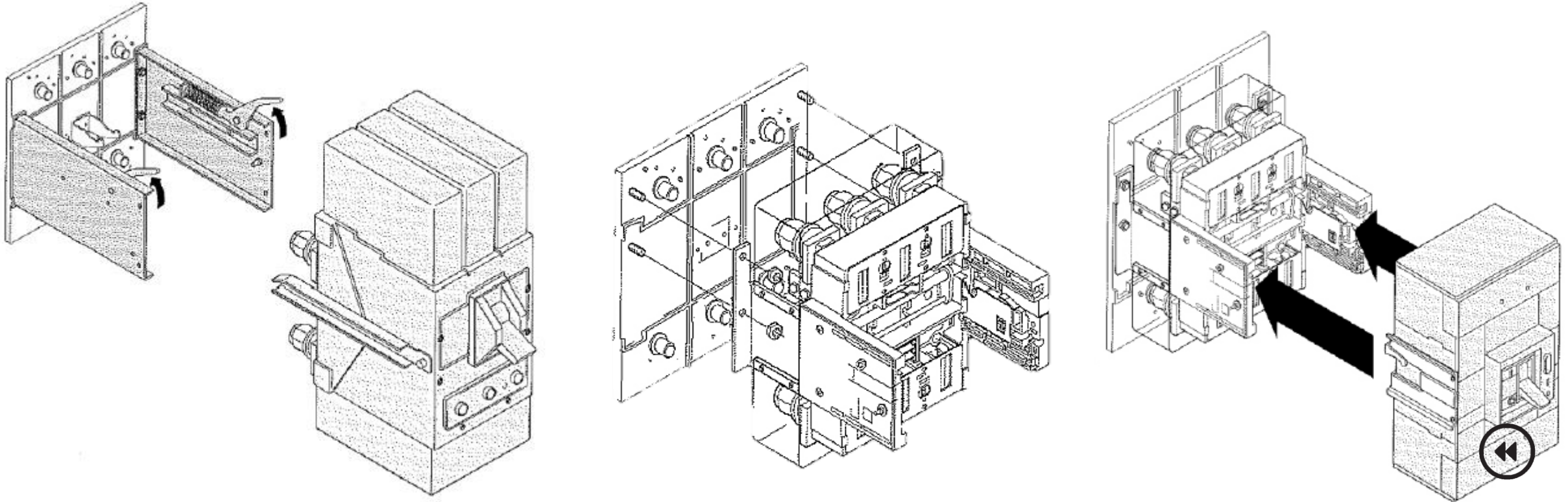
Bottom adapting
fixing plates



Retrofit kits

Isol/Fusol → Tmax CiC

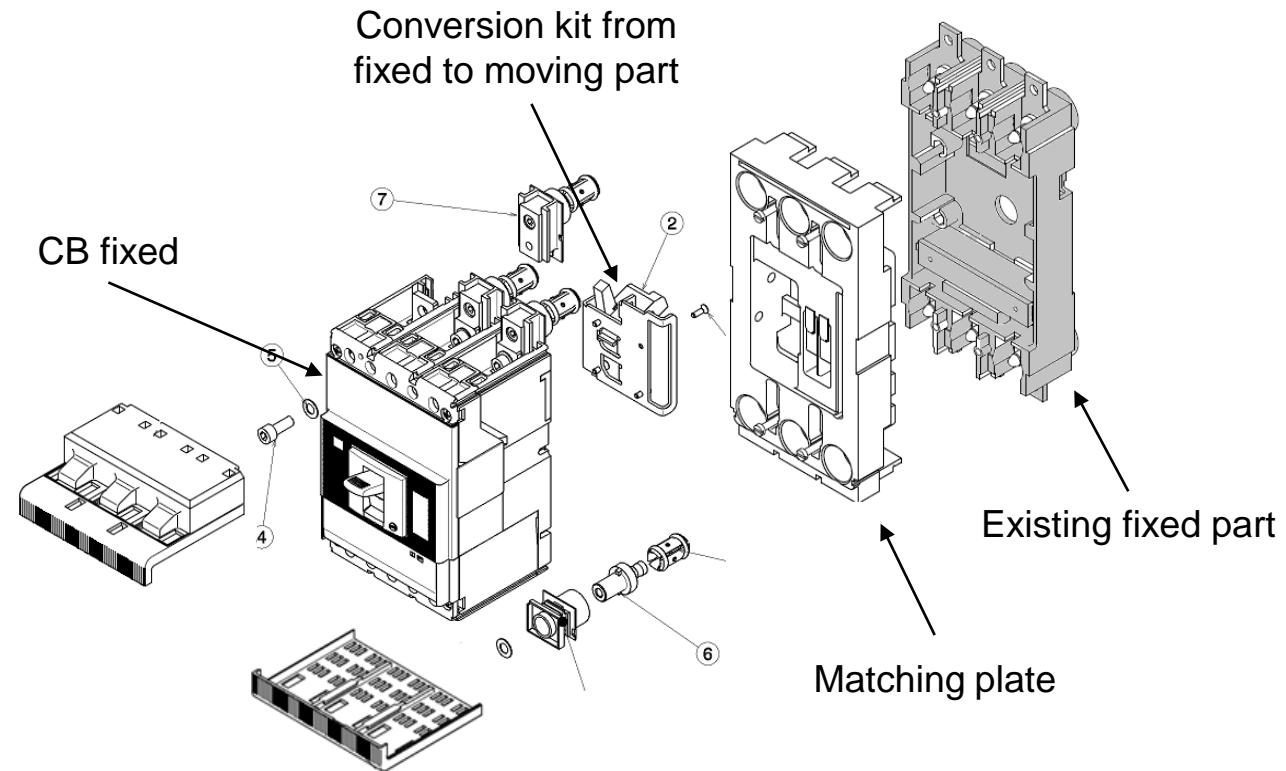
Isol/Fusol → Tmax CiC



Retrofit kits

Modul → Tmax DR

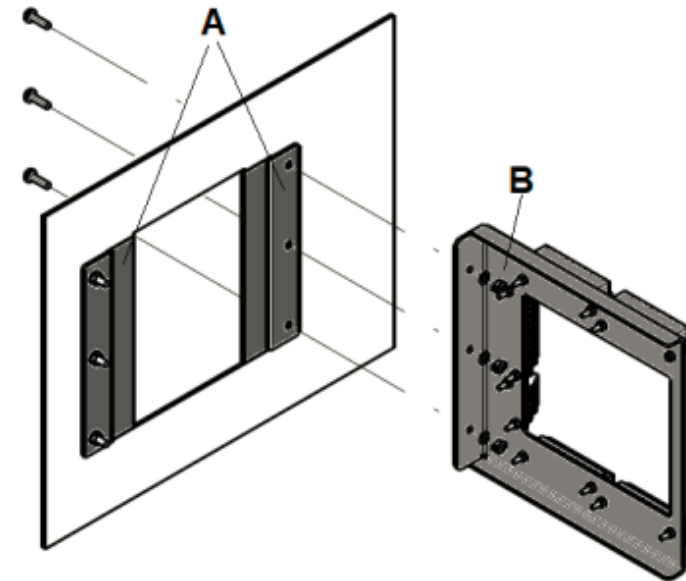
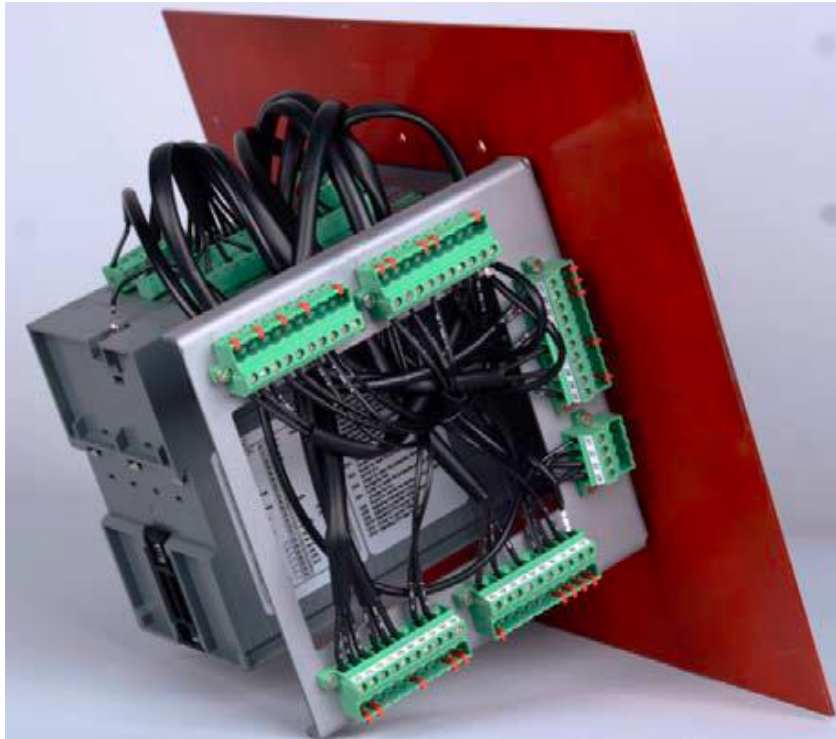
Modul → Tmax DR



Retrofit kits

ATS 010 → ATS 022 RF

ATS 010 → ATS 022 RF

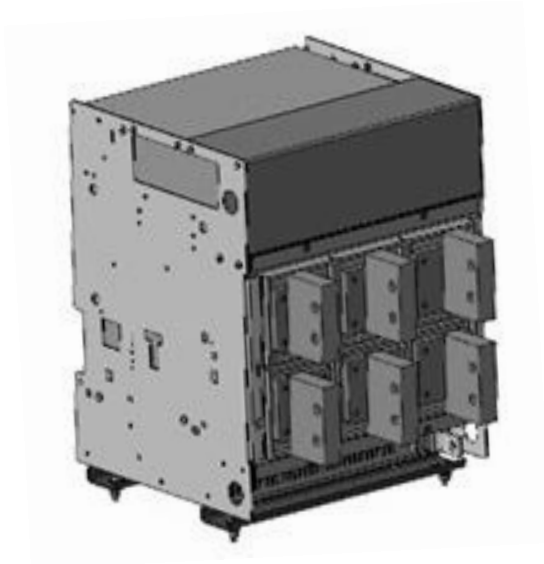


Retrofit kits

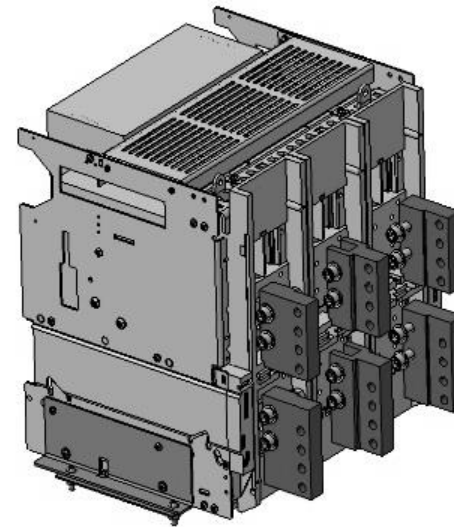
Competitors → ABB RF

Competitors → ABB RF

Siemens → New Emax Retrofill



Masterpact M → Emax 2 - Retrofill

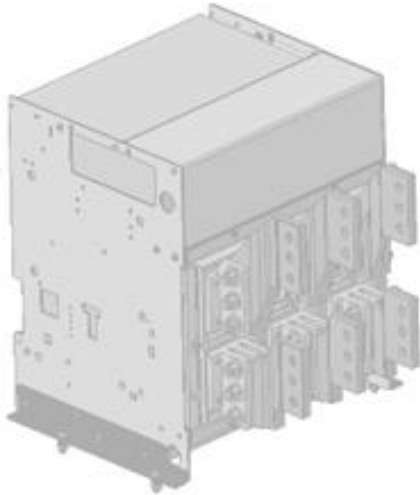


Retrofit kits

Competitors → ABB RF

Competitors → ABB RF

Terasaki → New Emax Retrofill



Mitsubishi → New Emax Retrofill

