

## Advanced retrofitting kit solution

### Direct Replacement Legrand DMX/Legrand DPX/BTicino Megabreak to Emax 2 IEC



With few modifications to your existing switchgear, retrofitting kits are a cost-effective solution to upgrade your electrical system. The Direct Replacement retrofitting kits allows a very fast and reliable upgrade of Legrand DMX/Legrand DPX/BTicino Megabreak circuit breakers and switch-disconnectors with Emax 2.

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 enough 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Service offers a unique way to upgrade installed hardware and software to the next generation, by changing the worn or outdated parts while maintaining the original plant and equipment configuration.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.

#### Safety and Service continuity

- Safety improvement
- Service continuity guaranteed
- Ease of installation
- Reduction of the cost of maintenance
- Long availability of the product and its spare parts
- Factory tested solution
- Wide range of mechanical and electrical accessories with Emax 2.

## Value Propositions



### Safety & Protection

Highest quality level confirmed by certified products. ABB brand is associated with buying quality products.



### Easy to install

Fast and easy installation without dismantle the existing fixed part. Reduction of the downtime due to the installation in less than 1 hour.



### Control & Connectivity

Ekip Power Controller to improve energy efficiency and saving. Integration into systems with integrated communication modules of different protocols: Modbus RS-485, Modbus TCP, Profibus, DeviceNet, EtherNet/IP, IEC61850, Bluetooth.



### Easy to maintain

Diagnosis and installation with Ekip Connect Software. Automatic notifications to remind maintenance activities. ABB Ability Energy and Asset Manager is also available with Emax 2 for Predictive Maintenance.



### Sustainability

Retrofit kits enable a circular economy by extending the lifespan of your electrical system and minimizing CO<sub>2</sub> emissions and raw materials usage.

## How to retrofit a DMX/DPX/Megabreak IEC?

ABB offers a complete range of solutions to upgrade Legrand DMX/Legrand DPX/BTicino Megabreak IEC circuit breakers with Emax 2:

- **Hard Bus Retrofill (HBRF):** it is the traditional retrofit kit for which the complete DMX/DPX/Megabreak circuit breaker needs to be dismantled. The kit consists in a new Emax 2 breaker equipped with special terminals to fit the existing busbars. This solution is available for both Fixed and Withdrawable versions.
- **Direct replacement (DR):** it is the most advanced retrofit solution. In this case only the moving part of withdrawable circuit breakers need to be removed. A special version of Emax 2 moving part is supplied by ABB to be racked in/out in the existing DMX/DPX/Megabreak fixed part.

When shutdown time is an issue, the DR solutions are preferable. Installation time is reduced to minimum, as the existing fixed part is not removed; with few adaptations on-site the Emax2 moving part can be inserted. All retrofit solutions have been tested for mechanical and electrical operations, short circuit breaking capacity, short circuit withstand current and dielectric properties according to IEC standards.

The Direct Replacement is a solution suitable when the existing fixed part is fully working. Before ordering it is important to verify integrity of the fixed part according to the directions on the document 1SDH001279R0002. When fixed part is not fully working the best retrofit solution is the Hard Bus Retrofill.

## Retrofitting kit solutions for DMX/DPX/Megabreak IEC

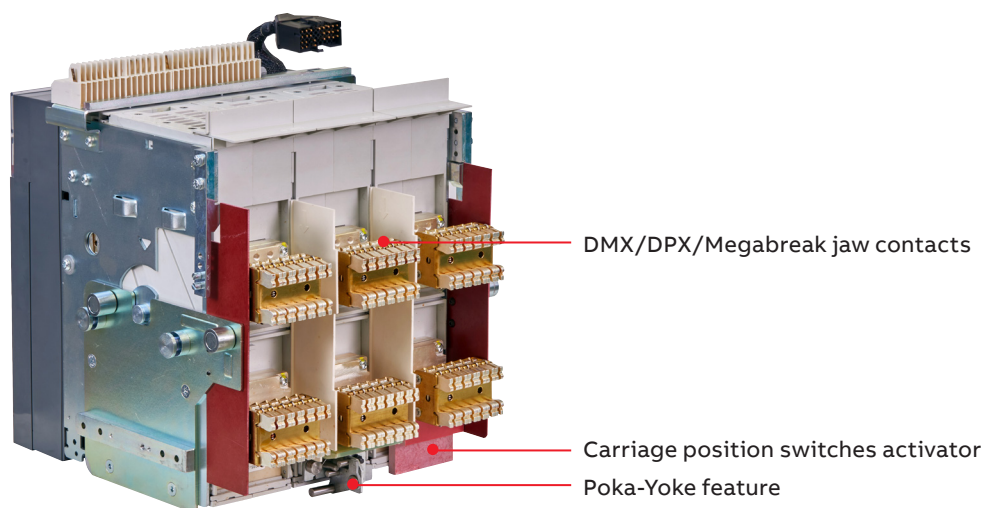
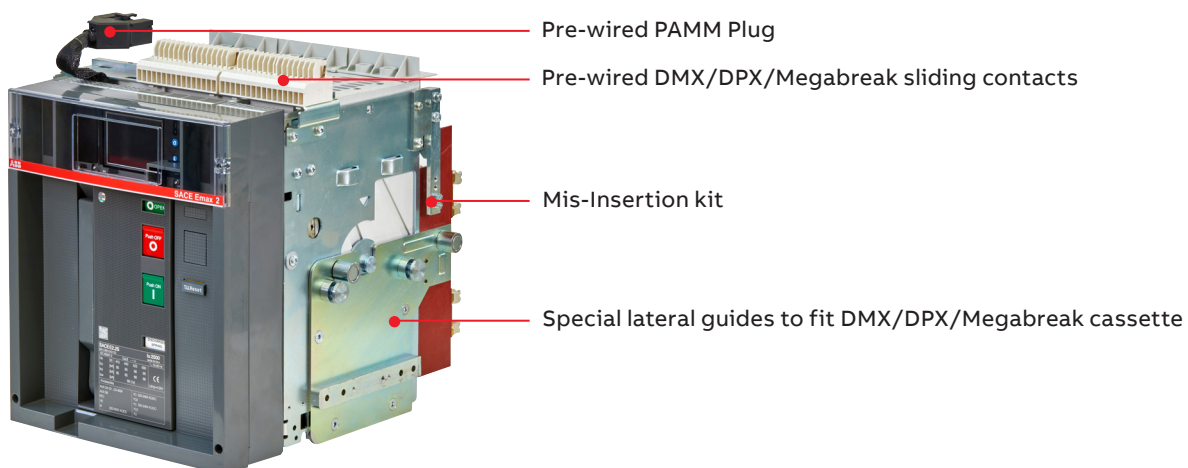
DMX/DPX/Megabreak	Frame	1	2	2
	Rating	from 800A to 2500A	from 800A to 3200A	4000A
FIXED	HR terminals			
	VR terminals (*)	HBRF	HBRF	-
	F terminals (*)			
WITHDRAWABLE	HR terminals			
	VR terminals	HBRF/DR	HBRF/DR	HBRF/DR
	F terminals			

(\*) For DMX/DPX/Megabreak fixed versions with rear vertical (VR) or front (F) terminals, it's possible to obtain HBRF solutions ordering the kit for HR terminals and, during the installation, connecting the existing DMX/DPX/Megabreak VR or F terminals.

### Product details

The Direct Replacement retrofit kit consists in a special Emax 2 moving part developed and tested in ABB Service factory and designed to fit inside the DMX/DPX/Megabreak cassette.

The Direct Replacement kit includes:



The kit includes also:

- Racking panel
- Door adaptation kit
- Wiring diagrams
- Instruction manual.

### Correspondence table

The tables below show the correspondences between DMX/DPX/Megabreak and Emax 2 both for automatic circuit breakers and switch disconnectors.

#### Automatic Circuit Breakers: Legrand DMX/Legrand DPX/BTicino Megabreak to Emax 2

Legrand/ BTicino Frame	DMX Type	DPX Type	Megabreak Type	Iu [A]	Poles	Emax2 lu [A]	Iu [A]	Iu Rating Plug [A]	Icu/Ics 415V [kA]	Icu/Ics 500V [kA]	Icu/Ics 600V [kA]	Icu/Ics 690V [kA]	Icw 500V, 1s [kA]
Frame 1	DMX	A	MA	800	3p/4p	E2.2N	800	-	50	50	50	40	50
				1000	3p/4p	E2.2N	1000	-	50	50	50	40	50
				1250	3p/4p	E2.2N	1250	-	50	50	50	40	50
				1600	3p/4p	E2.2N	1600	-	50	50	50	40	50
				2000	3p/4p	E2.2N	2000	-	50	50	50	40	50
	2500	3p/4p	E2.2N	2500 <sup>(1)</sup>	-	50	50	50	40	50			
	DMX-H	D	MH	800	3p/4p	E2.2N	800	-	65	65	50	40	65
				1000	3p/4p	E2.2N	1000	-	65	65	50	40	65
				1250	3p/4p	E2.2N	1250	-	65	65	50	40	65
				1600	3p/4p	E2.2N	1600	-	65	65	50	40	65
2000				3p/4p	E2.2N	2000	-	65	65	50	40	65	
Frame 2	DMX	A	MA	3200	3p/4p	E4.2N	3200 <sup>(2)</sup>	-	50	50	50	40	50
				4000	3p/4p	E4.2N	4000 <sup>(3)</sup>	-	50	50	50	40	50
	DMX-H	D	MH	3200	3p/4p	E4.2N	3200 <sup>(2)</sup>	-	65	65	50	40	65
				4000	3p/4p	E4.2N	4000 <sup>(3)</sup>	-	65	65	50	40	65
	DMX-L	H	ML	800	3p/4p	E4.2H	3200	800	80 <sup>(4)</sup>	80	65	60	80
				1000	3p/4p	E4.2H	3200	1000	80 <sup>(4)</sup>	80	65	60	80
				1250	3p/4p	E4.2H	3200	1250	80 <sup>(4)</sup>	80	65	60	80
				1600	3p/4p	E4.2H	3200	1600	80 <sup>(4)</sup>	80	65	60	80
				2000	3p/4p	E4.2H	3200	2000	80 <sup>(4)</sup>	80	65	60	80
				2500	3p/4p	E4.2H	3200	2500	80 <sup>(4)</sup>	80	65	60	80
3200	3p/4p	E4.2H	3200 <sup>(2)</sup>	-	80 <sup>(4)</sup>	80	65	60	80				
4000	3p/4p	E4.2H	4000 <sup>(3)</sup>	-	80 <sup>(4)</sup>	80	65	60	80				

**Note:**

(1) derating to 2400A in case of cassettes with vertical (VR) terminals. Derating to 2300A in case of cassettes with horizontal (HR) or front (F) terminals.

(2) derating to 3000A in case of cassettes with horizontal (HR) or front (F) terminals. No derating in case of cassettes with vertical (VR) terminals.

(3) derating to 3600A in case of cassettes with vertical (VR) terminals. Derating to 3450A in case of cassettes with horizontal (HR) or front (F) terminals.

(4) derating on Icu of DMX/DPX/Megabreak (100 kA)

For 4 poles circuit breakers it's mandatory to specify the position of the neutral phase by choosing between standard sequence (N, L1, L2, L3) or neutral on right side sequence (L1, L2, L3, N).

### Switch disconnectors: Legrand DMX/Legrand DPX/BTicino Megabreak to Emax 2

Legrand/ Bticino Frame	DMX Type	DPX Type	Megabreak Type	Iu [A]	Poles	Emax2	Iu [A]	Icw 500V, 1s [kA]
Frame 1	DMX-I	A	MS	1250	3p/4p	E2.2N/MS	1250	50
				1600	3p/4p	E2.2N/MS	1600	50
				2000	3p/4p	E2.2N/MS	2000	50
				2500	3p/4p	E2.2N/MS	2500 <sup>(1)</sup>	50
Frame 2	DMX-I	A	MS	3200	3p/4p	E4.2N/MS	3200 <sup>(2)</sup>	50
				4000	3p/4p	E4.2N/MS	4000 <sup>(3)</sup>	50

**Note:**

(1) derating to 2400A in case of cassettes with vertical (VR) terminals. Derating to 2300A in case of cassettes with horizontal (HR) or front (F) terminals.

(2) derating to 3000A in case of cassettes with horizontal (HR) or front (F) terminals. No derating in case of cassettes with vertical (VR) terminals.

(3) derating to 3600A in case of cassettes with vertical (VR) terminals. Derating to 3450A in case of cassettes with horizontal (HR) or front (F) terminals.

For 4 poles switch disconnectors it's mandatory to specify the position of the neutral phase by choosing between standard sequence (N, L1, L2, L3) or neutral on right side sequence (L1, L2, L3, N).

### Trip Unit comparison

With Emax 2 retrofit kits it is possible to choose amid three different Trip Units in order to replace the Legrand DMX/Legrand DPX/BTicino Megabreak ones: Ekip Dip, Ekip Touch and Ekip Hi-Touch.

The table below shows the functions available for the various DMX/DPX/Megabreak trip units compared to the Emax 2 trip units:



	DMX/DPX/Megabreak Trip Units MP				Emax 2 Trip Units		
	17	18	20	40	Ekip Dip	Ekip Touch	Ekip Hi-Touch
<b>Protection functions</b>							
L - Overload protection	●	●	●	●	●	●	●
S - Selective short-circuit	●	●	●	●	●	●	●
I - Instantaneous short-circuit	●	●	●	●	●	●	●
G - Earth fault	○	○	-	●	●	●	●
Neutral protection	○	○	○	●	● (4p); ▲(3p)	● (4p); ▲(3p)	● (4p); ▲(3p)
Thermal memory for L&S protections	●	●	●	●	●	●	●
<b>Other functions</b>							
Current measurement (L1, L2, L3, N)	-	-	-	-	▲	●	●
Trip target (trip reason indication)	-	-	●	●	●	●	●
Trip info (magnitude/phase)	-	-	●	●	∞	●	●
Trip counter	-	-	●	●	∞	●	●
Trip alarm contact	○	○	○	○	●	●	●
Event logger (trip events)	-	●	●	●	∞	●	●
General inputs (4 available)	-	-	-	●	-	▲	▲
General relay outputs (4 available)	-	-	-	●	-	▲	▲
Load shedding	-	-	-	●	-	●	●
Watchdog	-	-	○	○	●	●	●
Modbus	-	-	-	●	-	▲	▲
24V DC auxiliary power supply	○	●	●	●	●	●	●
Test kit with power support function	●	●	●	●	●	●	●

● = supplied as standard

○ = optional

▲ = module or device needed

∞ = control panel or connection software needed

### Accessories compatibility

The majority of Legrand DMX/Legrand DPX/BTicino Megabreak mechanical and electrical accessories can be replaced with Emax 2's ones:

Legrand DMX/Legrand DPX/ BTicino Megabreak	DR DMX/DPX/Megabreak to Emax 2
Shunt trip - ST	Emax 2 standard YO (AUX 4Q always installed on the kit and wired in series with YO, also if YO is not present)
Closing coil - CC	Emax 2 standard YC
Undervoltage release - UVR	Emax 2 standard YU
Undervoltage release time delayed - UVTD	Emax 2 standard UVD (external wiring required)
Motor operator - MOP	Emax 2 standard M
Spring charged contact (1 N/O)	Emax 2 standard S33 M/2 contact
Auxiliary contacts (5 N/C + 3 N/O)	Emax 2 standard AUX 6Q (max 6 auxiliary contacts available, AUX 4Q always installed on the kit and wired in series with YO)
MP trip alarm (1 N/O)	Emax 2 standard S51 contact
Carriage position switches	Re-use the ones of DMX/DPX/Megabreak fixed part
Facia push-button padlocking facilities	Emax 2 standard protection device for opening and closing pushbuttons PBC
Key interlock facilities	Emax 2 standard key lock in open position KLC
Cassette key lock facilities	Re-use DMX/DPX/Megabreak cassette key lock facilities
Interlocks Frames 1 and 2	Re-use DMX/DPX/Megabreak mechanical interlock (mechanical interlock adaptation kit required, mixed solutions with a DMX/DPX/Megabreak interlocked with a DR Emax 2 are not allowed)
Mis-Insertion kit	Emax 2 dedicated kit for Mis-Insertion
Mechanical operations counter - MOC	Emax 2 standard mechanical operation counter MOC
Current sensor for neutral conductor outside circuit-breaker (Rogowski coil)	Emax 2 current sensor for neutral conductor outside CB (only for 3 poles CB, local adaptation is needed)
Interposing CT for Ground Fault source return	Replace zero sequence CT for the earthing conductor of the main power supply by Emax 2's homopolar toroid
General inputs (4 available)	Emax 2 standard Ekip Signalling 2K-1, 2K-2 (Ekip Cartridge required)
General relay outputs (4 available)	

The following accessories are **not compatible** with these retrofit kit solutions:

- Auxiliary position contacts - AUP (Re-use DMX/DPX/Megabreak carriage position switches)
- Open/closed external supplementary auxiliary contacts - AUX 15Q
- Second opening release - YO2
- Second closing release - YC2
- Second contact signalling tripping of Ekip protection trip unit - S51/2
- Remote Reset - YR
- Ready to close signalling contact - RTC
- Key lock in racked-in/test/racked-out position - KLP
- Padlock in racked-in/test/racked-out position - PLP
- Door mechanical locks
- Ekip 4K Signalling module
- IP54 protection
- All the accessories of Emax 2 fixed part
- Remote Racking Device - RRD.

### **Ekip Cartridge for DR DMX/DPX/Megabreak to Emax 2**

This external device connected directly to the Ekip Touch/Ekip Hi-Touch Trip Unit allows to use most of the connectivity modules including: Ekip Supply, Ekip Com, Ekip Link, Ekip Signalling, Ekip Synchro-check, Ekip AUP.

The Ekip Cartridge has 4 slots (1 Ekip Supply + 3 modules).

If needed it is possible to connect the position AUP contacts to the related pins of the cartridge to avoid failure messages on the communication channel.

Ekip Cartridge can be installed on a DIN-rail everywhere in the panel (supplied with a 1 m long cable).

**Note:** this accessory is dedicated for the Direct Replacement Legrand DMX/Legrand DPX/BTicino Megabreak to Emax 2 and it is different compared to Tmax XT and other versions of Direct Replacement cartridges.

