

Hard Bus Retrofill Megamax to Emax 2

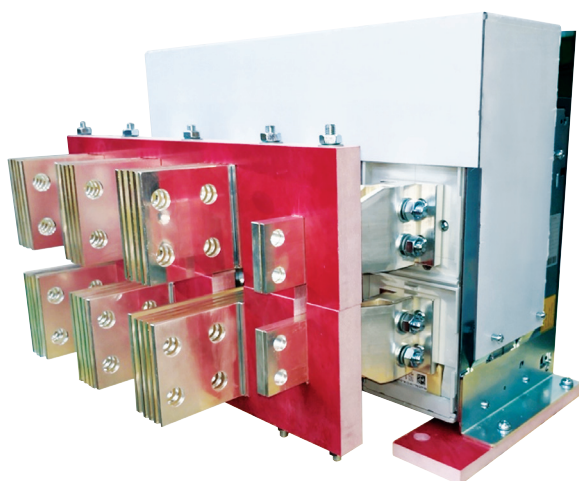
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ABB offers a complete range of solution to upgrade Megamax devices with Emax 2 retrofit solutions:

- **Hard bus retrofitfill (RF):** it is the traditional retrofit kit for which the complete Megamax circuit breakers/switch disconnectors need to be replaced. The kit consists in a new Emax 2 device equipped with special terminals to fit the existing busbars. This solution is available for both Fixed and Withdrawable versions.
- **Cradle in Cradle (CiC):** it is an advanced retrofitting solution type for which the Megamax moving part of withdrawable device need to be removed and replaced. In this case, a special version Emax 2 fixed part supplied by ABB service is ready to be racked in/out the existing fixed part and a standard Emax 2 moving part can be fitted in the Emax 2 fixed part.

- **Direct replacement (DR):** It is the most advanced retrofit solution type. In this case, only the mobile part of withdrawable devices need to be replaced with the special version of Emax 2 moving part supplied by ABB service is ready to be racked in/out the existing fixed part.

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 and Cradle in Cradle are solutions suitable when the existing part is full working (more information about these solution on the dedicated [brochure](#)). The Hard Bus Retrofitfill is the best retrofitting solution when fixed part is not fully working.

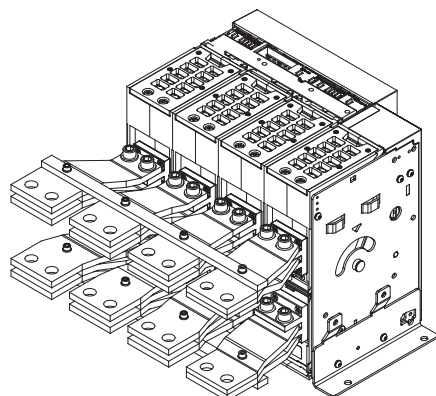
		F1						F2				F3	F4		F5		F6	
Rated Current [A]		1250		1250				2000		2500		2000	3200	3600	3200		6300	
		1600		1600				2500		3000		2500			4000			
		2000										3000			5000			
Version	Pole	F1B	F1N	F1S	F1H	F1V	F1L	F2H	F2V	F2L	F2S	F3S	F4S	F4S	F5S	F5H	F6S	F6H
FIXED	3P	RF	RF	RF	RF	-	-	RF ⁽¹⁾	-	-	RF	RF	RF	RF	RF	RF	-	-
	4P	RF	RF	RF	RF	-	-	RF ⁽¹⁾	-	-	RF	RF	RF	RF	RF	RF	-	-
WITHDRAWABLE	3P	RF - DR	RF - DR	RF - DR	RF - DR	-	-	RF - DR	-	-	RF ⁽¹⁾ - DR ⁽¹⁾	RF	RF - DR	RF - DR	RF - CiC ⁽²⁾	RF - CiC ⁽²⁾	RF	RF
	4P	RF - DR	RF - DR	RF - DR	RF - DR	-	-	RF - DR	-	-	RF ⁽¹⁾ - DR ⁽¹⁾	RF	RF - DR	RF - DR	RF - CiC ⁽²⁾	RF - CiC ⁽²⁾	-	-

(1) Available only for the F2 2500 A

(2) Cradle in Cradle available only for the 3200...4000 A versions

The Hard Bus Retrofitting kit for fixed versions consist of:

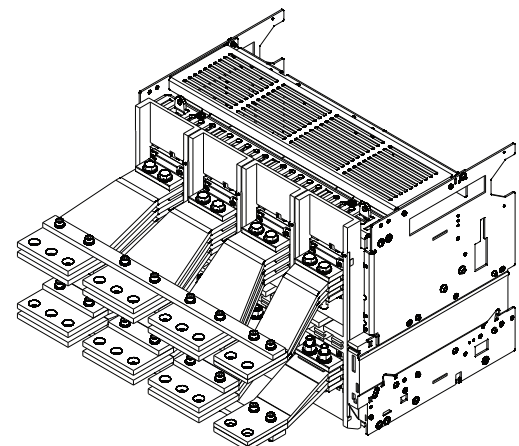
- Adapting terminals
- Side supports
- Instructional manuals
- Kit for the door's adaption
- Insulating materials.



HBRF for Megamax fixed version with HR terminals

The Hard Bus Retrofitting kit for withdrawable versions consist of:

- Adapting terminals
- Fixing plates
- Instructional manuals
- Kit for the door's adaption
- Insulating supports.



HBRF for Megamax withdrawable version with HR terminals

Correspondence tables

Fixed versions - Solutions suitable for Circuit Breakers and Switch Disconnectors

Megamax	Iu [A]	Terminals	Poles	Emax 2	Iu [A]	Rating Plug	Icu/Ics 380-415V [kA]	Icu/Ics 440V [kA]	Icu/Ics 500V [kA]	Icu/Ics 660V-690V [kA]	Icw (1s) 415V [kA]
F1B	1250	HR	3p/4p	E2.2B	1600	1250	40	40	40	35	40
F1B	1600	HR	3p/4p	E2.2B	1600	-	40	40	40	35	40
F1B	2000	HR	3p/4p	E2.2B	2000	-	40	40	40	35	40
F1N	1250	HR	3p/4p	E2.2N	1250	-	50*	50*	40	35	40
F1N	1600	HR	3p/4p	E2.2N	1600	-	50*	50*	40	35	40
F1N	2000	HR	3p/4p	E2.2N	2000	-	50*	50*	40	35	40
F1S	1250	HR	3p/4p	E2.2N	1250	-	55	50	50	45	50
F1S	1600	HR	3p/4p	E2.2N	1600	-	55	50	50	45	50
F1S	2000	HR	3p/4p	E2.2N	2000	-	55	50	50	45	50
F1H	1250	HR	3p/4p	E2.2H	1250	-	85	70	70	55	20
F1H	1600	HR	3p/4p	E2.2H	1600	-	85	70	70	55	20
F2H	2500	HR	3p/4p	E2.2H	2500	-	85	70	70	55	20
F2S	2500	HR	3p/4p	E2.2N	2500	-	65	60	60	55	65
F2S	3000	VR	3p/4p	E4.2S	3200	3000	65	60	60	55	65
F3S	2500	HR	3p/4p	E2.2H	2500	-	75	75	75	65	75
F3S	3000	VR	3p/4p	E4.2H	3200	3000	75	75	75	65	75
F4S	3200	HR	3p/4p	E4.2H	3200	-	75	75	75	65	75
F4S	3600	VR	3p/4p	E4.2H	4000	3600	80	75	75	65	80
F5S	3200	HR	3p/4p	E4.2V	3200	-	100	100	100	75	100
F5H	3200	HR	3p/4p	E4.2V	3200	-	120	100	100	85	120
F5S	4000	HR	3p/4p	E4.2V	4000	-	100	100	100	75	100
F5H	4000	HR	3p/4p	E4.2V	4000	-	120	100	100	85	120
F5S	5000	HR	3p/4p	E6.2V	5000	-	100	100	100	75	100
F5H	5000	HR	3p/4p	E6.2V	5000	-	120	100	100	85	120

Notes:

* Ics = 40 kA

Legend

HR= orizzontal terminals

VR= vertical terminals

Withdrawable versions - Solutions suitable for Circuit Breakers and Switch Disconnectors

Megamax F	Iu [A]	Terminals	Poles	Emax 2	Iu [A]	Rating Plug	Icu/Ics 380-415V [kA]	Icu/Ics 440V [kA]	Icu/Ics 500V [kA]	Icu/Ics 660V-690V [kA]	Icw (1s) 415V [kA]
F1B	1250	HR	3p/4p	E2.2B	1600	1250	40	40	40	35	40
F1B	1250	VR	3p/4p	E2.2B	1600	1250	40	40	40	35	40
F1B	1250	F	3p/4p	E2.2B	1600	1250	40	40	40	35	40
F1B	1600	HR	3p/4p	E2.2B	1600		40	40	40	35	40
F1B	1600	VR	3p/4p	E2.2B	1600		40	40	40	35	40
F1B	1600	F	3p/4p	E2.2B	1600		40	40	40	35	40
F1B	2000	HR	3p/4p	E2.2B	2000		40	40	40	35	40
F1B	2000	VR	3p/4p	E2.2B	2000		40	40	40	35	40
F1B	2000	F	3p/4p	E2.2B	2000		40	40	40	35	40
F1H	1250	HR	3p/4p	E2.2H	1250		85	70	70	55	20
F1H	1250	VR	3p/4p	E2.2H	1250		85	70	70	55	20
F1H	1250	F	3p/4p	E2.2H	1250		85	70	70	55	20
F1H	1600	HR	3p/4p	E2.2H	1600		85	70	70	55	20
F1H	1600	VR	3p/4p	E2.2H	1600		85	70	70	55	20
F1H	1600	F	3p/4p	E2.2H	1600		85	70	70	55	20
F1N	1250	HR	3p/4p	E2.2N	1250		50*	50*	40	35	40
F1N	1250	VR	3p/4p	E2.2N	1250		50*	50*	40	35	40
F1N	1250	F	3p/4p	E2.2N	1250		50*	50*	40	35	40
F1N	1600	HR	3p/4p	E2.2N	1600		50*	50*	40	35	40
F1N	1600	VR	3p/4p	E2.2N	1600		50*	50*	40	35	40
F1N	1600	F	3p/4p	E2.2N	1600		50*	50*	40	35	40
F1N	2000	HR	3p/4p	E2.2N	2000		50*	50*	40	35	40
F1N	2000	VR	3p/4p	E2.2N	2000		50*	50*	40	35	40
F1N	2000	F	3p/4p	E2.2N	2000		50*	50*	40	35	40
F1S	1250	HR	3p/4p	E2.2N	1250		55	50	50	45	50
F1S	1250	VR	3p/4p	E2.2N	1250		55	50	50	45	50
F1S	1250	F	3p/4p	E2.2N	1250		55	50	50	45	50
F1S	1600	HR	3p/4p	E2.2N	1600		55	50	50	45	50
F1S	1600	VR	3p/4p	E2.2N	1600		55	50	50	45	50
F1S	1600	F	3p/4p	E2.2N	1600		55	50	50	45	50
F1S	2000	HR	3p/4p	E2.2N	2000		55	50	50	45	50
F1S	2000	VR	3p/4p	E2.2N	2000		55	50	50	45	50
F1S	2000	F	3p/4p	E2.2N	2000		55	50	50	45	50
F2H	2000	HR	3p/4p	E2.2H	2500	2000	85	70	70	55	20
F2H	2000	F	3p/4p	E2.2H	2500	2000	85	70	70	55	20
F2H	2500	HR	3p/4p	E2.2H	2500		85	70	70	55	20
F2H	2500	F	3p/4p	E2.2H	2500		85	70	70	55	20
F2S	2000	HR	3p/4p	E2.2N	2500	2000	65	60	60	55	65
F2S	2000	F	3p/4p	E2.2N	2500	2000	65	60	60	55	65
F2S	2500	HR	3p/4p	E2.2N	2500		65	60	60	55	65
F2S	2500	F	3p/4p	E2.2N	2500		65	60	60	55	65

Megamax F	Iu [A]	Terminals	Poles	Emax 2	Iu [A]	Rating Plug	Icu/Ics 380-415V [kA]	Icu/Ics 440V [kA]	Icu/Ics 500V [kA]	Icu/Ics 660V-690V [kA]	Icw (1s) 415V [kA]
F3S	1250	HR	3p/4p	E2.2H	2500	1250	75	75	75	65	75
F3S	1250	VR	3p/4p	E2.2H	2500	1250	75	75	75	65	75
F3S	1600	HR	3p/4p	E2.2H	2500	1600	75	75	75	65	75
F3S	1600	VR	3p/4p	E2.2H	2500	1600	75	75	75	65	75
F3S	2000	HR	3p/4p	E2.2H	2500	2000	75	75	75	65	75
F3S	2000	VR	3p/4p	E2.2H	2500	2000	75	75	75	65	75
F3S	2500	VR	3p/4p	E2.2H	2500		75	75	75	65	75
F3S	3000	VR	3p/4p	E4.2H	3200	3000	75	75	75	65	75
F4S	3200	HR	3p/4p	E4.2H	4000	3200	75	75	75	65	75
F4S	3600	VR	3p/4p	E4.2H	4000	3600	80	75	75	65	80
F5S	3200	HR	3p/4p	E4.2V	3200		100	100	100	75	100
F5S	3200	VR	3p/4p	E4.2V	3200		100	100	100	75	100
F5S	4000	HR	3p/4p	E4.2V	4000 ⁽¹⁾		100	100	100	75	100
F5S	4000	VR	3p/4p	E4.2V	4000 ⁽¹⁾		100	100	100	75	100
F5S	5000	VR	3p/4p	E6.2V	5000		100	100	100	75	100
F5S	5000	F	3p/4p	E6.2V	5000		100	100	100	75	100
F5H	3200	HR	3p/4p	E4.2V	3200		120	100	100	85	100
F5H	3200	VR	3p/4p	E4.2V	3200		120	100	100	85	100
F5H	4000	HR	3p/4p	E4.2V	4000 ⁽¹⁾		120	100	100	85	100
F5H	4000	VR	3p/4p	E4.2V	4000 ⁽²⁾		120	100	100	85	100
F5H	5000	VR	3p/4p	E6.2V	5000		120	100	100	85	100
F5H	5000	F	3p/4p	E6.2V	5000		120	100	100	85	100
F6S	6300	VR	3p	E6.2V	6300		100	100	100	75	100
F6H	6300	VR	3p	E6.2V	6300		120	100	100	85	100

Notes:

* Ics = 40 kA

(1) Derating to 3400A; (2) Derating to 3920A

Legend

HR= orizzontal terminals

VR= vertical terminals

F= front terminals

Accessories and Trip Unit

This new retrofitting solution guarantees the use of all the mechanical and electrical accessories of the Emax 2.

With the retrofit kits with Emax 2 it is possible to choose amid three different Trip Units to replace the Megamax's ones: Ekip Dip, Ekip Touch, Ekip Hi-Touch available in the versions LI, LSI, and LSIg.



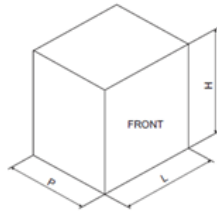
	AR1 LI	AR1 LS	PR1/P	PR1/P with PR1/A	PR1/P with PR1/C	PR1/P with PR1/C & PR1/D	Ekip DIP	Ekip Touch	Ekip Hi-Touch
	LI	LS	LI LSI LSIG	LI LSI LSIG	LI LSI LSIG	LI LSI LSIG	LI LSI LSIG	LI LSI LSIG	LI LSI LSIG
Overload - L									
Inverse long-time delayed trip	●	●	●	●	●	●	●	●	●
Thermal memory	-	-	●	●	●	●	●	●	●
Constant tripping time (t=k)	●	-	●	●	●	●	●	●	●
Constant specific let-through energy (t = k/I²)	-	-	●	●	●	●	●	●	●
Start-up function	-	-	-	-	-	-	-	●	●
Zone selectivity	-	-	-	-	●	●	-	●	●
Instantaneous overcurrents - I									
Tripping time without intentional delay -	-	●	●	●	●	●	●	●	●
Start-up function	-	-	-	-	-	-	-	●	●
Ground fault - G									
Constant tripping time (t=k)	-	-	●	●	●	●	●	●	●
Constant specific let-through energy (t = k/I²)	-	-	●	●	●	●	●	●	●
Instantaneous ground fault	-	-	●	●	●	●	●	●	●
Start up function	-	-	-	-	-	-	-	●	●
Zone selectivity	-	-	-	-	●	●	-	●	●
Grand fault ext	-	-	-	-	-	-	-	●	●
Ground fault - 2G	-	-	-	-	-	-	-	-	●
Instantaneous overcurrent - 2I	-	-	-	-	-	-	-	-	●
Time-delayed overcurrent - S2	-	-	-	-	-	-	-	-	●
Directional overcurrent - D	-	-	-	-	-	-	-	-	●
Current imbalance	-	-	-	-	-	-	-	●	●
Power Control	-	-	-	-	-	-	-	○	○
Network analyzer	-	-	-	-	-	-	-	-	●
Real-time monitoring and protection									
Current	-	-	-	●	●	●	○	●	●
Voltage - Power -Energy - Frequency	-	-	-	-	○	○	-	○	●
Maintenance indicators and records	-	-	-	-	●	●	●	●	●
Communication capability	-	-	-	-	-	○	-	○	○

● = Available

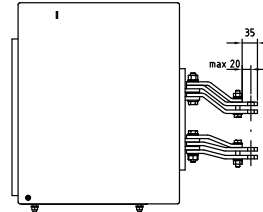
○ = Available with additional device

Checks before ordering

Before ordering, it is important verify some dimensions according to the following indications:



Check the minimum cubicle dimensions according to the indications on tables.



Make sure that the busbars do not exceed the maximum dimension indicated.

Withdrawable version

TYPE	L (III) [mm]		L (IV) [mm]		H [mm]		P [mm]	
	Emax2	Megamax	Emax2	Megamax	Emax2	Megamax	Emax2	Megamax
E2.2-F1	400	384	490	479	515	485	355	514
E2.2-F2	400	466	490	561	515	485	355	514
E2.2 - F3	400	466	490	581	515	625	355	576
E4.2 - F3	500	466	600	581	545	625	355	576
E4.2 - F4	500	586	600	701	545	625	355	576
E4.2-F5	500	811	600	926	545	625	355	576
E6.2-F5	900	811	1000	926	545	625	355	576
E6.2-F6	900	1051	-	-	545	625	355	576

Fixed version

TYPE	L (III) [mm]		L (IV) [mm]		H [mm]		P [mm]	
	Emax2	Megamax	Emax2	Megamax	Emax2	Megamax	Emax2	Megamax
E2.2-F1	400	384	490	479	515	485	221	356
E2.2-F2	400	466	490	561	515	485	221	356
E2.2 - F3	400	466	490	581	515	625	221	467.5
E4.2-F2	500	466	600	561	545	485	221	356
E4.2-F3	500	466	600	581	545	625	221	467.5
E4.2-F4	500	586	600	701	545	625	221	467.5
E4.2-F5	500	811	600	926	545	625	221	467.5
E6.2 - F5	900	811	1000	926	571	625	221	467.5

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