

Introduction

ABB's FORMULA molded case circuit breaker line offers simplicity and quality in some of the smallest dimensions available. The A1 breaker frame size ranges in amperes from 15 through 100 and the A2 breaker frame size ranges from 125 through 250 amperes. All UL FORMULA circuit breakers offer protection trip units that have fixed thermal and magnetic threshold values and are standard as a fixed version with front terminals.

Standards

UL 489 & IEC 60947-2

Dimensions (W x D x H):

1 pole: 1.00 x 2.36 x 5.12

2 pole: 2.00 x 2.36 x 5.12

3 pole: 3.00 x 2.36 x 5.12

Weight:

1 pole: 0.54 lbs

2 pole: 1.04 lbs

3 pole: 1.54 lbs

Available accessories:

Shunt opening release (2p & 3p)

Undervoltage release (2p & 3p)

Auxiliary contacts (2p & 3p)

Termination kits (1p, 2p & 3p)

Padlocks (1p, 2p & 3p)

Direct and extended rotary handles (3p)

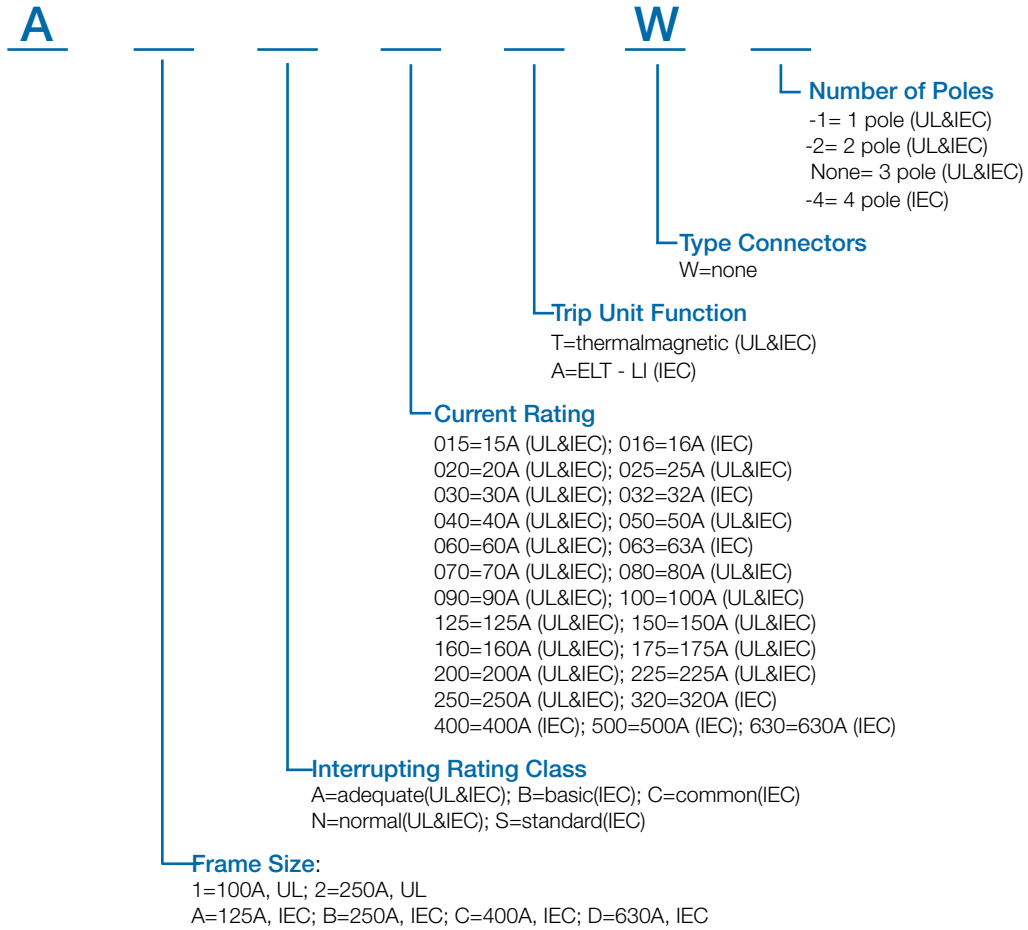
Circuit breakers for power distribution

Technical data

		A1				A2			
Frame size	A	100				250			
Rated current, I _n	A	15...100				125...250			
Poles [Nr]	Nr	1, 2, 3				1, 2, 3			
Rated service voltage, U _e (AC) 50-60 Hz	V	240 (1p, 2p, 3p)				240 (1p, 2p, 3p)			
(DC)	V	125 (1p), 250 (2p,3p)				125 (1p), 250 (2p,3p)			
Versions		Fixed				Fixed			
Performance Level		A		N		A		N	
Poles	Nr	1	2, 3	1	2, 3	1	2, 3	1	2, 3
Rated ultimate short circuit breaking capacity, I _{cu}		UL 489				UL 489			
Interrupting rating @ 240 V 50-60 Hz (AC)	kA	10	10	18	25	10	10	14	25
Interrupting rating @ 125 V (DC) 1 pole (in 2012)	kA	5	-	10	-	5	-	10	-
Interrupting rating @ 250 V (DC) 2 poles in series (2p, 3p) (in 2012)	kA	-	5	-	10	-	10	-	25
Reference Standard		UL 489				UL 489			
Isolation behavior		Yes				Yes			
Fixing onto DIN rail		DIN EN 50022				DIN EN 50022			
Dimensions (Width x Depth x Height)									
1 pole	in	1.00 x 2.36 x 5.12				1.38 x 2.36 x 5.91			
2 poles	in	2.00 x 2.36 x 5.12				2.76 x 2.36 x 5.91			
3 poles	in	3.00 x 2.36 x 5.12				4.13 x 2.36 x 5.91			
Weight									
1 pole	lbs	0.54				0.82			
2 poles	lbs	1.04				1.61			
3 poles	lbs	1.54				2.43			
Trip Unit - Thermomagnetic TMF		Yes				Yes			

Circuit breakers for power distribution

Catalog number explanation



A1
100A



1 Pole



2 Pole

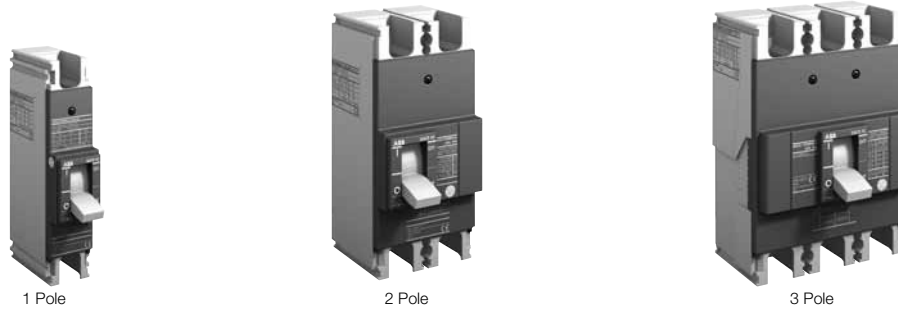


3 Pole

A1 - 100A Frame TMF, thermal magnetic fixed - fixed mount (F), front terminals (F)

Breaker	IC at 240VAC	Rating (A)	Magnetic trip	1 pole catalog number	2 pole catalog number	3 pole catalog number
A1A	10kA	15	400	A1A015TW-1	A1A015TW-2	A1A015TW
		20	400	A1A020TW-1	A1A020TW-2	A1A020TW
		25	400	A1A025TW-1	A1A025TW-2	A1A025TW
		30	400	A1A030TW-1	A1A030TW-2	A1A030TW
		40	400	A1A040TW-1	A1A040TW-2	A1A040TW
		50	500	A1A050TW-1	A1A050TW-2	A1A050TW
		60	600	A1A060TW-1	A1A060TW-2	A1A060TW
		70	700	A1A070TW-1	A1A070TW-2	A1A070TW
		80	800	A1A080TW-1	A1A080TW-2	A1A080TW
		90	900	A1A090TW-1	A1A090TW-2	A1A090TW
		100	1000	A1A100TW-1	A1A100TW-2	A1A100TW
A1N	1 pole 18kA 2-3 pole 25kA	15	400	A1N015TW-1	A1N015TW-2	A1A015TW
		20	400	A1N020TW-1	A1N020TW-2	A1A020TW
		25	400	A1N025TW-1	A1N025TW-2	A1A025TW
		30	400	A1N030TW-1	A1N030TW-2	A1A030TW
		40	400	A1N040TW-1	A1N040TW-2	A1A040TW
		50	500	A1N050TW-1	A1N050TW-2	A1A050TW
		60	600	A1N060TW-1	A1N060TW-2	A1A060TW
		70	700	A1N070TW-1	A1N070TW-2	A1A070TW
		80	800	A1N080TW-1	A1N080TW-2	A1A080TW
		90	900	A1N090TW-1	A1N090TW-2	A1A090TW
		100	1000	A1N100TW-1	A1N100TW-2	A1A100TW

A2
250A, 600Y/347V, 480V Δ
Thermal-magnetic



A2 - 250A Frame TMF, thermal magnetic fixed - fixed mount (F), front terminals (F)

Breaker	IC at 240VAC	Rating (A)	Magnetic trip	1 pole catalog number	2 pole catalog number	3 pole catalog number
A2A	10kA	125	1250	A2A125TW-1	A2A125TW-2	A2A125TW
		150	1500	A2A150TW-1	A2A150TW-2	A2A150TW
		175	1750	A2A175TW-1	A2A175TW-2	A2A175TW
		200	2000	A2A200TW-1	A2A200TW-2	A2A200TW
		225	2250	A2A225TW-1	A2A225TW-2	A2A225TW
		250	2500	A2A250TW-1	A2A250TW-2	A2A250TW
A1N	1 pole 18kA 2-3 pole 25kA	125	1250	A2N125TW-1	A2N125TW-2	A2N125TW
		150	1500	A2N150TW-1	A2N150TW-2	A2N150TW
		175	1750	A2N175TW-1	A2N175TW-2	A2N175TW
		200	2000	A2N200TW-1	A2N200TW-2	A2N200TW
		225	2250	A2N225TW-1	A2N225TW-2	A2N225TW
		250	2500	A2N250TW-1	A2N250TW-2	A2N250TW

Accessories

Electrical

A1 - A2



Cabled service release
SOR-C and UVR-C

Shunt opening release (SOR)

Frame size	Voltage	Catalog number
A1 - A2	12VDC	KA2S9
	24-30VAC/DC	KA2S8
	48-60VAC/DC	KA2S7
	110-127VAC	KA2S4
	220-240VAC	KA2S2

The shunt opening release allows for opening of the circuit breaker by means of a non-permanent electrical control. Operation of the release is guaranteed for a voltage between 70% and 110% of the power supply rated voltage value.

Undervoltage release (UVR)

Frame size	Voltage	Catalog number
A1 - A2	24-30VAC/DC	KA2U8
	48VAC/DC	KA2U7
	60VAC/DC	KA2U5
	110-127VAC	KA2U4
	220-240VAC	KA2U2

The undervoltage release ensures opening of the circuit breaker for lack/lowering of the release power supply voltage. Operation of the release is guaranteed for a voltage between 70% and 35% of the power supply rated voltage value. After tripping, the circuit breaker can be closed again starting from a voltage higher than 85% of the power supply rated voltage value.



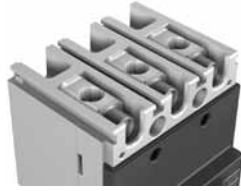
Auxiliary contacts (AUX) & early auxiliary contacts (AUE)

Frame size	Description	2 Pole Catalog number	3 Pole Catalog number
A1 - A2	AUX-C 1Q+1SY 250 VAC/DC	KA2AS-2	KA2AS
	AUX-C 2Q+1SY 250 VAC/DC	KA2AS2-2	KA2AS2
	AUX-C 1Q+1SY 24 VDC	KA2ASAU-2	KA2ASAU
	AUX-C 2Q+1SY 24 VDC	KA2AS2AU-2	KA2AS2AU
	AUX-C 250V 1 CONT. SPARE PART*	KA2ASSP	KA2ASSP
	AUE 2 CONTACTS x RHx	-	KA2RH-EM

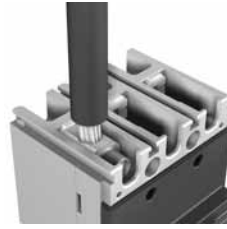
The auxiliary contacts allow information about the state of the circuit breaker to be available through an electronic signal to another apparatus. The early auxiliary contacts are normally open contacts which allow the undervoltage release to be supplied in advance prior to the closing of the main contacts in direct and extended rotary handle operating mechanisms.

① Electrical/mechanical accessories cannot be installed on single pole breakers.
 ② Rated 480Y/277 VAC for 15A.
 ③ When protected by a OCPD with appropriate ratings.

Accessories Mechanical A1 - A2



Terminal FCCuAl

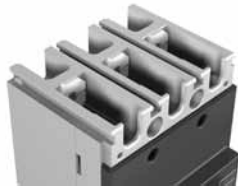


Terminal FCCuAl with cable

Front terminals for copper aluminum cables - FCCuAl

Frame size	Description	1 piece catalog number	2 piece catalog number	3 piece catalog number	4 piece catalog number	6 piece catalog number
A1	KIT FC CuAl A1 80A	KA1080-1	KA1080-2	KA1080-3	KA1080-4	KA1080-6
	KIT FC CuAl A1 100A	KA1100-1	KA1100-2	KA1100-3	KA1100-4	KA1100-6
A2	KIT FC CuAl A2 225A*	KA2225-1	KA2225-2	KA2225-3	KA2225-4	KA2225-6
	KIT FC CuAl A2 250A	KA2250-1	KA2250-2	KA2250-3	KA2250-4	KA2250-6

* 250A Cu cables and 225A Al cables



Terminal F



Terminal F with cable lug

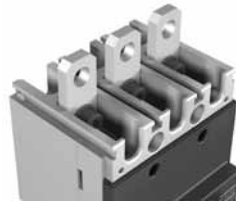


Terminal F with busbar

Front terminals - F

Frame size	Description	1 piece catalog number	2 piece catalog number	3 piece catalog number	4 piece catalog number	6 piece catalog number
A1	KIT F A1	KA1F-1	KA1F-2	KA1F-3	KA1F-4	KA1F-6
A2	KIT F A2	KA2F-1	KA2F-2	KA2F-3	KA2F-4	KA2F-6

Front terminals are supplied as standard with all FORMULA circuit breakers.



Terminal EF



Terminal EF with busbar

Front extended terminals - EF (IEC only)

Frame size	Description	1 piece catalog number	2 piece catalog number	3 piece catalog number	4 piece catalog number	6 piece catalog number
A1	KIT EF A1	KA1EF-1	KA1EF-2	KA1EF-3	KA1EF-4	KA1EF-6
A2	KIT EF A2	KA2EF-1	KA2EF-2	KA2EF-3	KA2EF-4	KA2EF-6

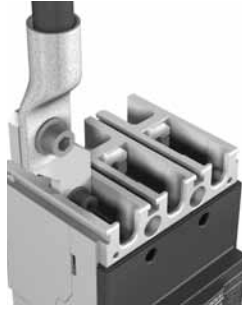
Accessories

Mechanical

A1 - A2



Terminal ES



Terminal ES with cable lug



Terminal ES with busbar

Front extended spread terminals - ES (IEC only)

Frame size	Description	1 piece catalog number	2 piece catalog number	3 piece catalog number	4 piece catalog number	6 piece catalog number
A1	KIT ES A1	-	KA1ES-2	KA1ES-3	KA1ES-4	KA1ES-6
A2	KIT ES A2	-	KA2ES-2	KA2ES-3	KA2ES-4	KA2ES-6



High terminal cover (HTC)

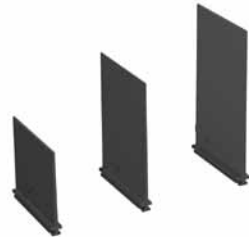


Low terminal cover (LTC)

Terminal covers - low profile (LTC) and high profile (HTC)

Frame size	Description	Catalog number
A1	LTC 3p - 2pcs	KA1LTC-3
	HTC 3p - 2pcs	KA1HTC-3
A2	LTC 3p - 2pcs	KA2LTC-3
	HTC 3p - 2pcs	KA2HTC-3
A1 - A2	Sealable screws for terminal covers*	KA2SSW-T
	Sealable screws for front*	KA2SSW-F

* IEC rated only



Phase barriers

Phase barriers - low profile and high profile

Frame size	Description	2-Piece catalog number	4-Piece catalog number
A1	PB 50mm	KA1PBL-2	KA1PBL-3
A2	PB 80mm	KA2PBL-2	KA2PBL-3
A1 - A2	PB 100mm	KA2PBH-2	KA2PBH-3

Direct mount rotary handle (RHD)



Direct handle (RHD)

Frame size	Description	Catalog number
A1 - A2	RHD A1-A2 STANDARD DIRECT	KA2RHD
	RHD A1-A2 EMERGENCY DIRECT	KA2RHDEM

Accessories

Mechanical

A1 - A2



Extended handle (RHE)

Extended mount rotary handle (RHE)

Frame size	Description	Catalog number
A1 - A2	RHE KIT A1-A2 STANDARD EXTENDED	KA2RHE
	RHE KIT A1-A2 EMERGENCY EXTENDED	KA2RHEEM
	RHE A1-A2 BASE	KA2RHE-B
	RHE A1-A2 SHAFT	KA2RHE-S
	RHE A1-A2 STANDARD HANDLE	KA2RHE-H
	RHE A1-A2 EMERGENCY HANDLE	KA2RHE-HEM



Fixed padlock in open position (PLL)

Padlocks for lever operating mechanism (PLL)

Frame size	Description	Catalog number
A1 - A2	PLL - removable in open position (1p, 2p, 3p)	KA2LDOR
	PLL - fixed in open position (3p)	KA2LDOR
	PLL - fixed in open and closed position (3p)	KA2LD



Fixed padlock in open and closed position (PLL)



Removable padlock in open position (PLL)



Key lock for direct handle

Key lock on handle and front lever operating mechanism (RHL) (IEC only)

Frame size	Description	Catalog number
A1 - A2	RHL-D open position, different keys	KA2RHLO
	RHL-S open position, type A key	KA2RHLO-A
	RHL-S open position, type B key	KA2RHLO-B
	RHL-S open position, type C key	KA2RHLO-C
	RHL-S open position, type D key	KA2RHLO-D
	RHL-D open and closed position, different keys	KA2RHL

Bracket for fixing on DIN rail (IEC only)

Frame size	Description	Catalog number
A1 - A2	Bracket for 1p, 2p, 3p	KA2DIN



Bracket for DIN rail