Product description

The AS168X is a thermal magnetic high performance CBE to IEC 934 and a «supplementary protector» to UL 1077. It is capable of drastically limiting the «let-through energy» in case of short circuit interruptions. The series is available in units from one to four poles for use in AC and DC circuits. Multipole devices are connected internally and at the handle for simultaneous operation. This applies also to combinations with the switched neutral pole. Well designed screw type terminals at line and load side are provided for safe and easy connection to line and load. They accept #16 to 4 AWG / 1,5 to 25 mm^2.

The AS168X is suitable as supplementary protector under UL 1077 / EN 60934 or as Manual Motor Controller according UL 508 / CSA 22.2 14. Thus the Breaker has a high versatility and is suitable for many functions:
- Motor overload protection (thermal and magnetic)
- Motor starting across-the-line (direct-on-line)
- Motor starting with motor disconnect (cos phi 0,4 – 0,5)
- Motor group installation (short capacity 5 kA)
- Control circuits

Accessories

- Auxiliary contact module
  Each auxiliary contact module contains one contact, either normally open or normally closed.

- Signal contact module
  Signal contact modules are linked internally with the protected poles but not linked at the handles.
  Contacts are actuated by a fault condition at the protected poles, not by the manual operation of the CBE.

- Relay trip module
  The relay trip module can be used for remote tripping of the adjacent poles by applying a voltage to the module's terminal.

- Switched neutral pole (factory assembled)
  This module allows to automatically open the neutral line when the protected poles have been tripped.

Features

- Excellent short circuit performance (up to 10 kA)
- High limits of discrimination (due to energy limitation)
- Wide choice of characteristics (Adaptability)
- Availability of AC and DC in the same frame size
- Compact, «finger safe» design
- Ease installation (on DIN rail)

Applications
- Industrial machines
- Automation
- Aircondition, ventilation
- Transformers
- Power supplies
- Telecom systems
- Computer systems
- Test systems
- Medical equipments

Effect of ambient temperature

AC-breakers are calibrated for an ambient temperature of +40°C, DC-breakers for +23°C. To determine the rated current for a lower or higher ambient temperature, use a correction factor from the table below:

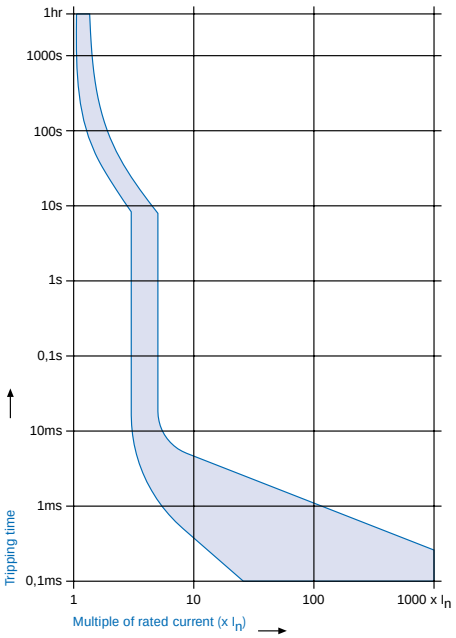
Ambient temperature [°C]	Correction factor AC version	DC version
–20	1,28	0,80
–5	1,22	0,87
0	1,20	0,90
+10	1,15	0,95
+23	1,10	1,00
+30	1,05	1,05
+40	1,00	1,10
+50	0,95	1,20
+60	0,90	1,30

Example DC version:

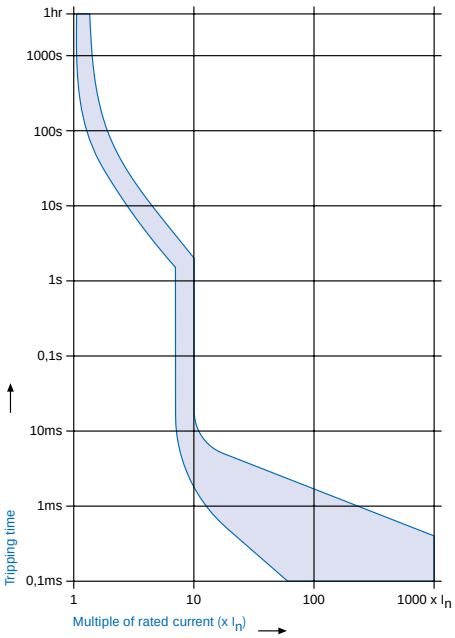
Rated current at +23°C	10 A
Ambient temperature	+50°C
Correction factor	1,2
Chosen rated current at +50°C ambient temperature	

10 A x 1,2 = 12 A

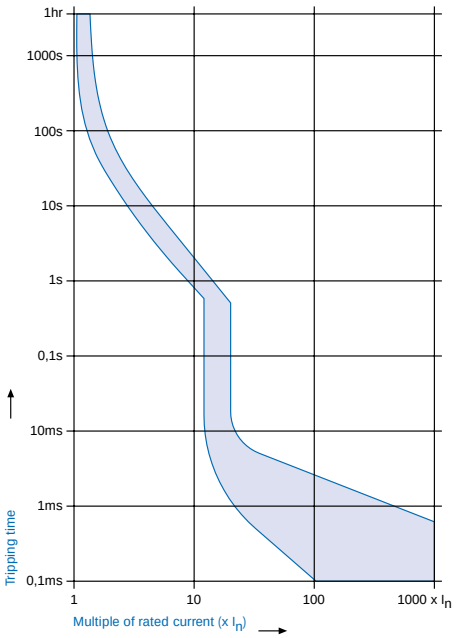
Tripping characteristic F



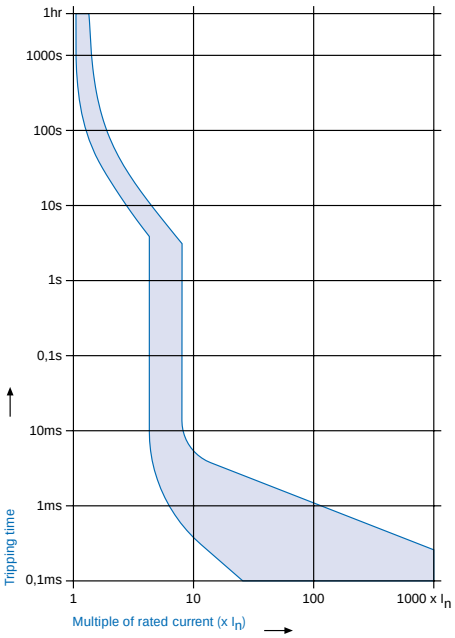
Tripping characteristic G



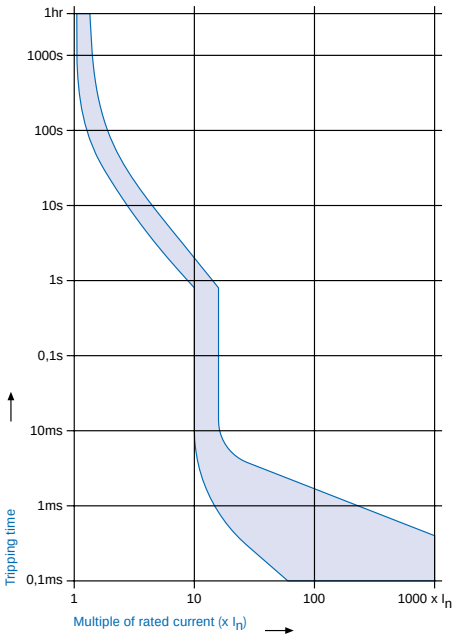
Tripping characteristic H



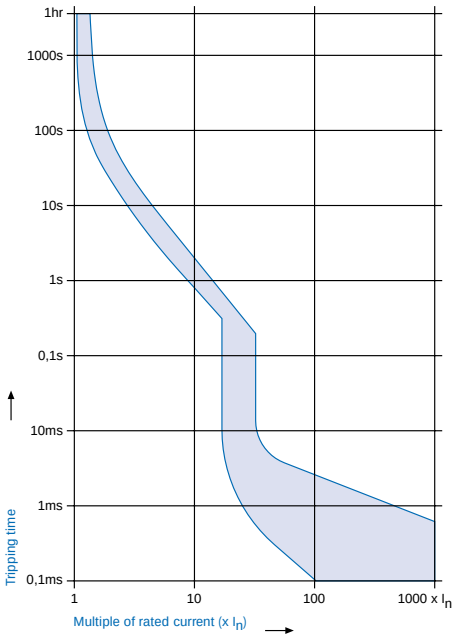
Tripping characteristic DF



Tripping characteristic DG



Tripping characteristic DH



Technical data

Pole :

Rated voltage U_e	AC versions F; G; H	AC 480/277 V; DC 65 V
	DC versions DF; DG; DH	DC 180 V 1 pole DC 360 V 2 – 3 pole
	Note: The connection polarity must be strictly observed. An application with a DC Type AS168X in an AC network is not allowed.	
Rated current I_n	See approvals, page 126	AC/DC 0,5 – 52 A
Endurance	Number of cycles at I_n	6000
Type of tripping	• Thermal magnetic • Positively trip-free	TM
Type of actuation	Manual ON/OFF	S-type
Permissible wire cross section		1,5 – 25 mm² /AWG #16...4

Switched neutral

Rated voltage U_e **Rated current I_n**	AC 277 V AC/DC 65 A
Function	The switched neutral closes with manual closure of the poles and opens automatically with thermal magnetic tripping of the poles.

Technical data (continued)

Add-on modules

	Rated voltage U_e	Rated current I_n
Auxiliary contact H1 & H2 and Signal contact S1 & S2	AC 277 V DC 125 V DC 50 V	6 A 1 A 6 A
Functional auxiliary contact module	Type H1 (assumes the same contact position) Type H2 (assumes the opposite position) T	Actuation of the contact is determined by the condition of the handle position of the adjacent poles.
Functional signal contact	Type S1 (assumes the same contact position) Type S2 (assumes the opposite position)	The signal contact operates due to a thermal magnetic tripping and must be reset by hand.

Relay trip module	Type	Voltage range AC/DC	Impedance at 50 Hz
	A1	5 – 12 V	1.1 Ω
	A2	10 – 24 V	4.7 Ω
	A3	20 – 48 V	16 Ω
	A4	40 – 110 V	63 Ω
	A5	90 – 240 V	395 Ω

Function of relay trip module	When voltage is applied across the terminals, remote tripping takes place by a self interrupting magnetic system. Trip delay time 8 - 16 ms.

General data

Dielectric strength		AC 2000 V
Vibration resistance	IEC 60068-2-6, Test Fc	0,75 mm amplitude, 10 – 57 Hz
Shock resistance	IEC 60068-2-27, Test Ea	25 g
Protection against electric shock	Finger safe per IEC 529	IP20
Permissible ambient temperature		-20°C to +60°C
Weight	1 pole	ca. 130 g
	Switched neutral	ca. 130 g
	Auxiliary contact	ca. 100 g
	Signal contact	ca. 100 g
	Relay trip module	ca. 120 g

Approvals

AC versions

		VDE EN 60934			UL UL 1077 CSA 22.2 235			UL UL 508 ** CSA 22.2 14	
Poles	Characteristic/	Volt AC	Volt DC	Icn [A]	Volt AC	Volt DC	Icn [A]	Volt AC	Icn [A]
1	F / G / H 45 - 52	420/240	65	4500	277	65	5000	277	5000
	F / G 0.5 - 25	420/240	65	4500	277 240	65	5000 10000	277	5000
	H 0.5 - 40	420/240	65	4500	277	65	5000	277	5000
	F / G 27 - 40	420/240	65	4500	277 240	65	5000 10000	277	5000
2	F / G / H 45 - 52	420	65	4500	480	65	5000	480	5000
	F / G 0.5 - 25	420	65	4500	480	65	10000	480	5000
	H 0.5 - 40	420	65	4500	480	65	5000	480	5000
	F / G 27 - 40	420	65	4500	480	65	10000	480	5000
3	F / G / H 45 - 52	420	65	4500	480Y/277	65	5000	480	5000
	F / G 0.5 - 25	420	65	4500	480Y/277	65	10000	480	5000
	H 0.5 - 40	420	65	4500	480Y/277	65	5000	480	5000
	F / G 27 - 40	420	65	4500	480Y/277	65	10000	480	5000
4	F / G / H 0.5 - 52	420/240	65	4500	480Y/277	65	5000	480Y/277	5000

DC versions

		VDE EN 60934		UL UL 1077 CSA 22.2 235	
Poles	Characteristic/	Volt DC	Icn [A]	Volt DC	Icn [A]
1	DF / DG 0.5 - 50	120	4500	180	2000
	DH 6 - 50	120	4500	180	2000
2	DF / DG 0.5 - 50	240	4500	360	2000
	DH 6 - 50	240	4500	360	2000
3	DF / DG 0.5 - 40	360	4500	360	10000
	DF / DG 45 - 50	360	4500	360	5000
	DH 6 - 50	360	4500	360	5000
4	DF / DG 0.5 - 40	360	4500	360	10000
	DF / DG 45 - 50	360	4500	360	5000
	DH 6 - 50	360	4500	360	5000

** Rated currents 32–52 A approval pending

Conversion table Ampere rating – Horsepower rating

Voltage Rating:
One pole: AC 277 V, 1 phase
Two pole: AC 480Y/277 V, 1 phase
Three pole: AC 480Y/277 V, 3 phase

HP-Rating: 1 phase (1 pole & 2 pole):

AS168X-CB	MOTOR NAMEPLATE		HORSEPOWER (FLA & LRC RATINGS APPLY WHERE NO HP RATING IS GIVEN) NOMINAL CIRCUIT VOLTAGE, Vac							
			110-120	200	208	220-240	265	**277**	380-415	**440-480**
Rated Current (See Note #1)	FLA Rating	Starting/ LRC Rating						**1 pole**		**2 pole**
0.5A	0.5A	3°								
1A	1A	6°							1/10	
1.5A	1.5A	9°				1/10	1/10	**1/10**	1/6	
2A	2A	12A				1/8	1/6	**1/6**	1/4	
3A	3A	18A	1/10	1/6	1/6	1/4	1/4	**1/3**	1/3	**1/2**
4A	4A	24A	1/8	1/4	1/3	1/3	1/3	**1/3**	1/2	**1**
5A	5A	30A	1/6	1/3	1/3	1/2	1/2	**1/2**	3/4	**1 1/2**
6A	6A	36A	1/4	1/2	1/2	1/2	3/4	**3/4**	1	**2**
7A	7A	42A	1/4	1/2	1/2	3/4	1	**1**	1 1/2	**2**
8A	8A	48A	1/3	3/4	3/4	1	1	**1**	2	**2**
9A	9A	54A	1/3	3/4	1	1	1 _	**1 1/2**	2	**3**
10A	10A	60A	1/2	1	1	1 1/2	1 1/2	**2**	2	**3**
12A	12A	72A	1/2	1 1/2	1 1/2	2	2	**2**	3	**3**
13A	13A	78A	1/2	1 1/2	1 1/2	2	2	**2**	3	**3**
15A	15A	90A	3/4	2	2	2	3	**3**	3	**5**
16A	16A	96A	1	2	2	2	3	**3**	3	**5**
18A	18A	108A	1	2	2	3	3	**3**	5	**5**
20A	20A	120A	1 1/2	3	3	3	3	**3**	5	**5**
23A	23A	138A	1 1/2	3	3	3	3	**3**	5	**7 1/2**
25A	25A	150A	2	3	3	3	5	**5**	5	**7 1/2**
27A	27A	162A	2	3	3	3	5	**5**	7 1/2	**10**
30A	30A	180A	2	3	3	5	5	**5**	7 1/2	**10**

HP-Rating: 3 phase (3 pole):

AS168X-CB	MOTOR NAMEPLATE		HORSEPOWER (FLA & LRC RATINGS APPLY WHERE NO HP RATING IS GIVEN) NOMINAL CIRCUIT VOLTAGE, VAC					
			110-120	200	208	220-240	380-415	**440-480**
Rated Current (See Note #1)	FLA Rating	Starting/ LRC Rating						**3 pole**
0.5A	0.5A							
1A	1A							
1.5A	1.5A	10A					1/2	**1/2**
2A	2A	12.5A					3/4	**3/4**
3A	3A	20A		1/2	1/2	1/2	1	**1 1/2**
4A	4A	25A		3/4	3/4	3/4	1 1/2	**2**
5A	5A	32A	1/2	1	1	1	2	**3**
6A	6A	32A	1/2	1	1	1 1/2	2	**3**
7A	7A	32A	3/4	1 1/2	1 1/2	2	3	**3**
8A	8A	46A	3/4	2	2	2	3	**5**
9A	9A	46A	1	2	2	2	3	**5**
10A	10A	46A	1	2	2	3	5	**5**
12A	12A	63.5A	1 1/2	3	3	3	5	**7 1/2**
13A	13A	63.5A	1 1/2	3	3	3	5	**7 1/2**
15A	15A	81A	2	3	3	3	7 1/2	**10**
16A	16A	81A	2	3	3	5	7 1/2	**10**
18A	18A	81A	2	5	5	5	10	**10**
20A	20A	81A	3	5	5	5	10	**10**
23A	23A	116A	3	5	5	7 1/2	10	**15**
25A	25A	116A	3	5	7 1/2	7 1/2	10	**15**
27A	27A	145A	3	7 1/2	7 1/2	7 1/2	15	**20**
30A	30A	145A	3	7 1/2	7 1/2	10	15	**20**

Note #1: For AC motor circuit nameplate FLA loads, AC general-use loads, AC resistance loads