Thermal-magnetic circuit breaker 3120-N...-...M1-...

3120-N...-...M1-...

The 3120-N…-…M1-… thermal-magnetic circuit breaker/switch combination combines overcurrent protection with an ON/OFF switch within a single component. The integrated bimetal provides perfectly harmonised overload protection. Through the magnetic fast-tripping element the circuit breaker/switch combination disconnects overload currents from 4-times the rated current within a range of milliseconds.

The 3120-N…-…M1-… meets the requirements of the fire resistance standard EN 60335-1: 2007-02 Safety requirements of household and similar electrical appliances.

Typical Features

- 3120-N with thermal-magnetic trip curve, available as one- or two-pole version
- Rated voltage: AC 240 V, DC 50 V, AC 415 V
- Rated current: 0.1…16 A
- Functionally expandable through power entry module

Your benefits

- Due to the magnetic trip element of the trip curve, the 3120-N...-..M1 trips faster in the event of higher currents than the 3120 with purely thermal trip curve.
- Increased device availability: the circuit breaker can be quickly and conveniently switched on after an overcurrent tripping. The overload protection is perfectly adjusted to the load, nuisance tripping is prevented.
- Increased device safety: All poles are reliably disconnected by a multi-pole CBE in the event of an error. This protects the user against electrocution.
- Reduced operating costs: no procurement, stocking, disposal and service costs, as incur when using fuses.
- Reduced costs: a circuit breaker/switch combination saves components and reduces mounting and wiring efforts as well as material planning and storage costs.

Typ. applications

Electric motors, household appliances and office equipment, electric tools, power supply modules, charging rectifiers

Approvals / Certifications

Web links

Further information, International approvals, Technical basics, REACH, RoHS, Contact

Compliance

General information

Further information

Further information
https://www.global.e-t-a.com/p6455

Technical data

Electrical data

Rated voltage and rated current range acc. to IEC 60934	AC 240 V (50/60 Hz); 0.1...16 A DC 50 V (50/60 Hz); 0.1...16 A AC 415 V (50/60 Hz); 0.1...16 A
Rated voltage and rated current range acc. to UL 1077	AC 250 V (50/60 Hz); 0.1...10 A AC 125 V (50/60 Hz); 0.1...16 A
Current ratings I_n	0.1 A; 0.2 A; 0.3 A; 0.4 A; 0.5 A; 0.6 A; 0.8 A; 1 A; 1.2 A; 1.5 A; 2 A; 2.5 A; 3 A; 3.5 A; 4 A; 5 A; 6 A; 7 A; 8 A; 10 A; 12 A; 14 A; 15 A; 16 A
Rated insulation voltage	AC 415 V
Minimum load	Main circuit: DC 10 V / 100 mA

Rated currents and typical internal resistance values

Rated current I_n [A]	Internal resistance [Ω]	Internal resistance [Ω]
	thermal 1.15 -1.38 x IN	thermal - magnetic
0.1	94.0	165
0.2	24.0	42.5
0.3	12.0	20.33
0.4	5.5	9.75
0.5	4.4	7.2
0.6	3.0	4.83
0.8	1.5	2.62
1.0	0.9	1.5
1.2	0.833	1.25
1.5	0.47	0.733
2.0	0.3	0.5
2.5	0.08	0.2
3.0	0.06	0.14
3.5	0.057	0.114
4.0	0.043	0.093
4.5	0.044	0.082
5.0	0.032	0.060
6.0	0.022	0.043
7.0	< 0.02	0.029
8.0	< 0.02	0.029
9.0	< 0.02	0.022
10.0	< 0.02	0.02
12.0	< 0.02	< 0.02
14.0	< 0.02	< 0.02
15.0	< 0.02	< 0.02
16.0	< 0.02	< 0.02

Indication per pole

Behaviour at rated current according to EN IEC 60934

Number of poles	Rated current I_n [A]	Number of cycles	Rated voltage U_n [V]	Multiple of rated current I_n
1-pole	0.1...16	30,000	AC 240	1.0

1-pole	0.1...4	30,000	DC 50	1.0
1-pole	4.5...16	30,000	DC 50	1.0
1-pole	0.1...16	30,000	DC 28	1.0
2-pole	0.1...16	50,000	AC 240	1.0
2-pole	0.1...16	50,000	DC 50	1.0
2-pole	0.1...16	10,000	AC 415	1.0

Rupture capacity according to EN IEC 60934 (I_{cn})			
Number of poles	**Rated current I_n [A]**	**Rated voltage U_n [V]**	**Short-circuit breaking capacity$_{cn}$ [A]**
1, 2-pole	0.1...2	AC 240	100 I_n
1-pole	2.5...16	AC 240	200
2-pole	2.5...16	AC 240	300
1-pole	0.1...10	DC 50	50
2-pole	0.1...2	DC 50	10 I_n
2-pole	2.5...16	DC 50	250
1, 2-pole	0.1...2	DC 28	100 I_n
1-pole	2.5...16	DC 28	200
2-pole	2.5...16	DC 28	300

Rupture capacity according to UL 1077 (I_{nc})				
Number of poles	**Rated current I_n [A]**	**Rated voltage U_n [V]**	**Rated short circuit current I_{nc} [A]**	**Backup fuse category**
1, 2-pole	0.1...10	AC 250	2,000	C1
1, 2-pole	0.1...16	AC 125	1,000	C1

Insulation co-ordination (EN IEC 60664)	2.5 kV /2 reinforced insulation at operating area
Insulation resistance	> 100 MΩ at DC 500 V

Dielectric strength according to EN IEC 60934	
Scope	**AC Test voltage [V]**
Actuating area	4,000
Installation area	2,000
pole to pole (2-pole)	2,000

Mechanical data	
Mass	Approx. 50 g (2-pole approx. 53 g)
Flammability class acc. to UL 94	V-2
Mounting data	Snap-in mounting push-in force max. 200 N firm fit in panel min. 88 N
Mechanical endurance	50,000 cycles
Operating force	**Rocker actuator** On-switching 10...20 N, Off-switching 3...8 N **Actuator with one/two push buttons** On-switching 10 - 25 N, Off-switching 3 - 10 N
Leakage current resistance (enclosure material)	CTI 575
Actuation according to EN 60934	S-type R-type
Trip behaviour	Trip-free mechanism (positive)
Trip method	TM
Terminal stability	according to EN IEC 60934: in plugging and pulling direction ≥ 88 N (6.3 mm terminal)

Ambient conditions	
Ambient temperature	-30...+60 °C
Storage temperature	-40...+80 °C

Damp heat	**Test according to IEC 60068-2-78, test Cab** 240 hrs in 95 % RH Temperature +40 °C
Vibration	**Test according to IEC 60068-2-6, test Fc** ±0.61 mm (10...57 Hz), 8 g (57...500 Hz) 10 frequency cycles / axis
Shock	**Test according to IEC 60068-2-27, test Ea** 30 g / 11 ms
Corrosion	**Test according to IEC 60068-2-11, test Ka** 96 hours at 5 % salt mist
IP code standard	IEC 60529, DIN VDE 0470
Actuating area IP code (standard)	IP40
Installation area IP code (standard)	IP40
Terminal area IP code (standard)	IP00
IP code description	**Terminal area:** the circuit breaker terminals are located here. Humidity or foreign objects cannot enter the terminal area through the cover (increased degree of protection) or penetrate the circuit breaker through openings at the back. **Actuating area** means the operating area (push button, rocker etc.). Sealing (higher IP protection class) prevents the ingress of humidity or foreign objects into the circuit breaker. **Installation area:** Panel cut-out area. The sealing (for higher IP protection class) prevents the ingress of humidity or foreign objects into the device/equipment.

Options	Actuating area	Installation area
Design version 7, U	IP54	-
Design version E, V	IP54	IP54
Design version 4	IP65	IP65

Operating altitude	≤ 2,000 m above sea level (SL)

Ordering number code

3	1	2	0	-	N	5	2	4	-	P	7	M	1	-	W	1	9	D	G	4	-	1	6	A	-	A
1					2		3	4		5		6			7		8	9	10	11			12			13

1 Type number	
3120	Thermal-magnetic circuit breaker/switch combination, rocker switch
3120	Thermal-magnetic resettable circuit breaker with push button
3120	Thermal-magnetic circuit breaker/switch combination, actuation via 2 push buttons

2 Panel cut-out	
N3	Sap-in mounting, panel cut-out 50.5 x 21.5 mm, for higher panel thicknesses
N5	Sap-in mounting, panel cut-out 44.5 x 22 mm

3 Pole number of the main current paths	
1	1-pole switching, 1-pole thermal-magnetic protection
2	2-pole switching, 2-pole protected; 1. pole thermal-magnetically protected, 2. pole thermally protected
5	2-pole switching, 1-pole thermal-magnetically protected

4 Design variant	
Rocker switch	
1	Standard flange
3	with actuation protection
4	Standard flange, with accordion-style seal
6	Short flange (only for N5 mounting type)
7	Short flange, with protective cover (only for N5 mounting type)

4 Design variant	
A	with actuation protection and cross-hole (for optional locking)
U	With switch-on protection and protective cover (only for N5 mounting type)
W	Standard flange, white (only for N5 mounting type)
One push button	
G	Designed as resettable circuit breaker
Two push buttons	
D	with actuation protection
E	with actuation protection and protective cover
F	with switch-on protection
V	With switch-on protection and protective cover

5 Terminal	
P7	Blade terminal 6.3 x 0.8 mm
H7	As P7, terminals 11 and 21 with additional M3.5 flat head screws
N7	As P7, with additional shunt terminals 12(i) and 22(i)
G7	as N7, terminals 11 and 21 with additional M3.5 flat head screws

6 Characteristic curve	
M1	Thermal-magnetic trip

7 Actuator	
W	Rocker (design versions 1, 3, 4, 6, 7, A, U)
D	One push button (design version G), without imprint, no illumination
S	Two push buttons (design versions D, E, F, V)

8 Actuator colour	
Rocker switch Opaque, not illuminated	
01	Black
02	White
04	Red
Rocker switch transparent, illuminated	
12	White
14	Red
15	Orange
16	Blue
19	Green
One push button Opaque, not illuminated	
01	Black
02	White
04	Red (1)
09	Green
Two push buttons	
GR	Green, red (when ordered without illuminated: both buttons opaque)

9 Actuator marking	
Rocker switch	
A	I-O front side vertically (not for design version 4)
D	I-O vertical
F	ON-OFF vertical
H	ON-OFF horizontal
K	I-O horizontal
L	I-O and ON-OFF vertical
S	ON-OFF vertical and circle symbol
T	I and standby logo

9 Actuator marking	
X	without imprint
One push button	
X	without imprint
Two push buttons	
D	Imprint on green button I, red button O (for design versions D, F)
X	without imprint, I and O is moulded in protective cover (for design versions E, V)

10 Actuator illumination	
[No indication, if no illumination is required]	
Rocker white transparent, illuminated	
Y	White
Rocker transparent, other colours, illuminated	
Y	Orange
R	Red
T	Blue
G	Green
Two push buttons	
G	Green button illuminated, red button opaque

11 Actuator illumination voltage (= circuit breaker operating voltage)	
[No indication, if no illumination is required]	
1	DC 12 V
2	DC 24 V
3	AC 115 V
4	AC 230 V
5	DC 48 V
6	AC 400 V

12 Rated current	
0,1...16 A	For increments see indication in the rated current series

13 Terminal cover	
[No indication, if no terminal cover is required]	
A	with terminal cover, mounted(2)

(1) only approved according to UL
(2) optional. If the ordering number code ends with -A, the 3120 is delivered with mounted terminal cover. Only available with -P7 or -N7 terminal versions.
Please observe our minimum order quantities.
For further details about the individual positions of the ordering number key please refer to the following pages.

Additional notes

Ordering examples

Purchase order number	Figure
3120-N521-P7M1-W02D	

3120-N52F-P7M1-SGRD	
3120-N52G-H7M1-D01X	

Actuator marking				
Rocker				
3120-N...-....-	W..A	W..D	W..F	W..H
3120-N...-....-	W..K	W..L	W..S	W..T
3120-N...-....-	W..X (without imprint)			
Two push buttons				
3120-N...-....-	SGRD	SGRX		

Approvals

Approvals			
Approval authority	**Test standard**	**Rated voltage [V]**	**Rated current range [A]**
VDE	IEC/EN 60934	AC 240 DC 50	0.1…16 0.1...16
UL	UL 1077	AC 250 AC 125	0.1...10 0.1...16
CSA	C22.2 No 235	AC 250 AC 125	0.1...10 0.1...16
CQC	GB 17701	AC 240 DC 50	0.1...16 0.1...16

*upon request

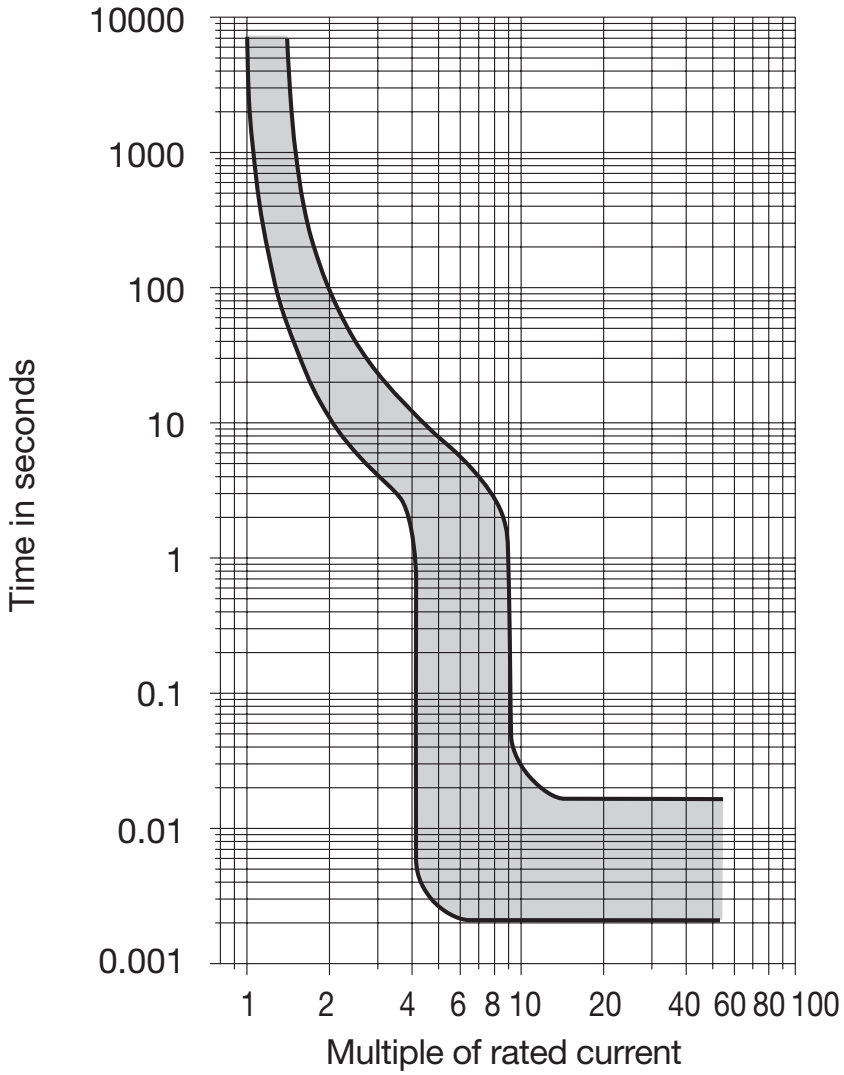
Find further information about approvals here: https://www.e-t-a.de/approvals_en

Time-/current characteristics

Time/current characteristics 0.1...2 A

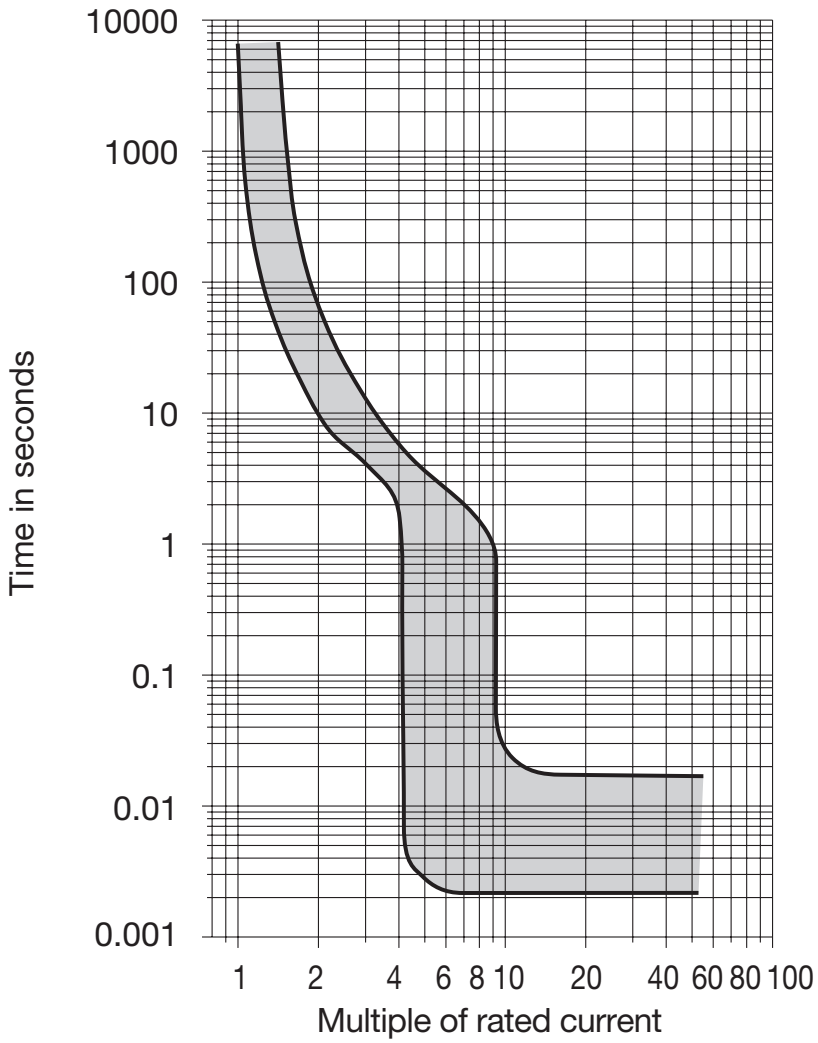
Total switch-off time at rated voltage and 1- or 2-pole load
Ambient temperature 23 °C

0.1...2 A **AC/DC** [1)]



Time/current characteristics

2.5...16 A **AC/DC [1)]**



[1)] With DC, the magnetic response values are higher by a factor of approx. 1.25.

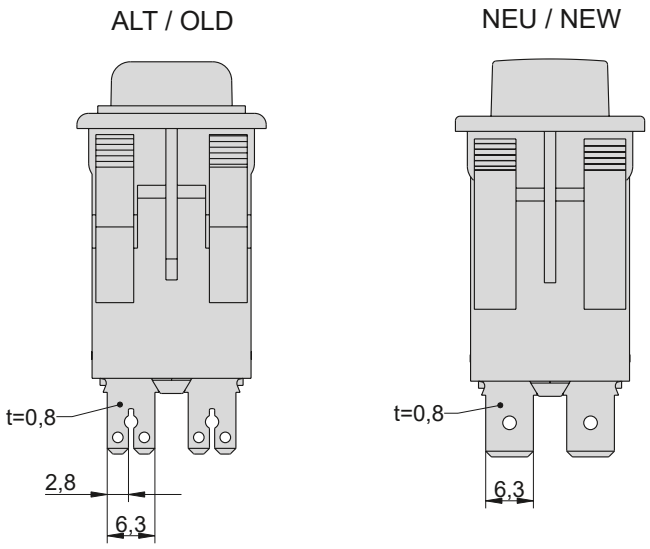
Ambient temperature-dependent trip curve

Ambient temperature [°C]	Temperature correction factor
-30	0.80
-20	0.84
-10	0.88
-5	0.9
10	0.94
23	1
30	1.03
40	1.08
50	1.14
60	1.23

The time/current characteristics depend on the ambient temperatures. In order to eliminate nuisance or delayed tripping, please multiply the rated current of the circuit breaker with a temperature factor (see Technical Information chapter).
Example: I_n = 10 A at 50 °C means 10 A x 1.14 = 11.4 A.
A circuit breaker with a rated current at I_n = 12 A must be selected.

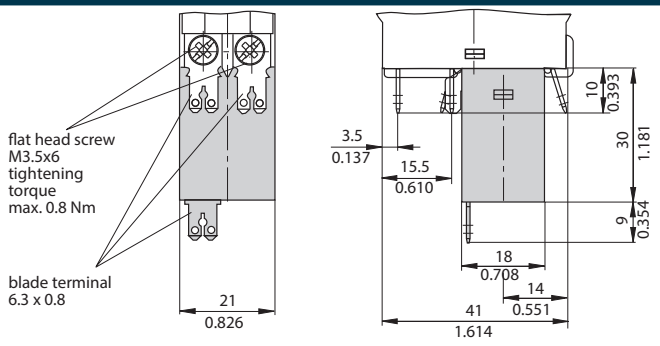
Dimensions

Modification of blade terminals



Note: From June 2026, blade terminals will be changed from slotted to unslotted. This has no effect on the form, fit or function of the circuit breaker (its electromechanical properties remain unchanged). The order number remains the same as well. However, it is no longer possible to attach blade receptacles for 2.8 x 0.8 mm. In some versions of this data sheet, the old version of the blade terminals is still visible.

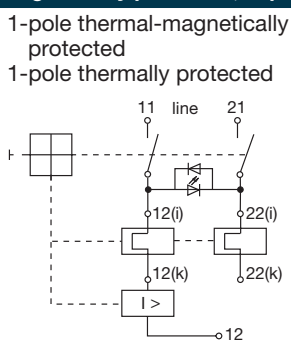
Magnetic trip module (mounted on all 3120-N...-..M1)



For version-dependent 3120 dimensions see 3120-N...-..T1 data sheet

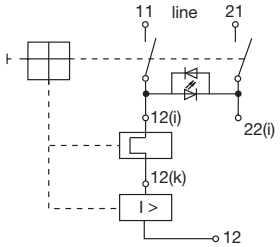
Schematic diagrams

2-pole switching, 2-pole protected; 1. pole thermal-magnetically protected, 2. pole thermally protected, 3120-N.2.-..M1-..



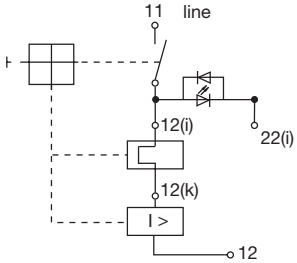
2-pole switching, 1-pole thermal-magnetically protected: 3120-N.5.-..M1-..

1-pole thermal-magnetically protected
1-pole thermally unprotected



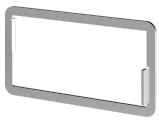
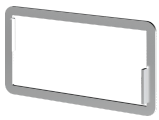
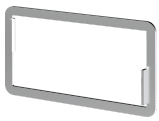
1-pole switching, 1-pole thermal-magnetic protection: 3120.-N.1.-..M1-..

1-pole thermal-magnetically protected



Accessories

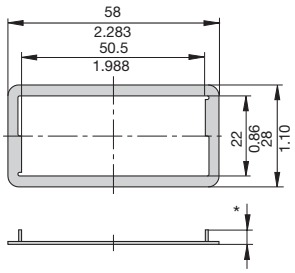
Optional accessories

Klemmrahmen (kz) 3120	The snap-in frame is used to fasten the circuit breaker in the panel cut-out, e.g. in case of dimensional tolerances, soft materials or when the specified edge condition cannot be complied with. Y30367501: with 3120-N3, can be used for panel thicknesses < 2 mm Y30367502: with 3120-N3, can be used for panel thicknesses < 4 mm Y30367601: with 3120-N5	
Klemmrahmen (kz) 3120	The snap-in frame is used to fasten the circuit breaker in the panel cut-out, e.g. in case of dimensional tolerances, soft materials or when the specified edge condition cannot be complied with. Y30367501: with 3120-N3, can be used for panel thicknesses < 2 mm Y30367502: with 3120-N3, can be used for panel thicknesses < 4 mm Y30367601: with 3120-N5	
Klemmrahmen (kz) 3120	The snap-in frame is used to fasten the circuit breaker in the panel cut-out, e.g. in case of dimensional tolerances, soft materials or when the specified edge condition cannot be complied with. Y30367501: with 3120-N3, can be used for panel thicknesses < 2 mm Y30367502: with 3120-N3, can be used for panel thicknesses < 4 mm Y30367601: with 3120-N5	

Further information about accessories (drawings)

Accessories

**Snap-in frame for 3120-N3...
order no. Y 303 675 01/02**

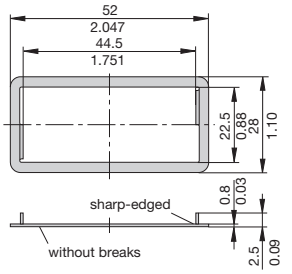


*Y30367501 can only be used for a panel thickness < 2 mm
*Y30367501 can only be used for a panel thickness < 4 mm

The snap-in frame is specifically used to fixate the circuit breaker in the panel cut-out, e.g. in case of dimensional tolerances, soft materials or when the specified edge condition cannot be observed.

Accessories

**Snap-in frame for 3120-N5...
order no. Y 303 676 01**

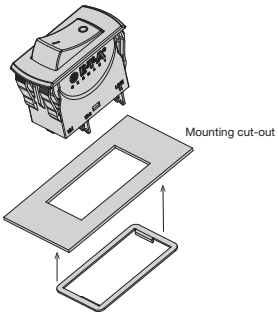


The snap-in frame is used to fasten the circuit breaker in the panel cut-out, e.g. in case of dimensional tolerances, soft materials or when the specified edge condition cannot be complied with.

Y30367501: with 3120-N3, can be used for panel thicknesses < 2 mm
Y30367502: with 3120-N3, can be used for panel thicknesses < 4 mm
Y30367601: with 3120-N5

Accessories

Snap-in frame mounting



Further products

Related products		
3120-N...-...T1	The thermal 3120-N...-....T1-... circuit breaker/switch combination combines overcurrent protection with an ON/OFF switch within a single component. The trip element is a thermal bimetal. The 3120-N...-....T1-... is ideally suited for overload protection of motors, pumps, transformers and cables. After tripping, it can safely, easily and quickly be reset. The positively trip-free mechanism ensures reliable disconnection of the circuit even with the actuator blocked. The 3120-N is also available with a thermal-magnetic tripping principle for a fast disconnection at higher currents. The 3120-N is also available in a version compliant with EN IEC 61058 (see 3120-N...Q1 data sheet).	
2210-S2	Single- or multi-pole thermal-magnetic circuit breaker with toggle actuation, panel or terminal block mounting, independent trip-free mechanism, various characteristic curves, disconnection of all poles. Optionally available with auxiliary contacts and intermediate positions. Special version of the auxiliary contacts for industrial atmosphere and low voltage equipment (e.g. 5 V) upon request. They meet the requirements of the circuit breaker standard EN 60934 (IEC 60934): S-type, TM. **Suitable for the use in power distribution systems - see power distribution systems product group - customer-specific solutions.**	

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