

## Description

The 3120 thermal circuit breaker/switch combination unites overcurrent protection and the function of an ON/OFF switch within a single component. The trip element is a thermal bimetal. Type 3120 is ideally suited for overload protection of motors, pumps, transformers and cables. After tripping, it can reliably, easily and quickly be reset. The positively trip-free mechanism ensures reliable disconnection of the circuit even with the actuator blocked.

Versions upon request:

- ON/OFF switch without overcurrent protection according to the relevant standard for switches for appliances IEC/EN 61058
- thermal-magnetic version for an additional short circuit protection

## Typical applications

Medical and laboratory equipment, apparatus and machine construction, professional tools, household and garden appliances, offices machines, audio equipment, machine tools

## Features

- Single or double pole thermal circuit breaker/switch combination
- Voltage ratings: AC 240 V, DC 50 V
- Current rating range: 0.1 ... 20 A (up to 30 A upon request)
- Optional: push-in terminals for easy and quick wiring with a long-term stability
- Functional extension options with add-on modules for low voltage release, auxiliary contact function or remote trip

## Approval logos



## Compliances



## Your benefits

- Maximum equipment availability is ensured by overload protection perfectly matched with the loads (prevention of nuisance tripping) and quick resettability
- Reduced mounting and wiring time
- Spacesaving design
- Reduced disposition and storage costs
- Increased overall reliability

## Further information

The current data sheet is available on our website: [www.e-t-a.de/d016](http://www.e-t-a.de/d016)

## Technical data

For detailed technical information please see [www.e-t-a.de/ti\\_e](http://www.e-t-a.de/ti_e)

Voltage ratings AC 240 V, DC 50 V  
(AC 415 V upon request)

Current rating range 0.1 ... 20 A  
(up to 30A upon request for single pole units)

### Typical life 1-pole

AC 240 V: 0.1...20 A 30,000 operations at  $1 \times I_N$ , inductive  
DC 50 V: 0.1...4 A 30,000 operations at  $1 \times I_N$ , inductive  
4.5...16 A 30,000 operations at  $1 \times I_N$ , resistive  
DC 28 V: 0.1...20 A 30,000 operations at  $1 \times I_N$ , inductive

### Typical life 2-pole

AC 240 V: 0.1...16 A 50,000 operations at  $1 \times I_N$ , inductive  
17...20 A 30,000 operations at  $1 \times I_N$ , inductive  
DC 50 V: 0.1...16 A 50,000 operations at  $1 \times I_N$ , inductive  
17...20 A 50,000 operations at  $1 \times I_N$ , inductive

Ambient temperature -30 ... +60°C (-22 ... +140°F)

Insulation coordination (IEC 60664) 2.5 kV /2 reinforced insulation at operating area

### Dielectric strength

operating area test voltage AC 3,000 V  
pole to pole (2-pole) test voltage AC 1,500 V

Insulation resistance > 100 MΩ (DC 500 V)

Interrupting capacity  $I_{cn}$  (IEC/EN 60934)

|                | $I_N$        | $U_N$                 | $I_{cn}$        |
|----------------|--------------|-----------------------|-----------------|
| 1-pole, 2-pole | 0.1 ... 2 A  | AC 240 V /<br>DC 50 V | $10 \times I_N$ |
| 1-pole         | 2.5 ... 10 A | DC 50 V               | 50 A            |
| 1-pole         | 2.5 ... 20 A | AC 240 V /<br>DC 28 V | 200 A           |
| 2-pole         | 2.5 ... 20 A | DC 50 V               | 250 A           |
| 2-pole         | 2.5 ... 20 A | AC 240 V /<br>DC 28 V | 300 A           |

Interrupting capacity  $I_{nc}$  (UL 1077)

|                 | $I_N$        | $U_N$    | $I_{nc}$      |
|-----------------|--------------|----------|---------------|
| 1-pole, 2- pole | 0.1 ... 20 A | AC 250 V | 5,000 A, C, 1 |
| 1-pole, 2- pole | 0.1 ... 20 A | DC 50 V  | 1,000 A, C, 1 |

Degree of protection (IEC 60529) operating area IP65  
mounting area IP65  
terminal area IP00

Vibration 8 g (57-500 Hz),  $\pm 0.61$  mm (10-57 Hz)  
test to IEC 60068-2-6, test Fc  
10 frequency cycles/axis

Shock 30 g (11 ms)  
test to IEC 60068-2-27, test Ea

Corrosion 96 hours at 5 % salt mist,  
test to IEC 60068-2-11, test Ka

Humidity 240 hrs in 95 % RH  
test to IEC 60068-2-78,  
test Cab

Mass approx. 30 g (1-pole)  
approx. 34 g (2-pole)  
approx. 45 g (2-pole with PT terminals)

## Current ratings and internal resistance values

| Current rating (A) | Internal resistance per pole (Ω) | Current rating (A) | Internal resistance per pole (Ω) |
|--------------------|----------------------------------|--------------------|----------------------------------|
| 0.1                | 94                               | 4                  | 0.0435                           |
| 0.2                | 24                               | 4.5                | 0.0435                           |
| 0.3                | 12                               | 5                  | 0.0325                           |
| 0.4                | 5.30                             | 6                  | 0.0215                           |
| 0.5                | 4.20                             | 7                  | 0.0165                           |
| 0.6                | 2.90                             | 8                  | 0.0165                           |
| 0.8                | 1.50                             | 10                 | < 0.02                           |
| 1                  | 0.9                              | 12                 | < 0.02                           |
| 1.2                | 0.80                             | 14                 | < 0.02                           |
| 1.5                | 0.45                             | 15                 | < 0.02                           |
| 2                  | 0.27                             | 16                 | < 0.02                           |
| 2.5                | 0.0785                           | 18                 | < 0.02                           |
| 3                  | 0.0595                           | 20                 | < 0.02                           |
| 3.5                | 0.0565                           |                    |                                  |

## Order numbering code

### Type No.

3120 thermal rocker-actuated circuit breaker

### Mounting method

**N3** snap-in, mounting cut-out 50.5 x 21.5 mm

**N5** snap-in, mounting cut-out 44.5 x 22 mm

### Number of poles

**1** 1-pole switching, 1-pole protected

**2** 2-pole switching, 2-pole protected

**5** 2-pole switching, 1-pole protected

### Style

**4** with water splash protection (IP65)

### Terminal design

**PT** push-in terminals

**P7** blade terminals

**H7** as P7, terminals 11 and 21 with flat head screws M3.5 - standard for units with undervoltage release module

**N7** as P7, with additional shunt terminals 12(i) and 22(i)

**G7** as N7, terminals 11 and 21 with additional flat head screws M3.5

### Trip curve

**T1** thermal trip

### Actuator

**W** rocker

### Rocker colour and illumination

**01** . black without illumination

**02** . white without illumination

**04** . red without illumination

**12** . Y white with illumination

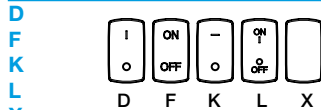
**14** . R red with illumination

**15** . Y orange with illumination

**16** . T blue with illumination

**19** . G green with illumination

### Marking of rocker actuator



### Illumination voltage range

(= operating voltage)

**1** DC 12 V

**2** DC 24 V

**3** AC 115 V

**4** AC 230 V

**5** DC 48 V

### Rated current

**0.1 ... 20 A**

3120-N5 2 4 - PT T1-W 19 D G 4 - 16 A ordering example

Please observe our minimum ordering quantities.

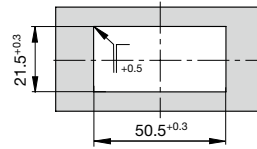
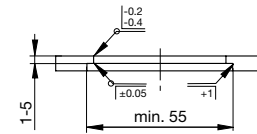
## Custom designed versions

Looking for a version you cannot find in our ordering number code? Please get in touch. We will be pleased to find a solution for you.

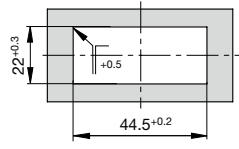
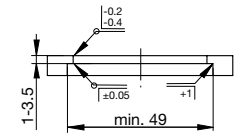
## Mounting method

### Mounting style

Cut-out for mounting style -N3.4

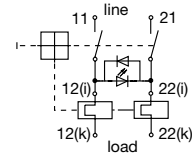


Cut-out for mounting style -N5.4

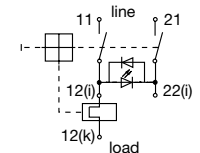


## Schematic diagrams

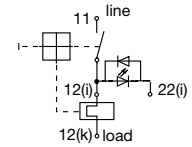
### 2-pole, thermally protected



### 2-pole, 1-pole thermally protected



### 1-pole, thermally protected



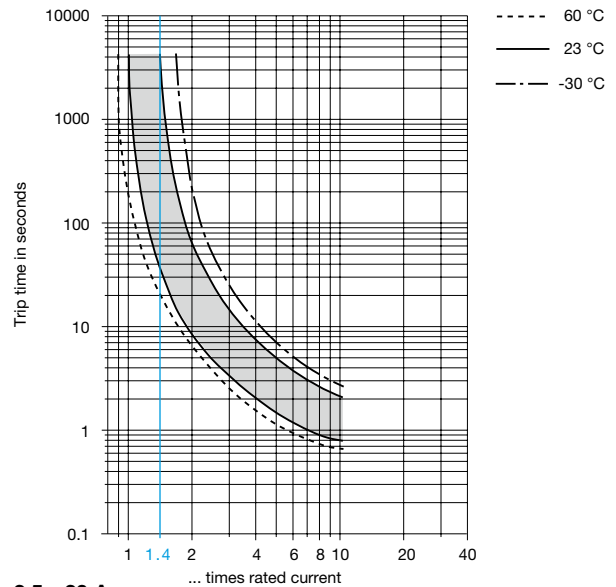
## Approvals

| Approval authority | Standard     | Voltage ratings                             | Current rating range   | Approval logos |
|--------------------|--------------|---|--|----------------|
| VDE                | IEC/EN 60934 | AC 240 V<br>DC 50 V<br>DC 50 V<br>DC 28 V   | 0.1 A ... 20 A<br>0.1 ... 20A (2-pole)<br>0.1 ... 16 A (1-pole)<br>0.1 A ... 20 A                      |                |
| UL                 | UL 1077      | AC 250 V<br>AC 250 V<br>DC 50 V<br>AC 250 V | 0.1 A ... 16 A (TC1, OL1)<br>17 A ... 20 A (TC1, OL0)<br>0.1 A ... 20 A (TC1, OL0)<br>30 A* (TC1, OL0) |                |
| CSA                | C22.2 No 235 | AC 250 V<br>AC 250 V<br>DC 50 V<br>AC 250 V | 0.1 A ... 16 A (TC1, OL1)<br>17 A ... 20 A (TC1, OL0)<br>0.1 A ... 20 A (TC1, OL0)<br>30 A* (TC1, OL0) |                |
| CQC                | GB 17701     | AC 240 V<br>DC 50 V                         | 0.1 A...20 A<br>0.1 A...20 A   |                |
| KTL                | KC6094       | AC 240 V                                    | 0.1...20 A (2-pole)  |                |

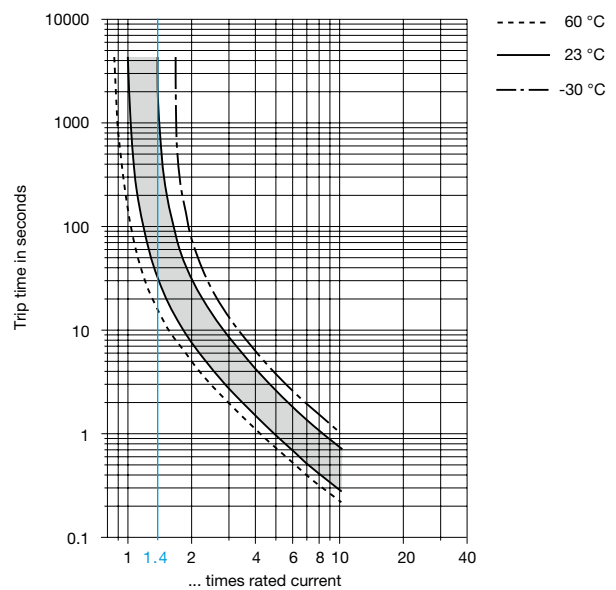
\* 2 poles in parallel

## Time/current characteristics

### 0.1...2 A



### 2.5...20 A

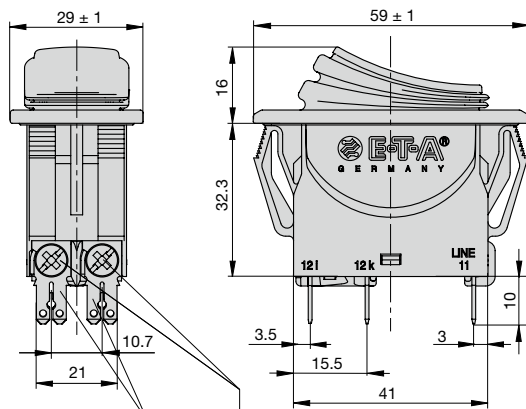


The time/current characteristic depends on the ambient temperature. In order to eliminate nuisance tripping, please multiply the current rating by a derating factor. For further details please see: [www.e-t-a.de/ti\\_e](http://www.e-t-a.de/ti_e)

|                          |     |      |      |      |    |      |      |      |
|--------------------------|-----|------|------|------|----|------|------|------|
| ambient temperature [°C] | -30 | -20  | -10  | 0    | 23 | 40   | 50   | 60   |
| temperature factor       | 0.8 | 0.84 | 0.88 | 0.92 | 1  | 1.08 | 1.14 | 1.23 |

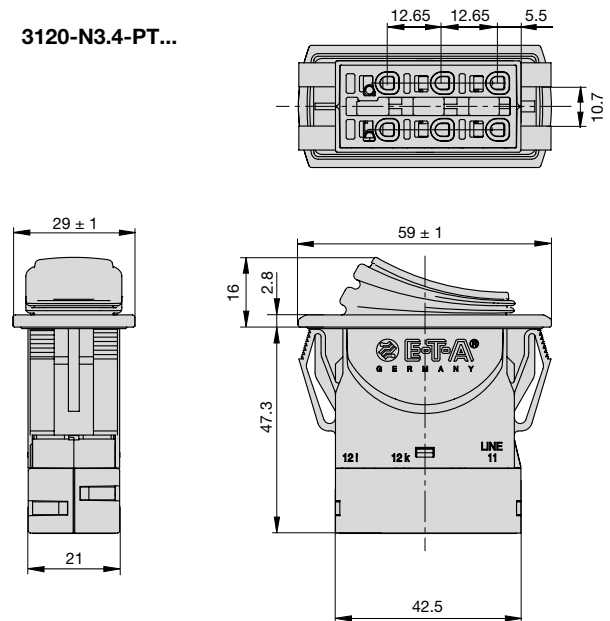
## Dimensions

**3120-N3.4-G7...**

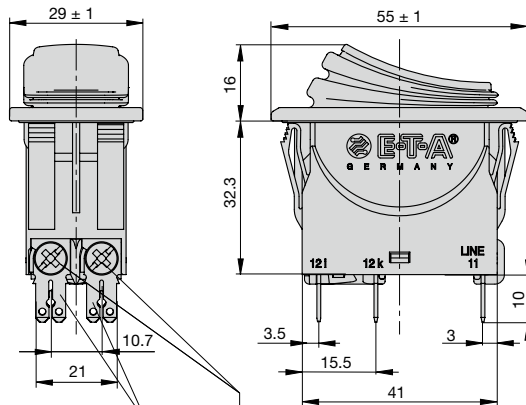


blade terminal  
6.3 x 0.8  
flat head screw M3.5x6  
tightening torque max. 0.8 Nm

**3120-N3.4-PT...**

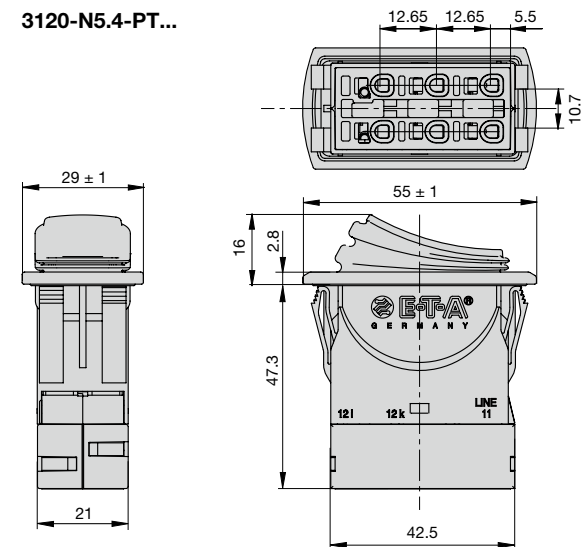


**3120-N5.4-G7...**



blade terminal  
6.3 x 0.8  
flat head screw M3.5x6  
tightening torque max. 0.8 Nm

**3120-N5.4-PT...**

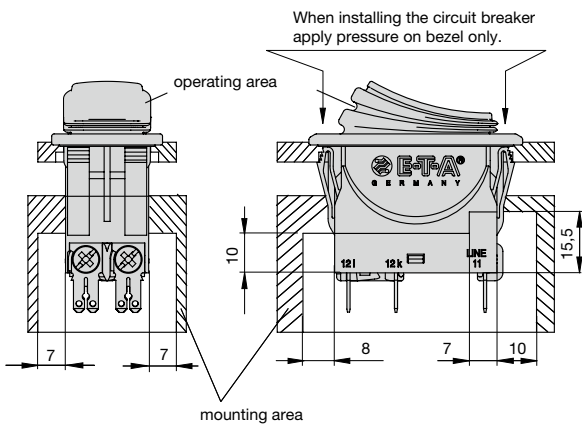


## Cable cross sections PT terminals

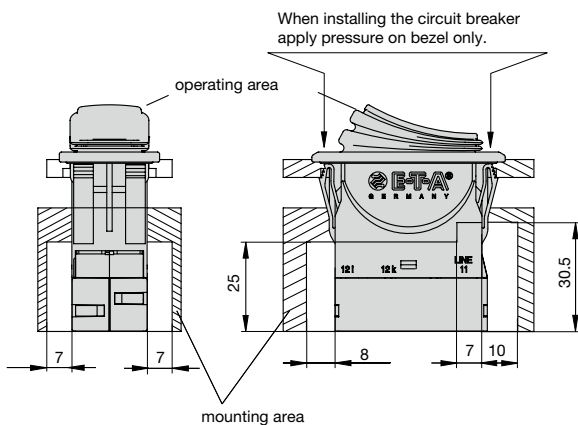
| Cable  | cross section with direct push-in wiring             |
|--|--|
| Rigid  | 1...4 mm <sup>2</sup><br>(stripping length: 10 mm)   |
| Flexible with wire end ferrule<br>(with or without plastic sleeve) | 0.5...2.5 mm <sup>2</sup>                            |
| Cable  | cross section when opening the push-in terminals     |
| Rigid  | 0.5...4 mm <sup>2</sup><br>(stripping length: 10 mm) |
| Flexible without wire end ferrule                                  | 0.5...2.5 mm <sup>2</sup>                            |

## Installation drawing

### 3120 with blade terminals



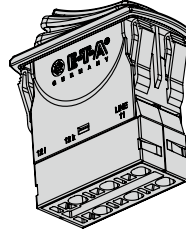
### 3120 with push-in terminals



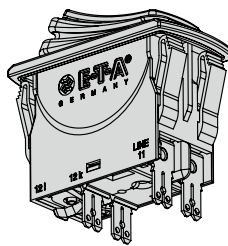
## Terminal types

### 2-pole switching and 2-pole protected

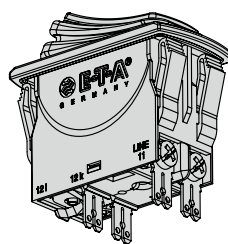
3120-N524-PT



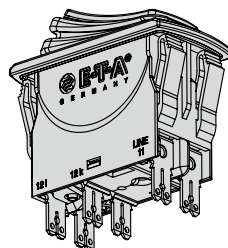
3120-N524-P7



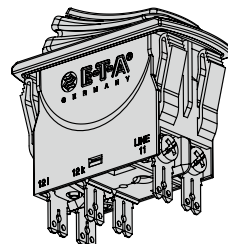
3120-N524-H7



3120-N524-N7

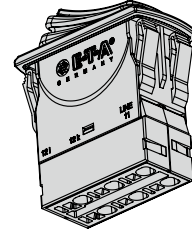


3120-N524-G7

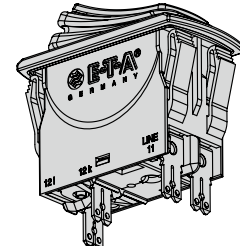


### 2-pole switching and 1-pole protected

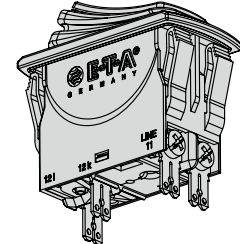
3120-N554-PT



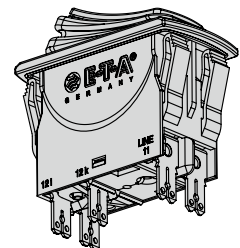
3120-N554-P7



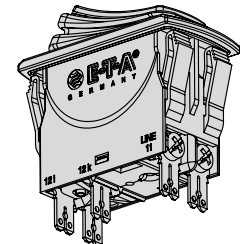
3120-N554-H7



3120-N554-N7

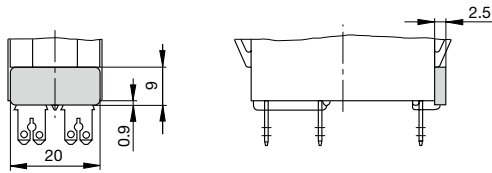


3120-N554-G7

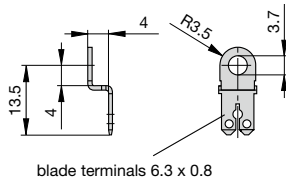


## Accessories

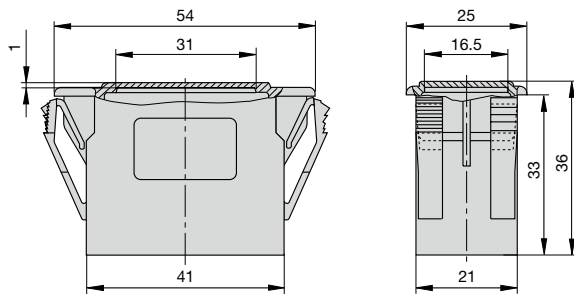
**Insulated cover**  
Y 303 068 01



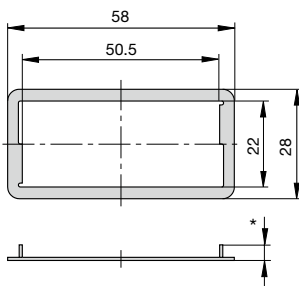
**Terminal adapter**  
Y 303 862 01



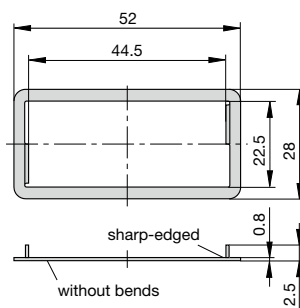
**Blanking piece in -N3 frame**  
Y 303 885 31



**Spacer for 3120-N3...**  
Y 303 675 01/02

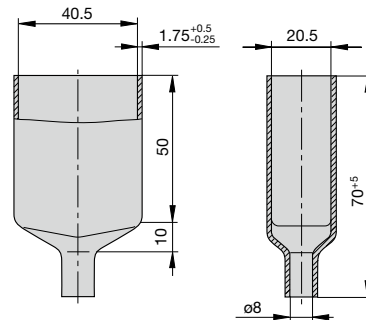


**Spacer for 3120-N5...**  
Y 303 676 01



\* Y 303 675 01 suitable for panel thickness < 2 mm  
\* Y 303 675 02 suitable for panel thickness < 4 mm

**Rear terminal shroud, black (IP64)**  
Y 304 275 01



1

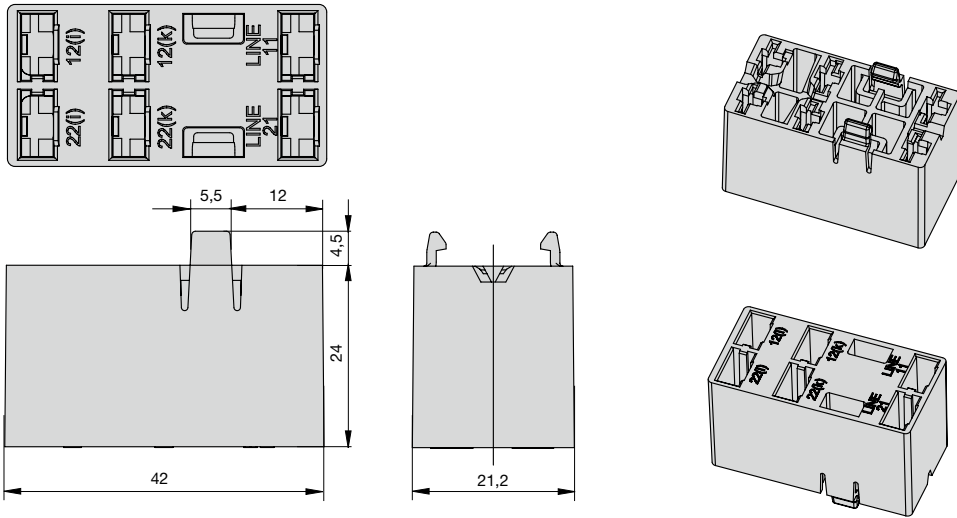
All information and data given on our products are accurate and reliable to the best of our knowledge, but E-T-A does not accept any responsibility for the use in applications which are not in accordance with the present specification. E-T-A reserves the right to change specifications at any time in the interest of improved design, performance and cost effectiveness. Dimensions are subject to change without notice. Please enquire for the latest dimensional drawing with tolerances if required. All dimensions, data, pictures and descriptions are for information only and are not binding. Amendments, errors and omissions excepted. Ordering codes of the products may differ from their marking.

Accessories

Plug-in connector

Y 31214001

Connecting cables can be pre-wired. Two retaining clips ensure a tight fit.



Benefits:

- Reduced installation time and costs for final assembly
- Quick replacement of devices

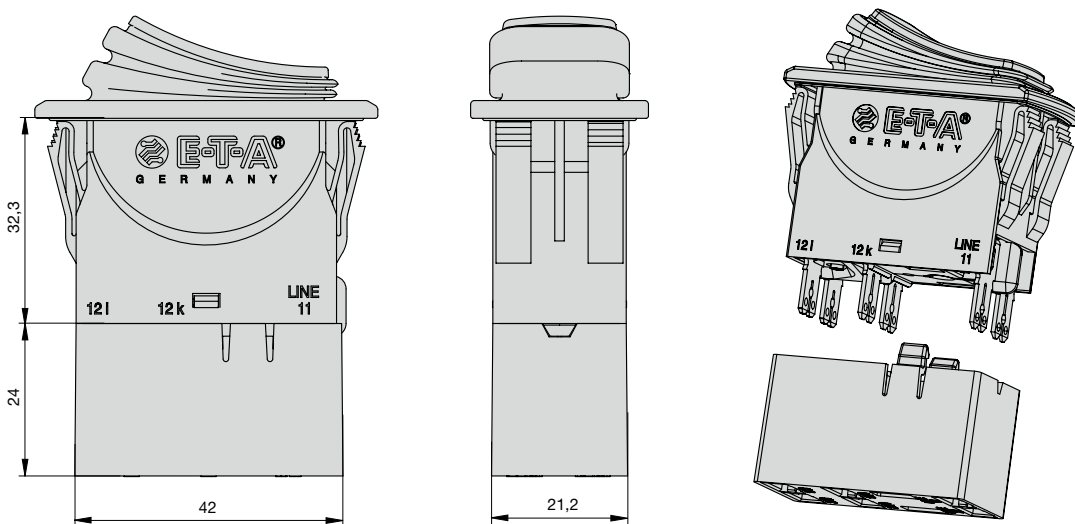
Note:

Delivery without receptacles.

Dimensions of receptacles (width 6.3 mm) are in accordance with DIN 46340 part 3, shape A.

Examples of suitable receptacles: Stocko RSB 7916 F6,3-1 / Klauke type 2730 / Vogt type 3832d.67 / TE FASTON Terminals 250 Series / Delphi Packard 58 Series

Plug-in connector mounted on circuit breaker:





## Description X3120-U undervoltage release module

The undervoltage release module reliably excludes personal injury through automatic re-start after voltage dip or power failure.

In the event of voltage dip or power failure, the undervoltage release module trips the circuit breaker. The rocker actuator will go into centre position. The breaker can be reset in two steps:

- Step 1: Switch rocker into OFF position.
- Step 2: Reset circuit breaker.

**Note:** Basic unit 3120-...-H7 or -G7 requires screw terminals. Not possible in combination with PT terminals.

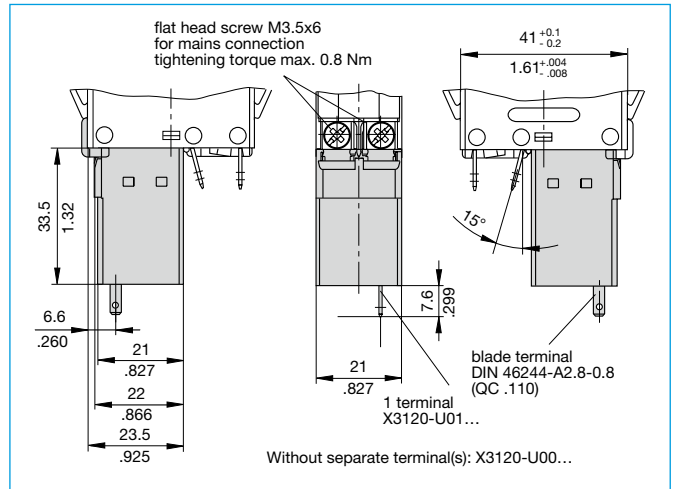
## Typical applications

All machines that could cause personal injury upon automatic re-start, e.g. drilling machines, electric saws, meat cutting machines etc.

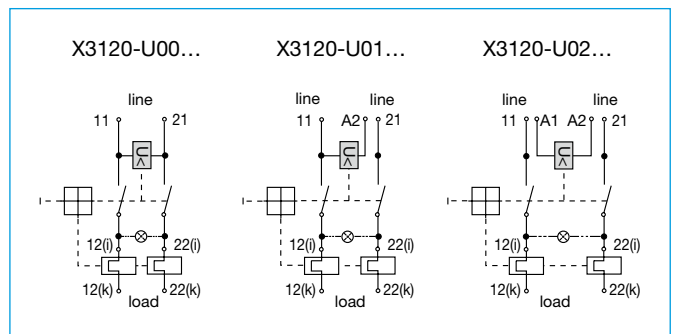
## Order numbering code

|                         |   |
|-------------------------|---|
| <b>Type No.</b>         |   |
| <b>X3120</b>            | module for type 3120                    |
| <b>Module</b>           |   |
| <b>U</b>                | undervoltage release module             |
| <b>Design</b>           |   |
| <b>00</b>               | standard (without separate connections) |
| <b>01</b>               | 1 blade terminal 2.8x0.8                |
| <b>02</b>               | 2 blade terminal 2.8x0.8                |
| <b>Voltage ratings</b>  |   |
| <b>00</b>               | AC 230/240 V 50/60 Hz                   |
| <b>01</b>               | AC 120 V 50/60 Hz                       |
| <b>02</b>               | AC 100 V 50/60 Hz                       |
| <b>03</b>               | DC 24 V                                 |
| <b>04</b>               | AC 400 V 50/60 Hz                       |
| <b>05</b>               | AC 42 V 50/60 Hz                        |
| <b>Supply status</b>    |   |
| <b>M</b>                | module mounted to circuit breaker 3120  |
| <b>X3120- U 00 00 M</b> | ordering example                        |

## Dimensions



## Schematic diagrams



## Technical data

|                            |   |
|----------------------------|---|
| <b>Voltage ratings:</b>    | AC 42 V; 100 V; 120 V; 230/240 V; 400 V (50/60 Hz)<br>DC 24 V   |
| <b>Voltage tolerances</b>  | + 10 %/- 15 %   |
| <b>Typical life</b>        | 20,000 cycles   |
| <b>Current consumption</b> | approx. 2.5 mA  |
| <b>Release values</b>      | $0.2 \times U_N < U < 0.7 \times U_N$<br>(at a rated voltage of AC 100 V the device can trip at 70 V and must trip at 20 V) |
| <b>Trip time</b>           | < 20 ms   |
| <b>Latch-in values</b>     | $\geq 85 \% U_N$  |
| <b>Ambient temperature</b> | -30 ... +60°C (-22 ... +140°F)  |
| <b>Vibration</b>           | 8 g (57-500 Hz), $\pm 0.61$ mm (10-57 Hz)<br>test to IEC 60068-2-6, test Fc<br>10 frequency cycles/axis                     |
| <b>Shock</b>               | 30 g (11 ms)<br>test to IEC 60068-2-27, test Ea   |
| <b>Corrosion</b>           | 48 hours at 5 % salt mist,<br>test to IEC 60068-2-11, test Ka   |
| <b>Humidity</b>            | 240 hrs in 95 % RH<br>test to IEC 60068-2-78,<br>test Cab   |
| <b>Mass</b>                | approx. 56 g (including base unit)  |

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## Description X3120-S auxiliary contact module

Add-on module for circuit breaker type 3120-F. The auxiliary contact module has a change-over contact as signal contact and is operated with actuation of the CBE.

**Note:** Not possible in combination with PT terminals.

## Typical applications

Status monitoring of CBE and/or the connected loads.

## Order numbering code

### Type No.

**X3120** module for type 3120

### Module

**S** auxiliary contact module

### Contact configuration

**0** change-over contact

### Terminal design

**1** blade terminals DIN 46244-A6.3-0.8

### Contact rating

|                             |                |
|-----------------------------|----------------|
| <b>A</b> AC 10 V – AC 250 V | 0.1 ... 4 A    |
| DC 12 V                     | 0.1 ... 4 A    |
| DC 24 V                     | 0.1 ... 4 A    |
| DC 60 V                     | 0.1 ... 1 A    |
| DC 110 V                    | 0.1 ... 0.5 A  |
| DC 220 V                    | 0.1 ... 0.25 A |
| <b>B</b> AC 5 V – AC 250 V  | 5 ... 100 mA   |
| DC 5 V – DC 250 V           | 5 ... 100 mA   |

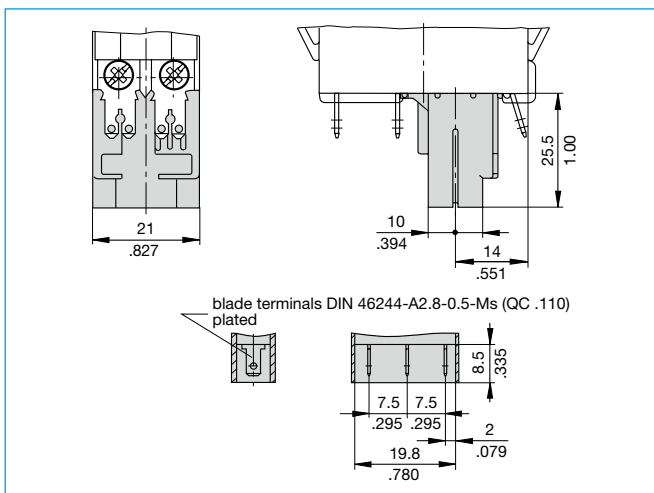
### Supply status

**M** module mounted to circuit breaker 3120

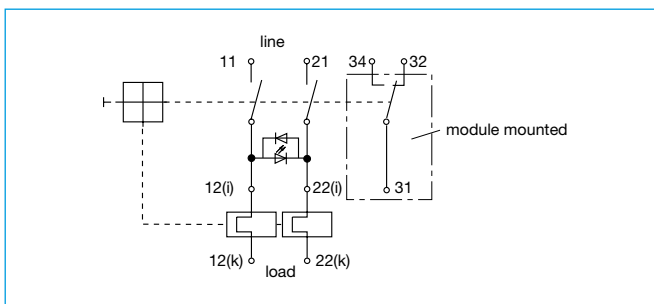
**X3120-S 0 1 A M** ordering example

\* without approval mark

## Dimensions



## Schematic diagram



## Technical data

|                                    |  |
|------------------------------------|--|
| Voltage ratings                    | AC 250 V, DC 250 V   |
| Rated current                      | 0.1...4 A / 5...100 mA   |
| Endurance                          | 50,000 cycles  |
| Ambient temperature                | -30...+60 °C (-22 ... +140°F)  |
| <b>Dielectric strength</b>         |  |
| between main and auxiliary circuit | test voltage AC 3,000 V  |
| Insulation resistance              | > 100 MOhm (DC 500 V)  |
| Vibration                          | < 6 g<br>(57-500 Hz), ± 0.46 mm (10-57 Hz)<br>test to IEC 60068-2-6, test Fc<br>10 frequency cycles/axis |
| Shock                              | 15 g (11 ms)<br>test to IEC 60068-2-27, test Ea  |
| Corrosion                          | 96 hours at 5 % salt mist,<br>test to IEC 60068-2-11, test Ka  |
| Humidity                           | 240 hrs in 95 % RH<br>test to IEC 60068-2-78,<br>test Cab  |
| Mass                               | approx. 41 g (including base unit)   |

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## Description X3120-M remote trip module

A module which adds remote trip capability to all versions of type 3120-F. A voltage applied across the coil will cause trip of the main switch/circuit breaker mechanism.

**Note:** Not possible in combination with PT terminals.

## Typical applications

Electrical remote trip of safety systems.

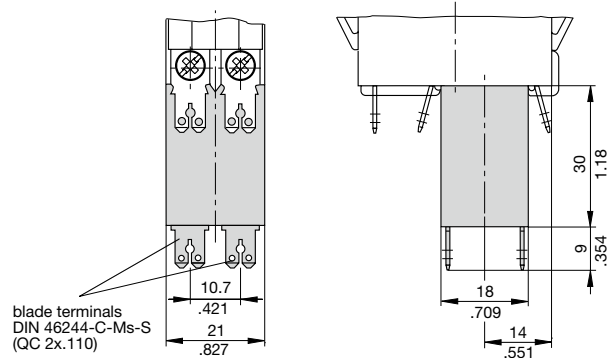
## Order numbering code

|                             |  |
|-----------------------------|--|
| <b>Type No.</b>             |  |
| <b>X3120</b>                | module for type 3120                   |
| <b>Module</b>               |  |
| <b>M</b>                    | magnetic trip module                   |
| <b>Design</b>               |  |
| <b>2</b>                    | magnetic remote trip coil              |
| <b>Terminal design</b>      |  |
| <b>P7</b>                   | blade terminals DIN 46244-A6.3-0.8     |
| <b>Supply status</b>        |  |
| <b>M</b>                    | module mounted to circuit breaker 3120 |
| <b>Voltage ratings</b>      |  |
| <b>AC 120, 230 V</b>        |  |
| <b>DC 12, 24 V</b>          |  |
| <b>X3120-M 2 P7 M -12 V</b> | ordering example                       |

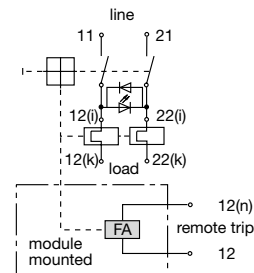
## Standard voltage ratings and typical internal resistance values

| Voltage ratings | Internal internal resistance (Ω) | Voltage ratings | Internal internal resistance (Ω) |
|-----------------|----------------------------------|-----------------|----------------------------------|
| DC 12 V         | 0.78                             | AC 120 V        | 71.0                             |
| DC 24 V         | 3.3                              | AC 230 V        | 312                              |

## Dimensions



## Schematic diagram



## Technical data

|                                       |   |
|---------------------------------------|---|
| Voltage ratings                       | AC 120...230 V; DC 12...24 V  |
| Power consumption                     | approx. 200 Watt  |
| Pulse operation                       | 20 ms < t <sub>ON</sub> < 100 ms / t <sub>OFF</sub> > 10 sec  |
| Trip time                             | < 20 ms   |
| Endurance                             | 50,000 operations at U <sub>N</sub>   |
| Ambient temperature                   | -30...60 °C (-22 ... +140°F)  |
| <b>Dielectric strength</b>            |   |
| between main and trip current circuit | test voltage AC 3,000 V   |
| Insulation resistance                 | > 100 MOhm (DC 500 V)   |
| Vibration                             | 8 g (57-500 Hz), ± 0.61 mm (10-57 Hz)<br>test to IEC 60068-2-6, test Fc<br>10 frequency cycles/axis |
| Shock                                 | 30 g (11 ms)<br>test to IEC 60068-2-27, test Ea   |
| Corrosion                             | 96 hours at 5 % salt mist,<br>test to IEC 60068-2-11, test Ka                                       |
| Humidity                              | 240 hrs in 95 % RH<br>test to IEC 60068-2-78,<br>test Cab   |
| Mass                                  | approx. 56 g (including base unit)  |

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