

## NB1 Miniature Circuit Breaker





## NB1 Miniature Circuit Breaker

### 1. General

#### 1.1 Function

protection of circuits against short-circuit currents,  
protection of circuits against overload currents,  
switch,  
isolation,

NB1 circuit-breakers are used in domestic installation,  
as well as in commercial and industry electrical  
distribution systems.

#### 1.2 Selection

Technical data of the network at the point considered:  
short-circuit current at the circuit-breaker installation point,  
which must always be less than the breaking capacity of  
this device,

Network normal voltage.

Tripping curves:

##### **B curve (3-5In)**

protection for people and big length cables in TN and IT  
systems.

##### **C curve (5-10In)**

protection for resistive and inductive loads with low inrush  
current.

##### **D curve (10-14In)**

protection for circuits which supply loads with high inrush  
current at the circuit closing  
(LV/LV transformers, breakdown lamps).

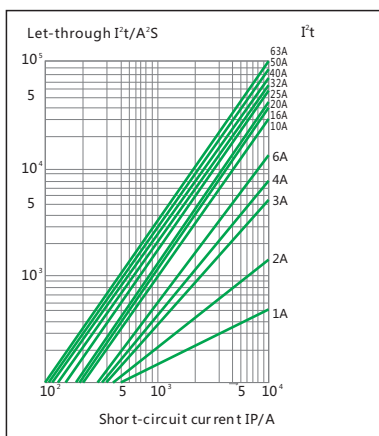
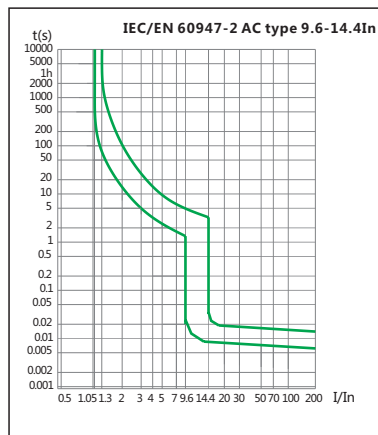
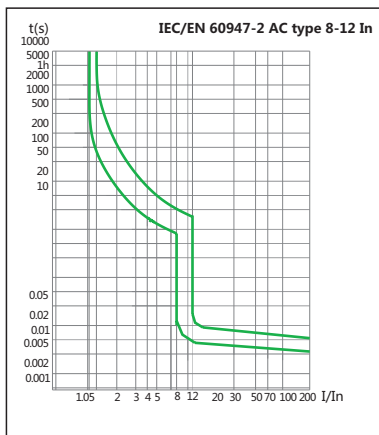
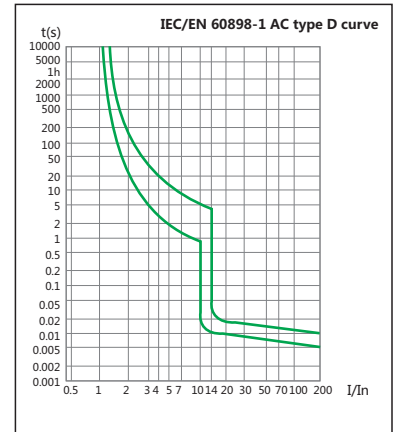
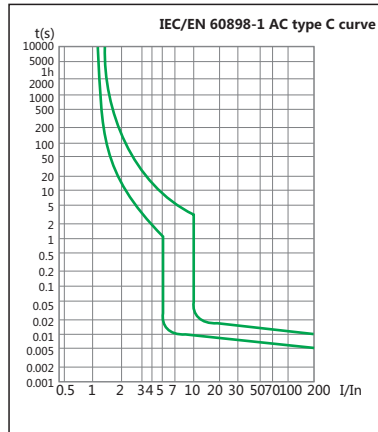
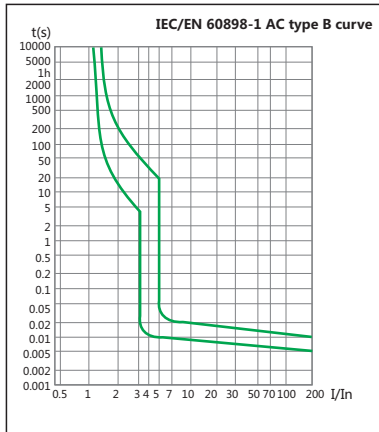
#### 1.3 Approvals and certificates

Detailed information, please refer to Certificates Table  
on the last page.



## 2. Technical data

### 2.1 Curves



## 2.2

|                              | Standard                                             |                 | IEC/EN 60898-1                                           | IEC/EN 60947-2 | UL1077                                            |
|------------------------------|------------------------------------------------------|-----------------|----------------------------------------------------------|----------------|---------------------------------------------------|
| Electrical features          | Rated current In                                     | A               | 1, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63        |                | 1, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63 |
|                              | Poles                                                |                 | 1P, 1P+N, 2P, 3P, 3P+N, 4P                               | 1P, 2P, 3P, 4P | 1P, 2P, 3P, 4P, 1P, 2P                            |
|                              | Rated voltage Ue                                     | V               | 230/400~240/415                                          |                | 277/480, 110/125                                  |
|                              | Insulation voltage Ui                                | V               | 500                                                      |                |                                                   |
|                              | Rated frequency                                      |                 | 50/60Hz                                                  |                | DC                                                |
|                              | Rated breaking capacity                              | A               | 6000                                                     | 6000           | 5000, 10000                                       |
|                              | Energy limiting class                                |                 | 3                                                        |                |                                                   |
|                              | Rated impulse withstand voltage(1.2/50) Uimp         | V               | 4000                                                     |                |                                                   |
|                              | Dielectric test voltage at ind. Freq. for 1 min      | kV              | 2                                                        | 1.890          | 2                                                 |
|                              | Pollution degree                                     |                 | 2                                                        |                |                                                   |
|                              | Power loss per pole                                  |                 | Rated current (A)                                        |                | Max power loss per pole (W)                       |
|                              |                                                      |                 | 1, 2, 3, 4, 6, 10                                        |                | 2                                                 |
|                              |                                                      |                 | 16, 20, 25, 32                                           |                | 3.5                                               |
|                              |                                                      |                 | 40, 50, 63                                               |                | 5                                                 |
|                              | Thermo-magnetic release characteristic               |                 | B, C, D                                                  | (8-12)In       | B, C, D                                           |
| Mechanical features          | Electrical life                                      |                 | 4,000                                                    |                |                                                   |
|                              | Mechanical life                                      |                 | 20,000                                                   |                |                                                   |
|                              | Contact position indicator                           |                 | Yes                                                      |                |                                                   |
|                              | Protection degree                                    |                 | IP20                                                     |                |                                                   |
|                              | Reference temperature for setting of thermal element | °C              | 30                                                       |                |                                                   |
|                              | Ambient temperature (with daily average≤35°C)        | °C              | -5...+40                                                 |                |                                                   |
|                              | Storage temperation                                  | °C              | -25...+70                                                |                |                                                   |
| Installation                 | Terminal connection type                             |                 | Cable/U-type busbar/Pin-type busbar                      |                |                                                   |
|                              | Terminal size top/bottom for cable                   | mm <sup>2</sup> | 25                                                       |                |                                                   |
|                              |                                                      | AWG             | 18-4                                                     |                |                                                   |
|                              | Terminal size top/bottom for busbar                  | mm <sup>2</sup> | 10                                                       |                |                                                   |
|                              |                                                      | AWG             | 18-8                                                     |                |                                                   |
|                              | Tightening torque                                    | N-m             | 2.5                                                      |                |                                                   |
|                              |                                                      | In-lbs.         | 22                                                       |                |                                                   |
| Combination with accessories | Mounting                                             |                 | On DIN rail EN 60715 (35mm) by means of fast clip device |                |                                                   |
|                              | Connection                                           |                 | From top and bottom                                      |                |                                                   |
|                              | Auxiliary contact                                    |                 | Yes                                                      |                |                                                   |
|                              | Shunt release                                        |                 | Yes                                                      |                |                                                   |
|                              | Under voltage release                                |                 | Yes                                                      |                |                                                   |
|                              | Alarm contact                                        |                 | Yes                                                      |                |                                                   |

### 2.3 Selectivity

| Load side: NB1-63,<br>NB1-63H<br>Curve B, C | In<br>(A) | Power supply side: RT36-00 (fuse) |     |      |      |      |      |      |      |      |
|---------------------------------------------|-----------|-----------------------------------|-----|------|------|------|------|------|------|------|
|                                             |           | 20                                | 25  | 36   | 50   | 63   | 80   | 100  | 125  | 160  |
|                                             |           | Is (kA)                           |     |      |      |      |      |      |      |      |
|                                             | ≤2        | 1.2                               | 4   | > 12 | > 12 | > 12 | > 12 | > 12 | > 12 | > 12 |
|                                             | 3         | 0.7                               | 1.2 | 3.8  | 5.3  | 6    | 6    | 6    | 6    | 6    |
|                                             | 4         | 0.6                               | 0.9 | 2.5  | 3.8  | 6    | 6    | 6    | 6    | 6    |
|                                             | 6         | 0.5                               | 0.8 | 1.9  | 2.5  | 4.5  | 5    | 6    | 6    | 6    |
|                                             | 10        |                                   | 0.7 | 1.4  | 2.2  | 3.2  | 3.6  | 6    | 6    | 6    |
|                                             | 16        |                                   |     | 1.2  | 1.8  | 2.6  | 3    | 5.6  | 6    | 6    |
|                                             | 20        |                                   |     |      | 1.5  | 2.2  | 2.5  | 4.6  | 6    | 6    |
|                                             | 25        |                                   |     |      | 1.3  | 2    | 2.2  | 4.1  | 5.5  | 6    |
|                                             | 32        |                                   |     |      |      | 1.7  | 1.9  | 3.8  | 4.5  | 6    |
| 40                                          |           |                                   |     |      |      | 1.7  | 3    | 4    | 5    |      |
| 50                                          |           |                                   |     |      |      | 1.5  | 2.6  | 3.5  | 4.5  |      |
| 63                                          |           |                                   |     |      |      |      | 2.4  | 3.3  | 4.5  |      |

| Load side: NB1-63,<br>NB1-63H<br>Curve B, C | In<br>(A) | Power supply side: NM8-100S/H/R |      |     |     |     |     |     |      |     |
|---------------------------------------------|-----------|---------------------------------|------|-----|-----|-----|-----|-----|------|-----|
|                                             |           | 16                              | 20   | 25  | 32  | 40  | 50  | 63  | 80   | 100 |
|                                             |           | Is (kA)                         |      |     |     |     |     |     |      |     |
|                                             | ≤10       | 0.19                            | 0.19 | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 |
|                                             | 16        |                                 |      | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 |
|                                             | 20        |                                 |      |     |     | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 |
|                                             | 25        |                                 |      |     |     |     | 0.5 | 0.5 | 0.63 | 0.8 |
|                                             | 32        |                                 |      |     |     |     |     | 0.5 | 0.63 | 0.8 |
|                                             | 40        |                                 |      |     |     |     |     |     | 0.63 | 0.8 |
|                                             | 50        |                                 |      |     |     |     |     |     |      | 0.8 |
| 63                                          |           |                                 |      |     |     |     |     |     |      |     |

### 2.4 Backup protection

| Load side: NB1-63,<br>NB1-63H<br>Curve B, C | In<br>(A) | Power supply side: RT16 series |    |    |    |     |     |     |
|---------------------------------------------|-----------|--------------------------------|----|----|----|-----|-----|-----|
|                                             |           | 40                             | 50 | 63 | 80 | 100 | 125 | 160 |
|                                             |           | Is (kA)                        |    |    |    |     |     |     |
|                                             | 1~6       | 40                             | 40 | 40 | 40 | 40  | 40  | 40  |
|                                             | 8~10      | 40                             | 40 | 40 | 40 | 40  | 40  | 40  |
|                                             | 13        | 40                             | 40 | 40 | 40 | 35  | 35  | 35  |
|                                             | 16        | 40                             | 40 | 40 | 40 | 30  | 30  | 30  |
|                                             | 20        | 40                             | 40 | 40 | 40 | 30  | 30  | 30  |
|                                             | 25        | 40                             | 40 | 40 | 40 | 30  | 30  | 30  |
|                                             | 32        | 40                             | 40 | 40 | 40 | 30  | 30  | 30  |
| 40                                          | 40        | 40                             | 40 | 40 | 30 | 30  | 30  |     |
| 50                                          | 30        | 30                             | 30 | 30 | 30 | 30  | 30  |     |
| 63                                          | 20        | 20                             | 20 | 20 | 15 | 15  | 15  |     |

| Load side: NB1-63,<br>NB1-63H<br>Curve B, C | In<br>(A) | Power supply side: NM8 |          |          |          |          |          |
|---------------------------------------------|-----------|------------------------|----------|----------|----------|----------|----------|
|                                             |           | NM8-125S               | NM8-125H | NM8-125R | NM8-250S | NM8-250H | NM8-250R |
|                                             |           | Is (kA)                |          |          |          |          |          |
|                                             | 1~6       | 15                     | 18       | 18       | 15       | 15       | 15       |
|                                             | 10~20     | 12                     | 15       | 15       | 12       | 12       | 12       |
| 32~40                                       | 12        | 15                     | 15       | 12       | 12       | 12       |          |
| 50~60                                       | 12        | 15                     | 15       | 12       | 12       | 12       |          |

## 2.5 Temperature derating

The maximum permissible current in a circuit breaker depends on the ambient temperature where the circuit breaker is placed. Ambient temperature is the temperature inside the enclosure or switchboard in which the circuit breakers are installed.

**The reference temperature is 30°C**

| Ambient temperature<br>Rated current(A) | -35°C | -30°C | -20°C | -10°C | 0°C   | 10°C  | 20°C  | 30°C  | 40°C  | 50°C  | 60°C  | 70°C  |
|-----------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1                                       | 1.30  | 1.26  | 1.23  | 1.19  | 1.15  | 1.11  | 1.05  | 1.00  | 0.96  | 0.93  | 0.88  | 0.83  |
| 2                                       | 2.60  | 2.52  | 2.46  | 2.38  | 2.28  | 2.20  | 2.08  | 2.00  | 1.92  | 1.86  | 1.76  | 1.66  |
| 3                                       | 3.90  | 3.78  | 3.69  | 3.57  | 3.42  | 3.30  | 3.12  | 3.00  | 2.88  | 2.79  | 2.64  | 2.49  |
| 4                                       | 5.20  | 5.04  | 4.92  | 4.76  | 4.56  | 4.40  | 4.16  | 4.00  | 3.84  | 3.76  | 3.52  | 3.32  |
| 6                                       | 7.80  | 7.56  | 7.38  | 7.14  | 6.84  | 6.60  | 6.24  | 6.00  | 5.76  | 5.64  | 5.28  | 4.98  |
| 10                                      | 13.20 | 12.70 | 12.50 | 12.00 | 11.50 | 11.10 | 10.60 | 10.00 | 9.60  | 9.30  | 8.90  | 8.40  |
| 16                                      | 21.12 | 20.48 | 20.00 | 19.20 | 18.40 | 17.76 | 16.96 | 16.00 | 15.36 | 14.88 | 14.24 | 13.44 |
| 20                                      | 26.40 | 25.60 | 25.00 | 24.00 | 23.00 | 22.20 | 21.20 | 20.00 | 19.20 | 18.60 | 17.80 | 16.8  |
| 25                                      | 33.00 | 32.00 | 31.25 | 30.00 | 28.75 | 27.75 | 26.50 | 25.00 | 24.00 | 23.25 | 22.25 | 21.00 |
| 32                                      | 42.56 | 41.28 | 40.00 | 38.72 | 37.12 | 35.52 | 33.92 | 32.00 | 30.72 | 29.76 | 28.16 | 26.88 |
| 40                                      | 53.20 | 51.20 | 50.00 | 48.00 | 46.40 | 44.80 | 42.40 | 40.00 | 38.40 | 37.20 | 35.60 | 33.6  |
| 50                                      | 67.00 | 65.50 | 63.00 | 60.50 | 58.00 | 56.00 | 53.00 | 50.00 | 48.00 | 46.50 | 44.00 | 41.50 |
| 63                                      | 83.79 | 81.90 | 80.01 | 76.86 | 73.71 | 70.56 | 66.78 | 63.00 | 60.48 | 58.90 | 55.44 | 52.29 |

When several simultaneously operating circuit breakers are mounted side by side in a small enclosure, the temperature rise inside the enclosure causes a reduction in current rating.

You must then assign the rating (already derated if necessary according to ambient temperature) a downrating factor of 0.8.

## 3. Overall and mounting dimensions (mm)

