# MINIATURE CIRCUIT BREAKERS LTK

LTK-16B-1N

## Description

- Series of 1+N-pole miniature circuit breakers with 1-module width (17.5 mm) for building, housing and similar installations up to 40 A, 230 V AC.
- Tripping characteristics B, C according to EN 60898.
- Breaking capacity 6 kA.
- Possibility of additional mounting of auxiliary switch PS-LT or signal switch SS-LT.

## Miniature circuit breakers 1+N-pole

| $I_n$ | Characteristic B | | | Characteristic C | | | Number | Package |
|---|---|---|---|---|---|---|---|---|
| [A] | Type | Order code | Weight [kg] | Type | Order code | Weight [kg] | of modules | [pcs] |
| 2 | - | - | - | **LTK-2C-1N** | OEZ:43452 | 0.140 | 1 | 1 |
| 4 | - | - | - | **LTK-4C-1N** | OEZ:43453 | 0.134 | 1 | 1 |
| 6 | **LTK-6B-1N** | OEZ:43443 | 0.133 | **LTK-6C-1N** | OEZ:43454 | 0.118 | 1 | 1 |
| 8 | - | - | - | **LTK-8C-1N** | OEZ:43455 | 0.137 | 1 | 1 |
| 10 | **LTK-10B-1N** | OEZ:43445 | 0.133 | **LTK-10C-1N** | OEZ:43456 | 0.123 | 1 | 1 |
| 13 | **LTK-13B-1N** | OEZ:43446 | 0.120 | **LTK-13C-1N** | OEZ:43457 | 0.097 | 1 | 1 |
| 16 | **LTK-16B-1N** | OEZ:43447 | 0.122 | **LTK-16C-1N** | OEZ:43458 | 0.115 | 1 | 1 |
| 20 | **LTK-20B-1N** | OEZ:43448 | 0.113 | **LTK-20C-1N** | OEZ:43459 | 0.132 | 1 | 1 |
| 25 | **LTK-25B-1N** | OEZ:43449 | 0.137 | **LTK-25C-1N** | OEZ:43460 | 0.126 | 1 | 1 |
| 32 | **LTK-32B-1N** | OEZ:43450 | 0.148 | **LTK-32C-1N** | OEZ:43461 | 0.145 | 1 | 1 |
| 40 | **LTK-40B-1N** | OEZ:43451 | 0.113 | **LTK-40C-1N** | OEZ:43462 | 0.144 | 1 | 1 |

## Accessories

| | | |
|---|---|---|
| Auxiliary and signal switches | **PS-LT, SS-LT** | page B36 |
| Locking insert | **OD-LT-VU01** | page B38 |
| Interconnecting busbars | **S1L, S2L, S3L** | page B45 |

## Specifications

| Type | | LTK |
|---|---|---|
| Standards | | EN 60898-1 |
| Approval marks | | |
| Number of poles | | 1+N |
| Tripping characteristics | | B, C |
| Rated current | $I_n$ | 2 ÷ 40 A |
| Rated operating voltage | $U_e$ | AC 230 V |
| Max. operating voltage | $U_{max}$ | AC 250 V, DC 72 V |
| Min. operating voltage | $U_{min}$ | AC/DC 24 V |
| Rated frequency | $f_n$ | 50 Hz |
| Rated short-circuit breaking capacity | $I_{cn}$ | 6 kA |
| Rated insulation voltage | | AC 250 V |
| Electrical endurance with rated load | | 20 000 operating cycles / 2 A, 4 A, 40 A 8 000 operating cycles |
| Energy limitation class | | 3 |
| Overvoltage category | | III |
| Pollution degree | | 2 |
| Mounting on **"U"** rail according to EN 60715 | | TH 35 |
| Degree of protection - with connected conductors | | IP20 |
| **Connection** | | |
| Conductor Cu - rigid (solid, stranded) | | 0.75 ÷ 16 mm² |
| Conductor Cu - flexible with a sleeve | | 0.75 ÷ 10 mm² |
| Torque | | 2 ÷ 2.5 Nm |
| Screw head type | | PZ2 |
| **Operating conditions** | | |
| Ambient temperature | | -25 ÷ +45 °C |
| Working position | | arbitrary |

# MINIATURE CIRCUIT BREAKERS LTK

### Internal impedance Z, powers losses P

| $I_n$ [A] | Characteristic B | | | | Characteristic C | | | |
|---|---|---|---|---|---|---|---|---|
| | L-Pole | | N-Pole | | L-Pole | | N-Pole | |
| | Z [mΩ] | P [mW] | Z [mΩ] | P [mW] | Z [mΩ] | P [mW] | Z [mΩ] | P [mW] |
| 2 | - | - | - | - | 290.0 | 1 161 | 3.80 | 15 |
| 4 | - | - | - | - | 110.0 | 1 766 | 4.00 | 64 |
| 6 | 30.00 | 1 092 | 4.20 | 150 | 26.0 | 931 | 4.30 | 154 |
| 8 | - | - | - | - | 19.8 | 1 264 | 3.90 | 249 |
| 10 | 15.00 | 1 539 | 4.10 | 407 | 13.0 | 1 297 | 4.10 | 406 |
| 13 | 9.50 | 1 598 | 4.10 | 692 | 9.1 | 1 531 | 4.40 | 742 |
| 16 | 8.70 | 2 219 | 4.00 | 1 018 | 7.5 | 1 926 | 3.30 | 852 |
| 20 | 5.20 | 2 082 | 1.10 | 436 | 5.3 | 2 118 | 1.20 | 478 |
| 25 | 3.30 | 2 065 | 1.30 | 804 | 3.0 | 1 906 | 1.10 | 674 |
| 32 | 2.60 | 2 625 | 1.20 | 1 192 | 2.7 | 2 718 | 1.30 | 1 310 |
| 40 | 2.30 | 3 619 | 1.10 | 1 789 | 2.2 | 3 531 | 1.10 | 1 820 |

## Correction of rated current $I_n$

Correction of circuit breaker rated current $I_n$ is determined by relation $I_{n1} = K_T \times K_N \times I_n$ where:

$I_{n1}$ ... is corrected rated current of the circuit breaker
$I_n$ ... is rated current of the circuit breaker (i.e. the one placed separately at reference temperature 30 °C)
$K_T$ ... is correction factor taking ambient temperature into account
$K_N$ ... is correction factor taking into account placement of more loaded circuit breakers side-by-side

### 1) Correction factor $K_T$

For concrete circuit breaker type ($I_n$, characteristic, number of poles), determine correction curve number (1, 2 or 3) in the table, and using the correction curve number and given ambient temperature on the graph, determine Correction factor $K_T$ .

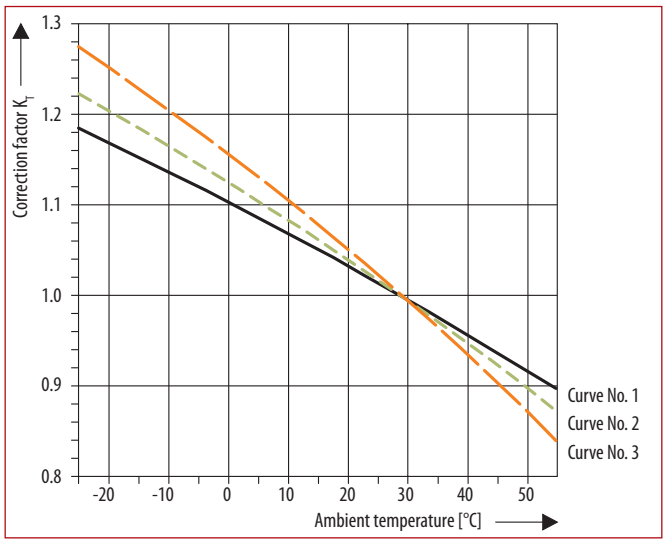
| Characteristic | Rated current of the circuit breaker $I_n$ [A] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 4 | 6 | 8 | 10 | 13 | 16 | 20 | 25 | 32 | 40 |
| | Correction curve number | | | | | | | | | | |
| B | - | - | 1 | - | 2 | 2 | 2 | 2 | 1 | 2 | 2 |
| C | 1 | 1 | 1 | 3 | 2 | 2 | 3 | 3 | 1 | 2 | 2 |

### 2) Correction factor $K_N$

Determine correction factor $K_N$ according to the number of circuit breakers placed side-by-side .

| Correction factor $K_N$ for circuit breakers placed side-by-side | | | | |
|---|---|---|---|---|
| Number of LTK circuit breakers side-by-side | 1 | 2 ÷ 3 | 4 ÷ 6 | > 7 |
| Correction factor $K_N$ | 1.00 | 0.90 | 0.88 | 0.85 |

### Correction factor $K_T$ depending on ambient temperature




**Example**

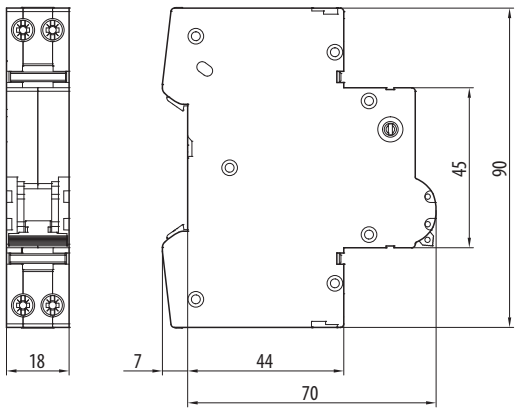
Task: How rated current $I_n = 16$ A will change for circuit breaker LTK-16B-1 at ambient temperature 40 °C and for 4 circuit breakers placed side-by-side?

Determination of $K_T$: For characteristic B and In 16 A, it is possible to take correction curve No. 2 from the table. For intersection of the correction curve No. 2 and ambient temperature 40 °C it is possible to determine correction factor $K_T = 0.94$ on the vertical scale of the graph.

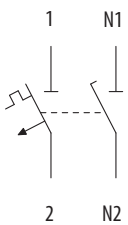
Determination of $K_N$: For 4 circuit breakers LTK-16B-1 placed side-by-side it is possible to determine from the table correction factor $K_N = 0.88$.

Correction $I_n$: new rated current $I_{n1} = K_T \times K_N \times I_n = 0.94 \times 0.88 \times 32$ A = 13.24 A

### Dimensions




### Diagram



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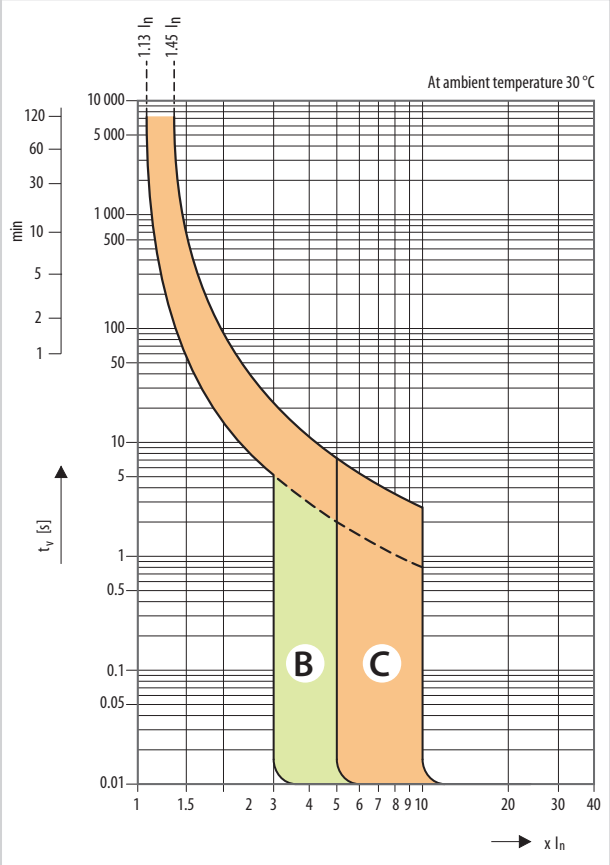
## Characteristics




- **Characteristic B**: for protection of line of electrical circuits with equipment, which does not cause current surges (lighting and socket circuits etc.). The short-circuit release is set to (3 ÷ 5) $I_n$.
- **Characteristic C**: for protection of line of electrical circuits with equipment, which causes current surges (light bulb groups, motors etc.). The short-circuit release is set to (5 ÷ 10) $I_n$.

**Tripping characteristics of circuit breakers according to EN 60898-1**

| Thermal release | Tripping characteristic type B, C |
|---|---|
| Conventional non-tripping current $I_{nt}$ for $t \geq 1$ hr | $I_{nt} = 1.13\ I_n$ |
| Conventional tripping current $I_t$ for $t < 1$ hr | $I_t = 1.45\ I_n$ |
| Current $I_3$ for 1 s < t < 60 s a $I_n \leq 32$ A | $I_3 = 2.55\ I_n$ |

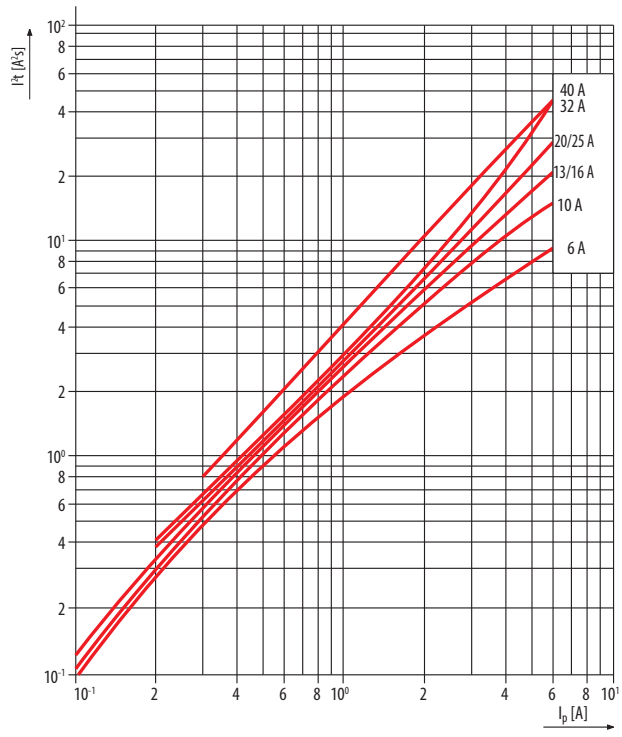
t - break time of the circuit breaker

| Electromagnetic release | | Tripping characteristic type B | C |
|---|---|---|---|
| Current $I_4$ for | 0.1 s < t < 45 s (for $I_n \leq 32$ A) | $I_4 = 3\ I_n$ | - |
| | 0.1 s < t < 15 s (for $I_n \leq 32$ A) | - | $I_4 = 5\ I_n$ |
| Current $I_5$ for t < 0.1 s | | $I_5 = 5\ I_n$ | $I_5 = 10\ I_n$ |

t - break time of the circuit breaker

## Characteristics $I^2t$

**LTK - Characteristic B**




**LTK - Characteristic C**