

# MINIATURE CIRCUIT BREAKERS LTP

- Series of miniature circuit breakers up to 63 A, AC 230/400 V a DC 60 V / pole.
- For protection of cables and conductors against over-load and short-circuit.
- For protection of cables and conductors against over-load and short-circuit.
- Breaking capacity 6 kA.

### Miniature circuit breakers 1-pole

I <sub>n</sub> [A]	Characteristic B		Characteristic C		Number of modules	Weight [kg]	Package [pcs]
	Type	Order code	Type	Order code			
2	LTP-2B-1	OEZ:42190	LTP-2C-1	OEZ:42202	1	0.178	12
4	LTP-4B-1	OEZ:42191	LTP-4C-1	OEZ:42203	1	0.152	12
6	LTP-6B-1	OEZ:42192	LTP-6C-1	OEZ:42204	1	0.128	12
10	LTP-10B-1	OEZ:42193	LTP-10C-1	OEZ:42205	1	0.144	12
13	LTP-13B-1	OEZ:42194	LTP-13C-1	OEZ:42206	1	0.149	12
16	LTP-16B-1	OEZ:42195	LTP-16C-1	OEZ:42207	1	0.132	12
20	LTP-20B-1	OEZ:42196	LTP-20C-1	OEZ:42208	1	0.134	12
25	LTP-25B-1	OEZ:42197	LTP-25C-1	OEZ:42209	1	0.137	12
32	LTP-32B-1	OEZ:42198	LTP-32C-1	OEZ:42210	1	0.178	12
40	LTP-40B-1	OEZ:42199	LTP-40C-1	OEZ:42211	1	0.160	12
50	LTP-50B-1	OEZ:42200	LTP-50C-1	OEZ:42212	1	0.187	12
63	LTP-63B-1	OEZ:42201	LTP-63C-1	OEZ:42213	1	0.181	12

### Miniature circuit breakers 2-pole

I <sub>n</sub> [A]	Characteristic B		Characteristic C		Number of modules	Weight [kg]	Package [pcs]
	Type	Order code	Type	Order code			
2	-	-	LTP-2C-2	OEZ:42226	2	0.306	6
4	-	-	LTP-4C-2	OEZ:42227	2	0.301	6
6	LTP-6B-2	OEZ:42216	LTP-6C-2	OEZ:42228	2	0.248	6
10	LTP-10B-2	OEZ:42217	LTP-10C-2	OEZ:42229	2	0.347	6
13	LTP-13B-2	OEZ:42218	LTP-13C-2	OEZ:42230	2	0.282	6
16	LTP-16B-2	OEZ:42219	LTP-16C-2	OEZ:42231	2	0.273	6
20	LTP-20B-2	OEZ:42220	LTP-20C-2	OEZ:42232	2	0.261	6
25	LTP-25B-2	OEZ:42221	LTP-25C-2	OEZ:42233	2	0.259	6
32	LTP-32B-2	OEZ:42222	LTP-32C-2	OEZ:42234	2	0.320	6
40	LTP-40B-2	OEZ:42223	LTP-40C-2	OEZ:42235	2	0.340	6
50	LTP-50B-2	OEZ:42224	LTP-50C-2	OEZ:42236	2	0.338	6
63	LTP-63B-2	OEZ:42225	LTP-63C-2	OEZ:42237	2	0.343	6

### Miniature circuit breakers 3-pole

I <sub>n</sub> [A]	Characteristic B		Characteristic C		Number of modules	Weight [kg]	Package [pcs]
	Type	Order code	Type	Order code			
2	-	-	LTP-2C-3	OEZ:42250	3	0.491	4
4	-	-	LTP-4C-3	OEZ:42251	3	0.460	4
6	LTP-6B-3	OEZ:42240	LTP-6C-3	OEZ:42252	3	0.378	4
10	LTP-10B-3	OEZ:42241	LTP-10C-3	OEZ:42253	3	0.374	4
13	LTP-13B-3	OEZ:42242	LTP-13C-3	OEZ:42254	3	0.394	4
16	LTP-16B-3	OEZ:42243	LTP-16C-3	OEZ:42255	3	0.376	4
20	LTP-20B-3	OEZ:42244	LTP-20C-3	OEZ:42256	3	0.389	4
25	LTP-25B-3	OEZ:42245	LTP-25C-3	OEZ:42257	3	0.400	4
32	LTP-32B-3	OEZ:42246	LTP-32C-3	OEZ:42258	3	0.465	4
40	LTP-40B-3	OEZ:42247	LTP-40C-3	OEZ:42259	3	0.496	4
50	LTP-50B-3	OEZ:42248	LTP-50C-3	OEZ:42260	3	0.473	4
63	LTP-63B-3	OEZ:42249	LTP-63C-3	OEZ:42261	3	0.499	4



### Accessories

Auxiliary and signal switches	PS-LT, SS-LT	page B33
Locking insert	OD-LT-VU02	page B35
Sealing insert	OD-LT-VP01	page B35
Interconnecting busbars	S1L, S2L, S3L	page B41
Terminal extension	AS-50-S-AL01	page B43



## MINIATURE CIRCUIT BREAKERS LTP

### Specifications

Type	LTP	
Standards	EN 60898-1	
Approval marks	 	
Number of poles	1, 2, 3	
Tripping characteristics	B, C	
Rated current	$I_n$	2 ÷ 63 A
Rated operating voltage	$U_e$	AC 230/400 V
Max. operating voltage	$U_{max}$	AC 250/440 V, DC 60 V / protected pole
Min. operating voltage (1 pole)	$U_{min}$	AC/DC 24 V
Rated insulation voltage	$U_i$	AC 250/440 V
Rated frequency	$f_n$	50/60 Hz
Rated short-circuit breaking capacity (EN 60898-1)	$I_{cn}$	AC 6 kA
Rated short-circuit ultimate breaking capacity (EN 60947-2)	$I_{cu}$	AC 6 kA
Mechanical endurance	10 000 cycles	
Electrical endurance	10 000 cycles	
Mounting on "U" rail according to EN 60715 - type	TH 35	
Degree of protection - with connected conductors	IP20	
<b>Connection</b>		
Conductor	see table Connection range	
Screw head type	PZ2	
Torque	max. 3.5 Nm	
Top or bottom connection	top/bottom	
<b>Operating conditions</b>		
Ambient temperature	°C	-25 ÷ +45 °C, max. 95 % air humidity
Working position	arbitrary	
Climatic resistance (EN 60068-2-30)	6 cycles	

### Connection range

Number of connected conductors	Rigid conductor (solid, stranded)	Conductor flexible with a sleeve	Conductor flexible without a sleeve <sup>1)</sup>
1x conductor	1x (0.75 ÷ 35) mm <sup>2</sup>	1x (0.75 ÷ 25) mm <sup>2</sup>	1x (1 ÷ 35) mm <sup>2</sup>
2x conductor	2x (0.75 ÷ 10) mm <sup>2</sup>	2x (0.75 ÷ 4) mm <sup>2</sup>	2x (1 ÷ 4) mm <sup>2</sup>
1x conductor + interconnecting busbar	1x (10 ÷ 25) mm <sup>2</sup> + interconnecting busbar pin thickness max. 1.5 mm	1x (6 ÷ 16) mm <sup>2 2)</sup> + interconnecting busbar pin thickness max. 1.5 mm	-

<sup>1)</sup> The conductor must be twisted before insertion to a terminal; individual conductor fibres must not stick out of the terminal

<sup>2)</sup> In case of use of a sleeve without plastic neck: conductor 1x (6 ÷ 25) mm<sup>2</sup>

If more conductors are used they must be of the same type and cross-section

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## Internal impedance Z, powers losses P, impedance of fault loop Z<sub>s</sub>

I <sub>n</sub> [A]	Characteristic B		Characteristic C		Max. impedance of fault loop Z <sub>s</sub> [Ω] <sup>2)</sup>			
	Z <sup>1)</sup> [mΩ/pole]	P <sup>1)</sup> [W/pole]	Z <sup>1)</sup> [mΩ/pole]	P <sup>1)</sup> [W/pole]	Characteristic B		Characteristic C	
					t ≤ 0.4 s	t ≤ 5 s	t ≤ 0.4 s	t ≤ 5 s
2	446	1.8	295	1.2	23.0	23.0	11.5	23.0
4	97	1.6	81.0	1.3	11.5	11.5	5.8	11.6
6	23.3	0.8	17.1	0.6	7.6	7.6	3.8	7.6
10	14.9	1.5	12.1	1.2	4.6	4.6	2.3	4.6
13	11.0	1.9	10.6	1.8	3.57	3.57	1.7	3.4
16	7.6	1.9	6.6	1.7	2.9	2.9	1.4	2.8
20	5.2	2.1	5.1	2.0	2.3	2.3	1.1	2.2
25	4.0	2.5	3.7	2.3	1.8	1.8	0.9	1.8
32	2.3	2.4	2.4	2.5	1.4	1.4	0.7	1.4
40	2.1	3.4	2.1	3.3	1.1	1.1	0.6	1.2
50	1.5	3.8	1.4	3.5	0.9	0.9	0.5	1.0
63	1.4	5.4	1.1	4.4	0.7	0.7	0.4	0.8

<sup>1)</sup> Average values per protected pole

<sup>2)</sup> For TN network, U<sub>0</sub> = AC 230 V, according to EN 60364-4-41; if the measured value exceeds the table value, we recommend to use residual current circuit breaker

## Correction of rated I<sub>n</sub>

Correction of circuit breaker rated current I<sub>n</sub> is determined by relation I<sub>n1</sub> = K<sub>T</sub> x K<sub>N</sub> x I<sub>n</sub> where:

I<sub>n1</sub> ... is corrected rated current of the circuit breaker

I<sub>n</sub> ... is rated current of the circuit breaker (i.e. the one placed separately at reference temperature 30 °C)

K<sub>T</sub> ... is correction factor taking ambient temperature into account

K<sub>N</sub> ... is correction factor taking into account placement of more loaded circuit breakers side-by-side

### 1) Correction factor K<sub>T</sub>

For concrete circuit breaker type (I<sub>n</sub>, 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<sub>T</sub>.

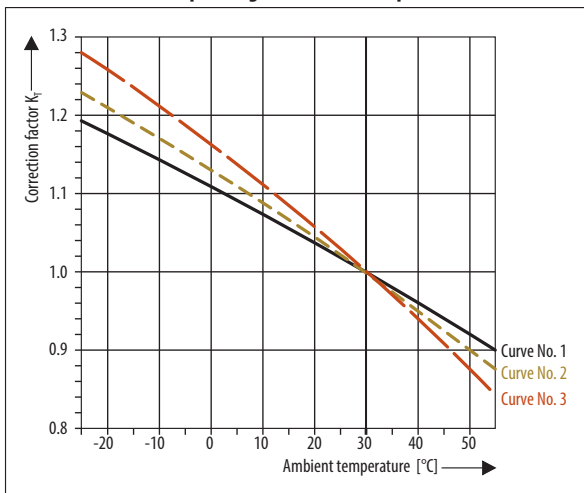
Characteristic	Number of poles	Rated current of the circuit breaker I <sub>n</sub> [A]											
		2	4	6	10	13	16	20	25	32	40	50	63
B	1, 2	2	2	3	2	2	2	3	3	3	3	3	3
	3	-	-	3	2	2	2	3	2	1	2	3	3
C	1, 2	2	3	3	3	2	2	3	3	3	3	3	3
	3	2	2	3	3	2	2	3	2	3	2	3	3

### 2) Correction factor K<sub>N</sub>

Determine correction factor K<sub>N</sub> according to the number of circuit breakers placed side-by-side.

Correction factor K <sub>N</sub> for circuit breakers placed side-by-side				
Number of LTP circuit breakers side-by-side	1	2 ÷ 3	4 ÷ 6	> 7
Correction factor K <sub>N</sub>	1.00	0.90	0.88	0.85

## Correction factor K<sub>T</sub> depending on ambient temperature



### Example

Task: how rated current I<sub>n</sub> = 32 A will change for circuit breaker LTP- 32B- 3 at ambient temperature 10 °C and for 4 circuit breakers placed side-by-side?

Determination of K<sub>T</sub>: for characteristic B, number of poles 3, and I<sub>n</sub> 32 A, it is possible to take correction curve No. 1 from the table. For intersection of the correction curve No. 1 and ambient temperature 10 °C it is possible to determine correction factor K<sub>T</sub> = 1.07 on the vertical scale of the graph.

Determination of K<sub>N</sub>: for 4 circuit breakers LTP-32B-1 placed side-by-side it is possible to determine from the table correction factor K<sub>N</sub> = 0.88

Correction I<sub>n1</sub>: new rated current I<sub>n1</sub> = K<sub>T</sub> x K<sub>N</sub> x I<sub>n</sub> = 1.07 x 0.88 x 32 A = 30.13 A

# MINIATURE CIRCUIT BREAKERS LTP

## Selectivity and short-circuit current with backup fuse

Selectivity of LPE miniature circuit breakers of characteristics B and C with backup fuses [kA]

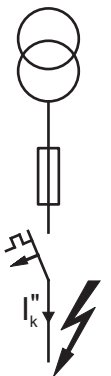
$I_n$ [A]	Fuse of type gG									
	16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A	125 A	
2	0.3	0.4	0.7	1.4	2.5	3.3	4.6	6.0	6.0	
4	0.3	0.4	0.6	1.3	2.2	2.9	4.1	6.0	6.0	
6	-	0.4	0.5	1.0	1.7	2.2	3.2	6.0	6.0	
10	-	-	0.5	1.0	1.6	2.0	2.9	5.0	6.0	
13	-	-	-	1.0	1.6	2.0	2.9	5.0	6.0	
16	-	-	-	0.8	1.3	1.8	2.6	4.0	5.6	
20	-	-	-	-	1.3	1.8	2.6	4.0	5.6	
25	-	-	-	-	-	1.8	2.6	4.0	5.6	
32	-	-	-	-	-	-	2.3	3.4	4.5	
40	-	-	-	-	-	-	-	3.4	4.5	
50	-	-	-	-	-	-	-	-	4.4	
63	-	-	-	-	-	-	-	-	-	

The time selectivity of particular combination up to the value of short-circuit current  $I_k''$  shown in the table is ensured in case of short-circuit behind the LTP circuit breaker with back-up fuse-link.

Which means that at short-circuit of particular combination under the  $I_k''$  value only the circuit breaker actuates. In case the short-circuit current value is bigger than  $I_k''$  value then also the back-up fuse-link actuates.

**Example:**

Miniature circuit breaker LTP-10B-.. actuates earlier than back-up fuse-link with rated current 50 A up to short-circuit current 1.6 kA.



### Max. short-circuit current with backup fuse kA

In case that short-circuit current passing through the circuit breaker is not known in the place of installation or is higher than breaking capacity of the circuit breaker, backup fuse must be used to eliminate circuit breaker overload.

#### Characteristic B

$I_n$ [A]	Backup fuse of gG type			
	63 A	80 A	100 A	125 A
2	30	30	10	10
4	30	30	10	10
6	30	30	10	10
10	30	30	10	10
13	30	30	15	15
16	30	30	15	15
20	30	30	20	15
25	30	30	25	20
32	30	30	25	25

#### Characteristic C

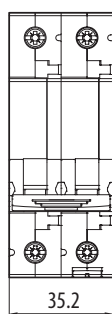
$I_n$ [A]	Backup fuse of gG type			
	63 A	80 A	100 A	125 A
2	30	30	25	10
4	30	30	25	10
6	30	30	20	20
10	30	30	25	20
13	30	30	25	20
16	30	30	25	20
20	30	30	25	20
25	30	30	25	20
32	30	30	25	25

## Dimensions

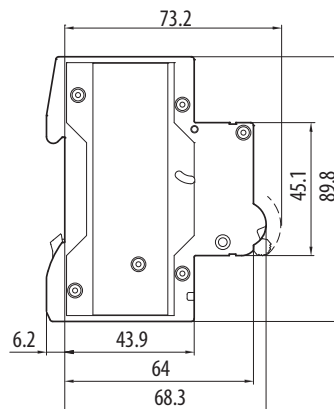
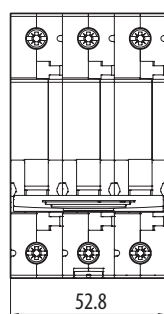
LTP-...-1



LTP-...-2



LTP-...-3

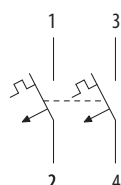


## Diagram

LTP-...-1



LTP-...-2



LTP-...-3

