



**langir**<sup>®</sup>

DC circuit supplementary  
protectors for photovoltaic  
installations

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## IEC 60947-2, EN60947-2, GB 14048.2

The JB is a DC circuit breaker dedicated to multi string photovoltaic installations.

This circuit breaker is designed to protect the cables located between each string of photovoltaic modules and the photovoltaic inverter against overloads and short circuits (see application diagram).

Combined with a switch, the JB will be installed in a string PV protection enclosure at the end of each string of photovoltaic modules.

It can be locked (by a padlocking device) in OFF position as a safety measure for removal of the PV inverter.

Since a fault current can flow in the reverse direction to the operating current, the JB can detect and protect against any bidirectional current.

To ensure the safety of the installation, it is necessary, depending on the various types of application, to combine the JB with:

- a residual current device at the AC end,
- a fault passage detector (insulation monitoring device) at the DC end
- an earth protection circuit breaker at the DC end

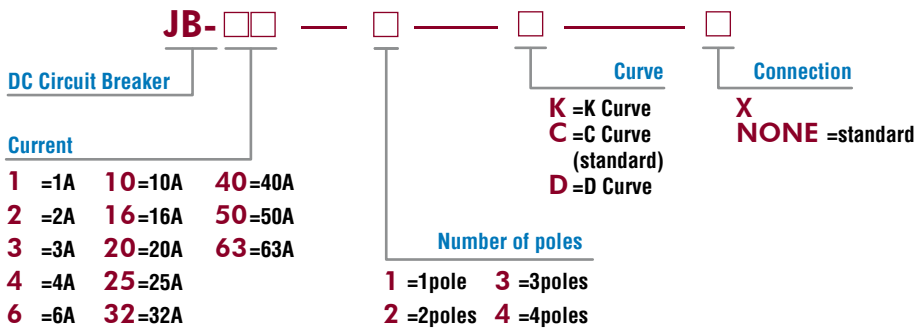
In all cases, fast action on site will be required to clear the fault (protection not ensured in the event of a double fault).

JB is not polarity sensitive: (+) and (-) wires can be inverted without any risk.

The JB is delivered with three inter-pole barriers to provide increased isolation distance between two adjacent connectors.



### Meaning and classification models



### Main characteristics

Operating voltage (Ue)	1P=250 V DC, 2P=500 V DC 3P=750 V DC, 4P=1000 V DC
Rated insulation voltage (Ui)	1,000 V DC
Breaking capacity (Icu)	10 kA
Impulse voltage (Uimp)	4 kV
Electrical connection	By the bottom for In and Out
Number of poles	1P, 2P, 3P, 4P
Standards	IEC 60947-2 EN 60947-2

### Instantaneous Trip

#### B Curve

These MCBs are suitable for cable protection.  
Rating: 1-63A(30 C)  
Instantaneous trip: (3-5)In

#### C Curve

Suitable Domestic and residential applications and electromagnetic starting loads with medium starting currents.  
Rating: 1-63A(30 C)  
Instantaneous trip: (7-10)In

#### D Curve

Suitable for inductive and motor loads with high starting currents.  
Rating: 1-63A (30 C)  
Instantaneous trip: (10-14)In

#### K Curve

Suitable for inductive and motor loads with high inrush currents.  
Rating: 1-63A(30 C)  
Instantaneous trip: (14-18)In

## Technical data

- Position contact indication - suitability for isolation according to IEC/EN 60947-2 standard.
- The presence of the green strip guarantees physical opening of the contacts and allows operations to be performed on the downstream circuit in complete safety.
- Increased product service life thanks to fast closing independent of the speed of actuation of the toggle.
- Pre-wired product: Input / Output on the same side.

Main characteristics		
Rated service breaking capacity (Ics)		100 % of the Icu
Endurance (O-C)	Electrical	1,500 cycles (where L/R=2 ms)
	Mechanical	20,000 cycles
Mechanical		20,000 cycles
Degree of pollution		2
Category		A (no delay in accordance with IEC / EN 60947-2 standards)
Degree of protection (IEC 60529)	Device in modular enclosure	IP40
Tropicalisation		Relative humidity: 95 % at 55°C in accordance with IEC 60068-2 and GB 14048.2 standards
Temperature	Operating	-25°C to 70 °C (Reference temperature 30°C, ref. table 1)
	Storage	-40°C to 85°C

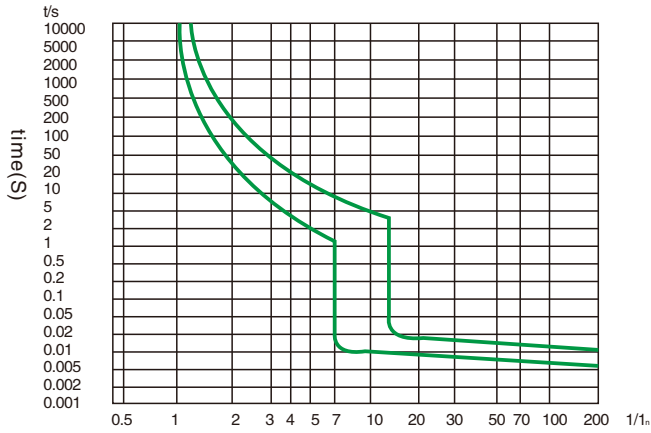
Additional characteristics (@T <sub>A</sub> = 1P 60VDC)			
Rating (A)	Voltage drop (mV)	Impedance (mΩ)	Power loss (W)
1	1230	1230	1.230
2	536	238	1.072
3	439	146.3	1.317
4	381	95.3	1.524
6	158	26.3	0.948
10	147	14.7	1.470
16	125	7.8	2.000
20	93	4.7	1.860
25	76	3	1.900
32	91	2.8	2.912
40	68	1.7	2.720
50	70	1.4	3.500
63	68	1.1	4.284

## Temperature Derating (Table 1)

JB	Ambient temperature (°C)											
Rating	-35°C	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C	70°C
1A	1.30	1.26	1.23	1.19	1.15	1.11	1.05	1.00	0.96	0.93	0.88	0.83
2A	2.60	2.52	2.46	2.38	2.28	2.20	2.08	2.00	1.92	1.86	1.76	1.66
3A	3.90	3.78	3.69	3.57	3.42	3.30	3.12	3.00	2.88	2.79	2.64	2.49
4A	5.20	5.04	4.92	4.76	4.56	4.40	4.16	4.00	3.84	3.76	3.52	3.32
6A	7.80	7.56	7.38	7.14	6.84	6.60	6.24	6.00	5.76	5.64	5.28	4.98
10A	13.20	12.76	12.50	12.00	11.50	11.10	10.60	10.00	9.60	9.30	8.90	8.40
16A	21.12	20.48	20.00	19.20	18.40	17.76	16.96	16.00	15.36	14.88	14.24	13.44
20A	26.40	25.60	25.00	24.00	23.00	22.20	21.20	20.00	19.20	18.60	17.80	16.80
25A	33.00	32.00	31.25	30.00	28.75	27.75	26.50	25.00	24.00	23.25	22.25	21.00
32A	42.56	41.28	40.00	38.72	37.12	35.52	33.92	32.00	30.72	29.76	28.16	26.88
40A	53.20	51.20	50.00	48.00	46.40	44.80	42.40	40.00	38.40	37.20	35.60	33.60
50A	67.00	65.50	63.00	60.50	58.00	56.00	53.00	50.00	48.00	46.50	44.00	41.50
63A	83.79	81.90	80.01	76.86	73.71	70.56	66.78	63.00	60.48	58.90	55.44	52.29

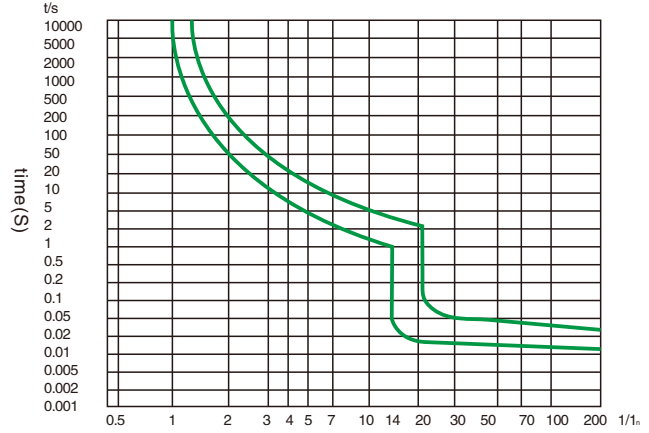
## Curve

### C curve



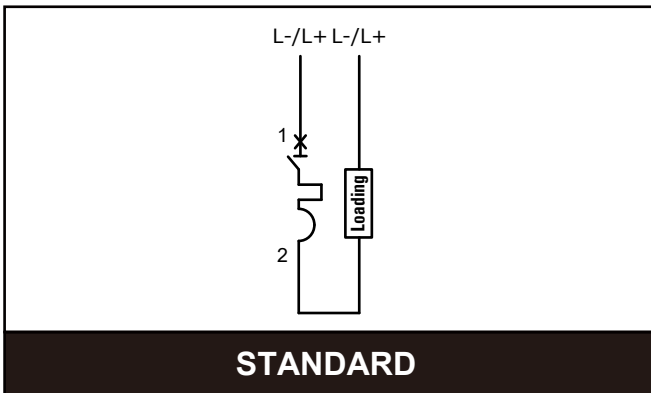
C trip curve: (7 –10)In  
K trip curve: (14–18)In

### K curve

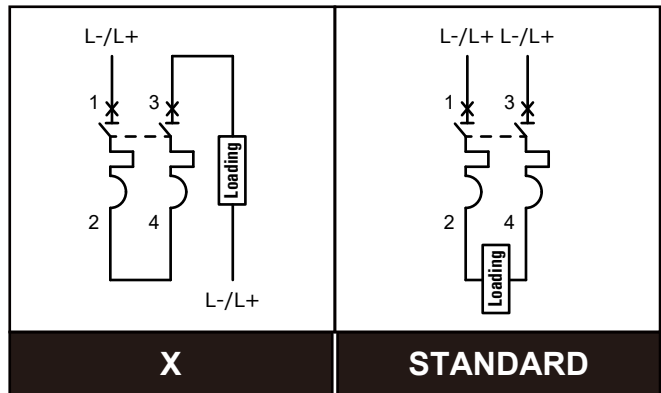


## Diagrams

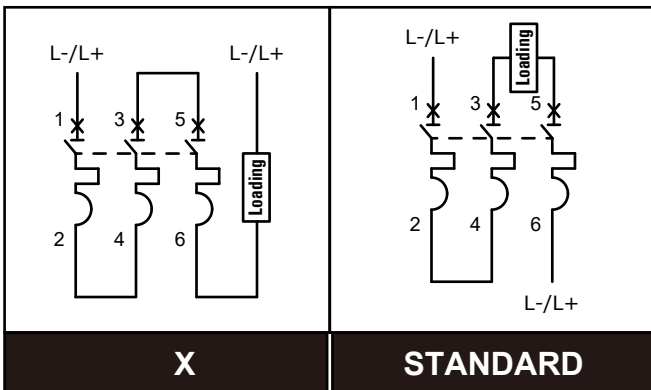
### 1P: 250V DC



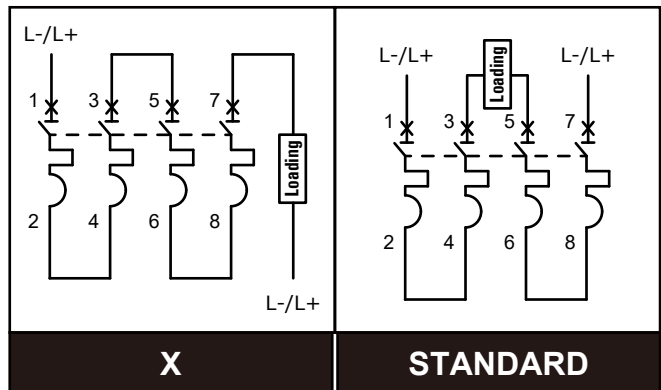
### 2P: 500V DC



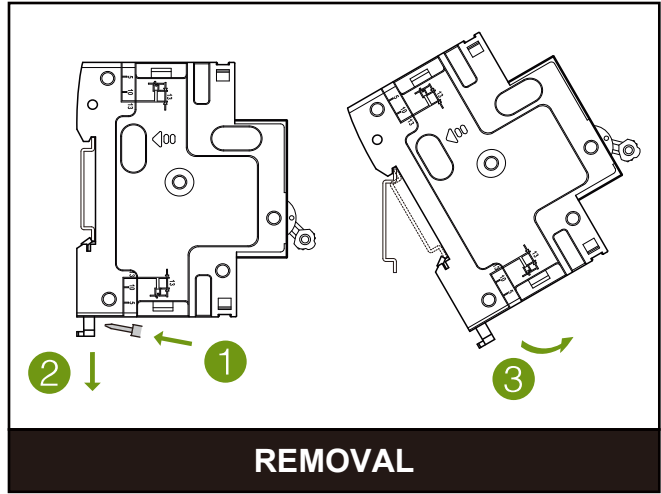
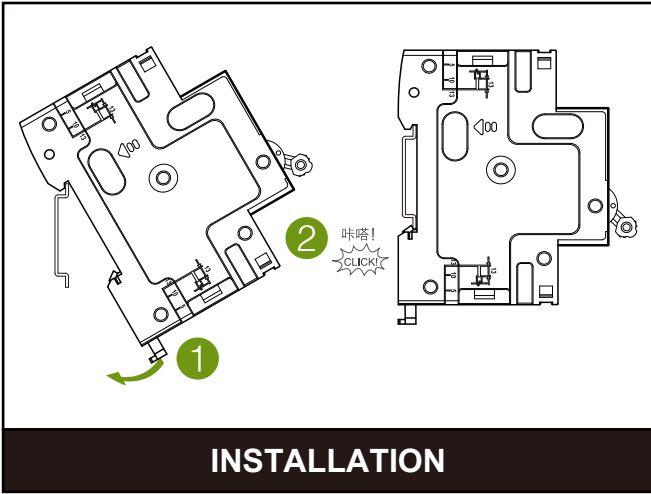
### 3P: 750V DC



### 4P: 1000V DC



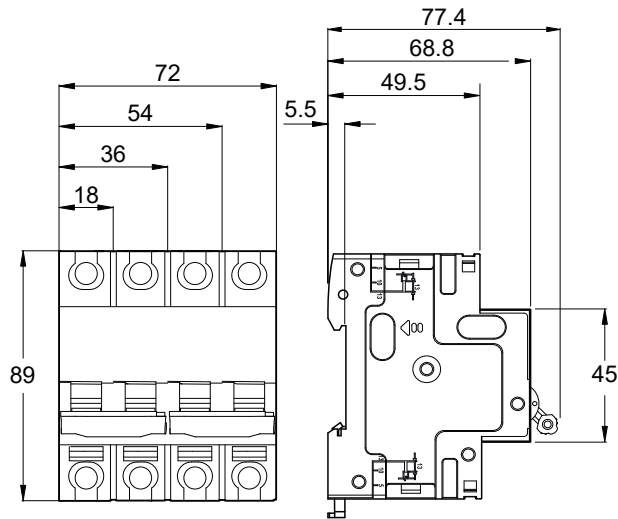
## Installation



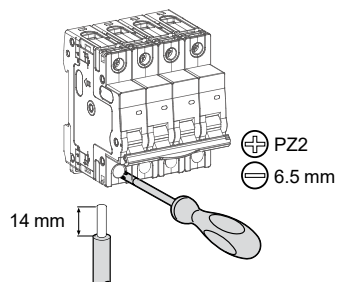
## Weight (g)

Circuit breaker				
Type	1P	2P	3P	4P
	120	240	360	480

## Dimensions (mm)



## Connection



Tightening torque	Without accessory		With accessories	
	Copper cables		50 mm <sup>2</sup> Cu/Al Terminal	Ring tongue terminal screw connection
	Rigids	Flexibles with ferrule		
2.5 N.m	1 to 25 mm <sup>2</sup>	1 to 16 mm <sup>2</sup>	50 mm <sup>2</sup>	Ø 5 mm

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