

# NBL7 Series 10kA

## DC No-Polarity Breaker

TheNBL7 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 NBL7 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 NBL7 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 NBL7 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

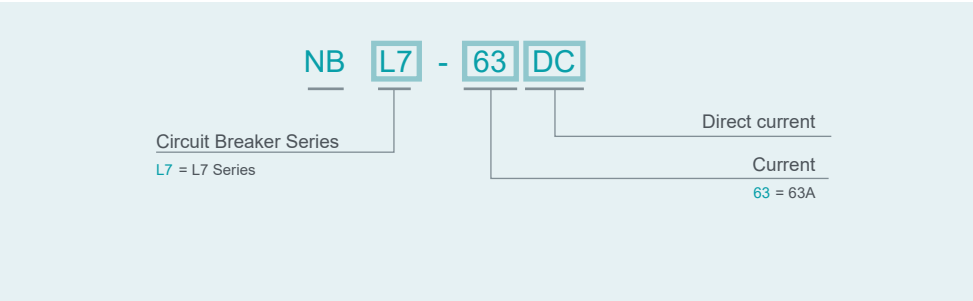
In all cases, fast action on site will be required to clear the fault (protection not ensured in the event of a double fault).

NBL7 is not polarity sensitive: (+) and (-) wires can inversed without any risk.

The NBL7 is: delivered with three inter-pole barrier to provide increased isolation distance between two adjacent connectors.



### Meaning and Classification Models



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Number of poles		1P	2P	3P	4P
Operating voltage (Ue)	VDC	250	500	750	1,000
Rated insulation voltage (Ui)	VDC	1,000			
Breaking capacity (Icu)	kA	10			
Impulse voltage (Uimp)	kV	4			
Electrical connection		By the bottom for In and Out			
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.

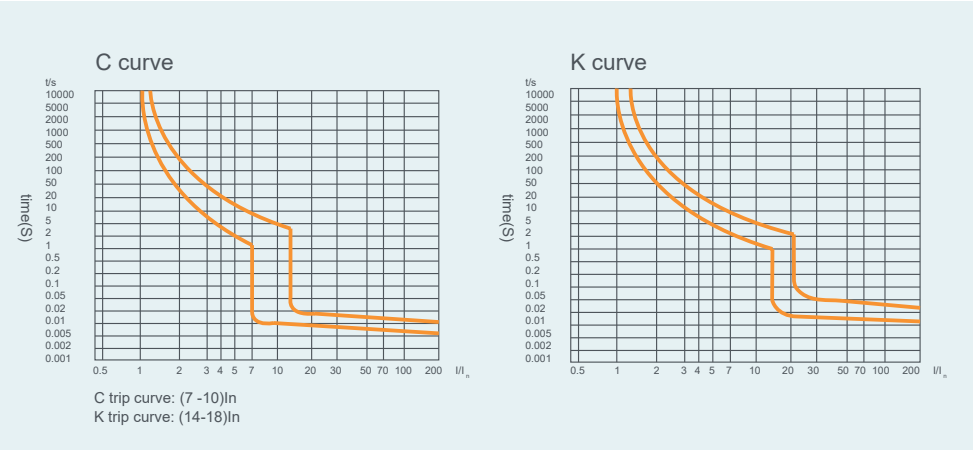
Main Characteristics		
Rated service breaking capacity (Ics)		100% of the Icu
Endurance (O-C)	Electrical	1,500 cycles (where L / R=2 ms)
	Mechanical	20,000 cycles
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Degree of pollution		2
Category		A (no delay in accordance with IEC / EN 60947-2 standards)
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)

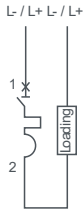
QYL7	Ambient temperature (°C)											
Rating	-35°C	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C	70°C
1A	1.3	1.26	1.23	1.19	1.15	1.11	1.05	1	0.96	0.93	0.88	0.83
2A	2.6	2.52	2.46	2.38	2.28	2.2	2.08	2	1.92	1.86	1.76	1.66
3A	3.9	3.78	3.69	3.57	3.42	3.3	3.12	3	2.88	2.79	2.64	2.49
4A	5.2	5.04	4.92	4.76	4.56	4.4	4.16	4	3.84	3.76	3.52	3.32
6A	7.8	7.56	7.38	7.14	6.84	6.6	6.24	6	5.76	5.64	5.28	4.98
10A	13.2	12.76	12.5	12	11.5	11.1	10.6	10	9.6	9.3	8.9	8.4
16A	21.12	20.48	20	19.2	18.4	17.76	16.96	16	15.36	14.88	14.24	13.44
20A	26.4	25.6	25	24	23	22.2	21.2	20	19.2	18.6	17.8	16.8
25A	33	32	31.25	30	28.75	27.75	26.5	25	24	23.25	22.25	21
32A	42.56	41.28	40	38.72	38.12	35.52	33.92	32	30.72	29.76	28.16	26.88
40A	53.2	51.2	50	48	46.4	44.8	42.4	40	38.4	37.2	35.6	33.6
50A	67	65.5	63	60.5	58	56	53	50	48	46.5	44	41.5
63A	83.79	81.9	80.01	76.86	73.71	70.56	66.78	63	60.48	58.9	55.44	52.29

Curve

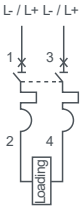
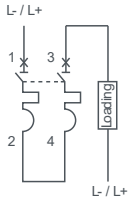


Diagrams

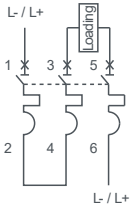
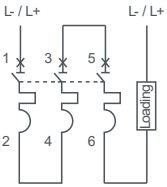
1P: 250V DC
Standard



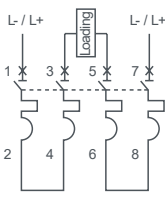
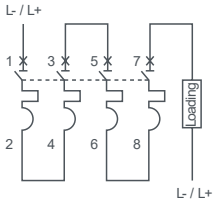
2P: 500V DC	
X	Standard



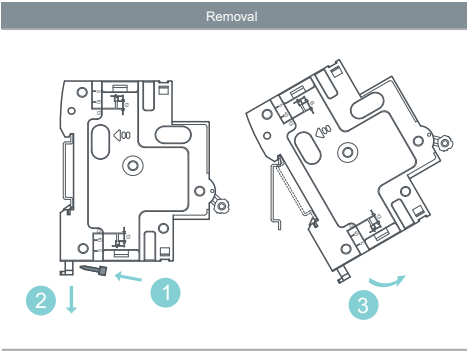
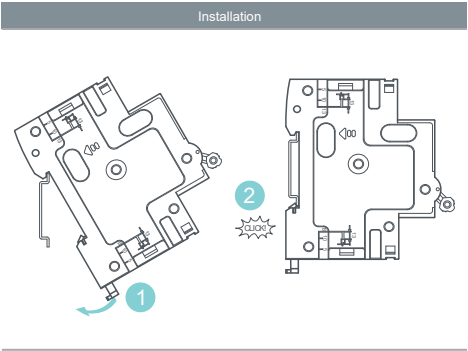
3P: 750V DC	
X	Standard



4P: 1000V DC	
X	Standard



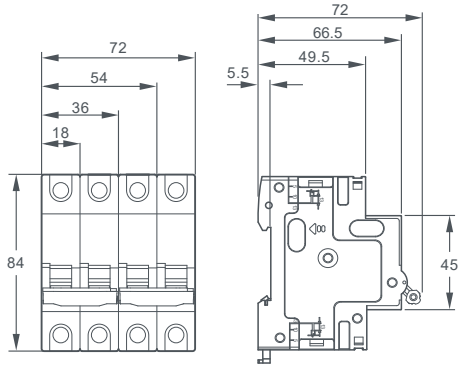
Installation



Weight

Circuit breaker				
Type	1P	2P	3P	4P
Weight (g)	120	240	360	480

Dimensions (mm)



Connection

	Without Accessory		With Accessories		
Tightening torque	Copper cables		50 mm <sup>2</sup> Cu / Al Terminal	Ring tongue terminal screw connection	 14mm
	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>	Φ5 mm	 PZ2 6.5mm