

VM51L, MCCBs with earth leakage protection

The Residual Current circuit breakers of series VM51L (circuit breaker) is one of the new circuit breakers developed with international advanced design and technology of our company. The rated insulating voltage is 800 V, Suitable for the circuit with the frequency 50/60 Hz, rated working voltage 400 V, rated current 100 A for the infrequent change-over and motor protection. The circuit breakers has the protective function of overload protection, short-circuit protection and under-voltage protection, protect the circuit and the power unit from the damage, at the same time, it can provide the protection against indirect contact, and can also protect term ground faults that cannot be detected by overcurrent protection, which may cause fire hazards. When others protective devices fail, the circuit breaker 100 A rated residual currents 30 mA can provide additional protect against direct contacts.



Product Profile

- The circuit breaker can be equipped with a leakage alarm module to avoid major losses caused by power outages.
- The circuit breakers has two types: type L (Standard and type M (high breaking capacity) according to its rated breaking capacity (Icu), it has characteristics of compact size, high breaking capacity, short arc, anti-vibration, etc.
- The circuit breaker can be installed vertically or horizontally. The circuit breaker can't be reversed into the line, that is, only 1,3, and 5 are connected to the power line, and 2,4, and 6 are connected to the load line.
- This circuit breakers has the insulation function.
- The Circuit breakers meet the requirements of IEC 60947-2.

Conditions for normal use and the installation conditions

- Ambient temperature $-5\text{ }^{\circ}\text{C} \sim +40\text{ }^{\circ}\text{C}$
- Altitude: Max. 2,000
- Humidity: When the ambient air temperature is $+40\text{ }^{\circ}\text{C}$, the relative humidity of the air shall not be higher than 50 %, a higher relative humidity is allowed at a lower temperature. For example, the relative humidity should be 90% when temperature is $20\text{ }^{\circ}\text{C}$. Special measures should be adopted for the condensation occasionally produced due to temperature change.
- Pollution degree: 3
- Installation type: Main circuit III; Others II.
- Circuit breaker is suitable for electromagnetic environment A
- The circuit breaker should be installed in a place where there is no danger of explosion and no lead dust, no enough corrosion metal and damage to insulation.
- The circuit breaker should be installed in a place where there is no wind and rain
- Storage temperature: $-40\text{ }^{\circ}\text{C} \sim +70\text{ }^{\circ}\text{C}$.

Main technical specifications

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Type		VM51L01	VM51L02	VM51L04	VM51L06
Standard		IEC 60947-2			
Breaking capacity		D G	D G	G H	G H
Poles (P)		3 3, 4	3 3, 4	3, 4 3	3, 4 3
Rated frame current I _{rm} (A)		100		225	400
Rated current I _n (A)		16, 20, 25, 32, 40, 50, 63, 80, 100		100, 125, 140, 160, 180, 200, 225	225, 250, 315, 350, 400
Rated insulating voltage U _i (V)		AC 800		AC 800	AC 800
Rated impulse withstand voltage U _{imp} (kV)		8000		8000	8000
Rated service voltage U _e (V)		AC 400		AC 400	AC 400
Arcing distance (mm)		≤ 50		≤ 100	≤ 100
Rated ultimate short-circuit breaking capacity I _{cu} (kA)		35 50	35 50	50 65	50 65
Rated service short-circuit breaking capacity I _{cs} (kA)		22 35	22 35	35 42	35 42
Rated residual currents I _{Δn} (A)	Residual current protection of AC-Type	Type-U release, non-delay	0.03-0.1-0.3-0.5	0.03-0.1-0.3-0.5	-
	Type-V release, non-delay, with delay time adjustable	0.1-0.3-0.5	0.1-0.3-0.5	0.1-0.3-0.5	0.3-0.5-1
	Type-W release, without delay, with delay time adjustable	0.3-1-3-10	0.3-1-3-10	1-3-10-30	1-3-10-30
Residual current protection of A-Type	Type-VA release, without delay, with delay time adjustable	0.1-0.3-0.5	0.1-0.3-0.5	0.1-0.3-0.5	0.3-0.5-1
Rated residual non-operating current		1/2 I _{Δn}		1/2 I _{Δn}	1/2 I _{Δn}
Rated residual short-circuit (breaking) capacity		1/4 I _{cu}		1/4 I _{cu}	1/4 I _{cu}
Utilization category		A		A	A
Electrical life (times)		8000		8000	7500
Mechanical life (times)	Without maintenance	20000		20000	10000
	With maintenance	40000		40000	20000
Overall dimension	Width	92 122	107 142	150 198	210 280
	Length	150		165	257
	Height	92		90	106.5
					115.5

Notes:

1. According to IEC 60947-1 The term "lifetime" indicates the frequency of the number of operating cycles that the electric completes before repairing or replacing parts.
2. When the three-phase circuit breaker of this series is connected to the three-phase load, the load cannot be with the neutral line, and the load control loop power supply taken from the load terminal of the circuit breaker can not carry the neutral line. Otherwise, the circuit breaker will malfunction.

Tripping Characteristic

For power distribution

Rated current (A)	Thermal release (Ambient temperature +40 °C)		Electromagnetic tripping unit tripping current (A)
	1.05 I _n (cold conditions) tripping time (h)	1.30 I _n (thermal state) tripping time (h)	
16 ≤ I _n ≤ 63	≥ 1	< 1	10 I _n ± 20 %
63 < I _n ≤ 140	≥ 2	< 2	-
140 < I _n ≤ 630	≥ 2	< 2	5 I _n ± 20 %, 10 I _n ± 20 %

Notes: For the VM51L02 4P circuit breaker, the neutral (N) electromagnetic release (short circuit protection) does not have a 5 I_n specification.

For motor protection

Rated current (A)	Thermal overload release (Ambient temperature +40 °C)					Operating current of electronic release (A)
	1.0 I _n (cold conditions) non-tripping time (h)	1.20 I _n (thermal state) tripping time (h)	1.50 I _n (thermal state) tripping time	7.2 I _n (cold conditions) tripping time	Tripping level	
16 ≤ I _n ≤ 630	≥ 2	< 2	8 min	6 s < T _p ≤ 20 s	20	12 I _n ± 20 %

For power distribution

Residual current		I _{Δn}	2 I _{Δn}	5 I _{Δn}	10 I _{Δn}
Non-delay	Maximum tripping time (s)	0.3	0.15	0.04	0.04
Delay	Maximum tripping time (s)	0.5, 1.15, 2.15	0.35, 1, 2	0.25, 0.9, 1.9	0.25, 0.9, 1.9
	Limit non-actuating time Δt (s)	-	0.1, 0.5, 1	-	-

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