

iALM1L Residual Current Operated Circuit Breaker

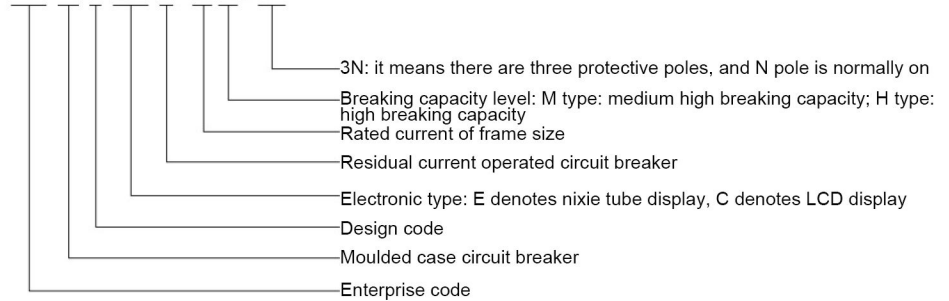


Overview

iALM1L series intelligent residual current operated circuit breaker (hereinafter referred to as leakage circuit breaker) is an integrated, multifunctional and current adjustable leakage circuit breaker. It is applicable to the low-voltage power grid with three-phase four-wire neutral direct grounding (TT grounding system), which is used to provide indirect contact protection against human contact hazards, and also to protect the grounding fault, overcurrent, short circuit, etc. of lines or electricity.

Product naming rules

iAL M 1 E/C L - □ □ / 3N



Functional features

- ◆ High performance 8-bit microprocessor is adopted for real-time signal processing and intelligent control;
- ◆ It supports LCD Chinese display, friendly man-machine interface and simple operation;
- ◆ Long time delay, short-circuit short time delay and instantaneous three-segment protection, electronic tripping, independent of auxiliary power supply;
- ◆ Overvoltage and undervoltage protection, phase loss protection, abrupt change protection, etc., with automatic reclosing function after recovery meanwhile;
- ◆ Residual current protection, automatic gear setting and reclosing function;
- ◆ Real time display of line residual current, three-phase supply voltage and load current;
- ◆ Enabling and disabling of the setting of protection functions and parameters;
- ◆ It can monitor and record a large amount of data to facilitate maintenance and overhaul;
- ◆ It has communication function, and the product meets the standard: DL/T20 Residual Current Device Communication Protocol;

Scope of application

The products are applied to low-voltage JP cabinet (integrated distribution cabinet of distribution transformer) and photovoltaic power generation system for urban and rural power grid transformation; JP cabinet is designed to meet the requirements of standardization, miniaturization and outdoor type of rural low-voltage distribution devices. It integrates power distribution, metering, protection (overload, short circuit, leakage, snow prevention) and capacitance reactive power compensation into one whole.

Normal operating conditions

- ◆ Ambient temperature: -15°C ~ 70°C;
- ◆ Relative air humidity: when the maximum temperature is +40°C, the relative humidity of the air shall not exceed 50%; at +20°C, the relative humidity of the air is allowed to reach 90%, and the condensation on the product surface due to temperature change should be taken into;
- ◆ The altitude is generally not more than 2000m, otherwise it needs to be reduced;
- ◆ The pollution level is level 3;
- ◆ Installation category is III;
- ◆ The magnetic field outside the installation site shall not exceed 5 times of the geomagnetic field in any direction; no explosive and corrosive gas; no invasion of rain or snow; dry and ventilated;
- ◆ The sine wave distortion of the power supply is less than 5%.

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Function sort

Sort	Display type	LCD	Nixie tube type
Display	12864 LCD	●	
	4-digit nixie tube display		●
	Highlight LED indicator		8
Leakage protection	Slow change protection	●	●
	Abrupt change protection	●	●
	Baud protection	●	●
	Leakage alarm	●	●
	Maximum leakage phase judgement	●	●
Current protection	Overload long time delay protection	●	●
	Short circuit short time delay protection	●	●
	Short circuit instantaneous protection	●	●
Voltage protection	Self-generated power supply	●	●
	Overvoltage protection	●	●
	Undervoltage protection	●	●
	Phase loss protection	●	●
External breaking	Total voltage loss protection	●	●
	Short circuit opening/closing	●	●
	Auxiliary output interface	●	●
Clock function	Real time clock	●	●
	Fault trip record	●	●
Storage record	Residual current alarm record	●	●
	Residual current overrun record	●	●
	Protector test record	●	●
	Record of maximum daily residual current	●	●
	Daily ABC phase current maximum value record	●	●
	Daily ABC phase voltage maximum value record	●	●
	Daily residual current minimum value record	●	●
	Daily ABC phase current minimum value record	●	●
	Daily ABC phase voltage minimum value record	●	●
	Leakage curve record	●	●
Communication function	Statistics of tripping times	●	●
	All functions (national standard)	●	●
	Part functions (national standard)	●	●

Technical parameter

Model	iALM1E/CL-125	iALM1E/CL-250	iALM1E/CL-400/630	iALM1E/CL-800
Rated current of frame size Inm(A)	125	250	400/630	800
Rated current In(A)	0.4-1.0Inm (A) continuously adjustable			
Auxiliary supply voltage Ue(AC V)	400/50HZ			
Applicable poles	3P+N			
Rated residual operating current(mA)I Δ n	The gear value is optional, and eight groups of parameter values can be customized according to customer requirements (default 50-1000)			
Rated residual non-operating current (mA)	I Δ no=50%I Δ n			
Rated limit non-actuating time (s)	The gear value is optional, and three groups of parameter values can be customized according to user requirements (default 60-300ms)			
Ultimate short circuit breaking capacity Icu (KA)	M50	M50/H85	M65/H100	M65/H100
Service short circuit breaking capacity Ics (KA)	M35	M35/H55	M50/H65	M50/H65
Rated residual short circuit making (breaking) capacity	25%Icu			
Delayed reclosing time (s)	20-60			
Operation characteristic classification	AC type			
Undervoltage operation value (V)	Single phase 165V \pm 5% (user adjustable)			
Overvoltage operation value (V)	Single phase 275V \pm 5% (user adjustable)			
Phase failure operation value (V)	Default 120 \pm 5% (user adjustable)			
Delay Time	0-10s (overvoltage, undervoltage, full voltage loss time for photovoltaic grid connection can be adjusted by the user)			
Operation mode	Key setting			
Display mode	LCD, LED display			

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Protection characteristics

Overload long time delay protection

Model	Frame size current	Set value
Operation set value Ir1	125	0.4-1.0Inm(A) continuously adjustable, step size:1A
	250	0.4-1.0Inm(A) continuously adjustable, step size:1A
	400	0.4-1.0Inm(A) continuously adjustable, step size:1A
	630	0.4-1.0Inm(A) continuously adjustable, step size:1A
Delay time set value Tr1		3-18S, step size:1S

Delay characteristic

Overload protection shall be carried out according to inverse time limit

$T=(6I_r/I)^2 \cdot Tr1, \pm 20\%$; T is the actual operation time; I is the fault current and Tr1 is the delay setting value; Ir1 is the operation setting value.

Short circuit short time delay protection

Parameter	Set value
Operation set value Ir2	2 ~12 times of Ir1, step size: 1 time
Delay time set value Tr2	100~1000ms, step size:1ms

Note: $T > 200ms$ (if it is less than 200ms, the operation shall be delayed by 200ms), $\pm 20\%$;

Delay characteristic

The protection shall be carried out according to definite time limit

Parameter	Set value
Operation set value Ir3	4~14x Ir1, step size: 1x
Delay time set value Tr3	< 200ms

Residual current protection

Gear setting range

Parameter	Set value
Residual operating current	Default: 30, 50, 100, 150, 200, 300, 500, 800, 1000

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Protection characteristics

		Unit(S)		
Parameter		Set value		
Short time characteristic	2 I _{Δn} limit non-actuating time	Breaking time		
		1 time	2times	5times
0.06	> 0.06	0.2	0.2	0.2
0.2	> 0.2	0.3	0.3	0.3
0.3	> 0.3	0.5	0.5	0.5

Automatic reclosing

When the residual current exceeds the operation current value and the gear acts and trips, it can automatically reclose after 20-60 seconds, but the manual closing is not limited by time. If the fault current is eliminated within 3 minutes after closing, the closing is successful and the circuit breaker operates normally; If the fault current is not eliminated, the circuit breaker trips and locks again, and it will not automatically reclose, then it must be closed manually.

Protection function

Overvoltage protection function

When the line phase voltage is higher than the set value, the circuit breaker will trip after a 5-second delay. When the line voltage returns to normal voltage, the circuit breaker can be automatically closed and put into operation.

Overvoltage protection setting value range is 255-350V, step size: 1V; the user can also set the protection on or off by himself.

Undervoltage protection function

When the line phase voltage is lower than the set value, the circuit breaker will trip after a 5-second delay. When the line voltage returns to normal voltage, the circuit breaker can be automatically closed and put into operation.

The setting range of undervoltage protection is 120-195V, and the step size is 1V; the user can also set the protection on or off by himself.

Phase failure protection function

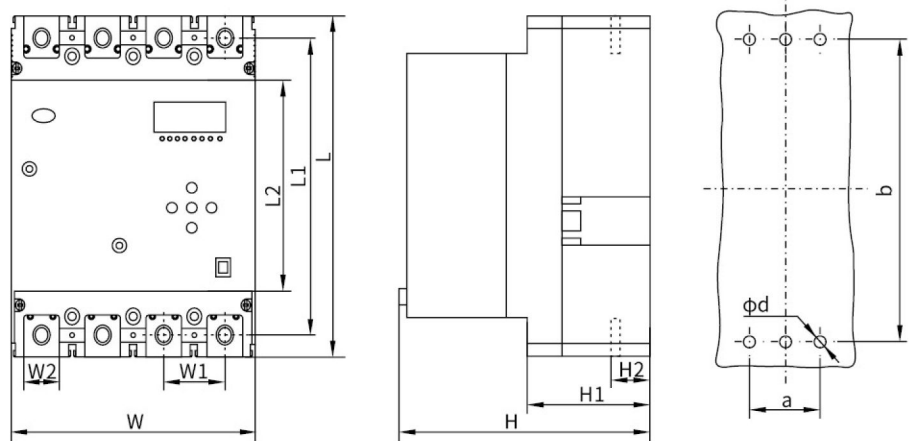
In case of phase loss at the incoming end of the line power supply, the circuit breaker will trip. When the line voltage returns to normal voltage, the circuit breaker is closed again. The setting range of phase loss protection is 10-120V, and the step size is 1V; The user can also set the protection on or off by himself.

For the special circuit breaker for photovoltaic grid connection, the setting value of voltage loss adjustment is 20%UN, the setting value of overvoltage trip is 135%UN, the setting value of closing is 85%UN in condition there's voltage detected, and it can be adjusted for 0~10s in case of overvoltage and undervoltage delay.

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Mounting dimensions

◆ Outline and installation dimensions for circuit breaker of front-panel wiring



(Unit:mm)

Product model	Overall dimension									Mounting dimension		
	L	L1	L2	W	W1	W2	H	H1	H2	a	b	φd
M1L-125	220	201	169	122.5	30	18	138	81	28	60	198.5	4.5
M1L-250	240	218	178	142.5	35	23	138	86	24	70	201	4.5
M1L-400	335	305	253	198	48	33	182.5	98.5	Upper:39 Lower:37	96	272	8
M1L-630 (Increased capacity)	335	305	253	198	48	33	182.5	98.5	Upper:40 Lower:41	96	272	8
M1L-630	355	318	270	240	58	44	191	102	43	116	285	8
M1L-800	370			280			188	107			333	8

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Quick selection table of iALM1L residual current operated circuit breaker

iALM1E/CL	125	M	3N	LF	125A
iALM1E/CL Residual current operated circuit breaker	Frame size current code (Imm)	Short circuit breaking capacity	Number of poles and protection	Derived code	Rated current
E: digital C: LCD	125	Breaking capacity level	Three pole pro- tection plus N is zero line	Derived code	50A ~ 800A
	250	M Medium high breaking	The N-pole is always connected and does not open and close together with the other three poles	No mark for general condition F: with charge control LF: leakage protection with charge control	
	400	H High breaking			
	630				
	800				