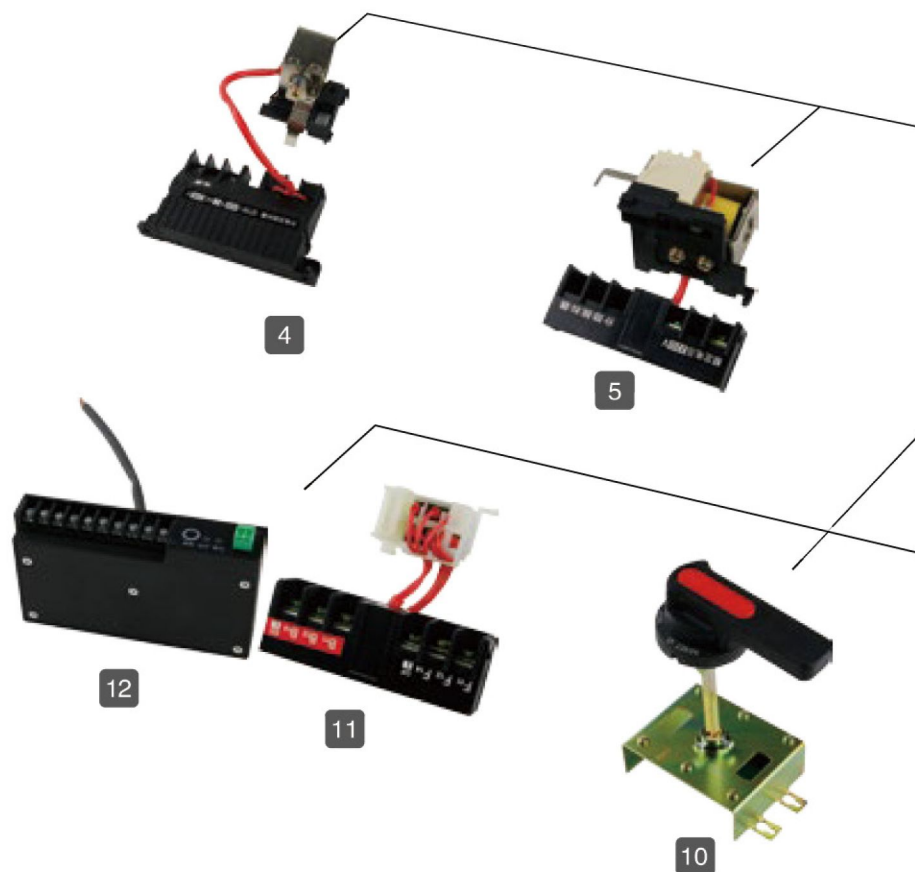
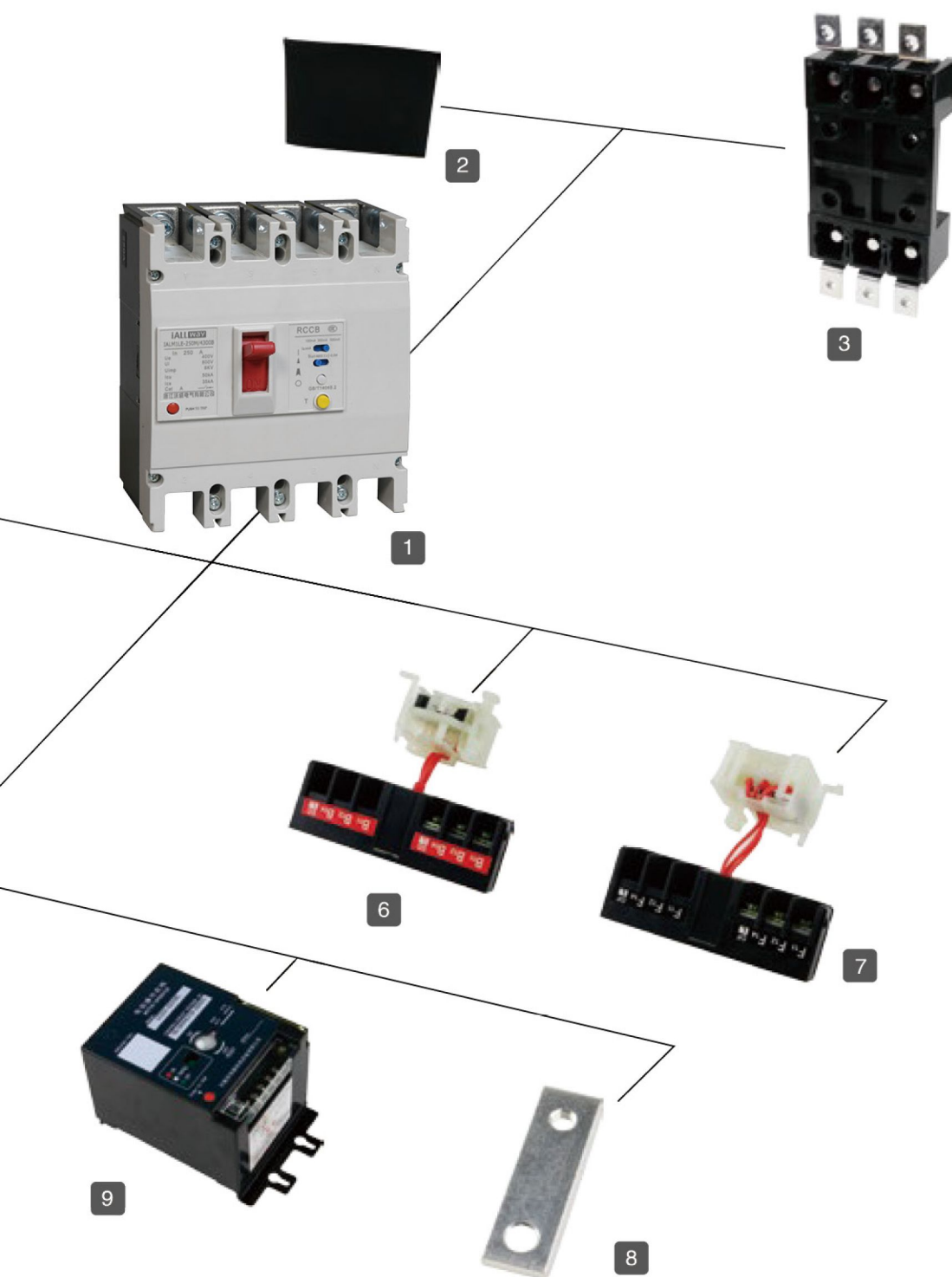


iALM1LE Moulded Case Leakage Circuit Breaker

1	Switch body
2	Arc chute (standard)
3	plug-in type (optional)
4	Undervoltage release (optional)
5	Shunt release (optional)
6	Alarm contact (optional)
7	Auxiliary contact (optional)
8	Front-panel wiring transition board (optional)
9	Electric operating mechanism (optional)
10	Rotary handle operating mechanism (optional)
11	Auxiliary alarm contact (optional)
12	Communication shunt alarm accessories (optional)





iALM1LE Moulded Case Leakage Circuit Breaker



Product overview

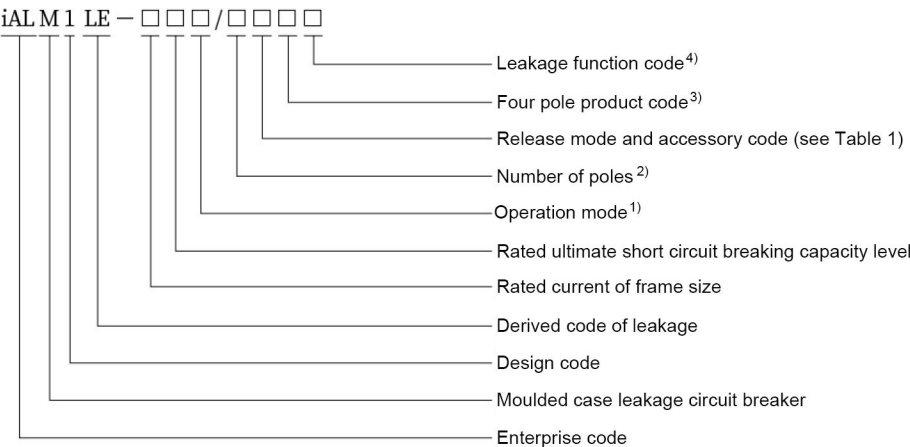
iALM1LE series residual current protection circuit breaker (hereinafter referred to as circuit breaker) is one of the new leakage circuit breakers designed and developed by our company with international advanced technology. It is applicable to the AC 50Hz circuit with rated voltage up to 400V and rated current from 16A to 800A.

Its main function is to provide indirect contact protection for personal electric shock with fatal danger. When other protective measures fail, the leakage circuit breaker with rated residual operating current not exceeding 30mA can also be used as supplementary protection for direct contact, but not as the only direct contact protection. It can also be used to prevent fire hazards caused by contact with fault current. Meanwhile it can be used to protect the line from overload, short circuit and other hazards. It can also be used for infrequent conversion of the line and infrequent startup of the motor.

The circuit breaker has the characteristics of small volume, high breaking, short arcing, adjustable residual operating current and residual current operation time. At the same time, it can be equipped with alarm contact, shunt release, auxiliary contact, rotating handle operating mechanism, electric operating mechanism and other accessories. It can also adopt a variety of wiring modes such as front-panel, back-panel and plug-in type. It is an ideal product for users.

Standards: GB/T 14048.2 and IEC 60947-2.

Product naming rules



Note: 1) there is no code for direct operation of the handle; electric operation is represented by D; the rotation operation is represented by Z.

2) Three-pole is represented by 3; the four-pole is represented by 4.

3) Type A: the N-pole is not equipped with overcurrent tripping element, and the N-pole is always connected and is closed and open with other three poles;

Type B: the N-pole is not equipped with overcurrent tripping element, and the N pole is closed and open together with other three poles;

Type C: the N-pole is equipped with overcurrent tripping element, and the N-pole is closed and open together with other three poles;

Type D: the N-pole is equipped with overcurrent tripping element, and the N-pole is always connected, and it is not closed or open together with other three poles;

4) No code for Leakage tripping without alarm; the leakage tripping with alarm is represented by 1; the leakage alarm without tripping is represented by II.

iALM1LE Moulded Case Leakage Circuit Breaker

Release and accessory code

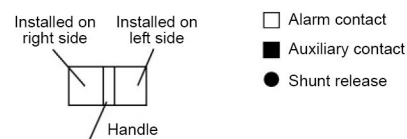


Table 1

Type of release and accessories	Model	iALM1LE-125 iALM1LE-250		iALM1LE-400 iALM1LE-800	
		Number of poles		Number of poles	
		3P	4P	3P	4P
Accessory name					
00	No accessories				
08	Alarm contact				
10	Shunt release				
20	Auxiliary contact				
40	Shunt release, auxiliary contact	—		—	
60	Two sets of auxiliary contacts	—		—	
18	Shunt release, alarm contact	—		—	
28	Auxiliary contact, alarm contact				
48	Shunt release, auxiliary contact, alarm contact	—		—	
68	Two sets of auxiliary contacts, alarm contact	—		—	

Note: 1. The first digit 2 of release mode and internal accessory code represents electromagnetic (instantaneous) release, and 3 represents thermal electromagnetic (compound) release; the last two digits represent the code of internal accessories. If there is no accessory, it is represented by 00.

2. In iALM1LE series, the auxiliary contacts of specifications 28 and 48 are a pair of contacts (one normally open and one normally closed), and the auxiliary contacts of specification 68 are two pairs of contacts (i.e. two normally open and two normally closed).

3. If a leakage alarm module is required, when the number of accessories is greater than 2, it cannot be equipped with wiring terminals.

iALM1LE Moulded Case Leakage Circuit Breaker

Product parameter

◆ See table 2 for product parameters

Table 2

Basic information								
Rated current of frame size		125		250		400		800
Number of poles		1P+N、2P	3P、 3P+N、4P	1P+N、2P	3P、3P+N、 4P	3P、3P+N、4P		3P、3P+N、4P
Frequency (Hz)		50		50		50		50
Rated working voltage Ue (V)		230	400	230	400	400		400
Rated insulation voltage Ui (V)		690	800	690	800	800		800
Rated impulse withstand voltage Uimp(kV)		8		8		8		8
Rated operating current In(A)		16A、20A、25A、 32A、40A、50A、 63A、80A、100A、 125A		100A、125A、140A、 160A、180A、200A、 225A、250A		225A、250A、 315A、 350A、400A		400A、500A、 630A、700A、 800A
Rated residual operating current I△n (mA)		30、50、75、100、 150、200、300、 400、500		30、50、75、100、 150、200、300、 400、500		50、75、 100、 150、 200、300、 400、500、1000		50、75、100、 200、300、 500、1000
Breaking capacity level		L	M	L	M	L	M	/
Rated ultimate short circuit breaking capacity Icu(kA)	AC400V	35	65	35	65	65	80	65
Rated service short circuit breaking capacity Ics(kA)	AC400V	22	50	22	50	42	65	42
Isolation function		2P、3P、4P Provided		2P、3P、4P Provided		3P、4P Provided		3P、4P Provided
Usage category		Class A		Class A		Class A		Class A
Service life	Mechanical	40000		40000		20000		20000
	Electrical	8000		8000		7500		7500
Arc distance (mm)		≤ 50		≤ 50		≤ 100		≤ 100
Accessory information								
Handle direct operation		■ (Standard)		■ (Standard)		■ (Standard)		■ (Standard)
Extended rotary handle		□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)
Electric operating mechanism		□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)
Shunt release		□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)
Auxiliary contact		□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)
Alarm contact		□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)
Fixed type front-panel		■ (Standard)		■ (Standard)		■ (Standard)		■ (Standard)
Fixed type back-panel		□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)
Plug-in front-panel (4P product cannot be selected)		□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)
Plug-in back-panel		□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)
Transition bar		□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)
Interphase partition		■ (Standard)		■ (Standard)		■ (Standard)		■ (Standard)

Note: the current specifications in the column of rated residual operating current are for users to choose, and the product itself is adjustable in three gears.
 Delay type and delay adjustable products have no 30mA gear.
 If the rated residual operating current needs to be fixed in one gear, please indicate it when ordering, otherwise the three-gear is adjustable by default.

iALM1LE Moulded Case Leakage Circuit Breaker

◆ See table 3 for inverse time breaking operation characteristics of overcurrent release of distribution circuit breaker when all poles are energized at the same time Table 3

No.	Test current name	I/I_n	Conventional time	Initial state
1	Conventional non-tripping current	1.05	$\geq 2h (I_n > 63A), \geq 1h (I_n \leq 63A)$	Cold state
2	Conventional tripping current	1.3	$< 2h (I_n > 63A), < 1h (I_n \leq 63A)$	Immediately after test No. 1

◆ See table 4 for inverse time limit breaking operation characteristics of overcurrent release of circuit breaker for motor protection when all poles are energized at the same time Table 4

No.	Test current name	I/I_n	Conventional time	Initial state
1	Conventional non-tripping current	1.0	$\geq 2h$	Cold state
2	Conventional tripping current	1.2	$< 2h$	Immediately after test No. 1

◆ The instantaneous operation characteristic of the circuit breaker for power distribution is set to $10I_n \pm 20\%$.
The instantaneous operation characteristic setting of the circuit breaker for motor protection is $12I_n \pm 20\%$.

Normal operating and installation conditions

◆ Ambient air temperature: the upper limit of ambient air temperature is $+40^\circ\text{C}$, the lower limit of ambient air temperature is -5°C , and the average value of ambient air temperature for 24h does not exceed $+35^\circ\text{C}$.

◆ Altitude: the altitude of the installation site shall not exceed 2000m.

◆ Pollution level: Level 3.

◆ Installation category: III.

◆ Atmospheric conditions: the atmospheric relative humidity shall not exceed 50% when the ambient air temperature is $+40^\circ\text{C}$; it can have higher relative humidity at lower temperature; the monthly average maximum relative humidity in the wettest month is 90%, and the monthly average minimum humidity in that month is $+25^\circ\text{C}$, the condensation on the product surface due to temperature change should be taken into.

◆ External magnetic field: the magnetic field near the circuit breaker installation site shall not exceed 5 times of the geomagnetic field in any direction.

◆ It shall be installed in a place without impact, vibration, and invasion from rain and snow. The upper terminal shall be connected to the power side and the lower terminal shall be connected to the load side. The inclination with each direction shall not exceed 5° .

Residual current breaking time of circuit breaker

◆ Operation characteristics of general circuit breaker

See table 6 for the operation characteristics of general circuit breaker (the circuit breaker with $I\Delta n \leq 30\text{mA}$ shall be non-time delay type). Table 5

Residual current	$I\Delta n$	$2I\Delta n$	$5I\Delta n^{(a)}$	$10I\Delta n^{(b)}$
Max breaking time (s)	0.2	0.15	0.04	0.04

Note: a. For circuit breakers with $I\Delta n < 30\text{mA}$, $5I\Delta n$ can be replaced by 0.25A.

b. When 0.25A is adopted according to note a, $10I\Delta n$ is 0.5A.

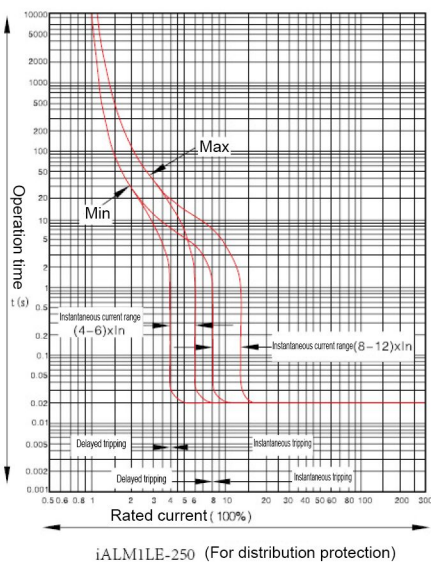
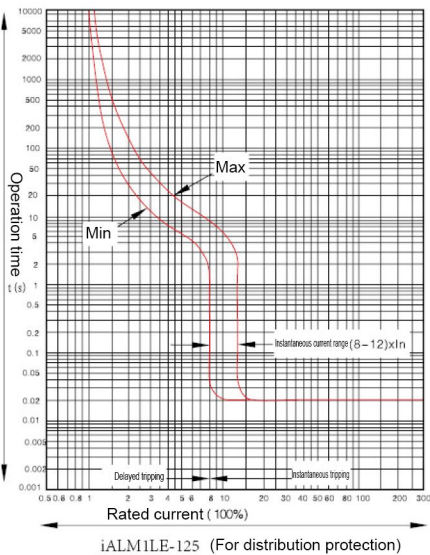
iALM1LE Moulded Case Leakage Circuit Breaker

◆ Operation characteristics of time delay circuit breaker

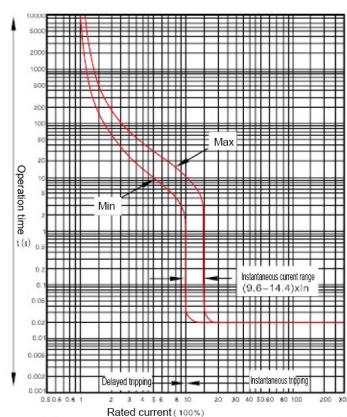
The limited non-driving time of time-delay circuit breaker is specified as $2I\Delta n$, and its operation time is shown in table 6.

Delay Time(s)	Max breaking time at $I\Delta n$ (s)	Limited non-driving time at $2I\Delta n$ (s)	Max breaking time (s)	Max breaking time at $5I\Delta n$ (s)	Max breaking time at $10I\Delta n$ (s)
0.1	0.3	0.1	0.3	0.25	0.25
0.2	0.4	0.2	0.4	0.35	0.35
0.3	0.5	0.3	0.5	0.45	0.45
0.4	0.6	0.4	0.6	0.55	0.55
0.5	0.7	0.5	0.7	0.65	0.65
0.6	0.8	0.6	0.8	0.75	0.75
0.7	0.9	0.7	0.9	0.85	0.85
0.8	1	0.8	1	0.95	0.95

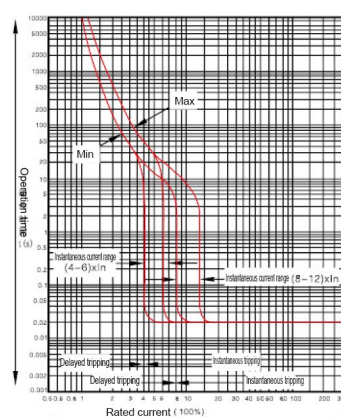
Circuit breaker inverse time protection characteristic curve



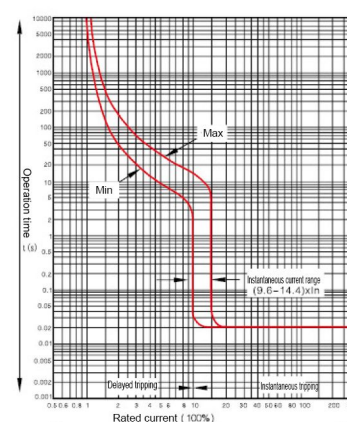
iALM1LE Moulded Case Leakage Circuit Breaker



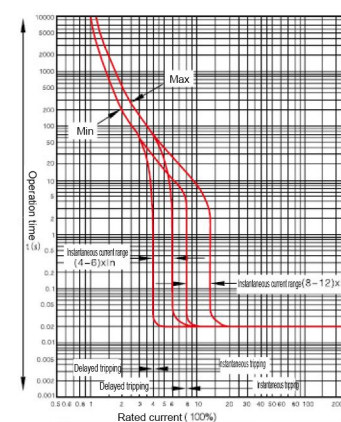
iALM1LE-250 (For motor protection)



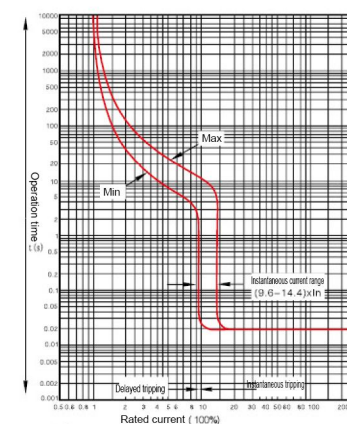
iALM1LE-400 (For distribution protection)



iALM1LE-400 (For motor protection)



iALM1LE-800 (For distribution protection)



iALM1LE-800 (For motor protection)

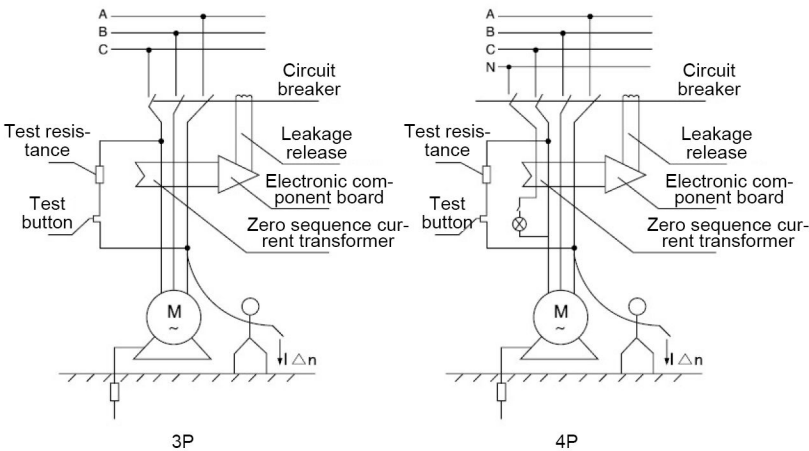
iALM1LE Moulded Case Leakage Circuit Breaker

Structure and working principle

This series of circuit breakers are electronic residual current operated circuit breakers. The main components include: main switch (including overcurrent release), zero sequence current transformer, electronic amplification components, leakage release and test device. All parts are installed in a plastic shell.

Working principle

When there is leakage or personal electric shock in the protected circuit and the current reaches the setting operating current value, the output signal of the secondary winding of the zero sequence current transformer triggers the thyristor to turn on, and the circuit breaker acts through the leakage release to cut off the power supply, so as to play the function of leakage and electric shock protection. Working principle diagram (see the figure below)



In case of overload or short circuit of the protected circuit, the thermal magnetic release completes the delay or instantaneous tripping action to make the circuit breaker act, so as to cut off the power supply and play the role of overload or short circuit protection.

Internal and external accessories of circuit breaker

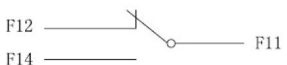
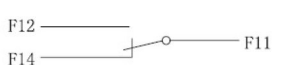
◆ Internal accessories of circuit breaker

a. Shunt release and its wiring diagram

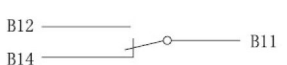
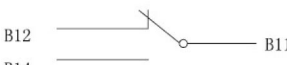
Rated control supply voltage U_s	AC100V/380V、AC230/220V、DC220V、DC110V、DC24V	
Operating voltage	$(0.7-1.1)U_s$	
Wiring diagram	<p>The wiring diagram shows a power input connected to terminals A1 and A2. A microswitch is connected in series with the coil of the shunt release K. The contact K is shown in a normally closed position.</p>	<p>Note: the microswitch in series with the coil inside the K-shunt release is a normally closed contact. When the circuit breaker switches off, the contact will open automatically and close when switching on.</p>

iALM1LE Moulded Case Leakage Circuit Breaker

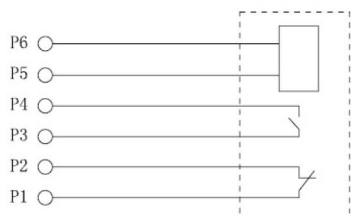
b. Auxiliary contact and its wiring diagram

Rated current of frame size	$I_{nm} \leq 250A$		$I_{nm} \geq 400A$	
Conventional heating current I_{th}	3A		6A	
Usage category	AC-15	DC-13	AC-15	DC-13
Operating voltage	AC380V/400V		AC380V/400V	
Rated Operating current	0.26A	0.14A	3A	0.2A
Wiring diagram	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>Status of circuit breaker in "off" position</p> </div> <div style="text-align: center;">  <p>Status of circuit breaker in "on" position</p> </div> </div>			

c. Alarm contact and its wiring diagram

Conventional heating current I_{th}	3A	
Rated operating current I_e	Same as auxiliary contact	
Wiring diagram	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>Status of circuit breaker in free tripping (alarm)</p> </div> <div style="text-align: center;">  <p>Status of circuit breaker in "off" and "on" positions</p> </div> </div>	

d. Leakage alarm module and its wiring diagram

Input voltage	AC230V、AC400V、DC24V	
Wiring diagram	<div style="display: flex; align-items: center;"> <div style="flex: 1;">  </div> <div style="flex: 1; padding-left: 20px;"> <p>Description: P5-P6: input power; P1-P2, P3 and P4: contact capacity AC230V, 0.5A.</p> <p>Note: the dotted box is the wiring diagram of internal accessories of leakage alarm module.</p> </div> </div>	

Note: the leakage alarm module has two working modes, which can be indicated by the user when ordering:

I: When leakage occurs, the leakage alarm module sends a signal and the circuit breaker trips at the same time.

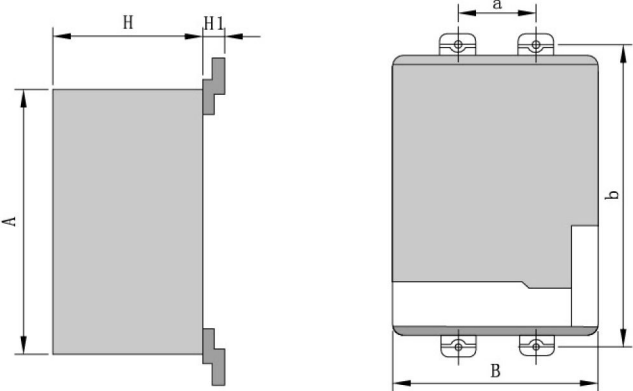
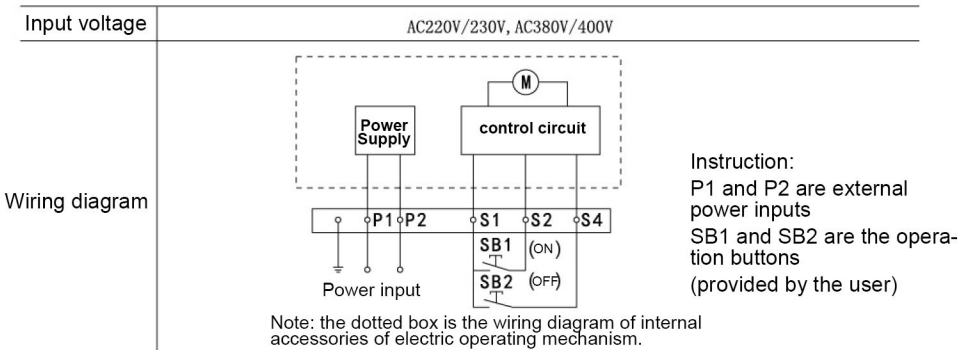
II: In case of leakage, the leakage alarm module sends a signal, but the circuit breaker does not trip.

(II is to meet the needs of special occasions, users should consider carefully when using this function to protect electrical appliances)

iALM1LE Moulded Case Leakage Circuit Breaker



- ◆ External accessories of circuit breaker
- a. Electric operating mechanism



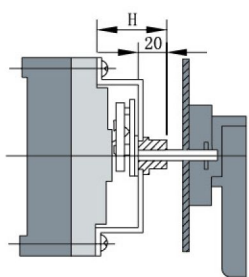
Unit: mm

Model	A	B	H	H1	a	b
iALM1LE-125	116	90	77	12.5	30	129
iALM1LE-250	116	90	77	15	35	126
iALM1LE-400	176	130	115	27	44	194
iALM1LE-800	176	130	115	31	70	243

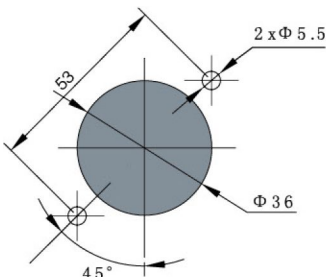
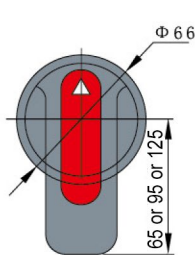
iALM1LE Moulded Case Leakage Circuit Breaker



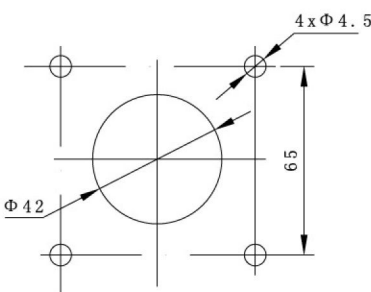
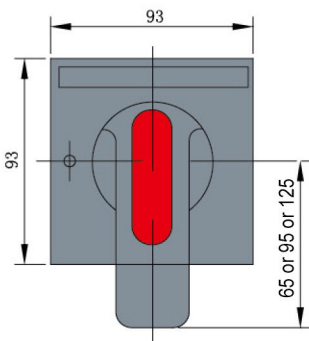
b. Installation dimension of manual operating mechanism



Handle operating mechanism



Outline and opening size of circular handle



Outline and opening size of square handle

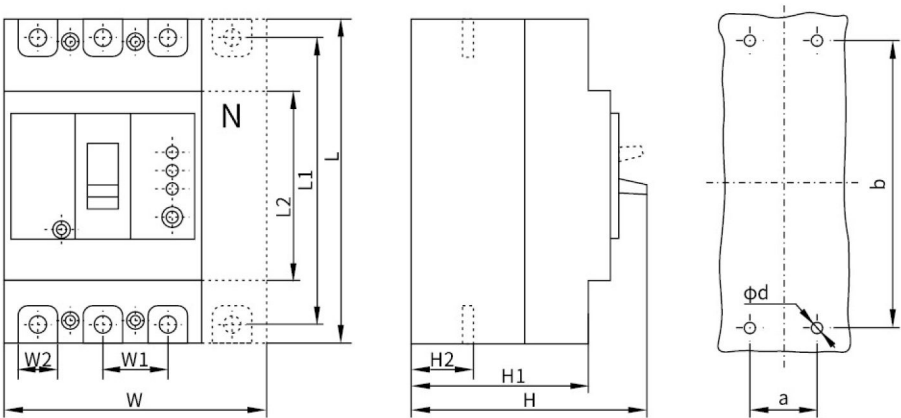
Installation dimension of rotating handle

Model	iALM1LE-125	iALM1LE-250	iALM1LE-400	iALM1LE-800
Mounting dimensions	61mm	57mm	86.5mm	87mm

iALM1LE Moulded Case Leakage Circuit Breaker

Outline and installation dimensions

◆ Outline and installation dimension of front-panel wiring circuit breaker

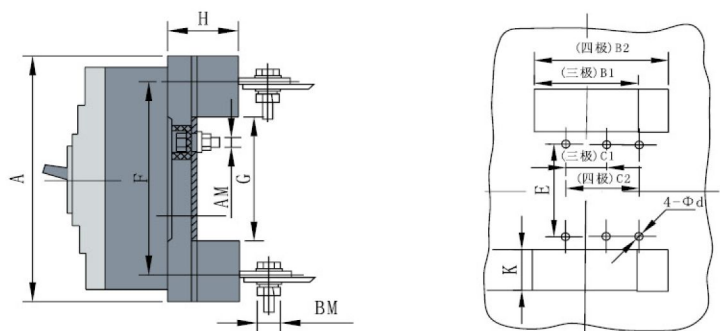


(Unit: mm)

Product model	Number of poles	Overall dimension									Mounting dimension		
		L	L1	L2	W	W1	W2	H	H1	H2	a	b	φd
M1LE-125L	3	150	132	96	92	30	18	94	67	27	30	129	4.5
	4	150	132	96	122	31	18	94	67	27	30	129	4.5
M1LE-125M	3	150	132	96	92	30	18	110	82	29	30	129	4.5
	4	150	132	96	122	30	18	110	82	29	30	129	4.5
M1LE-250L	3	165	145	96	107	35	23	94	62	26	35	126	4.5
	4	165	145	96	142	35	23	94	62	26	35	126	4.5
M1LE-250M	3	165	145	96	107	35	23	110	85	23	35	126	4.5
	4	165	145	96	142	35	23	110	85	23	35	126	4.5
M1LE-400M	3	257	223	175	150	48	32	146	97	39	44	194	7
	4	257	223	175	198	48	32	146	97	39	44	194	7
M1LE-630M/800M	3	280	235	203	210	71	45	146	104	41	70	243	7
	4	280	235	203	280	71	45	146	104	41	70	243	7

iALM1LE Moulded Case Leakage Circuit Breaker

◆ Outline and installation dimensions of plug-in back-panel wiring



(Unit: mm)

Product model	Overall installation dimension (mm)												
	A	B1	B2	C1	C2	E	F	G	K	H	AM	BM	4-φd
iALM1LE-125	168	91	125	60	90	56	132	92	48	50	M6	M8	Φ6.5
iALM1LE-250	186	107	145	70	105	54	145	94	56	50	M6	M8	Φ6.5
iALM1LE-400	280	149	200	60	108	129	224	170	65	60	M8	M12	Φ8.5
iALM1LE-800	305	210	280	90	162	143	242	181	72	87	M10	M14	Φ11

iALM1LE Moulded Case Leakage Circuit Breaker

Selection principle

- a) When selecting the rated residual operating current value of the circuit breaker, full consideration shall be given to the possible normal leakage current value of the protected line and equipment. If necessary, the leakage current value of the protected line or equipment can be obtained through actual measurement.
- b) The rated residual non-operating current of the circuit breaker shall not be less than 2 times of the maximum normal leakage current of electrical lines and equipment.
- c) Hand held electric tools, mobile appliances, household appliances, sockets, construction site appliances (rated current not less than 100A)
- d) Circuit breakers with rated residual operating current of 30mA or less can be selected for single equipment. The circuit breaker with rated residual operating current of 30mA or above shall be selected for the total protection of multiple-equipment (multiple-supports).
- e) Circuit breakers with rated residual operating current of 30mA or less shall be selected for electrical equipment installed in wet places.

Ordering instructions

When ordering, the customer must state:

- a) Model and name of circuit breaker.
- b) Rated current of circuit breaker overcurrent release.
- c) Rated residual operating current of circuit breaker.
- d) Breaking time of circuit breaker.
- e) Protection type, number of poles and quantity.
- f) Rated operating voltage of internal and external accessories of circuit breaker.

Note: please indicate the N-pole protection type when ordering. If the protection type is not indicated, then the protection type provided for L-type and M-type are respectively type A and type B.

Example: order of iALMILE-125 with rated current of 125A, rated residual operating current of 100/300/500mA (adjustable in three gears), non delay of 0.2s, breaking capacity of standard type, four pole, for distribution protection, with shunt release (AC220V), N-pole protection type of type A, 100 sets.

It shall be written as: iALMILE-125L/3N310A 125A 100/300/500mA 0.2s AC220V 100 sets.

Quick selection

Example: iALM1LE-125MP/43002BII 80A 100/300/500mA 0.2s AC220V.

It refers to the iALM1LE-125 motor protection circuit breaker with residual current protection. The rated current of frame size is 125A, the rated current is 80A, the breaking capacity is medium high type, four pole, type B, the rated residual operation current is 100/300/500mA, three gears adjustable, the breaking time is $\leq 0.2s$, thermal magnetic release, with alarm non-tripping module and motor operating mechanism (AC220V).

iALM1LE Moulded Case Leakage Circuit Breaker

Quick selection table of iALM1LE molded case leakage circuit breaker

iALM1LE	125	M	P	/	4	3	00	2	B	II	80A	100/300/500mA	0.2s	AC220V	B	Plateau	Other
Product model	Frame size rated current code	Characteristic code of breaking capacity	Operation mode code	Number of poles	Release name	Accessory	Purpose code	N-pole code	Leakage alarm module	Rated current	Residual operating current	Operation time	Internal and external voltage	Installation mode	Application occasion	Special requirements	
ALM1LE air circuit breaker with residual current protection	125A	L standard M medium H high type	No code for handle direct operation	1N(1P+N)	2 Electro-magnetic release	00 no accessories 08 alarm 10 shunt release	No code for power distribution	No code for three-pole products	I alarm and trip	16, 20, 25, 32, 40, 50, 63, 80, 100, 125	30mA/50mA/75mA/100mA/200mA/300mA/400mA/500mA/600mA/800mA/1000mA	Non-time delay 0.2s; 0.1s	AC380V	Default: fixed front-panel	Default: General application	Length-reduced handle and operating lever	
	250A		P electric operation	2P	3 Thermal magnetic release	20 auxiliary contact 40 shunt release, auxiliary contact	2 for motor protection	Four pole products: type A, type B, type C and type D (see table 1 for details)	II alarm without trip	160, 180, 200, 225, 250, 315, 350, 400	30mA is only available for 125A and 250A. The delay switch has no 30mA product	Delay type: 0.3s/0.4s/ 0.5s/0.6s/ 0.7s/0.8s/ 0.9s/1s	AC220V	B: fixed back-panel	Plateau Damp heat Environment friendly Salt fog Low temp.	Description of other customized parameters	
	400A		Z rotary handle operation	3P		60 two sets of auxiliary contacts N: shunt release, alarm trip R: shunt release, alarm trip		No code means no such function		500, 630, 700, 800	Any three gears can be selected to be adjustable or one gear can be selected to be fixed		DC110V	C: plug-in back-panel			
	630A			3N(3P+N)		28 auxiliary contact, alarm contact							DC220V	F: plug-in front-panel			
	800A				4P		48 shunt release, auxiliary contact, alarm contact										
						68 two sets of auxiliary contacts, alarm contact											