ZQM1L
Plastic case circuit breaker with residual current protection

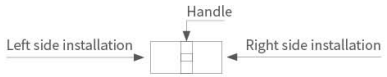
Model meaning

◇ Rated residual operating current: the residual current value of ZQM1L-125, 250 and 400 shells is constant, and the regulation is divided into three grades: 100mA, 300mA and 500mA, which can be adjusted.ZQM1L-630, 800 shell frame, the residual current value is generally 300mA, 500mA and 1250mA， which can be adjusted in three gears.
◇ Rated voltage value is AC220V and AC380V;
◇ Rated voltage value of accessories: conventional shunt release, rated voltage value of AC220V, AC380V, DC24V, conventional undervoltage release.
◇ Optional according to the wiring methods: front panel wiring, rear panel wiring, plug-in wiring, and plug-in front wiring.

Applicable working environment and installation conditions

◇ The altitude of the installation site is 2000m and below;
◇ The surrounding medium temperature shall not be higher than +40℃ and not lower than -5℃ ; And the 24-hour average value shall not exceed 35℃ (except for special orders);
◇ The relative humidity of the air at the installation site shall not exceed 50% when the maximum temperature is+40℃ ; There can be a higher relative humidity at a lower temperature. The monthly average minimum temperature of the wettest month does not exceed+25 ℃ , and the monthly average maximum relative humidity of the month does not exceed 90%. In addition, the condensation on the product surface caused by temperature changes should be considered;
◇ The pollution level is 3;
◇ Protection level: IP20;
◇ The installation category of the main circuit of the circuit breaker is III, and the installation category of the auxiliary circuit and control circuit which are not connected to the main circuit is II;
◇ In the place where there is no explosive medium and there is no gas and conductive dust that can corrode metal and damage insulation;
◇ In a place free from rain and snow;
◇ Circuit breakers shall be installed according to the product instructions.

Release mode and internal accessory code

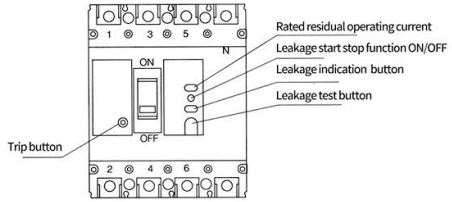


□ Alarm contact ■ Auxiliary contact
● Shunt release ○ Undervoltage tripper
→ Lead direction

Attachment name	Code of release and accessory		Accessory installation side and lead laying			
	Electromagnetic tripping release	Multiple release	ZQM1L-125/3 □ ZQM1L-250/3 □	ZQM1L-125/4 □ ZQM1L-250/4 □	ZQM1L-400/3 □ ZQM1L-630/3 □ ZQM1L-800/3 □	ZQM1L-400/4 □ ZQM1L-630/4 □ ZQM1L-800/4 □
No attachment	200	300				
Alarm contact	208	308				
Shunt release	210	310				
Auxiliary contact	220	320				
Undervoltage release	230	330				
Shunt release, auxiliary contact	240	340				
Two sets of auxiliary contacts	260	360				
Auxiliary contact, undervoltage release	270	370				
Shunt release, alarm contact	218	318				
Auxiliary contact, alarm contact	228	328				
Undervoltage release, alarm contact	238	338				
Shunt release, auxiliary contact and alarm contact	248	348				
Two groups of auxiliary contacts and alarm contacts	268	368				
Auxiliary contact, undervoltage release, alarm contact	278	378				

ZQM1L
Plastic case circuit breaker with residual current protection

Structure introduction



Main technical performance indexes

Model		ZQM1L-125		ZQM1L-250		ZQM1L-400		ZQM1L-630		ZQM1L-800
Rated current of shell frame grade Inm(A)		100		250		400		630		800
Rated current In(A)		16、20、25、32 40、50、63 80、100、125		125、125 140、160、180 200、225、250		225、250 315、350、400		400、500、630		630、700、800
Number of poles		3		3		3		3		3
		4		4		4		4		4
Rated insulation voltage Ui(V)		AC800								
Rated working voltage Ue(V)		AC400								
Rated working frequency (AC)		50/60Hz								
Rated impulse withstand voltage Uimp(V)		8000								
Arc distance (mm)		≥ 50		≥ 50		≥ 100		≥ 100		≥ 100
Segmentation cability level		L	M	L	M	L	M	L	M	M
Ultimate short-circuit sectioning capacity Icu(KA)	AC400V	32	50	35	50	65	100	65	100	100
Operating short-circuit sectioning capability Ics(KA)	AC400V	22	35	22	35	42	50	42	50	50
Rated residual short-circuit switching-on (sectioning) capacity I△m(kA)		8.75	12.5	8.75	12.5	13.5	25	13.5	25	25
Rated residual operating current I△no(mA)	Non-delay	30/100/500		30/100/500		100/300/500		100/300/500		100/300/500
		100/300/500		125/300/500						
	Delay	100/300/500		125/300/500		100/300/500		100/300/500		100/300/500
Rated residual nonoperating current I△no(mA)		$^1/_2$I△n								
Operating performance (times)	Power on	1500		1000		1000		1000		1000
	No electricity	8500		7000		4000		4000		4000
Residual current protection action time		I△n		2 I△n		5 I△n		10 I△n		10 I△n
Maximum segmentation time (S)	Non-delay	0.2		0.1		0.04		0.04		0.04
	Delay	0.5/1.15/2.15		0.31/1/2		0.25/0.9/1.9		0.25/0.9/1.9		0.25/0.9/1.9

Note: The breaking capacity level of bipolar products is only M-type; The maximum breaking time of delay type can be customized according to customer's requirements.

◇ Derating coefficient of ambient temperature change

Ambient temperature / Coefficient / Model	+40°C	+45°C	+50°C	+55°C	+60°C
	Lineup coefficient	Lineup coefficient	Lineup coefficient	Lineup coefficient	Lineup coefficient
ZQM1L-125	1In	0.95In	0.89In	0.84In	0.76In
ZQM1L-250	1In	0.96In	0.91In	0.87In	0.82In
ZQM1L-400	1In	0.94In	0.87In	0.81In	0.73In
ZQM1L-630	1In	0.91In	0.85In	0.80In	0.74In
ZQM1L-800	1In	0.88In	0.83In	0.79In	0.76In

Note: The above derating coefficients are all measured under rated frame current.

Protection characteristics

◇ The thermal release of circuit breaker has inverse time limit characteristic.
The electromagnetic release is instantaneous action, and its characteristics are shown in Table 3 (for power distribution) and Table 4 (for motor protection).

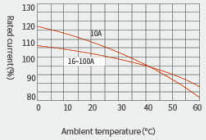
Rated current of tripper(A)	Thermal release (ambient temperature+40℃)		Action current of electromagnetic (A)
	1.05In (cold state) inactivity time (h)	1.30 In (hot state) action time (h)	
In ⩽ 63	⩾ 1	< 1	10In±20%
63 < In ⩽ 125	⩾ 2	< 2	
125 < In ⩽ 630	⩾ 2	< 2	5In±20%，10In±20%

Note: For ZQM1L-225 four-pole circuit breaker, there is no 5In specification for the electromagnetic release (short circuit protection) of the neutral pole (N).

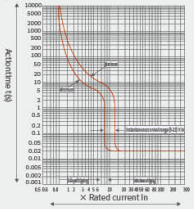
Rated current of release(A)	Thermal release (ambient temperature+40℃)				Action current of electromagnetic(A)
	1.0In(cold state)	1.2In (hot state)	1.5In (hot state)	7.2In(cold state)	
	Inactive time (h)	Action time (h)	Action time (h)	Action time (h)	
10 < In ⩽ 400	2	2	8min	2s ⩽ Tp ⩽ 20s	12In±20%

Characteristic curve ofcircuit breaker

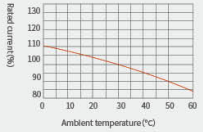
◇ Current-temperature characteristics



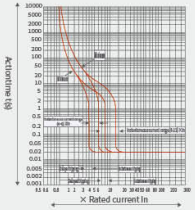
◇ ZQM1L-125L、M/current characteristic curve (power distribution)



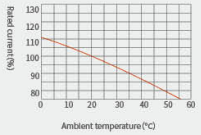
◇ Current-temperature characteristics



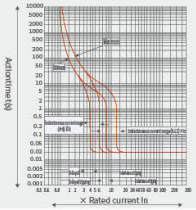
◇ ZQM1L-225L、M/current characteristic curve (power distribution)



◇ Current-temperature characteristics

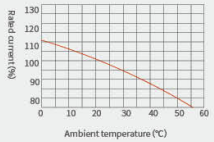


◇ ZQM1L-400L、M/current characteristic curve (power distribution)

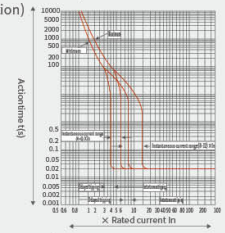


Characteristic curve ofcircuit breaker

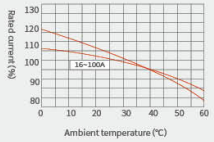
◇ Current-temperature characteristics



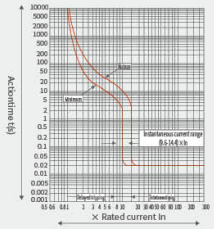
◇ ZQM1L-630M、800M time/current characteristic curve (power distribution)



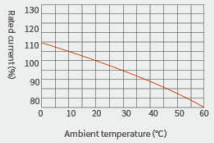
◇ Current-temperature characteristics



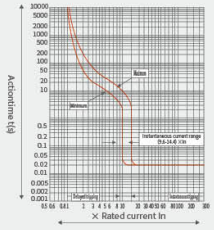
◇ ZQM1L-125L、M time/current characteristic curve (Motor)



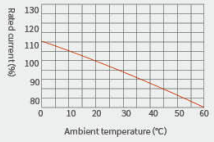
◇ Current-temperature characteristics



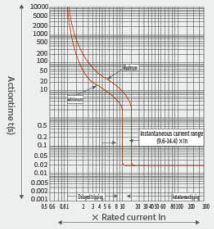
◇ ZQM1L-250L、M time/current characteristic curve (Motor)



◇ Current-temperature characteristics

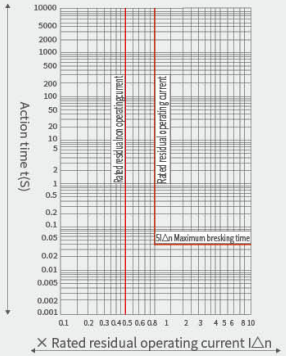


◇ ZQM1L-400L、M time/current characteristic curve (Motor)

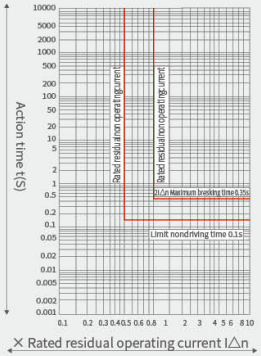


Characteristic curve ofcircuit breaker

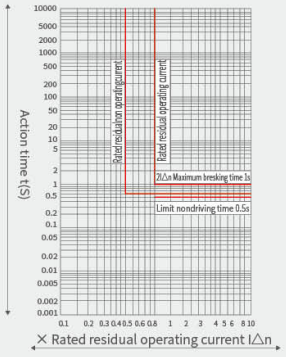
◇ I△n=100mA、300mA、500mA non-delayed residual current protection time/current characteristic curve

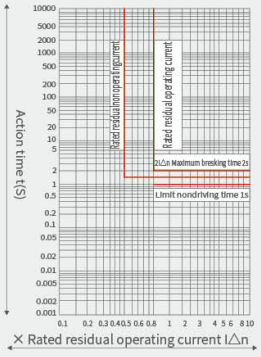


◇ I△n=100mA、300mA、500mA、1250mA delay residual current protection time/current characteristic curves



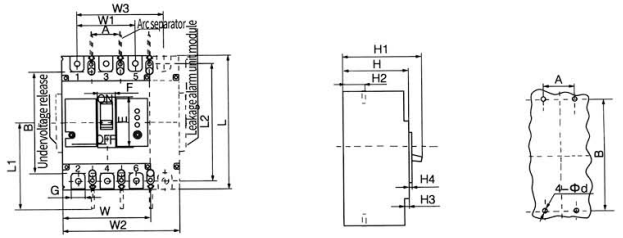
◇ I△n=100mA、300mA、500mA、1000mA delay residual current protection time/current characteristic curves





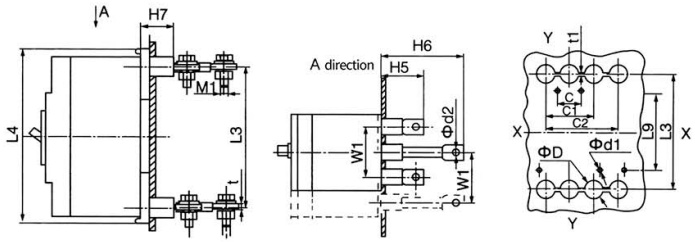
Outline and installation opening size

◇ Outline drawing of front panel wiring and dimension drawing of installation opening



Model	Outline and installation opening size																	
	Front panel wiring																	
	W	W1	L	L1	L2	H	HI	H2	H3	H4	E.	F	G	W2	W3	A	B	Φd
ZQM1L-125L	92	60	150	125	132	75	92	26	10	4	50	22.5	18	122	90	30	129	4.5
ZQM1L-125M	92	60	150	125	132	92	110	28.5	10	4	50	22.5	18	122	90	30	129	4.5
ZQM1L-250L	107	70	165	132.5	144	73	92	26	6	4	50	22.5	23	142	105	35	126	4.5
ZQM1L-250M	107	70	165	132.5	144	91	110	23.5	6	4	50	22.5	23	142	105	35	126	4.5
ZQM1L-400L、M	150	96	257	220.5	224	107	147	38	9	5	86	56	32.5	198	144	44	194	7
ZQM1L-630L、M	210	140	280	240	243	114	158	42	10.5	6	86	64	45	280	210	70	243	7
ZQM1L-800M	210	140	280	240	243	114	158	42	10.5	6	86	64	45	280	210	70	243	7

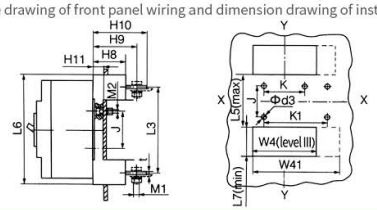
◇ Outline drawing of rear panel wiring and dimension drawing of installation opening



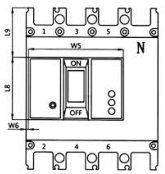
Model	Outline and installation opening size													
	Rear panel wiring													
	C	C1	C2	L9	t	Φd2	L3	L4	H5	H6	ΦD	M	Φd1	H7
ZQM1L-125L	30	60	90	129	/	6	132	164	53	93	22	M8	5.5	35
ZQM1L-125M	30	60	90	129	/	6	132	164	53	93	22	M8	5.5	35
ZQM1L-250L	35	70	105	126	5	8.5	144	173	55	125	24	t1 ⩾ 3	5.5	35
ZQM1L-250M	35	70	105	126	5	8.5	144	173	55	125	24	t1 ⩾ 3	5.5	35
ZQM1L-400L、M	44	96	144	194	8.5	10.5	224	267	67.5	127.5	32	⩾ 3	6.5	37
ZQM1L-630L、M	70	140	210	243	16	13	243	295	50	83	40	⩾ 3	7	37
ZQM1L-800M	70	140	210	243	16	13	243	295	50	83	40	⩾ 3	7	37

Characteristic curve of circuit breaker

◇ Outline drawing of front panel wiring and dimension drawing of installation opening



◇ Opening size of ZQM1L series panel



Model	Outline and installation opening size																		
	Plug-in panel front/rear																		
	L5	L6	H8	H9	H10	H11	M1	M2	J	K	K1	L7	W4	W41	Φd3	W5	L8	L9	W6
ZQM1L-125L	90	168	50	64	76	17.5	M8	M6	56	60	90	41	94	125	6.5	88	50.5	50	2.0
ZQM1L-125M	90	168	50	64	76	17.5	M8	M6	56	60	90	41	94	125	6.5	88	50.5	50	2.0
ZQM1L-250L	88	183	50	71.5	86.5	17.5	M8	M6	54	70	105	51	110	145	6.5	102	50.5	54	2.5
ZQM1L-250M	88	183	50	71.5	86.5	17.5	M8	M6	54	70	105	51	110	145	6.5	102	50.5	54	2.5
ZQM1L-400L、M	166	279	60	83.5	106.5	21	M10	M8	129	60	108	58	152	200	8.5	140	91	83	5.0
ZQM1L-630L、M	171	205	87	87	109	27	M12	M8	143	90	162	72	220	290	10	182	91	94.5	15
ZQM1L-800M	171	205	87	87	109	27	M12	M8	143	90	162	72	220	290	10	182	91	94.5	15

Circuit breaker internal accessories

The circuit breaker accessories can be directly led out or equipped with terminal blocks according to user needs.

◇ Undervoltage release

a、The undervoltage release is type c: AC50Hz 230V and 400V.
b、See the table for power of undervoltage release .

Model	Undervoltage release power (VA)	
	AC230V	AC400V
ZQM1L-125	2.6	33
ZQM1L-250	3.8	3.3
ZQM1L-400	3.7	2.7
ZQM1L-630	2.5	2.8
ZQM1L-800	2.5	2.8

When the rated working voltage is 35%~ 70%, the undervoltage device shall reliably trip the circuit breaker;
When the rated working voltage is 85% ~ 110%, the undervoltage release shall ensure that the circuit breaker can be closed.
When the rated working voltage is lower than 35%, the undervoltage release shall prevent the circuit breaker from closing.
Wiring diagram of external undervoltage module (wiring diagram 1 of internal accessories of circuit breaker is shown in the dotted box)
Notice: The undervoltage release must be powered on before the circuit breaker can be tripped and closed again. Otherwise, the circuit breaker will be damaged!

◇ Shunt tripping release

a、Voltage specification: AC50Hz230V, 400v; DC220V
b、When the rated control power supply voltage is 70~110%, the shunt release shall reliably trip the circuit breaker.
c、K: The microswitch in series with the coil inside the shunt release is a normally closed contact. When the circuit breaker is opened, the contact will automatically open and close when it is closed. . Wiring diagram (wiring diagram 2 of the internal accessories of the circuit breaker is shown in the dotted box)

◇ Leakage alarm unit module

a、The leakage alarm unit module has two ways, which can be explained by the user when ordering.
b、When leakage occurs， the leakage alarm module sends a signal and the circuit breaker is tripped at the same time mode I (indicated by I)
c、when leakage occurs, the leakage alarm module sends a signal, but the circuit breaker is not tripped mode 2 (indicated by N), and the wiring diagram (The dotted frame is the wiring diagram of the internal accessories of the leakage alarm module) .

Note: The second way is to meet the needs of special occasions. Users should consider carefully when using this function to protect electrical appliances.

Circuit breaker internal accessories

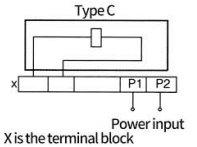


Figure 1

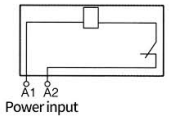


Figure 1

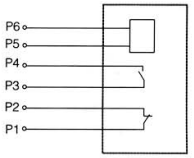


Figure 3

Specification: Terminal P5- P6 input power is AC50Hz 230V or 400V. P1-P2 and P3-P4 contact capacity are AC230V5A.
Note: PI -P2 is normally closed contact and P3-P4 is normally open contact.

◇ Alarm contact

The circuit breaker is in the position of "opening" and "closing"	B12 B14 — B11
The circuit breaker is in the position of "free tripping" (alarm).	B11、B14 change from off state to on state B11、B12 change from on state to off state

◇ Auxiliary contact

When the circuit breaker is in the "open" position	F12 F14 — F11
When the circuit breaker is in the "close " position	F11、F14change from off state to on state F11、F12change from on state to off state

◇ Rated current of auxiliary contact and alarm contact

Classification	Rated current of shell frame grade Inm(A)	Agreed heating current Ith(A)	Rated working current Ie(A) at AC400V	Rated working current Ie(A) at DC220V
Auxiliary contact	⩽ 225	3	0.3	0.15
	⩾ 400	3	0.4	0.2
Alarm contact	100 ⩽ Inm ⩽ 630		AC220V/1A	0.15

◇ Power-on operation performance and corresponding test conditions of auxiliary contact

Use category	Put through			Breaking			Number of power on operation cycles	Number of operation cycles per minute	Power on time
	I/Ie	U/Ue	cosΦ or T0.95	I/Ie	U/Ue	cosΦ or T0.95			
AC-15	10	1	0.3	10	1	0.3	6050	6	⩾ 0.05s
DC-13	1	1	6Pe	1	1	6Pe			⩾ T0.95

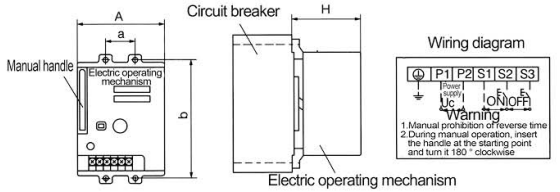
◇ Power-on operation performance and corresponding test conditions of auxiliary contact

Use category	Put through			Breaking			Number of power on operation cycles	Number of operation cycles per minute	Power on time
	I/Ie	U/Ue	cosΦ or T0.95	I/Ie	U/Ue	cosΦ or T0.95			
AC-15	10	1.1	0.3	10	1.1	0.3	10	2	⩾ 0.05s
DC-13	1.1	1.1	6Pe	1.1	1.1	6Pe			⩾ T0.95

Note: the above two tables
a、T=6Pe is the empirical formula, where Pe is in watts and T is in milliseconds;
b、When the total number of operating performance of the circuit breaker is less than 6050, the number of power-on operating performance of the auxiliary contact can be equal to the number of operating performance of the circuit breaker;
c、The operating frequency and power-on time are allowed to be consistent with the main circuit of the circuit breaker.

Circuit breaker internal accessories

◇ CD2 motor operating mechanism



Note: After the circuit breaker trips, the electric operating mechanism must make the circuit breaker trip again before closing.

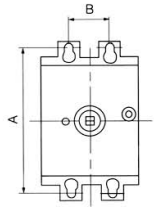
◇ CD2 Electric operating mechanism appearance and installation dimension, wiring diagram, starting current, power and life

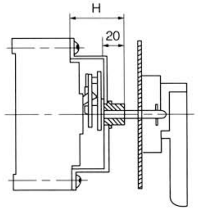
Electric operating mechanism	Circuit breaker model	Overall dimension of installation (mm)				Rated voltage (V)	Action current (A)	Mechanical life (times)	Motor power (W)
		a	b	A	H				
CD2-125/ M	ZQM1L-125	30	129	90	92	AC 230/110V DC 250/110V	⩽ 0.5	14000	14
CD2-250/ M	ZQM1L-250	35	126	90	93				
CD2-400/ M	ZQM1L-400	44	194	130	143	AC 230/110V DC 250/110V	⩽ 2.0	5000	35
CD2-630/800 M	ZQM1L-630/800	70	243	130	147				

Rotating handle operating mechanism

◇ Rotary handle operating mechanism (common for three-pole and four-pole circuit breakers)
Purpose: This mechanism is specially used for ZQM1L series molded case circuit breaker. It can realize the requirements of drawer cabinet, power distribution cabinet, power box, etc. on the panel by rotating the handle, and ensure that the cabinet door panel can not be opened when the circuit breake is closed (that is, it is interlocked with the door) .
Features: The operating mechanism adopts a unique design and transmission structure. The closing, opening and re-tripping of the molded case circuit breaker are realized by rotating the handle. The operation is flexible and stable, the operation force is small, the installation is convenient, and the overall performance and quality of the mechanism are superior to other similar products.

Overall dimensions of rotary handle operating mechanism





Manual operation	Circuit breaker model	A	B	H
CT2-127.4	ZQM1L-125	129	30	61
CT2-127.5	ZQM1L-250	142	35	57
CT2-237.2	ZQM1L-400	194	138	87
CT2-2310.4	ZQM1L-630(800)	243	197	87

Overall dimensions of rotary handle operating mechanism

Note:

1、The MCCB model corresponding to the panel number of the rotating handle operating mechanism is: ZQM1L-125 number "127.4"; ZQM1L-250No. "127.5"; ZQM1L-400No. "237.2"; ZQM1L-630No. "228.3"; ZQM1L-800No. "2310.4".

2、The CT2 rotary manual operating mechanism can be equipped with two operating handles; One is "F" type square handle; The other is "A" type round handle, and its door panel opening size is shown in the figure below.

3、The length of the square shaft D=150mm. If the length is greater than 150mm, it shall be noted when ordering.

4、When ordering, if the handle is equipped with "F type" handle, add "F"; if the handle is equipped with "A type" handle, add "A"; the order is written as "model and its meaning".

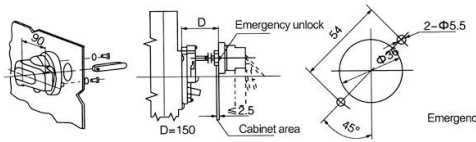
Warning to the user: the manual operating mechanism required for this circuit breaker must be ordered from our factory to ensure the product quality. If the user purchases the manual operating mechanism by himself or after installation, our factory will not be responsible for any adverse consequences.

◇ Operating handle features

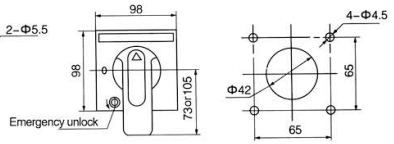
a、The cabinet door can not be opened when the circuit breaker is closed

b、If there is a fault in the operating handle or manual operating mechanism is in the closing state, the cabinet door can be opened by the emergency unlocking device on the handle

c、The opening of the door panel corresponding to the operating mechanism of different specifications is consistent.



Hole size of "A" handle panel



Hole size of "F" handle panel

Rated current and conductor sectional area

Cross-sectional area of connecting wires and corresponding rated current.

Rated current value (A)	10	16,20	25	32	40 ,50	63	80	125	125 ,140	160	180, 200,225	250	315 ,350	400
Wire cross-sectional area (mm^2)	1.5	2.5	4	6	10	16	25	35	50	70	95	120	185	240

The rated current value (A)	Electric cable		Copper bar	
	Quantity	Sectional area (mm^2)	Quantity	Sectional area (mm^2)
500	2	150	2	30x5
630	2	185	2	40x5
800	2	240	2	80x5

Notice when ordering

◇ When ordering, the user must indicate the model, specification and accessories of the circuit breaker, and the residual current operating time (i.e., non-delay type and delay type). When ordering the undervoltage release and shunt release, the user should indicate the voltage value of the working power supply (or control power supply).

◇ For example, ZQM1L-125 four-pole, rated current is 50A, residual action time type is delay type, with rotating handle operating mechanism, with leakage alarm unit module, and operates in mode 1, neutral pole type is C, shunt release (AC400V), and 20 sets are connected behind the board.

◇ Namely, it is written as order ZQM1L-125Z/4310C1, In=50A, the remaining action time type is delay type, shunt release AC400V, 20 sets of wiring behind the board, and the leakage module needs to provide rated working voltage.

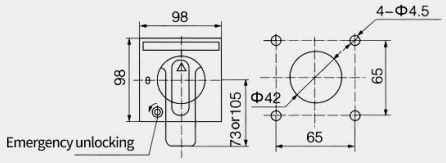
Note: Due to the continuous improvement of product technology, all data shall be subject to the confirmation of the latest data of the company, and are subject to change without notice.

◇ Operating handle features

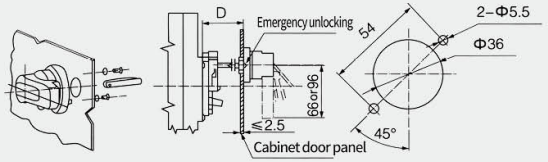
a、When the circuit breaker is in the closing state, the cabinet door cannot be opened;

b、If the operating handle or the hand-operated mechanism fails in the closing state, the cabinet door can be opened by the emergency unlocking device on the operating handle;

c、corresponding to different specifications of hand-operated mechanism, matching hand-operated handle, the door opening is consistent.

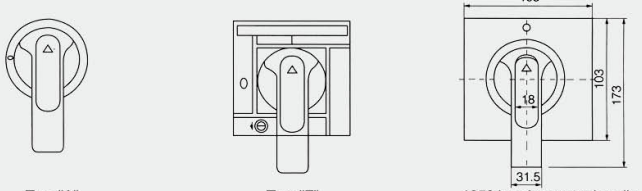


The shape of F-shaped square handle and the opening size of door panel shall be no less than 100mm from the hinge



Type A round handle shape and door panel opening size
(the distance from the opening center to the hinge is not less than 100mm)

Handle diagram



Type"A" Type"F" 1250 hand operator handle