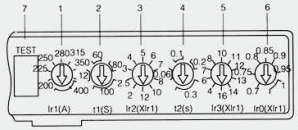
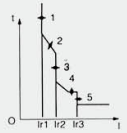
ZQM1E
Intelligent Moulded Case Circuit Breaker

Introduction to structure identification

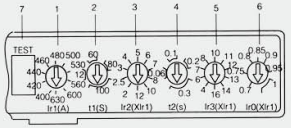
◇ ZQM1E-400，In=400A intelligent release



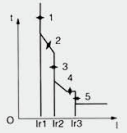
Intelligent release protection characteristic curve



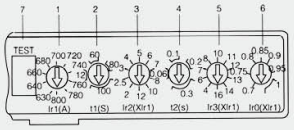
◇ ZQM1E-630，In=630A intelligent release



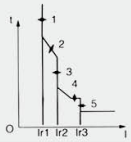
Intelligent release protection characteristic curve



◇ ZQM1E-800，In=800A intelligent release



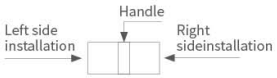
Intelligent release protection characteristic curve



Main technical performance indicators

Model		ZQM1E-125		ZQM1E-250		ZQM1E-400		ZQM1E-630		ZQM1E-800	
Shell frame current Inm(A)		125		250		400		630		800	
Rated current Ir1(A)		32(16/20/25/32) 63(32/40/50/63) 125(63/70/80/100 /125)		250(125/125/140/ 160/180/200/225/ 250)		400(225/250/280/ 315/350/400)		630(400/440/460/ 560/600/630)		800(630/660/700/ 740/780/800)	
Number of poles		3		3		3		3		3	
		4		4		4		4		4	
Rated insulation voltageUi(V)		AC800									
Rated working voltage Ue(V)		AC400									
Rated working frequency (AC)		50/60Hz		50/60Hz		50/60Hz		50/60Hz		50/60Hz	
Rated impulse withstand voltage Uimp (V)		8000									
		M	H	M	H	M	H	M	H	M	H
Ultimate short circuit breaking capacity Icu (kA)	AC400V	50	85	50	85	65	85	65	85	75	125
Operating short circuit breaking capability Ics(kA)	AC400V	35	50	35	50	42	50	42	50	50	65
Operating short-time withstand current Icw(In)/1s		15									
Use category		A		A		B		B		B	
Operational performance	Power on (times)	1500		1000		1000		1000		500	
	No power(times)	8500		7000		4000		4000		2500	

Release mode and accessory code

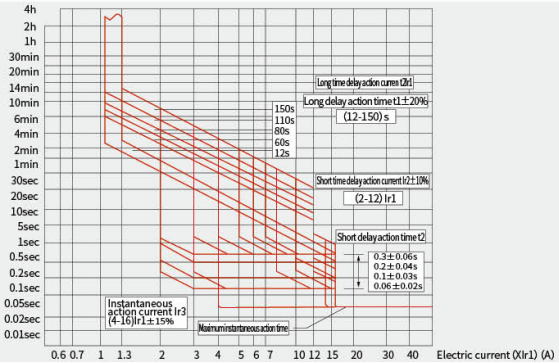


□ Alarm contact
● Shunt release
→ Lead direction
■ Auxiliary contact
○ Undervoltage release

Note: A、300 represents circuit breaker without accessories in the table
b、348 auxiliary contacts in ZQM1E-630 and ZQM1E-800 are a pair of contacts (i.e. one normally open and one normally closed) 368 auxiliary contacts are three pairs of contacts (i.e. three normally open and three normally closed)

Additional	Attachment name \ Number of poles \ Model	ZQM1E-125、250	ZQM1E-400		ZQM1E-630、800
		3 pole ,4 pole	3 pole, 4 pole	4 pole	3 pole ,4 pole
308	Alarm contact	✓	✓	✓	✓
310	Shunt release	✓	✓	✓	✓
320	Auxiliary contact	✓	✓	✓	✓
330	Undervoltage release	✓	✓	✓	✓
340	Shunt release, auxiliary contact			✓	✓
350	Shunt release Undervoltage release				✓
360	Two sets of auxiliary contacts			✓	✓
370	Auxiliary contact Undervoltage release			✓	✓
318	Shunt release Alarm contact				✓
328	Auxiliary contact Alarm contact	✓	✓	✓	✓
338	Undervoltage release Alarm contact				✓
348	Shunt release Auxiliary contact, alarm contact				✓
368	Two sets of auxiliary contacts Alarm contact			✓	✓
378	Auxiliary contact, alarm contact of undervoltagerelease				✓

Circuit breaker characteristic curve



Power loss and derating coefficient

Model	Power on current (A)	Three-phase total power loss (VA)	
		Front and rear plate wiring	Plug in wiring
ZQM1E-125	125	35	40
ZQM1E-250	250	62	70
ZQM1E-400	400	115	125
ZQM1E-630	630	190	210
ZQM1E-800	800	262	294

Ambient temperature / Coefficient / Model	+40℃	+45℃	+50℃	+55℃	+60℃
	Lineup coefficient	Lineup coefficient	Lineup coefficient	Lineup coefficient	Lineup coefficient
ZQM1E-125	1In	0.95In	0.89In	0.84In	0.76In
ZQM1E-250	1In	0.96In	0.91In	0.87In	0.82In
ZQM1E-400	1In	0.94In	0.87In	0.81In	0.73In
ZQM1E-630	1In	0.91In	0.85In	0.80In	0.74In
ZQM1E-800	1In	0.88In	0.83In	0.79In	0.76In

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

Characteristics of intelligent release

◇ Release characteristics
It has the protection functions of load long delay inverse time， short circuit short delay inverse time ，short circuit short delay definite time，short circuit instantaneous action， etc.It can be set by users to form the required protection characteristics.

◇ Inverse time limit action characteristics of long time delay overcurrent protection

Electric current		Actuation time								
For power distribution	1.05Ir1	⩾ 2h no action								
	1.3Ir1	⩽ 1h action								
	2Ir1	Setting time t1	Imm-125/250A				Inm-400/630/800A			
			12	60	80	100	12	60	100	150
Motor for household use	1.05Ir1	＞ 2hno action								
	1.2Ir1	＜ 1h action								
	1.5Ir1	Action time T1	Imm-125/250A				Inm-400/630/800A			
			21.3	107	142	178	21.3	107	178	267
	2Ir1	Action time T1	12	60	80	125	12	60	125	150
	7.2Ir1	Setting time t1	0.93	4.63	6.17	7.72	0.93	4.63	7.72	11.6

Note: 1. The action time conforms to i2t1 = (2ir1) 2t1 (1.2 ⩽ 1 < ir2);　　2、The action time tolerance is ±20%;
3. The returnable time shall not be less than 70% of the action time.

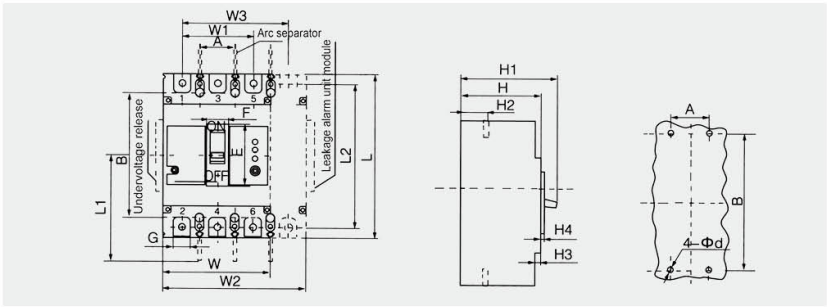
	Actuation time					
Ir2 ⩽ 1 ＜ 1.5Ir2	Inverse time limit		$I^2T2=(1.5Ir2)^2t2$			
1.5Ir2 ⩽ 1 ＜ Ir3	Definite time limit	Setting time t2(s)	0.06	0.1	0.2	0.3
		Tolerance (s)	±0.02	±0.03	±0.04	±0.06
		Returnable time (s)			0.14	0.21

◇ If the user has no special requirements when ordering, the characteristic parameters of the release are configured in the following table.

Overload long delay	Setting current Ir1	In	
	Time delay t1	60s	
Short circuit short time delay	Setting current Ir2	8Ir10.3	
	Time delay t2	0.3s	
Short circuit instantaneous short circuit	Setting current Ir3	Inm=125、250、400、630	12Ir1
		Inm=800	10Ir1
Pre-alarm	Setting current Ir0	0.9Ir1	

Outline and installation opening size

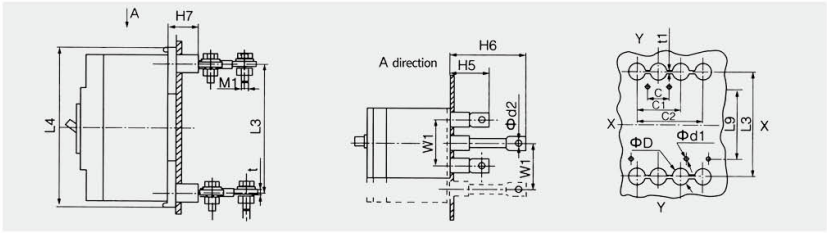
◇ Front panel wiring



◇ Outline installation opening size

Model	ZQM1E outline and installation opening size (mm)																	
	Front panel wiring																	
	W	W1	L	L1	L2	H	H1	H2	H3	H4	E	F	G	W2	W3	A	B	Φd
ZQM1E-125	92	60	150	125	132	92	110	28.5	10	4	50	22	17.6	122	90	30	129	4.5
ZQM1E-250	107	70	165	132.5	144	90	152	24	5	4	62	22	22	142	105	35	126	4.5
ZQM1E-400	150	96	257	220.5	224	106.5	146.5	38	4.5	3.5	88.6	65	30	198	144	44	194	7
ZQM1E-630	181.5	116	270	185	234	112	152	45.5	8	7	88.5	66	44	240	154.5	58	200	7
ZQM1E-800	210	140	280	240	243	115.5	152	45.3	8	6	81	66	44	280	210	70	243	7

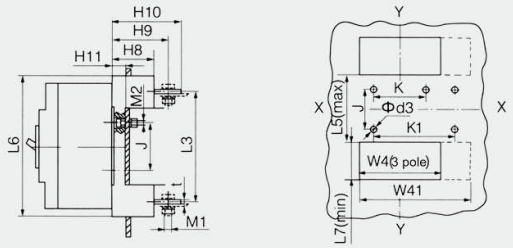
◇ Rear panel wiring



Model	ZQM1E outline and installation opening size (mm)													
	Rear panel wiring													
	C	C1	C2	L9	t	Φd2	L3	L4	H5	H6	ΦD	M	Φd1	H7
ZQM1E-125	30	60	90	129			132	164	53	93	22	M8	5.5	35
ZQM1E-250	35	70	105	126	5	8.5	144	173	55	125	24	t1 ⩾ 3	5.5	35
ZQM1E-400	44	96	144	194	8.5	10.5	224	267	67.5	127.5	32	⩾ 3	6.5	37
ZQM1E-630	58	116	154.5	200	16	13	234	270	48	80	40	⩾ 3	6.5	37
ZQM1E-800	70	140	210	243	16	13	243	295	50	83	40	⩾ 3	7	37

Outline and installation opening size

◇ Plug-in front and rear panel wiring

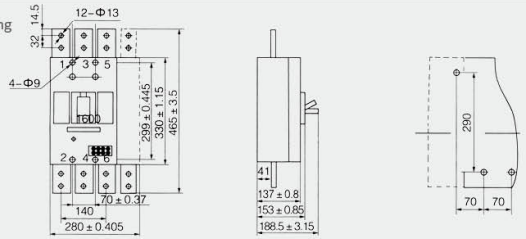


◇ Outline installation opening size

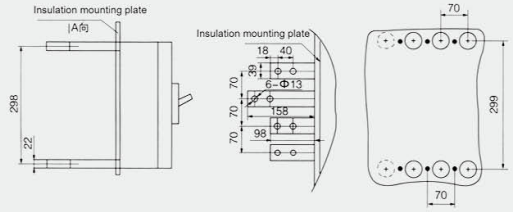
Model	ZQM1E outline installation opening size (mm)														
	Plug-in front and rear panel wiring														
	L5	L6	H8	H9	H10	H11	M1	M2	J	K	K1	L7	W4	W41	Φd3
ZQM1E-125	90	168	50	64	76	17.5	M8	M6	56	60	90	41	94	125	6.5
ZQM1E-250	88	183	50	71.5	86.5	17.5	M8	M6	54	70	105	51	110	145	6.5
ZQM1E-400	166	279	60	83.5	106.5	21	M10	M8	129	60	108	58	152	200	8.5
ZQM1E-630	160	300	67	60	110	22	M12	M8	123	125	158	75	192	252	10
ZQM1E-800	171	205	87	87	109	27	M12	M8	143	90	162	72	220	290	10

Outline and installation dimensions of ZQM1E-1250 (1600)

◇ Front panel wiring

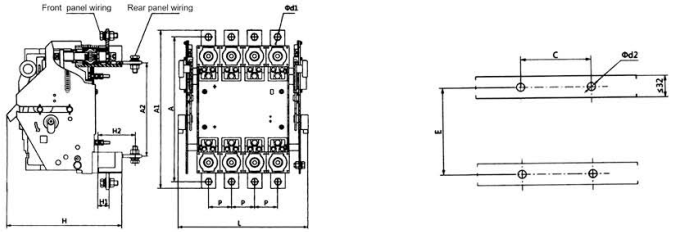


◇ Rear panel wiring



Outline and installation dimensions of ZQM1E-1250 (1600)

◇ Drawout (drawer-type) front and rear wiring



◇ Outline installation opening size (mm)

Model	Drawout (drawer-type) front and rear wiring											
	A	A1	A2	H	HI	H2	P	L	C	E	Φd1	Φd2
ZQM1E-400/3P	312	340	194	248	24	78	48	223	96	140	Φ11	Φ7
ZQM1E-630/3P	343	381	200	277	37	102	58	258	116	140	Φ13	Φ7
ZQM1E-800/3P	--	--	--	--	--	--	--	--	-	--	--	-
ZQM1E-1250/3P ZQM1E-1600/3P	485	515	261	280	29	48	70	265	140	140	Φ13.5	Φ9

Internal accessories of circuit breaker

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

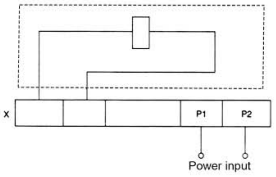
◇ Undervoltage release

The undervoltage tripping device is type C: AC50Hz 230V, 400V. See table for power of undervoltage release.

Overload long delay	Undervoltage release power (VA)	
	AC230V	AC400V
ZQM1E-125	2.6	3.3
ZQM1E-250	3.8	3.3
ZQM1E-400	3.7	2.7
ZQM1E-630	2.5	2.8
ZQM1E-800	2.5	2.8
ZQM1E-1600	2.5	2.8

When the rated working voltage is 35%~70%, the undervoltage release 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 of internal accessories of circuit breaker is shown in the dotted frame)

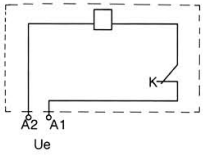


Warning: The undervoltage release must be power on before the circuit breaker can be tripped and closed again. Otherwise, the circuit breaker will be damaged!
Symbol description: X is the terminal block.

Internal accessories of circuit breaker

◇ Shunt release

According to the line diagram (the internal accessories of the switch are in the dotted box). Voltage specification: AC50Hz, 230V, 400V, DC220V. When the rated control power supply voltage is 70~110%, the shunt release shall reliably trip the circuit breaker.



K: The normally closed contact of the microswitch in series with the coil inside the shunt release will automatically open when the circuit breaker is opened and close when it is closed.

◇ Alarm contact

The circuit breaker is in the position of "opening" and "closing	B14, B12, B11
The position when the circuit breaker is in "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 "off" position	F14, F12, F11
When the circuit breaker is in the "on" position	F11 , F14 change from off state to on state. F11, F12 change 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)	The rated working current Ie(A) at AC400V	The rated working current Ie(A) at DC220V
Auxiliary contact	⩽ 250	3	0.3	0.15
	⩽ 400	3	0.4	0.2
Alarm contact	⩽ 100 ⩽ Inm ⩽ 630		AC220V/1A	0.15

◇ Power on operation performance of auxiliary contact and corresponding experimental conditions

Use category	Put through			Breaking			Number of poweron operation cycles	Number of operation cycles per minute	Power on time
	I/Ie	U/Ue	COSΦ 或 T0.95	I/Ie	U/Ue	COSΦ 或 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

◇ Connecting and breaking capacity of auxiliary contacts under abnormal conditions

Use category	Put through			Breaking			Number of poweron 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. T0.95=6Pe is an empirical formula, where Pe is in watts and T0.95 is in milliseconds.

b. When the total times of circuit breaker operation performance are less than 6050, the times of power on operation performance of auxiliary contact can be equal to the total times of circuit breaker operation performance.

c. The operating frequency and power on time are allowed to be consistent with the main circuit of the circuit breaker.

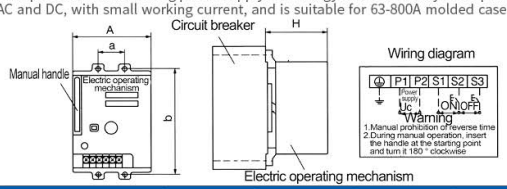
ZQM1E
Intelligent Moulded Case Circuit Breaker

Circuit breaker external accessories

◇ CD2 electric operating mechanism

Features and uses:

CD2 series electric operating mechanism adopts advanced switching power supply technology and is driven by small permanent magnet motor. It can be used for both AC and DC, with small working current, and is suitable for 63-800A molded case circuit breaker.



Electric operating mechanism	Model of circuit breaker	Overall installation dimensions				Rated voltage (V)	Action current (V)	Mechanical life (times)	Motor power (W)
		a	b	A	H				
CD2-125/ M	ZQM1E-125	30	129	90	92	AC 230/110V DC 250/110V	⩽ 0.5	10000	14
CD2-225/ M	ZQM1E-225	35	126	90	93				
CD2-400/ M	ZQM1E-400	44	194	130	143				
CD2-630/ M	ZQM1E-630	58	201	130	143	AC 230/110V DC 250/110V	⩽ 2.0	5000	35
CD2-800/ M	ZQM1E-800	70	243	130	147				
CD2-1250/ M CD2-1600/ M	ZQM1E-1250 ZQM1E-1600	70	300	130	153				

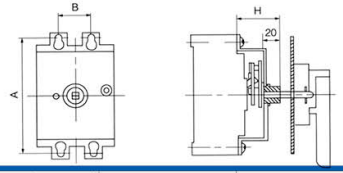
Rotating handle operating mechanism

◇ Rotating handle operating mechanism (common for three-pole and four-pole circuit breakers)

Purpose: This mechanism is specially used for ZQM1E series molded case circuit breakers. It can realize the requirements for the operation of drawer cabinets, distribution cabinets, power boxes, etc. on the panel by rotating the handle, and ensure that the door panel of the cabinet cannot be opened when the circuit breaker is closed (i.e. interlocked with the door).

Features: The operating mechanism adopts a unique design and transmission structure, and realizes the closing, opening and re tripping of the molded case circuit breaker by rotating the handle. Flexible and stable operation, small operation force, convenient installation, and the overall performance and quality of the mechanism are superior to other similar products.

Overall dimensions of rotary handle operating mechanism



Manual operating mechanism	Distribution circuit breaker model	A	B	H
CT2-127.4	ZQM1E-125	129	30	61
CT2-127.5	ZQM1E-250	142	35	57
CT2-237.2	ZQM1E-400	194	138	87
CT2-228.3	ZQM1E-630	201	166	97
CT2-2310.4	ZQM1E-800	243	197	87

Note:

◇ The corresponding MCCB model number of the operating mechanism panel of the rotary handle is ZQM1E-125, "127.4", and ZQM1E-250, "127.5"; ZQM1E-400 No. "237.2"; ZQM1E-630 No. "228.3"; ZQM1E-800 No. "2310.4".

◇ CT2 rotary manual operating mechanism can be equipped with two kinds of operating handles, one is "F" type square handle, and the other is "A" type round handle. See the figure below for the hole size of the door panel.

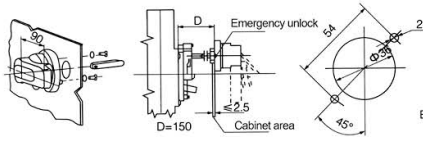
◇ The length of square shaft D=150mm, if the length is greater than 150mm, it shall be noted when ordering.

◇ When ordering, if the handle is equipped with "F-type" handle, add "F", if the handle is equipped with "A-type" handle, add "A", and the order writing method is as follows: "Model and its meaning".

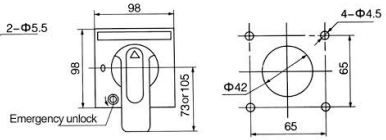
Warning to the user: the manual operating mechanism of this circuit breaker must be ordered from our factory to ensure the product quality. If the user purchases the manual operating mechanism by himself or after installation, our factory will not be responsible for any adverse consequences.

Overall dimensions of rotary handle operating mechanism

◇ Operating handle characteristics
a、when the circuit breaker is in the closing state, the cabinet door can not be opened;
b、If the operating handle or manual operating mechanism fails in the closing state, the cabinet door can be opened through the emergency unlocking device on the operating handle;
c、The opening of the door plate of the corresponding manual operating mechanism with different specifications and the matched manual handle is consistent.



Hole size of "A" handle panel



Hole size of "F" handle panel

Test current and sectional area of wire

The sectional area of the connecting wire for temperature rise test and the corresponding test current.

Rated current value A	10	16.20	25	32	40.50	63	80	100	125	140	160	180.200.225	250	315	400
sectional area of wire mm²	1.5	2.5	4	6	10	16	25	35	50	50	70	95	120	185	240

Rated current value A	Cable sectional area mm²		Copper bar size	
	Quantity	Sectional area mm²	Quantity	Size
500	2	150	2	30x5
630	2	185	2	40x5
800	2	240	2	80x5

Terminal block type

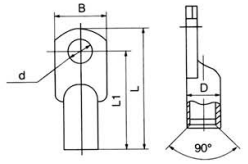
The terminal blocks are divided into JGC, JBC and JB models which are selected by users

Rated current value A	Cable sectional area mm²		Copper bar size	
	Quantity	Sectional area mm²	Quantity	Size
500	2	150	2	30x5
630	2	185	2	40x5
700.800	2	240	2	50x5
1000			2	60x5
1600			2	80x5

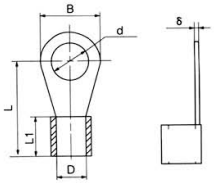
Model	Current A	Wire sectional area mm²	Terminal model	B	L	L1	D	d
ZQM1E-125	10.16.20	2.5	JBC2.5-8	15	28	8.5	Φ2.6	Φ8.2
	32	6	JBC6-8	15	30	10	Φ3.5	Φ8.2
	40.50	10	JBC10-8	15	32	11	Φ4.5	Φ8.2
	63	16	JGC16-8	17	41	33.5	Φ6	Φ8.2
	80	25	JGC25-8	17	46	38.5	Φ7	Φ8.2
	100	35	JGC35-8	17	52	44.5	Φ8	Φ8.2
	125	50	JGC50-8	17	52	44.5	Φ8	Φ8.2
ZQM1E-250	125	50	JGC50-8	22	54	45	Φ10	Φ8.2
	160	70	JGC70-8	22	61	52	Φ11	Φ8.2
	180.200.225	95	JGC95-8	22	66	57	Φ13	Φ8.2
	250	120	JGC120-8	22	66	57	Φ13	Φ8.2

Note: Due to the continuous improvement of product technology, all data shall be subject to the latest data confirmed by our company. In case of any change, no further notice will be given.

Overall dimension and installation drawing



JGC type



JBC type

Use and maintenance

◇ Various characteristics and accessories of the circuit breaker shall be set by the manufacturer and can not be adjusted randomly in use.
◇ The handle of the circuit breaker can be located in each position, indicating the three states of closing, breaking and tripping respectively. When the handle is in the tripping position, pull the handle backward to make the circuit breaker trip again and then close.
◇ The maintenance and inspection must be carried out by professionals.
◇ If users need to select internal and external accessories, our company will provide them according to the ordered model and ensure the quality. If the user chooses to purchase or refit by himself/herself, our company will not be responsible.
◇ Before performing maintenance operations, the following operations must be completed:
Open the circuit breaker;
Disconnect the power supply from the circuit breaker (including main circuit and auxiliary circuit);
Remove the circuit breaker from the installation position (generally used for plug-in type, preferably fixed type).
◇ The circuit breaker shall be maintained once a year under normal operating conditions and once half a year under abnormal operating conditions. The following are the maintenance contents:

Clean the arc separator and replace it if necessary.
Insulation test:
(1) Use a 500VDC megger, when the circuit breaker is in the off state, to respectively conduct the test between the incoming and outgoing connecting plates 1-2, 3-4, 5-6 and between the 135 connecting plates (three connecting plates are connected with wires) and the shell (the shell is covered with metal foil).
(2) The undervoltage release connect to the main circuit, between the incoming line and the circuit breaker shell.
(3) The insulation resistance should be no less than 20MΩ.
Check all connections, wipe the oxide with emery cloth, and tighten the studs and nuts after cleaning with soluble agent.
If the circuit breaker is equipped with a manual operating mechanism, manually open and close the circuit breaker for three times (if the circuit breaker is also equipped with an undervoltage release, the undervoltage release should be powered on before operation). The operating lever or handle should move freely.
If the circuit breaker is installed with an electric operating mechanism, the circuit breaker shall be opened and closed for three times by electric operation (if the circuit breaker is also installed with an undervoltage release, the undervoltage release shall be powered on before operation). The electric operation control function shall be normal.
If the circuit breaker is equipped with a shunt release, the circuit breaker shall be closed first, and then the shunt release shall pass the rated voltage, and the circuit breaker shall trip reliably.
If the circuit breaker is equipped with an undervoltage release, the undervoltage release will close the circuit breaker after passing the rated voltage to make the circuit breaker in the closing state. Then the undervoltage release shall be de energized, the circuit breaker shall be reliably tripped, and the circuit breaker can not be closed at this time.
If the circuit breaker is installed with auxiliary and alarm contacts, the auxiliary and alarm contacts, opening, closing and tripping circuit breakers shall be connected in the test circuit, and the auxiliary and alarm conversion signals shall be normal.
If the circuit breaker is installed with plug-in device, the circuit breaker shall be moved for 3-5 times, and the function and sliding of its plug-in components shall be normal without jamming.

Use and maintenance

The rated current value (A)	Fault description	Possible causes	Trouble shooting
1	The circuit breaker is used for motor protection It trips during startup and fails to start.	1、If the motor is started directly, the starting current is at least 8 times of the normal operating current, or even more than 10 times. If the multiple of instantaneous protection current setting is inappropriate, the motor will trip during the starting process and can not complete the starting.	1、Find out whether the load is the direct starting and the starting current of the motor. 2、 Reasonably determine the setting action current and action current multiple of the circuit breaker.
		2、 If the distribution cabinet is far away from the equipment and the line voltage drop is large, the terminal voltage of the motor is lower than the voltage value reflected in the table on the cabinet. The starting current will increase, causing tripping.	1、Find out the moter terminal voltage (P=IUCOSΦ)。 2、Reasonably determine the setting action current and action current multiple of the circuit breaker.
		3、If the motor is started with mechanical load, check whether the load is normal and reliable. If the mechanical operation part is blocked and noisy, poor operation will cause difficulty in starting, sudden increase of current value and long starting time, which will cause tripping. In addition, if the equipment such as water pump and conveyor belt are started with load, the starting current will also increase and trip.	1、Check the operation of the mechanical part of the motor (load). 2、Reasonably determine the setting action current and action multiple of the circuit breaker.
2	Tripping occurs when the circuit breaker is in operation.	1、The three-phase load is unbalanced, causing overload tripping	Find out whether the three-phase current is balanced.
3	In case of short circuit override trip during the operation of the circuit breaker, there may be the following two kinds of situations: 1. The molded case circuit breaker does not trip the universal circuit breaker trips. 2. The low-voltage circuit breaker does not trip the high-voltage side protective apparatus trips.	1、Generally, the matching of protection characteristics of each series circuit breaker is improper, and there is no appropriate safety time. 2. During the analysis, the circuit conditions shall be understood, including the length and section of the connecting cable, the estimation of short circuit current, the estimation of the passing current of the main circuit of the circuit breaker, the occurrence time of short circuit fault, etc.	1、Go to the site to check the status of the circuit breaker. If there is no disconnection rejection, the product should be normal. 2、Test the characteristics to judge whether the circuit breaker is qualified or not. 3、Reasonable use the circuit breaker.