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Molded Case Circuit Breaker

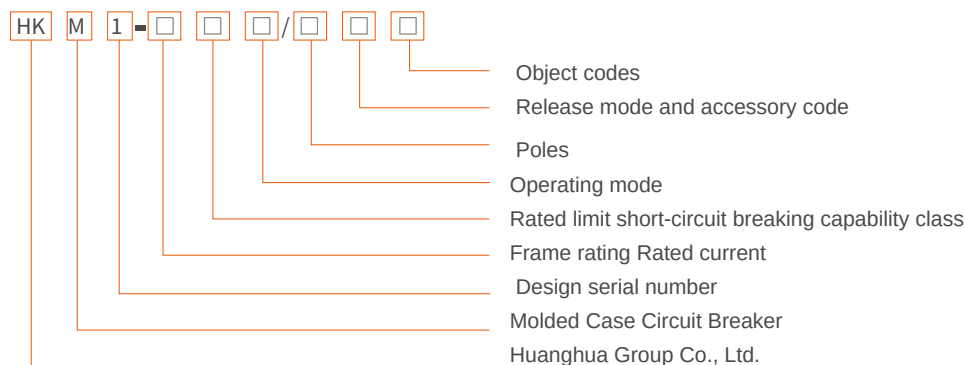
HKM1

CNHK® Huanghua Group Co., Ltd.



HKM1 Molded Case Circuit Breaker

Model and its meaning



Applicable working environment and installation conditions

△ Elevation of installation site 2000m and below;

△ Ambient medium temperature is not higher than +40°C and not lower than -5°C ; and the average value of 24 hours does not exceed 35°C (except for special orders);

△ The relative humidity of the air at the installation site shall not exceed 50% at the highest temperature of +40°C; there may be higher relative humidity at lower temperatures, the monthly average minimum temperature of the wettest month shall not exceed +25°C, and the monthly average maximum relative humidity of the month shall not exceed 90%, and the condensation on the surface of the product due to temperature change shall be considered;

△ The pollution level shall be Grade 3;

△ Protection class: IP20;

△ The installation category of the main circuit of the circuit breaker is III, and the auxiliary circuit and control circuit not connected to the main circuit are installed in category II;

△ In the medium without explosion hazard, and the medium has no gas and conductive dust sufficient to corrode metal and destroy insulation;

△ In the place without rain and snow attack;

△ Circuit breaker should be installed according to the product manual.

Note:

△ Circuit breaker for power distribution has no code; circuit breaker for protection motor is represented by "2".

△ No code for direct operation of handle; P for electric operation; Z for rotating handle.

△ According to the number of product poles, it is divided into two poles (100, 225 type), three poles and four poles (HKM1-1250, 1600 without four poles). There are four types of neutral pole (N pole) in quadropole products Type A: N pole is not equipped with overcurrent tripping elements, and N pole is always on, not closed with other three poles;

Type B: N pole is not equipped with overcurrent tripping element, and N pole is closed together with other three poles;(N pole is closed first and then divided) Type C: N pole is equipped with overcurrent tripping element, and N pole is closed together with other three poles;(N pole is closed first and then divided) Type D: N pole is equipped with overcurrent tripping element, and N pole is always connected, not closed together with other three poles.

△ According to rated current: HKM1 -63 is 6, 10, 16, 20, 25, 32, 40, 50, 63A nine levels (6A specification without overload protection); HKM1-125 is 10, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125A eleven levels; HKM1 -250 is 100, 125, 140, 160, 180, 200, 225, 250A eight levels; HKM1-400 is 250, 315, 350, 400A; HKM1-630 is 400, 500, 630A. HKM1-800 is 630, 700 and 800A.

△ According to the connection mode, it can be divided into three types: front connection, rear connection and plug-in connection.

△ According to the type of overcurrent release, it can be divided into two types: thermal-electromagnetic (compound) type and electromagnetic (instantaneous) type.

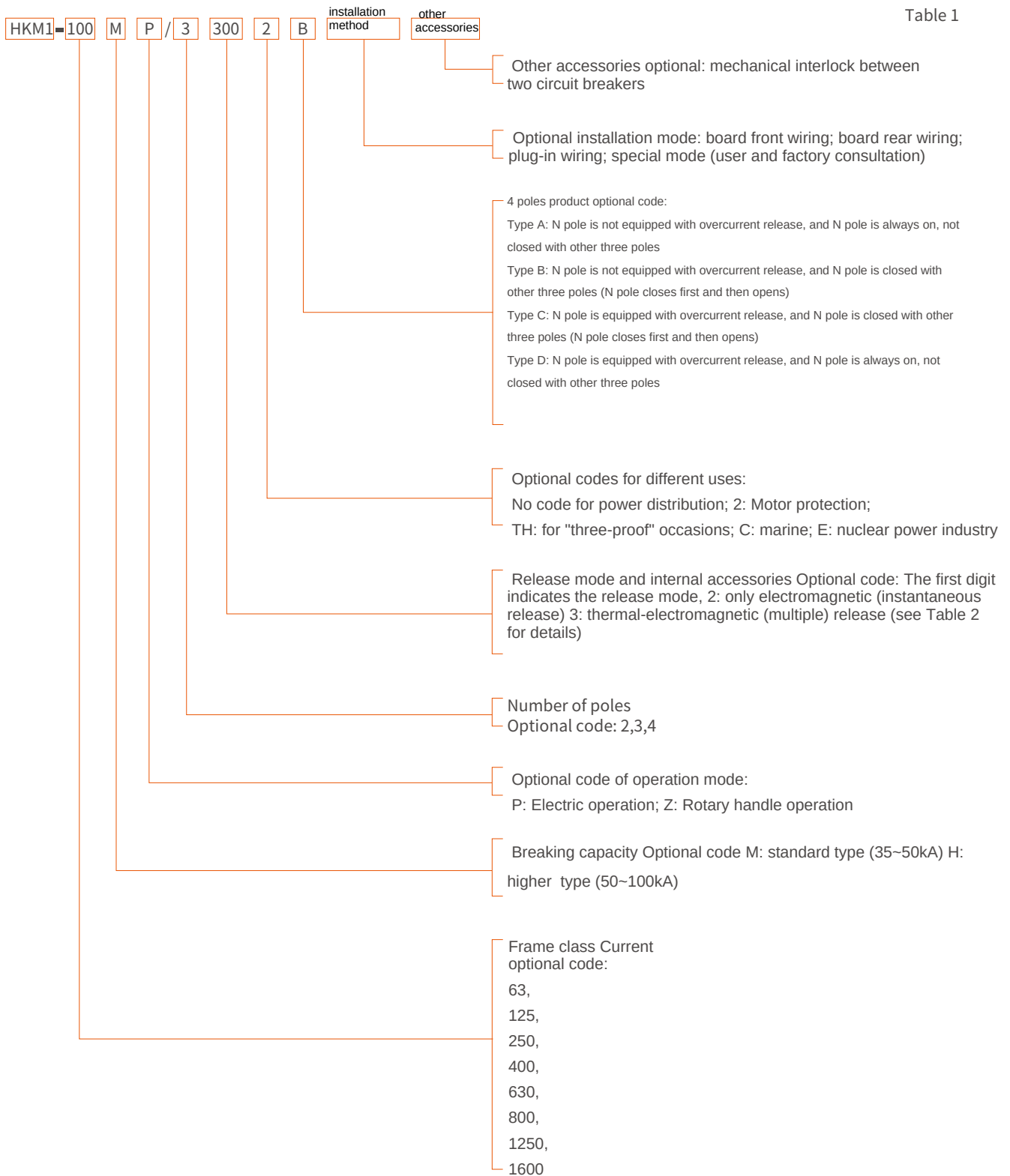
△ According to the accessory device, it is divided into two types: with accessory device and without accessory device;

△ Accessory devices are divided into internal devices and external devices;

△ Internal devices include shunt trip, undervoltage trip, auxiliary contact and alarm contact;

△ External devices include rotary handle operating mechanism, motor operating mechanism, interlocking mechanism and connecting terminals of auxiliary devices, etc.

Table 1



Examples:

△ If HKM1 - 125M is ordered, it is used for motor protection, rated current is 80A, and it is equipped with shunt release. Auxiliary contact, wiring in front of board and two sets are required to be equipped with mechanical interlocking mechanism. HKM1 - 125M/33402In-80A, 2 sets of mechanical interlock in front of board wiring, release coil voltage: AC 220V.

△ HKM1 -250 four-pole, power distribution, rated current of 180A, with electric operating mechanism and shunt release, N-pole installed overcurrent release, and N-pole and other three poles together in the form of on-off, 10 sets of wiring behind the board. That is to say, HKM1 - 250P/4310C type, In-180A board rear wiring 10 sets, electric operating voltage: 220V, release coil voltage: 220V.

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Release mode and accessory code

See Table 2 for release mode and accessory code

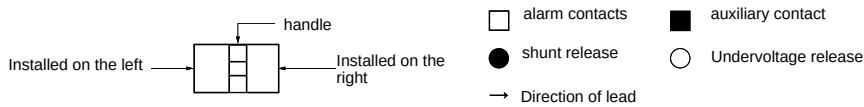


Table 2

Code	Accessory name	Pole	Model HKM1- 63 125		HKM1- 250 225		HKM1- 400 630		HKM1- 630 800	
			3	4	3	4	3	4	3	
208、308	alarm contacts		← □ □		← □ □		← □ □		← □ □	
210、310	shunt release		← ● □		← ● □		← ● □		□ □ ● →	
220、320	auxiliary contact		← ■ □		← ■ □		← ■ □		← ■ □	
230、330	undervoltage release		□ □ ● →		□ □ ● →		□ □ ● →		← ○ □	
240、340	shunt release, auxiliary contact		← ● □ ■ →		← ● □ ■ →		← ● □ ■ →		← ■ □ ● →	
250、350	shunt release, undervoltage release		← ● □ ○ →		← ● □ ○ →		← ● □ ○ →		← ○ □ ● →	
260、360	2 auxiliary contact		← ■ □ ■ →		← ■ □ ■ →		← ■ □ ■ →		← ■ □ ■ →	
270、370	auxiliary contact, undervoltage release		← ■ □ ○ →		← ■ □ ○ →		← ■ □ ○ →		← ○ □ ■ →	
218、318	shunt release, alarm contacts		← □ ● □		← □ ● □		← □ ● □		← □ ● □	
228、328	auxiliary contact, alarm contact		← ■ □ □		← ■ □ □		← □ □ ■		← □ □ ■	
238、338	undervoltage release, alarm contact		← □ □ ●		← □ □ ○		← □ □ ○		← □ □ ○	
248、348	shunt release, auxiliary contact, alarm contact		← ■ □ ●		← ■ □ ●		← □ □ ■		← □ □ ■	
268、368	2 auxiliary contact, alarm contact		← ■ □ ■		← ■ □ ■		← ■ □ ■		← ■ □ ■	
278、378	auxiliary contact, undervoltage release, alarm contact		← ■ □ ○		← ■ □ ○		← ■ □ ○		← □ □ ■	

Note:

△ 200: circuit breaker body with only electromagnetic trip:

△ 300: Circuit breaker body with thermal-actuated electromagnetic trip:

△ 000: Circuit breaker body without trip:

△ For HKM1-63, 125 HKM1-225, 250 four-pole circuit breakers. 240, 340, 260, 360, 218, 318, 248, 348, 268, 368 for N pole A and D;

△ For HKM1 -400, HKM1 -630 and HKM1 -800, 1250, 1600, the auxiliary contacts in 248, 348, 278, 378 specifications are a pair of contacts (i.e. one normally open and one normally closed). The auxiliary contacts in 268 and 368 specifications are three pairs of contacts.

Protective feature

△ Circuit breaker thermal release has inverse time characteristic;

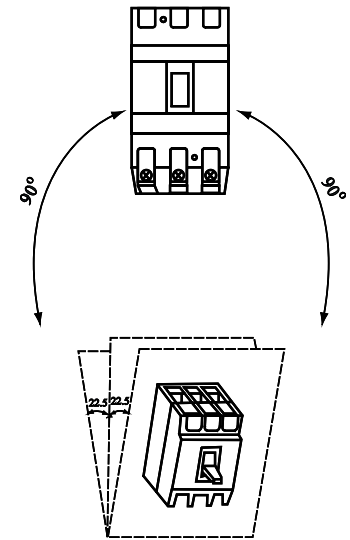
△ Electromagnetic trip is instantaneous action, see Table 3 (for power distribution) and Table 4 (for motor protection) for characteristics.

Table 3

Rated current of tripping device (A)	Thermal release (+40°C)		Electromagnetic trip current (A)
	1.05In (cold state) inactive time (h)	1.30In (hot state) action time	
$I_n \leq 63$	≥ 1	< 1	$10I_n \pm 20\%$
$63 < I_n \leq 125$	≥ 2	< 2	
$125 < I_n \leq 800$	≥ 2	< 2	$5I_n \pm 20\%$ 、 $10I_n \pm 20\%$
1250、1600	≥ 2	< 2	$4I_n \pm 20\%$ 、 $7I_n \pm 20\%$

Table 4

Rated current of tripping device(A)	Thermal release (+40°C)				Electromagnetic trip current (A)
	1.0In (cold state) inactive time (h)	1.50In(hot state) action time(h)	1.50In (hot state) action time(h)	7.2In (cold state) action time(h)	
$10 < I_n \leq 225$	≥ 2	< 2	4min	$2s < T_p \leq 10s$	$12I_n \pm 20\%$
$220 < I_n \leq 1500$			8min	$4s < T_p \leq 20s$	



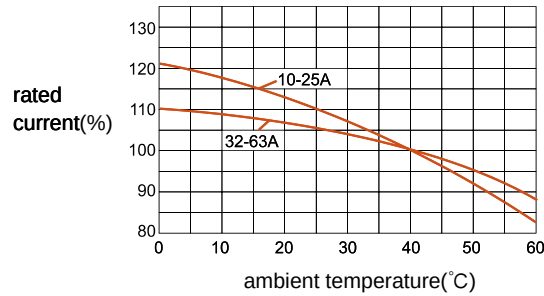
Main technical performance indicators

Model	Rated Current	Poles	Rated insulation voltage	Rated working voltage	arcing distance (mm)	ICU	ICS	Operability(times)	
								energized	not energized
HKM1-63M	6、10、16、20、25、32、40、50、63	2,3,4p	800V	690V and below	0		25	2000	10000
						30			
HKM1-125M	10、16、20、25、32、40、50、63、80、100、125				0(≤ 50)	30	25	2000	10000
						50	35		
HKM1-250M	100、125、140、160、180、200、225、250				≤ 50	50	35	2000	10000
HKM1-400	250、315、350、400				≤ 100	65	50	2000	10000
HKM1-630	400、500、630				≤ 100	60	50	1000	5000
HKM1-800	630、700、800				≤ 100	75	50	1000	5000

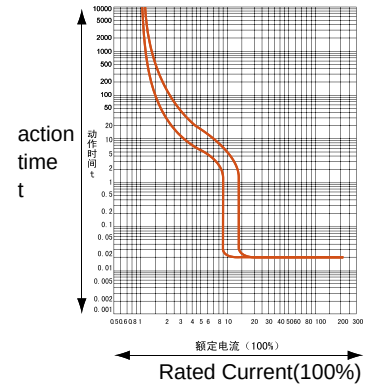
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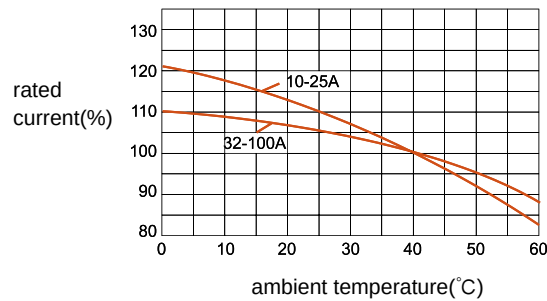
- current-temperature characteristic



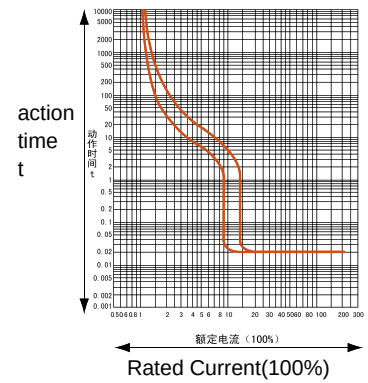
- HKM1-63L,M action time/current characteristic curve



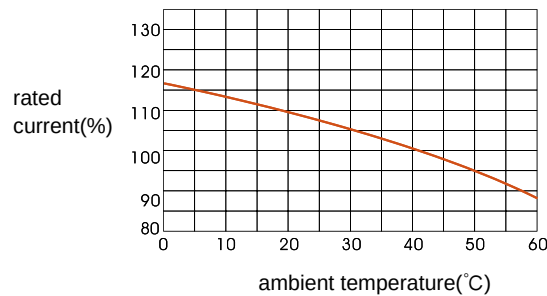
- current-temperature characteristic



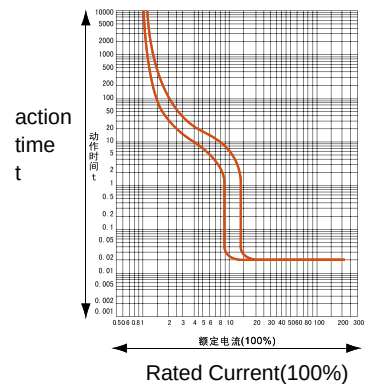
- HKM1-125M action time/current characteristic curve



- current-temperature characteristic

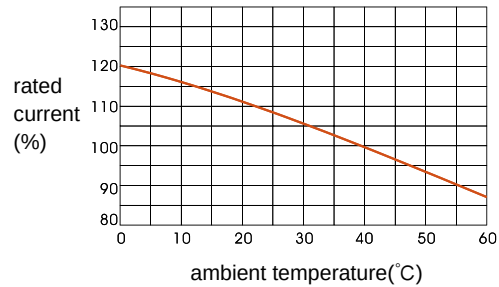


- HKM1-250M,H action time/current characteristic curve

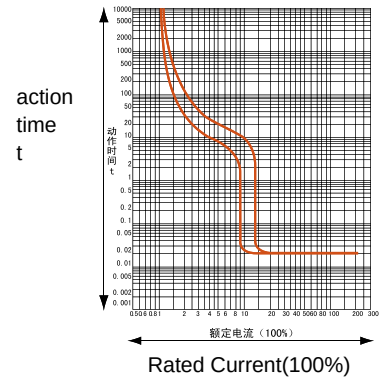




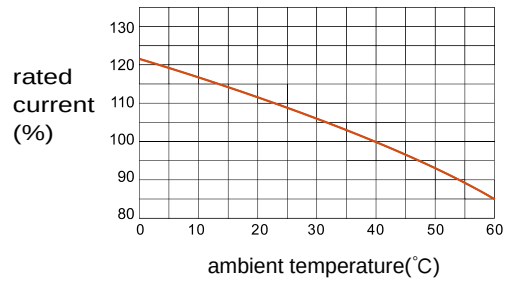
- current-temperature characteristic



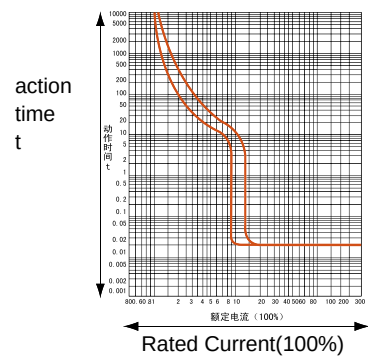
- HKM1-400M,H action time/current characteristic curve



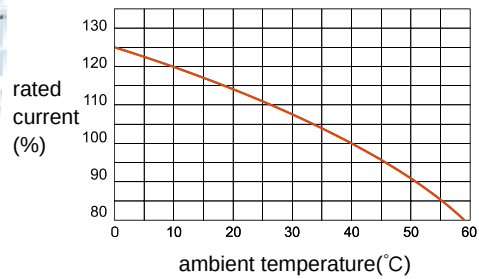
- current-temperature characteristic



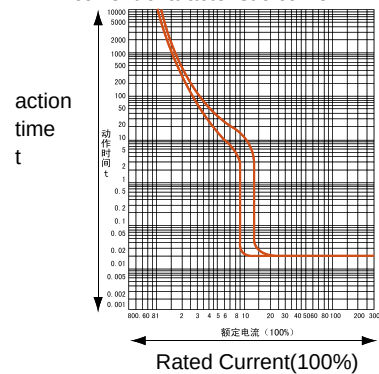
- HKM1-630 L,M action time/current characteristic curve



- current-temperature characteristic



- HKM1-630H,800M,H action time/current characteristic curve



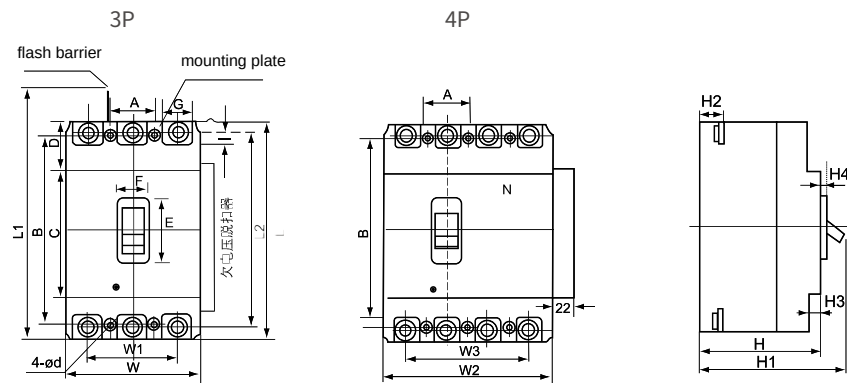
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Appearance and installation size

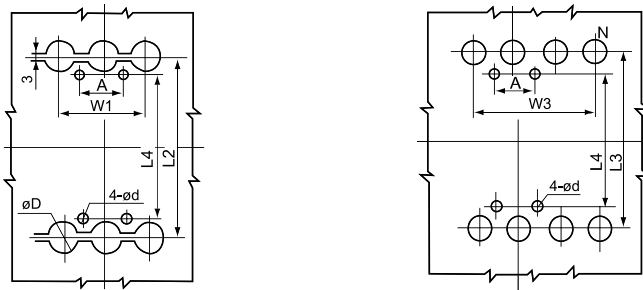
Model	HKM1							
	measure	code	63M	100M/H	250M/H	400M/H	630M/H	800M/H
Front wiring appearance size	mm	W	78	91	106	148	180	210
	mm	W1	50	60	70	96	116	140
	mm	L	135	150	165	256	270	280
	mm	L1	154	199	230	356	370	404
	mm	L2	117	132	144	223	237	242.5
	mm	L7	27	28	37.2	66.1	63.2	63.2
	mm	H	81	86	104	108.5	111.5	116.5
	mm	H1	98.5	104	127	155	160	145.8
	mm	H2	27.5	24	24	38	40	28.7
	mm	H3	7	7	4.5	8	8	8
	mm	H4	4	4	3.5	6	6	6
	mm	C	85	88	102	128	134	154
	mm	D	26	32.5	31.5	64.5	69.5	69.5
	mm	E	48	58	58	89	89	105
	mm	F	22	22.5	25	65	65	65.5
	mm	G	14	17	17.5	32.5	44.5	44.5
	mm	I	7.5	8	9	12.5	13	13
	mm	W2	103	121	141	196.5	238.5	238.5
	mm	W3	75	90	105	144	173.5	210
Appearance size of rear wiring	mm	L3	116.5	132.5	144	224	234.5	210
	mm	L4	117	102.5	123	194	200	242.5
	mm	H5	25	68	73	66	68	87
	mm	H6	49.5	102	110	118	124	87
	mm	Ø D	6.5	24	24	24	24	24
	mm	M	M6	M8	M10	M12	M16	M16
Plug-in profile size	mm	L5	100	92	94	169	170	176.5
	mm	L6	135	168	185	279	299	302
	mm	H7	27.5	38	45.5	60	60	88
	mm	H8	36	65	68.5	81.5	92	88
	mm	H9	43	77	86.5	105.5	112	104
	mm	H10	8	17.5	18	18.5	20	20
	mm	J	60	56	54	129	123	142
	mm	K	50.5	60	70	60	100	90
	mm	Ø d1	5.5	6.5	6.5	8.5	8.5	10
	mm	M1	M5	M8	M8	M12	M12	M12
Installation size	mm	A	25	30	35	44	58	70
	mm	B	117	129	126	194	200	204
	mm	Ø d	3.5	4.5	5	7	7	7

HKM1-63~630M Appearance and installation size

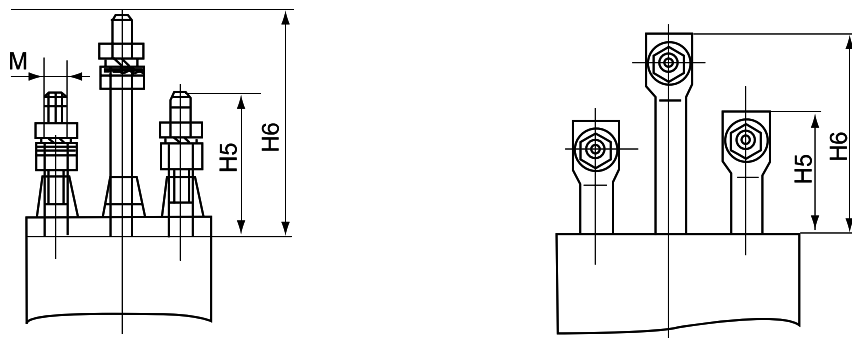
△ Front wiring



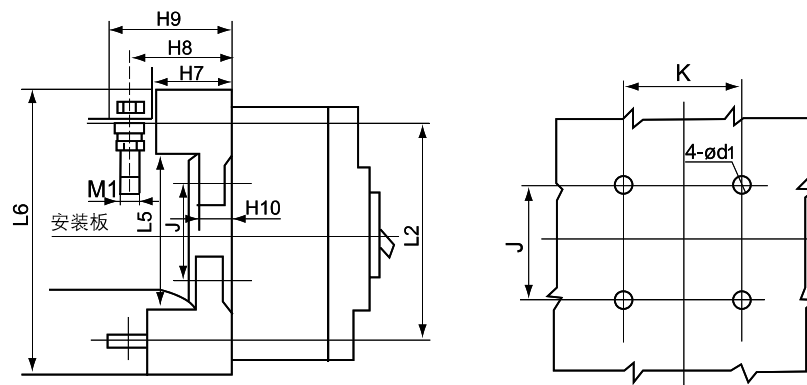
△ Opening diagram of rear wiring



△ rear wiring



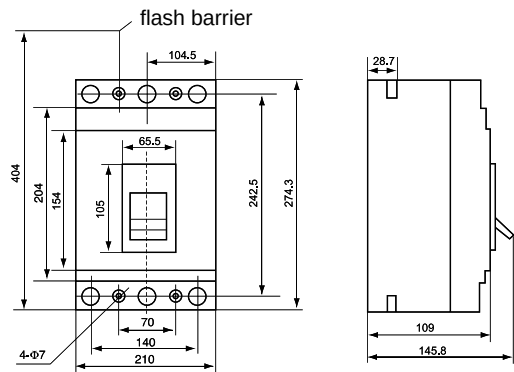
△ plug-in



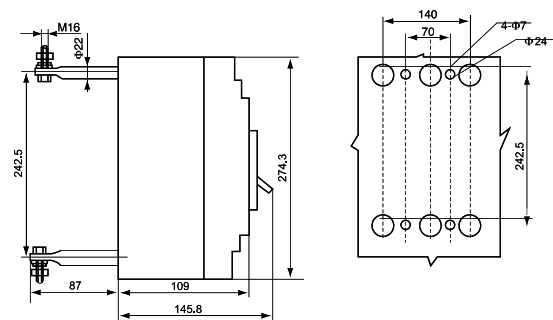
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HKM1-630H、800 (M、H) Appearance and installation size

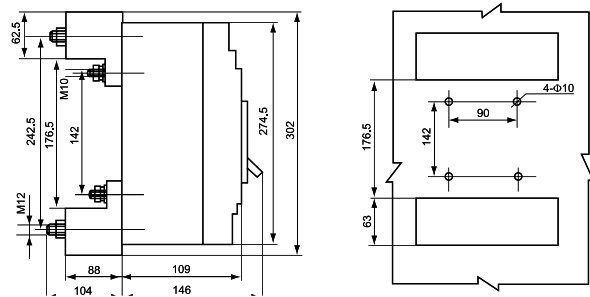
△ Front wiring and size(3P)



△ size of rear wiring and mounting opening (3P)



△ Plug-in shape and mounting, opening size (3P)



Derating coefficient

Table 6

ambient temperature	+40°C (ship +45°C)	+45°C (ship +50°C)	+50°C (ship +55°C)	+55°C (ship +60°C)	+60°C (ship +65°C)
Model	Derating coefficient	Derating coefficient	Derating coefficient	Derating coefficient	Derating coefficient
HKM1-63M	1In	0.94In	0.88In	0.80In	0.72In
HKM1-125(M、H)	1In	0.95In	0.89In	0.84In	0.76In
HKM1-250(M、H)	1In	0.96In	0.91In	0.87In	0.82In
HKM1-400(M、H)	1In	0.94In	0.87In	0.81In	0.73In
HKM1-630(M、H)	1In	0.93In	0.88In	0.83In	0.76In
HKM1-830(M、H)	1In	0.88In	0.83In	0.79In	0.76In

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

Internal accessories

△ Internal accessories of circuit breaker

According to user needs, circuit breaker accessories can be directly led out of wiring, or add lead terminals.

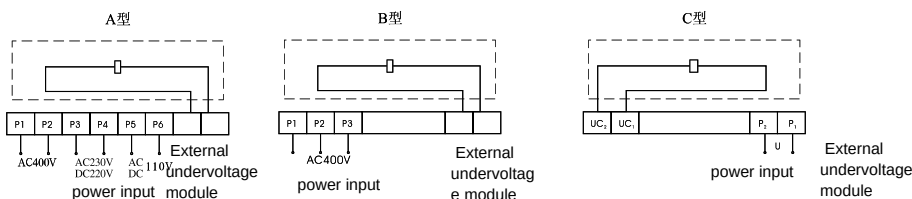
△ Under voltage trip

Type A: one specification five voltage levels: AC 50Hz 110V 230V 400V;DC110V 220V;

Type B: (three-phase protection) A specification: AC 50Hz 400V;

Type C: Two specifications: AC 50Hz AC 230V or 400 V.

△ Wiring diagram (the internal accessories of the switch are in the dotted box) Please confirm the voltage and then make wiring.



△ See Table 7 for power of undervoltage shunt tripping device

-when rated operating voltage is 35%~70%, undervoltage tripping device shall reliably trip circuit breaker

-when rated operating voltage is 85%~110%, undervoltage tripping device shall ensure circuit breaker can be closed;

-when rated operating voltage is below 35%,undervoltage tripping devices shall prevent circuit breaker closing .

Warning: undervoltage trip must be energized before circuit breaker can be tripped and closed again.

Otherwise, the switch will be damaged!

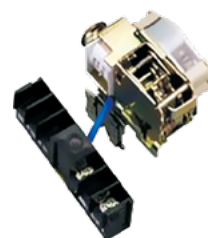
Note: Specifications in red boxes above are in trial operation.

△ Shunt tripping device

-according to the diagram (broken box is the internal accessories of the switch)

-specification: AC 50Hz, 230V or 400V ; DC 220V

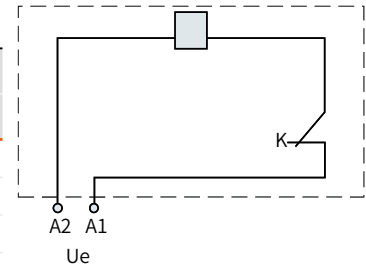
-between 70~110% of the rated control power supply voltage, shunt tripping device shall reliably trip the circuit breaker.



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Table 7

circuit breaker	Power of undervoltage release (W)	
	AC230V	AC400V
HKM1-63	3.5	3.3
HKM1-125	2.6	3.3
HKM1-160	3.8	3.3
HKM1-250	3.8	3.3
HKM1-400	3.7	2.7
HKM1-630	2.3	2.7
HKM1-800	2.5	2.8



K: Micro-switch normally closed contact connected in series with coil inside shunt tripping device. When the circuit breaker is opened, the contact opens automatically and closes when it is closed.

△ alarm contacts

When the circuit breaker is in the "open" and "close" positions	
When the circuit breaker is in the free trip (alarm) position	

△ auxiliary contact

When the circuit breaker is in the "open" positions		Circuit breaker with shell rating of 400A and above (1 set of 4 pairs of contacts)
		Circuit breaker with shell rating of 225A and below (1 set of 2 pairs of contacts)
When the circuit breaker is in the "close" positions		Circuit breaker with shell rating of 400A and above (1 set of 4 pairs of contacts)
		Circuit breaker with shell rating of 225A and below (1 set of 2 pairs of contacts)

△ See Table 8 for rated current of auxiliary contacts

Table 8

Frame rating	Rated current	conventional heating current (Ith)	Rated operating current(Ie)
≥ 400A		6	1
≤ 225A		3	0.30

△ See Table 9 for rated current of auxiliary contacts

Table 9

use class	closed			open			time	operating frequency	energized time(s)
	I/Ie	U/Ue	cos Ø	I/Ie	U/Ue	cos Ø			
AC-15	10	1	0.3	1	1	0.3	6050	360	≥ 0.05

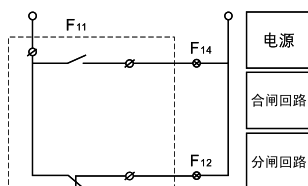
△ See Table 10 for rated current of auxiliary contacts

Table 10

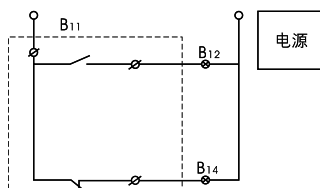
use class	closed			open			time	operating frequency	energized time(s)
	I/Ie	U/Ue	cos Ø	I/Ie	U/Ue	cos Ø			
AC-15	10	1.1	0.3	10	1.1	0.3	10	120	≥ 0.05



△ Auxiliary contact wiring diagram

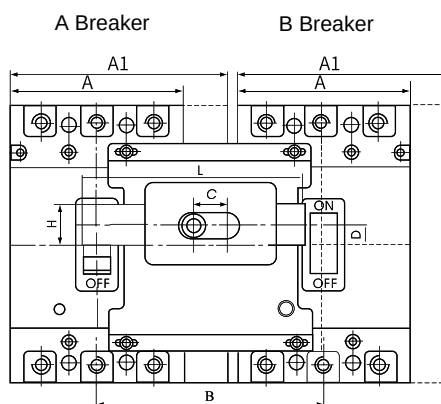


△ Alarm wiring diagram



△ External accessories for circuit breakers

△ Mechanical interlocking mechanism of two circuit breakers (see Table 11)



When the circuit breaker is normally closed and opened, the alarm contact does not act, and only alarms after free tripping (or fault tripping). The contact changes its original position, normally open to normally closed, normally closed to normally open, B12 lamp is on, B14 lamp is off. After the circuit breaker is buckled again, the alarm contact returns to its original state.

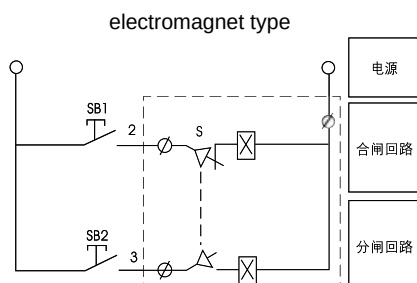
Table 11

Model	A	A1	B	C	D	L	H	note
HKM1-63	78		102	18	13	95	22	for HKM1-63L、M
HKM1-125	92		120	18	11.5	118	22	for HKM1-125L、M、H
HKM1-250	107		135	18	9	130	22	for HKM1-250L、M、H
HKM1-400	150		190	42	16	175	22	for HKM1-400L、M
HKM1-630	182		220	42	12	198	22	for HKM1-630L、M、400H
HKM1-800	210		240	42	3.5	230	20	for HKM1-630H、800M、H
HKM1-63/4P		103	132	18	13	125	22	for HKM1-63 4P
HKM1-125/4P		122	152	18	11.5	150	22	for HKM1-125 4P
HKM1-250/4P		142	173	18	9	168	22	for HKM1-250 4P
HKM1-400/4P		198	240	42	16	225	22	for HKM1-400 4P
HKM1-630/4P		240	280	42	12	258	22	for HKM1-630 4P

△ electric operating mechanism

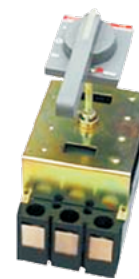
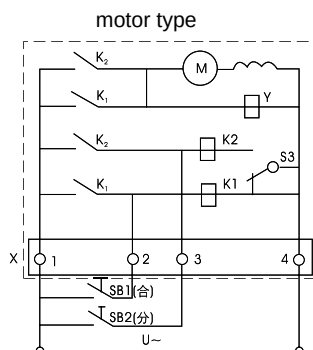
63
HKM1-125MCCB
250

Principle of electromagnet operation on/off
(external accessories of switch are shown in dotted box)



HKM1-400
630MCCB

Principle of electromagnet operation on/off (external
accessories of switch are shown in dotted box)



rotary handle operating mechanism

HKM1 Molded Case Circuit Breaker

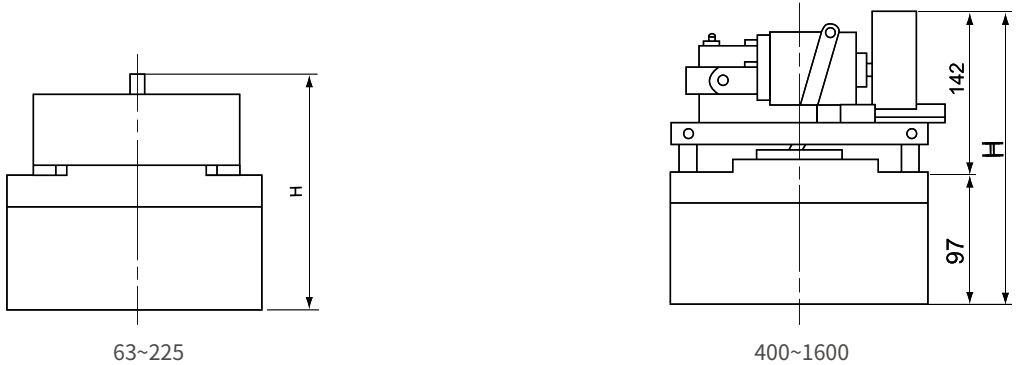
△ See Table XII for starting current, power and service life of electric operating mechanism

Table 12

model	starting current(A)	starting power(W)	service life/ time
HKM1-63M	≤ 5	1100	10000
HKM1-125(M、H)	≤ 7	1540	10000
HKM1-250(M、H)	≤ 8.5	1870	8000
HKM1-400M	≤ 5.7	1200	5000
HKM1-630M、HKM1-400H	≤ 5.7	1200	5000
HKM1-630H、HKM1-800(M、H)	≤ 7.5	2000	3000

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

△ Height of electric operating mechanism



△ Total height of circuit breaker after installation of electric operating mechanism

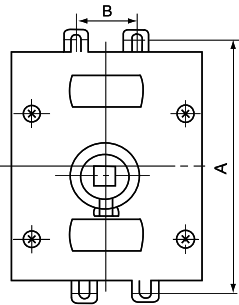
Table 13

model height	HKM1-63M	HKM1-125M、H	HKM1-250M、H	HKM1-400M、H	HKM1-630M、H	HKM1-800M、H
H	154	158	178.5	236.5	240	240

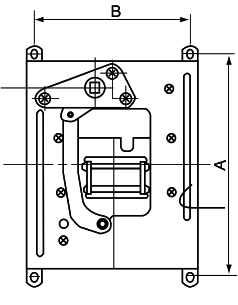
△ Features of the rotating handle operating mechanism

The operating mechanism adopts unique design and transmission mechanism, and realizes the breaking, closing and re-buckling of molded case circuit breaker by rotating the handle. Flexible and stable operation. Small operating force, convenient installation, no adjustment. The overall performance and quality of the mechanism are better than other similar products. At the same time, the mechanism is equipped with a type handle. In order to meet the requirements of different users, operating mechanism factory can provide CSI series, ZHKM1 (CS2) series and CZ series for selection. This mechanism is specially used for HKM1 series molded case circuit breaker. It can realize the requirements of drawer cabinet, distribution cabinet and power box operating on the panel by rotating the handle, and ensure that the cabinet door can not be opened when the circuit breaker is closed.

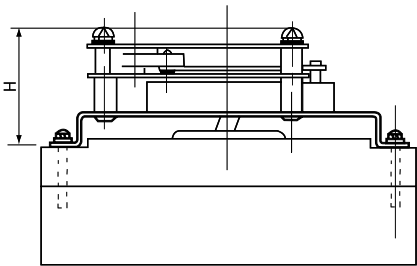
Note: the upper part of the figure is the operating machine with the incoming end and square axis j in the center, which is suitable for vertical installation and horizontal installation. The model of operating mechanism, relative size of operating lever and center of circuit breaker and installation size are shown in the figure below.



HKM1-63 operating mechanism



HKM1-125,250,400, 630,800
operating mechanism



Height of operating mechanism

△ The operating mechanism is also equipped with CS1 series (divided into metal type and plastic type) for users to choose the shape and size

Table 14

Model of operating mechanism	A	B	H
HKM1-63 (CZ3-138)	102	25	58
HKM1-63 (CS2-172)	98	25	24
HKM1-63 (CS2-139)	100	25	45
HKM1-125A (CS2-100/M)	104	30	45
HKM1-125B (CS2-100/MH)	104	30	45
HKM1-250A (CS2-225/M)	142	35	47
HKM1-250B (CS2-225/MH)	142	35	47
HKM1-400A (CS2-400/ML)	194	138	61
HKM1-630A (CS2-630/M)	200	168	61
HKM1-800A (CS1-800/M)	172	70	76
HKM1-100A (CS1-126)	104	30	60
HKM1-160、250 (CS1-127)	142	35	63
HKM1-400 (CS2-237)	194	138	94
HKM1-630 (CS2-228)	200	168	95
HKM1-1250 (CS1-1250)	380	195	340
HKM1-1600 (CS1-1600)	380	195	340

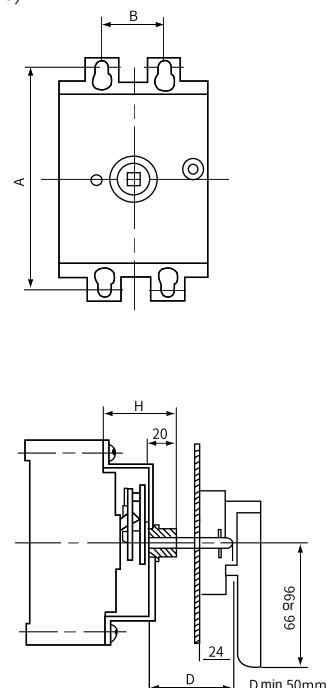


Table 15

Model of operating mechanism	Model of MCCB	A	B	H
CS1-50/M CS1A-50/M	HKM1-63 M	100	25	49
CS1-125/M CS1A-125/M	HKM1-125M、H	104	30	49
CS1-250/M CS1A-250/M	HKM1-250M、H	143	35	55
CS1-400/L CS1A-400/L	HKM1-400C	194	138	84
CS1-400/H CS1A-400/H	HKM1-400M、H	194	138	74
CS1-630/M CS1A-630/M	HKM1-630H	200	168	83
CS1-800/M CS1A-800/M	HKM1-630H、HKM1-800M、H	171	70	76
CS1-1250/H CS1A-1250/H	HKM1-1250H	380	195	340
CS1-1600/H CS1A-1600/H	HKM1-1600H	380	195	340

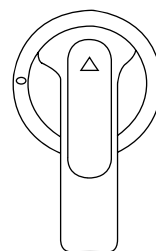
△ CS1 series and ZHKM1 (CS2) series of the same mechanism can choose two kinds of handle operation: a square handle called "F" handle. Another round handle is referred to as "A" handle. (as shown in the figure)

△ "A" type handle characteristics

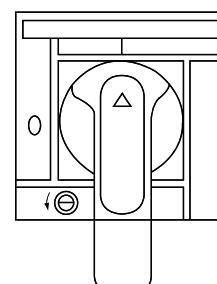
Simple structure and convenient installation. It also has the same function of corresponding to different specifications of circuit breaker panel opening.

△ "F" handle characteristics

The circuit breaker is equipped with an undervoltage release and can close the cabinet door when it is in the tripped position and open the cabinet door by emergency unlocking. Corresponding to different specifications of circuit breaker, the door opening is consistent.



"A" Type



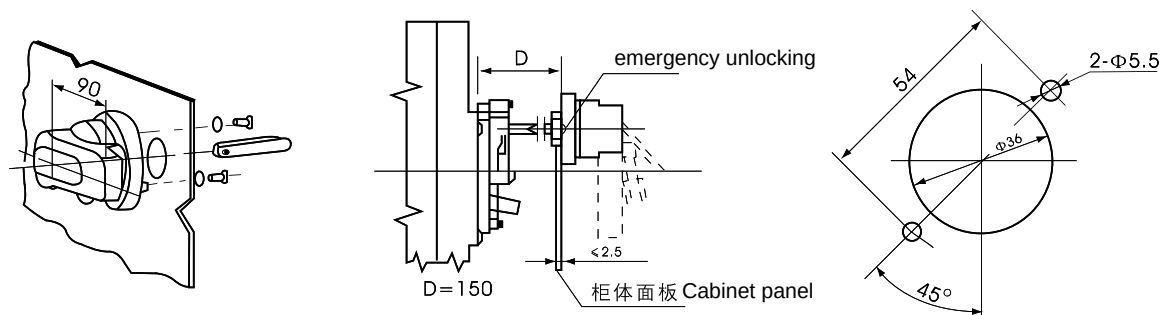
"F" Type

Purchasing instructions

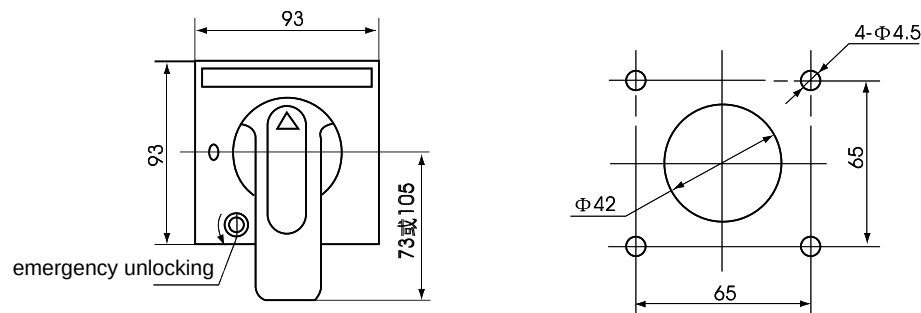
△ For those who choose "F" type handle, model CS1, ZHKM1 (CS2) do not add "F". For example, CS1 -100/M. CS2-100/M, etc.;

△ For those who choose "A" type handle, the model is marked with "A", that is, CS1A and CS2A. Such as CS1A-225/M. CS2A-225/M, etc.

HKM1 Molded Case Circuit Breaker



Type A handle panel opening size



Type F handle panel opening size

Warning to user

△ Manual operating mechanism must be ordered from our company to ensure quality.

△ If the user buys it by himself, please choose the manufacturer with reliable quality, otherwise the company will not be responsible for all adverse consequences after assembly.

Test current and conductor cross-sectional area

△ See Table 16 for cross-sectional area of connecting conductor for temperature rise test and corresponding test current Table 16

Rated current(A)	10	16 20	25	32	40 50	63	80	100	125	140	160	180 200 225	250	315	400
Conductor sectional area mm ²	1.5	2.5	4	6	10	16	25	35	50	50	70	95	120	185	240

Rated current(A)	Conductor sectional area mm ²		Copper bar size	
	QTY	sectional area mm ²	QTY	Size
500	2	150	2	30X5
630	2	185	2	40X5
700、800	2	240	2	50X5
1000			2	60X5
1250			2	80X5
1600			2	100X5