

产品选型手册

CATALOGUE OF ELECTRIC PRODUCTS







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HMKM1 系列塑料外壳式断路器

Moulded case circuit breaker series

适用范围 Scope of application

HMKM1 系列塑料外壳式断路器（以下简称断路器），是本公司采用国际先进的设计和制造技术进行研制和开发的新型断路器之一。其额定绝缘电压为 800V，适用于交流 50Hz，额定工作电压 AC690V 及以下，额定工作电流至 800A 的电路中作不频繁转换及电动机不频繁启动之用。断路器具有过载、短路和欠电压保护装置，能保护线路和电源设备免受损坏。

断路器按照其额定极限短路分断能力 (Icu) 的高低，分为 L 型（标准型）、M 型（较高分断型）、H 型（高分断型）三类。该断路器具有体积小、分断高、飞弧短（部分规格零飞弧）、抗振动等特点，是陆地及船舶使用的理想产品。

本系列断路器可垂直安装（即竖装），亦可水平安装（即横装）。

本系列断路器具有隔离功能，符号标识为 $\text{---} \text{I} \times \text{---}$ 。

本系列断路器符合下列标准：GB14048.1《低压开关设备和控制设备第 1 部分：总则》
GB14048.2《低压开关设备和控制设备第 2 部分：断路器》。

HMKM1 series moulded case circuit breaker (hereinafter referred to as circuit breaker) is one of our new circuit breakers applying international advanced design and manufacturing technology. Its rated insulation voltage is 800V, which is suitable for infrequent switching and motor starting in circuits with AC 50Hz, rated working voltage AC690V and below and rated working current of 800A. The circuit breaker has overload, short circuit and under voltage protection devices, which can protect the circuit and power supply equipment from damage.

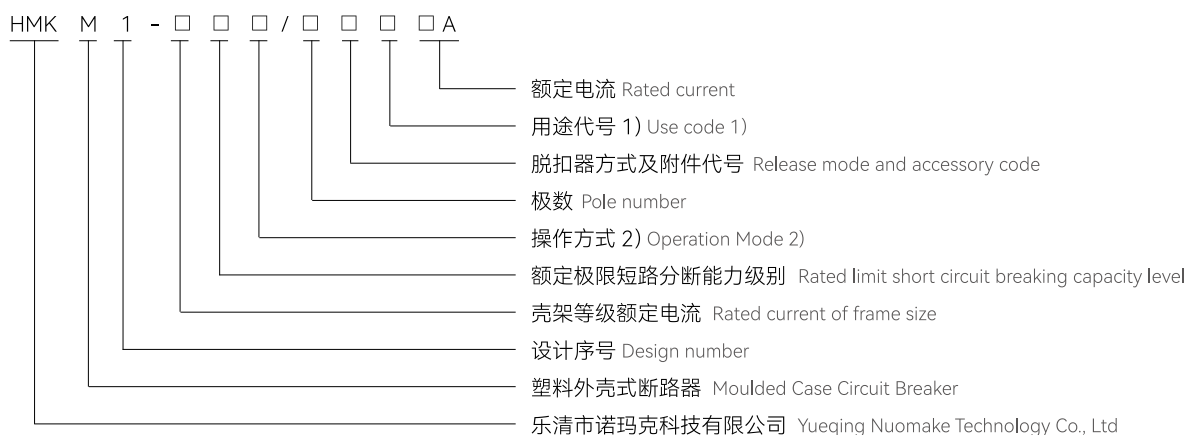
According to its rated limit short circuit breaking capacity (Icu), circuit breakers can be divided into three types: L-type (standard), M-type (higher break) and H-type (high break). The circuit breaker has the characteristics of small size, high breaking, short flashover distance (zero flashover distance in some specifications), anti-vibration, etc. It is an ideal product for land and ship use.

This series of circuit breakers can be installed vertically or horizontally.

This series of circuit breakers have isolation function, and the symbol is $\text{---} \text{I} \times \text{---}$.

This series of circuit breakers meet the following standards: GB14048.1 Low-voltage Switchgear and Controlgear-Part 1: General
GB14048.2 Low-voltage Switchgear and Controlgear-Part 2: Circuit breakers.

型号及含义 Model and Meaning



注：1) 配电用断路器无代号；保护电动机用断路器以 2 表示。

2) 直接操作无代号；电动操作用 P 表示；转动手柄操作用 Z 表示。

Note: 1) Circuit breakers for distribution have no code; Circuit breakers for protection motors are indicated by 2.

2) There is no code for direct operation; Electric operation is represented by P; Rotating handle operation is represented by Z.

产品概况 Product overview

- ◆ 额定绝缘电压：800V
- ◆ 壳架等级额定电流：63A、100A、225A、400A、630A、800A、1000A、1250A、1600A；
- ◆ 分断能力高：最高可达 100kA；
- ◆ 设计合理、安全可靠、体积小、重量轻、外形美观大方；
- ◆ 附件品种齐全、安装快捷、使用方便、适用性强。
- ◆ Rated insulation voltage: 800V;
- ◆ Rated current of frame size: 63A, 100A, 225A, 400A, 630A, 800A, 1000A, 1250A, 1600A;
- ◆ High breaking capacity: up to 100kA;
- ◆ Reasonable design, safe and reliable, small size, light weight and beautiful appearance;
- ◆ Accessories are complete in variety, quick in installation, convenient in use and strong in applicability.

正常工作 and 安装条件 Normal working and installation conditions

- ◆ 海拔高度 2000m 及以下；
- ◆ 周围介质温度不高于 +40℃ (对船用产品为 +45℃) 和不低于 -5℃；
- ◆ 污染等级：III；
- ◆ 能耐受潮湿空气的影响；
- ◆ 能耐受烟雾、油雾的影响；
- ◆ 能耐受霉菌的影响；
- ◆ 最大倾斜度为 ±22.5°；
- ◆ 在受到船舶正常振动时能可靠工作；
- ◆ 在受到地震情况下 (4g) 能可靠工作；
- ◆ 在无爆炸危险的介质中，且介质无足以腐蚀金属和破坏绝缘的气体与导电尘埃的地方；
- ◆ 在没有雨雪侵袭的地方。
- ◆ The altitude is 2000m and below;
- ◆ The ambient medium temperature is not higher than + 40 °C (+ 45 °C for marine products) and not lower than -5 °C ;
- ◆ Pollution level: III;
- ◆ Resistant to the influence of humid air;
- ◆ Resistant to the influence of smoke and oil mist;
- ◆ Resistant to the influence of mold;
- ◆ The maximum inclination is 22.5°;
- ◆ Work reliably when it is subjected to normal vibration of the ship;
- ◆ Work reliably under the condition of earthquake (4g);
- ◆ In a medium without explosion danger, and there is no place in the medium where there is enough gas and conductive dust to corrode metals and damage insulation;
- ◆ Where there is no rain or snow.

分类 Classification

- ◆ 按产品极数分为二级（100A、225A）三极与四极，四极产品中按中性极（N 级）的型式分四种；
A 型：N 极不安装过电流脱扣器，且 N 极始终接通，不与其他三极一起合分；
B 型：N 极不安装过电流脱扣器，且 N 极与其他三极一起合分；（N 极先合后分）；
C 型：N 极安装过电流脱扣器，且 N 极与其它三极一起合分；（N 极先合后分）；
D 型：N 极安装过电流脱扣器，且 N 极始终接通，不与其他三极一起合分。
- ◆ 按额定电流 (A) 分：
HMKM1-63 为 (6)、10、16、20、25、32、40、50、63A 九级（6A 规格无过载保护）；[带 () 为不推荐规格]
HMKM1-100 为 (10)、16、20、25、32、40、50、63、80、100A 十级：[带 () 为不推荐规格]
HMKM1-225 为 100、125、140、160、180、200、225A 七级；
HMKM1-400 为 225、250、315、350、400A 五级；
HMKM1-630 为 400、500、630A 三级；
HMKM1-800 为 630、700、800A 三级；
HMKM1-1000 为 800、1000A 三级；
HMKM1-1250 为 1000、1250A 三级；
HMKM1-1600 为 1250、1600A 三级。
- ◆ 按接线方式分为板前接线、板后接线、插入式三种。
- ◆ 按过电流脱扣器型式分为热动 - 电磁（复式）型、电磁（瞬时）型两种。
- ◆ According to the pole number, the product can be divided into dipole (100A, 225A), triple pole and quadrupole, and quadrupole products are divided into four types according to the type of neutral pole (N level);
Type A: N pole is not equipped with over-current release, and N pole is always connected, does not close or open with other three poles;
Type B: N pole is not equipped with overcurrent release, and N pole opens and closes with other three poles; (N pole is first closed and then opened);
Type C: N-pole is equipped with over-current release, and N-pole opens and closes with other three poles; (N pole is first closed and then opened);
Type D: N pole is fitted with an over-current release, and the N pole is always on and does not close or open with the other three poles.
- ◆ According to rated current (A):
HMKM1-63 includes (6), 10, 16, 20, 25, 32, 40, 50 and 63A (6A without overload protection); [The one with () is not recommended specification]
HMKM1-100 includes (10), 16, 20, 25, 32, 40, 50, 63, 80, 100A; [The one with () is not recommended specification]
HMKM1-225 includes 100, 125, 140, 160, 180, 200 and 225A;
HMKM1-400 includes 225, 250, 315, 350, 400A;
HMKM1-630 includes 400, 500 and 630A;
HMKM1-800 includes 630, 700, 800A;
HMKM1-1000 includes 800, 1000A;
HMKM1-1250 includes 1000, 1250A;
HMKM1-1600 includes 1250, 1600A.
- ◆ The wiring modes are divided into three types: front wiring, back wiring and plug-in wiring.
- ◆ According to the type of over-current release, they are divided into two types: thermal-electromagnetic (compound) type and electromagnetic (instantaneous) type.

主要技术参数 Technical Parameters

型号 Model	壳架等级 额定电流 (A) Rated current of frame size (A)	额定电流 (A) Rated current (A)	极数 Pole		额定工作 电压 (V) Rated working voltage (V)	额定绝缘 电压 (V) Rated insulation voltage (V)	额定极限短路分断 能力 Icu (kA) 400V Rated limit short-circuit breaking capacity Icu (kA) 400V	额定运行短路分断 能力 Ics (kA) 400V Rated operating short circuit breaking capacity Ics(kA)400V
HMKM1-63L	63	(6),10,16,20,25, 32,40,50,63	3	4	AC400	AC800	25	18
HMKM1-63M							50	35
HMKM1-100L	100	(10),16,20,25,32, 40,50,63,80,100	3	4	AC400	AC800	35	22
HMKM1-100M							50	35
HMKM1-100H							85	50
HMKM1-225L	225	100,125,140,160, 180,200,225	3	4	AC400	AC800	35	22
HMKM1-225M							50	35
HMKM1-225H							85	50
HMKM1-400L	400	225,250,315, 350,400	3	4	AC400	AC800	50	35
HMKM1-400M							65	42
HMKM1-400H							100	65
HMKM1-630L	630	400,500,630	3	4	AC400	AC800	50	35
HMKM1-630M							65	42
HMKM1-630H							100	65
HMKM1-800M	800	630,700,800	3	4	AC400	AC800	75	50
HMKM1-800H							100	65
HMKM1-1000	1000	800,1000	3	4	AC400	AC800	100	65
HMKM1-1250	1250	800,1000	3	4	AC400	AC800	100	65
HMKM1-1600	1600	800,1000	3	4	AC400	AC800	100	65

脱扣器方式及内部附件代号 Release mode and internal accessory code



附件 代号 Accessory code	附件名称 Accessory name	型号 Model	极数 Pole		HMKM1-63 HMKM1-100		HMKM1-225		HMKM1-400 HMKM1-630		HMKM1-800		HMKM1-1000 HMKM1-1250 HMKM1-1600	
			3P	4P	3P	4P	3P	4P	3P	4P	3P	4P	3P	4P
208 308	报警触头 Alarm contact		← □ □		← □ □		← □ □		← □ □		← □ □		← □ □	
210 310	分励脱扣器 Shunt release		← ● □ □		← ● □ □		← ● □ □		← ● □ □		← ● □ □		← ● □ □	
220 320	辅助触头 Auxiliary contact		← ■ □ □		← ■ □ □		← ■ □ □		← ■ □ □		← ■ □ □		← ■ □ □	
230 330	欠电压脱扣器 Under-voltage release		← ○ □ □		← ○ □ □		← ○ □ □		← ○ □ □		← ○ □ □		← ○ □ □	
240 340	分励脱扣器、辅助触头 Shunt release, Auxiliary contact		← ● ■ □ □		← ● ■ □ □		← ● ■ □ □		← ● ■ □ □		← ● ■ □ □		← ● ■ □ □	
250 350	分励脱扣器、欠电压脱扣器 Shunt release, Under-voltage release		← ● ○ □ □		← ● ○ □ □		← ● ○ □ □		← ● ○ □ □		← ● ○ □ □		← ● ○ □ □	
260 360	二组辅助触头 Two sets of auxiliary contacts		← ■ ■ □ □		← ■ ■ □ □		← ■ ■ □ □		← ■ ■ □ □		← ■ ■ □ □		← ■ ■ □ □	
270 370	辅助触头、欠电压脱扣器 Auxiliary contact, Under-voltage release		← ○ ■ □ □		← ○ ■ □ □		← ○ ■ □ □		← ○ ■ □ □		← ○ ■ □ □		← ○ ■ □ □	
218 318	分励脱扣器、报警触头 Shunt release, Alarm contact		← ● □ □		← ● □ □		← ● □ □		← ● □ □		← ● □ □		← ● □ □	
228 328	辅助触头、报警触头 Auxiliary contact, Alarm contact		← ■ □ □		← ■ □ □		← ■ □ □		← ■ □ □		← ■ □ □		← ■ □ □	
238 338	欠电压脱扣器、报警触头 Under-voltage release, Alarm contact		← ○ □ □		← ○ □ □		← ○ □ □		← ○ □ □		← ○ □ □		← ○ □ □	
248 348	分励脱扣器、辅助触头、报警触头 Shunt release, Auxiliary contact, Alarm contact		← ● ■ □ □		← ● ■ □ □		← ● ■ □ □		← ● ■ □ □		← ● ■ □ □		← ● ■ □ □	
268 368	二组辅助触头，报警触头 Two sets of auxiliary contacts, Alarm contact		← ■ ■ □ □		← ■ ■ □ □		← ■ ■ □ □		← ■ ■ □ □		← ■ ■ □ □		← ■ ■ □ □	
278 378	辅助触头，欠电压脱扣器，报警触头 Auxiliary contact, Under-voltage release, Alarm contact		← ○ ■ □ □		← ○ ■ □ □		← ○ ■ □ □		← ○ ■ □ □		← ○ ■ □ □		← ○ ■ □ □	

注：

- 1.200：表示仅有电磁脱扣器的断路器本体；300：表示带有热动 - 电磁脱扣器的断路器本体；000：表示不带脱扣器的断路器本体（隔离开关）；
2. 对 HMKM1-100、225 二极产品只有 210、310、220、320、230、330；对 HMKM1-100、225 四极断路器无 218、318、248、348，N 极为 A 型和 D 型时无 240、340、260、360、268、368；
3. 对 HMKM1-400、HMKM1-630 及 HMKM1-800 其中 248、348、278、378 规格中辅助触头为一对触头（即一常开、一常闭），268、368 规格中的辅助触头为三对触头。

Note:

- 1.200: Indicates the circuit breaker body with only electromagnetic release; 300: denotes the circuit breaker body with thermodynamic-electromagnetic release; 000: denotes the circuit breaker body (isolating switch) without release;
2. For HMKM1-100, 225 diode products, only ; No 218 for quadrupole circuit breakers HMKM1-100 and 225 ; No 240 for N pole A and D circuit breakers;
3. For HMKM1-400, HMKM1-630 and HMKM1-800, the auxiliary contacts in specifications 248, 348, 278 and 378 are one pair of contacts (i.e. one normally open and one normally closed), and the auxiliary contacts in specifications 268 and 368 are three pairs of contacts.

快速选型表 Quick selection table

壳架等级额定电流 Inm=63A Inm=800A Inm=100A Inm=1000A Inm=225A Inm=1250A Inm=400A Inm=1600A Inm=630A Rated current of frame size Inm=63A Inm=800A Inm=100A Inm=1000A Inm=225A Inm=1250A Inm=400A Inm=1600A Inm=630A	操作方式选择 P 电动操作 Z 转动手柄操作 Operation mode selection P:Electric operation Z:Rotating handle operation	脱扣器方式及内部附件选择： 首位数字表示脱扣器方式， 后两位数字表示内部附件代号； 2： 仅电磁（瞬时脱扣器） 3： 热动 - 电磁（复式）脱扣器 （详见表 1） Selection of release mode and internal accessories: The first digit indicates the release mode and the last two digits indicate the internal accessory code 2: Electromagnetic only (instantaneous release) 3: Thermodynamic-electromagnetic (compound) release (See Table 1 for details)	额定电流 (A) 详见主要技术参数表 Rated current (A) See the table of main technical parameters for details	安装方式选择： 板前接线； 板后接线； 插入式接线； 特殊方式 (用户与工厂协商) Installation mode selection: Front wiring Back wiring Plug-in wiring Special mode (User Negotiates with Factory)	其他附件选择：二台断路器之间机械联锁 Other accessories option: Mechanical interlocking between two circuit breakers
HMKM1-100 H P / 3 300 2 B In 安装方式 其它附件 Installation mode Other accessories	分断能力级别选择： L：标准型 (25、35、50kA) M：较高分断型 (50、65、75kA) H：高分断型 (85、100kA) Breaking capacity level selection: L: Standard (25, 35, 50kA) M: Higher breaking type (50, 65, 75kA) H: High breaking type (85, 100 kA)	极数选择： 2：二极 3：三极 4：四极 Pole number selection: 2: dipole 3: Triple pole 4: Quadru-pole	不同用途选择： 无： 配电用无代号 2： 电动机保护用 TH：“三防”场合用 Different use options: None: No code for power distribution 2: For motor protection TH: "Three defenses" occasion	四极产品选择： A 型： N 极不安装过电流脱扣器， 且 N 极始终接通， 不与其他三极一起合分 B 型： N 极不安装过电流脱扣器， 且 N 极与其他三极一起合分 C 型： N 极安装过电流脱扣器， 且 N 极与其他三极一起合分 D 型： N 极安装过电流脱扣器， 且 N 极始终接通， 不与其他三极一起合分 Quadrupole product selection: Type A: Type A: N pole is not equipped with over-current release, and N pole is always connected, does not close or open with other three poles; Type B: Type B: N pole is not equipped with overcurrent release, and N pole opens and closes with other three poles; Type C: Type C: N-pole is equipped with over-current release, and N-pole opens and closes with other three poles; Type D: Type D: N pole is fitted with an over-current release, and the N pole is always on and does not close or open with the other three poles.	

举例：

- 如订 HMKM1-100M 三极，电动机保护用，额定电流为 80A 并带分励脱扣器、辅助触头，板前接线且要求两台带机械联锁机构。即写为订：HMKM1-100M/33402 In=80A，板前接线 2 台机械联锁，脱扣器线圈电压：AC230V。
- 如订 HMKM1-225M 四极，配电用，额定电流为 180A 并带电动操作机构及分励脱扣器，N 极安装过电流脱扣器，且 N 极与其它三极一起合分形式，板后接线 10 台。即写为订：HMKM1-225MP/4310C 型，In=180A 板后接线 10 台，电操电压：AC230V，脱扣器线圈电压：AC230V。

Example:

- If you want to order HMKM1-100M (triple pole) for motor protection, whose rated current is 80A with shunt release, auxiliary contact, front wiring, and require two sets of mechanical interlocking mechanism. It should be written as follow: HMKM1-100M/33402 In=80A, front wiring, two mechanical interlocks, release coil voltage: AC230V.
- If you want to order 10 sets of HMKM1-225M (quadrupole) for power distribution, whose rated current is 180A with Electro-control mechanism and shunt release, N pole is equipped with over-current release, and N pole opens and closes with other three poles, back wiring. It should be written as follow: HMKM1-225MP/4310C, In=180A back wiring, 10 sets, electric operation voltage: AC 230V, release coil voltage: AC 230V.

保护特性 Protection characteristic

- ◆ 断路器热动型脱扣器具有反时限特性；电磁脱扣器为瞬时动作，特性见下表（配电用）及（保护电动机用）。
- The Thermal release of circuit breaker has inverse time characteristic; The electromagnetic release acts instantaneously, and its characteristics are shown in the following table (for power distribution) and (for motor).

配电用 For power distribution

脱扣器额定电流 (A) Rated current of release(A)	热动型脱扣器 (环境温度: 陆用 +40℃; 船用 +45℃) Thermal release (ambient temperature + 40 °C for land and + 45 °C for ship)		电磁脱扣器动作电流 (A) Operating current of electromagnetic release (A)
	1.05In (冷态) 不动作时间 (h) 1.05 In (cold) inactive time (h)	1.30In (热态) 动作时间 (h) 1.30 In (hot) action time (h)	
10 ≤ In ≤ 63	1	1	10In±20%
63 ≤ In ≤ 100	2	2	
100 ≤ In ≤ 800	2	2	5In±20% 10In±20%
注: HMKM1-225 中的 100A, 125A 规格中无 5In 电磁脱扣器。 Note: There is no 5In electromagnetic release in 100A and 125A specifications in HMKM1-225.			

保护电动机用 For motor protection

脱扣器额定电流 (A) Rated current of release(A)	热动型脱扣器 (环境温度: 陆用 +40℃; 船用 +45℃) Thermal release (ambient temperature + 40 °C for land and + 45 °C for ship)				电磁脱扣器动作电流 (A) Operating current of electromagnetic release (A)
	1.05In (冷态) 不动作时间 1.05 In (cold) inactive time	1.20In (热态) 动作时间 1.20 In (hot) action time	1.50In (热态) 动作时间 1.50 In (hot) action time	7.2In (冷态) 动作时间 7.2 In (cold state) action time	
10 ≤ In ≤ 225	≥ 2h	< 2h	< 4min	4S < Tp ≤ 10S	12In±20%
225 ≤ In ≤ 630			< 8min	6S < Tp ≤ 20S	

连接导线的截面积与相适应的额定电流 Cross-sectional area of connecting wire and corresponding rated current

额定电流值 (A) Rated current (A)	10	16、20	25	32	40、50	63	80	100	125	160	180、200、225	250	315、350	400
导线截面积 (mm²) Cross-sectional area of connecting wire (mm²)	1.5	2.5	4	6	10	16	25	35	50	70	95	120	185	240

额定电流值 (A) Rated current (A)	电缆 Cable		铜排 Copper bar	
	截面积 (mm²) Cross-sectional area (mm²)	数量 Number	尺寸 (mm×mm) Size (mm×mm)	数量 Number
500	150	2	30×5	2
630	185	2	40×5	2
700,800	200	2	40×5	2

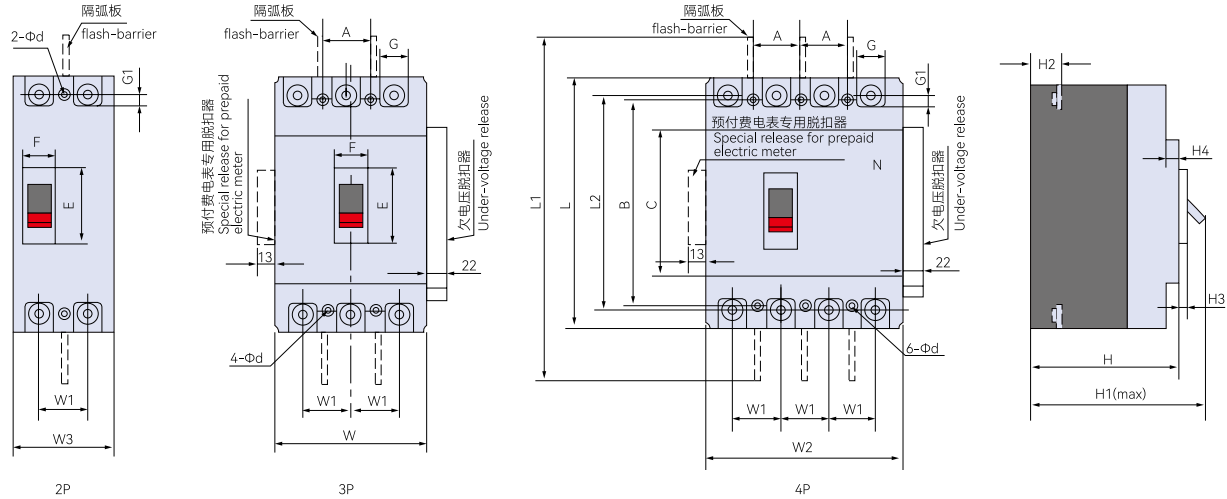
不同环境温度下的降容系数 Derating factor at different ambient temperatures

型号 Model	Temperature 温度				
	+40℃ (船用 +45℃) (for ship)	+45℃ (船用 +50℃) (for ship)	+50℃ (船用 +55℃) (for ship)	+55℃ (船用 +60℃) (for ship)	+60℃ (船用 +65℃) (for ship)
	降容系数 Derating factor				
HMKM1-63 (L、M)	1In	0.94In	0.88In	0.80In	0.72In
HMKM1-100 (L、M、H)	1In	0.95In	0.89In	0.84In	0.76In
HMKM1-225 (L、M、H)	1In	0.96In	0.91In	0.87In	0.82In
HMKM1-400 (L、M、H)	1In	0.94In	0.87In	0.81In	0.73In
HMKM1-630 (L、M、H)	1In	0.93In	0.88In	0.83In	0.76In
HMKM1-800 (M、H)	1In	0.88In	0.83In	0.79In	0.76In
HMKM1-1000 (M、H)	1In	0.88In	0.83In	0.79In	0.76In
HMKM1-1250 (M、H)	1In	0.88In	0.83In	0.79In	0.76In
HMKM1-1600 (M、H)	1In	0.88In	0.83In	0.79In	0.76In
注: 以上降容系数均在通于壳架额定电流下测得 Note: The coefficients above are measured under the rated current passing through the frame size					

外形及安装尺寸 Shape and installation dimensions

◆ HMKM1-63、100、225 外形及安装尺寸（板前接线）

Shape and installation dimensions of HMKM1-63, 100, 225 (front wiring)



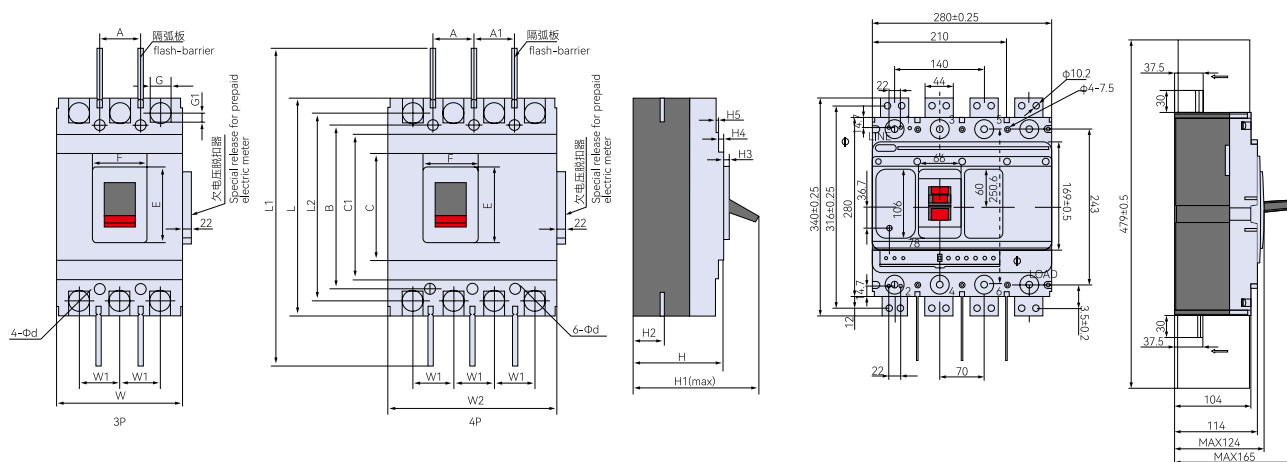
单位: mm Unit:mm

		型号 Model					
		HMKM1-63L	HMKM1-63M	HMKM1-100L	HMKM1-100M HMKM1-100H	HMKM1-225L	HMKM1-225M HMKM1-225H
外形尺寸 External dimension	C	85	85	84	84	102	102
	E	48	48	50.5	50.5	50	50
	F	22	22	22	22	22	22
	G	14	14	17.5	17.5	23	23
	G1	6.5	6.5	7.5	7.5	11.5	11.5
	H	72	82	68	86	86	103
	H1	90	100	86	104	110	127
	H2	18	28	24	24	24	24
	H3	4	4	4	4	4	4
	H4	6	6	7	7	5	5
	L	135	135	150	150	165	165
	L1	235	235	255	250	360	360
	L2	117	117	136	136	144	144
	W	76	76	90	90	105	105
	W1	25	25	30	30	35	35
	W2	/	102.5	120	120	140	140
	W3	/	/	/	65	/	75
安装尺寸 Installation size	A	25	25	30	30	35	35
	B	117	117	129	129	126	126
	φd	4.5	4.5	4.5	4.5	5	5

外形及安装尺寸 Shape and Installation Dimensions

◆ HMKM1-400、630、800、1000、1250、1600 外形及安装尺寸 (板前接线)

Shape and Installation Dimensions of HMKM1-400, 630, 800, 1000, 1250, 1600 (Front Wiring)



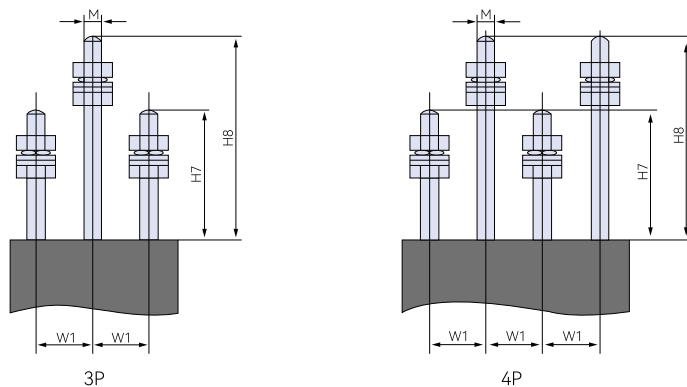
单位: mm Unit:mm

		型号 Model								
		HMKM1-400L/3P HMKM1-400M/3P HMKM1-400H/3P	HMKM1-400L/4P HMKM1-400M/4P HMKM1-400H/4P	HMKM1-630L/3P HMKM1-630M/3P HMKM1-630H/3P	HMKM1-630L/4P HMKM1-630M/4P HMKM1-630H/4P	HMKM1-800M/3P HMKM1-800H/3P	HMKM1-800M/4P	HMKM1-1000M/3P 1000H/4P	HMKM1-1250M/3P 1250H/4P	HMKM1-1600M/3P 1600H/4P
外形尺寸 External dimension	C	127.5	127.5	134	134.5	136	136	/	/	/
	C1	173.5	173.5	184.5	184.5	204	204	/	/	/
	E	88.5	88.5	89	89	81	81	100	100	100
	F	65	65	65.5	65	66	66	77	77	77
	G	30.5	30.5	44	44	45	45	/	/	/
	G1	11	12	13.5	15.5	12.5	12	/	/	/
	H	107	107	112	112	116	116	135	135	135
	H1	162	162	164.5	164.5	168	168	190	190	190
	H2	38	40	41.5	42	41.5	41.5	/	/	/
	H3	6.5	6	7	6.5	4.5	4.5	15	15	15
	H4	5.5	5	3.5	3.5	5	5	/	/	/
	H5	5	4.5	4.5	4.5	8	8	/	/	/
	L	257	257	270.5	270.5	280	280	330	330	330
	L1	457	457	470	470	470	485	640	640	640
	L2	224	224	234	234	243	243	/	/	/
	W	150	/	182	/	210	/	210	210	210
	W1	48	48	58	58	70	70	/	/	/
	W2	/	197.5	/	240	/	280	/	/	/
安装尺寸 Installation size	A	44	44	58	58	70	70	70	70	70
	A1	/	50	/	58	/	/	/	/	/
	B	194	194	200	200	243	243	300	300	300
	φd	7	7	7	7	7	7	17.5	17.5	17.5

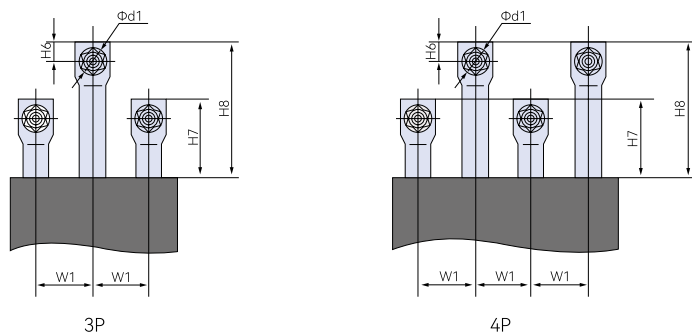
注: HMKM1-1250 (加本体联结板) 总长为 470mm。

Note: The total length of HMKM1-1250 (with body connecting plate) is 470mm.

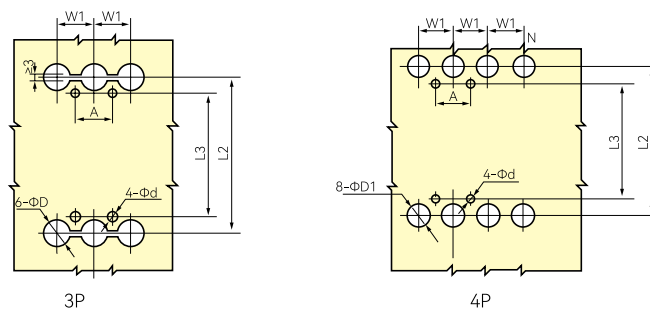
◆ HMKM1-63、100、225 外形及安装尺寸（板后接线）
Shape and Installation Dimensions of HMKM1-63, 100, 225 (Back wiring)



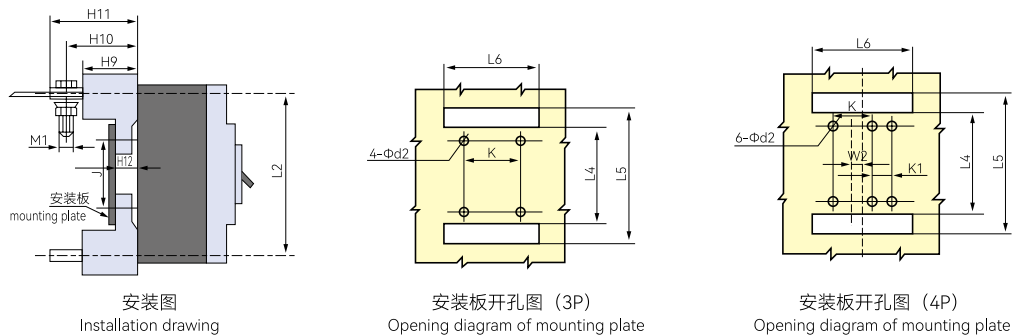
◆ HMKM1-400、630、800 外形及安装尺寸（板后接线）
Shape and Installation Dimensions of HMKM1-400, 630, 800 (Back wiring)



◆ 板后接线开孔图
Open hole diagram of back wiring



◆ 插入式外形及安装尺寸
Plug-in shape and installation dimensions



注：板后接线、插入式的外形及安装尺寸以附件实物尺寸为准，本系列尺寸仅供参考！！

Note: The shape and installation dimensions of back wiring and plug-in wiring are subject to the physical dimensions of accessories. The sizes are for reference only!

◆ 板后接线插入式外形及安装尺寸
Shape and installation dimensions of plug-in wiring

单位: mm
Unit: mm

型号 Model							
		HMKM1-63L HMKM1-63M	HMKM1-100L HMKM1-100M HMKM1-100H	HMKM1-225L HMKM1-225M HMKM1-225H	HMKM1-400L HMKM1-400M HMKM1-400H	HMKM1-630L HMKM1-630M HMKM1-630H	HMKM1-800M HMKM1-800H
板后接线 插入式尺寸 Shape dimensions of plug-in wiring behind plate	A	/	30	35	/	/	/
	φd	4.5	4.5×6 长孔	5.5	7	7	7
	φd1	/	/	/	12	16	16
	φd2	6	8	8	9	9	12
	ΦD	8	10	12	33	37	37
	φD1	8	10	12	33	37	37
	H6	/	/	/	18	20	20
	H7	L:32/M:23	63.5	67.5	39	45	64
	H8	L:47/M:38	96.7	118.5	74	79	64
	H9	28	50	50	60	60	87
	H10	38	67.5	71.5	88	92	143.7
	H11	44.5	81	84.5	111	110	158.7
	H12	10	18	18	21.5	21	27
	L2	117	132	145	224	234	242
	L3	/	86	125	/	/	/
	L4	90	82	84	160	160	171
	L5	145	178	196	290	310	315
	L6	3P:85	3P:101	3P:117	3P:159	3P:192	3P:220
		4P:110	4P:135	4P:155	4P:210	4P:252	4P:290
	M	M6	M8	M10	/	/	/
	K	50	60	70	60	100	90
	K1	25	30	35	48	58	72
	J	60	56	54	129	123	146
	M1	M5	M8	M8	M10	M12	M12
	W1	25	30	35	48	58	70
	W2	12.5	15	17.5	24	29	35

断路器的内部附件和外部附件 Internal and external accessories of circuit breaker

◆ 断路器的内部附件 Internal accessories of circuit breaker

1. 欠电压脱扣器 Under-voltage release

当电压下降(甚至缓慢下降)到额定电压的 70%至 35% 范围内,欠电压脱扣器应动作;欠电压脱扣器在电源电压低于脱扣器电压(额定电压)的 35% 时,欠电压脱扣器应能防止断路器闭合;电源电压等于或大于 85% 时,应能保证断路器闭合。

特别提醒:装有欠电压脱扣器的断路器,只有在欠电压脱扣器通以额定电压的情况下,断路器才能正常分合闸。

When the voltage drops (or even slowly drops) to the range of 70% to 35% of the rated voltage, the undervoltage release should operate; When the power supply voltage is lower than 35% of the rated voltage, the undervoltage release should be able to prevent the circuit breaker from closing; When the power supply voltage is equal to or greater than 85%, the circuit breaker should be able to close.

Special reminder: Circuit breakers equipped with undervoltage release devices can only be opened and closed normally when the undervoltage release device is at rated voltage.

代号 Code	A2	A4	D1	D2
额定电压 Rated voltage	AC230V	AC400V		
额定频率 Rated frequency	50Hz	50Hz		

2. 分励脱扣器 Shunt release

在 70% ~ 100% 的额定电压下断路器能可靠断开。

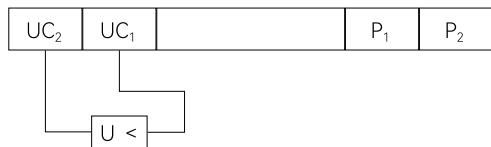
The circuit breaker can reliably disconnect at 70% to 100% of the rated voltage.

代号 Code	A2	A4	D1	D2	D3
额定电压 Rated voltage	AC230V	AC400V			DC24V
额定频率 Rated frequency	50Hz	50Hz			

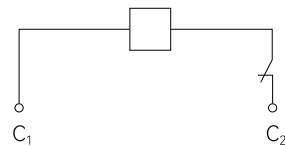
注:电压规格选用 DC24V 时,额定电流达到 5A±0.5A

Note: When the voltage specification is DC24V, the rated current reaches 5A ± 0.5A

欠电压脱扣器接线图 Wiring diagram of undervoltage release



分励脱扣器接线图 Wiring diagram of shunt release

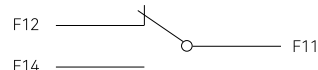


3. 辅助触头和报警触头 Auxiliary contact and alarm contact

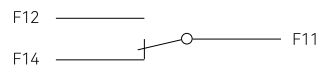
壳架等级 frame size	约定发热电流 Ith A Conventional thermal current Ith A	AC400V 时的额定电流 Ie A Rated current at AC 400V Ie A	DC230V 时的额定电流 Ie A Rated current at DC230V Ie A
Inm ≤ 225A	3	0.26	0.14
Inm ≥ 400A	6	3	0.2

a. 辅助触头 Auxiliary contact

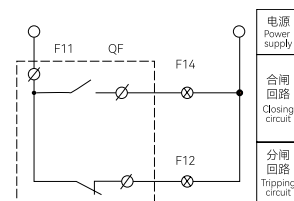
断路器在“分”位置时
Circuit breaker
in the "open" position



断路器在“合”位置时
Circuit breaker
in the "close" position



接线图 Wiring diagram

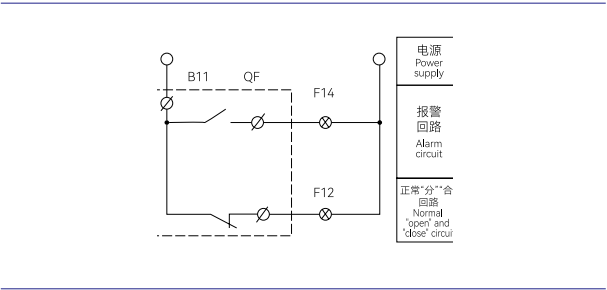
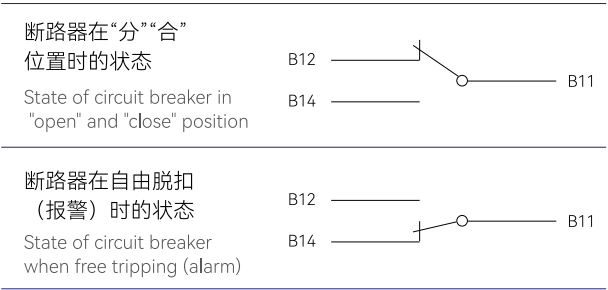


b. 报警触头 Alarm contact

断路器正常合分时、报警触头不动作，只有在自由脱扣（或故障跳闸）后报警，触头才改变原始位置，即常开变闭合、常闭变打开。待断路器再扣后，报警触头恢复原始状态。

When the circuit breaker is normally closed and opened, the alarm contact does not act. Only when the alarm is given after free tripping (or fault tripping), the contact changes its original position, that is, normally open to close and normally closed to open. After the circuit breaker is buckled again, the alarm contact returns to its original state.

报警触头接线图 Wiring diagram of alarm contact

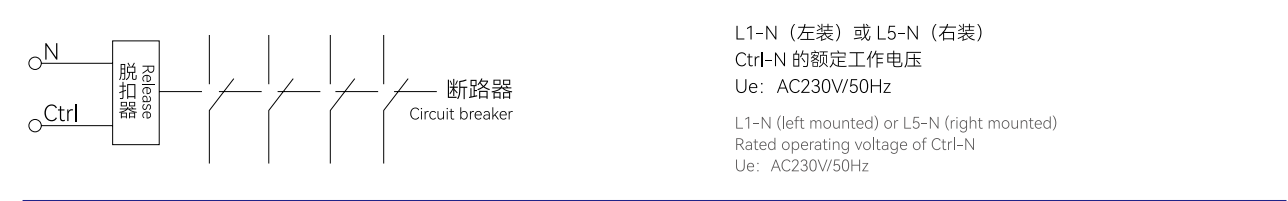


4. 预付费电表专用脱扣器 Special release for prepaid electric meter

预付费电表专用脱扣器的额定工作电压 U_e 为 AC230V/50Hz，在 $(65\% \sim 110\%) U_e$ 范围内能正常工作，当 Ctrl 端切断后，断路器会延时 0.5s ~ 2s 分闸。

The rated working voltage U_e of the special release for prepaid electric meter is AC230V/50Hz, which can work normally in the range of $(65\% \sim 110\%) U_e$. When the Ctrl terminal is cut off, the circuit breaker will delay opening for 0.5 s ~ 2s.

接线图 Wiring diagram



◆ 断路器的外部附件 External accessories of circuit breaker

1. 电动操作机构

类别 Type	Model 型号	HMKM1-63、HMKM1-100 HMKM1-225	HMKM1-400、HMKM1-630 HMKM1-800、HMKM1-1250	HMKM1-63、HMKM1-100、HMKM1-225、HMKM1-400 HMKM1-630、HMKM1-800、HMKM1-1250
结构型式 Structural type		电磁铁 Electromagnet	电动机 Motor	交直流两用 AC and DC dual-purpose
代号 Code		A2、A4	A2、A4	A1/D1、A2/D2、D3
额定电压 Rated voltage		AC230V AC400V	AC230V AC400V	AC230V/DC220V
额定频率 Rated frequency		50Hz	50Hz	50Hz

HMKM1-63、100、225

电动操作机构

Electro-control mechanism



HMKM1-400、630、800、1250

电动操作机构

Electro-control mechanism



HMKM1-63、100、225、400、630、800、1250

交直流电动操作机构

Electro-control mechanism



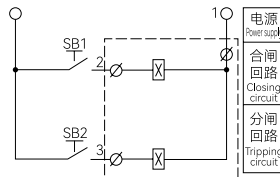
手动操作机构 operation mechanism



HMKM1-63、100、225

交流电动机操作 (AC) 分、合闸原理图

Schematic diagram of opening and closing of AC electro-control mechanism (AC)

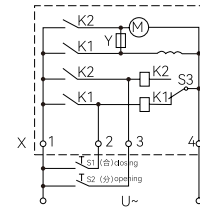


AC 50Hz 230V、400V

HMKM1-400、630、800、1250

交流电动机操作 (AC) 分、合闸原理图

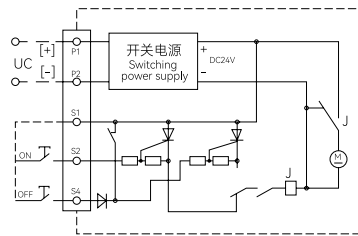
Schematic diagram of opening and closing of AC electro-control mechanism (AC)



AC 50Hz 230V、400V

HMKM1-63、100、225、400、630、800、1250 交直流电动操作机构 (AC/DC) 分、合闸原理图

HMKM1-63, 100, 225, 400, 630, 800, 1250 Schematic diagram of opening and closing of AC/DC electro-control mechanism (AC/DC)



50Hz AC100V/DC110V; AC230V/DC220V DC24V

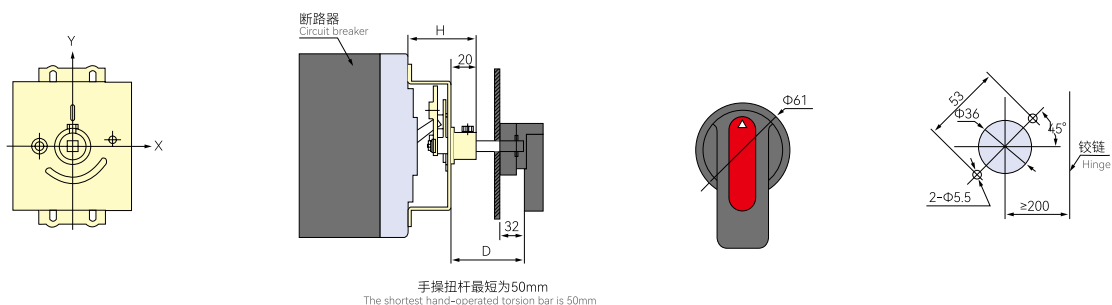
断路器安装电动操作机构的总高度 (mm)

Total height (mm) of electro-control mechanism for circuit breaker installation

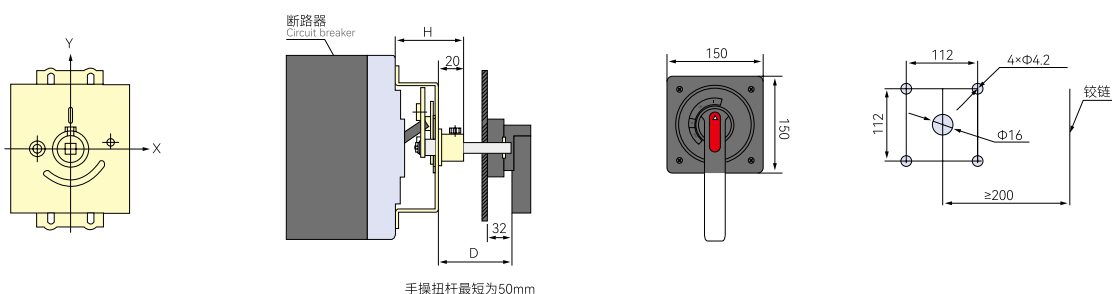
型号 Model 高度 Height	HMKM1-63L	HMKM1-63M	HMKM1-100L	HMKM1-100M HMKM1-100H	HMKM1-225L	HMKM1-225M HMKM1-225H	HMKM1-400L HMKM1-400M HMKM1-400H	HMKM1-630L HMKM1-630M HMKM1-630H	HMKM1-800M HMKM1-800H	HMKM11250H
H1 (AC)	155	164	152	170	182	199	238	246	247	300
H2 (AC/DC)	160	171	153	171	177	194	255	262	261	290

2. 手动操作机构 Manual operation mechanism

HMKM1-63 ~ 800 手柄安装开孔示意图 Opening diagram of handle installation



HMKM1-1250 手柄安装开孔示意图 Opening diagram of handle installation

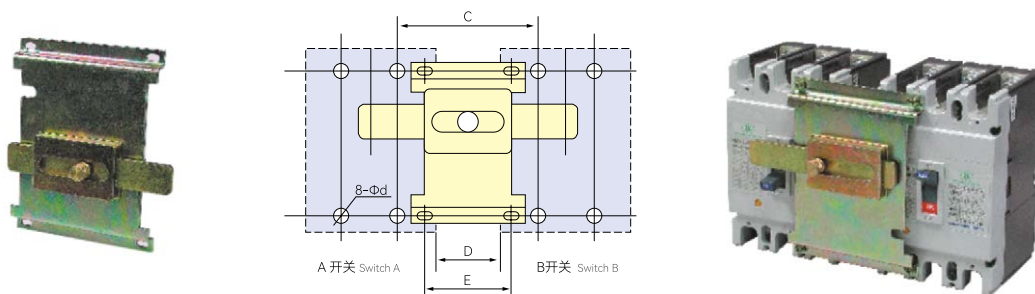


手动操作机构安装尺寸 (mm)

Installation dimensions of manual operation mechanism(mm)

型号 Model	HMKM1-63	HMKM1-100	HMKM1-225	HMKM1-400	HMKM1-630	HMKM1-800	HMKM1-1250H
安装尺寸 H Installation dimensions H	49	51	54	88	89	76	103
操作手柄相对于 断路器中心 Y 值 Operating handle relative to circuit breaker center Y	0	0	0	0	0	0	0

3 两台断路器的机械联锁机构 Mechanical interlocking mechanism of two circuit breakers



安装尺寸 Installation dimensions(mm)

型号 Model	HMKM1-63	HMKM1-100	HMKM1-225	HMKM1-400	HMKM1-630	HMKM1-800
C	80	90	100	136	172	167
D	30	30	30	30	48	28
E	80	90	100	40	62	40

注：安装时，先将断路器装在安装架上，再将联锁机构装在断路器上。

Note: When installing, install the circuit breaker on the mounting frame first, and then install the interlocking mechanism on the circuit breaker.

HMKM1 系列塑料外壳式断路器 HMKM1Series Moulded Case Circuit Breaker

1	主体	Principal part
2	插入式 (客户选购)	Plug-in (customer optional)
3	板后接线 (客户选购)	Back wiring (customer optional)
4	欠压脱扣器 (客户选购)	Under-voltage release(customer optional)
5	分励脱扣器 (客户选购)	Shunt release(customer optional)
6	报警触头 (客户选购)	Auxiliary contact(customer optional)
7	辅助触头 (客户选购)	Alarm contact(customer optional)
8	电动操作机构 (客户选购)	Electro-control mechanism(customer optional)
9	手操机构 (客户选购)	Manual operation mechanism(customer optional)
10	机械联锁 (客户选购)	Mechanical interlocking(customer optional)
11	端子护罩 (客户选购)	Terminal shroud(customer optional)
12	板前接线版 (客户选购)	Front wiring(customer optional)
13	隔弧板 (与主体标配)	Flash-barrier(standard with the principal part)
14	预付费电表专用脱扣器 (客户选购)	Special release for prepaid

订货须知 Ordering Information

用户在订货时，采用订货代号进行订货。

订货代号组成如下：

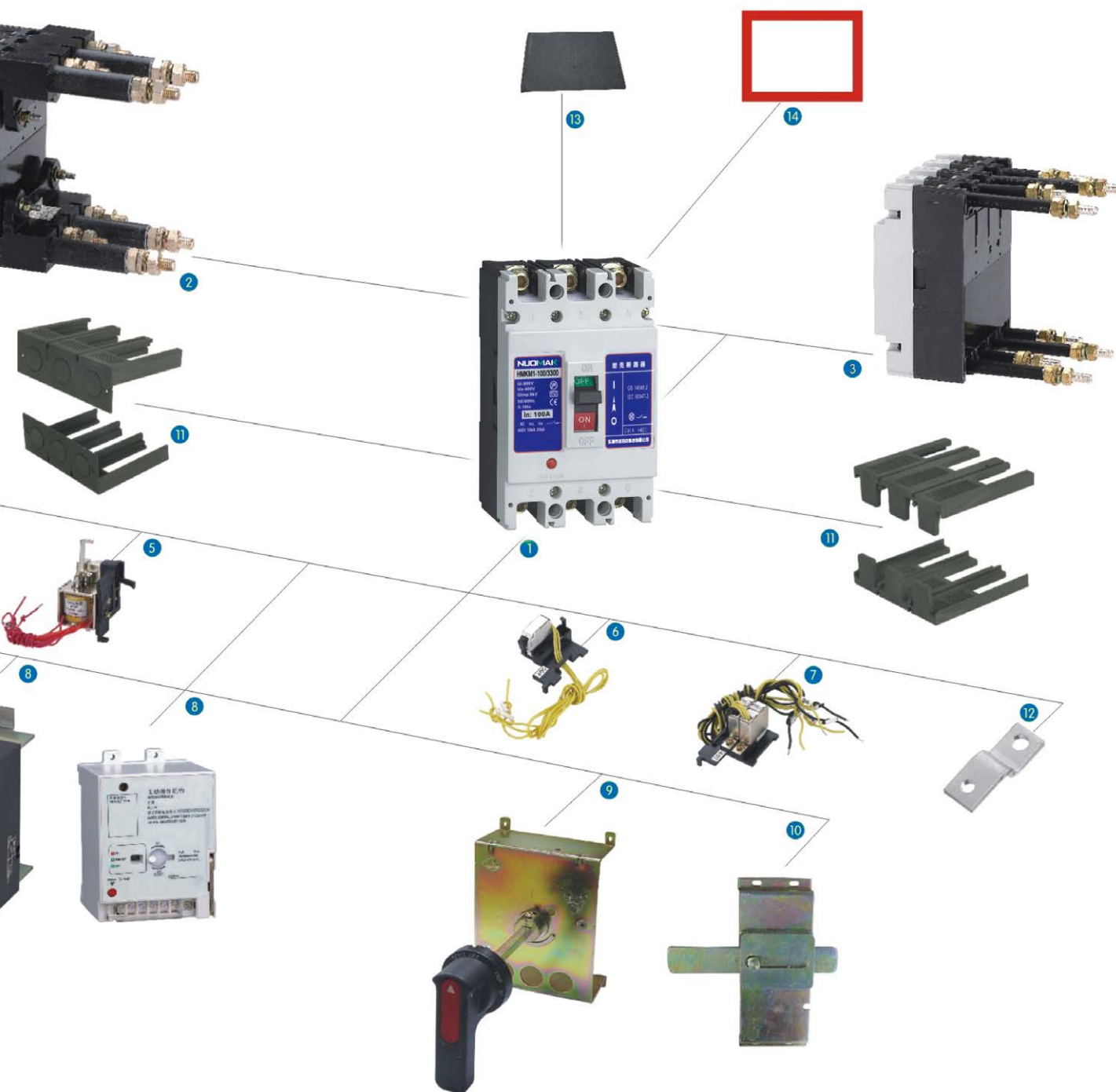
产品型号 + 额定电流规格代号（见表）+ 内部附件额定电压代号（无时，用 00 表示）+ 电动操作机构额定电压代号（无时，用 00 表示）

When ordering, customers will use the ordering code to order.

The order code is composed as follows:

Product Model + Rated Current Specification Code (see table) + Internal Accessories Rated Voltage Code (None, 00) + Rated voltage code for electric operating mechanism (None, 00)

代号 Code	A	B	C	D	E	F	G	H	I	J	K	L	M
额定电流 (A) Rated Current(A)	/	10	16	20	25	32	40	50	63	80	100	125	160
代号 Code	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
额定电流 (A) Rated Current(A)	180	200	225	250	315	350	400	500	630	70	800	1000	1250



例如：订货 HMKM1-100L，50A，三级，分励脱扣器（AC230V），电动操作机构（AC230V），数量 10 台。

订货代号为：HMKM1-100LP/3310 50A AC230V 10 台

For example: Order 10 sets of HMKM1-100L, 50A, triple pole, shunt release (AC230V), electro-control mechanism (AC230V).

Order code: 10 sets of HMKM1-100LP/3310 50A AC230V.



HMKM1L 系列带剩余电流保护塑料外壳式断路器

Moulded Case Circuit Breaker with Residual Current Protection

适用范围 Scope of application

HMKM1L 系列带剩余电流保护塑料外壳式断路器，是公司采用先进的 CAD/CAM/CAE 设计、制造技术、研制、开发的新型断路器之一。其额定绝缘电压为 800V，适用于交流 50Hz，额定工作电压 AC400V，额定电流至 800A 的电路中作不频繁转换及电动机不频繁起动之用。断路器具有过载、短路和欠电压保护功能，能保护线路和电源设备不受损坏，同时，可对人提供间接接触保护，还可以对过电流保护不能检测出的长期存在的接地故障可能引起火灾危险提供保护。在其它保护装置失灵时，额定剩余动作电流为 30mA 的断路器可对直接接触起附加保护作用。

该断路器具有体积小、分断高、飞弧短、抗振动等特点。

断路器可垂直安装（即竖装），亦可水平安装（即横装）。

断路器不可倒进线，即只允许 1、3、5 接电源线，2、4、6 接负载线。

断路器产品符合下列标准：

IEC60947-1 及 GB14048.1-2006 总则

IEC60947-2 及 GB14048.2-2008 断路器及附录 B 具有剩余电流保护的断路器

断路器适用于隔离，符号表示为“—/—”。

HMKM1L Series Moulded Case Circuit Breaker with Residual Current Protection is one of the new circuit breakers we developed with advanced CAD/CAM/CAE design and manufacturing technology. Its rated insulation voltage is 800V, suitable for AC 50Hz, rated working voltage is AC 400V. In the circuit with rated current to 800A, it is used for infrequent conversion and infrequent starting of motor. The circuit breaker has the functions of overload, short circuit and under-voltage protection, which can protect the line and power supply equipment from damage. At the same time, it can provide indirect contact protection for people, and can also provide protection against long-standing ground fault that can not be detected by overcurrent protection, which may cause fire danger. When other protection devices fail, the circuit breaker with rated residual operating current of 30mA can play an additional protection role for direct contact.

The circuit breaker has the characteristics of small size, high breaking, short flashover and anti-vibration.

The circuit breaker can be installed vertically or horizontally.

The circuit breaker cannot be reversed into the line, that is, only 1, 3 and 5 are allowed to connect to the power line, and 2, 4 and 6 are allowed to connect to the load line.

The circuit breaker products meet the following standards:

IEC60947-1 and GB14048.1-2006 General

IEC60947-2 and GB14048.2-2008 Circuit Breakers and Appendix B Circuit Breakers with Residual Current Protection

The circuit breaker is suitable for isolation, and the symbols are indicated as “—/—”.

适用工作环境及安装条件 Applicable working environment and installation conditions

- ◆ 周围介质温度不高于 +40℃ 和不低于 -5℃；且 24 小时平均值不超过 35℃（特殊订货除外）；
 - ◆ 安装地点的相对湿度在最高温度为 +40℃ 时不超过 50%；在较低温度下可以有较高的相对湿度，列如 20℃ 时达 90%，对由于温度变化偶尔产生的凝露应采取特殊的措施；
 - ◆ 湿热带型断路器空气相对湿度在 +25℃ 时不超过 95%；
 - ◆ 污染等级为 III 级；
 - ◆ 断路器主电路的安装类别为 III，不接至主电路的辅助电路和控制电路，安装类别为 II；
 - ◆ 断路器适用于电磁环境 A；
 - ◆ 湿热带断路器能耐受湿热、盐雾、霉菌的影响；
 - ◆ 断路器应安装在无爆炸危险和无导电尘埃、无足以腐蚀金属和破坏绝缘的地方；
 - ◆ 在没有雨雪侵袭的地方；
 - ◆ 断路器应按产品的使用说明书安装。
-
- ◆ The temperature of surrounding medium shall not higher than + 40 °C and not lower than -5 °C ; And the 24-hour average temperature shall not exceed 35 °C (except for special orders);
 - ◆ The relative humidity of the installation site shall not exceed 50% when the maximum temperature is + 40 °C ; It can also be installed in places with low temperature and high relative humidity, such as 90% at 20 °C , and special measures should be taken for occasional condensation due to temperature change;
 - ◆ The air relative humidity of thermal-humid circuit breaker shall not exceed 95% at + 25 °C ;
 - ◆ The pollution level is Grade III;
 - ◆ 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 II;
 - ◆ The circuit breaker is suitable for electromagnetic environment A;
 - ◆ The thermal-humid circuit breaker can withstand the influence of damp heat, salt spray and mold;
 - ◆ The circuit breaker shall be installed in a place free from explosion danger, conductive dust, corrosion of metal and damage of insulation;
 - ◆ Where there is no rain or snow;
 - ◆ The circuit breaker shall be installed according to the instruction manual of the product.

主要特点 Main characteristics

- ◆ 剩余电流三相保护：HMKM1L 断路器实现接地故障保护，常规的带剩余电流保护断路器的漏电保护模块工作电源取样为二相，本系列断路器为三相，若缺一相，断路器漏电保护模块仍能正常工作；
 - ◆ 现场可调：额定剩余动作电流 $I_{\Delta n}$ 及剩余电流动作时间（非延时和延时）可根据实际情况现场可调；
 - ◆ 低电压保护：当相电压降低至 85V，漏电保护模块仍能正常工作；
 - ◆ 具有漏电报警输出功能：当设备或线路的剩余电流，达到或超过设定值，带漏电报警单元模块的断路器输出一个无源接点信号，驱动相应的报警装置；
 - ◆ 安装具有互换性：外形尺寸与 M1 系列断路器同规格相同（除 M1-630），安装具有较好的互换性。
-
- ◆ Residual current three-phase protection: HMKM1L circuit breaker to achieve grounding fault protection. The working power supply of conventional leakage protection module with residual current protection circuit breaker is sampled as two phases. This series of circuit breaker for three-phase, if missing any phase, circuit breaker leakage protection module can still work normally;
 - ◆ Field adjustable: Rated residual current $I_{\Delta n}$ and residual current action time (non-delay and delay) can be adjusted on site according to the actual situation;
 - ◆ Low voltage protection: When the phase voltage is reduced to 85V, the leakage protection module can still work normally;
 - ◆ With leakage alarm output function: When the residual current of equipment or line reaches or exceeds the set value, the circuit breaker with leakage alarm unit module outputs a passive contact signal to drive the corresponding alarm device;
 - ◆ Installation with interchangeability: Its overall dimensions are the same as those of M1 series circuit breakers (except M1-630), so the installation has good interchangeability.

脱扣器方式及内部附件代号 Release mode and internal accessory code



附件名称 Accessory name	脱扣方式及内部附件代号 Tripping mode and internal accessory code			附件安装侧及引线方向 Accessory mounting side and lead direction		
	电磁式 脱扣器 Electromagnetic release	复式 脱扣器 Compound release	HMKM1L-100/3 □ HMKM1L-225/3 □	HMKM1L-100/4 □ HMKM1L-225/4 □	HMKM1L-400/3 □ HMKM1L-800/3 □	HMKM1L-400/4 □ HMKM1L-800/4 □
无附件 No accessory	200	300				
报警触头 Alarm contact	208	308				
分励脱扣器 Shunt release	210	310				
辅助触头 Auxiliary contact	220	320				
欠电压脱扣器 Under-voltage release	230	330				
分励脱扣器、辅助触头 Shunt release, Auxiliary contact	240	340	/		/	
二组辅助触头 Two sets of auxiliary contacts	260	360				
辅助触头、欠电压脱扣器 Auxiliary contact, Under-voltage release	270	370	/		/	
分励脱扣器、报警触头 Shunt release, Alarm contact	218	318	/		/	
辅助触头、报警触头 Auxiliary contact, Alarm contact	228	328				
欠电压脱扣器、报警触头 Under-voltage release, Alarm contact	238	338	/		/	
分励脱扣器、辅助触头、报警触头 Shunt release, Auxiliary contact, Alarm contact	248	348	/		/	
二组辅助触头、报警触头 Two sets of auxiliary contacts, Alarm contact	268	368	/		/	
辅助触头、欠电压脱扣器、报警触头 Auxiliary contact, Under-voltage release, Alarm contact	278	378	/		/	

型号及含义 Model and meaning

◆ 型号及含义如下: The models and meanings are as follows:



主要技术参数 Technical Parameters

型号		HMKM1L-100			HMKM1L-225			HMKM1L-400		HMKM1L-630, 800	
壳架电流 I_{nm} (A) Current shell frame $I_{nm}(A)$		100			225			400		630,800	
额定电流 I_n (A) Rated current $I_n(A)$		(10)、16、20、25、32 40、50、63、80、100			100、125、140、160 180、200、225			225、250、315 350、400		400、500、630 700、800	
极数 Pole number		2	3	4	2	3	4	3	4	3	4
额定绝缘电压 U_i (V) Rated insulation voltage U_i (V)		AC800									
额定工作电压 U_e (V) Rated working voltage U_e (V)		AC400									
额定冲击耐受电压 U_{imp} (V) Rated impulse withstand voltage $U_{imp}(V)$		8000									
飞弧距离 (mm) Flashover distance (mm)		50						100			
分断能力级别 Breaking capacity level		L	M		L	M		M		M	
极限短路分断能力 I_{cu} (kA) Limit short circuit breaking ability $I_{cu}(kA)$	AC400V	35	50		35	50		65		65	
运行短路分断能力 I_{cs} (kA) Operation short circuit breaking capability $I_{cs}(kA)$	AC400V	22	35		22	35		42		42	
额定剩余短路接通 (分断) 能力 $I \Delta m$ (kA) Rated residual operating current $I \Delta m(kA)$		$1/4 I_{cu}$									
额定剩余动作电流 $I \Delta n$ (mA) Rated residual operating current $I \Delta n(mA)$	非延时型 Non-delay type	30/100/500、100/300/500			30/100/500、100/300/500			100/300/500		300/500/1000	
	延时型 Delay type	100/300/500			100/300/500			100/300/500		300/500/1000	
额定剩余不动作电流 $I \Delta no$ (mA) Rated residual inactive current $I \Delta no(mA)$		$1/2 I \Delta n$			$1/2 I \Delta n$			$1/2 I \Delta n$		$1/2 I \Delta n$	
操作性能 (次) Operational performance (times)	通电 Electrify	1500			1000			1000		1000	
	不通电 Unelectrify	8500			7000			4000		4000	
	总次数 Total number of times	10000			8000			5000		5000	
剩余电流保护动作时间 (s) Residual current protection operation time (s)		$I \Delta n$			$2 I \Delta n$			$5 I \Delta n$		$10 I \Delta n$	
最大分断时间 (s) Maximum breaking time (s)	非延时型 Non-delay type	0.3			0.15			0.04		0.04	
	延时型 Delay type	0.4/1			0.4/1			0.4/1		0.4/1	

注：1. 本系列三极断路器接三相负载时，负载不能带中性线，包括取自断路器负载端的负载控制回路电源也不能带中性线，否则该断路器会产生误动作；
2. 本系列三极和四极断路器当作单相负载使用时，进、出线相线接 A 极，中性线接 C 极，不要接 B 极。

Note: 1. When this series of triple pole circuit breaker is connected to three-phase load, there can be no neutral line in the load, including the load control loop power supply taken from the load end of the circuit breaker, otherwise the circuit breaker will produce misoperation;
2. When this series of triple pole and quadropole circuit breakers are used as single-phase loads, the incoming and outgoing phase lines should be connected to the A pole, and the neutral line should be connected to the C pole, not to the B pole.



环境温度变化降容系数 Derating factor of ambient temperature change

环境温度 Ambient temperature	+30℃	+40℃	+45℃	+50℃	+55℃	+60℃
型号 Model	降容系数 Derating factor					
HMKM1L-100	1In	0.95In	0.89In	0.84In	0.76In	0.66In
HMKM1L-225	1In	0.95In	0.90In	0.86In	0.82In	0.74In
HMKM1L-400	1In	0.94In	0.87In	0.81In	0.73In	0.65In
HMKM1L-630, 800	1In	0.93In	0.88In	0.83In	0.76In	0.68In

高海拔降容系数 Derating factor of high altitude

海拔 (m) Altitude(m)	2000	3000	4000	5000
工频耐压 (V) Power-frequency(V)	3000	2500	2000	1800
工作电流修正系数 Operating current correction coefficient	1	0.94	0.88	0.83
短路分断能力修正系数 Correction coefficient of short circuit breaking ability	1	0.83	0.71	0.63

保护特性 Protection characteristic

◆ 配电保护用 For distribution protection

脱扣器额定电流 (A) Rated current of release (A)	热动型脱扣器 (环境温度 +30℃) Thermal release (Ambient temperature + 30 °C)		电磁脱扣动作电流 (A) Electromagnetic tripping action current (A)	
	1.05In (冷态) 不动作时间 1.05 In (cold state) inactive time	1.3In (热态) 动作时间 1.3 In (hot) action time		
10 ≤ In ≤ 63	1 小时不动作 Inactive for 1 hour	1 小时内动作 Start action within 1 hour	10In±20%	
63 < In ≤ 140	2 小时不动作 Inactive for 2 hours	2 小时内动作 Start action within 2 hours		
140 < In ≤ 800	2 小时不动作 Inactive for 2 hours	2 小时内动作 Start action within 2 hours	5In±20%	10In±20%

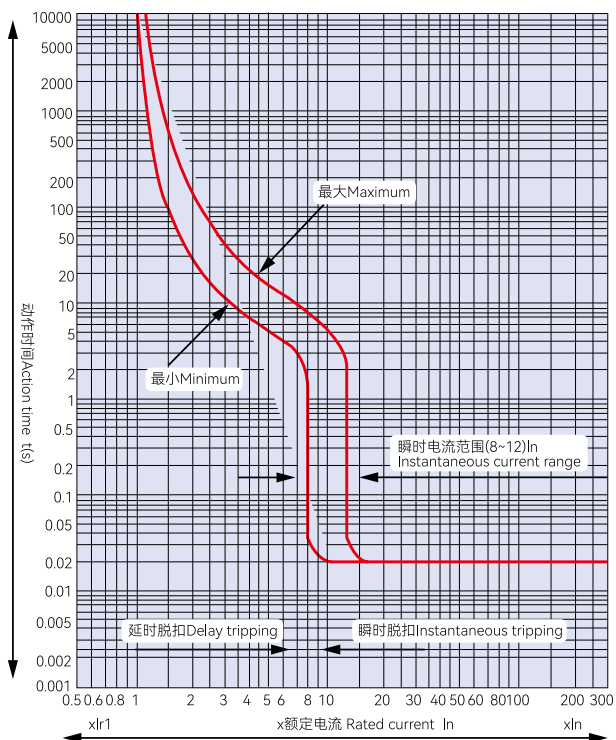
◆ 电动机保护用 For motor protection

脱扣器额定电流 (A) Release Rated current (A)	热动型脱扣器 (环境温度 +30℃) Thermal release (Ambient temperature + 30 °C)					电磁脱扣动作电流 (A) Electromagnetic tripping action current (A)
	1In (冷态) 不动作时间 1In (cold) inaction time	1.2In (热态) 动作时间 1.2 In (hot) action time	1.5In (热态) 动作时间 1.5 In (hot) action time	1In (冷态) 不动作时间 1In (cold) inaction time	脱扣级别 Trip level	
10 ≤ In ≤ 800	2 小时不动作 Inactive for 2 hours	2 小时内动作 Start action within 2 hours	8min 动作 8min action	6s < Tp ≤ 20s	20	12In±20%

断路器配电保护特性曲线 Characteristic curve of circuit breaker distribution protection

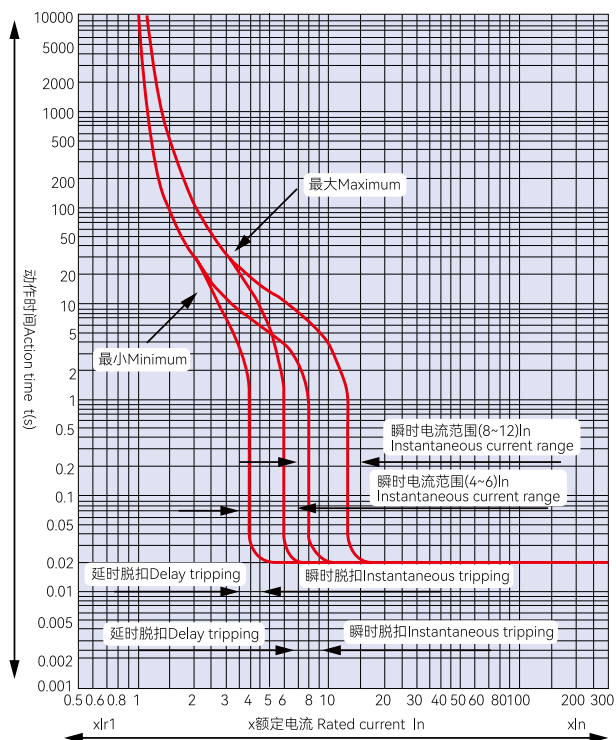
◆ HMKM1L-100L、M 时间 / 电流特性曲线 (配电)

HMKM1L-100L、M Time/current characteristic curve (distribution)



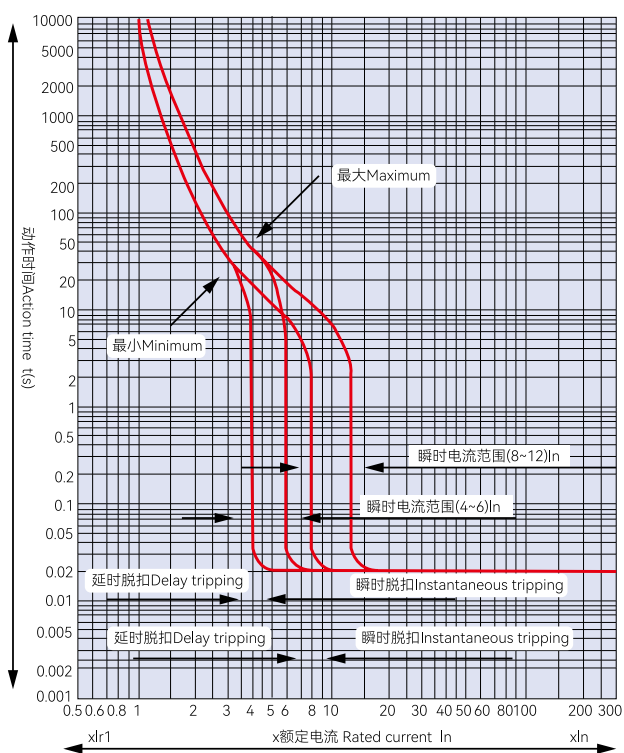
◆ HMKM1L-225L、M 时间 / 电流特性曲线 (配电)

HMKM1L-225L、M Time/current characteristic curve (distribution)



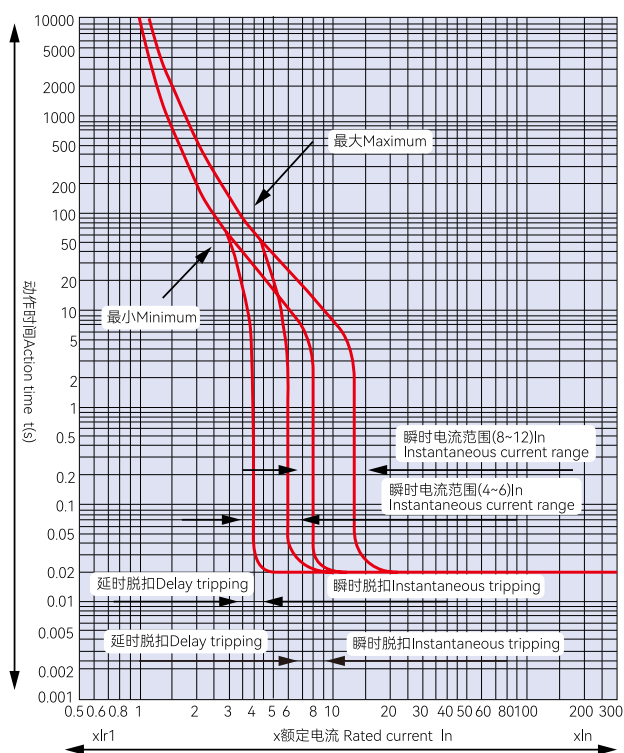
◆ HMKM1L-400M 时间 / 电流特性曲线 (配电)

HMKM1L-400M Time/current characteristic curve (distribution)



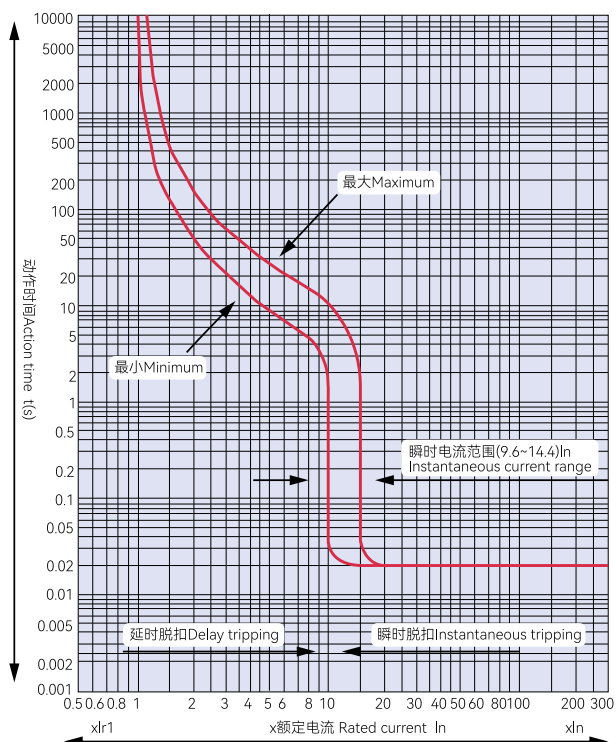
◆ HMKM1L-630M、800M 时间 / 电流特性曲线 (配电)

HMKM1L-630M, 800M Time/current characteristic curve (distribution)

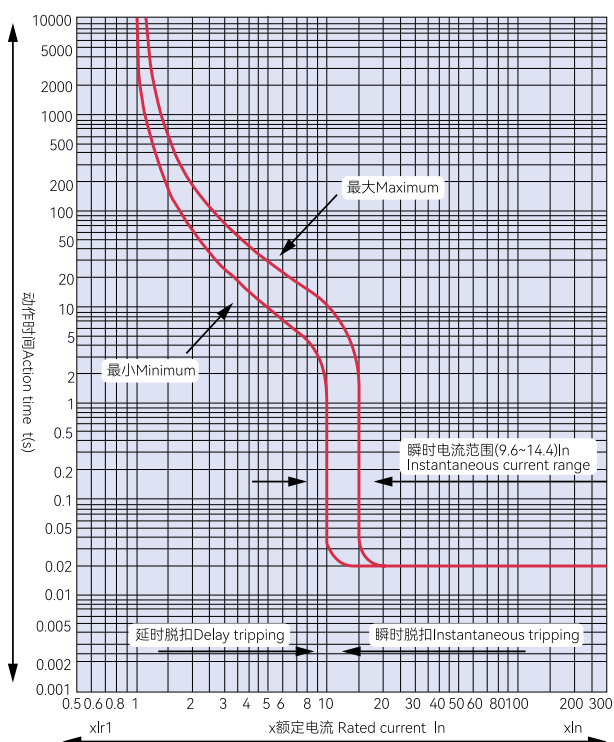


断路器电机保护特性曲线 Characteristic curve of circuit breaker distribution protection

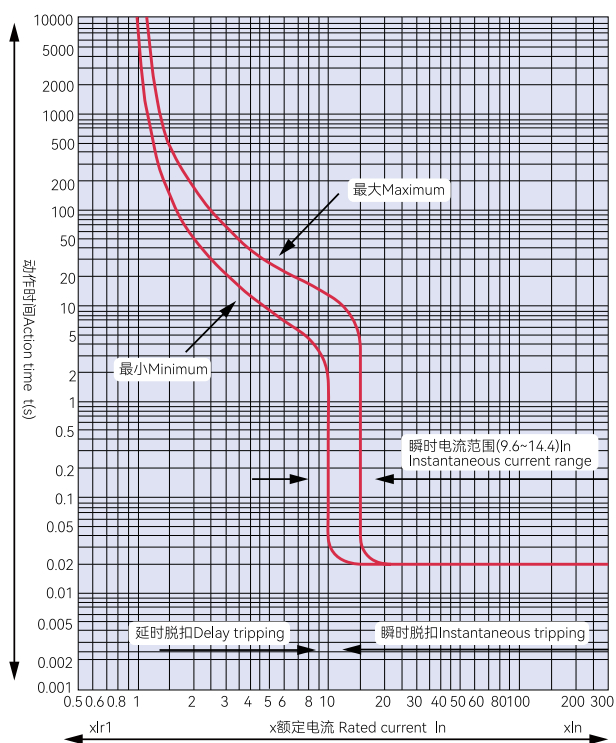
◆ HMKM1L-100L、M 时间 / 电流特性曲线 (电机)
HMKM1L-100L、M Time/current characteristic curve (motor)



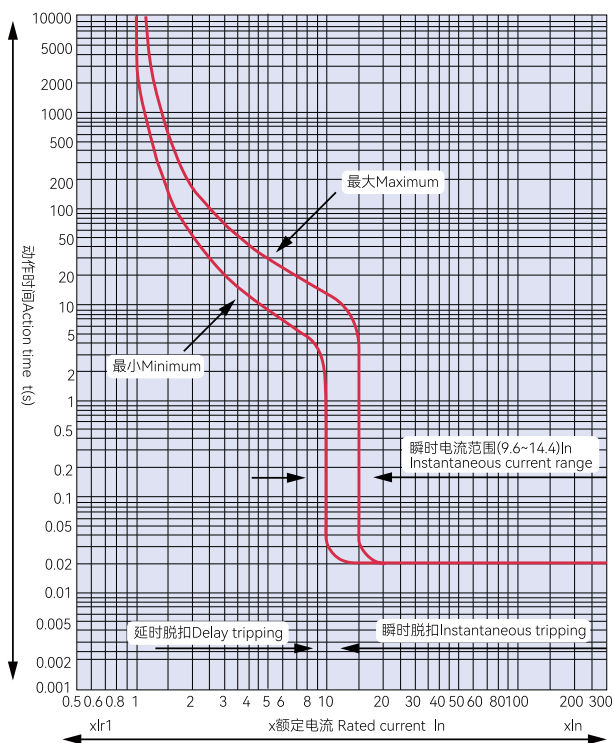
◆ HMKM1L-225L、M 时间 / 电流特性曲线 (电机)
HMKM1L-225L、M Time/current characteristic curve (motor)



◆ HMKM1L-400M 时间 / 电流特性曲线 (电机)
HMKM1L-100M Time/current characteristic curve (motor)

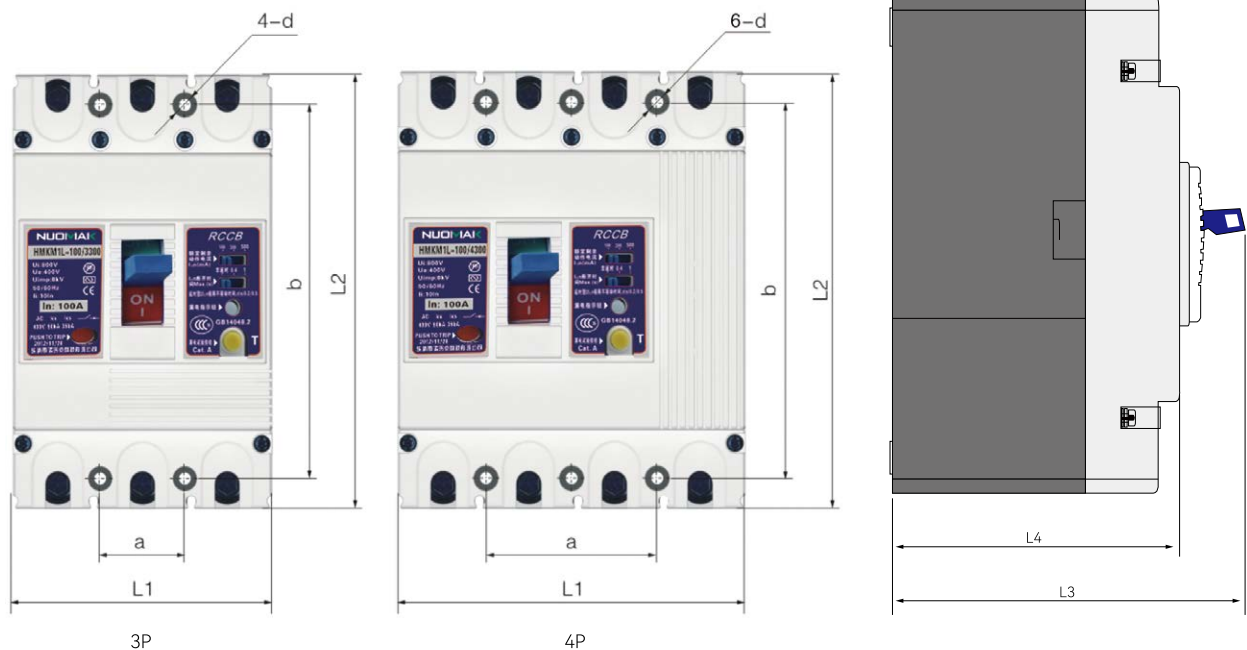


◆ HMKM1L-630M、800M 时间 / 电流特性曲线 (电机)
HMKM1L-630M,800M Time/current characteristic curve (motor)



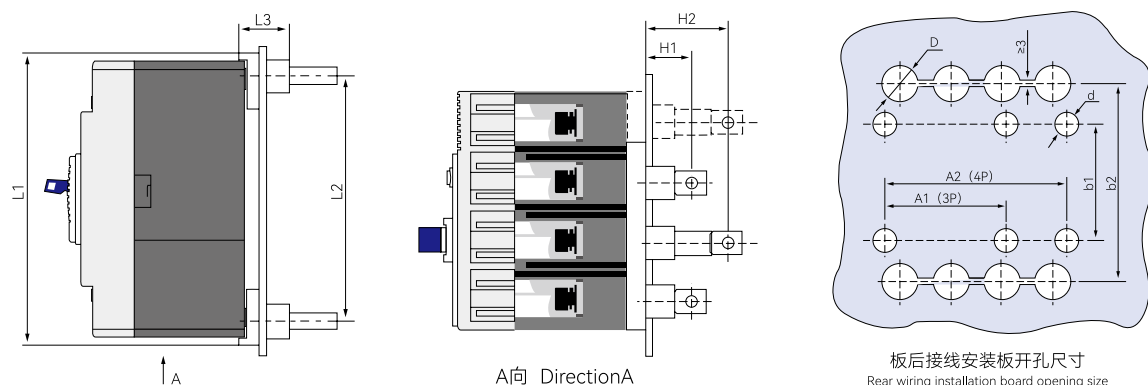
外形及安装尺寸 Shape and installation dimensions

◆ 板前接线的外形及安装尺寸 Shape and installation dimensions of front wiring



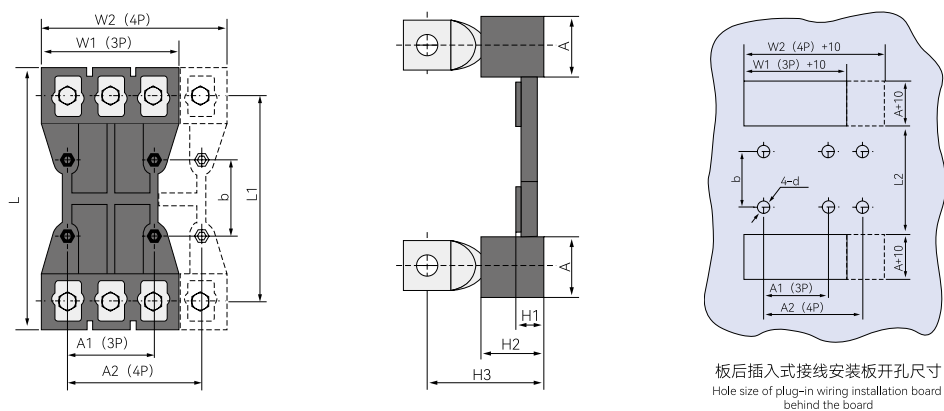
型号 Model	极数 Pole number	外形尺寸 (mm) Dimensions(mm)				安装尺寸 (mm) Installation dimensions(mm)		
		L1	L2	L3	L4	a	b	d
HMKM1L-100L	2	62max	150max	93max	74max	/	129	Φ4.5
	3	92max	150max	94max	75max	30	129	Φ4.5
	4	122max	150max	94max	75max	60	129	Φ4.5
HMKM1L-100M	2	62max	150max	110max	92max	/	129	Φ4.5
	3	92max	150max	110max	92max	30	129	Φ4.5
	4	122max	150max	110max	92max	60	129	Φ4.5
HMKM1L-225L	2	75max	165max	95max	72max	/	126	Φ4.5
	3	107max	165max	94max	72max	35	126	Φ4.5
	4	142max	165max	94max	72max	70	126	Φ4.5
HMKM1L-225M	3	107max	165max	110max	90max	35	126	Φ4.5
	4	142max	165max	110max	90max	70	126	Φ4.5
HMKM1L-400M	3	150max	257max	146max	106max	44	194	Φ7
	4	198max	257max	146max	106max	94	194	Φ7
HMKM1L-630M HMKM1L-800M	3	210max	280max	155max	116max	70	243	Φ7
	4	280max	280max	155max	116max	140	243	Φ7

◆ 板后接线的外形及安装尺寸 Shape and installation dimensions of back wiring



型号 Model	外形尺寸 (mm) Dimensions(mm)					安装尺寸 (mm) Installation dimensions(mm)					
	L1	L2	L3	H1	H2	A1	A2	b1	b2	D	d
HMKM1L-100	164	132	35	53	93	30	60	86	132	Φ22	Φ5.5
HMKM1L-225	173	144	35	55	100	35	70	125	144	Φ24	Φ5.5
HMKM1L-400	267	224	37	48.5	108.5	/	/	/	224	Φ32	Φ6.5
HMKM1L-630	295	243	37	62	84	/	/	/	243	Φ48	Φ7.0
HMKM1L-800	295	243	37	62	84	/	/	/	243	Φ48	Φ7.0

◆ 板后插入式接线的外形及安装尺寸 Shape and installation dimensions of plug-in wiring behind plate



型号 Model	W1	W2	L	L1	L2	A	H1	H2	H3	A1	A2	b	d
	3P	4P								3P	4P		
HMKM1L-100	91	125	168	132	90	38	17.5	50	64	60	90	56	Φ6.5
HMKM1L-225	107	145	186	145	88	46	17.5	50	71.5	70	105	54	Φ6.5
HMKM1L-400	149	200	280	224	166	55	21	60	83.5	60	108	129	Φ8.5
HMKM1L-630	203	280	305	242	183	62	18	87	97	90	162	146	Φ10
HMKM1L-800	210	280	305	242	183	62	18	87	97	90	162	146	Φ10

注：板后接线、板后插入式的外形及安装、开孔尺寸，以附件实物尺寸为准，本资料附件相关尺寸仅供参考！！

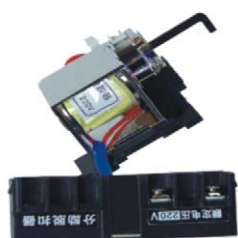
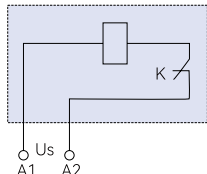
Note: The shape, installation and opening size of back wiring and plug-in wiring shall be subject to the physical size of the accessories. The relevant sizes of the accessories in this brochure are for reference only!

内外部附件 Internal and external accessories

◆ 内部附件 Internal accessories

根据用户需要断路器附件可直接导线引出（导线长度为 50cm，有特殊要求订货时说明），或加装接线端子。

According to the customer's needs, the circuit breaker accessories can be led out directly by wire (the length of wire is 50cm, which is explained when ordering with special requirements), or the connection terminals can be installed.

	分励脱扣器 Shunt release	额定控制电源电压 $U_s(V)$ Rated power voltage $U_s(V)$	AC230V、AC400V；DC24V、DC110V、DC220V	
		动作电压 (V) Operating voltage(V)	(0.7~1.1) U_s	
		接线图 Wiring diagram	 注：K- 分励脱扣器内部与线圈串联的微动开关为常闭触头，当断路器分闸后，该触头自行断开，合闸时闭合；虚线框内为断路器内部附件接线图。 Note: The microswitch connected in series with the coil in the shunt release is a normally closed contact, which is automatically opened after the circuit breaker is opened and closed when it is closed; The dashed line box is the wiring diagram of the internal accessories of the circuit breaker.	

注：当额定控制电源电压为 DC24V 时，有两种解决方案。

Note: When the rated power voltage is DC24V, there are two solutions.

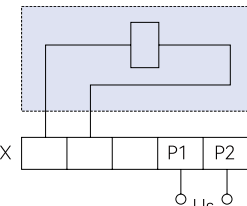
方案 1：采用 DC24V 分励脱扣器，但应满足如下条件。铜导线最大长度（两根导线中每根长度）须满足下表条件，脱扣器接线端处的电源功率须满足最小 50W 要求。

Scheme 1: Adopt DC24V shunt release, but the following conditions shall be met. The maximum length of copper wire (each length of two wires) shall meet the following conditions, and the power supply at the release terminal shall meet the minimum requirement of 50W.

导线截面积 Cross-sectional area of conductor		1.5mm ²	2.5mm ²
额定控制电源电压 $U_s(DC24V)$ Rated power voltage $U_s(DC24V)$	100% U_s	150m	250m
	85% U_s	100m	160m

方案 2：采用 DC24V 中间继电器控制 AC230V 或 400V 分励脱扣器，中间继电器触点容量不小于 1A。

Scheme 2: Adopt DC24V intermediate relay to control AC230V or 400V shunt release, and the contact capacity of intermediate relay is not less than 1A.

	欠电压脱扣器 Under-voltage release	额定控制电源电压 $U_s(V)$ Rated power voltage $U_s(V)$	AC230V、AC400V	
		动作电压 (V) Operating voltage(V)	在额定工作电压的 35%~70% 时，使断路器可靠脱扣； 85%~110% 时，应保证断路器合闸，低于 35% 时应防止合闸 When it reaches 35% ~ 70% of the rated working voltage, the circuit breaker can be reliably tripped; when reaches 85% ~ 110%, the circuit breaker should be closed, and when it is lower than 35%, it should be prevented from closing.	
		接线图 Wiring diagram	 注：X- 接线端子排；虚线框内为断路器内部附件接线图 Note: X-terminal block; In the dashed line box is the wiring diagram of the internal accessories of the circuit breaker	

注：欠电压脱扣器功率见表

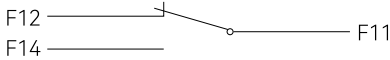
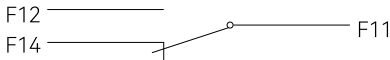
Note: See table for power of under-voltage release

配备断路器 Equipped with circuit breaker	欠电压脱扣器功率 (VA) Under-voltage release power (VA)	
	AC230V	AC400V
HMKM1L-100	2.6	3.3
HMKM1L-225	3.8	3.3
HMKM1L-400	3.7	2.7
HMKM1L-630	2.5	2.8
HMKM1L-800	2.5	2.8

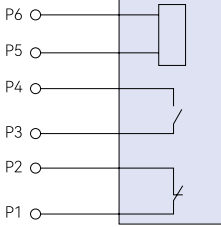


敬告：欠电压脱扣器必须先通电，断路器才能再扣及合闸，否则将损坏断路器！

Warning: The under-voltage release must be powered on first, and the circuit breaker can be buckled and closed again, otherwise the circuit breaker will be damaged!

辅助触头 Auxiliary contact 	约定发热电流 $I_{th}(A)$ Conventional thermal current $I_{th}(A)$	3A
	额定工作电流 $I_e(A)$ Rated working current $I_e(A)$	AC400V: $I_{nm} \leq 400A$ 时为 0.3A; $630A \leq I_{nm} \leq 800A$ 时为 0.4A DC220V: $100A \leq I_{nm} \leq 800A$ 时为 0.15A AC400V: 0.3 A when $I_{nm} \leq 400A$; 0.4 A when $630A \leq I_{nm} \leq 800A$ DC220V: 0.15 A for $100A \leq I_{nm} \leq 800A$
	接线图 Wiring diagram	 断路器在自由脱扣时或“OFF”位置时的状态 Circuit breaker in the free trip or "OFF" position  断路器在“ON”位置时的状态 Circuit breaker in the "ON" position

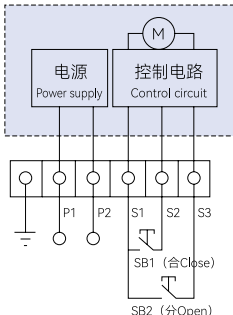
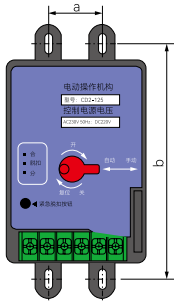
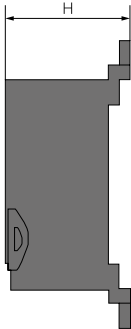
报警触头 Alarm contact 	约定发热电流 $I_{th}(A)$ Conventional thermal current $I_{th}(A)$	3A
	额定工作电流 $I_e(A)$ Rated working current $I_e(A)$	AC400V 时为 0.3A; DC220V 时为 0.15A 0.3A at AC400V; 0.15A at DC220V
	接线图 Wiring diagram	 断路器在“OFF”“ON”位置时的状态 Circuit breaker in the "OFF" and "ON" position  断路器在自由脱扣位置（报警）时的状态 Circuit breaker in free tripping position (alarm)

漏电报警模块 Leakage alarm module 	输入电压 (V) Input voltage (V)	AC230V、AC400V
	接线图 Wiring diagram	 说明: P5-P6: 电源输入; P3-P4: 常开触头, 触头容量 AC230V, 5A; P1-P2: 常闭触头, 触头容量 AC230V, 5A; 注: 虚线框内为断路器内部附件接线图。 Instruction: P5-P6: Power input; P3-P4: Normally open contact, contact capacity AC230V, 5A; P1-P2: Normally closed contact, contact capacity AC230V, 5A; Note: The wiring diagram of internal accessories of circuit breaker is in the dashed box.

注: 漏电报警模块有两种工作方式, 用户根据需要可在订货时说明;
 I: 当发生漏电时, 漏电报警模块发出信号, 同时断路器脱扣;
 II: 当发生漏电时, 漏电报警模块发出信号, 但断路器不脱扣;
 (II是为满足特殊场合需要, 用户在采用此功能保护电气时请慎重考虑)

Note: There are two working modes of leakage alarm module, which can be explained when ordering according to customer's needs;
 I: When leakage occurs, the leakage alarm module sends out a signal and the circuit breaker trips at the same time;
 II: When leakage occurs, the leakage alarm module sends out a signal, but the circuit breaker does not trip;
 (II is to meet the needs of special occasions, customers should carefully consider when using this function to protect electrical appliances)

◆ 外部附件 External accessories

电动操作机构 Electro-control mechanism 	输入电压 (V) Input voltage (V) AC230V、AC400V; DC110V, DC230V, DC24V					
接线图 Wiring diagram	 说明: P1-P2: 外接电源输入: SB1、SB2: 操作按钮 (用户自备) 注: 虚线框内为断路器内部附件接线图。 Instruction: P1-P2: External power input: SB1, SB2: Operation button (Prepared by customer) Note: The wiring diagram of internal accessories of circuit breaker is in the dashed box. 注: 断路器脱扣跳闸后, 电动操作机构必须先使断路器再扣, 然后才能合闸。 Note: After the circuit breaker trips, the electro-control mechanism must make the circuit breaker buckle again before closing.					
						
配套产品型号 Matching product model	电动操作机构参数 Parameters of electro-control mechanism			外形尺寸 (mm) Dimensions(mm)	安装尺寸 (mm) Installation dimensions(mm)	
	动作电流 (A) Action current (A)	电机功率 (VA) Motor Power (VA)	机械寿命 (次) Mechanical life (times)	H	a	b
HMKM1L-100	≤ 0.5A	14	20000	89.5	30	129
HMKM1L-225	≤ 0.5A	14	20000	93	35	126
HMKM1L-400	≤ 2A	35	10000	142	44	215
HMKM1L-630	≤ 2A	35	10000	146	70	243
HMKM1L-800	≤ 2A	35	10000	146	70	243

转动手柄操作机构
Rotating handle operation
mechanism

手柄扭杆最短为50mm
The shortest handle torsion bar is 50mm

型号 Model	HMKM1L-100	HMKM1L-225	HMKM1L-400	HMKM1L-630	HMKM1L-800
安装尺寸 H (mm) Installation dimensions H(mm)	49	55	74	66	66

订货须知: 订货时请写明漏电断路器的型号规格以及订货数量, 带欠电压脱扣器、分励脱扣器或电动操作机构时, 请注明工作电压或控制电源电压的电压值, 若有气温超过 +40℃或下限低于 -5℃请特别申明。

如订 HMKM1L-225/4300 塑壳漏电断路器, 额定电流 180A, 漏电流: 100mA、300mA、500mA, 延时型 0.4s, 20 台。

Ordering information: When ordering, please specify the model specification and order quantity of leakage circuit breaker. If there is under-voltage release, shunt release or electro-control mechanism, please indicate the voltage value of working voltage or controlling supply voltage. If the temperature exceeds + 40 °C or the lower limit is lower than -5 °C, please make a special statement.

For example, HMKM1L-225/4300 molded case leakage circuit breaker, rated current 180A, leakage current 100mA, 300mA,

注: 操作机构具体尺寸以实物为准, 本资料相关尺寸仅供参考!!!

Note: The specific dimensions of the operating mechanism are subject to the physical objects, and the relevant dimensions of this brochure are for reference only!



HMKM1E 系列电子式塑料外壳式断路器

Electronic Moulded Case Circuit Breaker

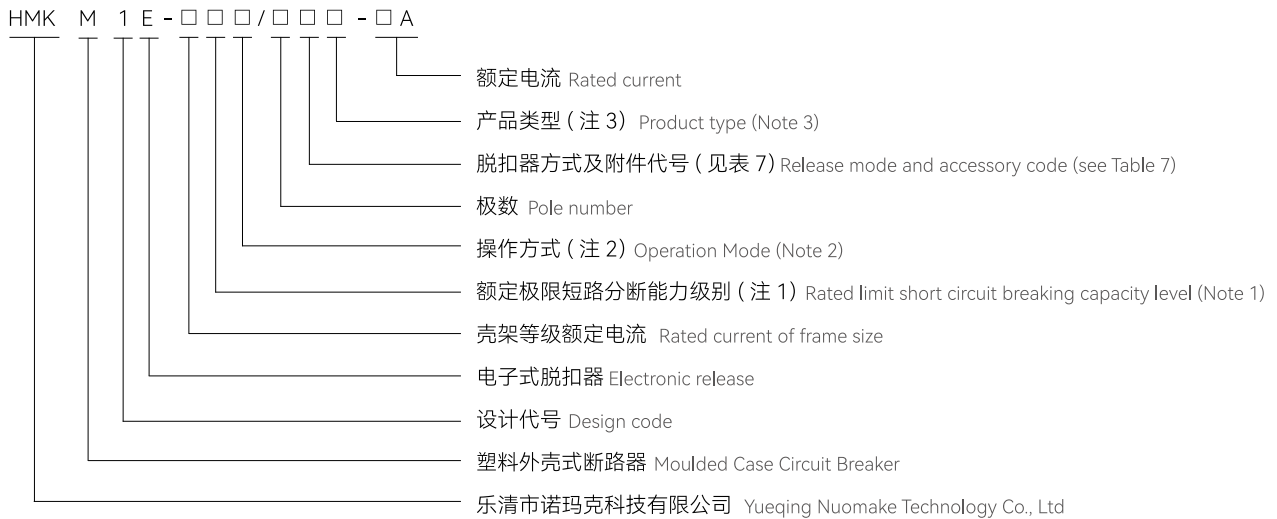
适用范围 Scope of application

- ◆ HMKM1E 系列电子式塑料外壳式断路器（以下简称断路器），适用于交流 50Hz(或 60Hz)，其额定绝缘电压为 800V，额定工作电压 690V 及以下，额定工作电流至 800A 的电路中作不频繁转换及电动机不频繁起动之用。断路器具有过载长延时反时限、短路短延时反时限、短路短延时定时限、短路瞬时和欠压保护功能以及剩余电流保护（可选），缺相保护功能（可选），能保护线路和电源设备不受损坏，断路器保护特性齐全、精确，能提高供电可靠性，避免不必要的停电，其中“Z”型控制带有通讯接口，可进行“四遥”，以满足控制中心和自动化系统的要求。
- ◆ 断路器按照其额定极限短路分断能力的高低，分为 M 型（较高分断型）、H 型（高分断型）二种。该断路器具有体积小、分断能力高、飞弧短、抗振动等特点。
- ◆ 断路器可垂直安装（即竖装），亦可水平安装（即横装）。
- ◆ 断路器具有隔离功能，其相应符号为：“ $\text{---}/\text{---}$ ”。
- ◆ 断路器不可倒进线，即只允许 1、3、5 接电源线，2、4、6 接负载线。
- ◆ HMKM1E series electronic moulded case circuit breaker (hereinafter referred to as circuit breaker) is suitable for infrequent switching and motor starting in circuits with AC 50Hz (or 60Hz), rated insulation voltage of 800V, rated working voltage of 690V and below, rated working current of 800A. The circuit breaker has overload long delay inverse time limit, short circuit short delay inverse time limit, short circuit short delay fixed time limit, short circuit instantaneous and under-voltage protection, residual current protection (optional), and phase-lacking protection (optional), which can protect lines and power equipment from damage. The circuit breaker has complete and accurate protection characteristics, which can improve the reliability of power supply and avoid unnecessary power failure. The “Z” type control has communication interface and can carry out “four remote” to meet the requirements of control center and automation system.
- ◆ According to its rated limit short circuit breaking capacity, circuit breakers are divided into M type (higher breaking type) and H type (high breaking type). The circuit breaker has the characteristics of small size, high breaking capacity, short flashover and anti-vibration.
- ◆ The circuit breaker can be installed vertically or horizontally.
- ◆ The circuit breaker has isolation function, and its corresponding symbol is: $\text{---}/\text{---}$.
- ◆ The circuit breaker cannot be reversed into the line, that is, only 1, 3 and 5 are allowed to connect to the power line, and 2, 4 and 6 are allowed to connect to the load line.

断路器符合标准 The circuit breaker meets the standard

- ◆ IEC 60947-1 及 GB/T14048.1《低压开关设备和控制设备 总则》
- ◆ IEC 60947-2 及 GB14048.2《低压开关设备和控制设备 低压断路器》及附录 F《带电子过电流保护断路器的附加要求》
- ◆ IEC 60947-5.1 及 GB14048.5《低压开关设备和控制设备 控制电路电器和开关元件》
- ◆ IEC 60947-1 and GB/T14048.1 General Rules for Low Voltage Switchgear and Control Equipment
- ◆ IEC 60947-2 and GB14048.2 Low Voltage Circuit Breakers for Low Voltage Switchgear and Control Equipment and Appendix F Additional Requirements for Circuit Breakers with Electronic Overcurrent Protection
- ◆ IEC 60947-5.1 and GB14048.5 Low Voltage Switchgear and Control Equipment, Control Circuits Devices and Switching Elements

型号及含义 Model and meaning



注: 1. 按额定极限短路分断能力的高低分为 M 型 (较高分断型)、H 型 (高分断型)。
2. 手柄直接操作无代号: 电动操作用 P 表示; 转动手柄用 Z 表示。
3. 基本型无代号, 智能通讯型用 Z 表示, 消防型用 X 表示, 漏电型用 L 表示。

Note: 1. According to the rated limit short circuit breaking capacity, it can be divided into M type (higher breaking type) and H type (high breaking type).
2. There is no code for direct operation of the handle; the electric operation is indicated by P; Handle rotating is denoted by Z.
3. The basic type has no code, the intelligent communication type is represented by Z, the fire type is represented by X, and the leakage type is represented by L.

正常工作环境 Normal working environment

- ◆ 海拔: $\leq 2000\text{m}$
- ◆ 环境温度: $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$
- ◆ 能耐受潮湿空气的影响
- ◆ 能耐受盐雾、油雾的影响
- ◆ 断路器主电路的安装类别为 III, 其余辅助电路、控制电路安装类别为 II。
- ◆ 最高温度 $+40^{\circ}\text{C}$ 时, 空气的相对湿度不超过 50%, 在较低的湿度下可以允许有较高的相对湿度, 对于温度变化偶尔产生的凝露应采取特殊措施
- ◆ 最大倾斜度为 22.5°
- ◆ 在无爆炸危险的介质中, 且介质无足以腐蚀金属和破坏绝缘的气体与导电尘埃的地方
- ◆ 在没有雨雪侵袭的地方
- ◆ Altitude: $\leq 2000\text{m}$
- ◆ Ambient temperature: $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$
- ◆ Withstand the influence of humid air
- ◆ Withstand the influence of salt spray and oil mist
- ◆ The installation category of main circuit of circuit breaker is III, and the installation category of other auxiliary circuits and control circuits is II.
- ◆ When the maximum temperature is $+40^{\circ}\text{C}$, the relative humidity of the air should not exceed 50%, and higher relative humidity can be allowed under lower humidity. Special measures should be taken for occasional condensation due to temperature change
- ◆ The maximum inclination is 22.5
- ◆ In a medium without explosion hazard, and there is no place in the medium where there is enough gas and conductive dust to corrode metals and damage insulation
- ◆ Where there is no rain or snow

主要功能及特点 Main functions and characteristics

- ◆ 智能控制器是塑壳断路器的核心部件，应用于电动机保护或者配电保护，实现测量、保护、控制和通信功能于一体，使线路和电源设备免受过载、短路、接地等故障危害。
- ◆ 采用 MCU 微处理器控制，性能稳定可靠：该智能控制器能自供电源，只要一相通电，当电流不低于其额定值的 20% 时，都能确保保护功能正常工作；
- ◆ 选择性配合具有三段保护：使用类别为 B 类的断路器与连接在同一电路中的其他短路保护装置在短路条件下具有选择性配合；过载长延时反时限、短路延时（反时限、定时限）、短路瞬时等保护功能参数的整定；
- ◆ 具有动作电流、动作时间三段保护参数设置，可进行 4-10 档调整：用户可根据负载电流要求对控制器进行设置调整，也可根据用户要求选择关断相应功能（定制功能，需用户定货时注明）；
- ◆ 大电流瞬时脱扣功能：当在断路器闭合时，或在运行时，如遇到短路大电流（ $\geq 20I_{In}$ ），断路器磁脱扣机构可直接脱扣，双重保护更加可靠安全；
- ◆ 具有脱扣测试（试验）功能：输入直流 DC12V 电压试验断路器动作特性；
- ◆ 故障自诊断功能：对智能控制器自身的工作状态和运行情况进行保护和检测；
- ◆ 具有预报警指示、过载指示：当负载电流达到或超过设定值时相应导光柱导出光源；
- ◆ 磁通变换器双气隙技术：工作更可靠稳定，杜绝误动作、脱扣可靠、功率微小；
- ◆ 保护精度高：过载保护、短路短延时保护动作时间精度 $\pm 10\%$ ；短路瞬时保护动作值精度为 $\pm 15\%$ 取决于动作电流；
- ◆ Intelligent controller is the core component of molded case circuit breaker, which is applied to motor protection or distribution protection, and realizes the functions of measurement, protection, control and communication, so as to protect the line and power supply equipment from overload, short circuit, grounding and other faults.
- ◆ Adopting MCU microprocessor, the intelligent controller has stable and reliable performance: the intelligent controller can make self-power supply, and when the current is not less than 20% of its rated value, it can ensure the normal operation of the protection function;
- ◆ Selective matching has three-stage protection: Circuit breakers of type B and other short-circuit protection devices connected in the same circuit have selective matching under short-circuit conditions; Setting of protection function parameters such as overload long delay inverse time limit, short circuit delay (inverse time limit, fixed time limit) and short circuit instantaneous protection;
- ◆ It has three-stage protection parameter settings of action current and action time, and can be adjusted in 4-10 gears: the user can set and adjust the controller according to the load current requirements, and can also choose to turn off the corresponding functions according to their requirements (customized functions, which need to be indicated when customer orders);
- ◆ Instantaneous tripping function of large current: when the circuit breaker is closed or in operation, if short circuit and large current ($\geq 20I_{In}$) is encountered, the magnetic tripping mechanism of the circuit breaker can be directly tripped, and the double protection is more reliable and safe;
- ◆ Tripping test function: Input DC 12V voltage to test the action characteristics of circuit breaker;
- ◆ Fault self-diagnosis function: Protect and detect the working state and operation of the intelligent controller itself;
- ◆ Warning indication and overload indication: when the load current reaches or exceeds the set value, the corresponding lamp guide leads out the light source;
- ◆ Double air gap technology of flux transfer trip: more reliable and stable, put an end to misoperation, reliable tripping, small power;
- ◆ High protection accuracy: the action time accuracy of overload protection and short circuit short-delay protection is $\pm 10\%$; The accuracy of short circuit instantaneous protection action value is $\pm 15\%$ depending on the action current;

可选功能（基于 HMKM1E 通讯型）Optional function (based on HMKM1E communication type)

- ◆ 具有温度监控保护功能：当环境温度超过设定值时（默认设置 85℃），控制器会输出报警光电信号或使断路器分闸；
- ◆ 双路无源信号输出功能：供发信号（或报警）用，容量 AC230V 5A；
- ◆ 具有过载热记忆功能：过负荷热记忆功能、短路（短延时）热记忆功能；
- ◆ 具有消防分励功能：过载报警不脱扣（提供一对无源触点）并提供分励脱扣功能；
- ◆ 具有通讯功能：标准的 RS232、RS485、Modbus 现场总线协议；
- ◆ 可连接手持式编程器：对断路器各种保护参数进行设定和进行近 10 次故障查询及各种状态显示等；
- ◆ 可连接智能控制模块：转换光隔离触点信号输出，包括可编程 DO 输出功能；
- ◆ 高档型带液晶显示模块
- ◆ Temperature monitoring and protection: when the ambient temperature exceeds the set value (the default setting is 85 °C), the controller will output alarm photoelectric signal or open the circuit breaker;
- ◆ Double-circuit passive signal output: for signal (or alarm), capacity AC 230V 5A;
- ◆ Overload thermal memory: overload thermal memory function, short circuit (short delay) thermal memory function;
- ◆ Fire shunt function: overload alarm without tripping (provide a pair of passive contacts) and provide shunt tripping function;
- ◆ Communication function: standard RS232, RS485, Modbus fieldbus protocol;
- ◆ Hand-held programmer can be connected: setting various protection parameters of circuit breaker, inquiring about faults and displaying various states for nearly 10 times;
- ◆ Intelligent control module can be connected: converting optical isolation contact signal output, including programmable DO output;
- ◆ High-grade LCD module

功能详解

◆ 通讯功能

通过通讯协议转换卡可方便接入 PROFIBUS-DP 协议网络、DEVICE-NET 协议和其它配电自动化网络中，具备遥控、遥调、遥讯和遥测功能，可实现对断路器远距离操作达到远距离电力调度。

遥测：电网的工作参数、负载电流、故障参数等；

遥讯：断路器的各种参数、脱扣特性、额定电流等；

遥调：计算机远程调节断路器的各种保护参数、脱扣特性、额定电流等；

遥控：计算机遥控开关的断开等

◆ Communication function

Through the communication protocol conversion card, it can be conveniently connected to PROFIBUS-DP protocol network, DEVICE-NET protocol and other distribution automation networks, and has the functions of remote control, remote adjustment, remote communication and remote measurement, which can realize the remote operation of circuit breakers and achieve remote power dispatching.

Remote measurement: Working parameters, load current, and fault parameters of power grids;

Remote communication: Various parameters, tripping characteristics and rated current of circuit breaker;

Remote adjustment: The computer remotely adjusts various protection parameters, tripping characteristics and rated current of circuit breakers

Remote control: Disconnection of computer remote control switch, etc.

◆ 手持式编程器

液晶显示、操作简单、界面简洁，可对断路器各种保护参数进行设定、上次故障查询、功能编辑、D0 功能输出编程等、可根据用户自定方案进行功能设置或期货功能升级

◆ Handheld programmer

Liquid crystal display, simple operation, simple interface, support setting various protection parameters of circuit breaker, last fault inquiry, function editing, D0 function output programming, etc., support users to set functions or upgrade futures functions according to their own schemes

◆ 过负荷热记忆功能

控制器过载热记忆功能可由用户选择，出厂时默认为关闭

控制器过载热记忆能量在 30 分钟内完全释放

◆ Overload thermal memory function

The overload thermal memory function of the controller can be selected by the user, and the default is to turn off the controller when leaving the factory.

The overload thermal memory energy is completely released within 30 minutes

◆ 短路热记忆功能

控制器（短延时）短路电流保护热记忆功能可由用户选择，出厂时默认为关闭

控制器（短延时）短路电流保护热记忆能量在 15 分钟内完全释放

◆ Short circuit thermal memory function

The thermal memory function of the controller (short delay) short circuit current protection can be selected by the user, and the default is to close the controller (short delay) when leaving the factory.

The thermal memory energy of the short circuit current protection is fully released within 15 minutes

◆ 故障记录功能

控制器可将最近 10 次发生的故障类型，故障跳闸时间，故障相及最大故障电流记录，掉电不丢失

◆ Fault recording function

The controller can record the fault type, fault tripping time, fault phase and maximum fault current of the last 10 times. The data will not be lost in the case of power failure.

◆ 消防分励功能

供消防系统使用，在设定的参数下达到脱扣条件时，断路器不脱扣并输出常开常闭触点，并提供分励功能可由用户自行选择是否断开断路器。

◆ Fire shunt function

For fire protection system. When tripping conditions are reached under the set parameters, the circuit breaker does not trip and outputs normally open and normally closed contacts, and provides shunt function, so that users can choose whether to disconnect the circuit breaker by themselves.

◆ 可编程 D0 输出功能

控制器有四个光电信号输出，D01 和 D02 光电信号都可编程为以下功能输出，D03 为分闸信号，D04 为合闸信号

◆ Programmable D0 output function

The controller has four photoelectric signal outputs, D01 and D02 photoelectric signals can be programmed to output the following functions, D03 is the opening signal, D04 is the closing signal

长延时故障 Long delay fault	短延时故障 Short delay fault	接地故障 Ground fault
漏电故障 Leakage fault	瞬时故障 Instantaneous fault	过压故障 Overvoltage fault
温度超温故障 Overtemperature fault	故障跳闸 Fault trip	欠压故障 Under-voltage fault
长延时故障报警 Long delay fault alarm	短延时故障报警 Short delay fault alarm	接地故障报警 Ground fault alarm
漏电故障报警 Leakage fault alarm	瞬时故障报警 Instantaneous fault alarm	过压故障报警 Over-voltage fault alarm
温度超温故障报警 Overtemperature fault alarm	故障跳闸报警 Fault trip alarm	欠压故障报警 Under-voltage fault alarm

◆ 断路器分合闸状态检测功能（可选功能）

控制器可检测断路器当前的分合闸状态，并实时地上传给上位机至计算机网络。

◆ Circuit breaker opening and closing state detection function (optional function)

The controller can detect the current opening and closing state of the circuit breaker and transmit it to the upper machine to the computer network in real time.

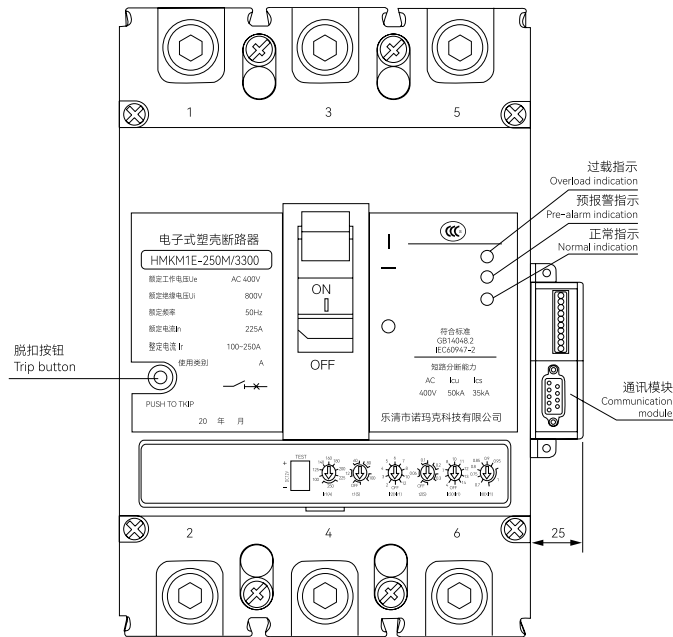
产品功能配置表 Product function configuration table

功能 Function	Product type 产品类型	HMKM1E 基本型 Basic type	HMKM1E(Z) 通讯型 Communication type	HMKM1E(X) 消防型 Fire type	HMKM1E(L) 漏电型 Leakage type
过载长延时整定 Overload long delay setting		●	●	●	●
短路短延时整定 Short circuit short-time delay setting		●	●	●	●
短路瞬时整定 Short circuit instantaneous setting		●	●	●	●
过载、预报警指示 Overload, pre-alarm indication		●	●	●	●
脱扣测试功能 Trip test function		●	●	●	●
故障自诊断功能 Fault self-diagnosis function		●	●	●	●
编码开关整定 Encoding switch setting		●	/	●	●
双路无源信号输出 Dual passive signal output		/	●	○	/
通讯功能模块 Communication function module		/	●	○	/
手持式编程器 Handheld programmer		/	○	○	/
编码整定 Coding tuning		/	●	○	/
分励功能 Shunt function		/	○	○	○
温度监控保护功能 Temperature monitoring and protection function		/	○	○	/
记忆功能 Memory function		/	○	○	/
智能控制模块 Intelligent control module		/	○	○	/
消防功能 Fire function		/	/	●	/
漏电功能 Leakage function		/	/	/	●

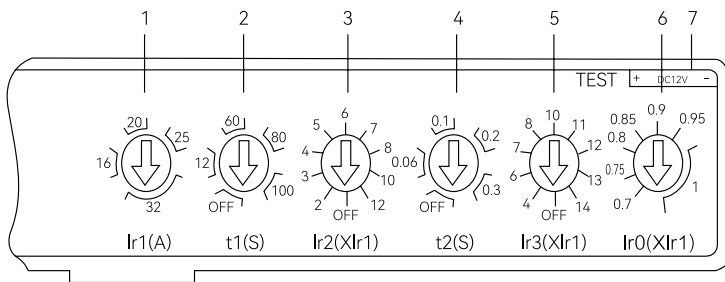
● 基本功能 Basic function ○ 可选功能 Optional function

结构与标识简介 Electronic Molded Case Circuit Breaker

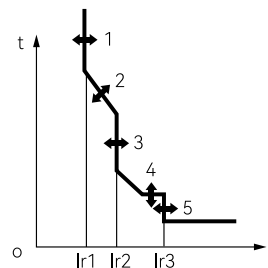
◆ 断路器正面指示 Front indicator of circuit breaker



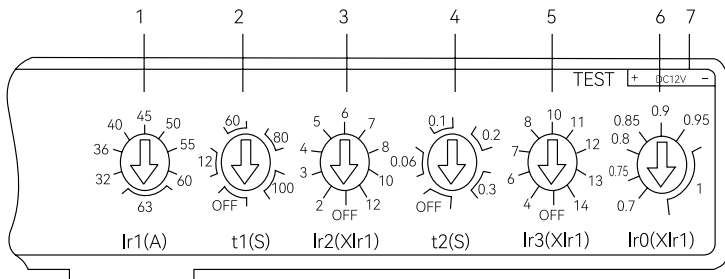
◆ HMKM1E-125, In=32A 电子式脱扣器 Electronic release



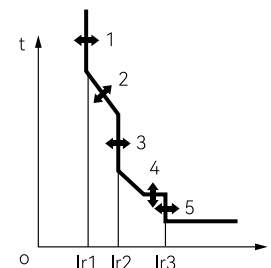
电子式脱扣器保护特性曲线 Protection characteristic curve of electronic release



◆ HMKM1E-125, In=63A 电子式脱扣器 Electronic release

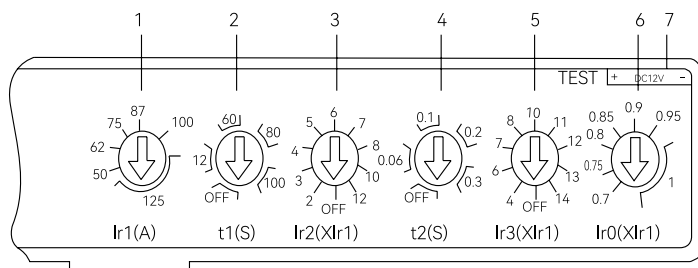


电子式脱扣器保护特性曲线 Protection characteristic curve of electronic release



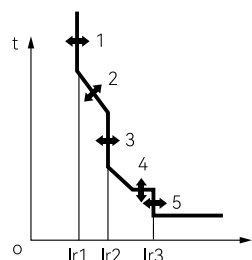
◆ HMKM1E-125, $I_n=125A$ 电子式脱扣器

Electronic release



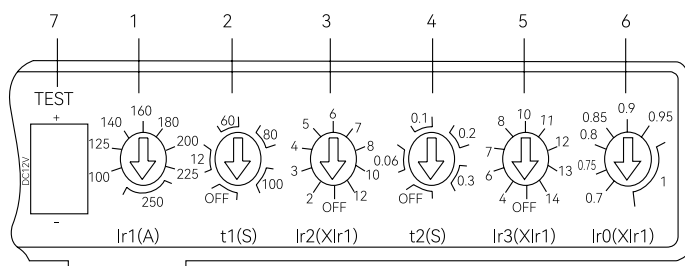
电子式脱扣器保护特性曲线

Protection characteristic curve of electronic release



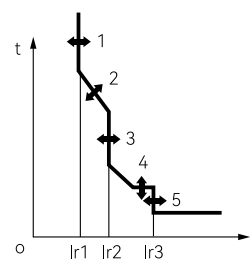
◆ HMKM1E-250, $I_n=250A$ 电子式脱扣器

Electronic release



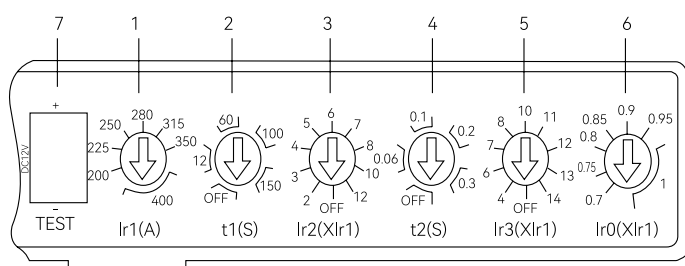
电子式脱扣器保护特性曲线

Protection characteristic curve of electronic release



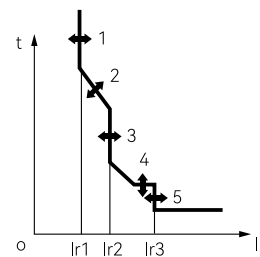
◆ HMKM1E-400, $I_n=400A$ 电子式脱扣器

Electronic release



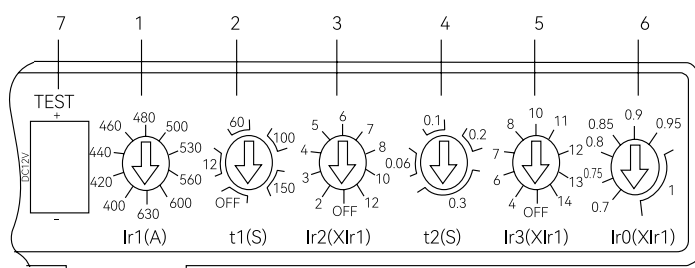
电子式脱扣器保护特性曲线

Protection characteristic curve of electronic release



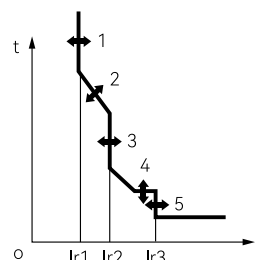
◆ HMKM1E-630, $I_n=630A$ 电子式脱扣器

Electronic release



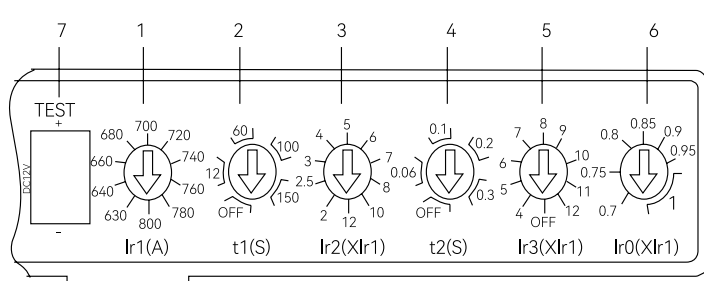
电子式脱扣器保护特性曲线

Protection characteristic curve of electronic release



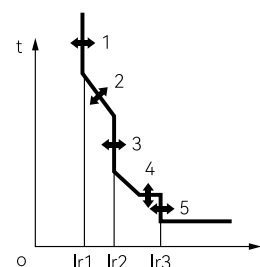
◆ HMKM1E-800, $I_n=800A$ 电子式脱扣器

Electronic release

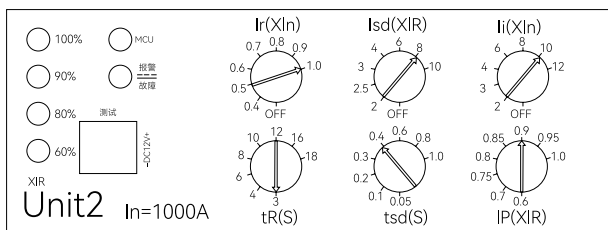


电子式脱扣器保护特性曲线

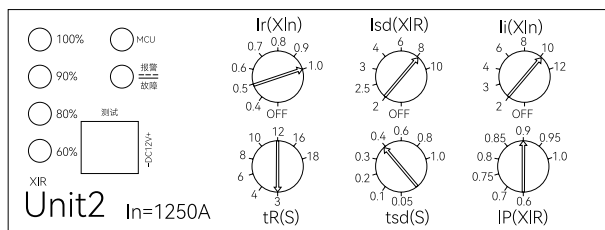
Protection characteristic curve of electronic release



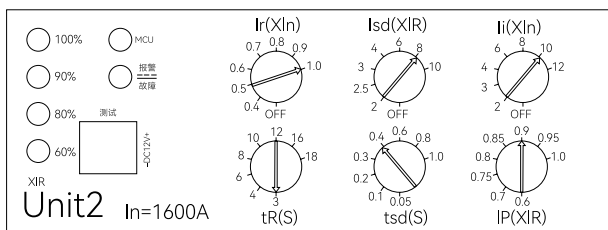
◆ HMKM1E-250, In=1000A 电子式脱扣器 Electronic release



◆ HMKM1E-400, In=1250A 电子式脱扣器 Electronic release



◆ HMKM1E-630, In=1600A 电子式脱扣器 Electronic release



注:

- ◆ 过载长延时动作电流 Ir1 调整, 根据断路器不同的额定电流, 可从 4 档到 10 档进行调整;
- ◆ 长延时动作时间 t1 调整, 可进行 4 档调整;
- ◆ 短路短延时动作电流 Ir2 调整, 可进行 10 档调整;
- ◆ 短延时动作时间 t2 调整, 可进行 4 档调整;
- ◆ 短路瞬时动作电流 Ir3 调整, 可进行 8 档、9 档或 10 档调整;
- ◆ 预警动作电流 Ir0 调整, 可进行 7 档调整。
- ◆ 测试端, 用于脱扣测试 (试验)。

Note:

- ◆ Overload long delay action current Ir1 can be adjusted from 4th gear to 10th gear according to different rated current of circuit breaker;
- ◆ Long delay action time T1 adjustment, can be adjusted in 4 gears;
- ◆ Short circuit short-delay action current Ir2 can be adjusted in 10 gears;
- ◆ Short delay action time t2 can be adjusted in 4 levels;
- ◆ Short circuit instantaneous action current Ir3 can be adjusted in 8, 9 or 10 gears;
- ◆ Warning action current Ir0 can be adjusted in 7 gears.
- ◆ Test terminal for tripping test.

智能断路器的通讯接口及外部模块应用与组网

Communication interface of intelligent circuit breaker and application and networking of external modules

- ◆ HMKM1E 系列可通讯智能化塑壳断路器备有通讯接口, 按 MODBUS 通讯接口规约。

当 HMKM1E 系列可通讯智能化塑壳断路器不用于组网通讯, 而是单独使用时, 手持编程器可通过通讯接口对断路器进行保护特性整定等操作。

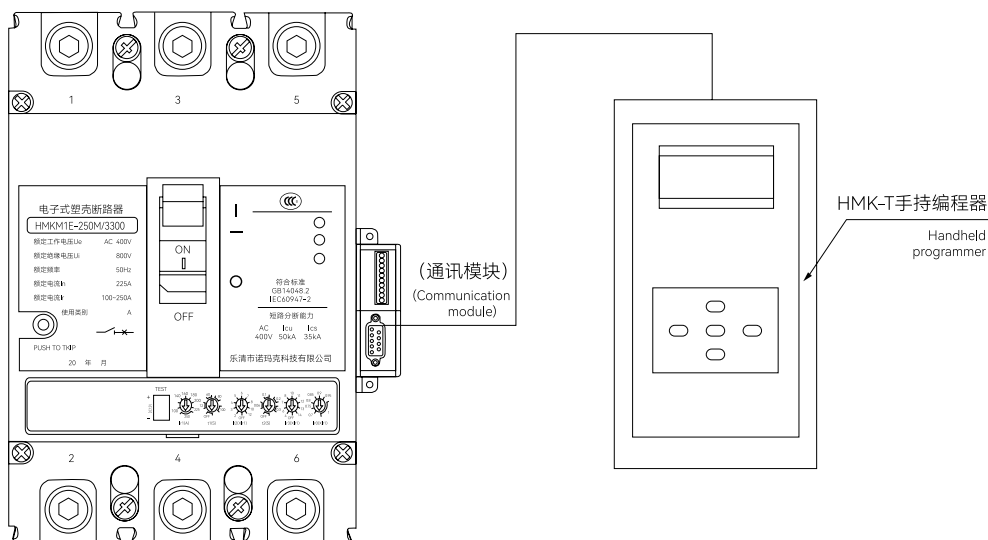
当 HMKM1E 系列可通讯智能化塑壳断路器用于组网通讯时, 可直接挂接到相应的现场总线; 针对不同协议的现场总线, 可选用协议转换模块, 将 MODBUS 协议转换后再挂接到相应的现场总线。

- ◆ HMKM1E series communicable intelligent moulded case circuit breaker with communication interface, according to MODBUS communication interface protocol.

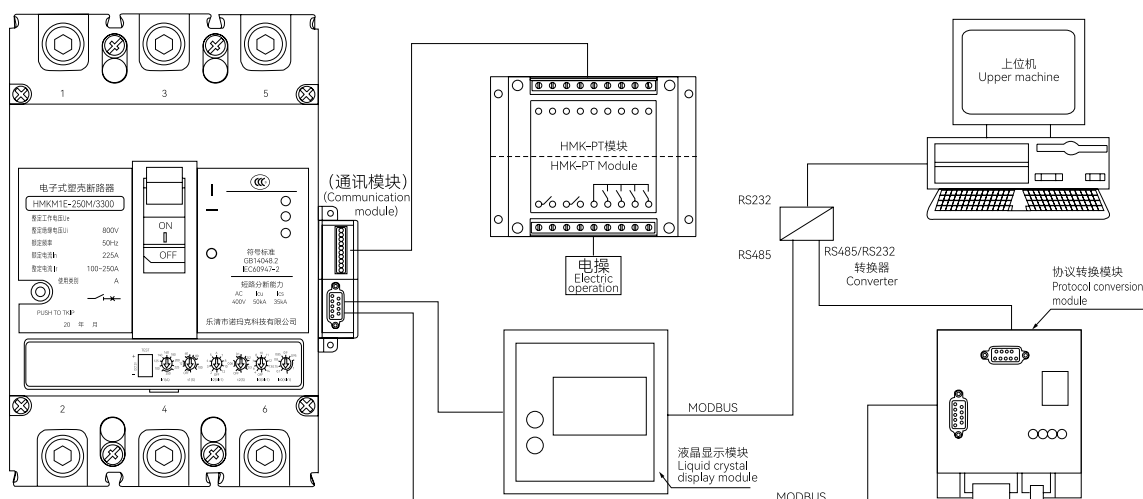
When HMKM1E series communicable intelligent moulded case circuit breaker is not used for network communication, but used alone, the handheld programmer can set the protection characteristics of the circuit breaker through the communication interface.

When HMKM1E series communicable intelligent moulded case circuit breaker is used for network communication, it can be directly connected to the corresponding fieldbus; For different protocols of the fieldbus, users can choose the protocol conversion module to convert the MODBUS protocol and then connect to the corresponding fieldbus.

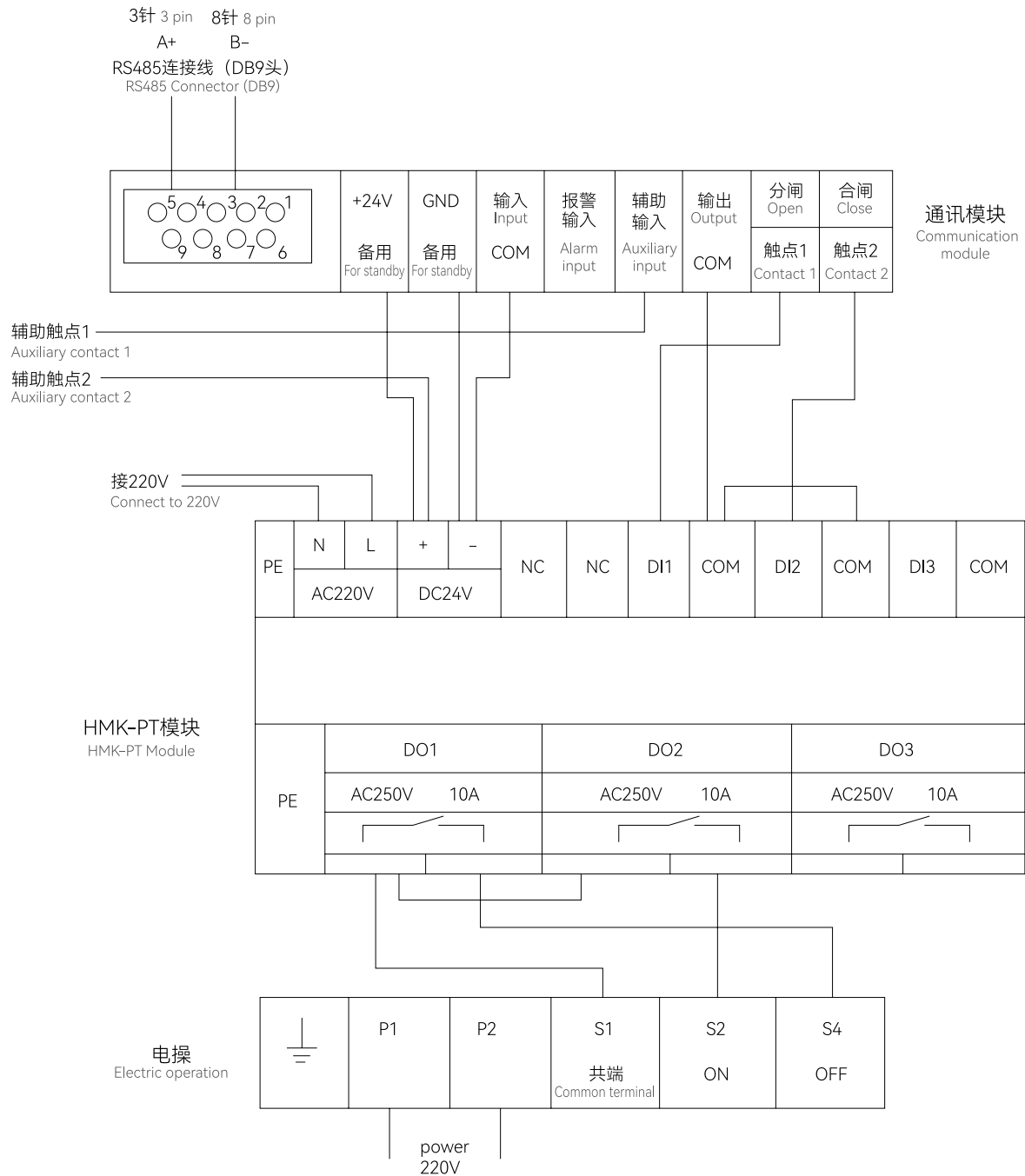
- ◆ HMKM1E 系列可通讯智能化塑壳断路器单独使用断路器的保护参数设定时，需专业人员采用 HMK-T 手持编程器按下图所示方式连接，再按手持编程器的操作说明进行操作。
- ◆ When using HMKM1E series communicable intelligent plastic case circuit breaker to set the protection parameters of the circuit breaker alone, professionals need to use the HMK-T handheld programmer to connect as shown in the figure below, and then operate according to the operating instructions of the handheld programmer.



- ◆ HMKM1E 系列可通讯智能化塑壳断路器的通讯组网
通讯组网可参考下图方案进行连接。针对不同协议可选不同的协议模块，将 MODBUS 转为 PROFIBUS-DP 等协议。
- ◆ Communication net of HMKM1E series communicable intelligent moulded case circuit breaker
Communication net can be connected with reference to the scheme shown below. Different protocol modules can be selected according to different protocols, and MODBUS can be converted into PROFIBUS-DP and other protocols.



◆ 通讯二次接线图 Communication secondary wiring diagram

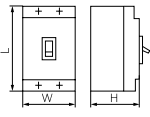


通讯二次接线图 Communication secondary wiring diagram

说明：通讯模块需与通讯型控制器、HMK-PT模块、RS485转换器配套使用才能实现遥控功能。

Note: Communication module should be matched with communication controller, FSA-PT module and RS485 converter to realize remote control function.

主要技术参数 Technical Parameters

型号 Model		HMKM1E-125			HMKM1E-250	HMKM1E-400	HMKM1E-630	HMKM1E-800	HMKM1E-1000	HMKM1E-1250	HMKM1E-1600								
壳架等级额定电流 Inm(A) Rated current of frame size Inm(A)		125			250	400	630	800	1000	1250	1600								
额定电流（可调） In(A) Rated current (adjustable) In (A)		16、20 25、32	32、36 40、45 50、55 60、63	63、65 70、75 80、85 90、95 100、125	100、125 140、160 180、200 225、250	200、225 250、280 315、350 400	400、420 440、460 480、500 530、560 600、630	630、640 660、680 700、720 740、760 780、800	800、1000	1000、1250	1250、1600								
额定工作电压 Ue(V) Rated working voltage Ue(V)		AC400V				AC400V				AC400V									
额定绝缘电压 Ui(V) Rated insulation voltage Ui (V)		AC800V				AC800V				AC800V									
额定冲击耐受电压 Uimp Rated impulse withstand voltage Uimp		AC8KV				AC8KV				AC8KV									
极数 Pole number		3		4	3	4	3	4	3	4	3	4	3	4	3	4			
额定极限短路分断能力级别 Rated ultimate short circuit breaking capacity level		M		H		M	H	M	H	M	H	M	H	M	H	M	H		
额定极限短路分断能力 Icu(kA) Rated limit short circuit breaking capacity Icu(kA)		50		85		50	85	85	100	85	100	85	100	85	100	85	100		
额定运行短路分断能力 Ics(kA) Rated operation short circuit breaking capability Ics(kA)		35		50		35	50	55	65	55	65	55	65	55	65	55	65		
额定短时耐受电流 Icw(kA)/1s Rated short time withstand current Icw(kA)/1s						5		8		10		5		8		10			
使用类别 Usage		A				A		B		B		B		B		B			
操作性能（次） Operational performance (times)		通电 Electrify	3000			3000		2000		1500		1500		2000		1500		1500	
		不通电 Unelectrify	7000			7000		4000		3000		3000		4000		3000		3000	
外形尺寸 Dimensions		L	150		165		257		280		280		470		470		510		
		W	92		122		107	142	150	198	210	280	210	280	210	280	210	280	
		H	92			90		106.5		115.5		115.5		195		195		195	
飞弧距离 (mm) Flashover distance (mm)		≤ 50			≤ 50		≤ 100		≤ 100		≤ 100		≤ 100		≤ 100		≤ 100		

功率损耗 Power loss

型号 Model	通电电流 (A) Electrified current (A)	三极总功率损耗 (W) Three-pole total power loss (W)		
		板前接线 Front wiring	板后接线 Back wiring	插入式接线 Plug-in wiring
HMKM1E-125	125	35	35	40
HMKM1E-250	250	62	62	70
HMKM1E-400	400	115	115	125
HMKM1E-630	630	190	190	210
HMKM1E-800	800	262	262	294

高海拔降容 Derating of high altitude

◆ 高海拔降容系数 Derating factor of high altitude

海拔超过适用于工作环境的 2000m，断路器电气性能可参照下表修正；

If the altitude exceeds 2000m suitable for working environment, the electrical performance of circuit breaker can be corrected with reference to the following table;

海拔 (m) Altitude(m)	2000	3000	4000	5000
工频电压 (V) Power frequency(V)	3000	2500	2000	1800
工作电流修正系数 Operating current correction coefficient	1	0.94	0.88	0.83
短路分断能力修正系数 Correction coefficient of short circuit breaking ability	1	0.83	0.71	0.63

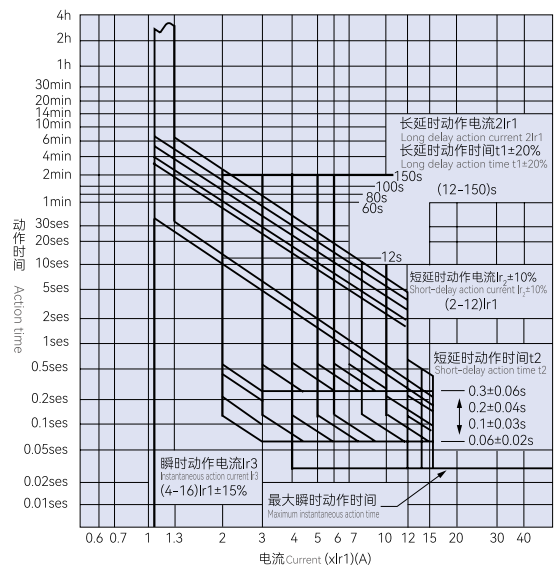
电子式脱扣器特性 Characteristics of electronic release

◆ 脱扣器特性

具有过载长延时反时限、短路短延时反时限、短路短延时定时限、短路瞬时动作等保护功能，可由用户自行设定组成所需的保护特性；中性线过电流保护电流、时间参数 100% 自动跟踪相线整定值。

◆ Release characteristics

The release has protection functions such as overload long delay inverse time limit, short circuit short delay inverse time limit, short circuit short delay fixed time limit, short circuit instantaneous action, etc. Users can set the required protection characteristics by themselves; The over current detection current of neutral line and time parameters 100% automatically track the setting value of the phase line.



长延时过电流保护反时限动作特性 Inverse time action characteristics of long delay overcurrent protection

控制器类型 Controller type	基本型 Basic type		智能通讯型、编程通讯型、液晶型 Intelligent communication type, programming communication type, LCD type
电流 Current	动作时间 Action time		
1.05I _{r1}	2 小时内不动作 Inactive within 2 hours		
1.3I _{r1}	≤ 1h 动作 Start action within 1 hour		
2I _{r1}	I _{nm} =125A、250A 整定时间 t1(s) I _{nm} =125A, 250A setting time t1(s)	t1=(12、60、80、100)s	12s-100s(最大步进 1s) 12s-100s (maximum step 1s)
	I _{nm} =400A、630A、800A 整定时间 t1(s) I _{nm} =400A, 630A, 800A setting time t1(s)	t1=(12、60、100、150)s	12s-100s(最大步进 1s) 12s-100s (maximum step 1s)
热记忆 Thermal memory	30min, 断电可清除 (该功能为通讯型可选功能) 30min, Power failure can be cleared (this function is optional for communication type)		
1、动作时间符合 I²T₁=(2I _{r1})²t₁(1.2I _{r1} ≤ I<I _{r2}) 2、动作时间允许差为 ±20% 3、可返回时间不小于动作时间的 70% 1. The action time accords with I²T₁= (2I _{r1})²t₁ (1.2 I _{r1} ≤ I < I _{r2}) 2. The allowable difference of action time is 20% 3. The returnable time is not less than 70% of the action time			

短延时过电流保护特性 Characteristics of short delay overcurrent protection

电流 Current	动作时间 Action time				
$I_{r2} \leq I < 1.5I_{r2}$	反时限 Inverse time		$I^2T_1=(1.5I_{r2})^2t_2$		
$1.5I_{r2} \leq I < I_{r3}$	定时限 Fixed time	整定时间 t2(s) Setting time t2(s)	0.06	0.01	0.2
		允差 (s) Tolerance (s)	±0.02	±0.03	±0.04
		可返回时间 (s) Returnable time (s)			0.14

注：反时限动作时间允差 ±20%。 Note: The tolerance of inverse time action time is 20%.

短路瞬时保护动作特性 Action characteristics of short circuit instantaneous protection

额定电流 Rated current	125、250	400、630	800
整定电流 Setting current	I _{r3} =(4、6、7、8、10、11、12、13、14)×I _{r1}	I _{r3} =(4、6、7、8、10、11、12、13、14)×I _{r1}	I _{r3} =(4、5、6、7、8、9、10、11、12)×I _{r1}
动作特性 Action characteristics	$I \leq 0.85I_{r3}$ 不动作 no action $I \geq 1.15I_{r3}$ 动作 action		

脱扣器方式及内部附件代号 Release mode and internal accessory code



附件代号 Accessory code	附件名称 Accessory name	HMKM1E-125 HMKM1E-250	HMKM1E-400		HMKM1E-630 HMKM1E-800	HMKM1E-1000 HMKM1E-1250 HMKM1E-1600
		3P、4P	3P	4P	3P、4P	3P、4P
308	报警触头 Alarm contact	← □ □ □	← □ □ □	← □ □ □	← □ □ □	← □ □ □
310	分励脱扣器 Shunt release	← ● □ □	← ● □ □	← ● □ □	← ● □ □	← ● □ □
320	辅助触头 Auxiliary contact	← ■ □ □	← ■ □ □	← ■ □ □	← ■ □ □	← ■ □ □
330	欠电压脱扣器 Under-voltage release	← ○ □ □	← ○ □ □	← ○ □ □	← ○ □ □	← ○ □ □
340	分励脱扣器、辅助触头 Shunt release, Auxiliary contact	—	—	← ● ■ □ ➔	← ● ■ □ ➔	← ● ■ □ ➔
350	分励脱扣器、欠电压脱扣器 Shunt release, Under-voltage release	—	—	—	← ● ○ □ ➔	← ● ○ □ ➔
360	二组辅助触头 Two sets of auxiliary contacts	—	—	← ■ □ ■ □ ➔	← ■ □ ■ □ ➔	← ■ □ ■ □ ➔
370	辅助触头、欠电压脱扣器 Auxiliary contact, Under-voltage release	—	—	← ○ □ ■ □ ➔	← ○ □ ■ □ ➔	← ○ □ ■ □ ➔
318	分励脱扣器、报警触头 Shunt release, Alarm contact	—	—	—	← ● □ □ ➔	← ● □ □ ➔
328	辅助触头、报警触头 Auxiliary contact, Alarm contact	← ■ □ □	← ■ □ □	← ■ □ □	← □ □ ■ □ ➔	← □ □ ■ □ ➔
338	欠电压脱扣器、报警触头 Under-voltage release, Alarm contact	—	—	—	← ○ □ □ ➔	← ○ □ □ ➔
348	分励脱扣器、辅助触头、报警触头 Shunt release, Auxiliary contact, Alarm contact	—	—	—	← ● □ ■ □ ➔	← ● □ ■ □ ➔
368	二组辅助触头，报警触头 Two sets of auxiliary contacts, Alarm contact	—	—	← ■ □ ■ □ ➔	← ■ □ ■ □ ➔	← ■ □ ■ □ ➔
378	辅助触头，欠电压脱扣器，报警触头 Auxiliary contact, Under-voltage release, Alarm contact	—	—	—	← ○ □ ■ □ ➔	← ○ □ ■ □ ➔

注：

脱扣器方式及内部附件代号首位数字 3 表示具有三段保护的电子式脱扣器；后两位数字表示内部附件代号，无附件则用 00 表示（隔离开关）；
 HMKM1E-400 中 328 规格，HMKM1E-630、800 中 348 规格，HMKM1E-400、630、800 中 368 规格辅助触头为三对触头（即三常开、三常闭）；其余规格辅助触头数量为：400 及以上二组，250 及以下为一组；
 HMKM1E-125、250 中 320 规格辅助触头可提供二对触头（即二常开、二常闭），但须订货时注明。
 在内部附件不能提供或满足客户的使用需要时，也可通过智能控制器提供更多辅助功能，该系列智能控制器能提供如下功能：合分闸辅助信号，分励脱扣功能，各种保护功能故障信号（见功能部分详解）。

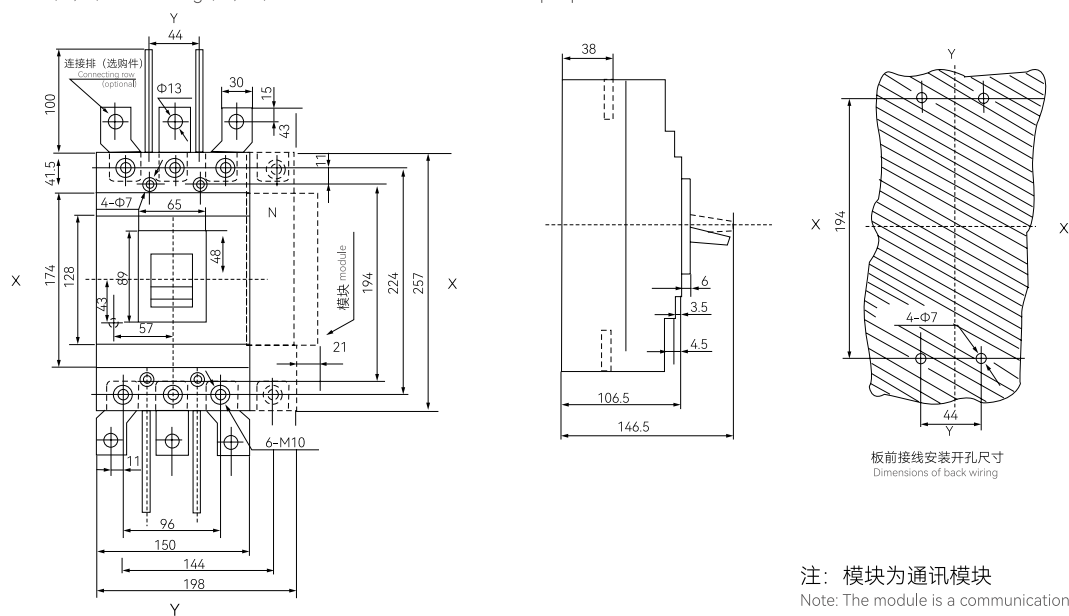
Note:

The first digit 3 of release mode and internal accessory code indicates electronic release with three-stage protection; The last two digits indicate the internal accessory code, and if there is no accessory, it is indicated by 00 (isolating switch);
 The 328 auxiliary contacts in HMKM1E-400, 348 in HMKM1E-630 and 800 and 368 in HMKM1E-400, 630 and 800 are three pairs of contacts (i.e. three normally open and three normally closed); The number of auxiliary contacts of other specifications is: two pairs in 400 and above, and one pair in 250 and below;
 The 320 auxiliary contacts in FSAM 2E-125, 250 can be provided with two pairs of contacts (i.e. two normally open and two normally closed), which must be indicated when ordering.
 When the internal accessories can not meet the needs of customers, more auxiliary functions can also be provided through intelligent controllers. This series of intelligent controllers can provide the following functions: closing and opening auxiliary signals, shunt tripping functions, and various protection function fault signals (see function section for detailed explanation).



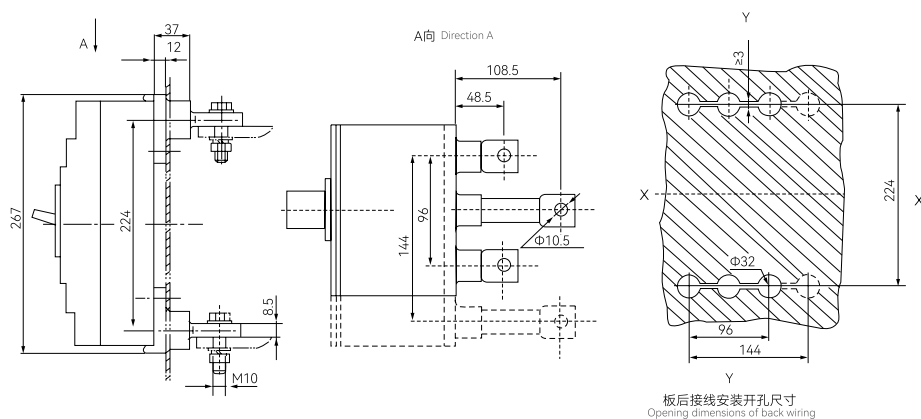
◆ HMKM1E-400 (M、H) 板前接线 (三极、四极) X-X、Y-Y 为三极断路器中心

HMKM1E-400 (M, H) front wiring (3P, 4P) X-X and Y-Y are the center of triple pole circuit breaker



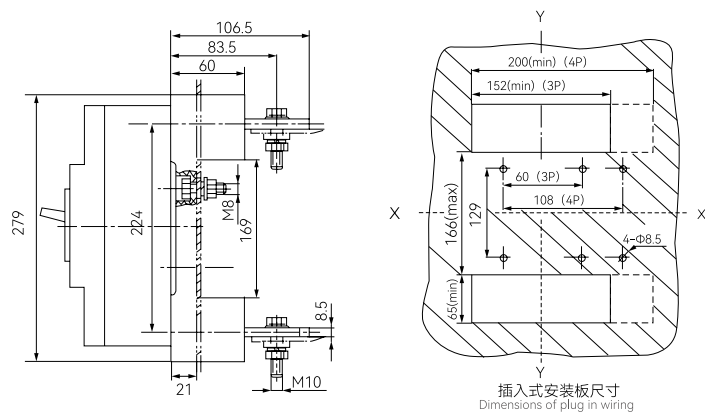
◆ HMKM1E-400 (M、H) 板后接线 (三极、四极) X-X、Y-Y 为三极断路器中心

HMKM1E-400 (M, H) back wiring (3P, 4P) X-X and Y-Y are the center of triple pole circuit breaker



◆ HMKM1E-400 (M、H) 插入式 (三极、四极) X-X、Y-Y 为三极断路器中心

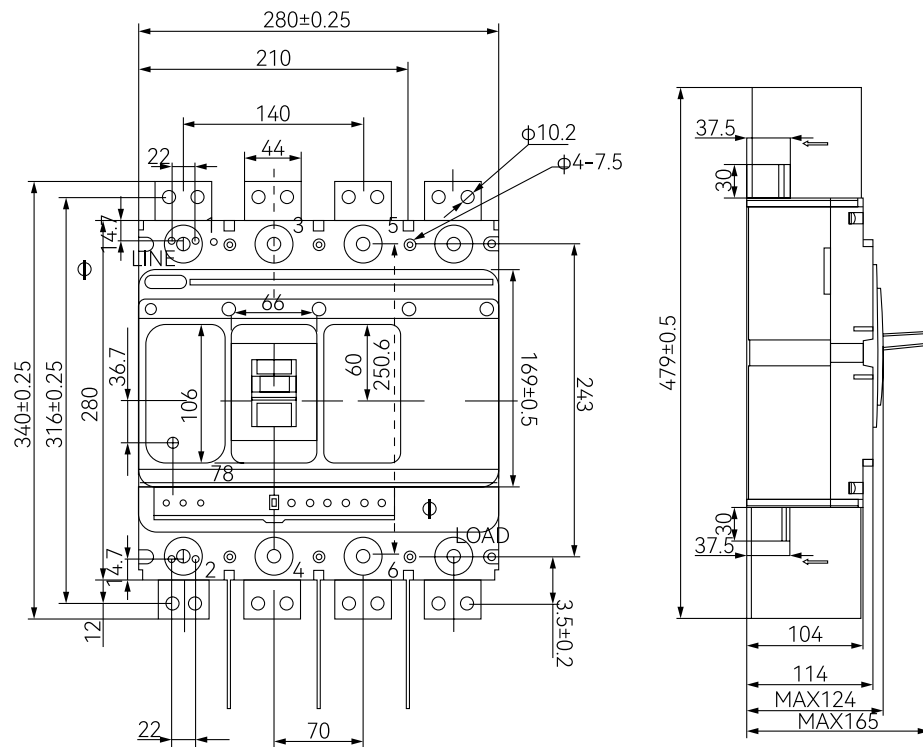
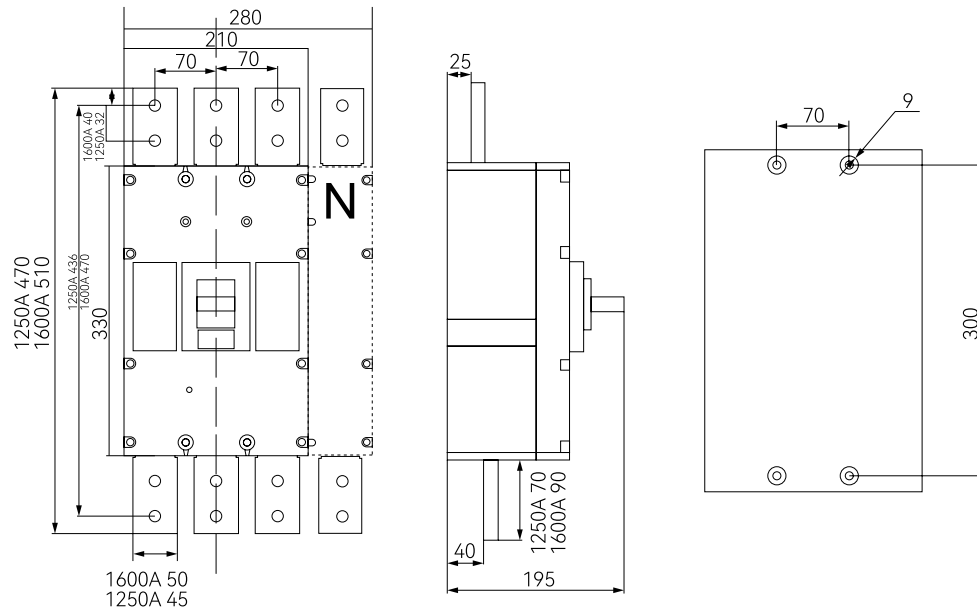
HMKM1E-400 (M, H) plug-in wiring (3P, 4P) X-X and Y-Y are the center of triple pole circuit breaker



注: 板后接线、板后插入式的外形及安装、开孔尺寸, 以附件实物尺寸为准, 本资料附件相关尺寸仅供参考!!!

Note: The shape, installation and opening size of back wiring and plug-in wiring shall be subject to the physical size of the accessories. The relevant sizes of the accessories in this brochure are for reference only!

- ◆ HMKM1E-1250、1600 (M、H) 板前接线 (三极、四极) X-X、Y-Y 为三极断路器中心
HMKM1E-1250,1600 (M, H) front wiring (3P, 4P) X-X and Y-Y are the center of triple pole circuit breaker



产品内外部附件 Internal and external accessories

◆ 辅助触头 Auxiliary contact

断路器处在“分”或 “自由脱扣”位置 Circuit breaker in the "open" or "free trip" position		壳架等级电流 400A 及以上断路器 (一组为四对触头) Circuit breakers with frame size current of 400A and above (four pairs of contacts per group)
		壳架等级电流 225A 及以下 (一组为二对触头) Circuit breakers with frame size current of 225A and below (two pairs of contacts per group)
断路器处在“合”位置 Circuit breaker in the "close" position “常闭”触点 (F11~F12) 由“闭合”转为“断开” “常开”触点 (F11~F14) 由“断开”转为“闭合” "Normally open" contacts (F11 ~ F14) change from "open" to "closed" "Normally open" contacts (F11 ~ F14) change from "open" to "closed"		

注：400A 及以上的断路器，根据用户需要，一组可安装二对或四对触头
Note: For circuit breakers of 400A and above, two or four pairs of contacts can be installed in one group according to users' needs.

电流参数 Current parameters

壳架等级额定电流 Rated current for frame size	约定发热电流 I _{th} Conventional thermal current I _{th}	AC 400V 时的额定工作电流 Rated working current at AC 400V
I _{nm} ≤ 250	3A	0.30A
I _{nm} ≥ 400	3A	0.40A

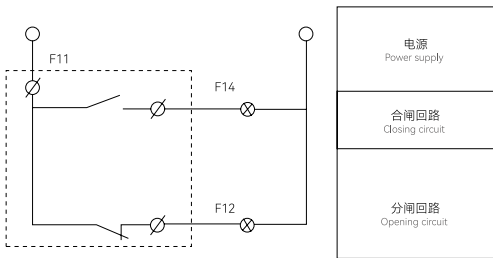
◆ 辅助触头 Auxiliary contact

电寿命 Electrical life

使用寿命 Service life	接通 Connect			分断 Break			次数 Times	操作频率 (次 / 小时) Operation frequency (Times / hour)	通电时间 Electrify time
	I/le	U/Ue	cosΦ	I/le	U/Ue	cosΦ			
AC-15	10	1	0.3	1	1	0.3	6050	360	≥ 0.05s
DC-13	1	1	6Pe	1	1	6Pe			≥ T0.95

接通和分断能力 The connecting and breaking capacity

使用寿命 Service life	接通 Connect			分断 Break			次数 Times	操作频率 (次 / 小时) Operation frequency (Times / hour)	通电时间 Electrify time
	I/le	U/Ue	cosΦ	I/le	U/Ue	cosΦ			
AC-15	10	1.1	0.3	10	1.1	0.3	10	120	≥ 0.05s
DC-13	1.1	1.1	6Pe	1.1	1.1	6Pe			≥ T0.95



接线图 Wiring diagram

◆ 报警触头 Alarm contact

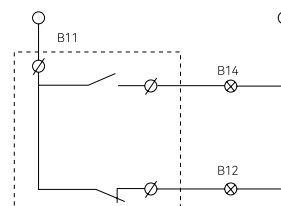
报警触头 Alarm contact $U_e=220V, I_{th}=3A$	
断路器处于“分”、“合”时的位置 Circuit breaker in the "open" and "close" position	
断路器处于“自由脱扣”时的位置 Circuit breaker in the "free trip" position	

报警触头约定发热电流为 3A，在额定工作电压为 AC400V 时，额定工作电流为 0.3A。

The conventional thermal current of the alarm contact is 3A, and when the rated working voltage is AC400V, the rated working current is 0.3A.

断路器正常合分时，触头不动作，只有在自由脱扣（或故障跳闸）后，触头方改变原始状态，即常开变闭合，常闭变断开，待断路器再扣后，触头恢复原始位置。

When the circuit breaker is normally closed and opened, the contact does not act. Only after free tripping (or fault tripping), the contact changes its original state, that is, normally open to close and normally closed to open. After the circuit breaker is buckled again, the contact returns to its original position.



接线图 Wiring diagram

◆ 分励脱扣器 Shunt release

一般安装在断路器 A 相，在额定控制电源电压的 70%~110% 之间时，分励脱扣器应在所有的操作条件下使断路器可靠脱扣。

控制电压: AC 50Hz 230V 400V DC 24V 220V

注意: 控制回路电源为 DC24V 时，推荐采用下图进行分励控制回路设计。

KA: 为 DC24V 中间继电器，触点电流容量为 1A。

K: 分励脱扣器内部与线圈串联的微型开关，为常闭触头，当断路器分闸后，该触头自行断开，合闸时闭合。

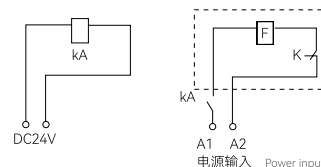
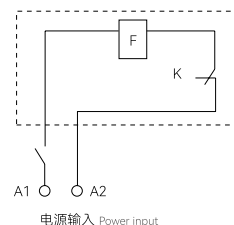
Generally installed in phase A of circuit breaker. When the rated power voltage is between 70% and 110%, the shunt release should make the circuit breaker release trip reliably under all operating conditions.

Control voltage: AC 50Hz 230V 400V DC 24V 220V

Note: When the power supply of the control loop is DC24V, it is recommended to use the following figure for the design of the shunt control loop.

KA: DC24V intermediate relay with 1A contact current capacity.

K: The micro-switch connected in series with the coil in the shunt release is a normally closed contact. When the circuit breaker is opened, the contact opens automatically and closes when it is closed.



接线图 Wiring diagram

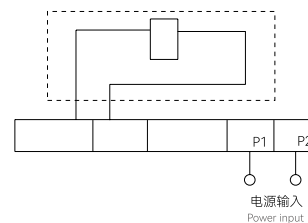
◆ 欠电压脱扣器 Under-voltage release

在额定控制电源电压的 35%~70% 时，欠电压脱扣器应可靠动作，并使断路器断开。在小于额定电压的 35% 时，应可靠防止断路器合闸。电源电压等于或大于额定电压的 85% 时，应确保断路器闭合。

控制电压: AC 50Hz 230V 400V DC 110V 220V

When it reaches 35% ~ 70% of the rated power voltage, the under-voltage release shall operate reliably and the circuit breaker shall be disconnected. When it is less than 35% of the rated voltage, the circuit breaker should be reliably prevented from closing. When the power supply voltage is equal to or greater than 85% of the rated voltage, the circuit breaker shall be closed.

Control voltage: AC 50Hz 230V 400V DC 110V 220V

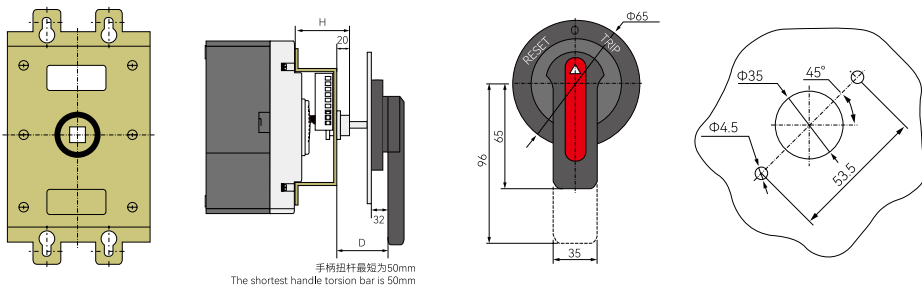


接线图 Wiring diagram

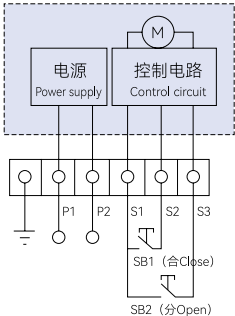
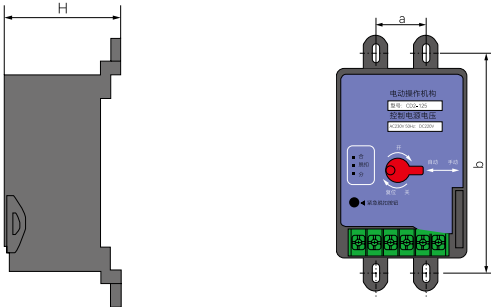
警告: 欠压脱扣器必须先通电，断路器才能再扣及合闸，否则将损坏断路器!

Warning: The under-voltage release must be electrified before the circuit breaker can be buckled and closed again, otherwise the circuit breaker will be damaged!

◆ 转动手柄操作机构和电动操作机构

转动手柄操作机构 Rotating handle operation mechanism 	 手柄扭杆长度为50mm The shortest handle torsion bar is 50mm				
型号 Model	HMKM1E-125	HMKM1E-250	HMKM1E-400	HMKM1E-630	HMKM1E-800
安装尺寸 Installation dimensions H(mm)	49	55	74	66	66

◆ 转动手柄操作机构和电动操作机构 Electro-control mechanism and rotating handle operating mechanism

电动操作机构 Electro-control mechanism 	输入电压 (V) Electro-control mechanism(V) AC230V、AC400V; DC110V, DC230V, DC24V																																										
接线图 Wiring diagram	 说明: P1-P2: 外接电源输入: SB1、SB2: 操作按钮 (用户自备) 注: 虚线框内为断路器内部附件接线图。 Instruction: P1-P2: External power input: SB1, SB2: Operation button (Prepared by customer) Note: The wiring diagram of internal accessories of circuit breaker is in the dashed box. 注: 断路器脱扣跳闸后, 电动操作机构必须先使断路器再扣, 然后才能合闸。 Note: After the circuit breaker trips, the electro-control mechanism must make the circuit breaker buckle again before closing.																																										
																																											
配用产品型号 Matching product model	电动操作机构参数 <table><tr><td>动作电流 (A)</td><td>电机功率 (VA)</td><td>机械寿命 (次)</td><td>外形尺寸 (mm)</td><td colspan="2">安装尺寸 (mm)</td></tr><tr><td>Action current (A)</td><td>Motor Power (VA)</td><td>Mechanical life (times)</td><td>H</td><td>a</td><td>b</td></tr><tr><td>HMKM1E-125</td><td>≤ 0.5A</td><td>14</td><td>20000</td><td>89.5</td><td>129</td></tr><tr><td>HMKM1E-250</td><td>≤ 0.5A</td><td>14</td><td>20000</td><td>93</td><td>126</td></tr><tr><td>HMKM1E-400</td><td>≤ 2A</td><td>35</td><td>10000</td><td>142</td><td>215</td></tr><tr><td>HMKM1E-630</td><td>≤ 2A</td><td>35</td><td>10000</td><td>146</td><td>243</td></tr><tr><td>HMKM1E-800</td><td>≤ 2A</td><td>35</td><td>10000</td><td>146</td><td>243</td></tr></table>	动作电流 (A)	电机功率 (VA)	机械寿命 (次)	外形尺寸 (mm)	安装尺寸 (mm)		Action current (A)	Motor Power (VA)	Mechanical life (times)	H	a	b	HMKM1E-125	≤ 0.5A	14	20000	89.5	129	HMKM1E-250	≤ 0.5A	14	20000	93	126	HMKM1E-400	≤ 2A	35	10000	142	215	HMKM1E-630	≤ 2A	35	10000	146	243	HMKM1E-800	≤ 2A	35	10000	146	243
动作电流 (A)	电机功率 (VA)	机械寿命 (次)	外形尺寸 (mm)	安装尺寸 (mm)																																							
Action current (A)	Motor Power (VA)	Mechanical life (times)	H	a	b																																						
HMKM1E-125	≤ 0.5A	14	20000	89.5	129																																						
HMKM1E-250	≤ 0.5A	14	20000	93	126																																						
HMKM1E-400	≤ 2A	35	10000	142	215																																						
HMKM1E-630	≤ 2A	35	10000	146	243																																						
HMKM1E-800	≤ 2A	35	10000	146	243																																						

注: 操作机构具体尺寸以实物为准, 本资料相关尺寸仅供参考! ! !

Note: The specific dimensions of the operating mechanism are subject to the physical objects, and the relevant dimensions of this brochure are for reference only!

智能断路器的外部配置模块图示（可选附件）

Illustration of external configuration module of intelligent circuit breaker (optional accessory)

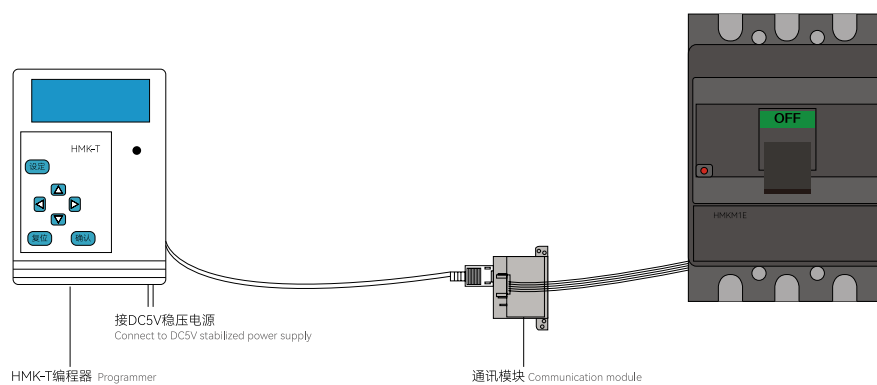
◆ HMK-T 型手持编程器 HMK-T handheld programmer

HMK-T 型手持编程器用来对智能断路器进行现场操作或参数编程设置，具有设备自动搜索功能、电源监视功能、通讯状态指示功能、自动切断远程通讯功能、工作权限确认功能，各种参数查询显示等。

携带方便，中英文操作界面，可用于电力部门或电力用户控制与管理。

HMK-T handheld programmer is used for field operation or parameter programming of intelligent circuit breaker. It has automatic equipment search function, power supply monitoring function, communication state indication function, automatic cut-off remote communication function, work authority confirmation function, various parameter inquiry display and so on.

Easy to carry, Chinese and English operation interface, can be used for power department or power user control and management.



◆ 分励模块 Shunt module

分励模块与带分励型控制器配套使用，实现分励功能。

The shunt module is matched with the controller with shunt to realize the shunt function.



◆ 外置漏电模块 External leakage module

外置漏电模块与带漏电型控制器配套使用，实现漏电功能。

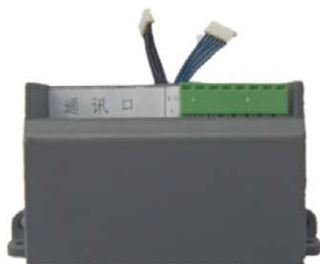
The external leakage module is matched with the controller with leakage to realize the leakage function.



◆ 通讯模块 Communication module

RS485 隔离转换，在控制器通讯组网或使用编程器时使用。

The RS485 isolation converter is used in controller communication net or when using a programmer.



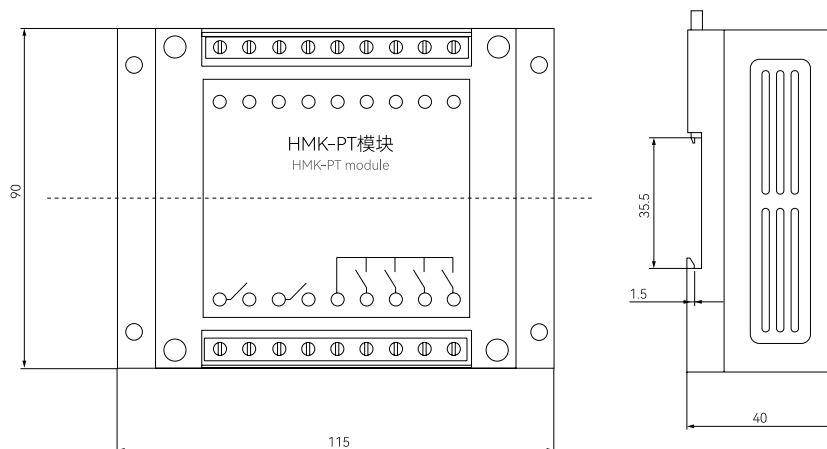
◆ HMK-PT 型智能控制模块 HMK-PT intelligent control module

HMK-PT 型智能控制模块采用标准导轨式安装。智能控制模块以光隔信号输入，各种报警和断路器分合信号以触点信号输出以及具有可编 DO 输出功能。

HMK-PT intelligent control module adopts standard DIN rail installation. The intelligent control module is input by optical isolation signal, and various alarm and circuit breaker opening and closing signals are output by contact signal, and has programmable DO output function.

HMK-PT 模块为信号输出模块，与通讯型控制器配套使用，实现遥控功能。

HMK-PT module is a signal output module, which is matched with communication controller to realize remote control function.



◆ 断路器内外附件的安装 Installation of internal and external accessories of circuit breaker

名称 Name	分励脱扣器 Shunt release	欠压脱扣器 Under-voltage release	辅助触头 Auxiliary contact	报警触头 Alarm contact	电磁铁操作机构 Electro-control mechanism	电动机操作机构 Electro-control mechanism	手动操作机构 Manual operation mechanism
安装方法 Installation method	左或右 Left or right	右 Right	左或右 Left or right	左或右 Left or right	面板 Panel	面板 Panel	面板 Panel

连接母线的截面积选择 Selection of cross-sectional area for connecting bus

额定电流 (A) Rated current (A)	10 16 20	25 32	40 50	63	80	100	125	140 160	180 200 225	250	315 350	400
导线截面积 mm ² Cross-sectional area of conductor mm ²	2.5	6	10	16	25	35	50	70	95	120	185	240

电缆的截面积选择 Selection of cross-sectional area for cable

额定电流 (A) Rated current (A)	电缆截面积 Cross-sectional area of cable		铜排尺寸 Copper bar size	
	数量 Number	截面积 Cross-sectional area mm ²	数量 Number	尺寸 Size mm
500	2	150	2	30×5
630	2	185	2	40×5
700、800	2	240	2	50×5
1250	2	/	2	60×5
1600	2	/	2	80×5

使用与维护 Use and maintenance

- ◆ 断路器各种特性及附件由制造厂整定, 在使用中不要随意调节, 用户务必对本产品技术资料详细了解后再对断路器的相关参数进行调整。
- ◆ 断路器手柄可以处在三个位置, 分别表示闭合、断开、自由脱扣三种状态, 当手柄处于自由脱扣位置时, 应向断开方向扳动手柄, 此时断路器再扣, 然后才能合闸。
- ◆ 请用户遵守存储和使用条件, 在质保期内产品如因制造质量问题发生损坏或不能正常使用时, 请与本公司联系维修或更换。
- ◆ Various characteristics and accessories of circuit breakers are set by the manufacturer, and should not be adjusted at will during use. Users must know the technical data of this product in detail before adjusting the relevant parameters of circuit breakers.
- ◆ The handle of the circuit breaker can be in three positions, which respectively indicate three states of closing, opening and free tripping. When the handle is in the free tripping position, the handle should be pulled in the opening direction, and the circuit breaker can be buckled again before closing.
- ◆ Please observe the storage and use conditions. If the product is damaged or can not be used normally due to manufacturing quality problems during the warranty period, please contact us for repair or replacement.

订货须知 Ordering Information

- ◆ 请写明断路器的型号规格以及订货数量, 采用欠电压脱扣器、分励脱扣器或电动操作机构时, 请注明工作电压或控制电源电压的电压值。
例如: HMKM1E-400M/3300Z 400A 通讯型, CD2 电动操作机构 10 台。
- ◆ 周围气温属下列情况请申明: 上限超过 +40℃或下限低于 -5℃
- ◆ Please specify the type, specification and order quantity of the circuit breaker. When ordering under-voltage release, shunt release or electro-control mechanism, please indicate the voltage value of working voltage or controlling supply voltage. For example, HMKM1E-400M/3300Z, 400A communication model, CD2 electro-control mechanism, 10 sets.
- ◆ Please state if the ambient temperature is above + 40 °C or below -5 °C



HMKM1E 液晶电子式量测断路器

LCD electronic measuring circuit breaker

适用范围 Scope of application

适于三相四线中性点直接接地 (TT) 的低压电网系统, 用来对线路或用电设备的接地故障、过电流、短路、过电压、欠电压、断电自动跳闸及缺相等进行保护。

通过中国电力科学研究院低压电器研究所关于通信标准的测试。

This product is suitable for low-voltage grid system with three-phase four-wire neutral grounding (TT), to prevent the grounding fault, overcurrent, short circuit, overvoltage, undervoltage, automatic tripping and phase loss of circuit or electrical equipment.

It has passed the communication standard test of China Electric Power Research Institute.

正常工作条件 Operational condition

- ◆ 环境温度 $-25^{\circ}\text{C} \sim +75^{\circ}\text{C}$;
- ◆ 相对空气湿度最湿月的平均最低温度不超过 25°C 时, 该月的月平均最大相对湿度不超过 90%, 并考虑到因温度变化发生在产品表面上的凝露;
- ◆ 海拔不超过 2000 米;
- ◆ 污染等级 3 级;
- ◆ 安装类别 III;
- ◆ 安装场所的外磁场在任何方向不超过地磁场的 5 倍。
- ◆ Environment temperature $-25^{\circ}\text{C} \sim +75^{\circ}\text{C}$;
- ◆ Relative air humidity: When the average minimum temperature of the wettest month does not exceed 25°C , the monthly average maximum relative humidity of that month does not exceed 90%, taking into account the condensation on the surface of the product due to temperature changes;
- ◆ Not more than 2000 meters above sea level;
- ◆ Pollution level 3;
- ◆ Installation category III;
- ◆ The external magnetic field of the installation site shall not exceed 5 times the geomagnetic field in any direction.

产品特点 Product Features

- ◆ 高精度的显示界面、分别显示三相电压、三相电流、三相有功功率、三相总功率、三相功率因数、三相总功率因数。具备电压、电流、电量、功率等数据的采集和传输，电流精度小于 0.5 级，电压精度小于 0.5 级，有功功率精度小于 1 级，无功测量精度小于 2 级。
- ◆ 本产品具备 485 通讯接口，645 协议，可读取电压电流等参数，远程控制分合闸。
- ◆ 该产品通过 645 通讯功能，可以实现产品的快速精准定位。对整个电网运行的电量调配提供有利参考数据。
- ◆ The high-precision display interface displays three-phase voltage, three-phase current, three-phase active power, three-phase total power, three-phase power factor and three-phase total power factor respectively. It has the collection and transmission function of voltage, current, electricity, power and other data. The current accuracy is less than 0.5, the voltage accuracy is less than 0.5, the active power accuracy is less than 1, and the reactive power measurement accuracy is less than 2.
- ◆ This product, with 485 communication interface and 645 protocol, can read voltage and current and other parameters and remotely control the opening and closing.
- ◆ Through the 645 communication function, this product can achieve fast and accurate positioning, and can provide favorable reference data for power allocation of the entire grid operation.

产品功能 Function

- ◆ 保护功能：
具有过压、欠压、断相保护、全失压功能；还具有过载、短路短延时及瞬时保护；缺零保护，电流不平衡保护等功能。
- ◆ 显示功能：
合闸状态下，自动轮显当前额定电流值、当前时间、当前三相电压参数，当前三相电流，当总功率，功率因数等参数。
- ◆ 设置、查询功能：
可通过按键设置过压、欠压、缺相、过载、缺零保护等功能的开启和关闭。也可通过通信设置上述功能。可通过按键设置额定电流、短路短延时倍数、短路短延时时间、短路瞬时倍数、过压、欠压等主要参数。可通过按键查询，跳闸记录，试验记录，总跳闸次数等诸多参数。
- ◆ 控制功能：
可通过远程预约分闸，以及预约取消控制功能。
- ◆ 自检功能：
具有远程试跳、无源分励等自检功能。
- ◆ 监控记录功能：
记录近 10 次跳闸的，三相电压，三相电流参数及时标。累计保护器跳闸总次数等累计参数。
- ◆ 辅助功能：
RS485 通信功能（波特率 2400）具有多种通讯协议可供选择，能与智能配变终端、上位机等建立通信功能，实现远程参数的调整、信息查询及下载故障参数等功能。高亮液晶屏，及 4 个按键实现参数设置、参数校准、数据查询、事件查询等现场操作。
- ◆ Protection Function:
This product has the functions of overvoltage, undervoltage, phase loss protection, voltage failure of the all phases, overload, short-circuit short delay and instantaneous protection, zero loss protection, current imbalance protection and other functions.
- ◆ Display Function:
In the closed state, it automatically displays the current rated current value, current time, current three-phase voltage parameters, current three-phase current, current total power, power factor and other parameters in turn.
- ◆ Settings and Query Function:
You can set the opening and closing of overvoltage, undervoltage, phase loss, overload, zero loss protection and other functions by pressing the button. The above-described functions can also be set through communication. The main parameters such as rated current, short-circuit short delay multiple, short-circuit short delay time, short-circuit instantaneous multiple, overvoltage, and undervoltage can be set by pressing the button. You can query many parameters such as trip records, test records, total trip times, etc. by pressing the button.
- ◆ Control Function:
It can reserve opening and cancel the control remotely.
- ◆ Self-test Function:
It has self-test functions such as remote and passive trip.
- ◆ Monitoring and Recording Function:
Record the cumulative parameters such as three-phase voltage, three-phase current parameters and time scale of nearly 10 tripping times, and the cumulative number of protector tripping times.
- ◆ Miscellaneous Function:
RS485 communication function (baud rate 2400) has a variety of communication protocols to choose from. It can establish communication functions with intelligent distribution transformer terminals, host computers, etc., and realize functions such as remote parameter adjustment, information query and download fault parameters. High-brightness LCD screen and 4 buttons realize on-site operations such as parameter setting, parameter calibration, data query, and event query.

性能及工艺 Performance and process

- ◆ 电路板选用高集成工业级材料，采用先进的防雷设计，完全符合 GB14048.2-2008 标准中对电磁兼容的要求。
- ◆ 电路板采用紧凑的结构设计，适合用户对断路器中紧凑空间的要求。
- ◆ 电路板工艺整洁，美观，接线方便，只需必要的信号输入接线。
- ◆ 可直接组装，组装完成可通过按键或本公司提供的校准软件、做电压、电流、三相功率的校准。
- ◆ 产品基本上包含了目前市场上高端产品的功能。
- ◆ The circuit board is made of highly integrated industrial-grade materials and adopts advanced lightning protection design, which fully meets the requirements of electromagnetic compatibility in GB14048.2-2008 standard.
- ◆ The circuit board adopts a compact structure design to meet the user's requirements for compact space in the circuit breaker.
- ◆ The process of the circuit board with only the necessary signal input wiring is clean and beautiful, and the wiring is convenient.
- ◆ It can be assembled directly. After assembly, the voltage, current and three-phase power can be calibrated by pressing buttons or the calibration software provided by our company.
- ◆ The product basically contains the features of the high-end products currently on the market.

主要性能指标 Main performance indicators

型号 Model	参数说明 Parameter
壳架等级额定电流 $I_{nm}(A)$ Shell grade rated current $I_{nm}(A)$	根据用户要求定制 Customized according to user requirements
额定电流 $I_n(A)$ Rated current $I_n(A)$	0.4 – 1.0 I_{nm} (A) 连续可调 0.4 – 1.0 I_{nm} (A) Continuously adjustable
辅助电源电压 $U_e(AC V)$ Auxiliary power supply voltage $U_e(AC V)$	400
适用极数 Number of applicable poles	3P 4P 或 3P+N 3P 4P or 3P+N
额定剩余动作电流 (mA) $I \Delta n$: Rated residual active current (mA) $I \Delta n$:	档位数值可选，可根据客户要求定制 8 组参数数值 Gear values are optional, and 8 groups of parameter values can be customized according to customer requirements
过压动作值 (V) Overvoltage action value (V)	默认 275±5% (用户可整定) Default 275 ± 5% (user adjustable)
欠压动作值 (V) Undervoltage action value (V)	默认 165±5% (用户可整定) Default 165±5% (user adjustable)
缺相动作值 (V) Phase loss action value (V)	默认 100±5% (用户可整定) Default 100±5% (user adjustable)
动作特性分类 Action characteristic classification	AC 型 Type AC
产品使用类别 Product use category	A 类 B Type A Type B

脱扣器动作性能 Release mechanism performance

- ◆ 过载保护特性（反时限动作） Overload protection characteristics (inverse time action)

脱扣器额定工作电流 (A) Rated operating current of release (A)	脱扣器 (环境温度 40℃) Release (environment temperature 40 °C)	
	1.05 I_n (冷态 cold state)	1.30 I_n (热态 hot state)
$I_n \leq 63A$	$\geq 1h$ 不动作 no action	$< 1h$ 动作 action
$I_n > 63A$	$\geq 2h$ 不动作 no action	$< 2h$ 动作 action

过载长延时时间的计算: $T1 = (6I_r/I)^2 \times Tr1$ (I_r : 额定电流, I : 为实际施加电流, $Tr1$: 为时间系数)

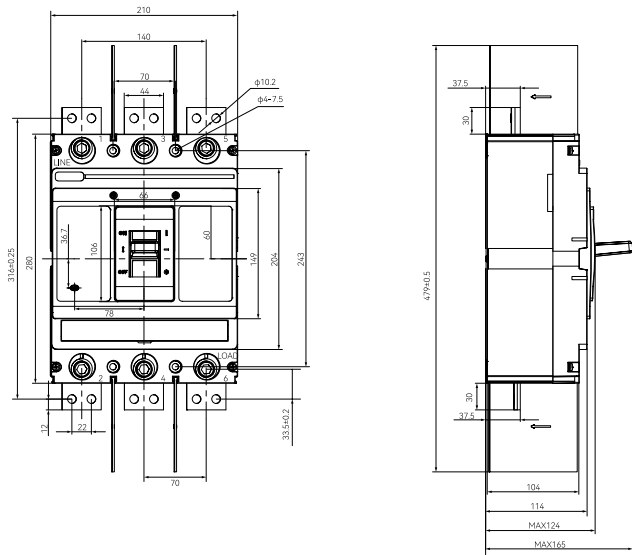
Calculation of overload long delay time: $T1 = (6I_r/I)^2 \times Tr1$ (I_r : the rated current, I : the actual applied current, $Tr1$: the time factor)

- ◆ 瞬间过电流脱扣器电流整定值 Current setting value of instantaneous overcurrent release

壳架等级额定电流 I_{nm} (A) Shell grade rated current $I_{nm}(A)$	整定电流倍数 Setting current multiple	约定时间 Setting time
250	10 $I_n \pm 20\%$	$< 0.2s$
400	10 $I_n \pm 20\%$	$< 0.2s$
630	10 $I_n \pm 20\%$	$< 0.2s$
800	10 $I_n \pm 20\%$	$< 0.2s$

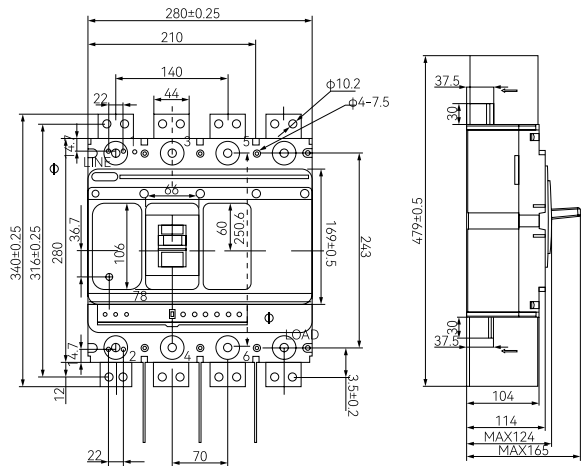
外形尺寸 External dimensions

◆ HMKM1E-250、400、630、800 外形及安装尺寸 Shape and installation dimensions of HMKM1E-250, 400, 630, 800



型号 Model	极数 Pole number	安装尺寸 (mm) Installation dimensions(mm)				
		L5	w1	a	b	d
HMKM1E-250M	3	144	35	35	126	Φ4.5
	4	144	35	70	126	Φ4.5
HMKM1E-400M	3	224	48	44	194	Φ7
	4	224	48	94	194	Φ7
HMKM1E-630M	3	234	58	58	200	Φ7
HMKM1E-800M	3	243	10	70	243	Φ7
	4	243	70	140	243	Φ7

◆ HMKM1E-1000、1250、1600（4极）外形及安装尺寸 Shape and installation dimensions of HMKM1E-1000,1250,1600（4P）





HMKM1EL 漏电电子式液晶塑壳断路器

Leakage electronic liquid crystal molded case circuit breaker

产品概述 Overview

本型号控制器适用于三相四线制辅助电源供电的环境中。其额定绝缘电压为 800V，适用于交流 50Hz，额定工作电压 400V，额定电流至 1250A 的电路中作不频繁转换及电动机不频繁起动之用。断路器具有过电压保护，欠电压保护，缺相保护，过载长延时反时限、短路短延时反时限、短路短延时定时限、短路瞬时和欠电压保护功能、漏电跳闸保护功能，能保护线路和电源设备不受损坏。

产品符合标准：GB 14048.2。

This product is suitable for the environment powered by three-phase four-wire auxiliary power supply. Its rated insulation voltage is 800V, which is suitable for infrequent conversion and infrequent motor starting in circuits with AC 50Hz, rated working voltage 400V and rated current 1250A. The circuit breaker has overvoltage protection, undervoltage protection, phase loss protection, overload long delay inverse time limit, short-circuit short delay inverse time limit, short-circuit short delay fixed time limit, short-circuit short instantaneous and undervoltage protection function, and leakage trip protection function, which can protect lines and power equipment from damage.

The product meets the standard: GB 14048.2.

正常工作条件 Operational condition

- ◆ 环境温度 -5℃ ~ +55℃;
- ◆ 相对空气湿度最湿月的平均最低温度不超过 25℃ 时，该月的月平均最大相对湿度不超过 90%，并考虑到因温度变化发生在产品表面上的凝露；
- ◆ 海拔不超过 2000 米；
- ◆ 污染等级别 3 级；
- ◆ 安装类别 III；
- ◆ 安装场所的外磁场在任何方向不超过地磁场的 5 倍。
- ◆ Environment temperature -5℃ ~ +55℃;
- ◆ Relative air humidity: When the average minimum temperature of the wettest month does not exceed 25 °C, the monthly average maximum relative humidity of that month does not exceed 90%, taking into account the condensation on the surface of the product due to temperature changes;
- ◆ Not more than 2000 meters above sea level;
- ◆ Pollution level 3;
- ◆ Installation category III;
- ◆ The external magnetic field of the installation site shall not exceed 5 times the geomagnetic field in any direction.

产品特点 Product Features

- ◆ 保护功能:
具有过压、欠压、缺相保护功能; 电流过载、短路短延时及瞬时保护、漏电跳闸保护功能。
- ◆ 显示功能:
12864 点阵式 OLED 液晶屏显示, 友好的中文人机交互界面。
自动轮显当前三相电压、三相电流、剩余电流、额定漏电流、额定电流、过欠电压等参数。
- ◆ 设置、查询功能:
可通过按键设置过压、欠压、缺相、电流过载长延时、短路短延时、瞬时保护、漏电流保护功能的启用和禁用。
可通过按键设置过压、欠压、缺相、额定电流、过载长延时时间、短路短延时倍数、短路短延时时间、短路瞬时倍数、剩余电流、剩余电流延时时间等主要参数。
可通过按键查询, 跳闸次数等诸多参数。也可通过通信接口查看、设置上述功能参数。
- ◆ 控制功能:
可通过通讯接口远程查看工作状态、查看参数设置、修改参数设置、控制分励脱扣等功能。
可通过外部分断接口实现断路器的同步分励功能。
- ◆ 监控记录功能:
累计保护跳闸次数, 及区别记录多种故障跳闸次数的记录。
- ◆ 辅助功能:
MODBUS 塑壳断路器通信规约; 亦可按照客户要求, 定制通讯规约。
- ◆ 性能及工艺
电路板选用高集成工业级材料, 采用先进的防雷设计, 完全符合 GB14048.2-2008 标准中对电磁兼容的要求。
电路板采用紧凑的结构设计, 适合用户对断路器中紧凑空间的要求。
电路板工艺整洁, 美观, 接线方便, 只需必要的信号输入接线。可直接组装, 无需二次调试。组装完成只需通过按键做简单的电压、电流、漏电流校准 (采购整套互感器时无需校准, 可以直接使用)。
产品基本上包含了目前电子式塑壳断路器产品的功能。
可根据客户需求按照客户样机的结构 (或原电路板) 进行设计, 开发。
- ◆ Protection Function:
This product has the functions of overvoltage, undervoltage, phase loss protection, overload, short-circuit short delay and instantaneous protection, and leakage trip protection function.
- ◆ Display Function:
12864 dot matrix OLED LCD screen display, friendly Chinese human-computer interaction interface.
It automatically displays the current three-phase voltage, three-phase current, residual current, rated leakage current, rated current, over-under voltage and other parameters in turn.
- ◆ Settings and Query Function:
You can set the opening and closing of overvoltage, undervoltage, phase loss, overload, current overload long delay, short-circuit short delay, instantaneous protection, and leakage current protection functions by pressing the button.
The main parameters such as overvoltage, undervoltage, phase loss, rated current, overload long delay time, short-circuit short delay multiple, short-circuit short delay time, short-circuit instantaneous multiple, residual current, residual current delay time, etc. can be set by pressing the button.
You can query many parameters such as trip times by pressing the button, and the above-described functions can also be set through communication.
- ◆ Control Function:
It can remotely check the working status and parameter settings, modify parameter settings, control tripping and other functions through the communication interface.
The synchronous tripping function of the circuit breaker can be realized through the external partial disconnection interface.
- ◆ Monitoring and Recording Function:
Record the cumulative parameters such as three-phase voltage, three-phase current parameters and time scale of nearly 10 tripping times, and the cumulative number of protector tripping times.
Accumulate the number of protection tripping, and differentially record the number of tripping due to multiple faults.
- ◆ Miscellaneous Function:
MODBUS Molded Case Circuit Breaker Communication Protocol; Customize communication protocols according to customer requirements
- ◆ Performance and Process
The circuit board is made of highly integrated industrial-grade materials and adopts advanced lightning protection design, which fully meets the requirements of electromagnetic compatibility in GB14048.2-2008 standard.
The circuit board adopts a compact structure design to meet the user's requirements for compact space in the circuit breaker.
The process of the circuit board with only the necessary signal input wiring is clean and beautiful, and the wiring is convenient.
It can be assembled directly. It can be assembled directly without secondary debugging. After assembly, users only need to do simple calibration of voltage, current and leakage current by pressing the button (if you purchase a complete set of transformers, there is no need for calibration and you can use them directly).
The product basically contains the features of the high-end products currently on the market.
This product can be designed and developed according to the prototype structure (or original circuit board) provided by customers.

主要性能指标 Main performance indicators

型号 Model	参数说明 Parameter
壳架等级额定电流 I_{nm} (A) Shell grade rated current I_{nm} (A)	160,250,400,630,800 可选 Optional 160,250,400,630,800
额定电流 I_n (A) Rated current I_n (A)	0.4 – 1.0 I_{nm} (A) 连续可调 Continuously adjustable 0.4 – 1.0 I_{nm} (A)
过载长延时时间 Overload long delay time (s) Overload long delay time (s)	12-100s 可调 Adjustable 12-100s
短路短延时倍数 (xI_n) Short-circuit short delay multiple (xI_n)	2-12 可调 Adjustable 2-12
短路短延时时间 (ms) Short-circuit delay time (ms)	60-300 连续可调 Continuously adjustable 60-300
短路瞬时倍数 (xI_n) Short-circuit instantaneous multiple (xI_n)	4 – 14 可调 Adjustable 4 – 14
辅助电源电压 (AC V) Auxiliary power supply voltage U_e (AC V)	400
适用极数 Number of applicable poles	4P 或 3P+N 4P or 3P+N
过压动作值 (V) Overvoltage action value (V)	默认 275±5% (用户可整定) Default 275 ± 5% (user adjustable)
欠压动作值 Undervoltage action value(V)	默认 175±5% (用户可整定) Default 175±5% (user adjustable)
缺相动作值 (V) Phase loss action value (V)	默认 100±5% (用户可整定) Default 100±5% (user adjustable)
产品使用类别 Product use category	B 类 Type B
额定剩余动作电流 (mA) $I_{\Delta n}$: Rated residual active current (mA) $I_{\Delta n}$:	档位数值可选, 可根据客户要求定制 10 组参数数值 Gear values are optional, and 10 groups of parameter values can be customized according to customer requirements
额定剩余不动作电流 (mA) Rated residual inactive current (mA)	$I_{\Delta no} = 50\%I_{\Delta n}$
额定极限不驱动时间 (s) Rated limit non-start time(s)	档位数值可选, 可根据客户要求定制 10 组参数数值 Gear values are optional, and 10 groups of parameter values can be customized according to customer requirements
额定剩余短路接通 (分断) 能力 Rated residual short-circuit on (off) capacity	$I_{\Delta m} = I_{cu}$ (kA)

过载长延时时间的计算: $T1 = (6I_{r1}/I)^2 \times Tr1$ (I_{r1} : 额定电流, I : 为实际施加电流, $Tr1$: 为时间系数)

Calculation of overload long delay time: $T1 = (6I_{r1}/I)^2 \times Tr1$ (I_{r1} : the rated current of the test product. I : the actual applied current. $Tr1$: the long delay overload factor)

脱扣器动作性能 Release mechanism performance

◆ 过载保护特性 (反时限动作) Overload protection characteristics (inverse time action)

脱扣器额定工作电流 (A) Rated operating current of release (A)	脱扣器 (环境温度 40℃) Release (environment temperature 40 °C)	
	1.05 I_n (冷态 cold state)	1.30 I_n (热态 hot state)
$I_n \leq 63A$	$\geq 1h$ 不动作 no action	$< 1h$ 动作 action
$I_n > 63A$	$\geq 2h$ 不动作 no action	$< 2h$ 动作 action

过载长延时时间的计算: $T1 = (2I_{r1}/I)^2 \times Tr1$ (I_{r1} : 测试产品的额定电流, I : 为实际施加电流, $Tr1$: 为长延时过载系数)

Calculation of overload long delay time: $T1 = (2I_{r1}/I)^2 \times Tr1$ (I_{r1} : the rated current of the test product. I : the actual applied current. $Tr1$: the long delay overload factor)

◆ 瞬间过电流脱扣器电流整定值 Current setting value of instantaneous overcurrent release

壳架等级额定电流 I_{nm} (A) Shell grade rated current $I_{nm}(A)$	整定电流倍数 Setting current multiple	约定时间 Setting time
160	$10 I_{n\pm 20\%}$	< 0.2s
250	$10 I_{n\pm 20\%}$	< 0.2s
400	$10 I_{n\pm 20\%}$	< 0.2s
630	$10 I_{n\pm 20\%}$	< 0.2s
800	$10 I_{n\pm 20\%}$	< 0.2s
1000	$10 I_{n\pm 20\%}$	< 0.2s
1250	$10 I_{n\pm 20\%}$	< 0.2s
1600	$10 I_{n\pm 20\%}$	< 0.2s

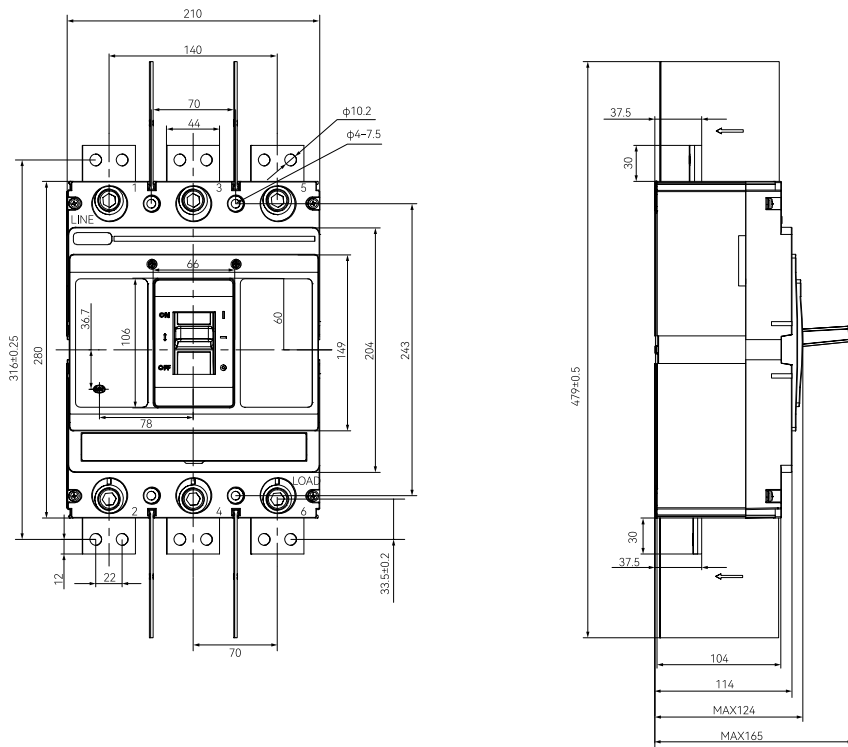
短路延时时间有定时限，也可以是反时限（默认是定时限），反时限计算如下：

短路延时时间的计算： $T_2 = (8I_r1/I)^2 \times Tr_2$ (I_r1 ：测试产品的额定电流。I：为实际施加电流。Tr2：为延时过载系数)

The short-circuit delay time has a fixed time limit or an inverse time limit (the default is a fixed time limit). The inverse time limit is calculated as follows:

Calculation of short-circuit delay time: $T_2 = (8I_r1/I)^2 \times Tr_2$ (I_r1 : the rated current of the test product. I: the actual applied current. Tr2: the delay overload factor)

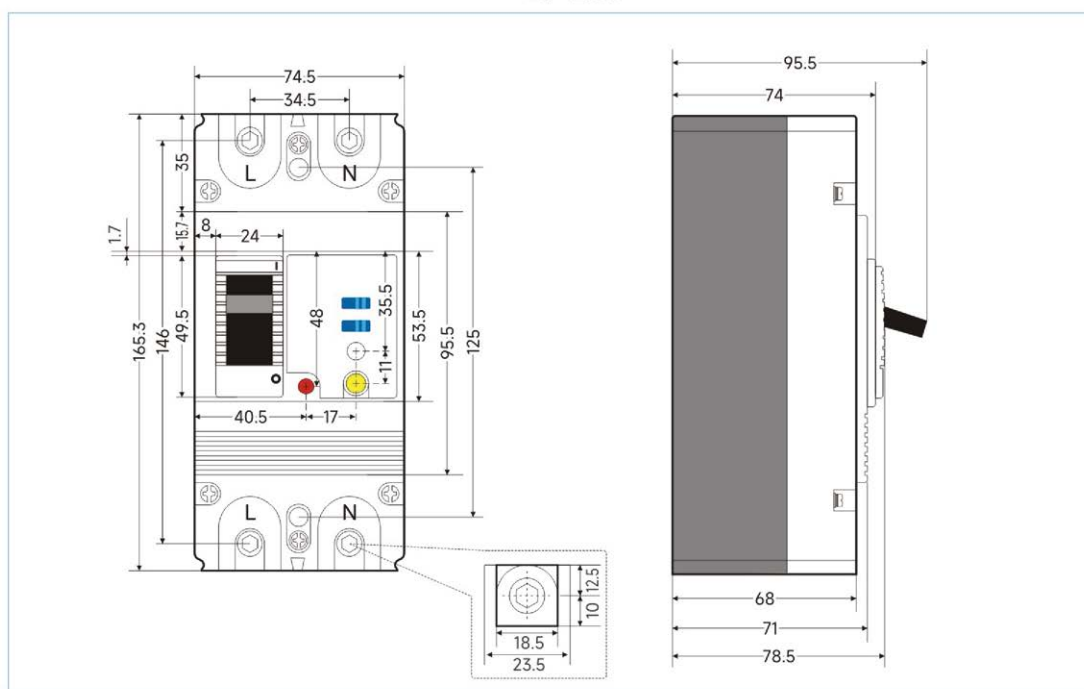
外形尺寸 External dimensions



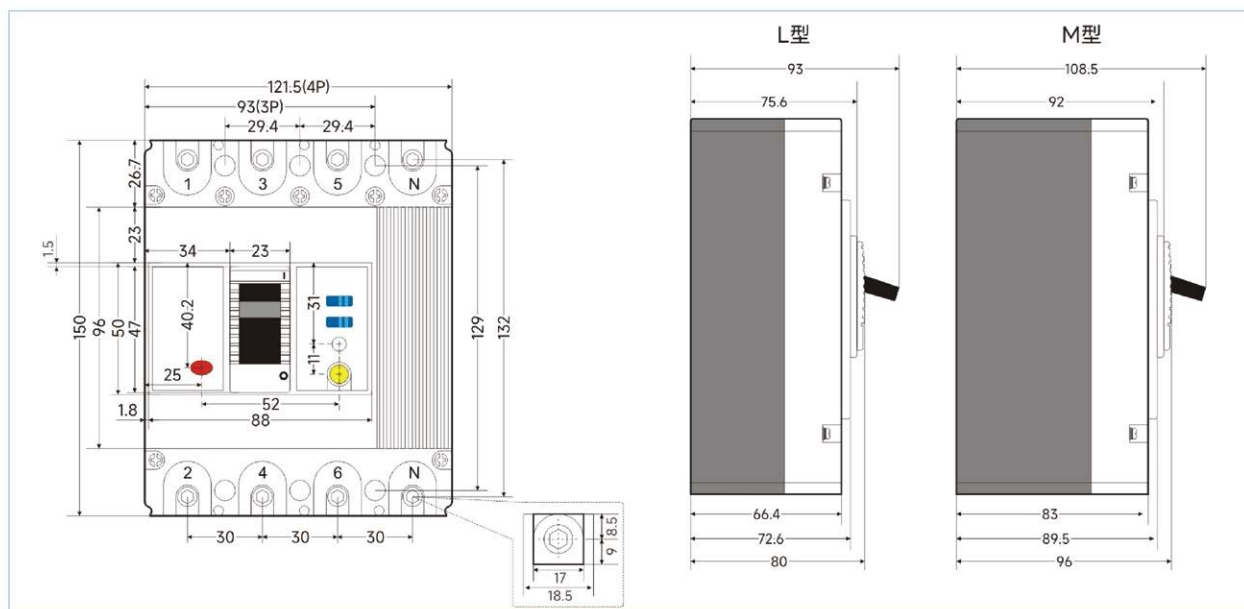
型号 Model	极数 Pole number	安装尺寸 (mm) Installation dimensions(mm)				
		L5	w1	a	b	d
HMKM1EL-250M	3	144	35	35	126	$\Phi 4.5$
	4	144	35	70	126	$\Phi 4.5$
HMKM1EL-400M	3	224	48	44	194	$\Phi 7$
	4	224	48	94	194	$\Phi 7$
HMKM1EL-630M	3	234	58	58	200	$\Phi 7$
HMKM1EL-800M	3	243	10	70	243	$\Phi 7$
	4	243	70	140	243	$\Phi 7$

[illegible]

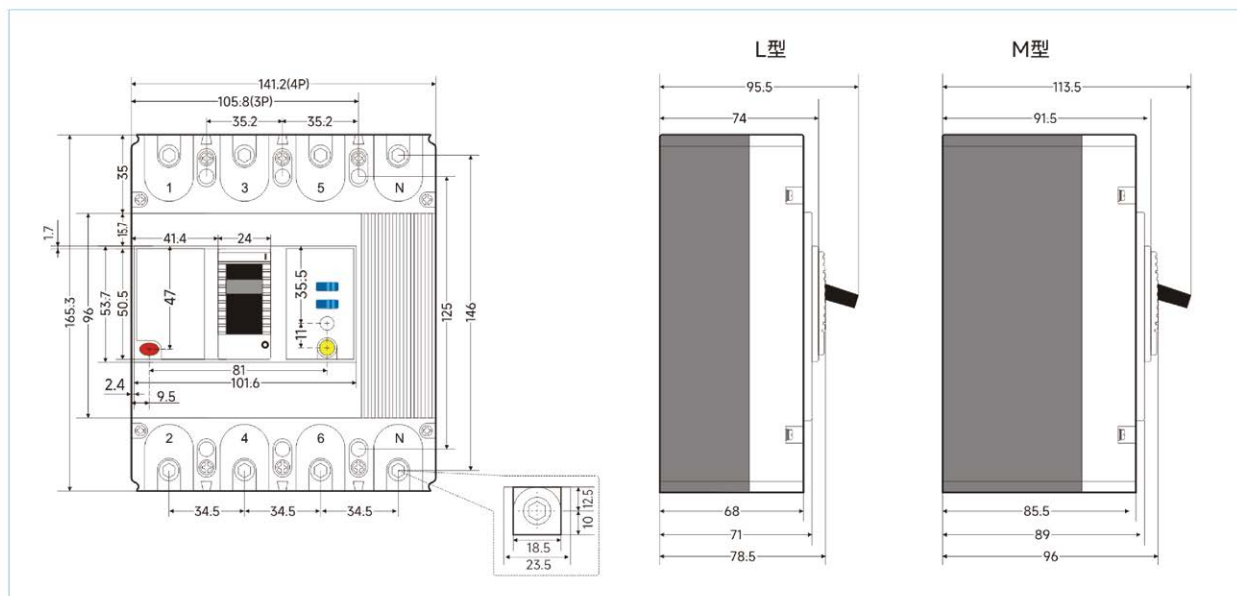
2P-250



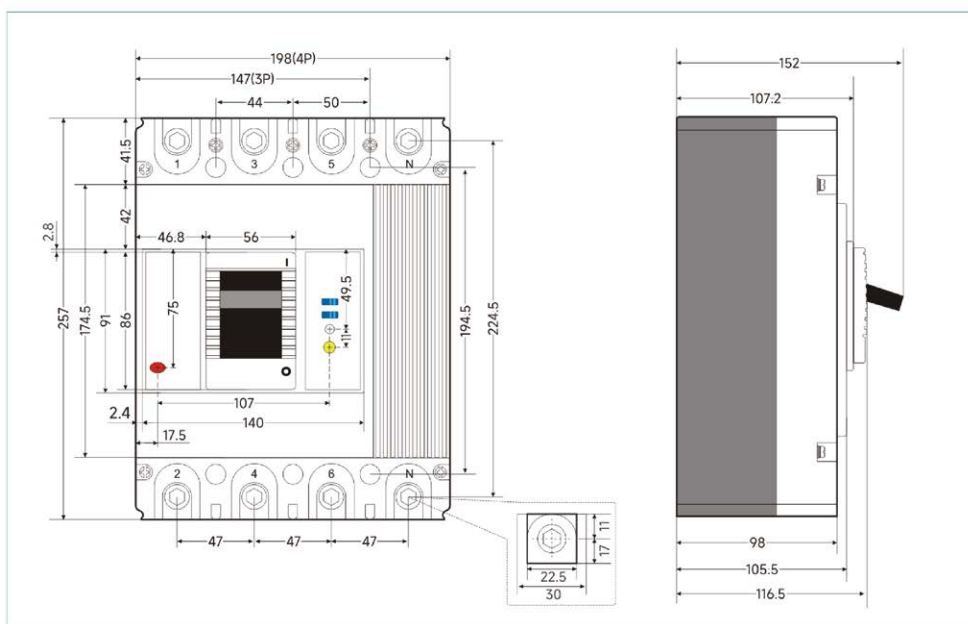
3P/4P-125



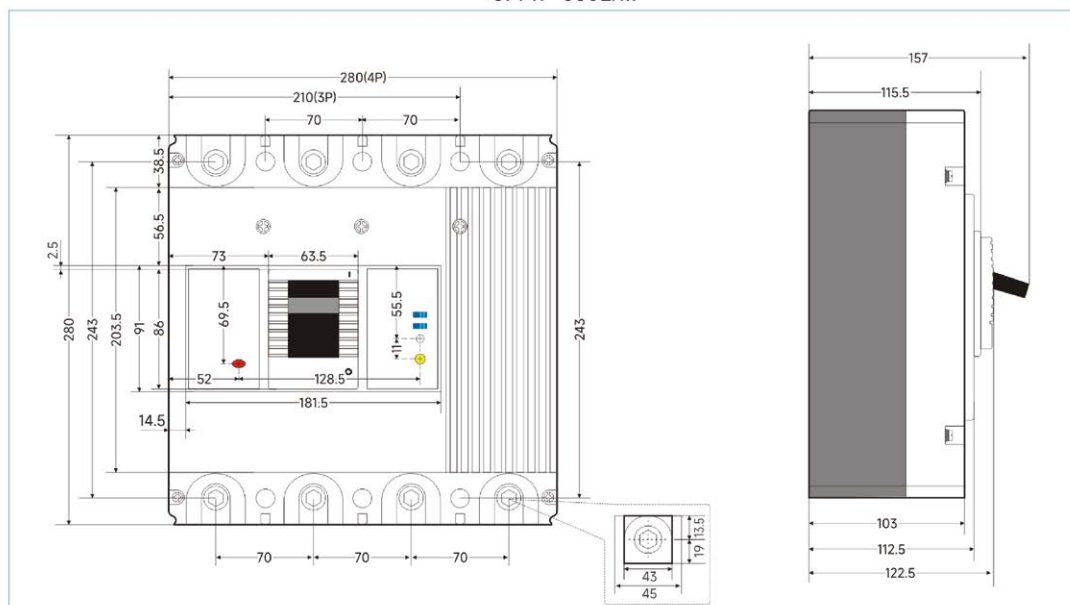
3P/4P-250



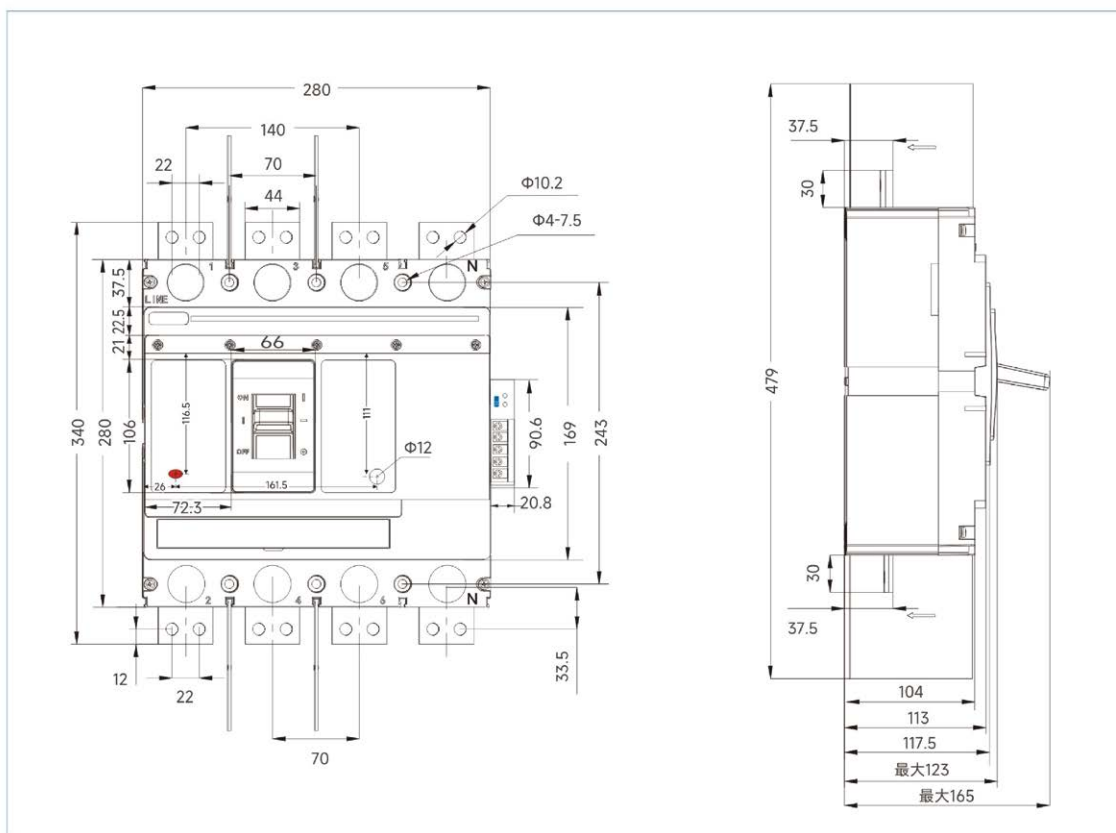
3P/4P-400L



3P/4P-630L/M



3P/4P-1250L/M



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