物联网塑壳断路器使用说明书

Iot Smart Circult Breaker

Operating Instructions


广东省珩祥安全科技有限公司

Guangdong Province Hengxiang Security Technology Co., Ltd

产品型号及含义

Model number and meaning
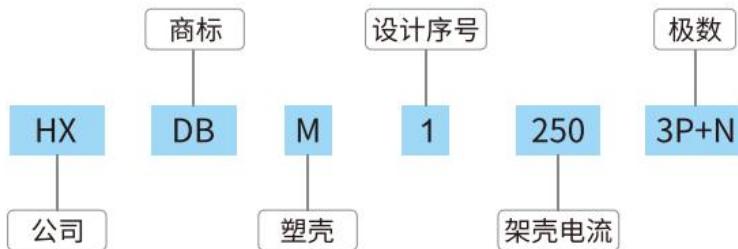
主要功能和特点

Main functions and features

分布式光伏保护开关，采用剩余电流重合闸塑壳断路器 作为主体，增加光伏专用的保护功能、HPLC 或 HPLC 双模通信功能、电能质量监控功能与精确计量等电力物联网功能。为方便描述.以下简称断路器。用于光伏发电系统接入低压电网的断路器，主要包含以下功能:

Distributed PV protective switchgear with residual current reclosing plastic case circuit breakers as the main body, with additional PV-specific protection functions, HPLC or HPLC dual-mode communication functions, power quality monitoring functions and precise metering and other power IoT functions. For ease of description. Hereinafter referred to as circuit breakers. Circuit breakers for photovoltaic power systems connected to the low-voltage grid, mainly containing the following functions.

a）孤岛保护：当电网停电时，不依托逆变器本身的孤岛保护.切断光伏发电系统与低压配电网的连接;

(a) Islanding protection: In the event of a grid failure, the islanding protection does not rely on the inverter itself. Disconnects the PV system from the low voltage distribution network.

b）过载保护、短路保护：无论是光伏发电侧还是低压电网侧出线短路，过载时断路器切断并网连接，起到保护系统稳定的作用;

b) Overload protection, short-circuit protection: Whether it is a short circuit on the photovoltaic side or on the low voltage grid side, the circuit breaker cuts off the grid connection in case of overload to protect the system stability.

c）电能质量监控：对并网电压与电流谐波分析，电能质量评估，为考核发电质量提供数据依据;

c) Power quality monitoring: analysis of grid-connected voltage and current harmonics, power quality assessment and data basis for assessment of power generation quality.

d）测量功能;量测发电功率、电压、电流、频率，为全台区电力供应与负荷响应提供数据支撑。

d) Measurement function; measuring power, voltage, current and frequency of power generation, providing data support for power supply and load response in the whole station area.

测量精度等级

Measurement accuracy class

精度 Precision	参数值 Parameter values	功率区数 Number of power zones	百分数误差极限 Percentage error limits
电压精度 Voltage accuracy	0. 35Un ≤U ≤0.77Un		±1%
	0.7Un ≤U ≤1.3Un		±0.5%
电流精度 Current accuracy	0. 05ln ≤l ≤1.2ln		±0.5%
有功功率精度 Active power	0.05ln ≤l ≤1.2ln	1.0	±1%

accuracy			
无功功率精度 Reactive power accuracy	0. 05ln ≤l ≤1.2ln	0.0	±2%
正反向电能累计精度 Accuracy of forward and reverse energy accumulation	0.7Un ≤U ≤1.3Un	1.0	±1%
剩余电流精度 Residual current accuracy			±2%

主要技术参数

Main technical parameters

规格型号 Specification	HXDBM1-250	HXDBM1-400	HXDBM1-630	HXDBM1-800
壳架电流(A) Shell frame current (A)	250	400	630	800
极数 polar number	3P+N			
额定工作电压 Ue(V) Rated operating voltage Ue(V)	AC 400 50HZ			
额定绝缘电压 Ui(V)	AC 1000			

Rated insulation voltage Ui(V)			
额定冲击耐受电压 Uimp(V) Rated impulse withstand voltage Uimp(V)	8000		
飞孤距离(mm) Flying solitary distance (mm)	≯ 50	≯100	≯100
极限短路分断能力 lcu(kA) Ultimate short-circuit breaking capacity lcu(kA)	50	65	65
运行短路分断能力 lcs (kA) Operating short-circuit breaking capacity lcs (kA)	35	45	45
额定短时耐受电流 lcw(kA/1s) Rated short-time withstand current lcw(kA/1s)	5	7.56	8
额定剩余短路接通(分断)能力 1 △m (kA) Rated residual short-circuit switching (breaking) capacity 1 Δm (kA)	25% ICU		
剩余电流动作特性 Residual current action characteristics	AC Type		

额定剩余动作电流 1 △n(mA) Rated residual action current 1 Δn(mA)	50mAv, 100mA, 200mA, 300mA, 400mA. 500mA, 600mA, 800mA	100mA, 200mA, 300mA, 400mA, 500mA, 600mA, 800mA, 1000mA	
延肘型极限不驱动时间(s) Extended elbow limit non-drive time (s)	Δt:0.06/0.1/0.2		
自动重合闸时间(s) Automatic reclosing time (s)	20-60		
通电 Electrification	1000	1000	500
操作性能(次) 不通电 Operating performance (times) Not powered	7000	4000	2500
总次数 Total number of times	8000	5000	3000
过载、短路特性 Overload, short circuit characteristics	三段保护，电子可调，详见"保护特性说明" Three-stage protection, electronically adjustable, see "Description of protection characteristics" for details		
过压保护值(V) Overvoltage protection value (V)	设置值(253V~286V) Setting value (253V~286V)		
欠压保护值(V) Undervoltage protection	设置值(154V~187V) Setting value (154V~187V)		

value (V)	
联控延迟时间(ms) Joint control delay time (ms)	≤40ms
通讯延退时间(ms) Communication delay time (ms)	≤200ms

保护特性说明

- 过载长延时保护

  Overload long delay protection

- ◆ 动作值设定范围

  Action value setting range

表 1：过载长延时参数设定

Table 1: Overload long delay parameter settings

参数 Parameters	壳架电流 Shell frame current	设定值 Set values	出厂整定值 Factory adjusted values
动作设定值 Irl Action setpoint	HX1LC-125	100A-125A 可调，步进 1A 100A-125A adjustable, step 1A	125A
	HX1LC-250	100A-250A 可调，步进 1A 100A-250A adjustable, step 1A	250A
	HX1LC-400	160A-400A 可调，步进 1A 160A-400A adjustable, step 1A	400A
	HX1LC-630	252A-630A 可调，步进 1A 252A-630A adjustable, step 1A	630A
	HX1LC-800	320A-800A 可调，步进 1A	800A

		320A-800A adjustable, step 1A	
延时时间设定值 tL Delay time setpoint		3s-18s 可调，步进 1s Adjustable from 3s-18s in 1s steps	10s

- 动作特性

  Movement characteristics

表 2：保护动作特性

Table 2: Protection action characteristics

环境温度 Ambient temperature	电流名称 Electric current name	电流名称 Electric current name	电流名称 Electric current name
+40°C	约定不脱扣电流 Covenant non-switch current	1.05lr1	≥2h
	约定脱扣电流 Approximate decoupling current	1.3lr1	<2h

- 延时特性

  Delay characteristics

过载保护按反时限特性进行：

Overload protection according to the inverse time characteristic:

$T=(6Ir1/I)^2 tL$　　　　　延时精度：±10%

$$T=(6Ir1/I)^2tL \qquad \text{Delay accuracy: } \pm 10\%$$

这其中 T 为动作时间值，Ir1 为长延时保护设定值，I 为故障电流，tL 为长延时时间设定值。

T is the action time value, Ir1 is the long delay time protection setting, I is the fault current and tL is the long delay time setting

- 短路短延时保护
- **Short circuit short delay protection**

短路短延时保护防止配电系统的阻抗性短路，跳闸延时是为了实现选择性保护

Short-circuit short-delay protection against impedance short-circuits in the distribution system, trip delay is for selective protection

- 短路短延时保护相关参数设定

    Setting of parameters related to short-circuit short delay protection

表 3：短路短延时参数设定

Table 3: Short circuit short delay parameter settings

参数设定 Parameter setting		出厂整定值 Factory adjusted values
短延时动作电流 设定值 Ir2 Short delayed action current Set value Ir2	2Ir1-10Ir1 可调，步进 1Ir1 2Ir1-10Ir1 adjustable in steps of 1Ir1	8Ir1
短延时时间设定值 ts Short delay time setpoint ts	0.1s-1.0s 可调，步进 0.1s 0. 1s - 1.0s adjustable in 0.1s steps	0. 3s

- 短路短延时保护动作特性

- **Short-circuit, short-delay protection action characteristics**

表 4：短路短延时动作特性

Table 4: Short circuit short delay action characteristics

特性 Characteristics	故障电流倍数 Fault current multiplier	脱扣时间 Decoupling time	延时误差 Time delay error
不动作特性 Non-action characteristics	W0.85 Ir2	不动作 No movement	±40ms
动作特性 Movement characteristics	>1.15 Ir2	延时动作 Time-delayed action	±40ms

- 瞬时保护

  Instantaneous protection

◆ 短路瞬时保护相关参数设定

  Short-circuit transient protection-related parameter setting

表 5：瞬时参数设定

Table 5: Transient parameter settings

参数设定 Parameter setting		出厂整定值 Factory adjusted values
瞬时动作电流设定值 Ir3 Instantaneous action current setting value Ir3	2lr1-12lr1 可调，步进 1lr1 2lr1-12lr1 Adjustable, step 1lr1	10 Ir1

- 短路瞬时保护动作特性

- **Short-circuit transient protection action characteristics**

表 6：瞬时动作特性

Table 6: Instantaneous action characteristics

特性 Characteristics	电流倍数（I/Ir3） Current multiplier (I/Ir3)	延时误差 Time delay error
不动作特性 Non-action characteristics	WO. 85	-
动作特性 Movement characteristics	>1. 15	±40ms

- 剩余电流保护特性

  Residual current protection characteristics

◆ 档位设置范围

  Range of gear settings

型号规格 Model specifications	参数 Parameters	设定值（mA） Setpoint (mA)	出厂整定值 Factory adjusted values
125/250	剩余动作电流 I △n Residual action current I △n	50mA, 100mA, 200mA, 300mA.400mA, 500mA, 600mA, 800mA	500mA
400*800		100mA, 200mA, 300mA, 400mA. 500mA, 600mA, 800mA, 1000mA	

- 动作特性

Movement characteristics

参数 Parameters	特性 Characteristics				
额定不动作电流 Rated inoperative current	$0.5 \mid \Delta n$				
额定动作电流 Rated action current	$\geq 0.8 \mid \Delta n$				
延时特性 Delay characteristics	$2\ 1\ \Delta n$ 极限不驱动时间（Δ） Ultimate non-drive time (Δ)	Break time			
		$\mid n$	$2 \mid \Delta n$	$5 \mid \Delta n$	$10 \mid \Delta n$
延时型 Time-lapse type	$\geq O.06s$	$\leq O.5s$	$\leq O.2s$	$\leq O.15s$	
	$\geq O.1s$	$\leq O.8s$	$\leq O.3s$	$\leq O.3s$	
	$\geq O.2s$	$\leq 1s$	$\leq O.4s$	$\leq O.4s$	

◆ 自动重合闸/闭锁

◆ **Automatic reclosing/blocking**

自动重合闸：当剩余电流超过动作电流值档位动作跳闸后，经过 20～60 秒的时间能自动重合闸，但手动合闸不受时间限制。

Automatic reclosing: When the residual current exceeds the action current value of the gear action trip, after 20 to 60 seconds of time can automatically reclose, but manual closing is not limited by time.

闭锁;闭锁时间为 5s.即当产品重合闸后 5s 内再次发生漏电故障，断路器在动作时间内再次跳闸且闭锁， 不可自动重合闸，必须人工操作合闸;当产品在重合闸后 5s 外发生漏电故障，断路器在动作时间内跳闸不闭锁，经过 20~60 秒的时间能再次自 动重合闸。

When a leakage fault occurs again within 5s after the product has been reclosed, the circuit breaker trips and locks again within the action time and cannot be automatically reclosed, it must be manually operated to close the gate; when a leakage fault occurs outside 5s after the product has been reclosed, the circuit breaker trips and does not lock within the action time and can be automatically reclosed again after 20 to 60 seconds.

● 过压保护功能

Overvoltage protection function

当线路相电压高于过压保护设定值时，断路器保护跳闸。当线路电压恢复到正常电压后，断路器可自动合闸投运。过压保护的设置值范围为 242V-286V.出厂设置为 253V. 用户可自行设定或关闭保护。

When the line phase voltage is higher than the overvoltage protection set value, the circuit breaker protection trips. When the line voltage is restored to normal voltage, the circuit breaker can be automatically closed and put into operation. The set value of overvoltage protection ranges from 242V to 286V. The factory setting is 253V. Users can set or close the protection themselves.

● 欠压保护功能

Undervoltage protection function

当线路相电压低于欠压保护设定值时，断路器保护跳闸。当线路电压恢复到正常电压后，断路器可自动合闸投运。欠压保护的设置值范围为 154V-187V，出厂设置为 187V，用户可自行设定或关闭保护。

When the line phase voltage is lower than the under-voltage protection set value, the circuit breaker protection trips. When the line voltage is restored to normal voltage, the circuit breaker can be automatically closed and put into operation. The setting

value of the under-voltage protection ranges from 154V to 187V, the factory setting is 187V, the user can set or close the protection.

● 缺相保护功能

Phase loss protection function

当线路电源端出现缺相时，断路器保护跳闸。当线路恢复到正常电压后，可自动合闸投运。用户可自行设定或关闭保护。

When there is a phase loss at the power end of the line, the circuit breaker protects against tripping. When the line is restored to normal voltage, it can be automatically closed and put into operation. The user can set or switch off the protection himself.

● 缺零保护功能

Zero loss protection function

当线路电源端出现零线断开时，断路器保护跳闸。开关因断零保护跳闸后开关进入闭锁状态，不能自动重合闸，必须由专业人员确定排除故障后按"返回"键使控制器复位，再按合闸键合闸或人工机械合闸。

When there is a zero line break at the power end of the line, the circuit breaker protection trips. After the switch has tripped due to zero protection, the switch enters a blocked state and cannot be automatically re-closed. It must be determined by professionals to remove the fault and then press the "return" key to reset the controller, and then press the closing key to close the switch or manually close the switch mechanically.

● 电源侧失压功能

Loss of voltage function on the power side

电源侧失压跳闸功能是指开关进线端出现各相相电压全部低于 70V 及以下时开关瞬时跳闸，此功能建议配合"上电自动合闸功能"使用，即两个功能同时打开或关闭。

The power supply side voltage loss tripping function refers to the instantaneous tripping of the switch when all phase voltages at the incoming end of the switch are lower than 70V or less, this function is recommended to be used in conjunction with the "power-on auto-closing function", i.e. both functions are turned on or off at the same time.

● **联动保护功能**

Linkage protection function

通过联动接口可与其他消防设备进行联动保护具体如下

The linkage interface allows for linkage protection with other fire-fighting equipment as follow.

DI 输入设置 DI input settings		功能说明 Function description	优先级 Priority	延迟时间(ms) Delay time (ms)
输入控制 Input control	5 与 4 短接 5 shorted to 4	断路器合闸 Breaker Closing	低 Low	≤40ms
	5 与 3 短接 5 with 3 short connections	断路器分闸 Breaker break	高 High	

注意：若长时间短接 5 与 3 端口会使一直处于分闸状态

Note: Shorting ports 5 and 3 for a long period of time will keep them in a bypassed state.

● 过流短路保护特性曲线

**Overcurrent short-circuit protection characteristic curve**
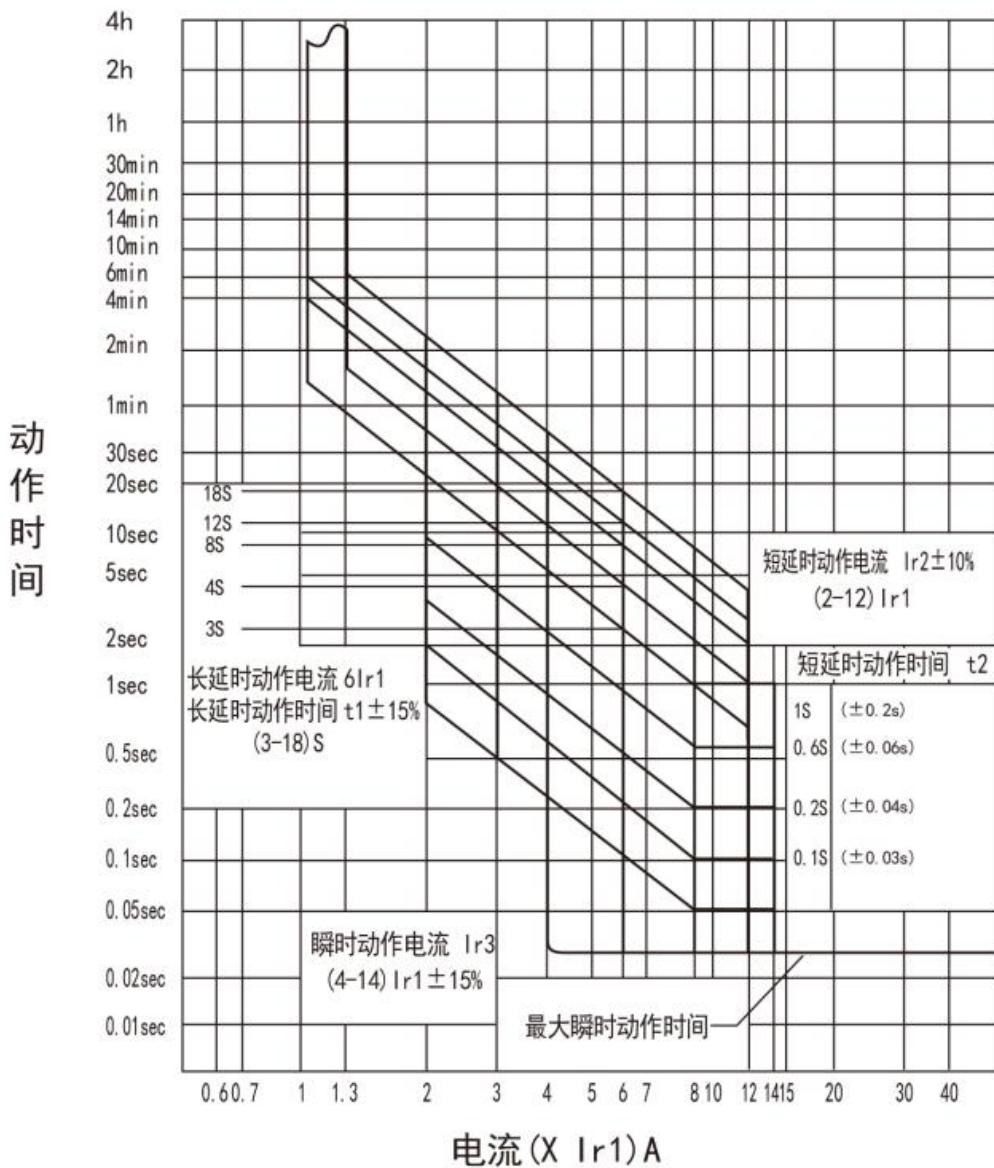
● 通讯功能

Communication functions

通信接口 Communication interface	接口类型 Interface type	通信协议 Communication protocols	通讯地址 Correspondence address	通讯速率 Communication rate

| RS485	外接端子 External terminals	DL/T-645	000000000000 (adjustable)	600-19200（可调） 600 - 19200 (adjustable)
HPLC	插拔式 Plug-in			自适应串口 Adaptive serial port
微功率无线通信 模块 Micropower wireless communication modules	插拔式 Plug-in			自适应串口 Adaptive serial port

● 外形及安装尺寸

Form and mounting dimensions
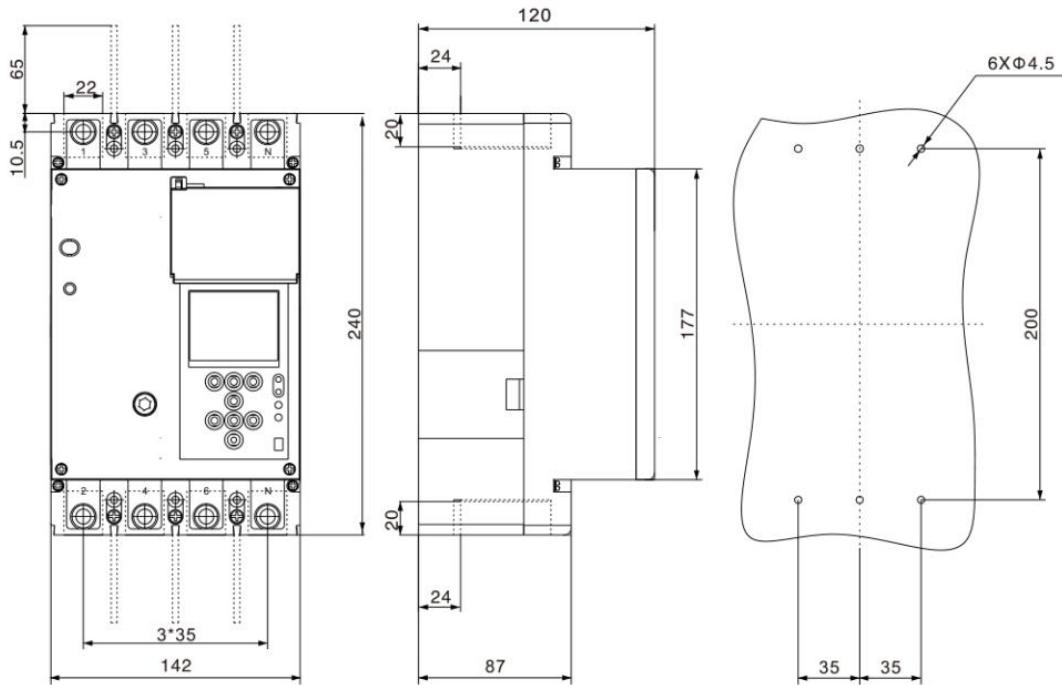
HX1LC-125/250/3P+N
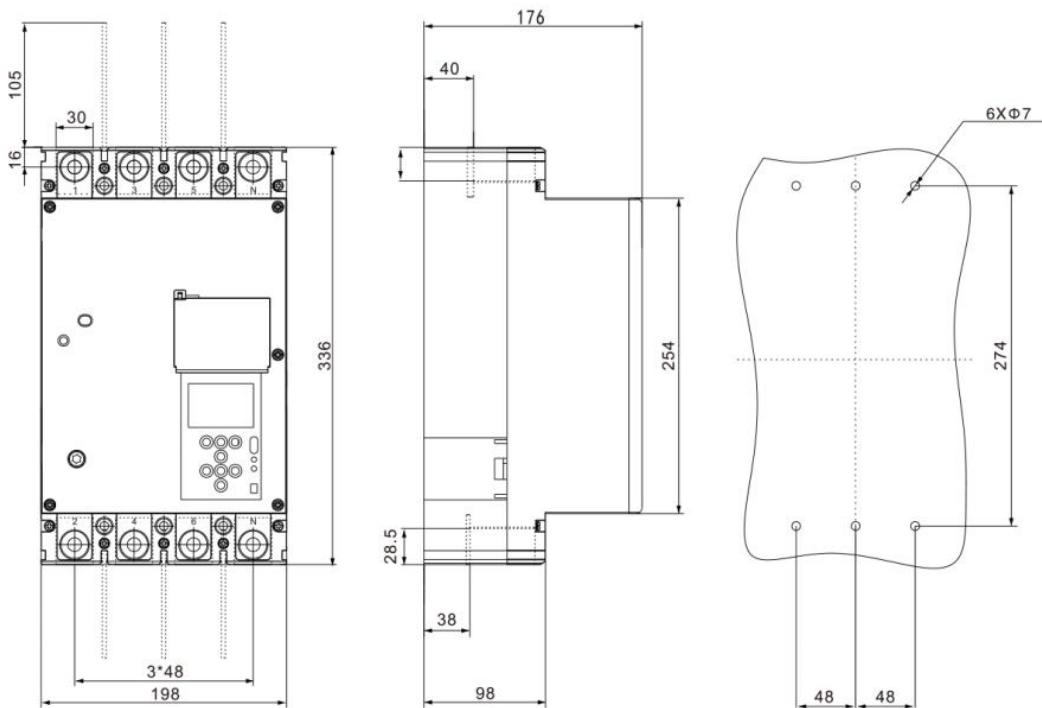
HX1LC-400/630J/3P+N
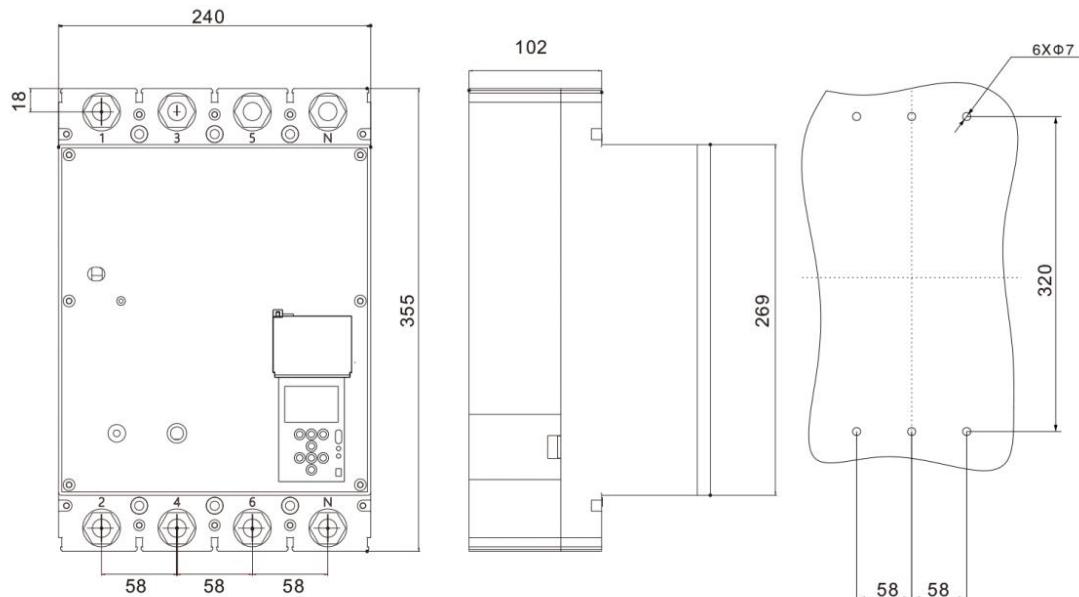
HX1LC-800J/3P+N

保险服务
Insurance service

该产品已经向中国人民保险公司购买了产品责任险。（产品责任险每年签约的保险公司可能不同。）：
This product has purchased product liability insurance from China People's Insurance Company. (Product liability insurance may be signed by different insurance companies every year. ）：

1、每次事故赔偿限额 1300 万，累计赔偿限额 1500 万
The compensation limit for each accident is 13 million, and the cumulative compensation limit is 15 million.

2、每次事故财产损失赔偿限额 500 万
The compensation limit for property losses per accident is 5 million.

3、每次事故人身伤亡赔偿限额 500 万
The compensation limit for personal injury and death in each accident is 5 million.

4、每次事故每人人身伤亡赔偿限额 150 万元
The compensation limit for personal injury and death per person per accident is 1.5 million yuan.

5、赔偿情况可能随着每年续签情况会有所变化，以最新为准。
The compensation situation may change with the annual renewal, whichever is the latest.

6、保险承保范围为中国大陆地区（香港，澳门，台湾除外）

The insurance coverage is in Chinese mainland (except Hongkong, Macau and Taiwan Province).

联系我们

contact us

Guangdong Province Hengxiang Security Technology Co., Ltd
Website: www.hxkj119.cn
Email: hxkj_119@163.com
Service Hotline: 400-7655-119

Tel:（+86） 0755-2972-8368
Address: Building 2, Nam Tai Inno Valley, Guangming Avenue, Guangming District, Shenzhen, Guangdong Province,China