LVMA

MOULDED CASE CIRCUIT BREAKER

PRODUCT MANUAL

浙 江 绿 马 电 气 有 限 公 司
ZHEJIANG LVMA ELECTRIC CO ,. LTD.

LVMA
ABOUT US

LVMA Electric Co., Ltd. is one of the leading high-tech companies specialized in the research, development, production and global marketing of high & low voltage electrical appliances.

These products include a complete line of automatic transfer switches, miniature circuit breakers, moulded case circuit breakers, disconnectors, air circuit breakers and motor protection circuit breaker. In addition, we obtained IEC60947, RoHS, CE, GB/T45001/IS045001,3C certificates.

Based on 7S methodology, LVMA company highlights the quality of each product. Every key procedure is strictly tested, and each main production line has automated testing equipment for withstand voltage detection, integrated detection, aging test, final inspection, life-time testing, with our own laboratories for components and finished products detection.

Ye Jinfei, the company's founder with over 40 years experience in technology research and development, participated in the formulation of China ATS GB standard and owned three manufacturing factories.

The company has an advanced R&D team of nearly 40 engineers, holding more than 40 valuable patents. Around 20 global marketing managers with professional service capabilities, maintaining long-term cooperation with top-ranking world clients.

Market coverage: Europe, Middle East, South America, Southeast Asia & Africa etc. Our products have been widely recognized by custom.

Application Area

The LMM3Z series plastic shell circuit breaker is a new product designed and developed by our company using advanced international technology and has obtained multiple patents. It has the characteristics of small and compact size, modularity, high breaking point, double breaking point, zero arcing, and green environmental protection. Suitable for distribution networks with AC 50Hz, 60Hz, rated working voltage of 690V and below, and rated current of 12.5A to 1600A, used to distribute electrical energy and protect lines and power equipment from overload, short circuit, and undervoltage faults. It can also be used for infrequent switching of circuits and infrequent starting of motors under normal conditions.

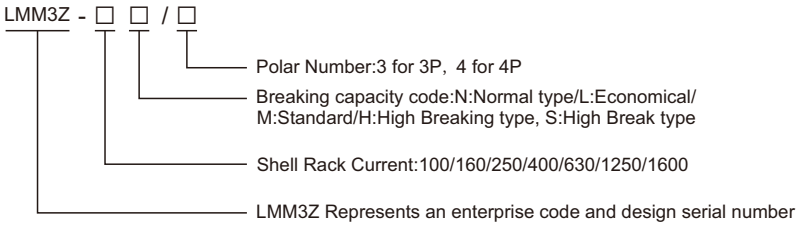
The LMM3Z series circuit breaker is also equipped with an intelligent controller, which not only increases the selection range of setting current, but also has LCD display, overload setting current, short-circuit delay current, short-circuit instantaneous current, and tripping time that can be set. Short circuit instantaneous three-stage protection and undervoltage protection are also available; Equipped with RS485 communication interface and MODBUS-RTU protocol; DL645 protocol, users can choose according to their needs. Remote signaling: disconnection/closing, tripping, alarm and fault status indication; Remote control: disconnect, close, reset; Telemetry: three-phase current and N-phase current, grounding current, trip memory function, and the ability to query trip record parameters further improve the reliability and continuity of power supply. This circuit breaker also has isolation function (can be used as a substitute for load switches).

This series of products complies with GB/T14048.2, GB/T22710, IEC60947-2 standards and has passed 3C, CE, and TSE certifications.

Normal Work And Installation Conditions

1.The altitude of the installation site does not exceed 2000m;
2.The LMM3Z thermomagmetic type with temperature of the surrounding medium is -5°C~+40°C,and the average temperature of 24 h is not more than +35°C.The relative humidity of the air at the installation site does not exceed 50% at a maximum temperature of +40C at lower temperatures, there may be a higher relative humidity; the average minimum temperature of the wettest month does not exceed +25°C for the average of the month The maximum relative humidity is not more than 90%,and the condensation on the surface of the product due to temperature changes is considered.
3.LMM3 intellgent type with temperature of the surrounding medium is -40°C ~+80°C
4.The product is used in non-explosive hazardous media, and the media does not have enough to corrode metals and destroy insulating gases and conductive dust.
5.In places where there is rain protection and no water vapor.
6.The installation category is Class lll.
7.The pollution level is level 3.
8.The basic installation of the circuit breaker is vertical (ie vertical)or horizontal (ie horizontal).
9.The incoming line is either the up line or the down line.
10.Circuit breakers can be divided into fixed and plug-in types.

Model Code



***Note:Other requirements at the time of ordering are subject to textual instructions**

Buckle unit:

The type of stripper is divided into:thermal magnetic stripper and Intelligent stripper

1.Thermal magnetic stripper is divided into two types according to protection type Distribution Protection Code:TM;Motor(single-magnetic) protection Code:MA.

2.Intelligent stripper According to the function is divided into four kinds: Ordinary type(micrologic 2),functional type(micrologic 3),liquid crystal current type(micrologic 5.0A),liquid crystal voltage type (micrologic 5.0E)

LMM3Z-250H/3P/4P-TM/MA

LMM3Z-250S/3P/4P-Micrologic 2

LMM3Z-250S/3P/4P-Micrologic 3

LMM3Z-250H/3P/4P-Micrologic 5.0A

See Table 1 for basic parameters of circuit breaker series.

Table 1

Type		LMM3Z-100					LMM3Z-160					LMM3Z-250				
Number of poles		3P/4P					3P/4P					3P/4P				
Shell frame maximum rated current Inm(A)		100					160					250				
Rated current In(A)	TM/MA	12.5/16/20/25/32/40/50/63/80/100					16/20/25/32/40/50/63/80/100/125/160					100/160/180/200/225/250				
	Electronic	100					160					250				
Rated insulation voltage Ui(V)		1000					1000					1000				
Rated impulse withstand voltage Uimp(kV)		8					8					8				
Rated voltage Ue(V)50H-60Hz		AC400/415/690					AC400/415/500/690					AC400/415/500/690				
Flying arc Distance(mm)		0														
Short circuit breaking capability level		N	L	M	H	S	N	L	M	H	S	N	L	M	H	S
Rated limit Short circuit Breaking capacitylcu(kA)	AC400/415V	35	50	85	100	150	35	50	85	100	150	35	50	85	100	150
	AC500V	/	35	50	60	65	/	35	50	60	65	/	35	50	60	65
	AC690V	/	6		8	10	/	6		8	10	/	6		8	10
Usage Category		A					A					A				
Rated running shortcircuit Breaking capacitylcs(kA)	AC400/415V	35	50	85	100	150	35	50	85	100	150	35	50	85	100	150
	AC500V	/	35	50	60	65	/	35	50	60	65	/	35	50	60	65
	AC690V	/	6		8	10	/	6		8	10	/	6		8	10
Rated short time resistant current ICW(kA)(1s)	Type of Stripper	3(micrologic 5.0A)					3(micrologic 5.0A)					3(micrologic 5.0A)				
Remaining Current protection		Additional Residual current protection module														
Electrical Life Test	AC415V	10000					8000					8000				
	AC690V	1500					1500					1500				
Number of mechanical life		20000					20000					20000				

LMM3Z-630H/3P/4P-TM/MA

LMM3Z-630H/3P/4P-micrologic 2

LMM3Z-630H/3P/4P-micrologic 3

LMM3Z-630H/3P/4P-micrologic 5. 0A

LMM3Z-1600H/3P/4P-micrologic 2
LMM3Z-1600H/3P/4P-micrologic 3

LMM3Z-1600H/3P/4P-micrologic 5.0A

See Table 2 for basic parameters of circuit breaker series.

Table 2

Type		LMM3Z-400				LMM3Z-630				LMM3Z-1250/1600	
Number of poles		3P/4P				3P/P4				3P/4P	
Shell frame maximum rated current Inm(A)		400				630				1250/1600	
Rated current In(A)	TM/MA	250/315/350/400				400/500/600				/	
	Electronic	400				630				630/800/1000/1250/1600	
Rated insulation voltage Ui(V)		1000				1000				1000	
Rated impulse withstand voltage Uimp(kV)		8				8				8	
Rated voltage Ue(V)50H-60Hz		AC400/415/500/690V				AC400/415/500/690V				AC400/415/500/690V	
Flying arc Distance(mm)		0									
Short circuit breaking capability level		L	M	H	S	L	M	H	S	M	H
Rated limit Short circuit Breaking capacitylcu(kA)	AC400/415V	50	85	100	150	50	85	100	150	50	65
	AC500V	35	50	60	65	35	50	60	65	35	45
	AC690V	10		15	20	10		15	20	20	30
Rated running shortcircuit Breaking capacitylcs(kA)	AC400/415V	50	85	100	150	50	85	100	150	50	65
	AC500V	35	50	60	65	35	50	60	65	35	45
	AC690V	10		15	20	10		15	20	20	30
Working with categories	TM/MA micrologic 2/3	A				A				/	
	micrologic 5.0A	B				B				B	
Rated short time resistant current ICW (kA)(1s)		5(micrologic5.0A)				5(micrologic5.0A)				20(micrologic5.0A)	
Remaining Current protection		Additional Residual current protection module									
Electrical Life Test	AC415V	6000				5000				1500	
	AC690V	1000				1000				1000	
Number of mechanical life		10000				10000				10000	

LMM3Z-250S/3P/4P
-micrologic 5.0E

LMM3Z-630H/3P/4P
-micrologic 5.0E

LMM3Z-1600H/3P/4P
-micrologic 5.0E

See Table 3 for basic parameters of circuit breaker series.

Table 3

Type	LMM3Z-100				LMM3Z-160				LMM3Z-250				LMM3Z-400				LMM3Z-630				LMM3Z-1250/1600	
Number of poles	3P/4P				3P/4P				3P/4P				3P/4P				3P/4P				3P/4P	
Shell frame maximum rated current Inm(A)	100				160				250				400				630				1600	
Rated current In(A)	100				160				250				400				630				630/800/1000/1250/1600	
Rated insulation voltage Ui(V)	1000				1000				1000				1000				1000				1000	
Rated impulse withstand voltage Uimp(kV)	8				8				8				8				8				8	
Rated voltage Ue400/415(V)50Hz	AC400/415				AC400/415				AC400/415				AC400/415				AC400/415				AC400/415	
Flying arc Distance(mm)	0																					
Short circuit breaking capability level	L	M	H	S	L	M	H	S	L	M	H	S	L	M	H	S	L	M	H	S	M	H
Rated limit Short circuit Breaking capacity Icu(kA)400/415V	50	85	100	150	50	85	100	150	50	85	100	150	50	85	100	150	50	85	100	150	50	65
Rated running short circuit Breaking capacity Ics(kA)	50	85	100	150	50	85	100	150	50	85	100	150	50	85	100	150	50	85	100	150	50	65
Working with categories	A				A				A				B				B				B	
Rated short time resistant current ICW(kA)(1s)	/				/				/				/				/				/	
Electrical Life Test	10000				8000				8000				6000				5000				1500	
Number of mechanical life	20000				20000				20000				10000				10000				10000	

Micrologic 5.0E measurement function

Table 4

Protection function	Current (A)	Overload protection	■
		Short circuit short delay protection	■
		Instantaneous action protection	■
		Netural line protection (4P)	□
		Grounding protection	■
		Current unbalance protection	□
		Overload preliminary warning	□
	Voltage(V)	Breaking zero	■
		Voltage unbalance protection	■
		Over frequency and under frequency protection	■
		Phase sequence protection	■
Measurement function	Current (A)	Phase current and Neutral line current	■
		Average phase current	■
		The maximum value of phase current and neutral line current	■
		Percentage of grounding faults	■
		Interphase Unbalanced Current value	■
	Voltage(V)	Line Voltage	■
		Line Voltage	■
		Average line voltage	■
		Average line voltage	■
		Unbalanced line voltage,unbalanced phase voltage	■
		Phase sequence	■
		Frequency(Hz)	
	Power	Active	□
		Active	□
		Seen in	□
		Costφ Power factors and measured	□
	Electricity	Active (kWh),reactive (kVARh),visual (kVAh)	□
Maintenance function	The figures recoed	Times of all kinds of prection of tripping	■
	MAX/MIN value record	Max/Min record of current and voltage from each phase	■
	Record	Trip alarm,and deflection record	■
	Contact avrasive wear	Contact abrasive wear record	■
	Times of operate	The times of operate record	■
	RTC function	Real time clock	■
	Auxiliary/alarm detection function	Auxiliary alarm detection,display the state of circuit breaker	■
	Electric operation control function	Remote electric operation control function	■
	Human and machine interaction	LED display	■
		LCD display	■
		Enter setting	■
	Communication function	Moedbus RTU DL/T645	■

Action characteristics of overload long delay and short circuit instantaneous protection

Table 5

Type	Overload long delay setting current (IR)	Overload long delay (6·IN) Fix buckle time	Short-circuit shorter delay tuning current (ISD)	Short-circuit shorter delay setting time (TSD)	Short- circuit transient tuning current (Ii)	Grounding Protection setting current (IG)	Grounding Protection Setting time (TG)	Type of Stripper
LMM3Z-100 LMM3Z-160 LMM3Z-250	(0.8~1)In	/	/	/	10In	/	/	Thermomagnetic (single adjustable)
	/	/	/	/	12In	/	/	Single magnet (MA)
	(0.4~1)In	/	(1.5~10)Ir	/	10In	/	/	micrologic 2
	(0.4~1)In	0.5~12s	(1.5~12)Ir	0.5~0.4s	(2~15)In	(20%~100%)In	optional	micrologic 3
	(0.4~1)In	1.5~24s	(1.5~12)Ir	0~0.4s	(2~15)In	(30%~100%)In	0~0.4s	micrologic 5.0A
	(0.4~1)In	1.5~24s	(1.5~12)Ir	0~0.4s	(2~15)In	(30%~100%)In	0~0.4s	micrologic 5.0E
LMM3Z-160 LMM3Z-250	(0.8~1)In	/	/	/	(5~10)In	/	/	Thermal magnetic type (Dualadjustable)
LMM3Z-400 LMM3Z-630	/	/	/	/	12n	/	/	Single magnet (MA)
	(0.7~1)In	/	/	/	(5~10)In	/	/	Thermomagnetic Dual Adjustable TM
	(0.4~1)In	/	(1.5~10)Ir	/	10In	/	/	micrologic 2
	(0.4~1)In	0.5~24s	(1.5~12)Ir	0.1~0.4s	(2~15)In	optional	optional	micrologic 3
	(0.4~1)In	1.5~24s	(1.5~12)Ir	0~0.4s	(2~15)In	(30%~100%)In	0~0.4s	micrologic 5.0A
	(0.4~1)In	1.5~24s	(1.5~12)Ir	0~0.4s	(2~15)In	(30%~100%)In	0~0.4s	micrologic 5.0E
LMM3Z-1250 LMM3Z-1600	(0.4~1)In	/	(1.5~10)Ir	/	10In	/	/	micrologic 2
	(0.4~1)In	0.5~12s	(1.5~12)Ir	0.5~0.4s	(2~15In)	(20%~100%)In	optional	micrologic 3
	(0.4~1)In	0.5~24s	(1.5~12)Ir	0~0.4s	(2~15)In	(30%~100%)In	0~0.4s	micrologic 5.0A
	(0.4~1)In	0.5~24s	(1.5~12)Ir	0~0.4s	(2~15)In	(30%~100%)In	0~0.4s	micrologic 5.0E

Circuit breaker characteristics

Mode of operation	Manual Direct operation	Yes	Yes	Yes
	Rotate handle operation	Yes	Yes	Yes
	Electric operating mechanism	Yes	Yes	Yes
Mounting method	Fixed type(front of plate)	Yes	Yes	Yes
	Fixed type (rear of plate)	Yes	Yes	Yes
	Plug-in (front of plate)	Yes	Yes	Yes
	Plug-in (rear of board)	Yes	Yes	Yes

The current setting range of the circuit breaker is shown in Tables 6 and 7.

Table 6

Serianumber	Distribution breaker				Circumstance temperature
	Test current(times)		Tripping time	Status	
1	1.05In		1h non-tripping(In≤63A) 2h non-tripping(In≤63A)	Initial	+40°C±2°C
2	1.3In		1h tripping(In≤63A) 2h tripping(In>63A)	Following serial 1	
3	10In±20%	8In	>0.2s No tripping	Initial	Any suitable temperature
4		12In	≤0.2s Tripping		

Table 7

Serianumber	Distribution breaker				Circumstance temperature
	Test current(times)		Tripping time	Status	
1	1.05In		2h Non-tripping	Initial	+40°C±2°C
2	1.2In		2h Tripping	Following serial 1	
3	1.5In		4min Tripping	The order 1 current reaches the thermal equilibrium and begins	
4	7.2In		2~10s Tripping	Initial	
5	12In±20%	9.6In	>0.2s No tripping	Initial	Any suitable temperature
6		14.1In	≤0.2s Tripping		

LMM3Z-250H/3P/4P
With residual current module

LMM3Z-630H/3P/4P
With residual current module

EI6 Remaining Current device module

EL6 Residual current Action Protection device module(Leakage protection module)

Provides leakage protection for all three-pole or quadrupole LMM3Z-100 to 630 circuit breakers.The circuit breaker with EL6 residual current protection module realizes the leakage protection function under the premise of maintaining the overall characteristics of the circuit breaker,and the EL6 module can directly act on the stripping unit.

Introduction of EL6 remaining current device module

Adherence to standards:

1.GB/T 14048.2,Appendix M.

2.GB/T 14598,with anti-instantaneous overvoltage, lightning, operating overvoltage, electrostatic discharge,RF interference ability.

Remote indication:

The EL6 module can be fitted with an auxiliary contact, which can remotely transmit the buckle caused by leakage fault.

Power:

The EL6 module can be powered by the power distribution system itself, eliminating the need for any external power supply.It can continue to operate even with AC two-phase power supply.

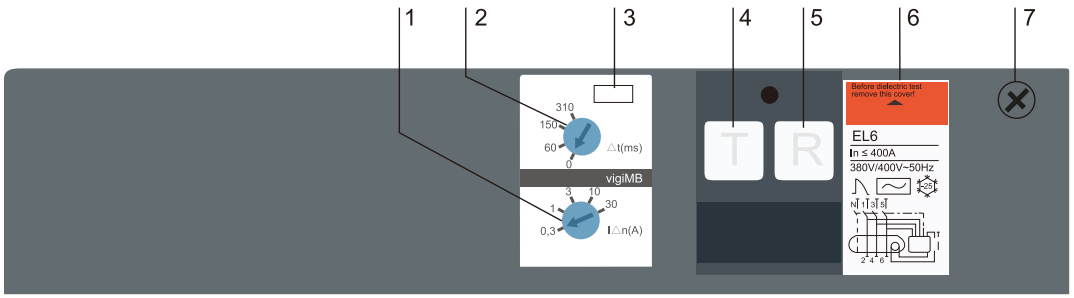
EL 6 - □ □ / □

- 1:100/2:160/3:250/4:400/5:630
- 3=3P/4=4P
- ME/MH/MB See the selection table for details
- Design serial Number
- Remaining Current Action Protector

Selection of EL6 modules

Model	EI6-ME	EL6-MH	EL6=MB
Pole	3P/4P	3P/4P	3P/4P
LMM3Z-100	Yes	Yes	No
LMM3Z-160	Yes	Yes	No
LMM3Z-250	No	Yes	No
LMM3Z-400	No	No	Yes
LMM3Z-630	No	No	Yes
Protective features			
Sensitivity I△n(A)	Fixed 0.3	Adjustable 0.03-0.3-1-3-10	Adjustable 0.03-0.3-1-3-10
Whether the delay is adjustable	Fixed	Adjustable	Adjustable
Delay settings	<40	0-60-150-310	0-60-150-310
Maximum break time(ms)	<40	<40<140<300<800	<40<140<300<800
Rated voltage AC50V/60Hz	200..440	200..440-440….500	200..440-440….500

If the sensitivity is set to 30mA,the stripper is instantaneous clasp.



1.Sensitivity setting
2.Delay setting (for selective leakage protection)
3.Calibration of the seal Sleeve
4.Test button-used to simulate leakage failure,to periodically check leakage protection function
5.Reset button (after leakage fault buckle must be reset)
6.Nameplate
7.Location of secondary contacts

Operational safety

EL6 Modular A user-friendly device that requires regular testing by the user (tested every 6 months)

Circuit breaker accessories

The internal accessories of the circuit breaker are installed in the inner cavity of the cover plate,and the shunt release,undervoltage release, auxiliary contact and alarm contact are all made into separate modules.Therefore,the installation is simple,convenient,safe and reliable,and the user can install the corresponding position of the circuit breaker by himself.The attached picture is as follows:

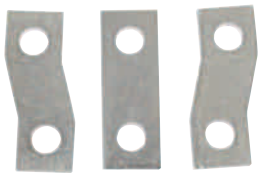
Accessory name	Rated operating voltage	Applicable shell frame
 MX Shunt release	AC220/230V AC380/400V DC220V DC110V	LMM3Z-100 LMM3Z-160 LMM3Z-250 LMM3Z-400 LMM3Z-630
	AC220/230V AC380/400V DC220V DC110V	LMM3Z-1250/1600
 MU Undervoltage release	AC220/230V AC380/400V	LMM3Z-100 LMM3Z-160 LMM3Z-250 LMM3Z-400 LMM3Z-630
	AC220/230V AC380/400V	LMM3Z-1250/1600
 AX Auxiliary contact	AC220/230V AC380/400V DC220V DC110V	All shells
 AL Alarm contact	AC220/230V AC380/400V DC220V DC110V	All shells

Accessory name	Rated operating voltage	Applicable shell frame
 EI6 Remaining Current protection module	Sensitivity I▵n(A)adjustable range 0.03,0.3,1,3,10. Note:The circuit breaker can be provided as needed by the user. Only the alarm does not trip.	LMM3Z-100 LMM3Z-160 LMM3Z-250
		LMM3Z-400 LMM3Z-630
 P Electric operating mechanism	AC220/230V AC380/400V DC220V DC110V	LMM3Z-100 LMM3Z-160 LMM3Z-250
 P Electric operating mechanism	AC220/230V AC380/400V DC220V DC110V	LMM3Z-400 LMM3Z-630

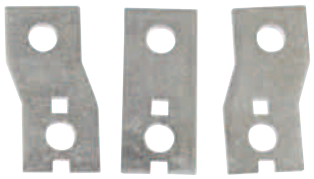
Accessory name	Applicable shell frame
 Economical extended rotating handle	LMM3Z-100 LMM3Z-160 LMM3Z-250 LMM3Z-400 LMM3Z-630
 Extended rotating handle	LMM3Z-100 LMM3Z-160 LMM3Z-250 LMM3Z-400 LMM3Z-630

Accessory name	Applicable shell frame
 Rotate the handle directly	LMM3Z-100 LMM3Z-160 LMM3Z-250 LMM3Z-400 LMM3Z-630
 Rotate the handle directly	LMM3Z-1600/1250

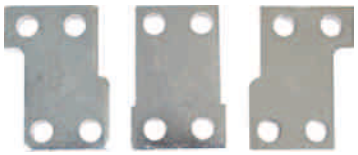
Circuit breaker accessories



1.LMM3Z-100/160/250
Outer connecting plate



1.LMM3Z-400/630
Outer connecting plate

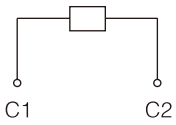


1.LMM3Z-1250/1600
Outer connecting plate

Note:Thermomagnetic and electronic dimensions,mounting dimensions and accessories are identical.

Shunt release

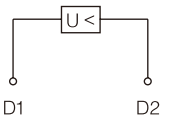
For remote control of the circuit breaker opening,the shunt release can reliably open the circuit breaker between 70%and 110%US.The shunt release should be prohibited from being energized for a long time (5s).



Coupling coil

Undervoltage release

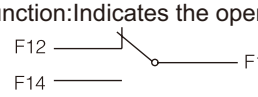
When the control voltage drops to 35%to 70%,the undervoltage release should trip and the circuit breaker should be reliably disconnected.When the control voltage is greater than or equal to 85%,the circuit breaker should be reliably closed.When the control voltage is less than 35%,it should be able to prevent the circuit breaker from closing.



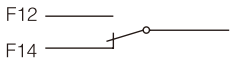
Coupling coil

Contact contact

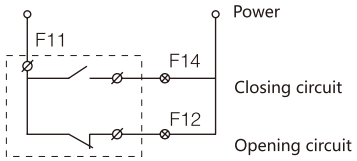
Function:Indicates the opening and closing state of the circuit breaker.



When the circuit breaker is in the opening position



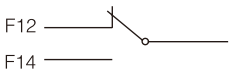
When the circuit breaker is in the closing position



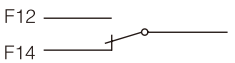
Coupling coil

Alarm contact

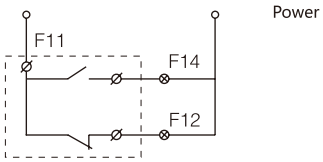
Function:Indicates the possible cause of tripping of the circuit breaker a:overload b:short circuit;c:ground fault d:undervoltage trip operation e:free trip When the circuit breaker is normally closed or opened,the alarm contact does not move, and only after the free trip or fault trip occurs.The position of the contact changes,that is,the normally open becomes normally closed,and the normally closed becomes normally open. When the circuit breaker is buckled again,the alarm contact returns to its original position.



When the circuit breaker is in the opening position



When the circuit breaker is in the closing position



Coupling coil

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ZHEJIANG LVMA ELECTRIC CO ,. LTD.

Mobile: +86-18157733126
E-mail: sale@lvma-ele.com
Http: www.lvma-ele.com

ADD: No. 6688, Xuyang Road, Chengdong Street,
Yueqing City, Wenzhou City, Zhejiang Province
(9th Floor, Building 5, Headquarters Economic Park)