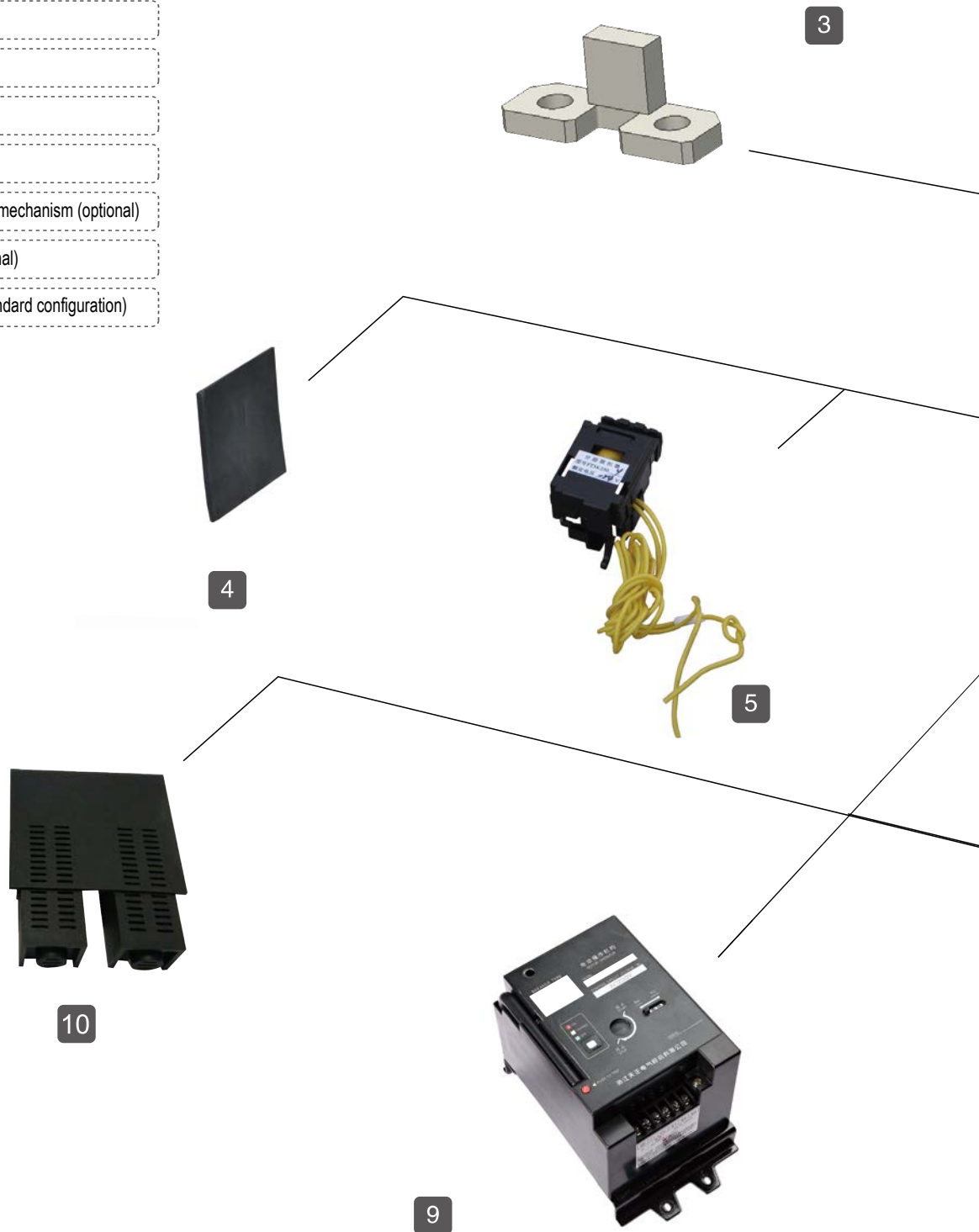


TGM3DC Series Moulded Case DC Circuit Breaker

- 1 Switch body
- 2 Front-panel wiring transition plate (optional)
- 3 Short wiring busbar
- 4 Arc isolating sheet
- 5 Shunt release (optional)
- 6 Alarm contact (optional)
- 7 Aux. contact (optional)
- 8 Rotary handle operating mechanism (optional)
- 9 Motor mechanism (optional)
- 10 Protective shield (4P standard configuration)





1



2



6



7



8


TGM3DC Series Moulded Case DC Circuit Breaker

1 Overview

TGM3DC series moulded case DC circuit breaker (hereinafter referred to as circuit breaker) is one of new circuit breaker researched and developed by our company using international advanced technology, and the product features with high operating voltage, high rated current, box type accessories, safety and reliability, and green environmental protection.

Circuit breakers are divided into M type (Medium breaking type) and H type (High breaking type) according to their rated ultimate short circuit breaking capacity (Icu), suitable for DC non-earthing system, single pole earthing, and center point earthing system. It is an ideal product for the protection of power DC system, communication DC system, and photovoltaic DC system, primarily suitable for DC systems with rated operating voltage of 1000V and below, rated operating current up to 1600A. It is widely used in many fields such as power generation, power transmission and transformation, new energy, communications, and construction. The product can work at 50°C (specified when ordering) normally without derating, and can be used to distribute electrical energy and prevent the lines and power equipment from damage due to overloads or short circuits.

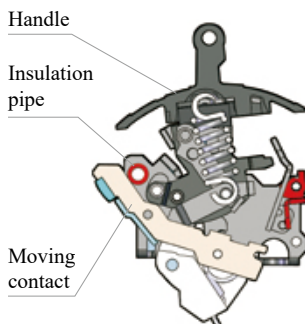
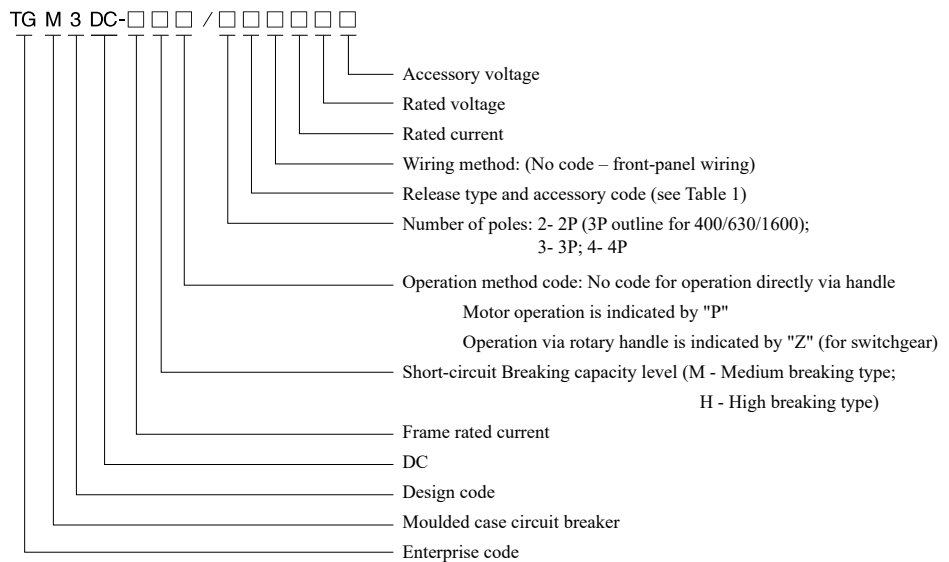
This series of circuit breakers has protection functions such as overload, short circuit and undervoltage protection (with accessories), and can prevent the lines and power supply equipment from damage by overcurrent or undervoltage.

This series of circuit breakers can be installed vertically (i.e. vertical installation) or horizontally (i.e. horizontal installation). The circuit breaker has an isolation function, and its corresponding symbol .

Circuit breakers comply with the following standards:

IEC 60947-1 and IEC 60947-2.

2 Type Designation



3 Technical Features

3.1 Safe operating mechanism

In order to ensure the absolute safety of the operator, a double-layer insulated handle system is carefully designed:

The first layer of insulation: the handle is injection molded by engineering plastics with high insulation performance, with super high insulation performance;

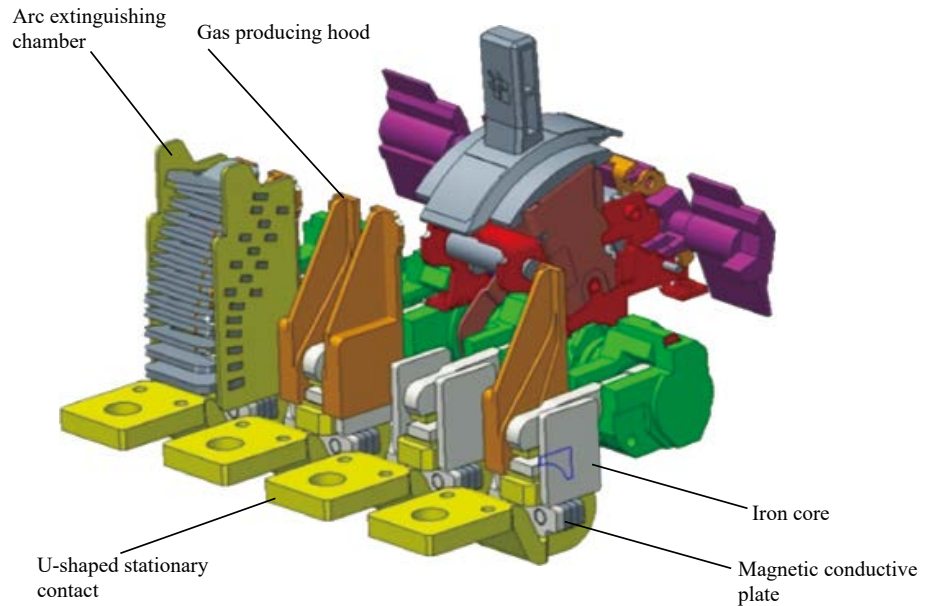
The second layer of insulation: the metal action mechanism connected to the handle is isolated from the energized conductor inside the circuit breaker through the insulation design.

Through the "double-layer insulated handle system", circuit breakers will be safer than previous versions, and their insulation will remain reliable even if the handle is damaged.

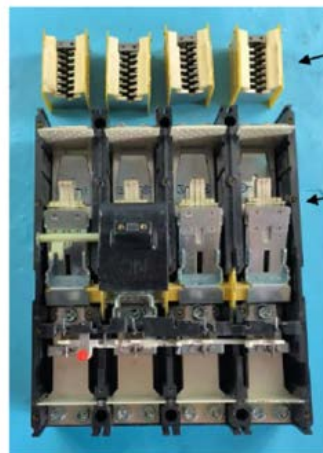
TGM3DC Series Moulded Case DC Circuit Breaker

3.2 Advanced arc extinguishing system

The use of the magnetic blowing principle of magnetic conductive plate and iron core, the arc will enter the arc extinguishing chamber more quickly, thereby greatly improving the arc extinguishing efficiency.



3.3 High product breaking capacity



Multi-layer grid staggered arc extinguishing chamber, for better arc cutting and arc extinguishing

Contacts are divided into arc contacts and main contacts; arc contacts can be better introduced into the arc extinguishing chamber

The contacts have double silver points of arc contacts and main contact

3.4 High rated current and excellent performance

In the industry, very few enterprise's DC moulded case products have the rated current up to 1600A, but our company's circuit breaker can carry 1600A. The circuit breaker can adopt a contact system with multiple contact knives and is made of sufficient high-quality copper material with excellent product performance.

TGM3DC Series Moulded Case DC Circuit Breaker

4 Technical Parameters

4.1 Technical parameters see Table 1

Table 1

Basic Information									
Frame rated current	125A		250A		400A		630A		
Number of poles	2P / 4P				2P (3-pole outline) / 4P				
Rated operating voltage Ue (V)	2P: DC250 / 500V 4P: 750 / 1000V								
Rated insulation voltage Ui (V)	1000								
Rated impulse withstand voltage (kV)	8				12				
Rated operating current In (A)	16A, 20A, 25A, 32A, 40A, 50A, 63A, 80A, 100A, 125A		100A, 125A, 140A, 160A, 180A, 200A, 225A, 250A		225A, 250A, 315A, 350A, 400A		400A, 500A, 600A, 630A		
Breaking capacity	M	H	M	H	M	H	M	H	
Rated ultimate short circuit breaking capacity Icu (kA)	DC=250V	35	50	35	50	50	65	50	65
	DC=500V	25	40	25	40	35	50	35	50
	DC=750V	20	40	20	40	25	40	25	40
	DC=1000V	20	40	20	40	20	40	25	40
Ics / Icu	100%								
Isolation function	Available								
Usage category	A								
Flashover distance (mm)	Upper and lower flashover distance ≤ 50				Upper and lower flashover distance ≤ 100				
Service life	Mechanical	20,000 times		10,000 times		5,000 times		5,000 times	
	Electrical	8,000 times		5,000 times		1,000 times		1,000 times	
Accessory information									
Operation directly via handle	■ (Standard)		■ (Standard)		■ (Standard)		■ (Standard)		
Fixed type front-panel	■ (Standard)		■ (Standard)		■ (Standard)		■ (Standard)		
Protective shield	■ (Standard)		■ (Standard)		■ (Standard)		■ (Standard)		
Motor mechanism	□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)		
Shunt release	□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)		
Extended rotary handle	□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)		
Aux. contact	□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)		
Alarm contact	□ (Optional)		□ (Optional)		□ (Optional)		□ (Optional)		

TGM3DC Series Moulded Case DC Circuit Breaker

Table 1, continued

Basic Information				
Frame rated current	800A		1440A	1600A
Number of poles	2P (3-pole outline)/4P		2P (4-pole outline)	2P (3-pole outline) / 3P / 4P
Rated operating voltage U _e (V)	2P: DC250 / 500V 4P: 750 / 1000V			DC500V / DC750V / DC1000V
Rated insulation voltage U _i (V)	1000		1000	1000
Rated impulse withstand voltage U _{imp} (kV)	12		12	12
Rated operating current I _n (A)	630A, 700A, 800A		1000A, 1250A, 1440A	800A, 1000A, 1250A, 1440A, 1500A, 1600A
Breaking capacity level	M	H	H	M
Rated ultimate short circuit breaking capacity I _{cu} (kA)	DC=250V	50	65	/
	DC=500V	35	50	30
	DC=750V	25	40	/
	DC=1000V	25	40	/
I _{cs} / I _{cu}	100%			
Isolation function	Available			
Usage category	A			
Flashover distance (mm)	Upper and lower flashover distance ≤100			
Service life	Mechanical	5,000 times		
	Electrical	1,000 times		
Accessory information				
Operation directly via handle	■ (Standard)		■ (Standard)	■ (Standard)
Fixed type front-panel	■ (Standard)		■ (Standard)	■ (Standard)
Protective shield	■ (Standard)		■ (Standard)	■ (Standard)
Motor mechanism	□ (Optional)		□ (Optional)	□ (Optional)
Shunt release	□ (Optional)		□ (Optional)	□ (Optional)
Extended rotary handle	□ (Optional)		□ (Optional)	/
Aux. contact	□ (Optional)		□ (Optional)	□ (Optional)
Alarm contact	□ (Optional)		□ (Optional)	□ (Optional)

4.2 Reverse time limit of circuit breaker sees Table 2

Table 2

Test current name	Multiple of setting current	Appointed time		Initial state
		I _n ≤ 63A	I _n > 63A	
Appoint non-trip current	1.05 I _n	≥ 1h	≥ 2h	Cold state
Appoint trip current	1.30 I _n	< 1h	< 2h	Hot state

Note: The hot state refers to the state of the appoint trip current when the specified appointed time expires.

TGM3DC Series Moulded Case DC Circuit Breaker

5 Normal Working Conditions and Installation Conditions

5.1 Temperature

5.1.1 Ambient air temperature does not exceed +50°C, the lower limit is -5°C, and the average temperature within 24 hours does not exceed +35°C.

5.1.2 Used in the special environment: The lower limit of temperature is not below -25°C, and the upper limit does not exceed +70°C.

5.1.3 If used in the environment where the temperature exceeds +50°C and is below -25°C, the derating based on temperature compensation coefficient is required, or contact our company.

5.2.2 If the altitude exceeds 2000m, the derating based on the altitude coefficient is required, or contact our company.

5.3.1 The relative humidity of atmosphere does not exceed 50% at the highest ambient temperature +50°C, and a higher relative humidity is allowed at lower temperatures.

5.3.2 The maximum mean relative humidity does not exceed 90% of the wettest month, and the minimum mean temperature of that month does not exceed +25°C.

5.3.3 The influence of condensation occurred on the product surface due to temperature changes on the product performance shall be considered.

5.4 Resistance to the effects such as moist air, salt mist, oil mist, and mildew.

5.5 Used in places where there is no explosive medium and where there is no sufficient gas or conductive dust to cause corrosion to the metal or damage to the insulation.

5.6 Used in places free from rain or snow erosion.

5.7 Pollution degree: 3

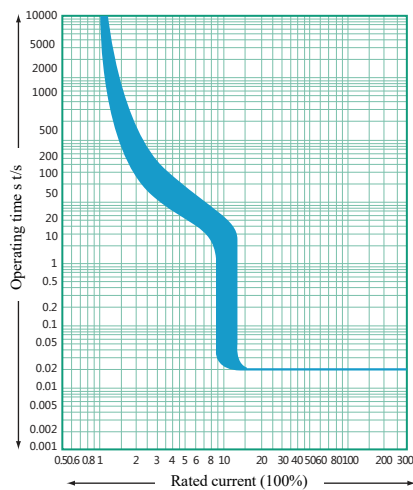
5.8 Installation category: III.

5.9 Installation conditions: The vertical inclination of the installed circuit breaker does not exceed 5°.

5.10 When the product is used in environments harsher than the above working conditions, please contact the manufacturer.

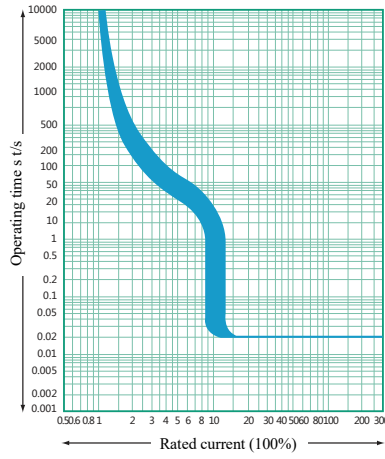
6 Circuit Breaker Protection Characteristics Curve

TGM3DC-125(M/H) Time / Current Characteristics Curve Diagram

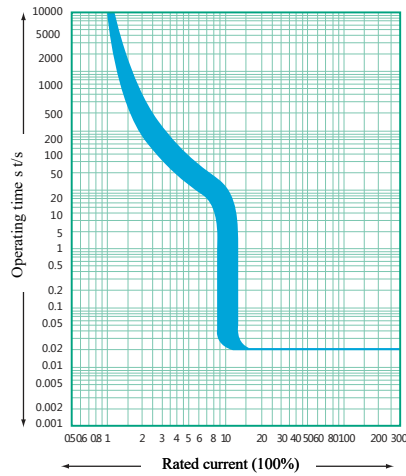


TGM3DC Series Moulded Case DC Circuit Breaker

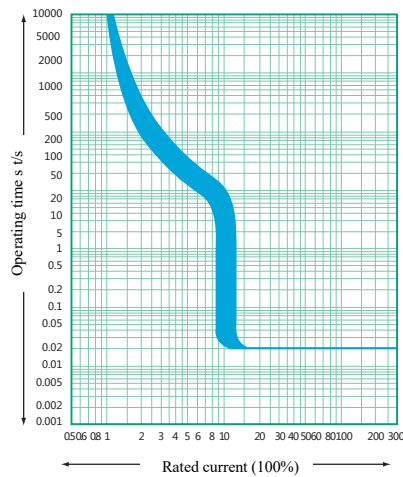
TGM3DC-250(M/H) Time / Current Characteristics Curve Diagram



TGM3DC-400(M/H) Time / Current Characteristics Curve Diagram



TGM3DC-630(M/H) Time / Current Characteristics Curve Diagram



TGM3DC Series Moulded Case DC Circuit Breaker

7 Circuit Breaker Wiring Method in the DC system Application and DC System

7.1 Application in the DC system

The following items are primarily considered when selecting circuit breaker in the DC system:

Rated operating voltage, considering the number of breaking poles connected in series

Rated current, considering the load power

Breaking capacity, considering the maximum short circuit current at installation site

Earthing system method

System type		Earth system		Non-earth system
		Load earthed	Center point earthed	
Various fault types				
Fault influence	Fault I	Produce maximum short circuit current The contact connected to the positive pole of power supply opens	U/2 voltage produces the current close to maximum short circuit current The contact connected to the positive pole of power supply opens	No influence
	Fault II	Produce maximum short circuit current Contacts connected in series all involve breaking operation	Produce maximum short circuit current Contacts connected in series all involve breaking operation	Produce maximum short circuit current Contacts connected in series all involve breaking operation
	Fault III	No influence	Same with fault I, only for contact connected to the negative pole of power supply	No influence
Most serious situation		Fault I	Fault I and fault III	Fault II
Breaking pole situation		For fault I, only 1 pole executes the breaking operation; for fault II, two poles jointly execute the breaking operation.	For each pole, execute the maximum short circuit current when U/2	Two poles jointly execute the breaking operation.

7.2 Wiring method of circuit breaker in the different DC system under different voltage

The following wiring methods of TGM3DC are available for selection by user, and the typical solutions are as follows: 2-pole 2P outline adopts E type wiring method, 2-pole 3P outline adopts F type wiring method, and 4-pole adopts G1, H1, and I type wiring method. Refer to the TGM3DC Outline Dimensions and Installation Dimensions, and other wiring methods have the same outline and installation dimensions.

Our company routinely recommends to use E, F, G1, H1, and I type wiring method. If other wiring method is required by client, please contact our company.

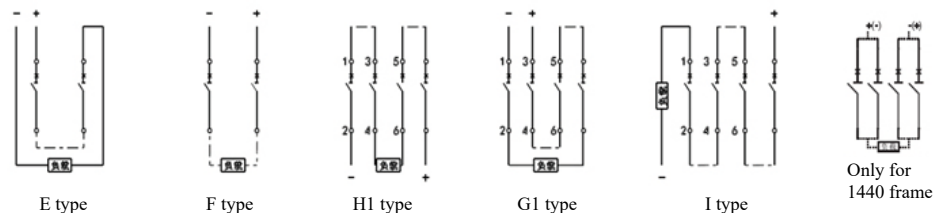


Table 3

Rated operating voltage	Power / Load wiring method		
	Earth insulation system	Negative pole earthing system	Center point earthing system
DC250V	F	E, F	F
DC500V	F	E	F
DC750V	G1, H1	G1, I	H1
DC1000V	G1, H1	I	H1

Notes:

1. For negative pole earthing system, the wiring listed in the above take is available;

2. For earth insulation and center point earthing system, the wiring method listed in the above table is recommended; the positive and negative poles can be exchanged according to the actual situations, and the locations of power supply and load can be exchanged.

TGM3DC Series Moulded Case DC Circuit Breaker

8 Correction Coefficient of Circuit Breaker in Special Environment

8.1 Derating coefficient due to ambient temperature changes see Table 4

Table 4

Product model	Ambient temperature Coefficient			
	+40°C	+50°C	+60°C	+70°C
TGM3DC-125	1In	1In	0.93In	0.85In
TGM3DC-250	1In	1In	0.93In	0.85In
TGM3DC-400	1In	1In	0.94In	0.85In
TGM3DC-630	1In	1In	0.9In	0.8In
TGM3DC-1440	1In	1In	0.9In	0.8In
TGM3DC-1600	1In	0.94In	0.83In	0.75In

8.1 Influence on circuit breaker features due to altitude changes see Table 5

If the altitude exceeds 2000m, the electrical performance of circuit breaker can be corrected according to the table below.

Table 5


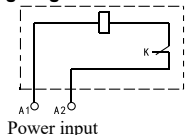
TGM3DC-125~1440 DC Moulded Case Circuit Breaker High Altitude Coefficient Correction Table				
Altitude	2000m	3000m	4000m	5000m
Power frequency withstand voltage U_{imp}	1	0.89	0.8	0.73
Max. operating voltage U_e	1	0.83	0.71	0.63
Rated operating current I_n	1	0.97	0.93	0.89
TGM3DC-1600 DC Moulded Case Circuit Breaker High Altitude Coefficient Correction Table				
Altitude	2000m	3000m	4000m	5000m
Power frequency withstand voltage U_{imp}	1	0.9	0.77	0.63
Max. operating voltage U_e	1	0.9	0.8	0.7
Rated operating current I_n	1	0.98	0.95	0.92

9 Accessories

Internal accessories

According to the user needs, the circuit breaker accessories can be led out directly through the lead wire (the length of wire is 50cm, and special requirements shall be specified when ordering), or the wiring terminal block (the wiring terminal block is specified when ordering if required) is provided.


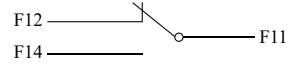
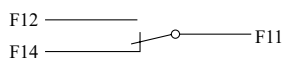
• Shunt release (left installation)

	Rated control circuit power voltage (Us)	AC: AC220/230V, AC380/400V DC: DC24V, DC110V, DC220V
	Operating voltage	(0.7~1.1) Us
	Wiring diagram: 	Note: K – The micro switch connected to the coil in series in the shunt release is a normally-closed contact; when the circuit breaker is closed, this contact will open automatically, and will be closed when closing.
DC24V shunt release can work reliably when the line operating current reaches 5A±0.5A.		


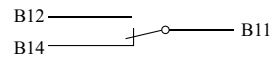
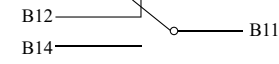
TGM3DC Series Moulded Case DC Circuit Breaker

• Aux. contact (left and right installation)

Table 6

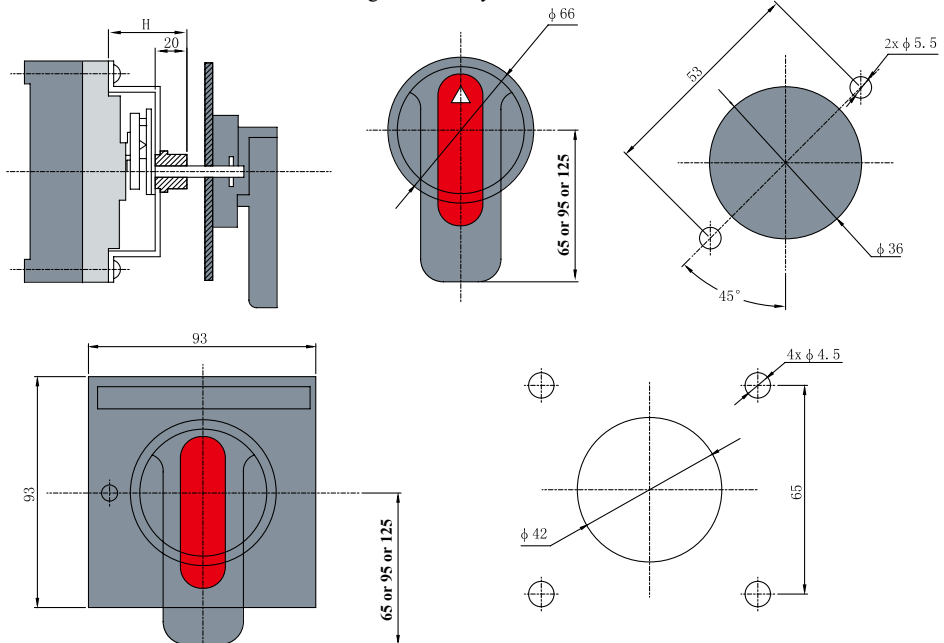
	Frame rated current	Inm ≤ 250A		Inm ≥ 400A	
	Resistive current Ith	3A		6A	
	Usage category	AC-15	DC-13	AC-15	DC-13
	Operating voltage	AC380V/400V	DC220V/230V	AC380V/400V	DC220V/230V
	Rated operating current Ie	0.3A	0.15A	1A	0.15A
Wiring diagram					
					
State when the circuit breaker is in the "OFF" position			State when the circuit breaker is in the "ON" position		

• Alarm contact (left and right installation)

	Resistive current Ith	3A
	Rated operating current Ie	Same with aux. contact
	Wiring diagram	
		
State when the circuit breaker is in the "free trip (alarm)" position		State when the circuit breaker is in the "OFF" and "ON" position

• Manual mechanism:

The outline and installation dimension diagram of rotary handle is shown below:



Outline and hole dimensions of rotary handle

Table 7

Model & Spec.	TGM3DC-125	TGM3DC-250	TGM3DC-400	TGM3DC-630	TGM3DC-800	TGM3DC-1440
Installation dimensions (H)	61	59	87	97	97	97

TGM3DC Series Moulded Case DC Circuit Breaker



External accessories of product

• Motor mechanism:

This accessory is installed on the panel of circuit breaker to realize the remote and electric operation of the closing, opening and re-tripping of circuit breaker, suitable for automation control application. The outline dimensions of motor mechanism see Table 8.

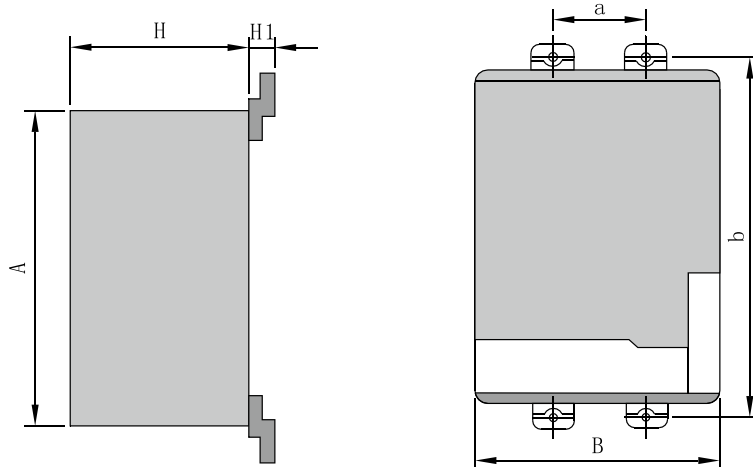
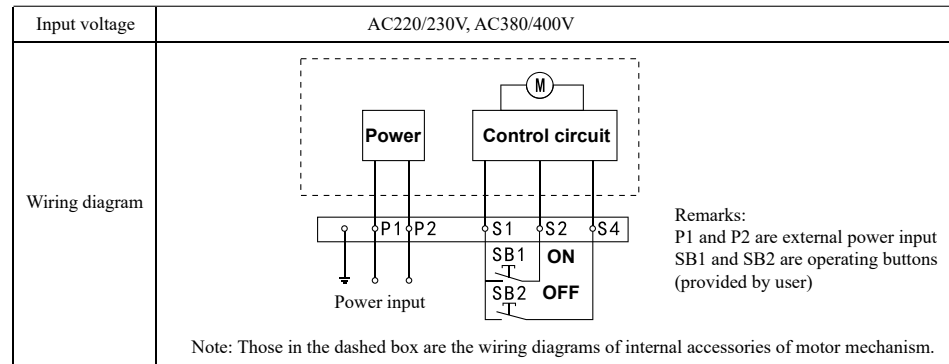


Table 8

Model	A	B	H	H1	a	b
TGM3DC-125	116	90	77	22	30	129
TGM3DC-250	116	90	77	17	35	126
TGM3DC-400	176	130	115	24	44	194
TGM3DC-630/800/1440	176	130	115	27	70	243
TGM3DC-1600	174	210	75	/	/	/

TGM3DC Series Moulded Case DC Circuit Breaker

Release and accessory codes

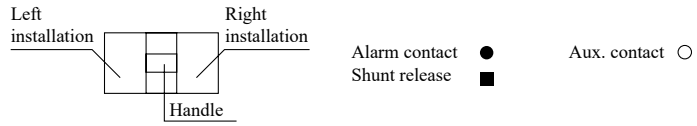
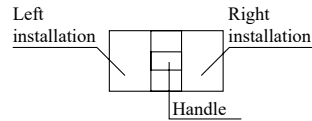


Table 9

Accessory name	Accessory code		Accessory installation and lead-wire mode					
	Electromagnetic release	Combined release	TGM3DC-125 (No right accessories for 2-pole product)		TGM3DC-250 (No right accessories for 2-pole product)		TGM3DC-400 TGM3DC-630/800	
No accessories	200	300						
Alarm contact	208	308						/
Shunt release	210	310						
Aux. contact	220	320						
Shunt release Aux. release	240	340						/
Two sets of aux. contact	260	360						
Shunt release Alarm contact	218	318					/	/
Aux. contact Alarm contact	228	328						/
Shunt release Aux. contact Alarm contact	248	348					/	/
Two sets of aux. contacts Alarm contact	268	368						/

TGM3DC Series Moulded Case DC Circuit Breaker



Alarm contact ● Aux. contact ○
Shunt release ■ Undervoltage release ▲

Table 9, continued

Accessory name	Accessory code	TGM3DC-1600	Picture
No accessory	00		
Alarm contact	08		
Shunt release	10		
Aux. contact	20		
Undervoltage release	30		
Shunt release Aux. release	40		Undervoltage release
Undervoltage release Shunt release	50		
Two sets of aux. contacts	60		
Undervoltage release Aux. contact	70		Alarm contact
Shunt release Alarm contact	18		
Aux. contact Alarm contact	28		
Undervoltage release Alarm contact	38		
Shunt release Aux. contact Alarm contact	48		
Two sets of aux. contacts Alarm contact	68		Aux. contact
Undervoltage release Aux. contact Alarm contact	78		

Note: TGM3DC-1600 alarm contact is only installed on the left side.

TGM3DC Series Moulded Case DC Circuit Breaker

10 Outline and Installation Dimensions of Circuit Breaker

The outline and installation dimensions of circuit breaker see Fig. 1, Fig. 2, Fig. 3, Table 10, and Table 11

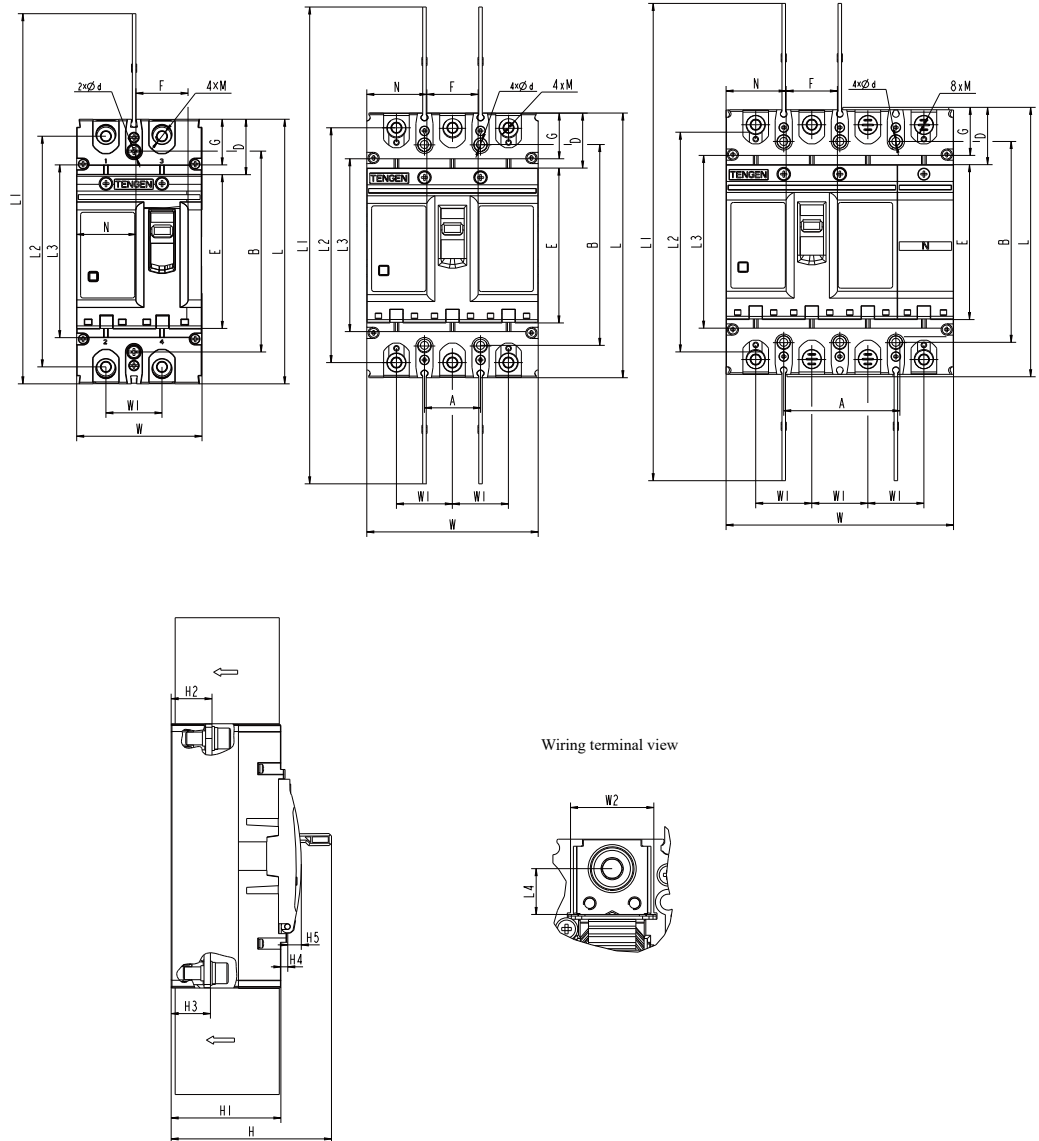


Fig. 1 TGM3DC-125~800 outline and installation dimensions

TGM3DC Series Moulded Case DC Circuit Breaker

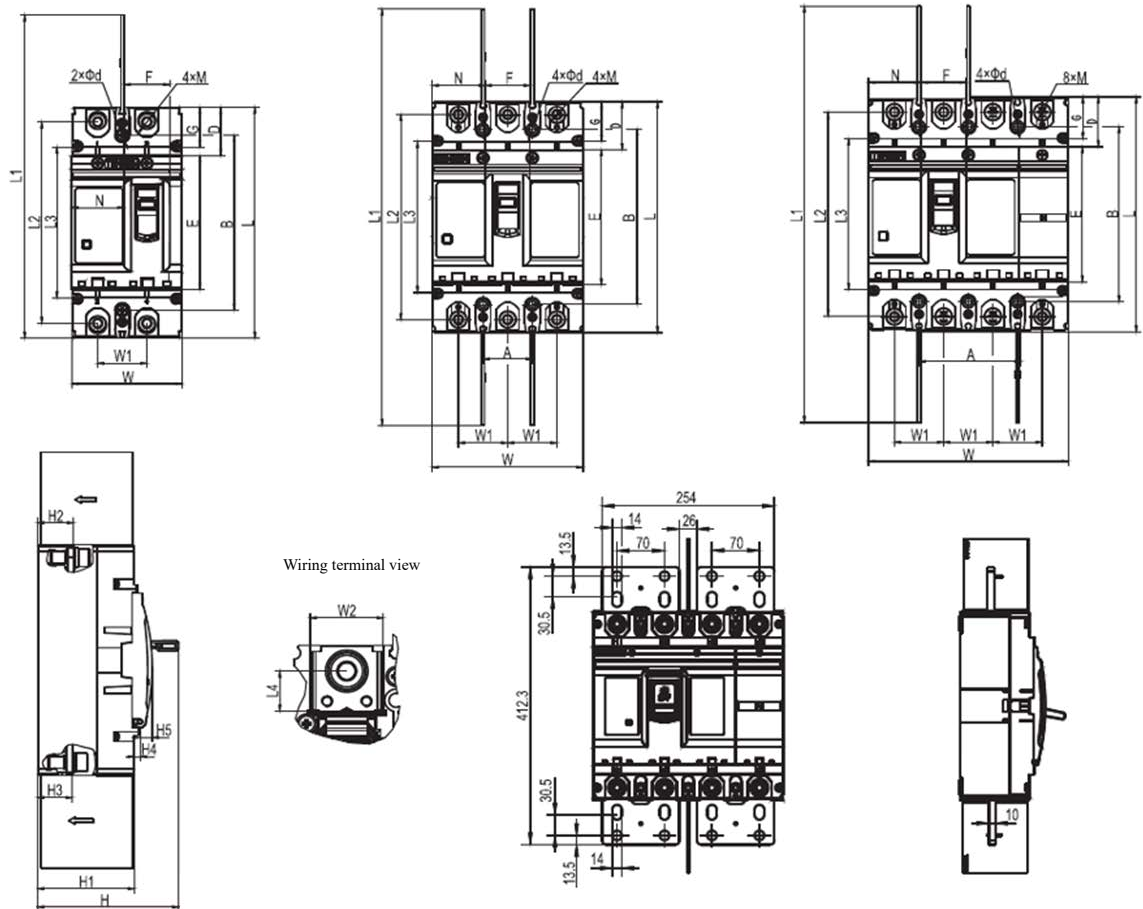


Fig. 2 TGM3DC-1440 outline and installation dimensions

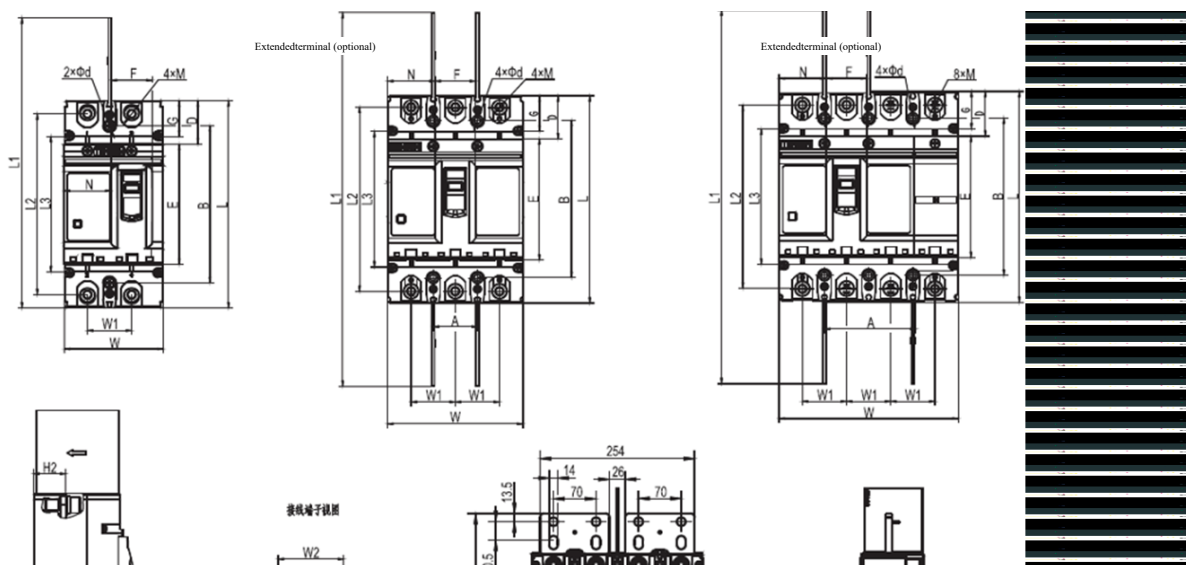


Fig. 3 TGM3DC-1600 outline and installation dimensions

TGM3DC Series Moulded Case DC Circuit Breaker

Outline dimensions of circuit breaker and size of hole on panel

Table 10

Product spec.	Number of poles	Outline dimensions (mm)					Size of hole on panel (mm)							
		W	L	L1	H	H1	N	F	G	D	E	L3	H4	H5
TGM3DC-125	2P	63	153	209	116	82	/	28	/	28	96	/	/	18
	4P	123	154	253			32							
TGM3DC-250	2P	78	165	232	116	85	37	33	29	35	96	108	3.5	10
	4P	142	169	300										
TGM3DC-400	2P	150	257	465	150	100	46	58	41	51	155	175	5	14
	4P	198	261	465										
TGM3DC-630/800	2P	212	281	496	155	103	74	66	39		175	204	8	16
	4P	282	284	496										
TGM3DC-1440	2P	282	281	496	155	103	74	66	39		175	204	8	16
TGM3DC-1600	2P	210	340	555	159	135	66	78	18.5	74	210	255	6	10
	3P	210												
	4P	280												

H is the height size of product; H is 195mm for 1600 frame product excluding handle sleeve, and is 239 mm including handle sleeve.

Wiring dimensions and installation dimensions of circuit breaker

Table 11

Product spec.	Number of poles	Outline dimensions (mm)							Size of hole on panel (mm)		
		H2	H3	W1	W2	L2	L4	M	A	B	Φd
TGM3DC-125	2P	28	/	30	18	132	8	M8	/	129	5
	4P		28						60		
TGM3DC-250	2P	22	/	35	23,5	146	12	M8	/	126	5
	4P		23,5						70		
TGM3DC-400	2P	40,1	38	49	33	224	13	M10	44	194	8
	4P								94		
TGM3DC-630/800	2P	41	42	70	45	243	15	M12	70	243	7
	4P								140		
TGM3DC-1440	2P	41	42	70	45	243	15	M12	140	243	7
TGM3DC-1600	2P	41,5	57	70	51,6	310	15,4	M10	70	303	7
	3P								140		
	4P								140		

11 Ordering Notice

Please specify the following items when ordering:

- Model, name, and number of poles of circuit breaker.
- Rated current and rated voltage of circuit breaker.
- Accessory name, specification, wiring method code of circuit breaker; if shunt release is used, please specify the operating voltage (or control power voltage) value.
- Qty.

For example: To order TGM3DC-125M, 4-pole circuit breaker, combined release, rated current 100A, rated voltage 750V, shunt release accessory voltage DC220V, wiring method H1, 20 units.

Please specify: TGM3DC-125M/4310 100A 750V DC220, H1, 20 units.

For special requirements of circuit breaker, please contact the manufacturer.

12 Example of Quick Selection

TGM3DC-125M/2310 80A DC500V AC220V:

Order one TGM3DC series 125 frame moulded case DC circuit breaker for protection, with a higher breaking M type, rated current 80A, rated operating voltage DC500V, 2-pole combined release, with shunt release, control power voltage AC220V.

TGM3DC-250HP/4300 200A DC1000V AC380V:

Order one TGM3DC series 250 frame moulded case DC circuit breaker for protection, with rated current 200A, rated operating voltage DC1000V, 4-pole combined release and motor mechanism, control power voltage AC380V.

Note: To customize the special product, please contact our company for consultation.

TGM3DC Series Moulded Case DC Circuit Breaker

13 Product Selection Table

TGM3DC	125	M	Z	/	4	3	10	125A	DC250V	AC230V	B	Plateau	Other	HI
Product model	Frame current	Breaking capacity	Operation method	Number of poles	Trip mode	Internal accessory	Rated current	Rated operating voltage	Rated operating voltage	Accessory operating voltage	Installation method	Application	Special requirements	Wiring type code
TGM3DC moulded case DC circuit breaker	125: 125A 250: 250A	M: Higher breaking capacity	Default: Direct operation	2-pole	2: Short circuit protection	00: No accessory 10: Shunt release 20: 1st aux contact 30: Under-voltage release	16A 1600A	DC250V DC500V DC750V DC1000V	DC250V DC500V DC750V DC1000V	AC380/400V AC230/230V DC220V DC110V DC24V	Default: Fixed type front-panel	Default: General application	Default: Flashover	E, F, HI, GI, and type wiring method (refer to the wiring diagram)
	400: 400A 630: 630A	H: High breaking capacity	Z: Operation via rotary handle	4-pole	3: Overload + Short circuit	40: Shunt + Aux. 50: Shunt + Under-voltage 60: Two sets of aux. contacts		Multiple accessory voltages shall be described separately			B: Fixed type back-panel	Plateau: Most heat environmental protection Salt mist Low heat	Phase partition	
	800: 800A 1440: 1440A		P: Electric operation			70: Under-voltage + Aux. 80: Alarm contact 10: Shunt + Alarm 20: Aux + Alarm							Handle lock	
	1600: 1600A					30: Under-voltage + Alarm 40: Shunt + Alarm + Aux. 60: Two sets of aux. + Alarm 70: Under-voltage + Aux. + Alarm								