TGM3E Series Moulded Case Circuit Breaker

1. Body
2. Flame arresting chamber (optional to customers)
3. Plug-in type (optional to customers)
4. Flash barrier (standard)
5. Zero flashover cover (optional to customers)
6. Undervoltage release (optional to customers)
7. Shunt release (optional to customers)
8. Alarm contact (optional to customers)
9. Auxiliary contact (optional to customers)
10. Front panel connection transition plate (optional to customers)
11. Electric motor operating mechanism (optional to customers)
12. Rotating handle operating mechanism (optional to customers)
13. Communication shunt alarm accessory (optional to customers)
14. Four-remote communication accessory (optional to customers)

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TGM3E Series Moulded Case Circuit Breaker

1 Overview

TGM3E Series Moulded Case Circuit Breaker (hereinafter referred to as circuit breaker) is one of the new circuit breakers researched and developed by us with international advanced technology. It has the characteristics of four sections of selective protection, zero flashover, high breaking, box-type accessories, small and compact structure, green and environmental protection.

By rated limit short-circuit breaking capacity (Icu), the circuit breaker is divided into M type (relatively high breaking) and H (high breaking). It is an ideal product for power distribution and motor protection. It has the rated isolation voltage of 1,000V. It can be used for occasional circuit switch and startup of motor in circuits under AC 50/60Hz, with the rated working voltage ≤690V and setting current of 12.5A-1,250A.

The circuit breaker can be equipped with communication modules, so as to upgrade the original circuit breaker to a communication circuit breaker easily, achieving “four remote” functions, namely remote control, remote adjustment, remote measurement and remote signaling.

The circuit breaker has the functions of overload long-time delay, short circuit short-time delay, short circuit instantaneous action and ground protection. Undervoltage, shunt, auxiliary, alarm and communication accessories are optional to the product.

This series circuit breaker may be installed vertically (i.e., vertical installation) or horizontally (i.e., horizontal installation).

It is has isolating function, with the corresponding symbol of:

Note: 3P+N type without isolating function has a unique “overload alarm without tripping” function, to ensure the continuity of power supply.

The circuit breaker shall meet the standard: IEC 60947-1 and IEC 60947-2.

2 Type Designation

TG M 3 E – □□□/□□□□□□□□□□□□□□

- Special requirements
- Code of zero flashover:
  No code: standard; W- zero flashover;
- Code of application scenarios: No code: standard;
- Installation mode:
  No code: Fixed, front panel connection;
  B: fixed, rear-panel connection; C: plug-in type;
- Voltage of accessories
- Rated current
- Controller function code:
  Default: Pre-alarm type controller E1: three-knob controller E2: Current unbalance type controller E3: Grounding type controller E4: Neutral pole protection controller
- Code of overload alarm without tripping:
  No code: standard; III: Overload alarm without tripping;
- Code of prepayment:
  No code: standard; F-prepaid;
- Code of N pole of 3N and 4P products (Table 1)
- Usage code: No code : For distribution,;
  2: Motor protection;
- Release type and accessory code (Table 2)
- Code of Number of poles:
  3: 3P; 3N : three-pole and four-line; 4 : 4P;
- Code of operation mode:
  No code : Direct operation with handle;
  P: Electric motor operation;
  Z: Rotating handle;
- Breaking capacity:
  M type: Medium breaking
  H type: High breaking L type: Standard breaking
- Frame current
- Electronic
- Design code
- Moulded case circuit breaker
- Enterprise code

Table 1

Code	Statement	Example
Type A	N pole is not equipped with over-current tripping element, has been connected with all along, and does not act with other three poles	3N300A
Type B	N pole is not equipped with over-current tripping element, and acts with other three poles (N-pole turn on prior to turn off)	4300B
Type C	N pole is equipped with over-current tripping element, and acts with other three poles (N-pole turn on prior to turn off)	4300C
Type D	N pole is equipped with over-current tripping element, has been connected with all along, and does not act with other three poles	3N300D

View of codes of 4-pole product

Without overcurrent release

Type A: N pole is not equipped with over-current tripping element, has been connected with all along, and does not act with other three poles.

Without overcurrent release

Type B: N pole is not equipped with over-current tripping element, and acts with other three poles (N-pole turn on prior to turn off).

With overcurrent release

Type C: N pole is equipped with over-current tripping element, and acts with other three poles (N-pole turn on prior to turn off).

With overcurrent release

Type D: N pole is equipped with over-current tripping element, has been connected with all along, and does not act with other three poles.

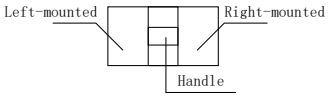
3 Operating Conditions

3.1 Ambient air temperature is -5ºC to +40ºC;
3.2 The relative air humidity at the installation site shall not exceed 50% at a maximum temperature of +40ºC. A higher relative humidity is allowed at the lower temperature. For example, the relative humidity can reach 90% at 20ºC. Special measures should be taken to deal with occasional condensation due to temperature changes;
3.3 Pollution degree is 3;
3.4 The circuit breaker is required to withstand mechanical vibration with the frequency of 2Hz-13.2Hz, displacement of ±1mm and mechanical vibration with the frequency of 13.2Hz-100Hz and accelerated velocity of ±0.7g;
3.5 The installation category is III for main circuits of the circuit breaker and II for other auxiliary circuits and control circuits;
3.6 The circuit breaker shall be applicable to electromagnetic environment B;
3.7 Hot and humid band type (TH type) circuit breaker can withstand the effect of damp air, salt mist, oil mist and mold;
3.8 The circuit breakers should be installed in a place without explosive hazard, conductive dust and corrosion against metal and damage to insulation;
3.9 The circuit breaker shall be installed in the place without invasion of rain and snow;
3.10 Operation conditions:
3.10.1 The ambient air temperature shall be from -30ºC to +70ºC (derate when the temperature exceeds; see the technical materials in the sample for details);
3.10.2 The characteristic shall not be affected when the altitude is 2,000 meters (derate when above 2,000 m; see the technical materials in the sample for details);
3.10.3 The ambient air temperature for storage shall be -40ºC- +75ºC.
3.11 The protection grade of the product body is IP20
3.12 Cabinet door installation
With toggle handle: Protection grade is IP40.
With rotation handle: Protection grade is IP50.
With motor-operated mechanism: Protection grade is IP40.

TGM3E Series Moulded Case Circuit Breaker

4 Tripper Mode and Accessary Code

Release mode and accessary code



Alarm contact ●　Auxiliary contact ○
Shunt release ■　Undervoltage release ▲

Table 2

	Accessory Code	Accessary installation and lead mode					
Accessory Name		TGM3E-125/160		TGM3E-250/320		TGM3E-400 TGM3E-630 TGM3E-800 TGM3E-1250 customized	
No accessories	300						
Alarm contact	308						
Shunt release	310						
Auxiliary contact	320						
Undervoltage release	330						
Shunt tripper Auxiliary contact	340						
Shunt release Undervoltage release	350						
Two groups of auxiliary contacts	360						
Auxiliary contact Undervoltage release	370						
Shunt release Alarm contact	318						
Auxiliary contact Alarm contact	328						
Undervoltage release Alarm contact	338						
Shunt release Auxiliary contact Alarm contact	348						
Two groups of auxiliary contacts Alarm contact	368						
Undervoltage release Auxiliary contact Alarm contact	378						

Note:4-pole products with 400 and aboveframes do not have right alarm contacts or auxiliary alarm contacts.

TGM3E Series Moulded Case Circuit Breaker

5 Technical Parameters

5.1 Product parameters (Table 3 and Table 4).

Table 3

Basic Information											
Frame current		125			160			250		320	
Number of poles		3P、3P+N、4P			3P、3P+N、4P			3P、3P+N、4P		3P、3P+N、4P	
Frequency (Hz)		50/60			50/60			50/60		50/60	
Rated working voltage Ue(V)		380/400/415 660/690			380/400/415 660/690			380/400/415 660/690		380/400/415 660/690	
Rated insulation voltage Ui(V)		1000			1000			1000		1000	
Rated impulse withstand voltage Uimp (kV)		8			8			8		8	
Rated working current In(A)		32AF:12.5 ～ 32 63AF:25 ～ 63 125AF:50 ～ 125			63AF:25 ～ 63 125AF:50 ～ 125 160AF:63 ～ 160			250AF:100 ～ 250		320AF:125 ～ 320	
Breaking capacity level		L	M	H	L	M	H	M	H	M	H
Breaking capacity of rated limiting short circuit Icu(kA)	AC415V	36	50	85	36	50	85	50	85	50	85
	AC690V	8	10	20	8	10	20	10	20	10	20
Breaking capacity of rated operating short circuit Ics(kA)	AC415V	36	50	50	36	50	50	50	50	50	50
	AC690V	5	10	10	5	10	10	10	10	10	10
Rated short-time withstand current Icw(kA/1s)	AC415V	2	2	2	2.5	2.5	2.5	3	3	4	4
Isolating function		3P, 4P			3P, 4P			3P, 4P		3P, 4P	
Usage category		Category A			Category A			Category A		Category A	
Flashover distance (mm)		0[1)]/≤50			0[1)]/≤50			0[1)]/≤50		0[1)]/≤50	
Mechanical life (times)	Without maintenancein	20,000			20,000			20,000		20,000	
	With With maintenance	40,000			40,000			40,000		40,000	
Electrical life (times)		10,000			10,000			10,000		10,000	

Protection function information				
Overload long-time delay protection	■ (Standard)	■ (Standard)	■ (Standard)	■ (Standard)
Short circuit short-time delay protection	■ (Standard)	■ (Standard)	■ (Standard)	■ (Standard)
Instantaneous short circuit protection	■ (Standard)	■ (Standard)	■ (Standard)	■ (Standard)
Ground protection	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Neutral pole protection	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Current unbalance protection	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)

Other functional information				
Communication function	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Overload alarm without tripping	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Operation LED indicator	■ (Standard)	■ (Standard)	■ (Standard)	■ (Standard)
Pre-alarm LED indicator	■ (Standard)	■ (Standard)	■ (Standard)	■ (Standard)
Alarm LED indicator	■ (Standard)	■ (Standard)	■ (Standard)	■ (Standard)

Accessories information				
Direct operation with handle	■ (Standard)	■ (Standard)	■ (Standard)	■ (Standard)
Extended rotating handle	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Electric motor operating mechanism	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Shunt release	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Undervoltage release	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Auxiliary contact	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Alarm contact	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Fixed, front panel connection	■ (Standard)	■ (Standard)	■ (Standard)	■ (Standard)
Fixed, rear-panel connection	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Plug-in, front-panel connection (not optional to 4P products)	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Plug-in rear-panel connection	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Front-panel connection transition plate	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Flash barrier	■ (Standard)	■ (Standard)	■ (Standard)	■ (Standard)
Handle lock	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Zero flashover accessories	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)
Convertor	□ (Optional)	□ (Optional)	□ (Optional)	□ (Optional)

Note 1): Select zero flashover accessories to achieve zero flashover
125L and 160L products for 3P only

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Table 4

Basic Information								
Frame current		400		630		800		
Number of poles		3P、3P+N、4P		3P、3P+N、4P		3P、3P+N、4P		
Frequency (Hz)		50/60		50/60		50/60		
Rated working voltage Ue(V)		380/400/415 660/690		380/400/415 660/690		380/400/415 660/690		
Rated insulation voltage Ui(V)		1000		1000		1000		
Rated impulse withstand voltage Uimp (kV)		12		12		12		
Rated working current In(A)		400AF:160~400		630AF:250~630		630AF:250~630 800AF:315~800		
Breaking capacity level		M	H	M	H	M	H	
Breaking capacity of rated limiting short circuit Icu(kA)	AC415V	70	100	70	100	70	100	
	AC690V	20	30	20	30	20	30	
Breaking capacity of rated operating short circuit Ics(kA)	AC415V	70	70	70	70	70	70	
	AC690V	20	20	20	20	20	20	
Rated short-time withstand current Icw(kA/1s)	AC415V	10	10	10	10	10	10	
Isolating function		3P, 4P		3P, 4P		3P, 4P		
Usage category		Category B		Category B		Category B		
Flashover distance (mm)		0[1)]/≤100		0[1)]/≤100		0[1)]/≤100		
Mechanical life (times)	Without maintenancein	10,000		10,000		8,000		
	With With maintenance	20,000		20,000		10,000		
Electrical life (times)		8,000		8,000		7,500		
Protection function information								
Overload long-time delay protection		■ (Standard)		■ (Standard)		■ (Standard)		
Short circuit short-time delay protection		■ (Standard)		■ (Standard)		■ (Standard)		
Instantaneous short circuit protection		■ (Standard)		■ (Standard)		■ (Standard)		
Ground protection		□ (Optional)		□ (Optional)		□ (Optional)		
Neutral pole protection		□ (Optional)		□ (Optional)		□ (Optional)		
Current unbalance protection		□ (Optional)		□ (Optional)		□ (Optional)		
Other functional information								
Communication function		□ (Optional)		□ (Optional)		□ (Optional)		
Overload alarm without tripping		□ (Optional)		□ (Optional)		□ (Optional)		
Operation LED indicator		■ (Standard)		■ (Standard)		■ (Standard)		
Pre-alarm LED indicator		■ (Standard)		■ (Standard)		■ (Standard)		
Alarm LED indicator		■ (Standard)		■ (Standard)		■ (Standard)		
Accessories information								
Direct operation with handle		■ (Standard)		■ (Standard)		■ (Standard)		
Extended rotating handle		□ (Optional)		□ (Optional)		□ (Optional)		
Electric motor operating mechanism		□ (Optional)		□ (Optional)		□ (Optional)		
Shunt release		□ (Optional)		□ (Optional)		□ (Optional)		
Undervoltage release		□ (Optional)		□ (Optional)		□ (Optional)		
Auxiliary contact		□ (Optional)		□ (Optional)		□ (Optional)		
Alarm contact		□ (Optional)		□ (Optional)		□ (Optional)		
Fixed, front panel connection		■ (Standard)		■ (Standard)		■ (Standard)		
Fixed, rear panel connection		□ (Optional)		□ (Optional)		□ (Optional)		
Plug-in, front panel connection (not optional to 4P products)		□ (Optional)		□ (Optional)		□ (Optional)		
Plug-in rear panel connection		□ (Optional)		□ (Optional)		□ (Optional)		
Front panel connection transition plate		□ (Optional)		□ (Optional)		□ (Optional)		
Flash barrier		■ (Standard)		■ (Standard)		■ (Standard)		
Handle lock		□ (Optional)		□ (Optional)		□ (Optional)		
Zero flashover accessories		□ (Optional)		□ (Optional)		□ (Optional)		
Convertor		□ (Optional)		□ (Optional)		/		
Note 1): Select zero flashover accessories to achieve zero flashover								

TGM3E Series Moulded Case Circuit Breaker

Table 4 continued

Basic Information					
Frame current		1250		1600	
Number of poles		3P, 4P		3P, 4P	
Frequency (Hz)		50/60		50/60	
Rated working voltage Ue(V)		380/400/415/500/550/660/690			
Rated insulation voltage Ui(V)		1000		1000	
Rated impulse withstand voltage Uimp (kV)		12		12	
Rated working current In(A)		1250AF:500~1250		1000AF:400~1000 1600AF:630~1600	
Breaking capacity level		M	H	M	H
Breaking capacity of rated limiting short circuit Icu(kA)	AC415V	70	100	70	100
	AC550V	40	50	40	50
	AC690V	20	30	20	30
Breaking capacity of rated operating short circuit Ics(kA)	AC415V	70	70	70	70
	AC550V	30	40	30	40
	AC690V	20	20	20	20
Rated short-time withstand current Icw(kA/1s)	AC415V	20	20	20	20
Isolating function		3P		3P, 4P	
Usage category		Category B		Category B	
Flashover distance (mm)		0[1)]/ ≤ 100		0[1)]/ ≤ 100	
Mechanical life (times)	Without maintenancein	8,000		8,000	
	With With maintenance	10,000		10,000	
Electrical life (times)		1,000		1,000	

Protection function information		
Overload long-time delay protection	■ (Standard)	■ (Standard)
Short circuit short-time delay protection	■ (Standard)	■ (Standard)
Instantaneous short circuit protection	■ (Standard)	■ (Standard)
Ground protection	□ (Optional)	□ (Optional)
Neutral pole protection	□ (Optional)	□ (Optional)
Current unbalance protection	□ (Optional)	□ (Optional)
Other functional information		
Communication function	□ (Optional)	□ (Optional)
Overload alarm without tripping	□ (Optional)	□ (Optional)
Operation LED indicator	■ (Standard)	■ (Standard)
Pre-alarm LED indicator	■ (Standard)	■ (Standard)
Alarm LED indicator	■ (Standard)	■ (Standard)
Accessories information		
Direct operation with handle	■ (Standard)	■ (Standard)
Extended rotating handle	/	/
Electric motor operating mechanism	□ (Optional)	□ (Optional)
Shunt release	□ (Optional)	□ (Optional)
Undervoltage release	□ (Optional)	□ (Optional)
Auxiliary contact	□ (Optional)	□ (Optional)
Alarm contact	□ (Optional)	□ (Optional)
Fixed, front panel connection	■ (Standard)	■ (Standard)
Fixed, rear panel connection	/	/
Plug-in, front panel connection (not optional to 4P products)	/	/
Plug-in rear panel connection	/	/
Front panel connection transition plate	□ (Optional)	□ (Optional)
Flash barrier	■ (Standard)	■ (Standard)
Handle lock	/	/
Zero flashover accessories	/	/
Convertor	/	/

Note 1): Select zero flashover accessories to achieve zero flashover

TGM3E Series Moulded Case Circuit Breaker

5.2 The application type: Power distribution type

The protection code of power distribution type TGM3E circuit breaker is no by default, with such functions as overload long-time delay + short circuit short-time delay + instantaneous short circuit protection. For example, the selection type is TGM3E - 125M/3300.

Table 5

Electronic tripper	Frame current Inm(A)	Rated current In(A)	Setting current of adjustable overload release IR(A)	Tripping characteristic/ time
Overload long-time delay	125	32	12.5-14-16-18-20-22-25-28-30-32	Act according to I^2t 1.05I_R: do not act within 2h 1.3I_R: do not act within 1h Inm<400A 2I_R:t_R = (12-60-80-100) Inm ≥ 400A 2 I_R:t_R = (12-60-100-150)s Characteristic curve T= (2*I_R/I) 2*t_R (1.2I_R≤I < Isd)
		63	25-28-32-36-40-45-50-56-60-63	
		125	50-56-63-70-75-80-90-100-110-125	
	160	63	25-28-32-36-40-45-50-56-60-63	
		125	50-56-63-70-75-80-90-100-110-125	
		160	63-70-80-90-100-110-125-140-150-160	
	250	250	100-110-125-140-150-160-180-200-225-250	
	320	320	125-140-160-180-200-225-250-280-300-320	
	400	400	160-180-200-225-250-280-315-350-375-400	
	630	630	250-280-315-350-375-400-450-500-560-630	
	800	630	250-280-315-350-375-400-450-500-560-630	
		800	315-350-400-450-500-560-630-700-760-800	
	1250	1000	IR=IR1+IR2 IR1=(0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1)*In IR2=(0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, 0.09)*In	2I_R:t_R = (8-12-16-24-32-48-64-96-128-256)
		1250		
	1600	1000		
		1600		
Action tolerance				±20%

5.3 The application type: Motor protection type

Table 6

Electronic tripper	Frame current Inm(A)	Rated current In(A)	Setting current of adjustable overload release IR(A)	Tripping characteristic/time
Overload long-time delay	125	32	12.5-14-16-18-20-22-25-28-30-32	Act according to I2t (see Table 7)
		63	25-28-32-36-40-45-50-56-60-63	
		125	50-56-63-70-75-80-90-100-110-125	
	160	63	25-28-32-36-40-45-50-56-60-63	
		125	50-56-63-70-75-80-90-100-110-125	
		160	63-70-80-90-100-110-125-140-150-160	
	250	250	100-110-125-140-150-160-180-200-225-250	
	320	320	125-140-160-180-200-225-250-280-300-320	
	400	400	160-180-200-225-250-280-315-350-375-400	Act according to I2t (see Table 8)
	630	630	250-280-315-350-375-400-450-500-560-630	
	800	630	250-280-315-350-375-400-450-500-560-630	
		800	315-350-400-450-500-560-630-700-760-800	
Action tolerance				±20%

Table 7

1.05I_R	Do not act within 2h			
1.2I_R	Do not act within 1h			
1.5I_R	21.3s	107s	142s	178s
2I_R	12s	60s	80s	100s
7.2I_R	0.93s	4.63s	6.17s	7.72s
Tripping level	/	10A	10	20

Table 8

1.05I_R	Do not act within 2h			
1.2I_R	Do not act within 1h			
1.5I_R	21.3s	107s	178s	267s
2I_R	12s	60s	100s	150s
7.2I_R	0.93s	4.63s	7.72s	11.6s
Tripping level	/	10	20	30

5.4 Short circuit short-time delay protection

Table 9

Electronic tripper	Frame current Inm(A)	Rated current In (A)	Setting current of short circuit short-time delay time for current adjustable type release Isd (A)	Tripping characteristic/time	
Short circuit short-time delay	Whole series	32-800	I_{sd}=(2-2.5-3-4-5-6-7-8-10-12)×I_R+OFF	When Isd ≤I ＜ 1.5Isd, inverse time-delay action tolerance ±20% characteristic curve T=(1.5×Isd/I)2×tsd When 1.5Isd ≤I ＜ Ii, definite time-delay action tsd=0.06s±0.02s; tsd=0.1s±0.03s; tsd=0.2s±0.04s; tsd=0.3s±0.06s;	
		1250-1600	I_{sd}=(2-3-4-5-6-7-8-10-12)×I_R+OFF	It²ON range	It²OFF range
				When Isd ≤I ＜ 1.5Isd, inverse time-delay action Tolerance of ±20%, characteristic curve T=(1.5×Isd/ I)2×tsd When 1.5Isd ≤I ＜ Ii, definite time-delay action tsd=0.05s±0.02s tsd=0.1s±0.03s tsd=0.15s±0.03s tsd=0.2s±0.04s tsd=0.3s±0.06s	When it is dialed to OFF interval, the inverse time-delay function is turned off, and only the definite time-delay action is enabled. When Isd ≤I ＜ Ii, definite time-delay action tsd=0.05s±0.02s tsd=0.1s±0.03s tsd=0.15s±0.03s tsd=0.2s±0.04s tsd=0.3s±0.06s

5.5 Instantaneous short circuit protection

Table 10

Electronic tripper	Frame current Inm(A)	Rated current In (A)	Setting current of short circuit short-time delay time for current adjustable type release Ii(A)	Tripping characteristic/time
Instantaneous short-circuit	Whole series	32-800	Ii=(4-6-7-8-10-11-12-13-14)×IR+OFF	When I ≤ 0.85Ii, do not act;
		1250-1600	I_i=(4-6-7-8-9-10-11-12-14)×I_R+OFF	When I ≥ 1.15Ii, the action time is < 0.08s
Action tolerance				±15%

5.6 Current unbalance protection

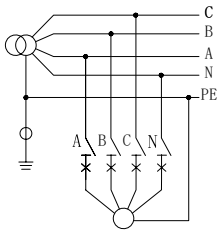
Table 11

Electronic tripper	Frame current Inm(A)	Rated current In (A)	Setting current of unbalanced current protection for adjustable type Iunbal (A)	Tripping characteristic/time
Current unbalance Protection	Whole series	32-800	I_{unbal}=(10-15-20-25-30-35-40-45-50)%×I_R+OFF	When I ≤ 0.9Iunbal, do not act; When I ≥ 1.1Iunbal, tunbal=(1-225)s, act;
Action tolerance				±15%

5.7 Ground protection, single-phase and three-phase current balance type

Table 12

Electronic tripper	Frame current Inm(A)	Rated current In (A)	Setting current of adjustable type for ground protection Ig (A)	Tripping characteristic/time
Ground protection	Whole series	32-800	I_g=(0.7-0.75-0.8-0.85-0.9-0.95-1)×I_R+OFF	When I≤ 1Ig, do not act; When I ≥ 1.1Ig, tg=(0.1-0.2-0.3-0.4)s, act
Action tolerance				±15%



1. Only applicable to TN-S system
2. The ground protection function is used to balance the load. In case of unbalanced load, this function shall be closed or set the setting value above the allowable unbalanced current value

5.8 Neutral pole protection

Table 13

Electronic tripper	Frame current Inm(A)	Rated current In (A)	Setting current of adjustable tripper for ground protection Ig (A)	Tripping characteristic/time
Neutral pole protection	Whole series	32-1600	I_{RN}=(0.5-1)×I_R+OFF	Inm<400A 2IRN:tRN ＝ (12-60-80-100) Inm ≥ 400A 2IRN:tRN ＝ (12-60-100-150)s Characteristic curve T=(2*IRN/I)2*tRN (1.2IRN ≤ I<Isd)
Action tolerance				±15%

5.9 Overload pre-alarm

Table 14

Electronic tripper	Frame current Inm(A)	Rated current In (A)	Setting current of adjustable type for overload pre-alarm protection tripper Ip (A)	Tripping characteristic/time
Overload pre-alarm	Whole series	32-800	I_P=(0.7-0.75-0.8-0.85-0.9-0.95-1)×I_R+OFF	/

6 Electronic Tripper

6.1 Indicator status explanation

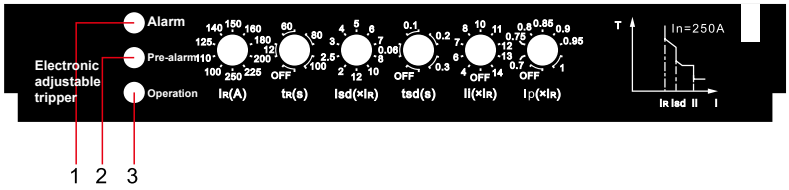


Table 15

	Instruction of indicator light	Instruction of indicator operating status
1	Alarm LED indicator (red)	When I ＞ 1.05IR, the overload alarm indicator light is on; when I≤1.0IR, the overload alarm indicator light is off;
2	Pre-alarm LED indicator (yellow)	When I ＞ 1.1Ip, the pre-alarm indicator light is on; when I≤0.9Ip, the pre-alarm indicator light is off.
3	Running LED indicator (green)	When I ＞ 0.4In, the operation indicator light flickers (once per second)

6.2 Three-knob intelligent controller (E1 type)

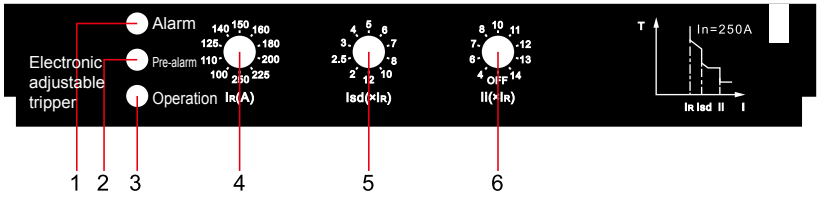


Table 16

Information of three-knob intelligent controller		
1	Alarm LED indicator	Default parameters 1Default setting value of overload long-time delay time tR=60s 2Default setting value of short circuit short-time delay time tsd=0.3s Default setting value of overload pre-alarm current Ip=0.9×IR
2	Pre-alarm LED indicator	
3	Operation LED indicator	
4	Setting current of overload long-time delay current IR(A)	
5	Setting current of short circuit short-time delay time Isd(A)	
6	Current setting of short-circuit short delay time Ii(A)	

6.3 Pre-alarm intelligent controller (conventional)

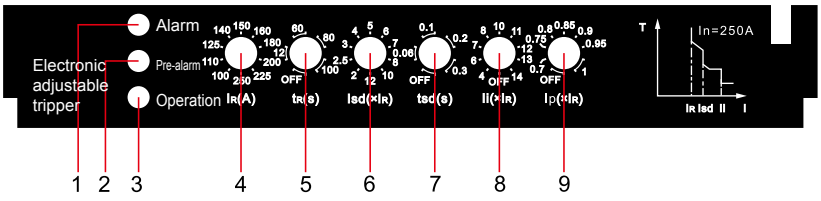


Table 17

Information of six-knob intelligent controller		
1	Alarm LED indicator light	Table 34 for default parameters
2	Pre-alarm LED indicator light	
3	Operation LED indicator light	
4	Setting current of overload long-time delay current IR(A)	
5	Setting value of overload long-time delay time tR(s)	
6	Setting current of short circuit short-time delay time Isd(A)	
7	Setting value of short circuit short-time delay time tsd(s)	
8	Current setting of short-circuit short delay time Ii(A)	
9	Setting current of overload pre-alarm Ip (A)	

6.4 Unbalanced current intelligent controller (E2 type)

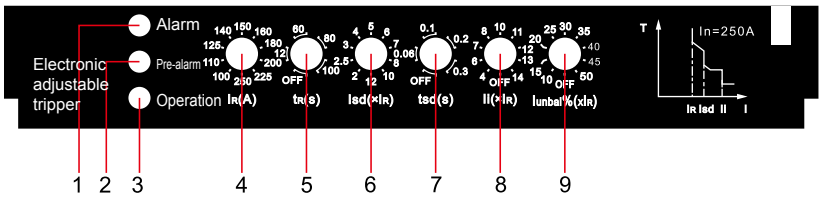


Table 18

Information of six-knob intelligent controller		
1	Alarm LED indicator	Default parameters 1 Setting value of unbalanced current time tunbal=10s 2 Default setting value of overload pre-alarm current Ip=0.9×IR
2	Pre-alarm LED indicator	
3	Operation LED indicator	
4	Setting current of overload long-time delay current IR(A)	
5	Setting value of overload long-time delay time tR(s)	
6	Setting current of short circuit short-time delay time Isd(A)	
7	Setting value of short circuit short-time delay time tsd(s)	
8	Current setting of short-circuit short delay time Ii(A)	
9	Setting unbalanced current Iunbal (A)	

6.5 Grounded intelligent controller (E3 type)

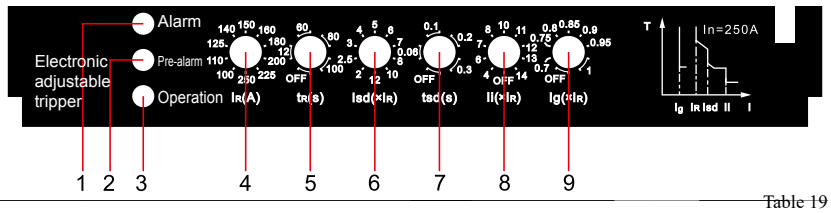


Table 19

Information of six-knob intelligent controller		
1	Alarm LED indicator	Default parameters 1 Setting value of ground protection time tg=0.4s 2 Default setting value of overload pre-alarm current Ip=0.9×IR
2	Pre-alarm LED indicator	
3	Operation LED indicator	
4	Setting current of overload long-time delay current IR(A)	
5	Setting value of overload long-time delay time tR(s)	
6	Setting current of short circuit short-time delay time Isd(A)	
7	Setting value of short circuit short-time delay time tsd(s)	
8	Current setting of short-circuit short delay time Ii(A)	
9	Setting current of ground protection lg(A)	

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6.6 Neutral pole protection controller (E4 type)

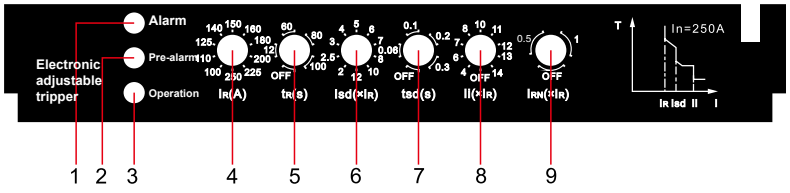

Table 20

Information of six-knob intelligent controller		
1	Alarm LED indicator	Default parameters 1 Default setting value of overload pre-alarm current Ip=0.9×IR
2	Pre-alarm LED indicator	
3	Operation LED indicator	
4	Setting current of overload long-time delay current IR(A)	
5	Setting value of overload long-time delay time tR(s)	
6	Setting current of short circuit short-time delay time Isd(A)	
7	Setting value of short circuit short-time delay time tsd(s)	
8	Current setting of short-circuit short delay time Ii(A)	
9	Setting current of neutral pole protection lRN(A)	

7 Technical Materials

7.1 Reference cross-sectional area of connecting wire for different rated currents

Table 21

Rated current In (A)	32	63	125	160	250	320	400
Cross-sectional area of conductor (mm^2)	6	16	50	70	120	185	240

Table 22

Rated current In (A)	Cable		Copper bar	
	Cross-section area (mm^2)	Quantity	Dimension (mm*mm)	Quantity
630	185	2	40×5	2
800	240	2	50×5	2
1250	/	/	80×5	2
1600	/	/	100×5	2

7.2 Power loss

Table 23

Model	Let-through current (A)	Total power consumption of 3 poles/4 poles (W)		
		Front and rear-panel connection	Plug-in front-panel connection	Plug-in rear-panel connection
TGM3E-125	125	12	12	12.2
TGM3E-160	160	40	50	62
TGM3E-250	250	50	75	86
TGM3E-320	320	55	80	89
TGM3E-400	400	58	87	90
TGM3E-630	630	110	120	130
TGM3E-800	800	115.2	125	140
TGM3E-1250	1250	200	/	/
TGM3E-1600	1600	/	/	/

7.3 Derating factor under different temperatures

Table 24

Model	Let-through current (A)	Ambient temperature					
		40℃	50℃	55℃	60℃	65℃	70℃
TGM3E-125	125	1In	1In	0.93In	0.92In	0.91In	0.89In
TGM3E-160	160	1In	1In	0.93In	0.92In	0.91In	0.89In
TGM3E-250	250	1In	1In	0.89In	0.85In	0.81In	0.78In
TGM3E-320	320	1In	1In	0.89In	0.85In	0.81In	0.78In
TGM3E-400	400	1In	1In	0.89In	0.85In	0.81In	0.78In
TGM3E-630	630	1In	1In	0.92In	0.9In	0.87In	0.86In
TGM3E-800	800	1In	1In	0.85In	0.82In	0.8In	0.78In
TGM3E-1250	1250	1In	1In	0.88In	0.87In	0.87In	0.85In
TGM3E-1600	1600	1In	1In	0.9In	0.86In	0.84In	0.8In

(1) For TGM3E circuit breakers, the derating factor is determined at the maximum rated current of each frame.

7.4 When the altitude exceeds 2,000 meters, the electrical performance of the circuit breaker shall be corrected according to the following table:

Table 25

Altitude (m)	2000	2500	3000	4000	5000
Power frequency withstand voltage (V)	3000	3000	2500	2000	1800
Insulation voltage (V)	1000	800	700	600	500
Maximum working voltage (V)	690	690	600	500	440
Working current correction factor	1In	1In	0.94In	0.88In	0.85In

7.5 Recommended tightening torques for the connecting cable/copper bar under different frame currents:

Table 26

Rated current (A)	Front-panel/rear-panel connection torque (N·m)
125/160	8.8~10
250/320	8.8~12
400/630	17.7~22.6
800	28~33
1250	28.8~39.2
1600	28.8~39.2

7.6 Screw tightening torque

Table 27

Model	TGM3E-125/160	TGM3E-250/320	TGM3E-400/630	TGM3E-800	TGM3E-1250	TGM3E-1600
Nominal diameter of thread (mm)	M8	M8	M10	M12	M10	M10
Tightening torque (N.m)	10	12	22	28	18	18
Failure moment (N.m)	15	18	26	33	22	22

8 Accessories

Product internal accessories

According to the needs of users, the circuit breaker accessories can be directly led out with wire (wire length of 50cm. For special requirements, please specify when ordering), or be equipped with terminal blocks (if needed, please specify when ordering).

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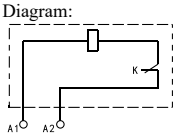
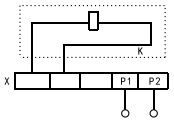
- Shunt release (left-mounted and right-mounted)

Rated control power supply voltage (Us)	AC: AC220/230V, AC380/400V DC: DC24V, DC110V, DC220V
Action voltage	(0. 7~1. 1)Us
Wiring Diagram:  Power supply input	Note: The microswitch in the K-shunt tripper which is in series with the coil inside is normally closed contact; after opening of circuit breaker, the contact is automatically opened; at the closing, it is closed.

When the rated control power supply voltage is DC24V, the shunt tripper can be used directly. The maximum length is 150m for 1.5mm^2 copper lead (the length of each of the two leads) and 250m for 2.5mm^2 copper lead. The power at the terminal of the tripper shall meet the minimum power of 50W, or a DC24V intermediate relay shall be used for controlling AC230V or AC400V shunt tripper, and the contact capacity of the intermediate relay shall be no less than 1A.

- Undervoltage release (left-mounted and right-mounted)

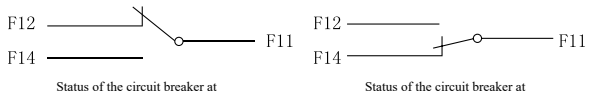
Rated working voltage (Ue)	AC: AC220/230V, AC380/400V
Action feature	When the voltage is 35%-70% of the rated working voltage, it shall trip reliably, When the voltage is 85%-110% of the rated working voltage, it shall guarantee closing; When the voltage is lower than 35% of the rated working voltage, it shall prevent closing.
Wiring Diagram:  Power supply input	Note: X- terminal block. Note: (The circuit breaker internal accessory wiring diagram is in the dotted box.)

Attention: The undervoltage release must be energized first in order to re-buckle and close the circuit breaker, otherwise it will damage the circuit breaker.

- Auxiliary contact (left-mounted and right-mounted)

Fram rated current	Inm≤320A		Inm≥400A	
Conventional heating current Ith	3A		6A	
Usage category	AC-15	DC-13	AC-15	DC-13
Working voltage	AC380V/415V	DC 110V/250V	AC380V/415V	DC 110V/250V
Rated working current	0. 3A	0. 15A	1A	0. 15A

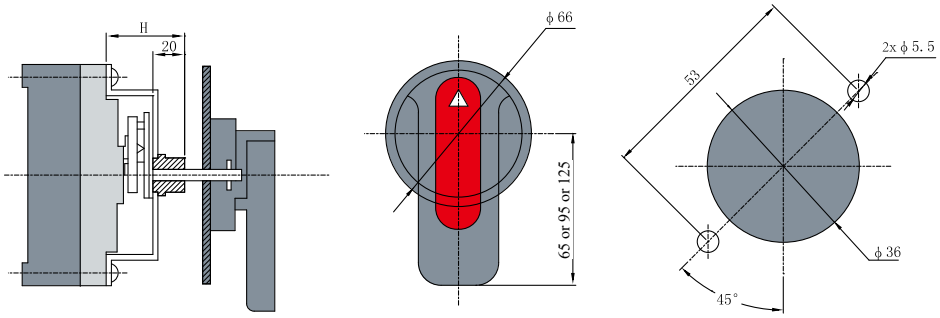
Wiring diagram



Status of the circuit breaker at "Opening" position

Status of the circuit breaker at "Closing" position.

- Manually operated mechanism:
  The outline and installation dimension of the rotating handle are shown in following figures and table:



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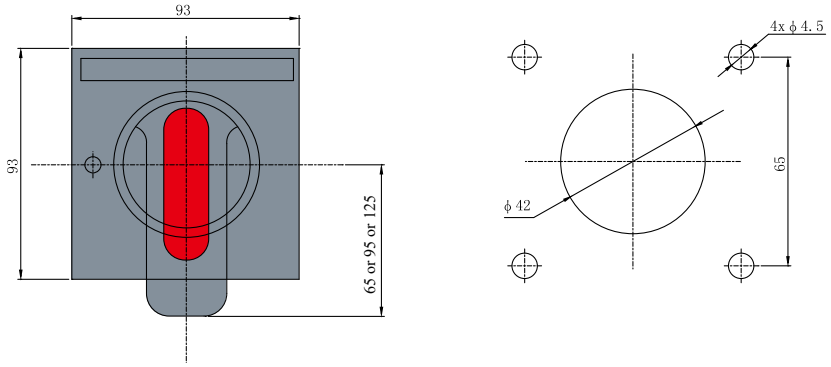


Outline and hole dimensions of the rotating handle

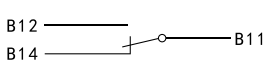
Table 28

Model and specification	TGM3E-125/160	TGM3E-250/320	TGM3E-400/630	TGM3E-800	TGM3E-1250	TGM3E-1600
Installation dimension (H)	61	57	87	92	/	/

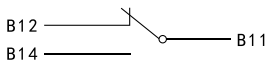
- Alarm contact (left-mounted and right-mounted)

Conventional heating current Ith	3A
Rated working current Ie	Same as auxiliary contact

Wiring Diagram:



The circuit breaker is at free release (alarm) status.

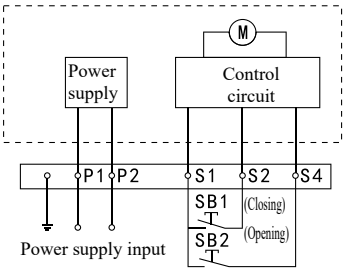


Status of the circuit breaker at "Opening" and "Closing" position.

Product external accessories

- Electric Motor operating mechanism:

It is mounted on the panel of the circuit breaker, and is used for the remote closing, disconnecting and re-closing of the circuit breaker electrically. It is suitable for automatic control. See Table 29 for the outline dimension of the motor-operated mechanism

Input voltage	AC220V/230V, AC380V/400V
Wiring diagram	

Note: P1 and P2 are inputs of external power supplies. SB1 and SB2 are operation buttons (prepared by users)

Note: The wiring diagram of internal accessories of motor-operated mechanism is in the bashed box.

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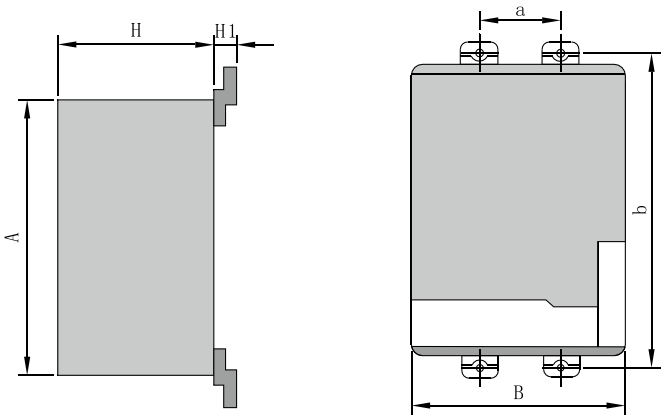


Table 29

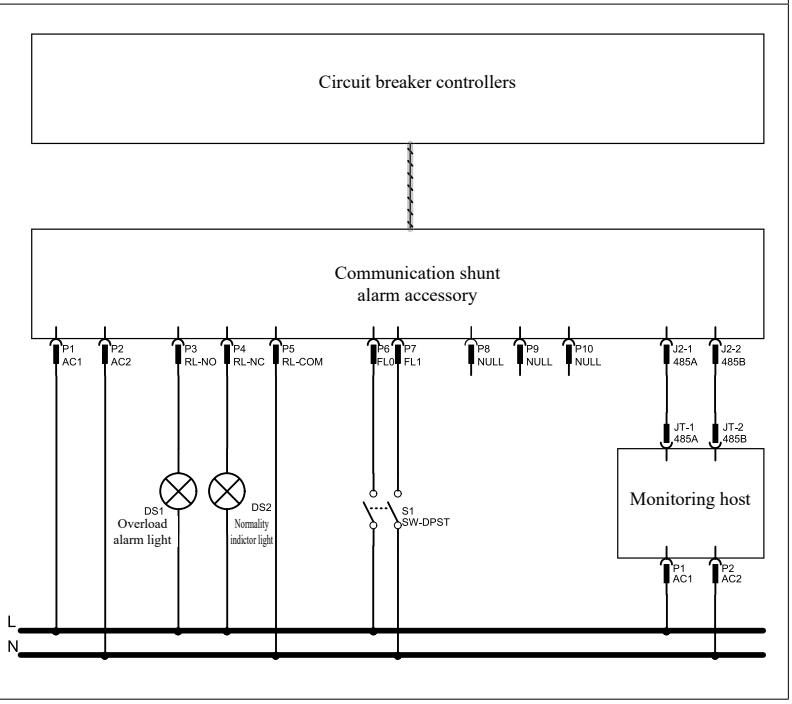
Model	A	B	H	H1	a	b
TGM3E-125/160	111	73	77	20	30	134
TGM3E-250/300	116	90	77	17	35	146
TGM3E-400/630	176	130	115	30	44	194
TGM3E-800	176	130	115	27	70	243
TGM3E-1250	177	129.5	115	37	70	243
TGM3E-1600	177	130	115	37	70	303

Electronic accessories of the product

According to user demands, electronic accessories of the circuit breaker can be divided into shunt alarm communication accessory, four-remote communication accessory and communication LCD components.

- Shunt alarm communication accessory

It is mounted on the side of the switch, and is used to realize the remote communication of the circuit breaker, remote shunt tripping and alarm signal output of the circuit breaker. It is suitable for intelligent automation circumstances. See Table 29 for outline dimension of accessories.

Input voltage	AC400V/230V
Wiring diagram	

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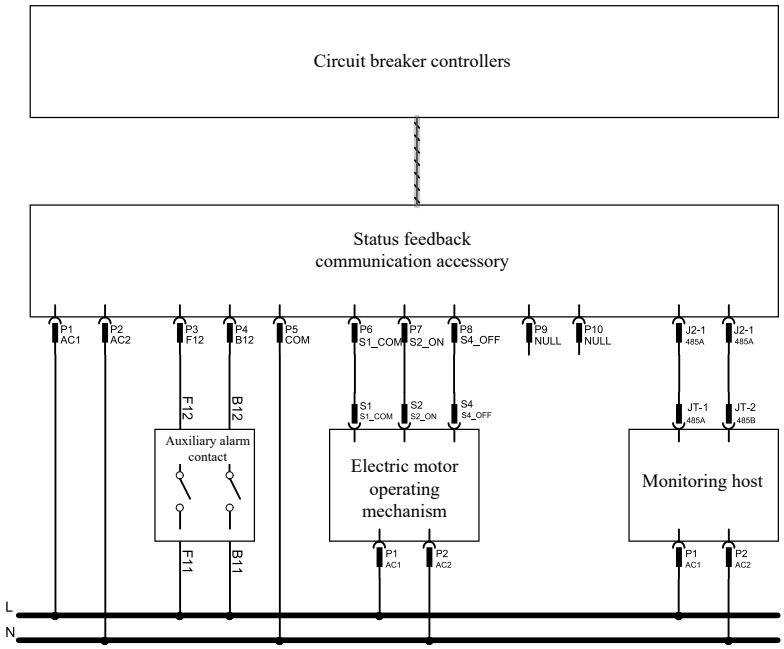
·Four-remote communication accessory

It is mounted on the side of the switch, and is used to achieve the “four-remote” function of the circuit breaker together with the auxiliary alarm accessory and motor-operated mechanism, i.e., remote control, remote adjustment, remote measurement and remote signaling. It is suitable for intelligent automation circumstances. See Table 31 for outline dimension of accessories.

Input voltage	AC400V/230V
Wiring diagram	

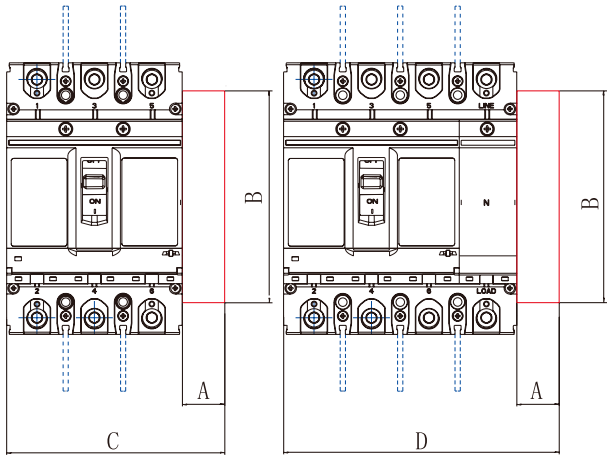


Table 30

Model and specification	Outline and installation dimension (mm)			
	A	B	C	D
TGM3E-125/160	25	125	117.5	147.5
TGM3E-250/320	25	125	132	167
TGM3E-400/630	25	125	175	223
TGM3E-800	25	125	235	305
TGM3E-1250	25	125	235	305
TGM3E-1600	25	125	235	305

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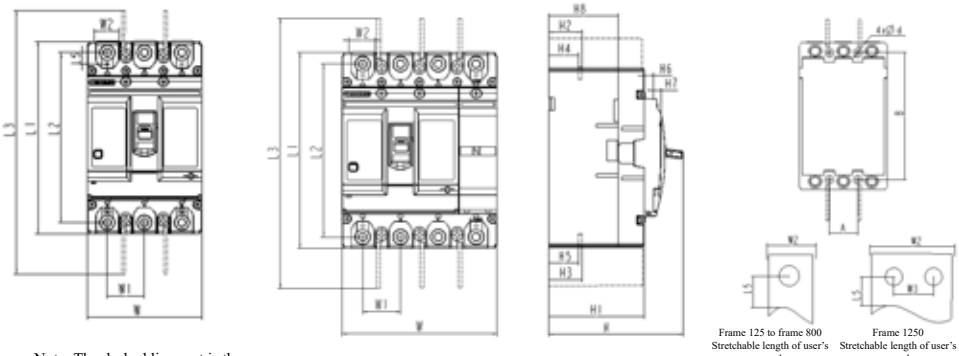
9 Outline and Installation Dimensions

9.1 Outline and installation dimension (Table 31, Figure 1 and Figure 2)

Table 31

Model	Number of poles	Outline dimension																		Installation dimension			
		L	L1	L2	L3	L4	L5	W	W1	W2	W3	H	H1	H2	H3	H4	H5	H6	H7	A	B	H8[1]	Φd
TGM3E-125L	3	163	151	133	265	268	8.5	92.5	30	18	/	99	64	25	25	22	22	/	14.5	30	129	28	5
TGM3E-125 M/H	3	169	155	137	254		8	92.5	30	18	/	116	82	28.5	28.5	25.5	25.5	/	14.5	30	134	25	4.5
	4							122.5												60			
TGM3E-160L	3	163	151	133	265		8.5	92.5	30	18	/	99	64	25	25	22	22	/	14.5	30	129	28	5
TGM3E-160 M/H	3	169	155	137	254		8	92.5	30	18	/	116	82	28.5	28.5	25.5	25.5	/	14.5	30	134	25	4.5
	4							122.5												60			
TGM3E-250 M/H	3	180	165	146	300	315	12	107	35	23.6	/	116	85	22.5	22.5	18.5	18.5	2.3	8	35	126	60.5	4.5
	4							142												70			
TGM3E-320 M/H	3	180	165	146	300		12	107	35	23.6	/	116	85	22.5	22.5	18.5	18.5	2.3	8	35	126	60.5	4.5
	4							142												70			
TGM3E-400 M/H	3	285	257	224	471	500	12	150	48	33.2	/	151	98	39.5	37.8	34.5	35.5	5	10	44	194	47	8.5
	4							198												94			
TGM3E-630 M/H	3	285	257	224	471		12	150	48	33.2	/	151	98	40	41	34.5	35.5	5	10	44	194	47	8.5
	4							198												94			
TGM3E-800 M/H	3	304	281	243	494	515	16.4	212	70	45	/	157	104	40	44.5	34	33	7	11.5	70	243	73.4	7
	4							282												140			
TGM3E-1250 M/H	3	297	276	243	476	/	13	210	70	45.7	21.8	152	98.4	28.7	35.6	19	19	/	/	70	243	65	7.8
	4							280												140			
TGM3E-1600 M/H	3	363	340	310	555	/	15	210	70	51.6	27	195	136	41.5	57	/	/	/	/	70	303	101	7
	4							280												140			

Note 1): H8 is the proper length of the mounting screws on the product

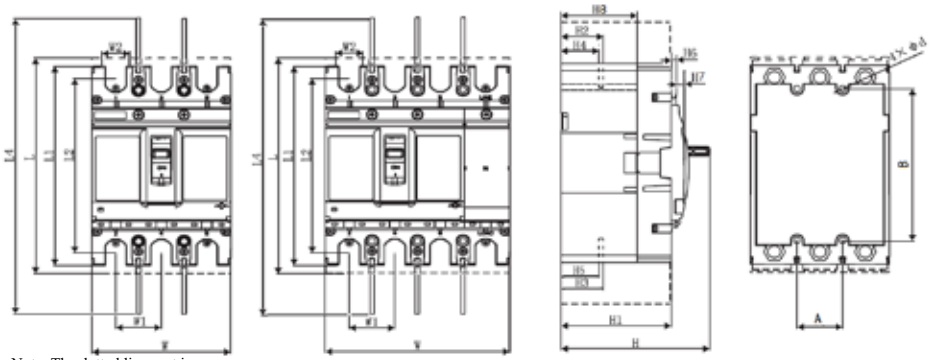


Note: The dashed line part is the flash barrier

Frame 125 to frame 800 Stretchable length of user's copper bar

Frame 1250 Stretchable length of user's copper bar

Figure 1 Outline and installation dimension (non-zero flashover)



Note: The dotted line part is zero flashover hood

Figure 2 Outline and installation dimension (zero flashover)

9.2 The hole sizes of the handle and panel of the product (Table 32 and Figure 3)

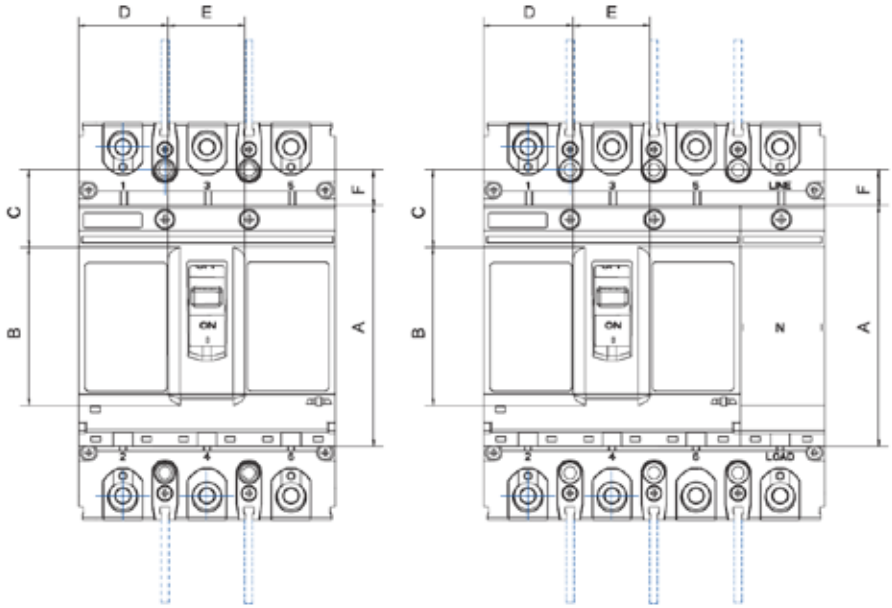


Figure 3 Hole sizes of the handle and panel

Table 32

Model and specification	Outline and installation dimension (mm)					
	A	B	C	D	E	F
TGM3E-125/160	101	68	33	32	29	16
TGM3E-250/320	100	67	32	37	33	15
TGM3E-400/630	162	107	46	46	58	20
TGM3E-800	177	116	54.4	73	67	20
TGM3E-1250	176	100	63	69	72	34
TGM3E-1600	210	120	92	58	99	56

TGM3E Series Moulded Case Circuit Breaker

9.3 Outline and installation dimension of plug-in type (Table 34 and Figure 4)

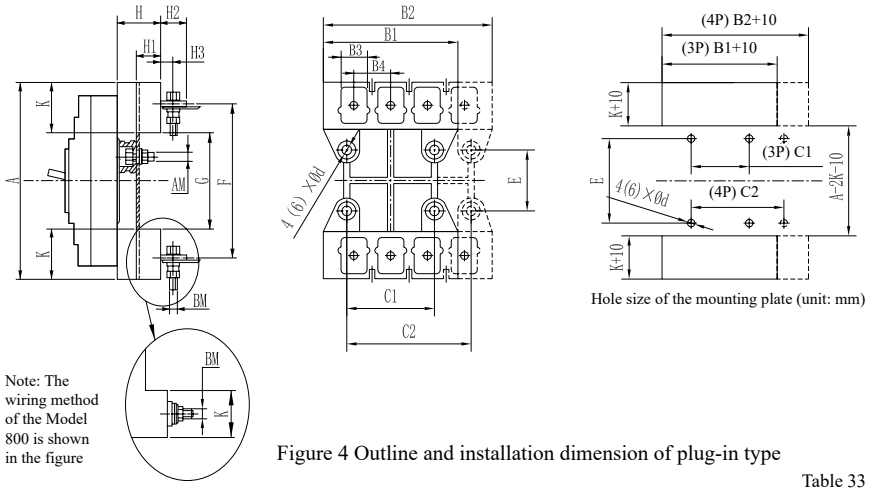


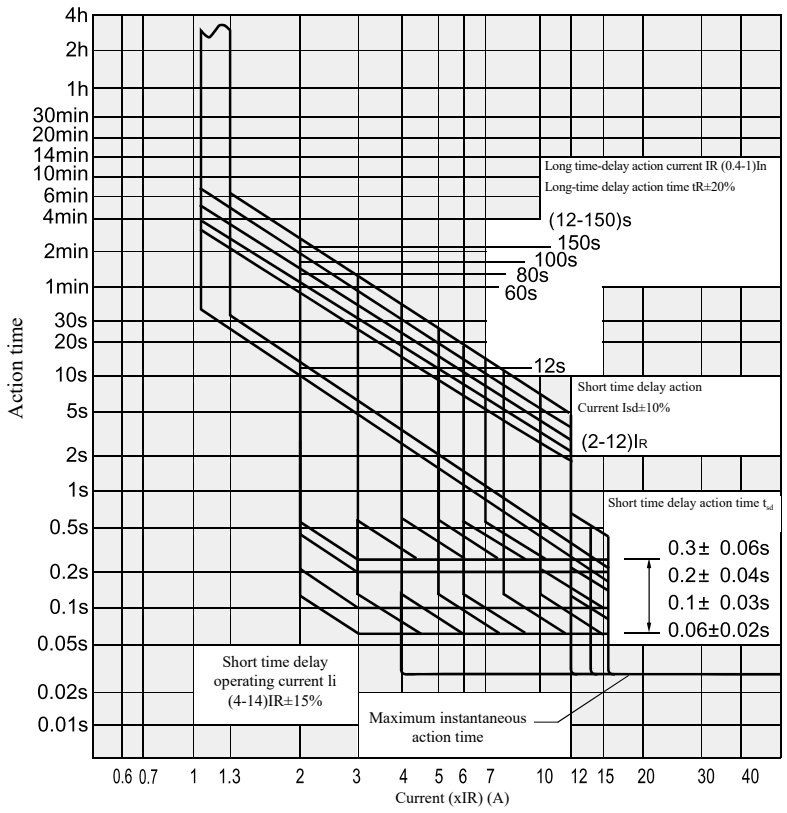
Figure 4 Outline and installation dimension of plug-in type

Table 33

Model and specification	Outline and installation dimension (mm)																	
	A	B1	B2	B3	B4	C1	C2	E	F	G	K	H	H1	H2	H3	AM	BM	Φd
TGM3E-125/160	174	91	125	20	30	60	90	63	137	98	38	50	33	35	15	M6	M8	6.5
TGM3E-250/320	185	107	145	22	35	70	105	56	143	94	45	50	33	37	20	M6	M8	6.5
TGM3E-400/630	280	150	200	31	48	60	108	129	224	170	55	60	38	46	22	M8	M12	8.5
TGM3E-800	303	210	280	/	71	90	162	143	242	180	62	87	60	/	/	M10	M14	11

Note: The maximum rated current of the 630 frame is 500A for the plug-in type, and the maximum rated current of 800 frame for the plug-in type is 700A.

10 The Protection Characteristic Curve of the Circuit Breaker



11 Setting of Factory Parameters of Intelligent Controller of the Circuit Breaker

Setting value of factory parameters

Table 34

	Protection type		Power distribution protection		Motor protection
4	Overload long delay	Set current I_R (A)	In		
5		Delay t_R (s)	60/64(1250)		100/96(1250)
6	Short circuit short delay	Set current I_{sd} (A)	8(XIR)		10(XIR)
7		Delay t_{sd} (s)	0.3		
8	Short circuit transient	Set current I_i (A)	Inm≤630A	12(XIR)	14(XIR)
			Inm≥800A	10(XIR)	
9 (Prewarming function is required as standard configurations, and other functions are optional)	Prewarning (conventional six-button type)	Delay I_p (A)	0.9(x IR)		
	Current unbalance protection (E2 type)	Set current I_{unbal} (A)	50%		
	Earthing protection (E3 type)	Delay I_g (A)	1.0(x IR)		
	Neutral pole protection (E4 type)	Set current I_{RN} (A)	1.0(x IR)		
Thermal simulation function		OFF			

12 Ordering Notice

Please specify following matters when ordering:
a) Model, name and Number of poles of the circuit breaker.
b) Rated current of circuit breakers.
c) Accessory name, specifications and combination code of the circuit breaker (the working voltage shall be specified for shunt tripper and undervoltage tripper).
d) Usage: For power distribution (be delivered as for power distribution by default if not specified) and for motor protection (represented by 2).
e) Quantity.
For example: 20 sets of TGM3E-250, 3-pole, 50kA, 250A, with shunt release, AC 400V. Fill in: TGM3E-250M/3310250AAC400V 20 sets.

For special requirements to the circuit breaker, please negotiate with the manufacturer.

13 Examples of Quick Selection

a) TGM3E-125M/3N300A125A:
i.e., order a TGM3E series electronic circuit breaker for power distribution protection, with 125A frame, 50kA (relatively high), rated current of 125A, 3-pole and 4-wire (i.e., 3P+N), without null line protection.

b) TGM3E-125M/33002125A:
i.e., order a TGM3E series electronic circuit breaker for motor protection, with 125A frame, 50kA (relatively high), rated current of 125A, 3 poles.

c) TGM3E-125H/3N300AE1W125A:
i.e., order a TGM3E series electronic circuit breaker for distribution protection, with 125A frame, 85kA (high breaking), rated current of 125A, 3-pole and 4-wire (i.e., 3P+N), with three-knob controller equipped with zero arc accessories, without null line protection.

Remarks: For special customized products, please consult us firstly.

TENGEN

TGM3E Series Moulded Case Circuit Breaker

14 Description of the Selection Table of TGM3E Series Moulded Case Circuit

TGM3E	–	125	M	Z	/	4	3	00	2	A	F	III	E1	125	AC230V	B	Plateau	W
Model		Shell frame -level current	Breaking capacity	Operation mode		Pole number	Tripping mode	Internal accessories	Usage	N pole code	Additional information	Alarm module	Controller code	Rated current	Voltage of accessories	Installation mode	Applicable situation	Special requirements
TGM3E electronic moulded case circuit breaker		125: 125A	M: relatively high	Default: Direct operation		3: 3 poles	3: Electronic	00: no accessory 10: shunt release 20: auxiliary contact 30: Undervoltage release 40: shunt release+ auxiliary contact	Default: Power distribution protection	A: three protective poles. Null line is not broken with other poles.	Default: Without prepay-ment	Default: Overload alarm release	Default: Pre-alarm controller	125: 32A 63A 125A	AC380/400V AC220/230V DC220V DC110V DC24V	Default: Fixed, front-board wiring	Default: Conven-tional application	Default: Flash barrier
		160: 160A																
		250: 250A	H: high breaking	Z: rotating handle operation		3N : 3P+N		50: shunt release+ undervoltage release 60: two sets of auxiliary contacts 70: undervoltage release+ auxiliary contact 08: Alarm contact	2: Motor protection	B: three protective poles. Null line is broken with other poles.	F: Prepay-ment	III: Overload alarm without tripping	E1: Three-knob controller	160: 63A 125A 160A	Multiple accessory voltages shall be described separately (for example: Shunt AC23 OV, undervolt-age AC400V)	B: Fixed, rear-board wiring	Plateau Damp heat Environmen-tal protection Salt mist Low temperature	w: Zero flashover
		320: 320A																
		400: 400A		P: motor operation		4: 4 poles		18: shunt release+ alarm contact 28: auxiliary contact+ alarm contact 38: undervoltage release + alarm contact 48: shunt release+ alarm contacts + auxiliary contact		C: four protective poles. Null line is broken with other poles.			E2: Current unbalance type controller	250: 250A		C: Plug-in rear-board wiring		Handle lock
		630: 630A												320: 320A				
		800: 630A 800A						68: two sets of auxiliary contacts + alarm contact 78: undervoltage release + auxiliary contact + alarm contact		D: four protective poles. Null line is not broken with other poles.			E3: Grounding type controller	400: 400A		F: Plug-in front-board wiring		
		1250: 1250A											E3: Grounding type controller	630: 630A				
		1600: 1600A												800: 630A 800A				
														1250: 1250A				
														1600: 1600A				