TGD1 AC Motor Circuit Breaker

1 Overview

TGD1 AC motor circuit breaker is suitable for circuits with AC voltage up to 690V and current up to 80A for overload, open-phase, short-circuit protection, and infrequent start control of three-phase squirrel-cage asynchronous motor and for power distribution line protection, and infrequent load changeover. It can be used as disconnector.

2 Type Designation

TG D 1 - □

- Frame current (A)
- Design code
- Motor circuit breaker
- Enterprise code

3 Technical Parameters

3.1 Rated insulation voltage Ui(V): 690.

3.2 Rated working voltage Ue(V): TGD1-32: 230/240, 400/415, 440, 500, 690;

TGD1-80: 400/415.

3.3 Rated frequency (Hz): 50.

3.4 Frame current Inm(A): 32/80.

3.5 Rated current of release In(A): (See Table 1).

3.6 Setting current range: (See Table 1).

3.7 Rated ultimate short-circuit breaking capacity Icu(kA): (See Table 1).

3.8 Rated operating short-circuit breaking capacity Ics(kA): (See Table 1).

3.9 Rated impulse withstand voltage Uimp(V): 6000.

Table 1

Model	Rated current of release In(A)	Setting current regulating range (A)	Rated limit short-circuit breaking capacity Icu / Rated run short-circuit breaking capacity Ics										Flashover distance (mm)
			230/240V		400/415V		440V		500V		690V		
			Icu kA	Ics kA	Icu kA	Ics kA	Icu kA	Ics kA	Icu kA	Ics kA	Icu kA	Ics kA	
TGD1	0.16	0.1-0.16	100	100	100	100	100	100	100	100	100	100	40
TGD1	0.25	0.16-0.25	100	100	100	100	100	100	100	100	100	100	40
TGD1	0.4	0.25-0.4	100	100	100	100	100	100	100	100	100	100	40
TGD1	0.63	0.4-0.63	100	100	100	100	100	100	100	100	100	100	40
TGD1	1	0.63-1	100	100	100	100	100	100	100	100	100	100	40
TGD1	1.6	1-1.6	100	100	100	100	100	100	100	100	100	100	40
TGD1	2.5	1.6-2.5	100	100	100	100	100	100	100	100	3	2.25	40
TGD1	4	2.5-4	100	100	100	100	100	100	100	100	3	2.25	40
TGD1	6.3	4-6.3	100	100	100	100	50	50	50	50	3	2.25	40

TGD1 AC Motor Circuit Breaker

Table, continued

Model	Rated current of release In(A)	Setting current regulating range (A)	Rated limit short-circuit breaking capacity Icu Rated run short-circuit breaking capacity Ics										Flashover distance (mm)
			230/240V		400/415V		440V		500V		690V		
			Icu kA	Ics kA	Icu kA	Ics kA	Icu kA	Ics kA	Icu kA	Ics kA	Icu kA	Ics kA	
TGD1	10	6-10	100	100	100	100	15	15	10	10	3	2.25	40
TGD1	14	9-14	100	100	15	7.5	8	4	6	4.5	3	2.25	40
TGD1	18	13-18	100	100	15	7.5	8	4	6	4.5	3	2.25	40
TGD1	23	17-23	50	50	15	6	6	3	4	3	3	2.25	40
TGD1	25	20-25	50	50	15	6	6	3	4	3	3	2.25	40
TGD1	32	24-32	50	50	10	5	6	3	4	3	3	2.25	40
TGD1-80	25	16-25	/	/	15	7.5	/	/	/	/	/	/	50
TGD1-80	40	25-40	/	/	15	7.5	/	/	/	/	/	/	50
TGD1-80	63	40-63	/	/	15	7.5	/	/	/	/	/	/	50
TGD1-80	80	56-80	/	/	15	7.5	/	/	/	/	/	/	50

3.10 Rated power of three-phase motor controlled by motor circuit breaker (see Table 2)

Table 2

Model	Rated current of release In(A)	Setting range regulating range (A)	Standard rated power of three-phase motor (kW)					
			AC-3, 50Hz					
			230/240V	400V	415V	440V	v500V	690V
TGD1	0.16	0.1-0.16	-	-	-	-	-	-
TGD1	0.25	0.16-0.25	-	-	-	-	-	-
TGD1	0.4	0.25-0.4	-	-	-	-	-	-
TGD1	0.63	0.4-0.63	-	-	-	-	-	0.37
TGD1	1	0.63-1	-	-	-	0.37	0.37	0.55
TGD1	1.6	1-1.6	-	0.37	-	0.55	0.75	1.1
TGD1	2.5	1.6-2.5	0.37	0.75	0.75	1.1	1.1	1.5
TGD1	4	2.5-4	0.75	1.5	1.5	1.5	2.2	3
TGD1	6.3	4-6.3	1.1	2.2	2.2	3	3.7	4
TGD1	10	6-10	2.2	4	4	4	5.5	7.5
TGD1	14	9-14	3	5.5	5.5	7.5	7.5	9
TGD1	18	13-18	4	7.5	9	9	9	11
TGD1	23	17-23	5.5	11	11	11	11	15
TGD1	25	20-25	5.5	11	11	11	15	18.5
TGD1	32	24-32	7.5	15	15	15	18.5	22
TGD1-80	25	16-25	/	11	11	/	/	/
TGD1-80	40	25-40	/	18.5	18.5	/	/	/
TGD1-80	63	40-63	/	30	30	/	/	/
TGD1-80	80	56-80	/	37	37	/	/	/

3.11 Housing protection grade: IP20.

3.12 Motor circuit breaker operating performance: When the maximum operating frequency is 120 times/h, the mechanical life is 100,000 times, and the electrical life is also 100,000 times.

TGD1 AC Motor Circuit Breaker

4 Operating Conditions

4.1 The altitude generally does not exceed 2,000 meters at the installation site.

4.2 The lower limit of ambient air temperature generally is not below than -5℃, the upper limit generally is not higher than +40℃, and the mean within 24H does not exceed +35℃.

4.3 Atmospheric conditions: The relative air humidity does not exceed 50% at the ambient air temperature +40℃, and a higher relative humidity is allowed at a lower temperature. The mean monthly minimum temperature of the wettest month does not exceed +25℃, and the mean monthly maximum relative humidity of this month does not exceed 90%. Condensation occurred on the product surface due to temperature changes shall be considered.

4.4 Pollution degree: 3.

4.5 Installation category: Class III.

4.6 The inclination between the motor circuit breaker and the vertical installation plane does not exceed 5°.

4.7 Trip class: TGD1-32 10A, TGD1-80 10.

5 Circuit Breaker Features

5.1 Action characteristics when all phase loads of motor circuit breaker are balanced (see Table 3).

Table 3

No.	Setting current multiple	Action time	Starting conditions	Ambient air temperature ℃
1	1.05	No action ≥ 2h	Cold state starts	20±2
2	1.2	Action < 2h	Hot state (after No. 1 test) starts	
3	1.5	Aciton < 2 minutes	Hot state (starts after double the setting current is balancved thermally)	
4	7.2	2s<Tp≤10s	Cold state	

5.2 Action characteristics when all phase loads of motor circuit breaker are unbalanced (see Table 4).

Table 4

No.	Set current multiple		Action time	Starting condition	Ambinet ari temperature ℃
	Any two phases	Third phase			
1	1	0.9	No action ≥ 2h	Cold state starts	20±2
2	1.15	0	Action < 2h	Hot state (after No. 1 test) starts	

5.3 Motor circuit breaker temperature compensation performance.

Table 5

No.	Set current multiple	Starting condition	Action time	Ambinet ari temperature ℃
1	1.0	Cold state starts	No action ≥2h	40±2
2	1.2	Hot state (after No. 1 test) starts	Action<2h	40±2
3	1.05	Cold state starts	No action ≥2h	-5±2
4	1.3	Hot state (after No. 3 test) starts	Action<2h	-5±2

TGD1 AC Motor Circuit Breaker

5.4 Setting current of instantaneous electromagnetic release of motor circuit breaker (see Table 6).

Table 6

Model	Related current of release In(A)	Setting current regulating range of thermal element (A)	Setting current of instantaneous electromagnetic release Ir(A)
TGD1	0.16	0.1-0.16	1.5
	0.25	0.16-0.25	2.4
	0.4	0.25-0.4	5
	0.63	0.4-0.63	8
	1	0.63-1	13
	1.6	1-1.6	22.5
	2.5	1.6-2.5	33.5
	4	2.5-4	51
	6.3	4-6.3	78
	10	6-10	138
	14	9-14	170
	18	13-18	223
	23	17-23	327
	25	20-25	327
	32	24-32	416
TGD1-80	25	16-25	350
	40	25-40	560
	63	40-63	910
	80	56-80	1120

5.5 Action characteristics of instantaneous electromagnetic release of motor circuit breaker (see Table 7)

Table 7

Test current	Starting state	Action time	Ambient air temperature ℃
0.8Ir	Cold state	No action ≥0.2s	20±2
1.2Ir	Cold state	Action<2s	20±2

5.6 Selection of backup fuse:

When the expected short-circuit current at the installation site is greater than the rated limit short-circuit breaking capacity of motor circuit breaker, the model and fuse current specification of the backup short circuit breaker fuse (see Table 8).

For example, fuse RT16(NT00) with usage category gG can be optional.

Table 8

Model	Rated current of release In(A)	Setting current regulating range (A)	Fuse current specifications of backup fuse only when the expected short-circuit current Icc>Icu rated limit short-circuit breaking capacity									
			230/240V		400/415V		440V		500V		690V	
			Am A	gL/gG A	Am A	gL/gG A	Am A	gL/gG A	Am A	gL/gG A	Am A	gL/gG A
TGD1	0.16	0.1-0.16	-	-	-	-	-	-	-	-	-	-
TGD1	0.25	0.16-0.25	-	-	-	-	-	-	-	-	-	-
TGD1	0.4	0.25-0.4	-	-	-	-	-	-	-	-	-	-
TGD1	0.63	0.4-0.63	-	-	-	-	-	-	-	-	-	-
TGD1	1	0.63-1	-	-	-	-	-	-	-	-	-	-
TGD1	1.6	1-1.6	-	-	-	-	-	-	-	-	-	-
TGD1	2.5	1.6-2.5	-	-	-	-	-	-	-	-	16	20
TGD1	4	2.5-4	-	-	-	-	-	-	-	-	25	32
TGD1	6.3	4-6.3	-	-	-	-	50	63	50	63	32	40
TGD1	10	6-10	-	-	-	-	50	63	50	63	32	40

TGD1 AC Motor Circuit Breaker

Table, continued

Model	Rated current of release In(A)	Setting current regulating range (A)	Fuse current specifications of backup fuse only when the expected short-circuit current Icc>Icu rated limit short-circuit breaking capacity									
			230/240V		400/415V		440V		500V		690V	
			Am A	gL/g G A	Am A	gL/g G A	Am A	gL/g G A	Am A	gL/g G A	Am A	gL/g G A
TGD1	14	9-14	-	-	63	80	50	63	50	63	40	50
TGD1	18	13-18	-	-	63	80	50	63	50	63	40	50
TGD1	23	17-23	80	100	80	100	63	80	50	63	40	50
TGD1	25	20-25	80	100	80	100	63	80	50	63	40	50
TGD1	32	24-32	80	100	80	100	63	80	50	63	40	50
TGD1-80	25	16-25	/	/	80	100	/	/	/	/	/	/
TGD1-80	40	25-40	/	/	80	100	/	/	/	/	/	/
TGD1-80	63	40-63	/	/	125	160	/	/	/	/	/	/
TGD1-80	80	56-80	/	/	125	160	/	/	/	/	/	/

6 Motor Circuit Breaker Accessories

6.1 Types, models, and specification of accessories (see Table 9).

Table 9

Accessory name	Accessory model & Spec.		
Undervoltage release	TGD1 UV110	TGD1 UV220	TGD1 UV380
Shunt release	TGD1 SR110	TGD1 SR220	TGD1 SR380
Instantaneous auxiliary contact (front-mounted)	TGD1 AF-11	TGD1 AF-20	-
Instantaneous aux. contact (side mounted)	TGD1 AS-11	TGD1 AS-20	-
	TGD1-80 AS-11	TGD1-80 AS-20	-
Waterproof mounting box	TGD1MC		

6.2 Performances of undervoltage releases TGD1 UV110, TGD1 UV220, and TGD1 UV380:

a. Rated insulation voltage Ui(V): 690

b. Action characteristics: When the voltage drops to the 70%-35% range of rated voltage, the undervoltage release shall work; when the power voltage is below than 35% rated voltage of release, the undervoltage release shall work to prevent the motor circuit breaker from closing; when the power voltage equals to or is greater than 85% rated voltage of release, the undervoltage release shall work to ensure the motor circuit breaker closed.

6.3 Performances of shunt releases TGD1 SR110, TGD1 SR220, and TGD1 SR380:

a. Rated insulation voltage Ui(V): 690;

b. Action characteristics: The action voltage range of shunt release is 70% ~ 110% of rated working voltage.

TGD1 AC Motor Circuit Breaker

6.4 Performance of instantaneous auxiliary contacts TGD1 AF-20 and TGD1 AF-11 (front-mounted)

a. Rated insulation voltage Ui(V): 250;

b. Resistive current Ith(A): 2.5;

c. Usage category, rated working voltage and rated working current of instantaneous auxiliary contact (see Table 10).

Table 10

Usage category	AC-15				DC-13	
Rated working voltage Ue(V)	24	48	110/127	230/240	24	48
Rated working current Ie(A)	2	1.25	1	0.5	1	0.3
Normal working power P(W)	48	60	127	120	24	15

6.5 Performances of instantaneous auxiliary contacts TGD1 AS-20 and TGD1 AS-11 (side-mounted):

a. Rated insulation voltage Ui(V): 690;

b. Resistive current Ith(A): 6;

c. Usage category, rated working voltage and rated working current of instantaneous auxiliary contact (see Table 11).

Table 11

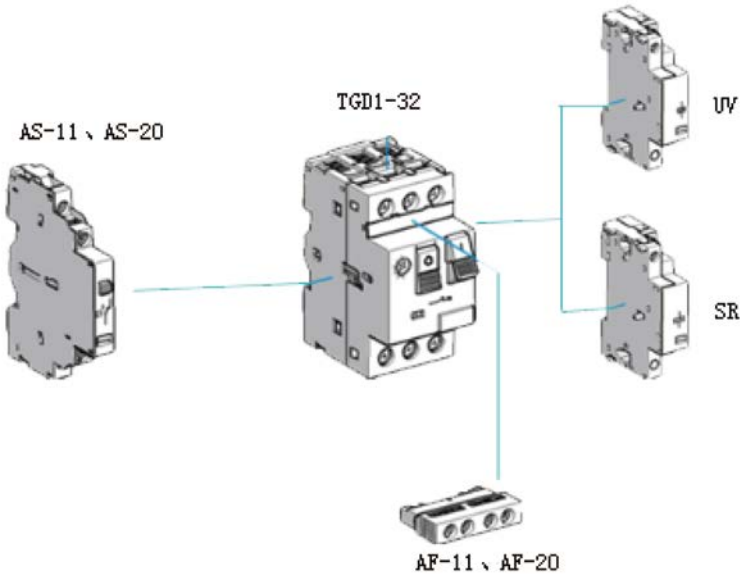
Usage category	AC-15				DC-13		
Rated working voltage Ue(V)	48	110/127	230/240	380/415	24	48	220
Rated working current Ie(A)	6	4.5	3.3	2.2	6	5	0.5
Normal working power P(W)	300	500	720	850	140	240	120

6.6 TGD1 waterproof box

TGD1MC waterproof mounting box, protection grade: IP55.

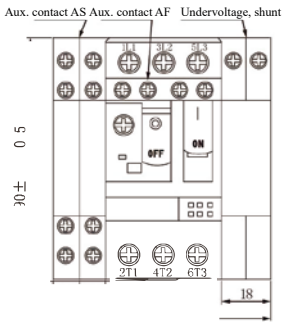
TGD1 AC Motor Circuit Breaker

6.7 Installation position and dimensions of accessories (as shown in Figure below)

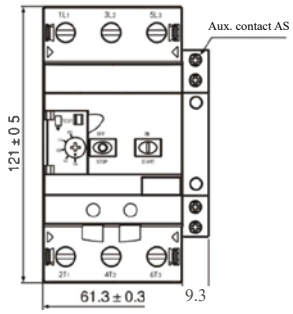


TGD1 accessory installation position

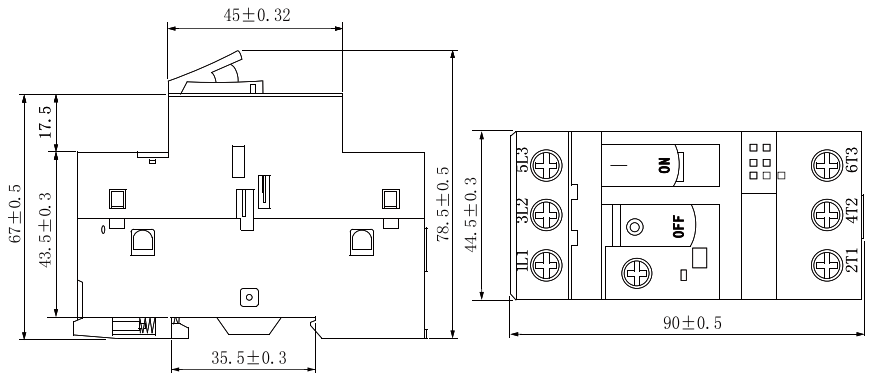
7 Outline and Installation Dimensions



TGD1-32 installation dimensions

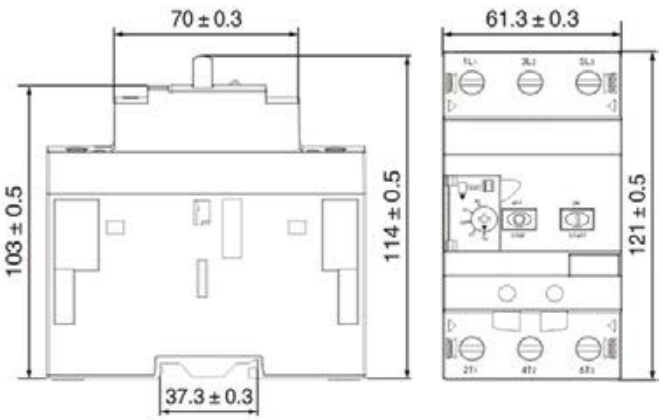


TGD1-80 installation dimensions

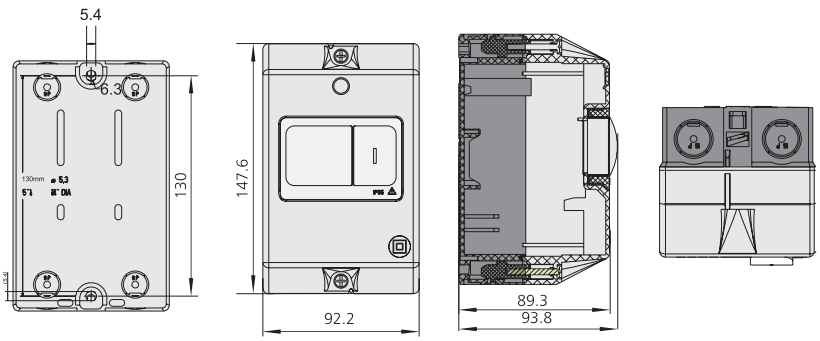


TGD1-32 outline and installation dimensions drawings

TGD1 AC Motor Circuit Breaker



TGD1-32 outline and installation dimensions drawings



TGD1 series AC motor circuit breaker

8 Ordering Notice

8.1 Please specify the product model, specification, and quantity when ordering.
For example: To order 20 TGD1 motor circuit breakers with setting current 24A-32A.
Please specify: TGD1 24A-32A, 20 pcs.

8.2 To order accessories, please specify the accessory model and quantity; accessory model sees Table 9.
For example: To order 20 pieces of 380V 50Hz undervoltage releases.
Please specify: TGD1 UV380V, 20 pcs.

For example: To order 10 instantaneous auxiliary contact sets with resistive current 6A containing one normally-open contact and one normally-closed contact.
Please specify: TGD1 AS-11, 10 pcs.