

Overload relays

6/2 Overview

Thermal overload relays

- 6/4 T16 thermal overload relays – 0.10 to 16.0 A
- 6/8 TF42 thermal overload relays – 0.10 to 38.0 A
- 6/13 TF65 thermal overload relays – 22.0 to 67.0 A
- 6/17 TF96 thermal overload relays – 40.0 to 96.0 A
- 6/21 TF140DU thermal overload relays – 66 to 142 A
- 6/25 TA200DU thermal overload relays – 66 to 200 A

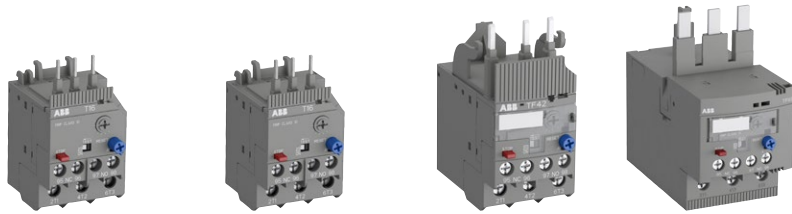
Electronic overload relays

- 6/29 E16DU, EF19, EF45 electronic overload relays – 0.10 to 45.0 A
- 6/33 EF65, EF96, EF146 electronic overload relays – 20 to 150 A
- 6/37 EF205, EF370 electronic overload relays – 63 to 380 A
- 6/41 EF460, EF750, EF1250DU electronic overload relays
150 to 1250 A

6/44 General accessories

Thermal and electronic overload relays

Thermal overload relays



IEC: rated operational power AC-3	400 V	0.06 ... 7.5 kW	0.06 ... 7.5 kW	0.06 ... 18.5 kW	11 ... 37 kW
UL/CSA: 3-phase hp-ratings	480 V	1/2 ... 10 hp	1/2 ... 10 hp	1/2 ... 25 hp	15 ... 50 hp
Fitting to contactors		B6, B7	AS09 ... AS16	AF09 ... AF38	AF40, AF52, AF65
Type	T16	T16	TF42	TF65	
Current range	0.10 ... 16 A	0.10 ... 16 A	0.10 ... 38 A	22 ... 67 A	
Trip class	10	10	10	10	
Single mounting kit	DB16	DB16	DB42	DB65	

Electronic overload relays with integrated CT

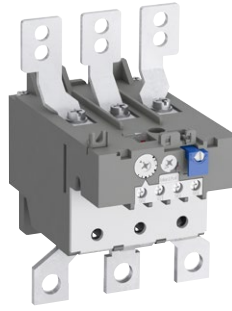


IEC: rated operational power AC-3	400 V	0.06 ... 7.5 kW	0.06 ... 7.5 kW	4 ... 22 kW	7.5 ... 37 kW
UL/CSA: 3-phase hp-ratings	480 V	1/2 ... 10 hp	1/2 ... 10 hp	5 ... 30 hp	15 ... 50 hp
Fitting to contactors		B6, B7, BC6, BC7, VB6, VB7, VBC6, VBC7	AF09 ... AF38	AF26 ... AF38	AF40, AF52, AF65
Type	E16DU	EF19	EF45	EF65	
Current range	0.10 ... 18.9 A	0.10 ... 18.9 A	9 ... 45 A	20 ... 70 A	
Trip class	10E, 20E, 30E selectable				
Single mounting kit	DB16E	DB19EF	DB45EF	-	

Electronic overload relays with external separate CT



IEC: rated operational power AC-3	400 V	75 ... 250 kW	132 ... 400 kW	250 ... 710 kW
UL/CSA: 3-phase hp-ratings	480 V	100 ... 400 hp	200 ... 500 hp	600 ... 900 hp
Fitting to contactors		AF400, AF460	AF580, AF750, AF1250	AF1350, AF1650, AF2050
Type	EF460	EF750	EF1250DU	
Current range	150 ... 500 A	250 ... 800 A	375 ... 1250 A	
Trip class	10E, 20E, 30E selectable			



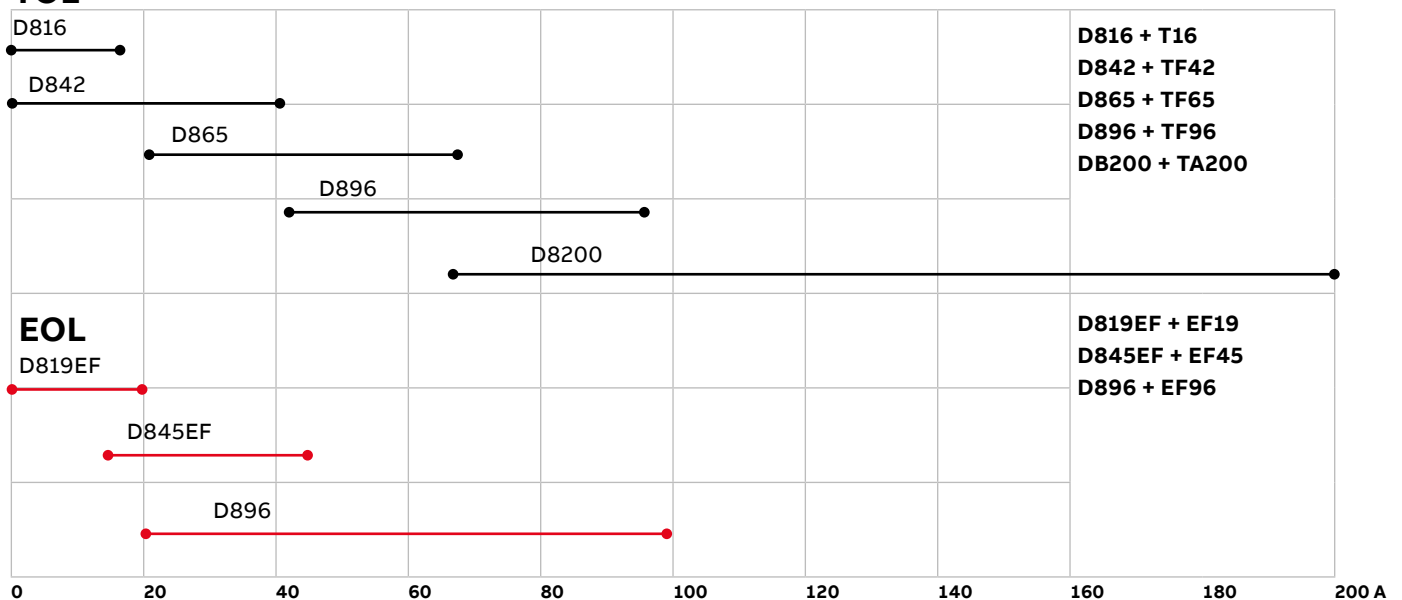
18.5 ... 45 kW	37 ... 75 kW	37 ... 110 kW
30 ... 75 hp	50 ... 100 hp	50 ... 150 hp
AF80, AF96	AF116, AF140, AF146	AF190, AF205
TF96	TF140DU	TA200DU
40 ... 96 A	66 ... 142 A	66 ... 200 A
10	10A	10A
DB96	-	DB200



22 ... 55 kW	30 ... 75 kW	37 ... 110 kW	75 ... 200 kW
30 ... 75 hp	50 ... 100 hp	50 ... 150 hp	100 ... 300 hp
AF80, AF96	AF116, AF140, AF146	AF190, AF205	AF265, AF305, AF370
EF96	EF146	EF205	EF370
36 ... 100 A	54 ... 150 A	63 ... 210 A	115 ... 380 A
10E, 20E, 30E selectable			
DB96	-	-	-

Single mounting kit overview

TOL



T16 thermal overload relays – 0.10 to 16.0 A

Ordering details



T16

2CDC231009F0013



T16 + DB16

2CDC231025F0013



KPR-101L

1SFC151224F0002



DB16

2CDC231002F0011

The T16 thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications

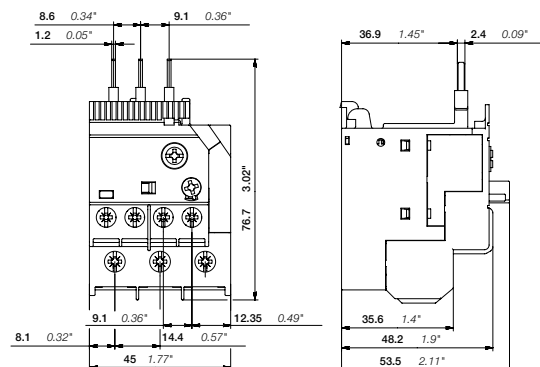
Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

Suitable for AS09...AS16, B6 and B7 all variants

0.10 ... 0.13	0.5 A, fuse type T	10	T16-0.13	1SAZ711201R1005	0.100
0.13 ... 0.17	1.0 A, fuse type T	10	T16-0.17	1SAZ711201R1008	0.100
0.17 ... 0.23	1.0 A, fuse type T	10	T16-0.23	1SAZ711201R1009	0.100
0.23 ... 0.31	1.0 A, fuse type T	10	T16-0.31	1SAZ711201R1013	0.100
0.31 ... 0.41	2.0 A, fuse type gG	10	T16-0.41	1SAZ711201R1014	0.100
0.41 ... 0.55	2.0 A, fuse type gG	10	T16-0.55	1SAZ711201R1017	0.100
0.55 ... 0.74	4.0 A, fuse type gG	10	T16-0.74	1SAZ711201R1021	0.100
0.74 ... 1.00	6.0 A, fuse type gG	10	T16-1.0	1SAZ711201R1023	0.100
1.00 ... 1.30	6.0 A, fuse type gG	10	T16-1.3	1SAZ711201R1025	0.100
1.30 ... 1.70	10.0 A, fuse type gG	10	T16-1.7	1SAZ711201R1028	0.100
1.70 ... 2.30	10.0 A, fuse type gG	10	T16-2.3	1SAZ711201R1031	0.100
2.30 ... 3.10	10.0 A, fuse type gG	10	T16-3.1	1SAZ711201R1033	0.100
3.10 ... 4.20	20.0 A, fuse type gG	10	T16-4.2	1SAZ711201R1035	0.100
4.20 ... 5.70	20.0 A, fuse type gG	10	T16-5.7	1SAZ711201R1038	0.100
5.70 ... 7.60	35.0 A, fuse type gG	10	T16-7.6	1SAZ711201R1040	0.100
7.60 ... 10.0	35.0 A, fuse type gG	10	T16-10	1SAZ711201R1043	0.104
10.0 ... 13.0	40.0 A, fuse type gG	10	T16-13	1SAZ711201R1045	0.104
13.0 ... 16.0	40.0 A, fuse type gG	10	T16-16	1SAZ711201R1047	0.104

Ordering details accessories

Description	Suitable for	Type	Order code	Weight (1 pce) kg
Single mounting kit	T16	DB16	1SAZ701901R0001	0.032
Reset push button	E16, EF, TF, T16, TA200	KPR-101L	1SFA616162R1014	0.027



T16

Main dimensions mm, inches

2CDC232008F0008

2CDC106036C0201

T16 thermal overload relays – 0.10 to 16.0 A

Technical data

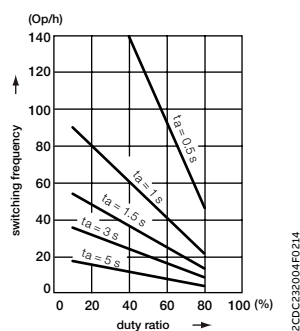
Main circuit – Utilization characteristics according to IEC/EN

Type	T16
Standards	IEC/EN 60947-4-1, IEC/EN 60947-5-1, IEC/EN 60947-1
Rated operational voltage Ue	690 V AC - V DC
Rated frequency	50/60 Hz
Trip class	10
Number of poles	3
Duty time	100%
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage Uimp	6 kV
Rated insulation voltage Ui	690 V AC

Auxiliary circuit according to IEC/EN

Type	T16
Rated operational voltage Ue	600 V
Conventional free air thermal current Ith	N.C., 95-96 6 A N.O., 97-98 4 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.O. + 1 N.C.
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	N.C., 95-96 3.00 A N.O., 97-98 0.75 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.75 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	N.C., 95-96 1.25 A N.O., 97-98 1.25 A
60 V	N.C., 95-96 0.55 A N.O., 97-98 0.55 A
110-120-125 V	N.C., 95-96 0.55 A N.O., 97-98 0.55 A
250 V	N.C., 95-96 0.27 A N.O., 97-98 0.27 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 6 A, fuse type gG N.O., 97-98 4 A, fuse type gG
Rated impulse withstand voltage Uimp	6 kV
Rated insulation voltage Ui	690 V

Technical diagram – Intermittent periodic duty



t_a : Motor starting time

2CDC232004F0214

T16 thermal overload relays – 0.10 to 16.0 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	T16
Standards	UL 508, CSA 22.2 No. 14
Maximum operational voltage	600 V AC
Trip rating	125% of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	T16
Contact rating	N.C., 95-96 B600, Q300
	N.O., 97-98 D300, Q300
Conventional thermal current	N.C., 95-96 5 A
	N.O., 97-98 2.5 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device 480 / 600 V AC		480 / 600 V AC	
		Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Fuse type
T16-0.13	0.13 A	18 kA	1 A, K5	100 kA	30 A, Class J
T16-0.17	0.17 A	18 kA	1 A, K5	100 kA	30 A, Class J
T16-0.23	0.23 A	18 kA	1 A, K5	100 kA	30 A, Class J
T16-0.31	0.31 A	18 kA	3 A, K5	100 kA	30 A, Class J
T16-0.41	0.41 A	18 kA	3 A, K5	100 kA	30 A, Class J
T16-0.55	0.55 A	18 kA	3 A, K5	100 kA	30 A, Class J
T16-0.74	0.74 A	18 kA	3 A, K5	100 kA	30 A, Class J
T16-1.0	1.00 A	18 kA	6 A, K5	100 kA	30 A, Class J
T16-1.3	1.30 A	18 kA	6 A, K5	100 kA	30 A, Class J
T16-1.7	1.70 A	18 kA	6 A, K5	100 kA	30 A, Class J
T16-2.3	2.30 A	18 kA	10 A, K5	100 kA	30 A, Class J
T16-3.1	3.10 A	18 kA	10 A, K5	100 kA	30 A, Class J
T16-4.2	4.20 A	18 kA	15 A, K5	100 kA	30 A, Class J
T16-5.7	5.70 A	18 kA	20 A, K5	100 kA	30 A, Class J
T16-7.6	7.60 A	18 kA	25 A, K5	100 kA	30 A, Class J
T16-10	10.0 A	18 kA	35 A, K5	100 kA	45 A, Class J
T16-13	13.0 A	18 kA	40 A, K5	100 kA	45 A, Class J
T16-16	16.0 A	18 kA	60 A, K5	100 kA	45 A, Class J

T16 thermal overload relays – 0.10 to 16.0 A

Technical data

General technical data

Type	T16	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation	Open - compensated	-25 ... +60 °C
Storage	Open	-25 ... +60 °C
Storage		-50 ... +80 °C
Ambient air temperature compensation	Acc. to IEC/EN60947-4-1	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6	3g / 3 ... 150 Hz	
Mounting position	Position 1-5	
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit on DIN rail (35 mm)	
Degree of protection	Housing	IP20
	Main circuit terminals	IP10

Electrical connection

Main circuit

Type	T16	
Connecting capacity		
 Rigid	1 x	0.75 ... 4 mm ²
	2 x	0.75 ... 1.5 mm ² or 1.5 ... 4 mm ² (1)
 Flexible	1 x or 2 x	0.75 ... 4 mm ²
Stranded acc. to UL/CSA	1 x or 2 x	AWG 18-10
Flexible acc. to UL/CSA	1 x or 2 x	AWG 18-10
Stripping length	12 mm	
Tightening torque	1.1 ... 1.5 Nm / 9 ... 13 lb.in	
Recommended screw driver	M4 (Pozidriv 2)	

Auxiliary circuit

Type	T16	
Connecting capacity		
 Rigid	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 x or 2 x	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 1.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ² (1)
Stranded acc. to UL/CSA	1 x or 2 x	AWG 18-12
Flexible acc. to UL/CSA	1 x or 2 x	AWG 18-12
Stripping length	9 mm	
Tightening torque	1.1 ... 1.5 Nm / 9 ... 13 lb.in	
Recommended screw driver	M3 (Pozidriv 2)	

(1) Only connect two different "conductor/wire" cross-sections, if they are within the indicated ranges

TF42 thermal overload relays – 0.10 to 38.0 A

Ordering details



TF42

2CDC231006F0013



TF42 + DB42

2CDC231026F0013

The TF42 thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

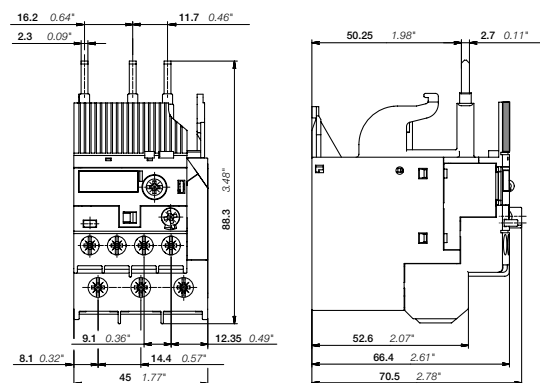
The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications
- With ATEX certification

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

Suitable for AF09...AF38 contactors

0.10 ... 0.13	0.5 A, fuse type T	10	TF42-0.13	1SAZ721201R1005	0.130
0.13 ... 0.17	1.0 A, fuse type T	10	TF42-0.17	1SAZ721201R1008	0.130
0.17 ... 0.23	1.0 A, fuse type T	10	TF42-0.23	1SAZ721201R1009	0.130
0.23 ... 0.31	1.0 A, fuse type T	10	TF42-0.31	1SAZ721201R1013	0.130
0.31 ... 0.41	2.0 A, fuse type gG	10	TF42-0.41	1SAZ721201R1014	0.130
0.41 ... 0.55	2.0 A, fuse type gG	10	TF42-0.55	1SAZ721201R1017	0.130
0.55 ... 0.74	4.0 A, fuse type gG	10	TF42-0.74	1SAZ721201R1021	0.130
0.74 ... 1.00	6.0 A, fuse type gG	10	TF42-1.0	1SAZ721201R1023	0.130
1.00 ... 1.30	6.0 A, fuse type gG	10	TF42-1.3	1SAZ721201R1025	0.130
1.30 ... 1.70	10.0 A, fuse type gG	10	TF42-1.7	1SAZ721201R1028	0.130
1.70 ... 2.30	10.0 A, fuse type gG	10	TF42-2.3	1SAZ721201R1031	0.130
2.30 ... 3.10	10.0 A, fuse type gG	10	TF42-3.1	1SAZ721201R1033	0.130
3.10 ... 4.20	20.0 A, fuse type gG	10	TF42-4.2	1SAZ721201R1035	0.130
4.20 ... 5.70	20.0 A, fuse type gG	10	TF42-5.7	1SAZ721201R1038	0.130
5.70 ... 7.60	35.0 A, fuse type gG	10	TF42-7.6	1SAZ721201R1040	0.130
7.60 ... 10.0	35.0 A, fuse type gG	10	TF42-10	1SAZ721201R1043	0.130
10.0 ... 13.0	40.0 A, fuse type gG	10	TF42-13	1SAZ721201R1045	0.130
13.0 ... 16.0	40.0 A, fuse type gG	10	TF42-16	1SAZ721201R1047	0.130
16.0 ... 20.0	63.0 A, fuse type gG	10	TF42-20	1SAZ721201R1049	0.145
20.0 ... 24.0	63.0 A, fuse type gG	10	TF42-24	1SAZ721201R1051	0.145
24.0 ... 29.0	63.0 A, fuse type gG	10	TF42-29	1SAZ721201R1052	0.145
29.0 ... 35.0	80.0 A, fuse type gG	10	TF42-35	1SAZ721201R1053	0.145
35.0 ... 38.0/40.0	80.0 A, fuse type gG	10	TF42-38	1SAZ721201R1055	0.145



TF42

Main dimensions mm, inches

2CDC232005F0009

2CDC106046C0201

TF42 thermal overload relays – 0.10 to 38.0 A

Ordering details



Ordering details accessories				
Description	Suitable for	Type	Order code	Weight (1 pce) kg
Single mounting kit	TF42	DB42	1SAZ701902R0001	0.087
Reset push button	E16, EF, TF, T16, TA200	KPR-101L	1SFA616162R1014	0.019
Remote reset coil 24-30 V AC/DC	TF42, TF65, TF96	DRS-F-01	1SAX101911R1001	0.077
Remote reset coil 48-60 V AC/DC		DRS-F-02	1SAX101911R1002	0.077
Remote reset coil 110-127 V AC/DC		DRS-F-03	1SAX101911R1003	0.077
Remote reset coil 220-240 V AC/DC		DRS-F-04	1SAX101911R1004	0.077

TF42 thermal overload relays – 0.10 to 38.0 A

Technical data

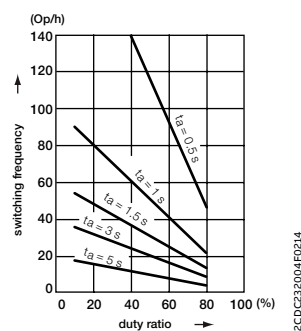
Main circuit – Utilization characteristics according to IEC/EN

Type	TF42
Standards	IEC/EN 60947-4-1, IEC/EN 60947-5-1, IEC/EN 60947-1
Rated operational voltage Ue	690 V AC
Rated frequency	50/60 Hz
Trip class	10
Number of poles	3
Duty time	100%
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage Uimp	6 kV
Rated insulation voltage Ui	690 V AC

Auxiliary circuit according to IEC/EN

Type	TF42
Rated operational voltage Ue	600 V
Conventional free air thermal current Ith	N.C., 95-96 6 A N.O., 97-98 4 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.O. + 1 N.C.
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	N.C., 95-96 3.00 A N.O., 97-98 0.75 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.75 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	N.C., 95-96 1.25 A N.O., 97-98 1.25 A
110-120-125 V	N.C., 95-96 0.55 A N.O., 97-98 0.55 A
250 V	N.C., 95-96 0.27 A N.O., 97-98 0.27 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 6 A, fuse type gG N.O., 97-98 4 A, fuse type gG
Rated impulse withstand voltage Uimp	6 kV
Rated insulation voltage Ui	690 V

Technical diagram – Intermittent periodic duty



ta: Motor starting time

TF42 thermal overload relays – 0.10 to 38.0 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TF42
Standards	UL 508, CSA 22.2 No. 14
Maximum operational voltage	600 V AC
Trip rating	125% of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	TF42
Contact rating	N.C., 95-96 B600, Q300
	N.O., 97-98 D300, Q300
Conventional thermal current	N.C., 95-96 5 A
	N.O., 97-98 2.5 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device			
		480 / 600 V AC		480 / 600 V AC	
		Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Fuse type
TF42-0.13	0.13 A	18 kA	1 A, K5	100 kA	30 A, Class J
TF42-0.17	0.17 A	18 kA	1 A, K5	100 kA	30 A, Class J
TF42-0.23	0.23 A	18 kA	1 A, K5	100 kA	30 A, Class J
TF42-0.31	0.31 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-0.41	0.41 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-0.55	0.55 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-0.74	0.74 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-1.0	1.00 A	18 kA	6 A, K5	100 kA	30 A, Class J
TF42-1.3	1.30 A	18 kA	6 A, K5	100 kA	30 A, Class J
TF42-1.7	1.70 A	18 kA	6 A, K5	100 kA	30 A, Class J
TF42-2.3	2.30 A	18 kA	10 A, K5	100 kA	30 A, Class J
TF42-3.1	3.10 A	18 kA	10 A, K5	100 kA	30 A, Class J
TF42-4.2	4.20 A	18 kA	15 A, K5	100 kA	30 A, Class J
TF42-5.7	5.70 A	18 kA	20 A, K5	100 kA	30 A, Class J
TF42-7.6	7.60 A	18 kA	25 A, K5	100 kA	30 A, Class J
TF42-10	10.0 A	18 kA	35 A, K5	100 kA	45 A, Class J
TF42-13	13.0 A	18 kA	40 A, K5	100 kA	45 A, Class J
TF42-16	16.0 A	18 kA	60 A, K5	100 kA	45 A, Class J
TF42-20	20.0 A	18 kA	80 A, K5	100 kA	60 A, Class J
TF42-24	24.0 A	18 kA	80 A, K5	100 kA	60 A, Class J
TF42-29	29.0 A	18 kA	100 A, K5	100 kA	100 A, Class J
TF42-35	35.0 A	18 kA	150 A, K5	100 kA	175 A, Class J
TF42-38	38.0 A	18 kA	150 A, K5	100 kA	175 A, Class J

TF42 thermal overload relays – 0.10 to 38.0 A

Technical data

General technical data

Type	TF42	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation	Open - compensated	-25 ... +60 °C
	Open	-25 ... +60 °C
Storage	-50 ... +80 °C	
Ambient air temperature compensation	Acc. to IEC/EN60947-4-1	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6	3g / 3 ... 150 Hz	
Mounting position	Position 1-5	
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit on DIN rail (35 mm)	
Degree of protection	Housing	IP20
	Main circuit terminals	IP10

Electrical connection

Main circuit

Type	TF42 (TF42-0.13 ... TF42-16)		TF42 (TF42-20 ... TF42-38)
Connecting capacity			
 Rigid	1 x or 2 x	0.75 ... 4 mm ²	1.5 ... 2.5 mm ² or 2.5 ... 10 mm ² (1)
 Flexible with insulated ferrule	1 x or 2 x	0.75 ... 4 mm ²	2.5 ... 4 mm ² or 4 ... 6 mm ² (1)
Stranded acc. to UL/CSA	1 x or 2 x	AWG 18-10	AWG 14-6
Flexible acc. to UL/CSA	1 x or 2 x	AWG 18-10	AWG 14-6
Stripping length	12 mm		
Tightening torque	1.5 - 2.5 Nm / 13 ... 22 lb.in		2.5 - 2.7 Nm / 22 lb.in
Recommended screw driver	M4 (Pozidriv 2)		

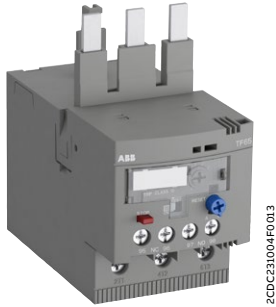
Auxiliary circuit

Type	TF42	
Connecting capacity		
 Rigid	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 x or 2 x	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 1.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ² (1)
Stranded acc. to UL/CSA	1 x or 2 x	AWG 18-12
Flexible acc. to UL/CSA	1 x or 2 x	AWG 18-12
Stripping length	9 mm	
Tightening torque	1.1 ... 1.5 Nm / 9 ... 13 lb.in	
Recommended screw driver	M3 (Pozidriv 2)	

(1) Only connect two different "conductor/wire" cross-sections, if they are within the indicated ranges.

TF65 thermal overload relays – 22.0 to 67.0 A

Ordering details



TF65

2CDC231004F013



DB65

2CDC231003V0015



DB65 + TF65

2CDC231004V0015



KPR-101L

15FC151224F0002

The TF65 thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications
- With ATEX certification (1)

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

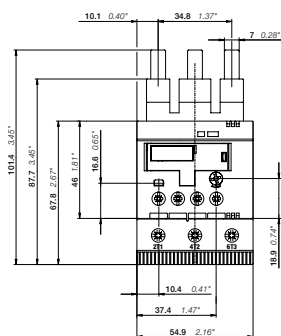
Suitable for AF40...AF65 contactors

22.0 ... 28.0	80 A, gG Type Fuses	10	TF65-28	1SAZ811201R1001	0.456
25.0 ... 33.0	80 A, gG Type Fuses	10	TF65-33	1SAZ811201R1002	0.456
30.0 ... 40.0	100 A, gG Type Fuses	10	TF65-40	1SAZ811201R1003	0.456
36.0 ... 47.0	125 A, gG Type Fuses	10	TF65-47	1SAZ811201R1004	0.456
44.0 ... 53.0	125 A, gG Type Fuses	10	TF65-53	1SAZ811201R1005	0.456
50.0 ... 60.0	125 A, gG Type Fuses	10	TF65-60	1SAZ811201R1006	0.466
57.0 ... 67.0	160 A, gG Type Fuses	10	TF65-67	1SAZ811201R1007	0.466

Ordering details accessories

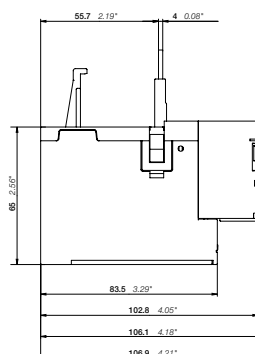
Description	Suitable for	Type	Order code	Weight (1 pce) kg
Single mounting kit	TF65	DB65	1SAZ801901R1001	0.132
Reset push button	E16, EF, TF, T16, TA200	KPR-101L	15FA616162R1014	0.019
Remote reset coil 24-30 V AC / DC	TF42, TF65, TF96	DRS-F-01	1SAX101911R1001	0.077
Remote reset coil 48-60 V AC / DC		DRS-F-02	1SAX101911R1002	0.077
Remote reset coil 110-127 V AC / DC		DRS-F-03	1SAX101911R1003	0.077
Remote reset coil 220-240 V AC / DC		DRS-F-04	1SAX101911R1004	0.077

1) ATEX is valid for products, produced from week 26, 2015.



TF65

Main dimensions mm, inches



2CDC232005F0009

2CDC106063 C0201

TF65 thermal overload relays – 22.0 to 67.0 A

Technical data

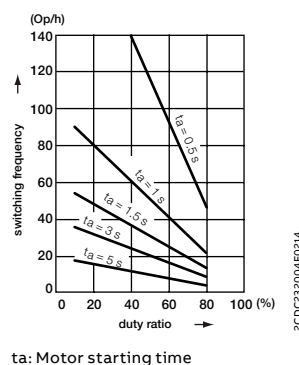
Main circuit – Utilization characteristics according to IEC/EN

Type	TF65
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage Ue	690 V AC
Rated frequency	50/60 Hz
Trip class	10
Number of poles	3
Duty time	100%
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage Uimp	8 kV
Rated insulation voltage Ui	690 V

Auxiliary circuit according to IEC/EN

Type	TF65
Rated operational voltage Ue	600 V
Conventional free air thermal current Ith	N.C., 95-96 6 A N.O., 97-98 4 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.O. + 1 N.C.
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	N.C., 95-96 3.00 A N.O., 97-98 0.75 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.75 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	N.C., 95-96 1.25 A N.O., 97-98 1.25 A
110-120-125 V	N.C., 95-96 0.55 A N.O., 97-98 0.55 A
250 V	N.C., 95-96 0.27 A N.O., 97-98 0.27 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 6 A, gG Type Fuses N.O., 97-98 4 A, gG Type Fuses
Rated impulse withstand voltage Uimp	6 kV
Rated insulation voltage Ui	690 V

Technical diagram – Intermittent periodic duty



TF65 thermal overload relays – 22.0 to 67.0 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TF65
Standards	UL 60947-1, UL 60947-4-1
Maximum operational voltage	600 V AC
Trip rating	125% of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	TF65
Contact rating	N.C., 95-96 B600, Q600
	N.O., 97-98 D300, Q600
Conventional thermal current	N.C., 95-96 6 A
	N.O., 97-98 4 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device		480 / 600 V AC	
		Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Fuse type
TF65-28	28 A	5 kA	100 A, K5 / RK5	100 kA	110 A, Class J
TF65-33	33 A	5 kA	100 A, K5 / RK5	100 kA	110 A, Class J
TF65-40	40 A	5 kA	100 A, K5 / RK5	100 kA	110 A, Class J
TF65-47	47 A	5 kA	125 A, K5 / RK5	100 kA	125 A, Class J
TF65-53	53 A	10 kA	125 A, K5 / RK5	100 kA	125 A, Class J
TF65-60	60 A	10 kA	150 A, K5 / RK5	100 kA	150 A, Class J
TF65-67	67 A	10 kA	150 A, K5 / RK5	100 kA	150 A, Class J

TF65 thermal overload relays – 22.0 to 67.0 A

Technical data

General technical data

Type	TF65	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation (1)	Open - compensated	-40 ... +70 °C
	Open	-40 ... +70 °C
Storage	-50 ... +80 °C	
Ambient air temperature compensation	Acc. to IEC/EN 60947-4-1	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz	
Mounting position	Position 1 to 6	
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit on DIN rail (35 mm)	
Degree of protection	Housing	IP20
	Main circuit terminals	IP10

(1) Valid for TF65 produced from week 11, 2016. Otherwise, -25 ... +60 °C range is valid.
Derating might be applicable for temperatures > 50°C. Data on request

Electrical connection

Main circuit

Type	TF65	
Connecting capacity		
 Rigid	1 x or 2 x	2.5 ... 16 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible with ferrule	1 x or 2 x	2.5 ... 10 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible with insulated ferrule	1 x or 2 x	2.5 ... 10 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible	1 x or 2 x	2.5 ... 16 mm ²
	1 x	2.5 ... 35 mm ²
	Stranded acc. to UL/CSA	1 x AWG 12 ... 2
		2 x AWG 12 ... 6
	Flexible acc. to UL/CSA	1 x AWG 12 ... 2
		2 x AWG 12 ... 6
Stripping length	17 mm	
Tightening torque	4.0 - 4.5 Nm / 35 ... 40 lb.in	
Recommended screw driver	M6 (Pozidriv 2)	

Auxiliary circuit

Type	TF65	
Connecting capacity		
 Rigid	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 1.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ²
	Stranded acc. to UL/CSA	1 x or 2 x AWG 18 ... 12
	Flexible acc. to UL/CSA	1 x or 2 x AWG 18 ... 12
Stripping length	9 mm	
Tightening torque	1.1 ... 1.5 Nm / 9 ... 13 lb.in	
Recommended screw driver	M3 (Pozidriv 2)	

TF96 thermal overload relays – 40.0 to 96.0 A

Ordering details



TF96

2CDC231005F0013



DB96

2CDC231001V0015



DB96 + TF96

2CDC231005V0015



KPR-101L

15FC151224F0002

The TF96 thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications
- With ATEX certification (1)

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

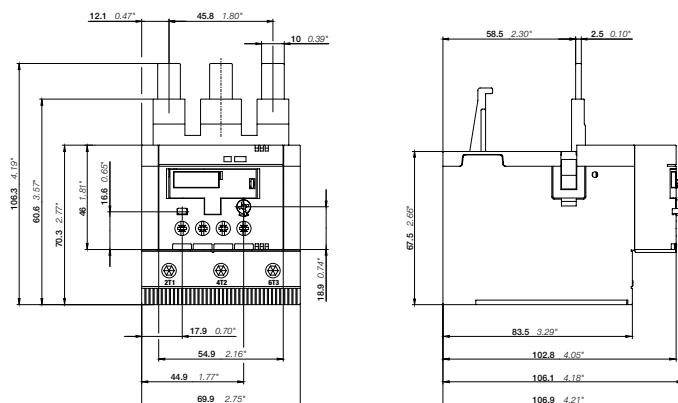
Suitable for AF80, AF96 contactors

40.0 ... 51.0	125 A, gG Type Fuses	10	TF96-51	1SAZ911201R1001	0.620
48.0 ... 60.0	160 A, gG Type Fuses	10	TF96-60	1SAZ911201R1002	0.620
57.0 ... 68.0	160 A, gG Type Fuses	10	TF96-68	1SAZ911201R1003	0.620
65.0 ... 78.0	200 A, gG Type Fuses	10	TF96-78	1SAZ911201R1004	0.620
75.0 ... 87.0	200 A, gG Type Fuses	10	TF96-87	1SAZ911201R1005	0.620
84.0 ... 96.0	250 A, gG Type Fuses	10	TF96-96	1SAZ911201R1006	0.630

Ordering details accessories

Description	Suitable for	Type	Order code	Weight (1 pce) kg
Single mounting kit	TF96, EF96	DB96	1SAZ901901R1001	0.190
Reset push button	E16, EF, TF, T16, TA200	KPR-101L	1SFA616162R1014	0.019
Remote reset coil 24-30 V AC/DC	TF42, TF65, TF96	DRS-F-01	1SAX101911R1001	0.077
Remote reset coil 48-60 V AC/DC		DRS-F-02	1SAX101911R1002	0.077
Remote reset coil 110-127 V AC/DC		DRS-F-03	1SAX101911R1003	0.077
Remote reset coil 220-240 V AC/DC		DRS-F-04	1SAX101911R1004	0.077

(1) ATEX is valid for products, produced from week 26, 2015.



TF96

Main dimensions mm, inches

2CDC231005F0009

2CDC106064C0201

TF96 thermal overload relays – 40.0 to 96.0 A

Technical data

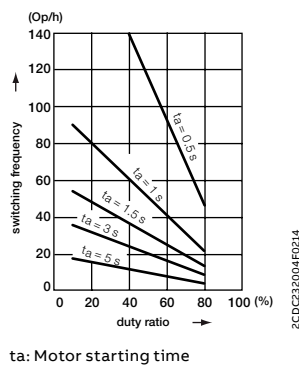
Main circuit – Utilization characteristics according to IEC/EN

Type	TF96
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage Ue	690 V AC
Rated frequency	50/60 Hz
Trip class	10
Number of poles	3
Duty time	100%
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage Uimp	8 kV
Rated insulation voltage Ui	690 V

Auxiliary circuit according to IEC/EN

Type	TF96
Rated operational voltage Ue	600 V
Conventional free air thermal current Ith	N.C., 95-96 6 A N.O., 97-98 4 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.O. + 1 N.C.
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	N.C., 95-96 3.00 A N.O., 97-98 0.75 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.75 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.75 A
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	N.C., 95-96 1.25 A N.O., 97-98 1.25 A
110-120-125 V	N.C., 95-96 0.55 A N.O., 97-98 0.55 A
250 V	N.C., 95-96 0.27 A N.O., 97-98 0.27 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 6 A, fuse type gG N.O., 97-98 4 A, fuse type gG
Rated impulse withstand voltage Uimp	6 kV
Rated insulation voltage Ui	690 V

Technical diagram – Intermittent periodic duty



TF96 thermal overload relays – 40.0 to 96.0 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TF96
Standards	UL 60947-1, UL 60947-4-1
Maximum operational voltage	600 V AC
Trip rating	125% of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	TF96
Contact rating	N.C., 95-96 B600, Q600
	N.O., 97-98 D300, Q600
Conventional thermal current	N.C., 95-96 6 A
	N.O., 97-98 4 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device		480 / 600 V AC	
		480 / 600 V AC		480 / 600 V AC	
		Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Fuse type
TF96-51	51 A	5 kA	150 A, K5 / RK5	100 kA	125 A, Class J
TF96-60	60 A	10 kA	150 A, K5 / RK5	100 kA	150 A, Class J
TF96-68	68 A	10 kA	150 A, K5 / RK5	100 kA	150 A, Class J
TF96-78	78 A	10 kA	175 A, K5 / RK5	100 kA	175 A, Class J
TF96-87	87 A	10 kA	200 A, K5 / RK5	100 kA	200 A, Class J
TF96-96	96 A	10 kA	250 A, K5 / RK5	100 kA	200 A, Class J

TF96 thermal overload relays – 40.0 to 96.0 A

Technical data

General technical data

Type	TF96	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation (1)	Open - compensated	-40 ... +70 °C
	Open	-40 ... +70 °C
Storage		-50 ... +80 °C
Ambient air temperature compensation	Acc. to IEC/EN60947-4-1	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz	
Mounting position	Position 1 to 6	
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit on DIN rail (35 mm)	
Degree of protection	Housing	IP20
	Main circuit terminals	IP10

(1) Valid for TF96 produced from week 11, 2016. Otherwise, -25 ... +60 °C range is valid.
Derating might be applicable for temperatures > 50 °C. Data on request.

Electrical connection

Main circuit

Type	TF96	
Connecting capacity		
 Rigid	1 x or 2 x	6 ... 35 mm ²
	1 x	6 ... 50 mm ²
 Flexible with ferrule	1 x or 2 x	6 ... 35 mm ²
	1 x	6 ... 50 mm ²
 Flexible with insulated ferrule	1 x or 2 x	6 ... 16 mm ²
	1 x	6 ... 50 mm ²
 Flexible	1 x or 2 x	6 ... 35 mm ²
	1 x	6 ... 50 mm ²
Stranded acc. to UL/CSA	1 x	AWG 8 ... 1
	2 x	AWG 8 ... 3
Flexible acc. to UL/CSA	1 x	AWG 8 ... 1
	2 x	AWG 8 ... 3
Stripping length	20 mm (1)	
Tightening torque	6 ... 9 Nm / 53 ... 80 lb.in (2)	
Recommended screw driver	M8 (Hexagon)	

(2) Valid for products, produced from week 27, 2015

Auxiliary circuit

Type	TF96	
Connecting capacity		
 Rigid	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 1.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ²
Stranded acc. to UL/CSA	1 x or 2 x	AWG 18 ... 12
Flexible acc. to UL/CSA	1 x or 2 x	AWG 18 ... 12
Stripping length	9 mm	
Tightening torque	1.1 ... 1.5 Nm / 9 ... 13 lb.in	
Recommended screw driver	M3 (Pozidriv 2)	

TF140DU thermal overload relays – 66 to 142 A

Ordering details



TF140DU

2CDC231012F0012



KPR-101L

1SFA616124F0002

The TF140DU thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10A.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications
- ATEX variants available

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

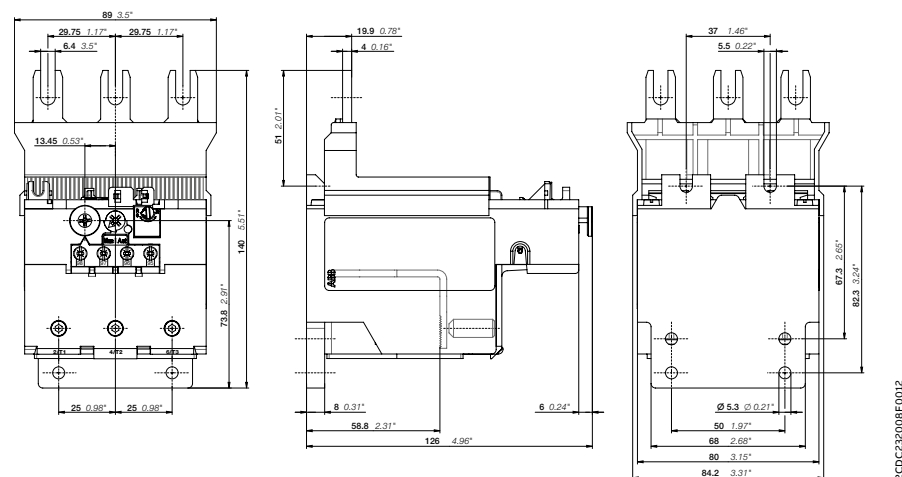
Suitable for AF116...AF140 contactors

66 ... 90	200 A, fuse type gG	10A	TF140DU-90	1SAZ431201R1001	0.820
80 ... 110	224 A, fuse type gG	10A	TF140DU-110	1SAZ431201R1002	0.820
100 ... 135	224 A, fuse type gG	10A	TF140DU-135	1SAZ431201R1003	0.820
110 ... 142	250 A, fuse type gG	10A	TF140DU-142	1SAZ431201R1004	0.820
66 ... 90	200 A, fuse type gG	10A	TF140DU-90-V1000*	1SAZ431301R1001	0.820
80 ... 110	224 A, fuse type gG	10A	TF140DU-110-V1000*	1SAZ431301R1002	0.820
100 ... 135	224 A, fuse type gG	10A	TF140DU-135-V1000*	1SAZ431301R1003	0.820
110 ... 142	250 A, fuse type gG	10A	TF140DU-142-V1000*	1SAZ431301R1004	0.820

*Note: ATEX variant

Ordering details accessories

Description	Suitable for	Type	Order code	Weight (1 pce) kg
Reset push button	E16, EF, TF, T16, TA200	KPR-101L	1SFA616162R1014	0.027



TF140DU

Main dimensions mm, inches

TF140DU thermal overload relays – 66 to 142 A

Technical data

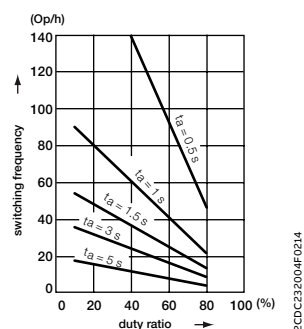
Main circuit – Utilization characteristics according to IEC/EN

Type	TF140DU / TF140DU-V1000
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage Ue	690 V AC
Rated frequency	DC, 50/60 Hz
Frequency range	0 ... 400 Hz
Trip class	10A
Number of poles	3
Duty time	100%
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage Uimp	8 kV
Rated insulation voltage Ui	690 V

Auxiliary circuit according to IEC/EN

Type	TF140DU / TF140DU-V1000
Rated operational voltage Ue	500 V AC, 440 V DC
Conventional free air thermal current Ith	N.C., 95-96 10 A N.O., 97-98 6 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.O. + 1 N.C.
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	N.C., 95-96 3.00 A N.O., 97-98 1.50 A
220-230-240 V	N.C., 95-96 1.50 A N.O., 97-98 1.50 A
440 V	N.C., 95-96 1.00 A N.O., 97-98 1.00 A
480-500 V	N.C., 95-96 1.00 A N.O., 97-98 1.00 A
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	N.C., 95-96 1.25 A N.O., 97-98 1.25 A
60 V	N.C., 95-96 0.25 A N.O., 97-98 0.25 A
110-120-125 V	N.C., 95-96 0.25 A N.O., 97-98 0.25 A
250 V	N.C., 95-96 0.12 A N.O., 97-98 0.04 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 10 A, fuse type gG N.O., 97-98 6 A, fuse type gG
Rated impulse withstand voltage Uimp	6 kV
Rated insulation voltage Ui	690 V

Technical diagram – Intermittent periodic duty



ta: Motor starting time

TF140DU thermal overload relays – 66 to 142 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TF140DU / TF140DU-V1000
Standards	UL 508, CSA 22.2 No. 14, UL 60947-4-1A
Maximum operational voltage	600 V AC
Trip rating	125% of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	TF140DU / TF140DU-V1000		
Contact rating	N.C., 95-96	B600	
	N.O., 97-98	C300	
Conventional thermal current	N.C./N.O.	10 A / 6 A	

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device					
		480 / 600 V AC		480 / 600 V AC		480 / 600 V AC	
		Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Listed circuit breaker
TF140DU-90 / TF140DU-90-V1000	90 A	10 kA	250 A, K5 / RK5	100 kA	250 A, Class J	100 kA	250 A
TF140DU-110 / TF140DU-110-V1000	110 A	10 kA	250 A, K5 / RK5	100 kA	250 A, Class J	100 kA	250 A
TF140DU-135 / TF140DU-135-V1000	135 A	10 kA	250 A, K5 / RK5	100 kA	250 A, Class J	100 kA	250 A
TF140DU-142 / TF140DU-142-V1000	142 A	10 kA	250 A, K5 / RK5	100 kA	250 A, Class J	100 kA	250 A

TF140DU thermal overload relays – 66 to 142 A

Technical data

General technical data

Type	TF140DU / TF140DU-V1000	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation	Open - compensated	-25 ... +55 °C
	Open	-25 ... +55 °C
Storage	-40 ... +70 °C	
Ambient air temperature compensation	Acc. to IEC/EN 60947-4-1	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	12g / 11 ms	
Mounting position	Position 1-5	
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals	
Degree of protection	Housing	IP20
	Main circuit terminals	IP00

Electrical connection

Main circuit

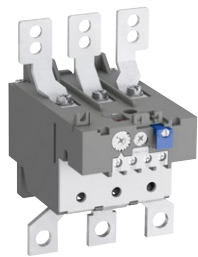
Type	TF140DU / TF140DU-V1000	
Connecting capacity		
 Rigid	1 x	16 ... 70 mm ²
	2 x	-
 Flexible	1 x	16 ... 70 mm ²
	2 x	-
	Stranded acc. to UL/CSA	1 x or 2 x AWG 6-2/0
	Flexible acc. to UL/CSA	1 x or 2 x AWG 6-2/0
Stripping length	25 mm	
Tightening torque	8 ... 10 Nm / 77 ... 88 lb.in	
Recommended screw driver	M8 (Hexagon)	

Auxiliary circuit

Type	TF140DU / TF140DU-V1000	
Connecting capacity		
 Rigid	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 x or 2 x	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 x or 2 x	0.75 ... 2.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 2.5 mm ²
	Stranded acc. to UL/CSA	1 x or 2 x AWG 18-14
	Flexible acc. to UL/CSA	1 x or 2 x AWG 18-14
Stripping length	9 mm	
Tightening torque	0.8 ... 1.3 Nm / 12 lb.in	
Recommended screw driver	M3.5 (Pozidriv 2)	

TA200DU thermal overload relays – 66 to 200 A

Ordering details



TA200DU

2CDC23016F0013



KPR-101L

1SFCU51224F0002

The TA200DU thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10A.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation
- Suitable for three- and single-phase applications
- ATEX variants available

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

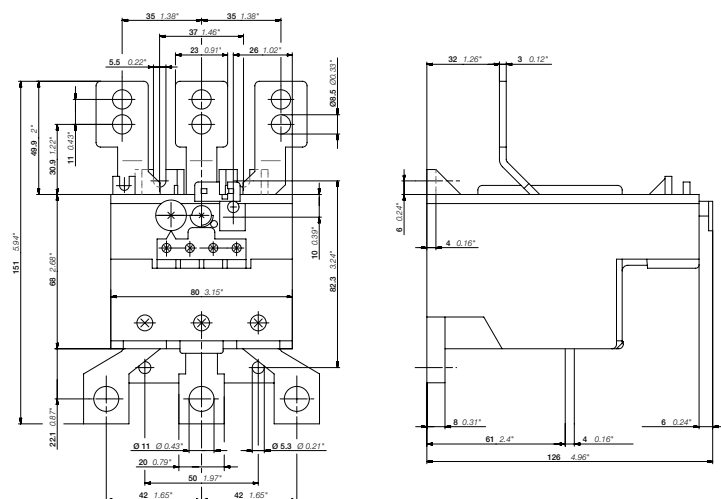
Suitable for AF145...AF2050 contactors

66 ... 90	200 A, fuse type gG / 125 A aM	10A	TA200DU-90	1SAZ421201R1001	0.755
80 ... 110	224 A, fuse type gG / 160 A aM	10A	TA200DU-110	1SAZ421201R1002	0.760
100 ... 135	224 A, fuse type gG / 200 A aM	10A	TA200DU-135	1SAZ421201R1003	0.760
110 ... 150	250 A, fuse type gG / 200 A aM	10A	TA200DU-150	1SAZ421201R1004	0.760
130 ... 175	315 A, fuse type gG / 250 A aM	10A	TA200DU-175	1SAZ421201R1005	0.770
150 ... 200	315 A, fuse type gG / 250 A aM	10A	TA200DU-200	1SAZ421201R1006	0.785
66 ... 90	200 A, fuse type gG / 125 A aM	10A	TA200DU-90-V1000 (1)	1SAZ421301R1001	0.755
80 ... 110	224 A, fuse type gG / 160 A aM	10A	TA200DU-110-V1000 (1)	1SAZ421301R1002	0.760
100 ... 135	224 A, fuse type gG / 200 A aM	10A	TA200DU-135-V1000 (1)	1SAZ421301R1003	0.760
110 ... 150	250 A, fuse type gG / 200 A aM	10A	TA200DU-150-V1000 (1)	1SAZ421301R1004	0.760
130 ... 175	315 A, fuse type gG / 250 A aM	10A	TA200DU-175-V1000 (1)	1SAZ421301R1005	0.770
150 ... 200	315 A, fuse type gG / 250 A aM	10A	TA200DU-200-V1000 (1)	1SAZ421301R1006	0.785

(1) ATEX variant

Ordering details accessories

Description	Suitable for	Type	Order code	Weight (1 pce) kg
Terminal shroud	TA200DU	LT200/A	1SAZ401901R1001	0.090
Single mounting kit	TA200DU	DB200	1SAZ401110R0001	0.225
Reset push button	E16, EF, TF, T16, TA200	KPR-101L	1SFA616162R1014	0.027



TA200DU

Main dimensions mm, inches

2CDC23022F0011

2CDC106038C0201

TA200DU thermal overload relays – 66 to 200 A

Technical data

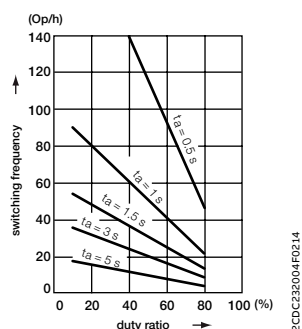
Main circuit – Utilization characteristics according to IEC/EN

Type	TA200DU / TA200DU-V1000
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1
Rated operational voltage Ue	690 V AC
Rated frequency	DC, 50/60 Hz
Frequency range	0 ... 400 Hz
Trip class	10A
Number of poles	3
Duty time	100%
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage Uimp	6 kV
Rated insulation voltage Ui	690 V AC

Auxiliary circuit according to IEC/EN

Type	TA200DU / TA200DU-V1000
Rated operational voltage Ue	500 V AC, 440 V DC
Conventional free air thermal current Ith	N.C., 95-96 10 A N.O., 97-98 6 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.O. + 1 N.C.
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	N.C., 95-96 3.00 A N.O., 97-98 1.50 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 1.50 A
440 V	N.C., 95-96 1.00 A N.O., 97-98 1.00 A
480-500 V	N.C., 95-96 1.00 A N.O., 97-98 1.00 A
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	N.C., 95-96 1.25 A N.O., 97-98 1.25 A
60 V	N.C., 95-96 0.25 A N.O., 97-98 0.25 A
110-120-125 V	N.C., 95-96 0.25 A N.O., 97-98 0.25 A
250 V	N.C., 95-96 0.12 A N.O., 97-98 0.04 A
Minimum switching capacity	17 V / 3 mA
Short-circuit protective device	N.C., 95-96 10 A, fuse type gG N.O., 97-98 6 A, fuse type gG
Rated impulse withstand voltage Uimp	6 kV
Rated insulation voltage Ui	690 V

Technical diagram – Intermittent periodic duty



TA200DU thermal overload relays – 66 to 200 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	TA200DU / TA200DU-V1000
Standards	UL 508, CSA 22.2 No. 14
Maximum operational voltage	600 V AC
Trip rating	125% of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	TA200DU / TA200DU-V1000
Contact rating	N.C., 95-96 C600
	N.O., 97-98 B600
Conventional thermal current	5 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device 480 / 600 V AC						
		Short circuit rating RMS symmetrical	Fuse type	Listed circuit breaker	Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Listed circuit breaker
TA200DU-90 / TA200DU-90-V1000	90 A	10 kA	250 A, K5 / RK5	225 A	100 kA	250 A, Class J	100 kA	250 A
TA200DU-110 / TA200DU-110-V1000	110 A	10 kA	250 A, K5 / RK5	225 A	100 kA	250 A, Class J	100 kA	250 A
TA200DU-135 / TA200DU-135-V1000	135 A	10 kA	300 A, K5 / RK5	225 A	100 kA	250 A, Class J	100 kA	250 A
TA200DU-150 / TA200DU-150-V1000	150 A	10 kA	300 A, K5 / RK5	225 A	100 kA	250 A, Class J	100 kA	250 A
TA200DU-175 / TA200DU-175-V1000	175 A	10 kA	300 A, K5 / RK5	225 A	100 kA	300 A, Class J	100 kA	300 A
TA200DU-200 / TA200DU-200-V1000	200 A	10 kA	400 A, K5 / RK5	400 A	100 kA	400 A, Class J	100 kA	400 A

TA200DU thermal overload relays – 66 to 200 A

Technical data

General technical data

Type	TA200DU / TA200DU-V1000	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation	Open - compensated	-25 ... +55 °C
	Open	-25 ... +55 °C
Storage	-40 ... +70 °C	
Ambient air temperature compensation	Acc. to IEC/EN60947-4-1	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	12g / 15 ms	
Mounting position	Position 1-6	
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit	
Degree of protection	Housing	IP20
	Main circuit terminals	IP00

Electrical connection

Main circuit

Type	TA200DU / TA200DU-V1000	
Connecting capacity		
 Rigid	1 x	25 ... 120 mm ²
 Flexible	1 x	25 ... 120 mm ²
	Stranded acc. to UL/CSA	1 x AWG 4 ... 0000
	Flexible acc. to UL/CSA	1 x AWG 4 ... 0000
	Lugs	L > 10 mm
Tightening torque	25 Nm / 220 lb.in	
Recommended screwdriver	Open bars	

Auxiliary circuit

Type	TA200DU / TA200DU-V1000	
Connecting capacity		
 Rigid	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 x or 2 x	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 x or 2 x	0.75 ... 2.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 2.5 mm ²
	Stranded acc. to UL/CSA	1 x or 2 x AWG 18 ... 14
	Flexible acc. to UL/CSA	1 x or 2 x AWG 18 ... 14
Stripping length	9 mm	
Tightening torque	0.8 ... 1.3 Nm / 12 lb.in	
Recommended screwdriver	M3.5 (Pozidriv 2)	

E16DU, EF19, EF45 electronic overload relays – 0.10 to 45.0 A

Ordering details



2CDC231001F0007

E16DU-1.0



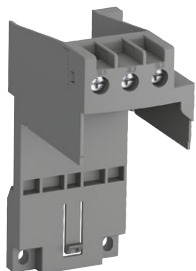
1SBC101147F0010

EF19-18.9



1SBC101148F0010

EF45-30



2CDC231024V0013

DB19EF



2CDC231002V0014

DB45EF



1SFC151224F0002

KPR-101L

The E16DU, EF19 and EF45 are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. The overload relays are connected directly to the contactors. The EF19 and EF45 have ATEX and IECEx certification (1).

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

E16DU electronic overload relays, suitable for B6 & B7

0.10 ... 0.32	1 A, fuse type gG	10E, 20E, 30E	E16DU-0.32	1SAX111001R1101	0.150
0.30 ... 1.00	4 A, fuse type gG	10E, 20E, 30E	E16DU-1.0	1SAX111001R1102	0.150
0.80 ... 2.70	10 A, fuse type gG	10E, 20E, 30E	E16DU-2.7	1SAX111001R1103	0.150
2.00 ... 6.30	20 A, fuse type gG	10E, 20E, 30E	E16DU-6.3	1SAX111001R1104	0.150
5.70 ... 18.9	50 A, fuse type gG	10E, 20E, 30E	E16DU-18.9	1SAX111001R1105	0.150

EF19 electronic overload relays, suitable for AF09 ... AF26 (1)

0.10 ... 0.32	1 A, fuse type gG	10E, 20E, 30E	EF19-0.32	1SAX121001R1101	0.158
0.30 ... 1.00	4 A, fuse type gG	10E, 20E, 30E	EF19-1.0	1SAX121001R1102	0.158
0.80 ... 2.70	10 A, fuse type gG	10E, 20E, 30E	EF19-2.7	1SAX121001R1103	0.158
1.90 ... 6.30	20 A, fuse type gG	10E, 20E, 30E	EF19-6.3	1SAX121001R1104	0.158
5.70 ... 18.9	50 A, fuse type gG	10E, 20E, 30E	EF19-18.9	1SAX121001R1105	0.158

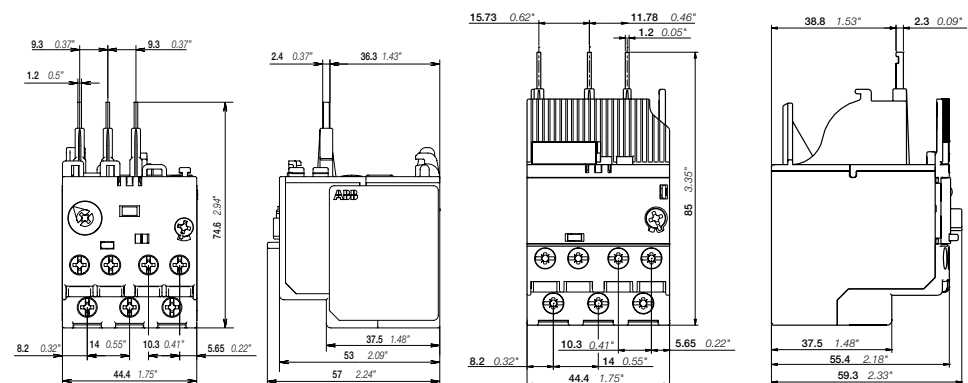
EF45 electronic overload relays, suitable for AF26 ... AF38 (1)

9.00 ... 30.0	160 A, fuse type gG	10E, 20E, 30E	EF45-30	1SAX221001R1101	0.362
15.0 ... 45.0	160 A, fuse type gG	10E, 20E, 30E	EF45-45	1SAX221001R1102	0.362

(1) ATEX is valid for products produced from week 42, 2014. IECEx is valid for products produced from week 15, 2017.

Ordering details accessories

Description	Suitable for	Type	Order code	Weight (1 pce) kg
Single mounting kit	E16DU	DB16E	1SAX101110R0001	0.035
Single mounting kit	EF19	DB19EF	1SAX101910R1001	0.046
Single mounting kit	EF45	DB45EF	1SAX201910R0001	0.100
Reset push button	E16, EF, TF, T16, TA200	KPR-101L	1SFA616162R1014	0.019



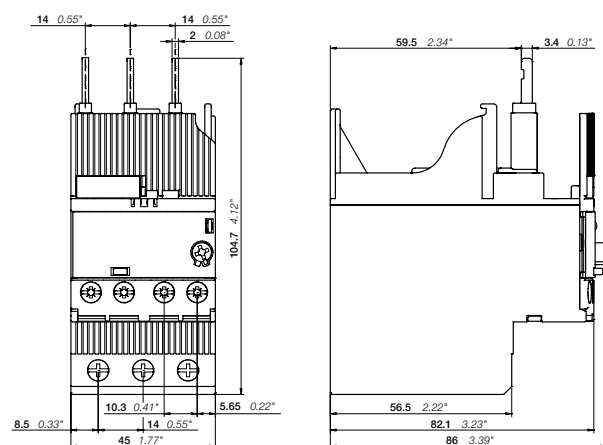
E16DU

EF19, EF45

Main dimensions mm, inches

E16DU, EF19, EF45 electronic overload relays – 0.10 to 45.0 A

Technical data



EF45

Main circuit – Utilization characteristics according to IEC/EN

Type	E16DU	EF19	EF45
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1		
Rated operational voltage U_e	690 V AC		
Rated frequency	50/60 Hz – not suitable for DC applications		
Trip class	10E, 20E, 30E, selectable		
Number of poles	3		
Duty time	100%		
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"		
Rated impulse withstand voltage U_{imp}	6 kV		
Rated insulation voltage U_i	690 V AC		

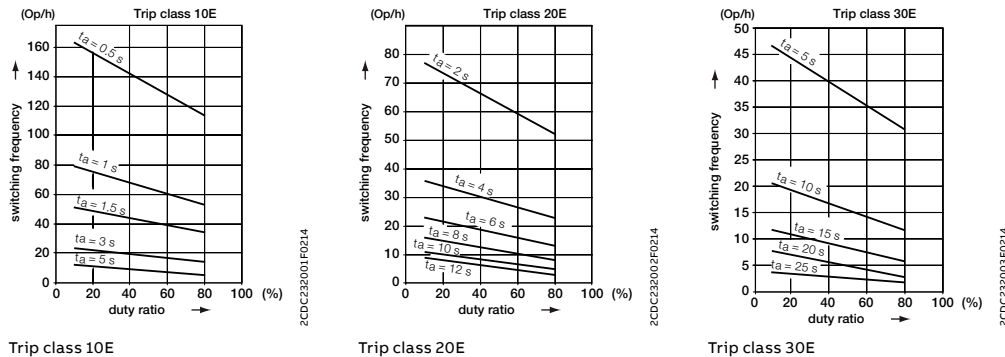
Auxiliary circuit according to IEC/EN

Type	E16DU		EF19	EF45
Rated operational voltage Ue	600 V AC / DC			
Conventional free air thermal current Ith	6 A			
Rated frequency	DC, 50/60 Hz			
Number of poles	1 N.C. + 1 N.O.			
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category				
110-120 V	50/60 Hz	3.00 A		
220-230-240 V	50/60 Hz	3.00 A		
440 V	50/60 Hz	1.10 A		
480-500 V	50/60 Hz	0.75 A		
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category				
24 V		1.50 A		
60 V		0.55 A		
110-120-125 V		0.55 A		
250 V		0.27 A		
Minimum switching capacity	12 V / 3 mA			
Short-circuit protective devices	6 A, fuse type gG			
Rated impulse withstand voltage Uimp	6 kV			
Rated insulation voltage Ui	690 V			

E16DU, EF19, EF45 electronic overload relays – 0.10 to 45.0 A

Technical data

Technical diagram – Intermittent periodic duty



Main circuit – Utilization characteristics according to UL/CSA

Type	E16DU	EF19	EF45
Standards	UL 508, CSA 22.2 No. 14		
Maximum operational voltage	600 V AC		
Trip rating	125% of FLA		
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"		
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"		
Short-circuit protective device	See table "Full load amps and short-circuit protective device"		

Auxiliary circuit according to UL/CSA

Type	E16DU	EF19	EF45
Contact rating	N.C., 95-96 B600, Q300 N.O., 97-98 B600, Q300	B600, Q600	
Conventional free-air thermal current	6 A		

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device					
		480 V AC		600 V AC			
		SCCR	Fuse type	SCCR	Fuse type	SCCR	Fuse type
E16DU-0.32	0.32 A	50 kA	2 A, Class J	5 kA	2 A, K5 / RK5	100 kA	2 A, Class J
E16DU-1.0	1.00 A	50 kA	2 A, K5 / RK5	5 kA	2 A, K5 / RK5	100 kA	2 A, Class J
E16DU-2.7	2.70 A	50 kA	4 A, K5 / RK5	5 kA	4 A, K5 / RK5	100 kA	4 A, Class J
E16DU-6.3	6.30 A	50 kA	15 A, K5 / RK5	5 kA	15 A, K5 / RK5	100 kA	15 A, Class J
E16DU-18.9	18.90 A	50 kA	30 A, K5 / RK5	5 kA	30 A, K5 / RK5	100 kA	30 A, Class J

Type	Full load amps (FLA)	Short-circuit protective device					
		480 V AC		600 V AC			
		SCCR	Fuse type	SCCR	Fuse type	SCCR	Fuse type
EF19-0.32	0.32 A	50 kA	2 A, Class J	5 kA	2 A, K5 / RK5	100 kA	2 A, Class J
EF19-1.0	1.00 A	50 kA	2 A, K5 / RK5	5 kA	2 A, K5 / RK5	100 kA	2 A, Class J
EF19-2.7	2.70 A	50 kA	4 A, K5 / RK5	5 kA	4 A, K5 / RK5	100 kA	4 A, Class J
EF19-6.3	6.30 A	50 kA	15 A, K5 / RK5	5 kA	15 A, K5 / RK5	100 kA	15 A, Class J
EF19-18.9	18.90 A	50 kA	30 A, K5 / RK5	5 kA	30 A, K5 / RK5	100 kA	30 A, Class J

Type	Full load amps (FLA)	Short-circuit protective device					
		480 V AC		600 V AC			
		SCCR	Fuse type	SCCR	Fuse type	SCCR	Fuse type
EF45-30	30 A	18 kA	150 A, K5 / RK5	18 kA	150 A, K5 / RK5	100 kA	150 A, Class J
EF45-45	45 A	18 kA	200 A, K5 / RK5	18 kA	200 A, K5 / RK5	100 kA	200 A, Class J

E16DU, EF19, EF45 electronic overload relays – 0.10 to 45.0 A

Technical data

General data

Type	E16DU	EF19	EF45
Pollution degree	3		
Phase loss sensitive	Yes		
Ambient air temperature			
Operation	Open - compensated		
Storage			
Operation	-25 ... +70 °C		
Storage	-50 ... +85 °C		
Ambient air temperature compensation	Acc. to IEC/EN60947-4-1		
Maximum operating altitude permissible	2000 m		
Resistance to shock acc. to IEC 60068-2-27	15g / 11 ms pulse	25g / 11 ms pulse	
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz	3g / 3 ... 150 Hz	
Mounting position	Position 1-6		
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals		
Degree of protection	Housing	IP20	
	Main circuit terminals	IP20	

Electrical connection

Main circuit

Type	E16DU	EF19	EF45
Connecting capacity			
 Rigid	1 or 2 x 1 ... 4 mm ²	1 ... 4 mm ²	2.5 ... 16 mm ²
 Flexible with insulated ferrule	1 or 2 x 0.75 ... 2.5 mm ²	0.75 ... 2.5 mm ²	2.5 ... 10 mm ²
 Stranded acc. to UL/CSA	1 or 2 x AWG 16-10	AWG 16-10	AWG 14-6
 Flexible acc. to UL/CSA	1 or 2 x AWG 16-10	AWG 16-10	AWG 14-6
Stripping length	9 mm	9 mm	13 mm
Tightening torque	0.8 ... 1.5 Nm / 7 ... 13 lb.in	0.8 ... 1.5 Nm / 7 ... 13 lb.in	2.3 ... 2.6 Nm / 20 ... 22 lb.in
Recommended screw driver	M3.5 (Pozidriv 2)	M3.5 (Pozidriv 2)	M3.5 (Pozidriv 2)

Auxiliary circuit

Type	E16DU	EF19	EF45
Connecting capacity			
 Rigid	1 or 2 x 1 ... 4 mm ²	1 ... 4 mm ²	1 ... 4 mm ²
 Flexible with ferrule	1 or 2 x 0.75 ... 2.5 mm ²	0.75 ... 2.5 mm ²	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 or 2 x 0.75 ... 2.5 mm ²	0.75 ... 2.5 mm ²	0.75 ... 2.5 mm ²
 Flexible	1 or 2 x 0.75 ... 2.5 mm ²	0.75 ... 2.5 mm ²	0.75 ... 2.5 mm ²
 Stranded acc. to UL/CSA	1 or 2 x AWG 16-10	AWG 18-10	AWG 18-10
 Flexible acc. to UL/CSA	1 or 2 x AWG 16-10	AWG 18-10	AWG 18-10
Stripping length	9 mm	9 mm	9 mm
Tightening torque	0.8 ... 1.2 Nm / 7 ... 11 lb.in	0.8 ... 1.2 Nm / 7 ... 11 lb.in	0.8 ... 1.2 Nm / 7 ... 11 lb.in
Recommended screw driver	M3 (Pozidriv 2)	M3 (Pozidriv 2)	M3 (Pozidriv 2)

EF65, EF96, EF146 electronic overload relays – 20 to 150 A

Ordering details



EF65-70

2CDC231001F0012



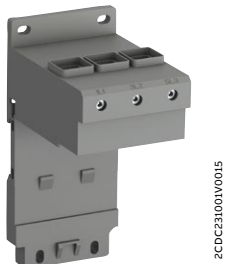
EF96-100

2CDC231002F0012



EF146-150

2CDC231003F0012



DB96

2CDC231001V0015



DB96 + EF96

2CDC231002V0015



KPR-101L

15FC15124F0002

The EF65, EF96 and EF146 are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. The overload relays are connected directly to the contactors. The EF65, EF96 and EF146 have ATEX and IECEx certification (1).

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

Suitable for AF40, AF52, AF65

20 ... 56	160 A, fuse type gG	10E, 20E, 30E	EF65-56	1SAX331001R1102	0.821
25 ... 70	160 A, fuse type gG	10E, 20E, 30E	EF65-70	1SAX331001R1101	0.821

Suitable for AF80, AF96

20 ... 56	160 A, fuse type gG	10E, 20E, 30E	EF96-56	1SAX341001R1102	0.802
36 ... 100	200 A, fuse type gG	10E, 20E, 30E	EF96-100	1SAX341001R1101	0.802

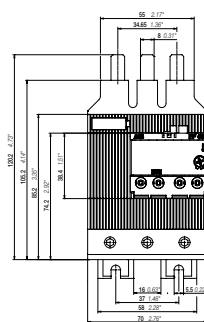
Suitable for AF116, AF140, AF146

54 ... 150	315 A, fuse type gG	10E, 20E, 30E	EF146-150	1SAX351001R1101	0.879
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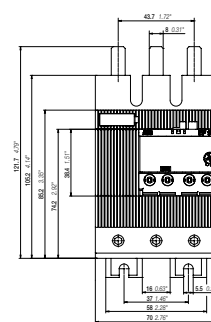
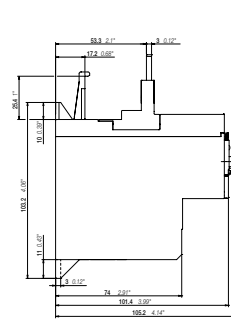
(1) ATEX is valid for products produced from week 42, 2014. ATEX certification is valid for EF65-56 produced from week 47, 2015. IECEx is valid for products produced from week 15, 2017.

Ordering details accessories

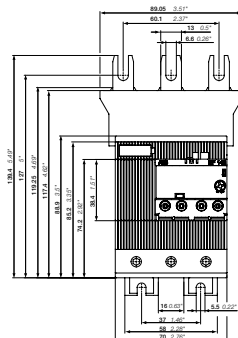
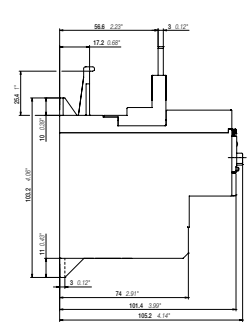
Description	Suitable for	Type	Order code	Weight (1 pce) kg
Single mounting kit	EF96, TF96	DB96	1SAZ901901R1001	0.190
Reset push button	E16, EF, TF, T16, TA200	KPR-101L	1SFA616162R1014	0.019



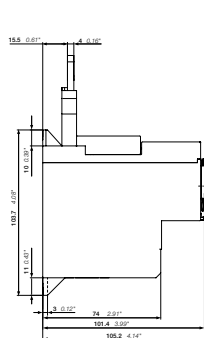
EF65-56 / EF65-70



EF96-56 / EF96-100



EF146-150



Main dimensions mm, inches

EF65, EF96, EF146 electronic overload relays – 20 to 150 A

Technical data

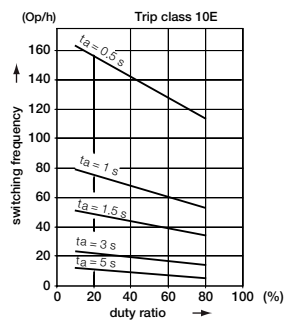
Main circuit – Utilization characteristics according to IEC/EN

Type	EF65, EF96, EF146
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage U _e	1000 V AC
Rated frequency	50/60 Hz – not suitable for DC applications
Trip class	10E, 20E, 30E, selectable
Number of poles	3
Duty time	100%
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage U _{imp}	8 kV
Rated insulation voltage U _i	1000 V

Auxiliary circuit according to IEC/EN

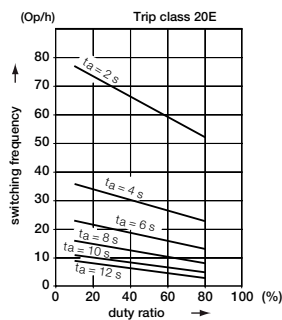
Type	EF65, EF96, EF146
Rated operational voltage U _e	600 V AC / DC
Conventional free air thermal current I _{th}	6 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.C. + 1 N.O.
I _e / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	50/60 Hz 3.00 A
220-230-240 V	50/60 Hz 3.00 A
400 V	50/60 Hz 1.10 A
480-500 V	50/60 Hz 0.75 A
I _e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	1.50 A
60 V	0.55 A
110-120-125 V	0.55 A
250 V	0.27 A
Minimum switching capacity	12 V / 3 mA
Short-circuit protective device	6 A, fuse type gG
Rated impulse withstand voltage U _{imp}	6 kV
Rated insulation voltage U _i	690 V

Technical diagram – Intermittent periodic duty



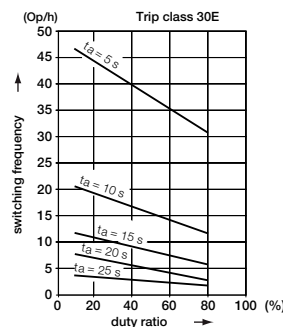
Trip class 10E

2CDC232001F0214



Trip class 20E

2CDC232002F0214



Trip class 30E

2CDC232003F0214

EF65, EF96, EF146 electronic overload relays – 20 to 150 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	EF65, EF96, EF146
Standards	UL 508, CSA 22.2 No. 14, UL 60947-4-1A
Maximum operational voltage	600 V AC
Trip rating	125% of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	EF65, EF96, EF146
Contact rating	N.C., 95-96 B600, Q600
	N.O., 97-98 B600, Q600
Conventional thermal current	6 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device					
		480 V AC		600 V AC			
		SCCR	Fuse type	SCCR	Fuse type	SCCR	Fuse type
EF65-56	56 A	10 kA	150 A, K5/RK5	10 kA	150 A, K5/RK5	100 kA	150 A, J
EF65-70	70 A	10 kA	150 A, K5/RK5	10 kA	150 A, K5/RK5	100 kA	150 A, J
EF96-65	56 A	10 kA	150 A, K5/RK5	10 kA	150 A, K5/RK5	100 kA	150 A, J
EF96-100	100 A	10 kA	200 A, K5/RK5	10 kA	200 A, K5/RK5	100 kA	225 A, J
EF146-150	150 A	10 kA	250 A, K5/RK5	10 kA	250 A, K5/RK5	100 kA	350 A, J

EF65, EF96, EF146 electronic overload relays – 20 to 150 A

Technical data

General data

Type	EF65, EF96, EF146	
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation	Open - compensated	-25 ... +70 °C
Storage		-50 ... +85 °C
Ambient air temperature compensation	Acc. to IEC/EN 60947-4-1	
Maximum operating altitude permissible	2000 m	
Resistance to shock acc. to IEC 60068-2-27	15g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6	5g / 3 ... 150 Hz	
Mounting position	Position 1-6	
Mounting	Mount on the contactor and tighten the screws of the main circuit terminals	
Degree of protection	Housing	IP20
	Main circuit terminals	IP10

Electrical connection

Main circuit

Type		EF65	EF96	EF146
Connecting capacity				
 Rigid (1)	1 x	4 ... 35 mm ²	4 ... 70 mm ²	10 ... 95 mm ²
	2 x	4 ... 35 mm ²	4 ... 35 mm ²	10 ... 35 mm ²
 Flexible (1)	1 x	4 ... 35 mm ²	4 ... 50 mm ²	10 ... 70 mm ²
	2 x	2.5 ... 35 mm ²	4 ... 35 mm ²	10 ... 35 mm ²
Stranded acc. to UL/CSA	1 x	AWG 10-2	AWG 10-2	AWG 6-00
	2 x			AWG 6-2
Flexible acc. to UL/CSA	1 x	AWG 10-2	AWG 10-2	AWG 6-00
	2 x			AWG 6-2
Stripping length		20 mm	20 mm	20 mm
Tightening torque		4 Nm / 35 lb.in	6 Nm / 55 lb.in	10 Nm / 70 lb.in
Recommended screw driver		M8 (Pozidriv 2)	M8 (Hexagon 4)	M8 (Hexagon 4)

(1) Only one wire size allowed when using 2 wires

Auxiliary circuit

Type	EF65, EF96, EF146	
Connecting capacity		
 Rigid	1 or 2 x	1 ... 4 mm ²
 Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible	1 or 2 x	0.75 ... 2.5 mm ²
Stranded acc. to UL/CSA	1 or 2 x	AWG 18-10
Flexible acc. to UL/CSA	1 or 2 x	AWG 18-10
Stripping length		9 mm
Tightening torque		0.8 ... 1.2 Nm / 7 ... 11 lb.in
Recommended screw driver		M3.5 (Pozidriv 2)

EF205, EF370 electronic overload relays – 63 to 380 A

Ordering details



EF205-210

2CDC231010V0012



EF370-380

2CDC231013V0012



KPR-101L

1SFA616162R1014

The EF205 and EF370 are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. The overload relays are connected directly to the contactors. The EF205 and EF370 have ATEX and IECEx certification (1).

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

Suitable for AF145, AF185, AF190, AF205

63 ... 210	1250 A, fuse type gG	10E, 20E, 30E	EF205-210	1SAX531001R1101	1.210
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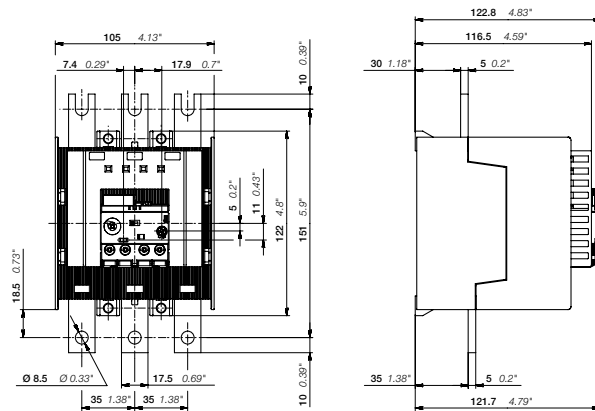
Suitable for AF210, AF260, AF265, AF300, AF305, AF370

115 ... 380	1600 A, fuse type gG	10E, 20E, 30E	EF370-380	1SAX611001R1101	1.430
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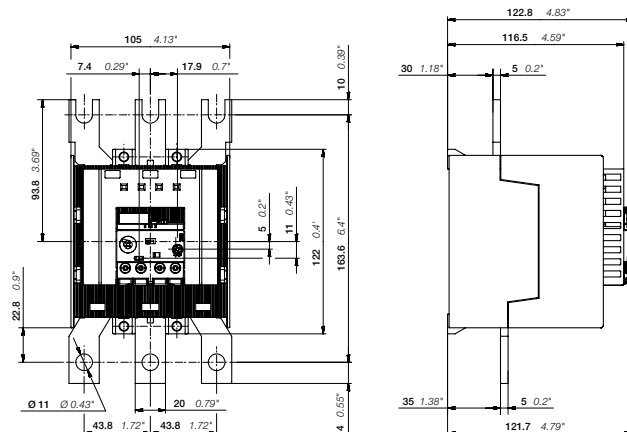
(1) ATEX is valid for products produced from week 42, 2015. IECEx is valid for products produced from week 15, 2017.

Ordering details accessories

Description	Suitable for	Type	Order code	Weight (1 pce) kg
Reset push button	E16, EF, TF, T16, TA200	KPR-101L	1SFA616162R1014	0.027
Terminal shroud	EF205	LT200E	1SAX501904R0001	0.085
Terminal shroud	EF370	LT320E	1SAX601904R0001	0.105



EF205-210



EF370-380

Main dimensions mm, inches

EF205, EF370 electronic overload relays – 63 to 380 A

Technical data

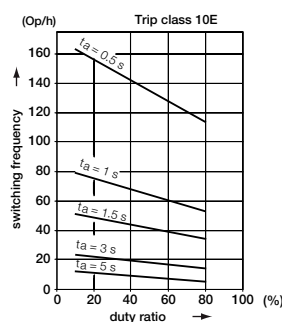
Main circuit – Utilization characteristics according to IEC/EN

Type	EF205, EF370
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage U_e	1000 V AC
Rated frequency	50/60 Hz – not suitable for DC applications
Trip class	10E, 20E, 30E, selectable
Number of poles	3
Duty time	100%
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage U_{imp}	8 kV
Rated insulation voltage U_i	1000 V

Auxiliary circuit according to IEC/EN

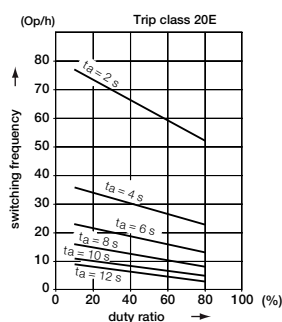
Type	EF205, EF370
Rated operational voltage U_e	600 V AC / DC
Conventional free air thermal current I_{th}	6 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.C. + 1 N.O.
I_e / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	50/60 Hz 3.00 A
220-230-240 V	50/60 Hz 3.00 A
400 V	50/60 Hz 1.10 A
480-500 V	50/60 Hz 0.75 A
I_e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	
24 V	1.50 A
60 V	0.55 A
110-120-125 V	0.55 A
250 V	0.27 A
Minimum switching capacity	12 V / 3 mA
Short-circuit protective device	6 A, fuse type gG
Rated impulse withstand voltage U_{imp}	6 kV
Rated insulation voltage U_i	690 V

Technical diagram – Intermittent periodic duty



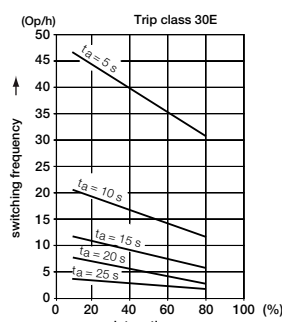
Trip class 10E

2CDC232002F0214



Trip class 20E

2CDC232002F0214



Trip class 30E

2CDC232003F0214

EF205, EF370 electronic overload relays – 63 to 380 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	EF205, EF370
Standards	UL 508, CSA 22.2 No. 14, UL 60947-4-1A
Maximum operational voltage	600 V AC
Trip rating	125% of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type	EF205, EF370
Contact rating	N.C., 95-96 B600, Q600
	N.O., 97-98 B600, Q600
Conventional thermal current	6 A

Full load amps and short-circuit protective device

Type	Full load amps (FLA)	Short-circuit protective device					
		480 V AC		600 V AC			
		SCCR	Fuse type	SCCR	Fuse type	SCCR	Fuse type
EF205-210	210 A	10 kA	400 A, R5/RK5	10kA	400 A, R5/RK5	100 kA	400 A, J
EF370-380	380 A	18 kA	800 A, L/T	18kA	800 A, L/T	-	-

EF205, EF370 electronic overload relays – 63 to 380 A

Technical data

General data

Type	EF205	EF370
Pollution degree	3	
Phase loss sensitive	Yes	
Ambient air temperature		
Operation	Open - compensated	
Storage	-25 ... +70 °C	
Ambient air temperature compensation	-50 ... +85 °C	
Maximum operating altitude permissible	Acc. to IEC/EN 60947-4-1	
Resistance to shock acc. to IEC 60068-2-27	2000 m	
Resistance to vibrations acc. to IEC 60068-2-6	25g / 11 ms	
Mounting position	5g / 3 ... 150 Hz	
Mounting	Position 1-6	
Degree of protection	Mount on the contactor and tighten the screws of the main circuit terminals	
Housing	IP20	
Main circuit terminals	IP20	

Electrical connection

Main circuit

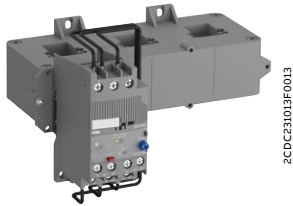
Type	EF205	EF370
Connecting capacity		
 Rigid	1 x 16 ... 185 mm ² 2 x 16 ... 120 mm ²	50 ... 240 mm ² 50 ... 150 mm ²
 Flexible	1 x 16 ... 185 mm ² 2 x 16 ... 120 mm ²	50 ... 240 mm ² 50 ... 150 mm ²
 Lugs	L ≤ 24 mm	32 mm
 Bars	Ø > 8 mm	10 mm
Stranded acc. to UL/CSA	1 x AWG 6-0000 2 x AWG 6-0000	AWG 1-500 kcmil AWG 1-500 kcmil
Flexible acc. to UL/CSA	1 x AWG 6-0000 2 x AWG 6-0000	AWG 1-500 kcmil AWG 1-500 kcmil
Stripping length	-	-
Tightening torque	18 Nm / 160 lb.in	28 Nm / 247 lb.in
Recommended screw driver	M8	M10

Auxiliary circuit

Type	EF205, EF370
Connecting capacity	
 Rigid	1 or 2 x 1 ... 4 mm ²
 Flexible with ferrule	1 or 2 x 0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 or 2 x 0.75 ... 2.5 mm ²
 Flexible	1 or 2 x 0.75 ... 2.5 mm ²
Stranded acc. to UL/CSA	1 or 2 x AWG 18-10
Flexible acc. to UL/CSA	1 or 2 x AWG 18-10
Stripping length	9 mm
Tightening torque	0.8 ... 1.2 Nm / 7 ... 11 lb.in
Recommended screw driver	M3.5 (Pozidriv 2)

EF460, EF750, EF1250DU electronic overload relays – 150 to 1250 A

Ordering details



EF460-500

2CDC231013F0013



EF750-800

2CDC231014F0013



EF1250DU-1250

2CDC231014F0013



KPR-101L

1SFA151224F0002

The EF460, EF750 and EF1250DU are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic overload relay is convincing, above all, due to its wide setting range, high accuracy, high operational temperature range and the possibility to select a trip class (10E, 20E, 30E). Further features are the temperature compensation, trip contact (N.C.), signal contact (N.O.), automatic or manual reset selectable, trip-free mechanism, STOP and TEST function and a trip indication. Busbar kits are available as accessory for contactor mounting. The EF460 and EF750 have ATEX and IECEx certification (1).

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

EF460 electronic overload relay, suitable for AF400, AF460 (1)

150 ... 500	690 V: 630 A, Type gG 1000 V: 1600 A, Type gG	10E, 20E, 30E	EF460-500	1SAX721001R1101	1.170
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EF750 electronic overload relay, suitable for AF580, AF750 (1)

250 ... 800	690 V: 800 A, Type gG 1000 V: 1600 A, Type gG	10E, 20E, 30E	EF750-800	1SAX821001R1101	3.905
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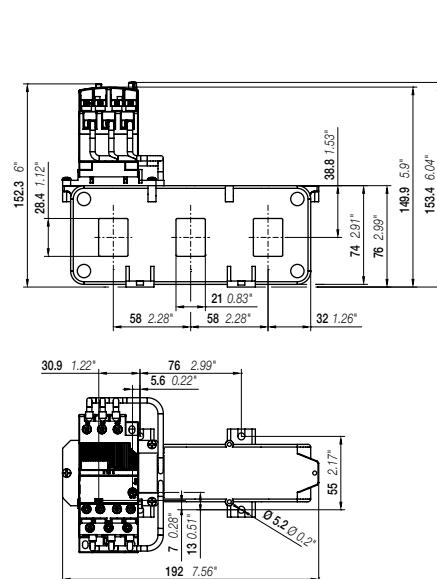
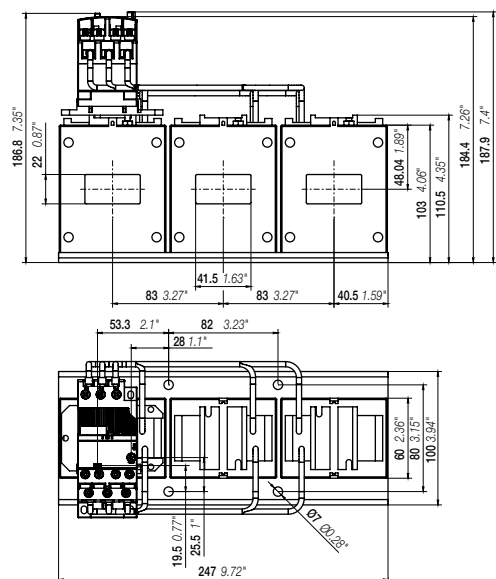
EF1250DU electronic overload relay, suitable for AF1350, AF1650, AF2050

375 ... 1250	500 V: 1600 A, Type gG	10E, 20E, 30E	EF1250DU-1250	1SFA739001R1001	
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(1) ATEX is valid for products produced from week 42, 2014. IECEx is valid for products produced from week 15, 2017.

Ordering details accessories

Description	Suitable for	Type	Order code	Weight (1 pce) kg
Reset push button	E16, EF, TF, T16, TA200	KPR-101L	1SFA616162R1014	0.027
Terminal shroud	EF460	LT460EF	1SAX701904R0002	0.320
Terminal shroud	EF750	LT750EF	1SAX801904R0002	0.440
DT500/AF460-S Mounting Kit short for mounting of EF460DU on AF460	EF460	DT500/AF460-S	1SAX701902R1011	0.635
DT500/AF460-L Mounting Kit long for mounting of EF460DU on AF460	EF460	DT500/AF460-L	1SAX701902R1001	0.740
DT800/AF750-S Mounting Kit short for mounting of EF750DU on AF750	EF750	DT800/AF750-S	1SAX801902R1011	1.000
DT800/AF750-L Mounting Kit long for mounting of EF750DU on AF750	EF750	DT800/AF750-L	1SAX801902R1001	1.475

EF460-500
All dimensions mm, inches

EF750-800

2CDC107045C0201

EF460, EF750, EF1250DU electronic overload relays – 150 to 1250 A

Technical data

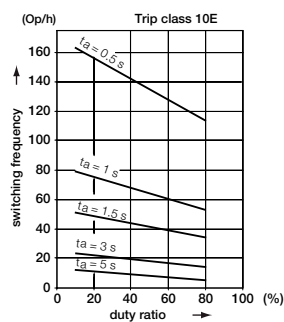
Main circuit – Utilization characteristics according to IEC/EN

Type	EF460	EF750	EF1250DU
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1		
Rated operational voltage U _e	1000 V AC		
Rated frequency	50/60 Hz – not suitable for DC applications		
Trip class	10E, 20E, 30E, selectable		
Number of poles	3		
Duty time	100%		
Operating frequency without early tripping	Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"		
Rated impulse withstand voltage U _{imp}	8 kV		
Rated insulation voltage U _i	1000 V AC		

Auxiliary circuit according to IEC/EN

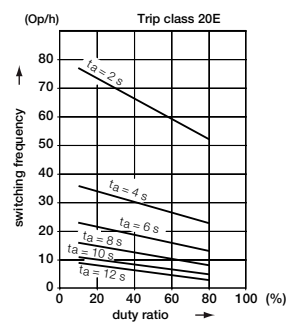
Type	EF460	EF750	EF1250DU
Rated operational voltage U _e	600 V AC / DC		
Conventional free air thermal current I _{th}	6 A		
Rated frequency	DC, 50/60 Hz		
Number of poles	1 N.C. + 1 N.O.		
I _e / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category			
110-120 V	50/60 Hz	3.00 A	
220-230-240 V	50/60 Hz	3.00 A	
400 V	50/60 Hz	1.10 A	
480-500 V	50/60 Hz	0.75 A	
I _e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category			
24 V		1.50 A	
60 V		0.55 A	
110-120-125 V		0.55 A	
250 V		0.27 A	
Minimum switching capacity	12 V / 3 mA		
Short-circuit protective device	6 A, fuse type gG		
Rated impulse withstand voltage U _{imp}	6 kV		
Rated insulation voltage U _i	690 V		

Technical diagram – Intermittent periodic duty



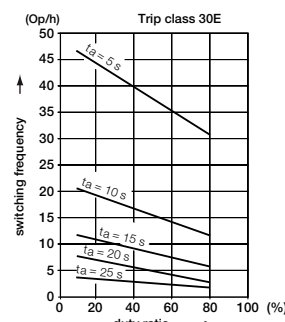
Trip class 10E

2CDC233003F0214



Trip class 20E

2CDC233003F0214



Trip class 30E

2CDC233003F0214

EF460, EF750, EF1250DU electronic overload relays – 150 to 1250 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	EF460	EF750	EF1250DU
Standards	UL60947-1, UL60947-4-1		
Maximum operational voltage	600 V AC		
Trip rating	125% of FLA		

Auxiliary circuit according to UL/CSA

Type	EF460	EF750	EF1250DU
Contact rating	N.C., 95-96 N.O., 97-98	B600, Q300 B600, Q300	
Conventional thermal current	5 A		

General data

Type	EF460	EF750	EF1250DU
Pollution degree	3		
Phase loss sensitive	Yes		
Ambient air temperature			
Operation Open - compensated	-25 ... +70 °C		
Storage	-25 ... +70 °C		
Ambient air temperature compensation	Acc. to IEC/EN60947-4-1		
Maximum operating altitude permissible	2000 m		
Resistance to shock acc. to IEC 60068-2-27	25g / 11 ms		
Resistance to vibrations acc. to IEC 60068-2-6	3g / 3 ... 150 Hz		
Degree of protection Housing	IP20		
Main circuit terminals	IP00		

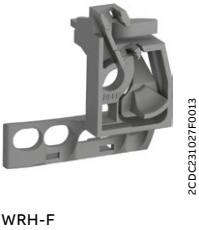
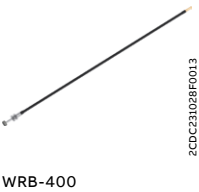
Electrical connection

Auxiliary circuit

Type		EF460	EF750	EF1250DU
Connecting capacity				
	Rigid	1 or 2 x	1 ... 4 mm²	
	Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm²	
	Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm²	
	Flexible	1 or 2 x	0.75 ... 2.5 mm²	
	Stranded acc. to UL/CSA	1 or 2 x	AWG 18-10	
	Flexible acc. to UL/CSA	1 or 2 x	AWG 18-10	
Stripping length		9 mm		
Tightening torque		0.8 ... 1.2 Nm / 7 ... 11 lb.in		
Recommended screw driver		M3.5 (Pozidriv 2)		

Thermal and electronic overload relays

General accessories

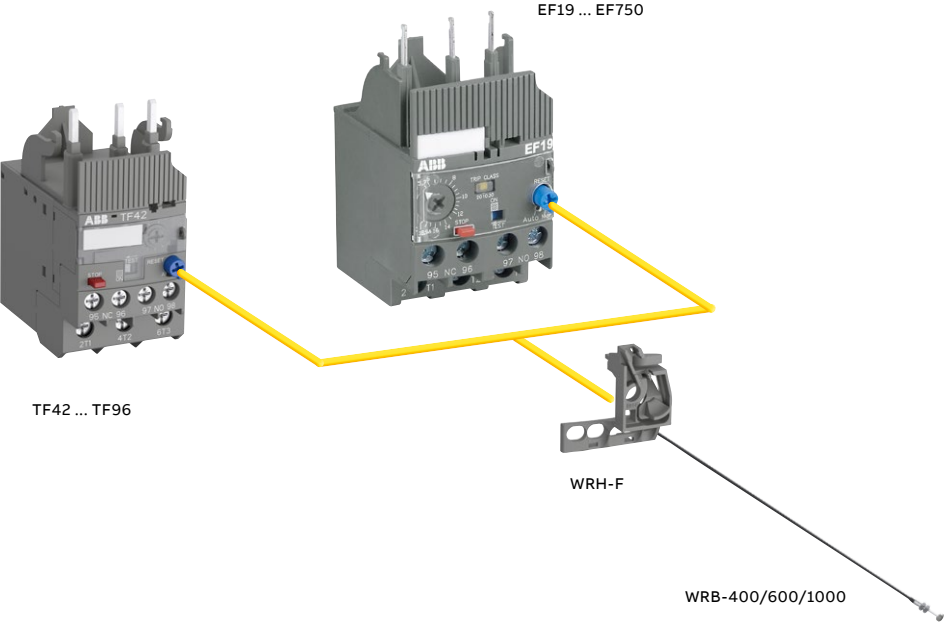


The wire reset is a general accessory for thermal and electronic overloads relays. In installations which are difficult to access, like a motor control centre or compact cubical, the accessory allows the user to remotely reset the overload relays.

The wire reset consists of two parts, the bowden wire with actuator and the holder. The actuator should be mounted into a door of a panel. The holder will be mounted on the overload relay. The actuator and holder are connected via the bowden wire.

Suitable for	Description	Length mm	Type	Order code	Weight (1 pce) kg
Holder					
TF42, TF65, TF96, EF19, EF45, EF65, EF96, EF146, EF205, EF370, EF460, EF750	Holder for tool less direct mounting		WRH-F	1SAZ701903R1001	0.006
Bowden wire with actuator					
WRH-F	Bowden wire with actuator, hole diameter: 7.3 mm, maximum panel thickness: 12 mm	400	WRB-400	1SAZ701903R1011	0.030
		600	WRB-600	1SAZ701903R1012	0.040
		1000	WRB-1000	1SAZ701903R1013	0.060
IP54 gasket					
WRB-400 WRB-600 WRB-1000	IP54 Panel seal gasket		WRBG	1SAZ701903R1030	0.037

Overload relays with accessory wire reset (WRH, WRB)



Notes