

Overload relays

6/2 Overview

Thermal overload relays

- 6/8 T16 thermal overload relays – 0.10 to 16.0 A
- 6/12 TF42 thermal overload relays – 0.10 to 38.0 A
- 6/17 TF65 thermal overload relays – 22.0 to 67.0 A
- 6/21 TF96 thermal overload relays – 40.0 to 96.0 A
- 6/25 TF140DU thermal overload relays – 66 to 142 A
- 6/29 TA200DU thermal overload relays – 66 to 200 A

Electronic overload relays

- 6/33 E16DU, EF19, EF45 electronic overload relays – 0.10 to 45.0 A
- 6/38 EF65, EF96, EF146 electronic overload relays – 20 to 150 A
- 6/43 EF205, EF370 electronic overload relays – 63 to 380 A
- 6/47 EF460, EF750, EF1250DU electronic overload relays
150 to 1250 A

6/51 General accessories

Overload relays

Protection concepts for your individual needs



Thermal and electronic overload relays provide, in combination with contactors, reliable protection against overloads and phase failures for motors. They allow to set up customized motor starting solutions according to individual needs



Easy application and storage

Cut your costs

Overload relays are a perfect fit to ABB's contactors (e.g. AF, mini contactors) and can be directly mounted and connected without further wiring. By combining wide current setting ranges with three trip classes, electronic overload relays allow to reduce the number of variants in stock.



Continuous operation

Secure uptime

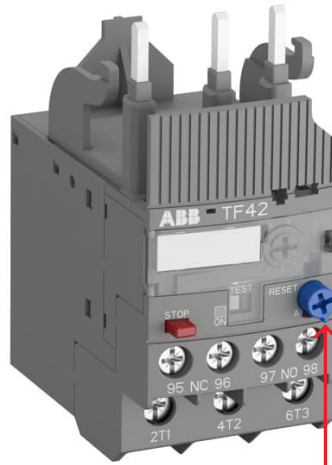
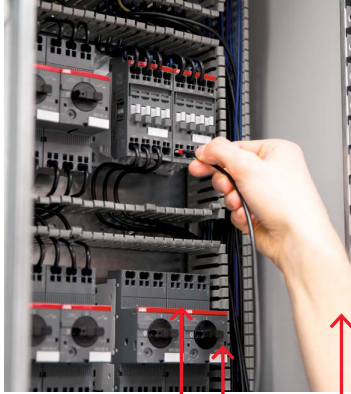
The selectable automatic reset mode allows to reduce downtimes and travelling costs for installation in dispersed locations. The manual reset mode can be complemented by the DRS-F reset coil that allows a remote control over large distances.



Optimized design

Efficient operation

Electronic overload relays combine a high accuracy with an energy efficient design that does not need extra external supply. Thanks to its overlapping current setting ranges, the usage at the limits of the setting range can be avoided which reduces power heat loss.



Wide current setting range

Electronic overload relays come with an optimized current setting range, that allows to reduce stock keeping.

Trip Class Selection

Electronic overload relays allow to choose between Trip Class 10, 20 or 30.

Manual or automatic reset modes

Selection between both reset modes. Accessories also allow the remote control of the manual mode.

Compatible with ABB Contactors

Easy and faultless combination without further wiring.



Protection wherever you are

Overload relays are suitable for worldwide use. The wide range of certifications covers standards like IEC (CB), cULus, CCC and various ship approvals. Furthermore they also apply to ATEX standards for hazardous areas.



Wide portfolio

Thermal overload relays cover a current range from 0.1 A to 200 A while electronic overload relays cover an even larger current range from 0.1 A to 1250 A.

Individual motor starting solutions



Direct-On-Line Starter

A direct-on-line starter is a simple and economic solution for controlling three-phase asynchronous motors.

You can easily assemble a direct-on-line starter by connecting an AF contactor with a TF thermal overload relay or EF electronic overload relay. In an extended combination with a MO manual motor starter, also a protection against short circuits can be implemented.



Reversing starters

Reversing starters use two contactors to interchange the connection of two terminals. This allows to change the direction of the motor.

Thanks to our complete range of accessories, you can easily assemble reversing starter combinations.



Star-Delta starters

This starting mode is a popular way to protect the motor during start-up and can be used with most squirrel cage motors. Star-delta starters are ideal for machines having high starting torque such as pumps, centrifugal compressors or wood-working machines.

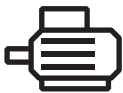
You can assemble star-delta starters with any contactor thanks to our complete range of connection sets.



All starting solutions can also be realized with ABB mini contactors in combination with suitable overload relays. This allows to create individual starting solutions in applications where space is at a premium.

Technical details regarding the creation of motor starting solutions with AF contactors are shown in chapter 13.

Application examples



MOTOR PROTECTION

ABB overload relays in combination with contactors offer reliable protection for motors in the event of overload or phase failure. In combination with 3 pole contactors, ABB overload relays allow to set up customized starter solutions, like direct-on-line starter, reversing starters or star-delta starters. Further combinations with fuses or manual motor starters allow additional protection against short-circuits.



LONG DISTANCE INSTALLATIONS

The reset modes of ABB overload relays can be selected between manual or automatic reset. In installations with dispersed locations (e.g. wind turbines), the automatic reset mode allows to reduce costs by avoiding travel time.



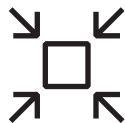
EXTREME CONDITIONS

Regardless if high-altitudes, shock and vibration environments or hazardous areas, ABB's overload relays are designed and certified to withstand harsh conditions. Specific versions for rolling stock applications are part of our offer.



DC LOADS

Despite AC applications, thermal overload relays are also rated for direct current loads (e.g. for motors used in solar panel tracking systems). They can be used for three- and single-phase applications.



SMALL SPACE INSTALLATION

Overload Relays are compatible to contactors and can be connected without further wiring. In combination with ABB mini contactors (compatible to T16 and E16DU overload relays), the installation in narrow spaces is possible.

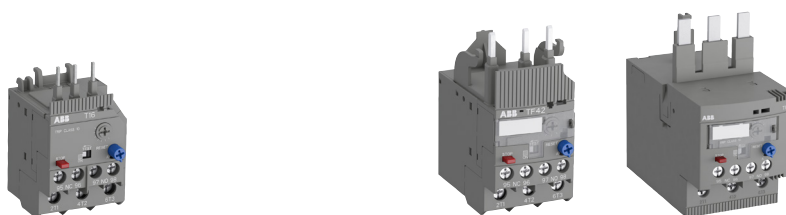


EFFICIENT APPLICATIONS

Electronic overload relays can reduce energy costs due to their comparably low power consumption. Furthermore, the current measurement is more exact compared to thermal protection devices so that deviations in the tripping time are minimized.

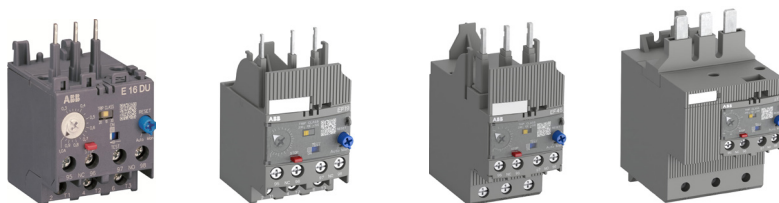
Thermal and electronic overload relays

Thermal overload relays



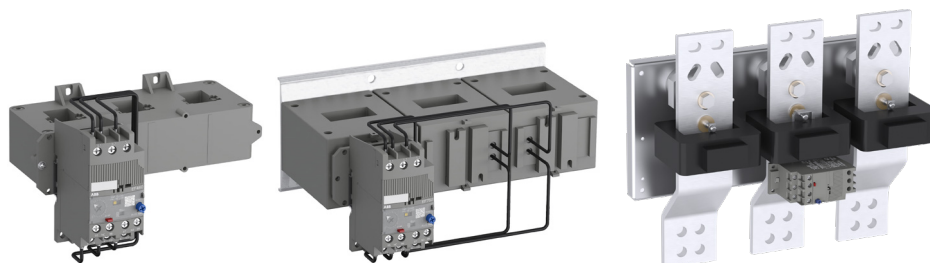
IEC: rated operational power AC-3	400 V	0.06 ... 7.5 kW	0.06 ... 18.5 kW	11 ... 37 kW	
UL/CSA: 3-phase hp-ratings	480 V	1/2 ... 10 hp	1/2 ... 25 hp	15 ... 50 hp	
Fitting to contactors		B6, B7, MC1, MC2	AF09 ... AF38	AF40, AF52, AF65	
Type	T16		TF42		TF65
Current range	0.10 ... 16 A		0.10 ... 38 A		22 ... 67 A
Trip class	10		10		10
Suitable for 1-phase	yes		yes		yes
Single mounting kit	DB16		DB42		DB65

Electronic overload relays with integrated CT

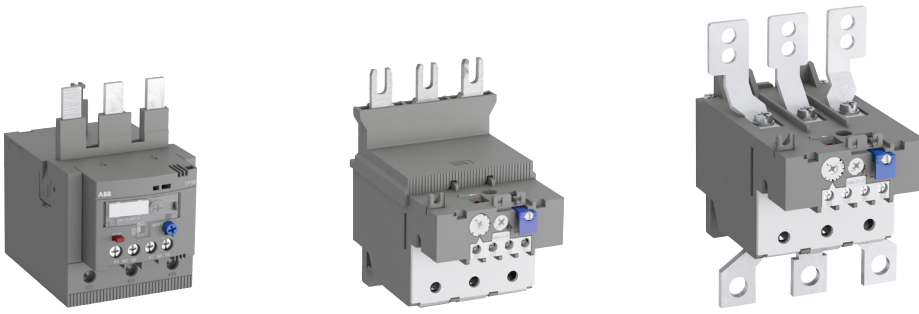


IEC: rated operational power AC-3	400 V	0.06 ... 7.5 kW	0.06 ... 7.5 kW	4 ... 22 kW	7.5 ... 37 kW	
UL/CSA: 3-phase hp-ratings	480 V	1/2 ... 10 hp	1/2 ... 10 hp	5 ... 30 hp	15 ... 50 hp	
Fitting to contactors		B6, B7, BC6, BC7, VB6, VB7, VBC6, VBC7	AF09 ... AF38	AF26 ... AF38	AF40, AF52, AF65	
Type	E16DU		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					
Suitable for 1-phase	no		no	no	no	
Single mounting kit	DB16E		DB19EF	DB45EF	-	

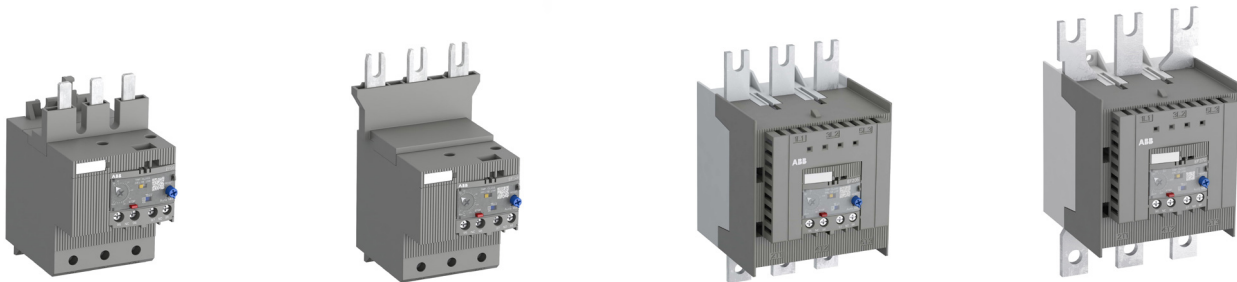
Electronic overload relays with external separate CT



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			



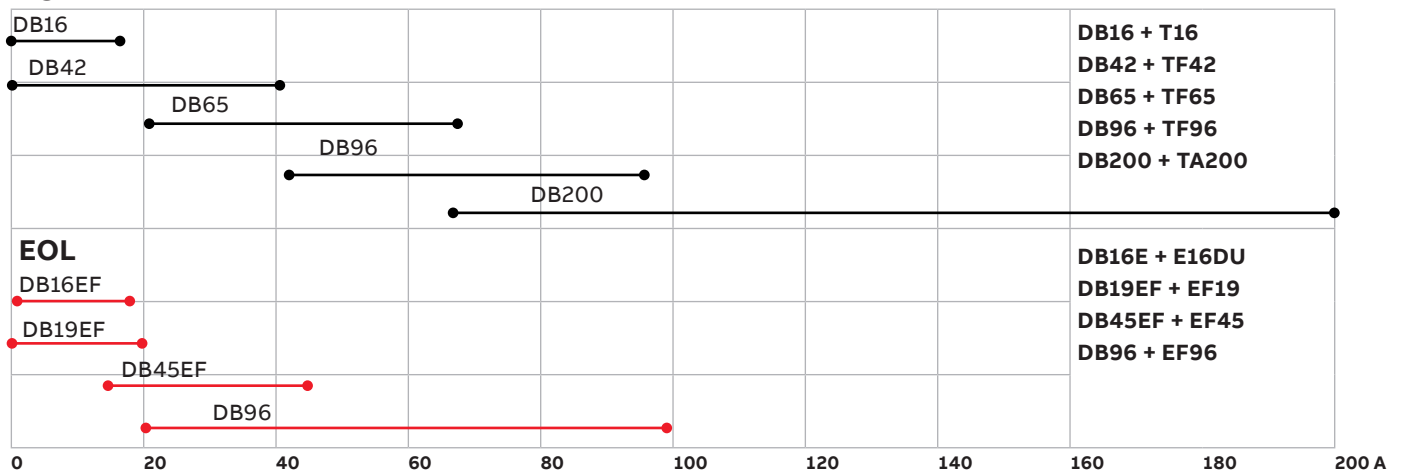
18.5 ... 45 kW	37 ... 75 kW	37 ... 110 kW
30 ... 75 hp	50 ... 100 hp	50 ... 150 hp
AF80, AF96	AF116, AF140, AF146	AF190, AF205
TF96	TF140DU	TA200DU
40 ... 96 A	66 ... 142 A	66 ... 200 A
10	10A	10A
yes	yes	yes
DB96	-	DB200



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
20 ... 100 A	54 ... 150 A	63 ... 210 A	115 ... 380 A
10E, 20E, 30E selectable			
no	no	no	no
DB96	-	-	-

Single mounting kit overview

TOL



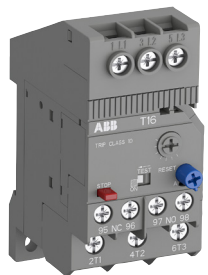
T16 thermal overload relays – 0.10 to 16.0 A

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

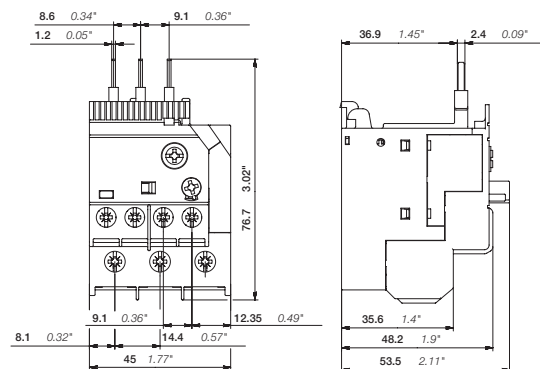
Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

Suitable for AS09...AS16, B6, B7, MC1 and MC2 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

T16 thermal overload relays – 0.10 to 16.0 A

Technical data

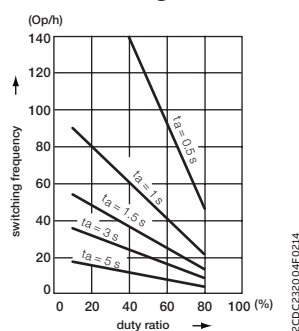
Main circuit – Utilization characteristics according to IEC/EN

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 0.50 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.50 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.50 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.50 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



ta: Motor starting time

2CD23204F0214

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 or 2 x	0.75 ... 4 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	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 or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 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 or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ² (1)
Stranded acc. to UL/CSA	1 or 2 x	AWG 18-12
Flexible acc. to UL/CSA	1 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.

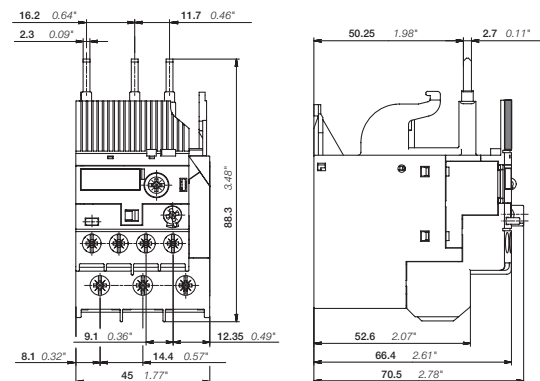
The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release 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	0.130
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

TF42 thermal overload relays – 0.10 to 38.0 A

Ordering details



DB42

2CDC231001F0011



KPR-101L

1SFCL51224 F0002



DRS-F

2CDC211002V0017

Ordering details accessories

Description	Suitable for	Type	Order code	Weight (1 pce) kg
Single mounting kit	TF42	DB42	1SAZ701902R0001	0.087
Reset push button	EF, TF, T16, TA200	KPR-101L	1SFA616162R1014	0.019
Remote reset coil 24-30 V AC/DC	TF42, TF65, TF96	DRS-F-01	1SAX101911R1001	0.076
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	0.078
Remote reset coil 220-240 V AC/DC		DRS-F-04	1SAX101911R1004	0.076
Remote stop coil 24-30 V DC		DRS-F-TF-01	1SAZ701904R1001	0.072
Remote stop coil 48-60 V DC		DRS-F-TF-02	1SAZ701904R1002	0.075
Remote stop coil 110-127 V DC		DRS-F-TF-03	1SAZ701904R1003	0.071
Remote stop coil 220-240 V DC		DRS-F-TF-04	1SAZ701904R1004	0.076

TF42 thermal overload relays – 0.10 to 38.0 A

Technical data

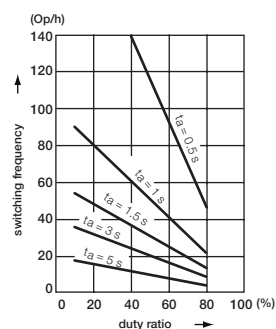
Main circuit – Utilization characteristics according to IEC/EN

Type	TF42
Standards	IEC/EN 60947-4-1, IEC/EN 60947-5-1, IEC/EN 60947-1
Rated operational voltage U _e	690 V AC, 600 V DC
Rated frequency	DC, 50/60 Hz, 400 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 U _{imp}	6 kV
Rated insulation voltage U _i	690 V AC

Auxiliary circuit according to IEC/EN

Type	TF42
Rated operational voltage U _e	600 V
Conventional free air thermal current I _{th}	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.
I _e / 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 0.50 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.50 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.50 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.50 A
I _e / 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 U _{imp}	6 kV
Rated insulation voltage U _i	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/DC
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, Q600
	N.O., 97-98 D300, Q600
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	5g / 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 ... TF42-20)	(TF42-24 ... TF42-38)
Connecting capacity		
 Rigid	1 or 2 x	0.75 ... 4 mm ²
 Flexible with insulated ferrule	1 or 2 x	1.5 ... 2.5 mm ² or 2.5 ... 10 mm ² (1)
 Stranded acc. to UL/CSA	1 or 2 x	2.5 ... 4 mm ² or 4 ... 6 mm ² (1)
 Flexible acc. to UL/CSA	1 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)	

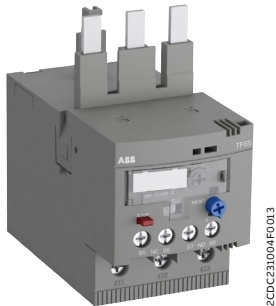
Auxiliary circuit

Type	TF42	
Connecting capacity		
 Rigid	1 or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 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 or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ² (1)
 Stranded acc. to UL/CSA	1 or 2 x	AWG 18-12
 Flexible acc. to UL/CSA	1 or 2 x	AWG 18-12
Stripping length	9 mm	
Tightening torque	1 ... 1.2 Nm / 9 ... 11 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

2CDC231004F0013



DB65

2CDC231003V0015



DB65 + TF65

2CDC231004V0015



KPR-101L

1SFA151224F0002



DRS-F

2CDC211002V0017

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					

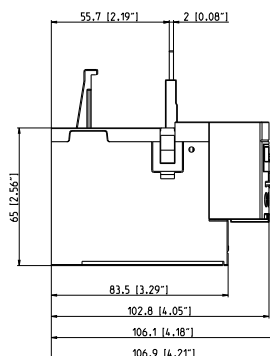
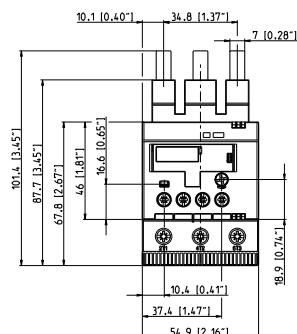
Suitable for AF40...AF65 contactors

22.0 ... 28.0	80 A, gG Type Fuses	10	TF65-28	1SAZ811201R1001	0.372
25.0 ... 33.0	80 A, gG Type Fuses	10	TF65-33	1SAZ811201R1002	0.372
30.0 ... 40.0	100 A, gG Type Fuses	10	TF65-40	1SAZ811201R1003	0.372
36.0 ... 47.0	125 A, gG Type Fuses	10	TF65-47	1SAZ811201R1004	0.372
44.0 ... 53.0	125 A, gG Type Fuses	10	TF65-53	1SAZ811201R1005	0.372
50.0 ... 60.0	125 A, gG Type Fuses	10	TF65-60	1SAZ811201R1006	0.382
57.0 ... 67.0	160 A, gG Type Fuses	10	TF65-67	1SAZ811201R1007	0.382

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	1SFA616162R1014	0.019
Remote reset coil 24-30 V AC / DC	TF42, TF65, TF96	DRS-F-01	1SAX101911R1001	0.076
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	0.078
Remote reset coil 220-240 V AC / DC		DRS-F-04	1SAX101911R1004	0.076
Remote stop coil 24-30 V DC		DRS-F-TF-01	1SAZ701904R1001	0.072
Remote stop coil 48-60 V DC		DRS-F-TF-02	1SAZ701904R1002	0.075
Remote stop coil 110-127 V DC		DRS-F-TF-03	1SAZ701904R1003	0.071
Remote stop coil 220-240 V DC		DRS-F-TF-04	1SAZ701904R1004	0.076

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



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TF65

Main dimensions mm, inches

TF65 thermal overload relays – 22.0 to 67.0 A

Technical data

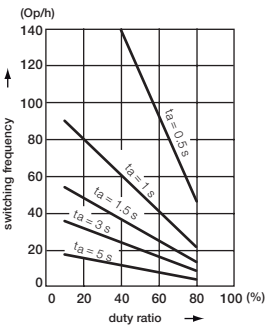
Main circuit – Utilization characteristics according to IEC/EN

Type	TF65
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage Ue	690 V AC, 440 V DC
Rated frequency	DC, 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 0.50 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.50 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.50 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.50 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	12 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



ta: Motor starting time

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/DC
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 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	
		Short circuit rating RMS symmetrical	Fuse type	Short circuit rating RMS symmetrical	Fuse type
TF65-28	28 A	5 kA	100 A, K5 / RK5	18 kA	110 A, Class J
TF65-33	33 A	5 kA	100 A, K5 / RK5	18 kA	110 A, Class J
TF65-40	40 A	5 kA	100 A, K5 / RK5	18 kA	110 A, Class J
TF65-47	47 A	5 kA	125 A, K5 / RK5	18 kA	125 A, Class J
TF65-53	53 A	10 kA	125 A, K5 / RK5	18 kA	125 A, Class J
TF65-60	60 A	10 kA	150 A, K5 / RK5	18 kA	150 A, Class J
TF65-67	67 A	10 kA	150 A, K5 / RK5	18 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 ... +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	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 or 2 x	2.5 ... 16 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible with ferrule	1 or 2 x	2.5 ... 10 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible with insulated ferrule	1 or 2 x	2.5 ... 10 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible	1 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 or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 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 or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ²
	Stranded acc. to UL/CSA	1 or 2 x AWG 18 ... 12
	Flexible acc. to UL/CSA	1 or 2 x AWG 18 ... 12
Stripping length	9 mm	
Tightening torque	1 ... 1.2 Nm / 9 ... 11 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

1SFC151224F0002



DRS-F

2CDC211002V0017

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					

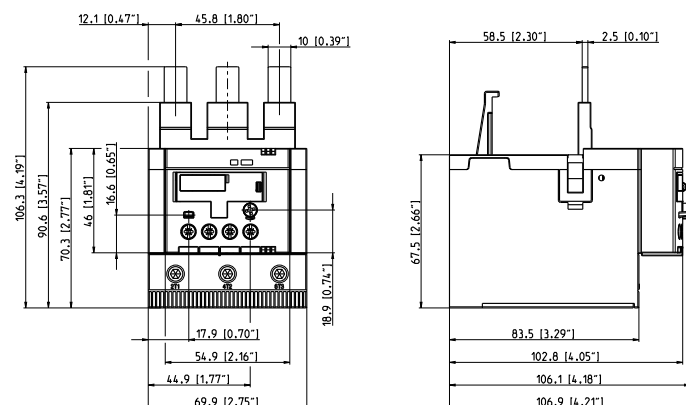
Suitable for AF80, AF96 contactors

40.0 ... 51.0	125 A, gG Type Fuses	10	TF96-51	1SAZ911201R1001	0.520
48.0 ... 60.0	160 A, gG Type Fuses	10	TF96-60	1SAZ911201R1002	0.520
57.0 ... 68.0	160 A, gG Type Fuses	10	TF96-68	1SAZ911201R1003	0.520
65.0 ... 78.0	200 A, gG Type Fuses	10	TF96-78	1SAZ911201R1004	0.520
75.0 ... 87.0	200 A, gG Type Fuses	10	TF96-87	1SAZ911201R1005	0.520
84.0 ... 96.0	250 A, gG Type Fuses	10	TF96-96	1SAZ911201R1006	0.530

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	0.076
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	0.078
Remote reset coil 220-240 V AC/DC		DRS-F-04	1SAX101911R1004	0.076
Remote stop coil 24-30 V DC		DRS-F-TF-01	1SAZ701904R1001	0.072
Remote stop coil 48-60 V DC		DRS-F-TF-02	1SAZ701904R1002	0.077
Remote stop coil 110-127 V DC		DRS-F-TF-03	1SAZ701904R1003	0.071
Remote stop coil 220-240 V DC		DRS-F-TF-04	1SAZ701904R1004	0.076

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



1SAZ900401F0001

TF96

Main dimensions mm, inches

TF96 thermal overload relays – 40.0 to 96.0 A

Technical data

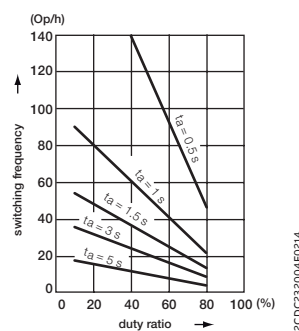
Main circuit – Utilization characteristics according to IEC/EN

Type	TF96
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1
Rated operational voltage Ue	690 V AC, 440 V DC
Rated frequency	DC, 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 0.50 A
220-230-240 V	N.C., 95-96 3.00 A N.O., 97-98 0.50 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.50 A
480-500 V	N.C., 95-96 0.75 A N.O., 97-98 0.50 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	12 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

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/DC
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 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
TF96-51	51 A	5 kA	150 A, K5 / RK5	18 kA	125 A, Class J
TF96-60	60 A	10 kA	150 A, K5 / RK5	18 kA	150 A, Class J
TF96-68	68 A	10 kA	150 A, K5 / RK5	18 kA	150 A, Class J
TF96-78	78 A	10 kA	175 A, K5 / RK5	18 kA	175 A, Class J
TF96-87	87 A	10 kA	200 A, K5 / RK5	18 kA	200 A, Class J
TF96-96	96 A	10 kA	250 A, K5 / RK5	18 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 ... +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	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 or 2 x	6 ... 35 mm ²
	1 x	6 ... 50 mm ²
 Flexible with ferrule	1 or 2 x	6 ... 35 mm ²
	1 x	6 ... 50 mm ²
 Flexible with insulated ferrule	1 or 2 x	6 ... 16 mm ²
	1 x	6 ... 50 mm ²
 Flexible	1 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)	

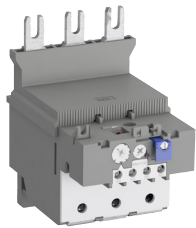
(2) Valid for products, produced from week 27, 2015

Auxiliary circuit

Type	TF96	
Connecting capacity		
 Rigid	1 or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 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 or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ²
	Stranded acc. to UL/CSA	1 or 2 x AWG 18 ... 12
	Flexible acc. to UL/CSA	1 or 2 x AWG 18 ... 12
Stripping length	9 mm	
Tightening torque	1 ... 1.2 Nm / 9 ... 11 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					

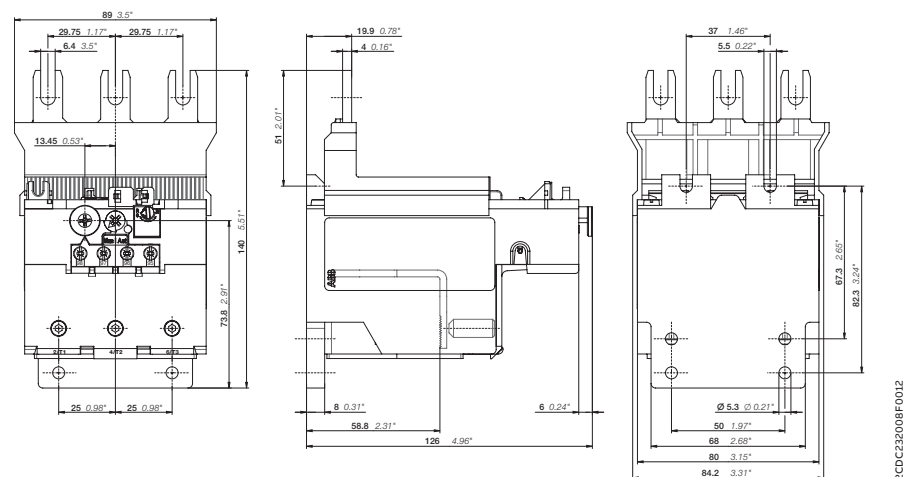
Suitable for AF116...AF140 contactors

66 ... 90	200 A, fuse type gG	10A	TF140DU-90	1SAZ431201R1001	0.882
80 ... 110	224 A, fuse type gG	10A	TF140DU-110	1SAZ431201R1002	0.824
100 ... 135	224 A, fuse type gG	10A	TF140DU-135	1SAZ431201R1003	0.818
110 ... 142	250 A, fuse type gG	10A	TF140DU-142	1SAZ431201R1004	0.828
66 ... 90	200 A, fuse type gG	10A	TF140DU-90-V1000*	1SAZ431301R1001	0.882
80 ... 110	224 A, fuse type gG	10A	TF140DU-110-V1000*	1SAZ431301R1002	0.824
100 ... 135	224 A, fuse type gG	10A	TF140DU-135-V1000*	1SAZ431301R1003	0.818
110 ... 142	250 A, fuse type gG	10A	TF140DU-142-V1000*	1SAZ431301R1004	0.828

*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

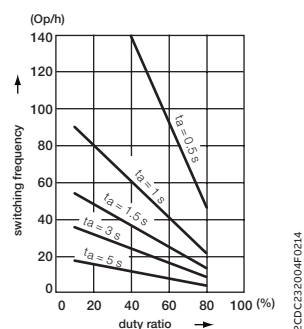
Main circuit – Utilization characteristics according to IEC/EN

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, 440 V DC
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 3.00 A N.O., 97-98 1.20 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.37 A
480-500 V	N.C., 95-96 0.30 A N.O., 97-98 0.25 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/DC
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	C600	
	N.O., 97-98	B600	
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	15 g / 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	IP10

Electrical connection

Main circuit

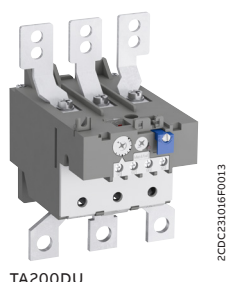
Type	TF140DU / TF140DU-V1000	
Connecting capacity		
 Rigid	1 x	16 ... 70 mm ²
	2 x	-
 Flexible	1 x	16 ... 70 mm ²
	2 x	-
	Stranded acc. to UL/CSA	1 or 2 x AWG 6-2/0
	Flexible acc. to UL/CSA	1 or 2 x AWG 6-2/0
Stripping length	25 mm	
Tightening torque	8 ... 10 Nm / 77 ... 88 lb.in	
Recommended screw driver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

Auxiliary circuit

Type	TF140DU / TF140DU-V1000	
Connecting capacity		
 Rigid	1 or 2 x	0.75 ... 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 18-14
	Flexible acc. to UL/CSA	1 or 2 x AWG 18-14
Stripping length	9 mm	
Tightening torque	0.8 ... 1.2 Nm / 12 lb.in	
Recommended screw driver	M3.5 (Pozidriv 2)	

TA200DU thermal overload relays – 66 to 200 A

Ordering details



TA200DU



KPR-101L

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					

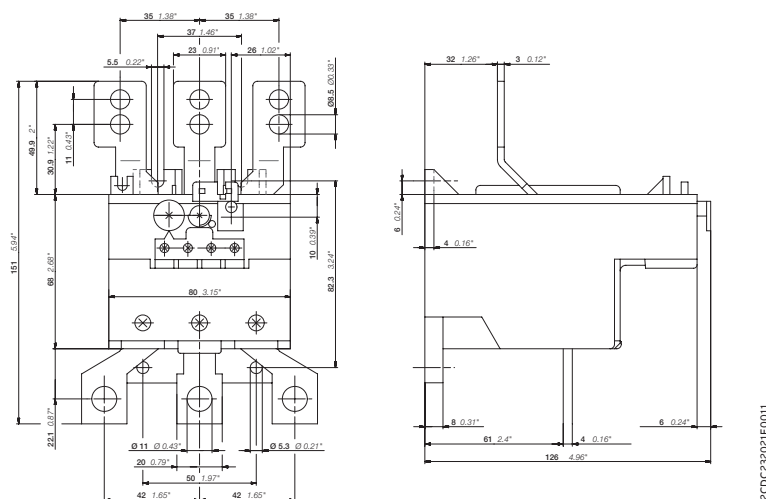
Suitable for AF190...AF205 contactors

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

TA200DU thermal overload relays – 66 to 200 A

Technical data

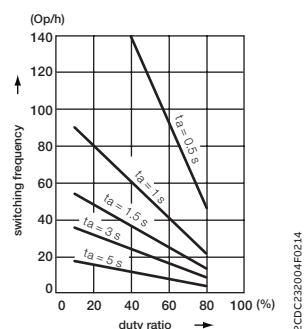
Main circuit – Utilization characteristics according to IEC/EN

Type	TA200DU / TA200DU-V1000
Standards	IEC/EN 60947-1, IEC/EN 60947-4-1
Rated operational voltage Ue	690 V AC / 440 V DC
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 1.20 A
440 V	N.C., 95-96 0.75 A N.O., 97-98 0.37 A
480-500 V	N.C., 95-96 0.30 A N.O., 97-98 0.25 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/DC
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	-5 ... +40 °C
Storage	Open	-25 ... +55 °C	-5 ... +40 °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 or 2 x	0.75 ... 4 mm ²
 Flexible with ferrule	1 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 mm ²
 Flexible	1 or 2 x	0.75 ... 2.5 mm ²
Stranded acc. to UL/CSA	1 or 2 x	AWG 18 ... 14
Flexible acc. to UL/CSA	1 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



E16DU-1-0



EF19-18.9



EF45-30

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
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E16DU electronic overload relays, suitable for B6 and B7

0.10 ... 0.32	1 A, fuse type gG	10E, 20E, 30E	E16DU-0.32	1SAX111001R1101	0.158
0.30 ... 1.00	4 A, fuse type gG	10E, 20E, 30E	E16DU-1.0	1SAX111001R1102	0.158
0.80 ... 2.70	10 A, fuse type gG	10E, 20E, 30E	E16DU-2.7	1SAX111001R1103	0.158
2.00 ... 6.30	20 A, fuse type gG	10E, 20E, 30E	E16DU-6.3	1SAX111001R1104	0.158
5.70 ... 18.9	50 A, fuse type gG	10E, 20E, 30E	E16DU-18.9	1SAX111001R1105	0.158

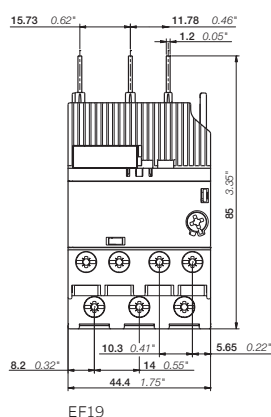
EF19 electronic overload relays, suitable for AF09 ... AF38 / AFC09 ... AFC38 (1)

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

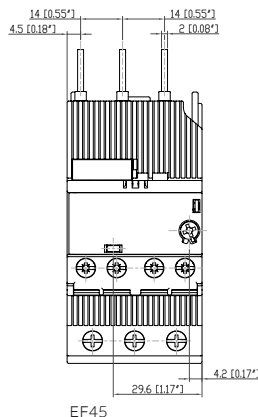
EF45-30 also suitable for AF26 ... AF38 (1)

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

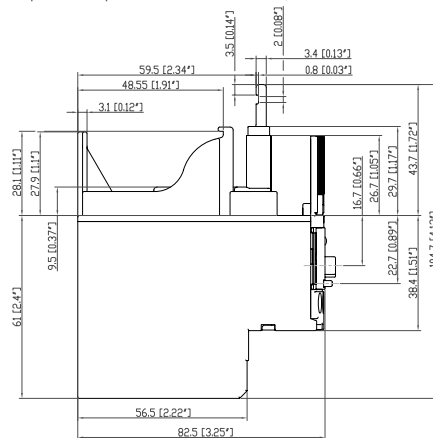
(1) ATEX is valid for products produced from week 42, 2014. IECEx is valid for products produced from week 15, 2017.



EF19



EF45

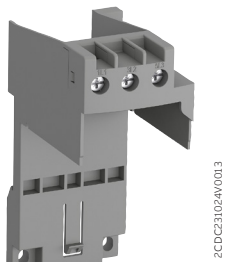


E16DU

Main dimensions mm, inches

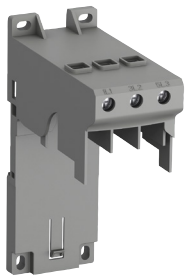
E16DU, EF19, EF45 electronic overload relays – 0.10 to 45.0 A

Ordering details



DB19EF

2CDC231024V001.3



DB45EF

2CDC231002V01.4



KPR-101L

1SFC151224F0002



DRS-F

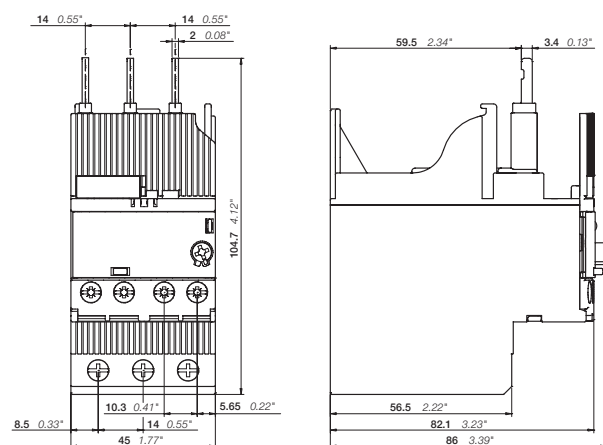
2CDC21002V0017

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
Remote reset coil 24-30 V DC	EF19, EF45, EF65,	DRS-F-01	1SAX101911R1001	0.076
Remote reset coil 48-60 V DC	EF96, EF146,	DRS-F-02	1SAX101911R1002	0.077
Remote reset coil 110-127 V DC	EF205, EF370,	DRS-F-03	1SAX101911R1003	0.078
Remote reset coil 220-240 V DC	EF460, EF750	DRS-F-04	1SAX101911R1004	0.076
Remote stop coil 24-30 V AC/DC		DRS-F-EF-01	1SAX101911R1011	0.075
Remote stop coil 48-60 V AC/DC		DRS-F-EF-02	1SAX101911R1012	0.076
Remote stop coil 110-127 V AC/DC		DRS-F-EF-03	1SAX101911R1013	0.076
Remote stop coil 220-240 V AC/DC		DRS-F-EF-04	1SAX101911R1014	0.074

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		

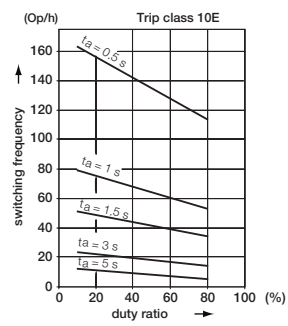
Auxiliary circuit according to IEC/EN

Type	E16DU		EF19	EF45		
Rated operational voltage 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	0.72 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 devices	6 A, fuse type gG					
Rated impulse withstand voltage U_{imp}	6 kV					
Rated insulation voltage U_i	690 V					

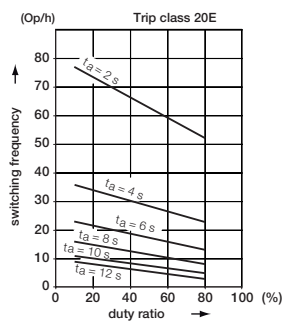
E16DU, EF19, EF45 electronic overload relays – 0.10 to 45.0 A

Technical data

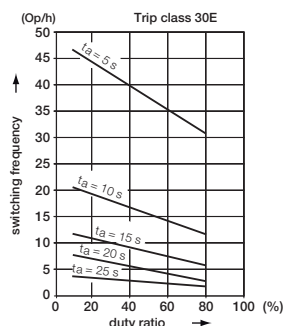
Technical diagram – Intermittent periodic duty



Trip class 10E



Trip class 20E



Trip class 30E

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	B600, Q600
Conventional free-air thermal current	5 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	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	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)	M5 (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	M3.5 (Pozidriv 2)	M3.5 (Pozidriv 2)	M3.5 (Pozidriv 2)

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

Ordering details



EF65-70



EF96-100

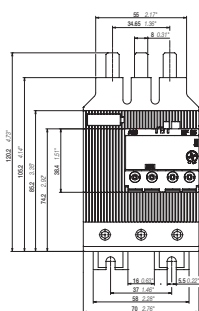


EF146-150

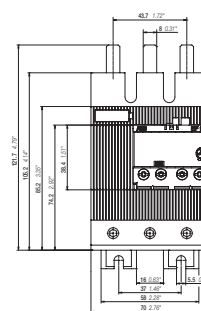
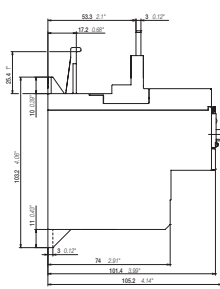
The EF65, EF96 and EF146 are self-supplied electronic overload relays, which means no extra external supply is needed. It offers reliable protection for motors in the event of overload or phase failure. Easy to use like a thermal overload relay and compatible with standard motor applications, the electronic 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)
A					kg
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	160A, 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	0.890

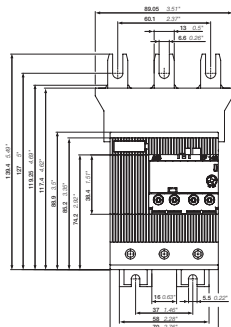
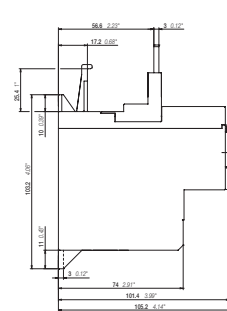
(1) ATEX is valid for products produced from week 42, 2014. ATEX certification is valid for EF65-56 produced from week 47, 2015. IECEx is valid for products produced from week 15, 2017.



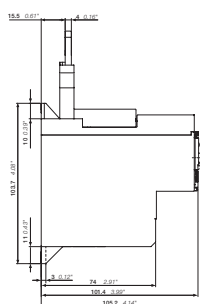
EF65-56 / EF65-70



EF96-56 / EF96-100



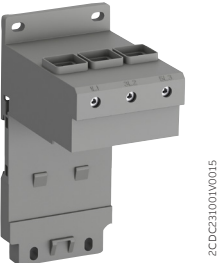
EF146-150



Main dimensions mm, inches

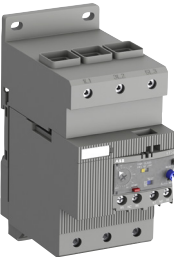
EF65, EF96, EF146 electronic overload relays – 20 to 150 A

Ordering details



DB96

2CDC231001V0015



DB96 + EF96

2CDC231002V0015



KPR-101L

1SFC151224F0002



DRS-F

2CDC211002V0017

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
Remote reset coil 24-30 V DC	EF19, EF45, EF65,	DRS-F-01	1SAX101911R1001	0.076
Remote reset coil 48-60 V DC	EF96, EF146,	DRS-F-02	1SAX101911R1002	0.077
Remote reset coil 110-127 V DC	EF205, EF370,	DRS-F-03	1SAX101911R1003	0.078
Remote reset coil 220-240 V DC	EF460, EF750	DRS-F-04	1SAX101911R1004	0.076
Remote stop coil 24-30 V AC/DC		DRS-F-EF-01	1SAX101911R1011	0.075
Remote stop coil 48-60 V AC/DC		DRS-F-EF-02	1SAX101911R1012	0.076
Remote stop coil 110-127 V AC/DC		DRS-F-EF-03	1SAX101911R1013	0.076
Remote stop coil 220-240 V AC/DC		DRS-F-EF-04	1SAX101911R1014	0.074

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

Technical data

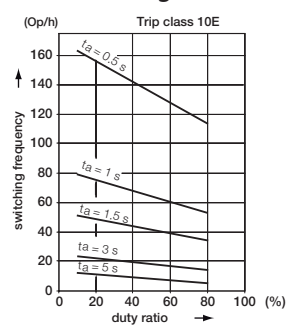
Main circuit – Utilization characteristics according to IEC/EN

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

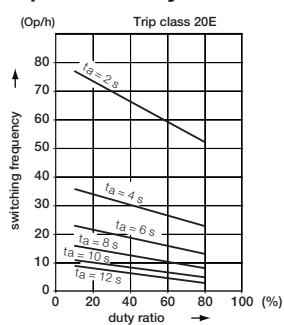
Type	EF65, EF96, EF146
Rated operational voltage U_e	600 V AC / DC
Conventional free air thermal current I_{th}	6 A
Rated frequency	DC, 50/60 Hz
Number of poles	1 N.C. + 1 N.O.
I_e / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	
110-120 V	50/60 Hz 3.00 A
220-230-240 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



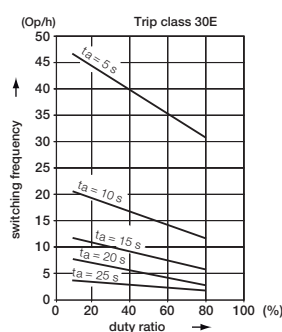
Trip class 10E

2CDC232002F0214



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	5 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	200 A, J
EF146-150	150 A	10 kA	250 A, K5/RK5	10 kA	250 A, K5/RK5	100 kA	200 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

1SFC151224F0002



DRS-F

2CDC21002V0017

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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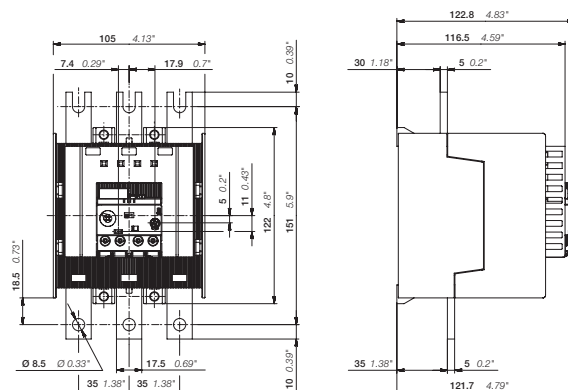
Suitable for AF210, AF260, AF265, AF300, AF305, AF370

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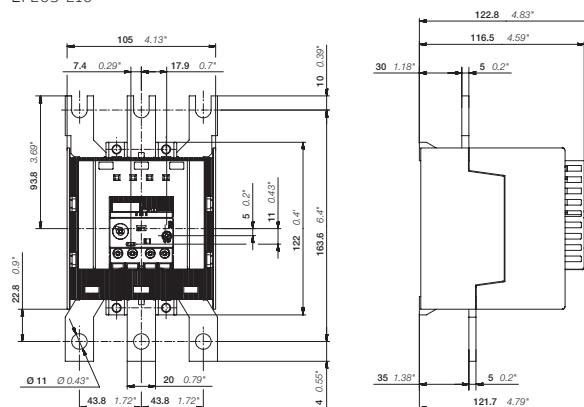
(1) ATEX is valid for products produced from week 42, 2015. IECEx is valid for products produced from week 15, 2017.

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
Remote reset coil 24-30 V DC	EF19, EF45, EF65,	DRS-F-01	1SAX101911R1001	0.077
Remote reset coil 48-60 V DC	EF96, EF146,	DRS-F-02	1SAX101911R1002	0.077
Remote reset coil 110-127 V DC	EF205, EF370,	DRS-F-03	1SAX101911R1003	0.077
Remote reset coil 220-240 V DC	EF460, EF750	DRS-F-04	1SAX101911R1004	0.077
Remote stop coil 24-30 V AC/DC		DRS-F-EF-01	1SAX101911R1011	0.077
Remote stop coil 48-60 V AC/DC		DRS-F-EF-02	1SAX101911R1012	0.077
Remote stop coil 110-127 V AC/DC		DRS-F-EF-03	1SAX101911R1013	0.077
Remote stop coil 220-240 V AC/DC		DRS-F-EF-04	1SAX101911R1014	0.077



EF205-210



EF370-380

Main dimensions mm, inches

EF205, EF370 electronic overload relays – 63 to 380 A

Technical data

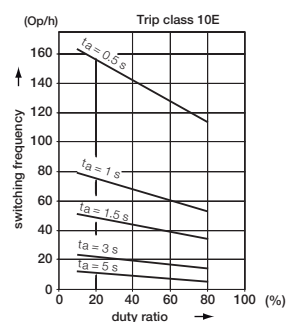
Main circuit – Utilization characteristics according to IEC/EN

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

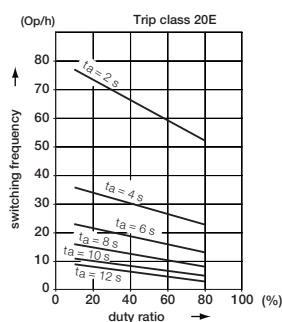
Auxiliary circuit according to IEC/EN

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

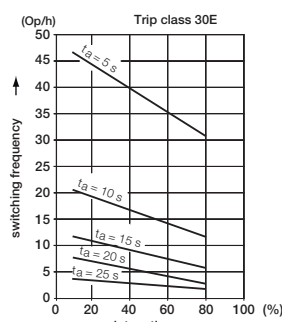
Technical diagram – Intermittent periodic duty



Trip class 10E



Trip class 20E



Trip class 30E

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	-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	25g / 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	IP00

Electrical connection

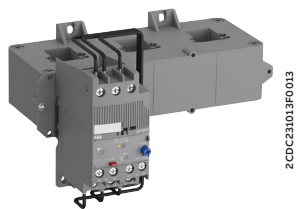
Main circuit

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)

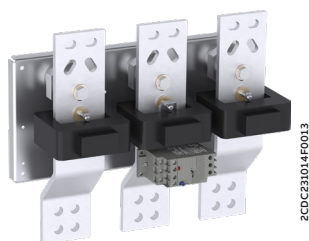
Ordering details



EF460-500



EF750-800



EF1250DU-1250

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 A	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
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EF460 electronic overload relay, suitable for AF400, AF460 (1)

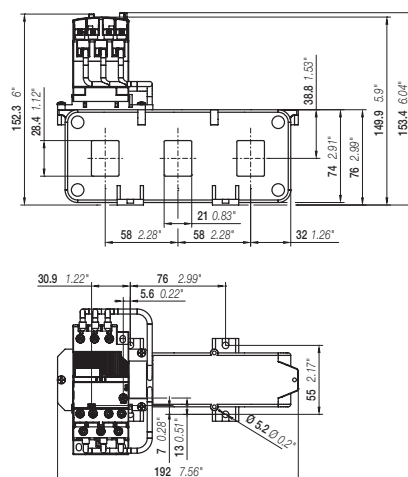
150 ... 500	690 V: 630 A, Type gG 1000 V: 1600 A, Type gG	10E, 20E, 30E	EF460-500	1SAX721001R1101	1.170
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EF750 electronic overload relay, suitable for AF580, AF750 (1)

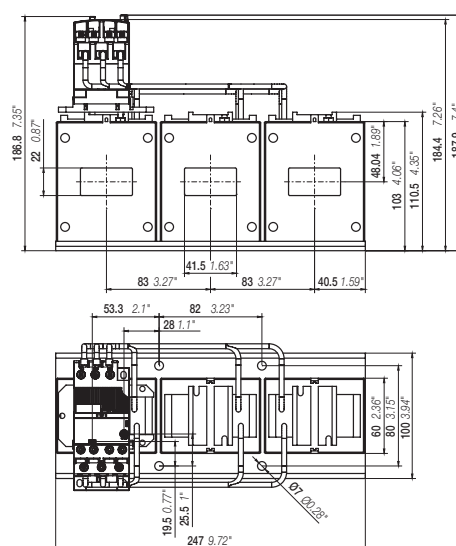
250 ... 800	690 V: 800 A, Type gG 1000 V: 1600 A, Type gG	10E, 20E, 30E	EF750-800	1SAX821001R1101	3.905
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EF1250DU electronic overload relay, suitable for AF1350, AF1650, AF2050

375 ... 1250	500 V; 1600 A, Type αG	10E, 20E, 30E	EF1250DU-1250	1SFA739001R1001
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EF460-500



EF750-800

Main dimensions mm,
inches

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

Ordering details



KPR-101L

1SFC151224F0002



DRS-F

2CDC11002V0017

(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
Remote reset coil 24-30 V DC	EF19, EF45, EF65, EF96, EF146, EF205, EF370, EF460, EF750	DRS-F-01	1SAX101911R1001	0.076
Remote reset coil 48-60 V DC		DRS-F-02	1SAX101911R1002	0.077
Remote reset coil 110-127 V DC		DRS-F-03	1SAX101911R1003	0.078
Remote reset coil 220-240 V DC		DRS-F-04	1SAX101911R1004	0.076
Remote stop coil 24-30 V AC/DC		DRS-F-EF-01	1SAX101911R1011	0.075
Remote stop coil 48-60 V AC/DC		DRS-F-EF-02	1SAX101911R1012	0.076
Remote stop coil 110-127 V AC/DC		DRS-F-EF-03	1SAX101911R1013	0.076
Remote stop coil 220-240 V AC/DC		DRS-F-EF-04	1SAX101911R1014	0.074

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

Technical data

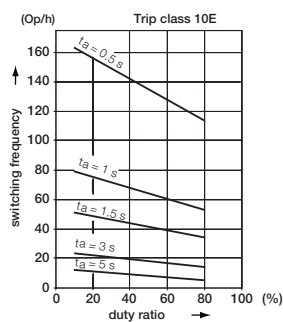
Main circuit – Utilization characteristics according to IEC/EN

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

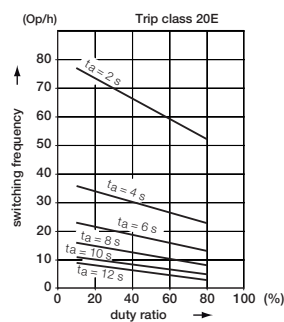
Type	EF460	EF750	EF1250DU
Rated operational voltage U_e	600 V AC / DC		
Conventional free air thermal current I_{th}	6 A		
Rated frequency	DC, 50/60 Hz		
Number of poles	1 N.C. + 1 N.O.		
I_e / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category			
110-120 V	50/60 Hz	3.00 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



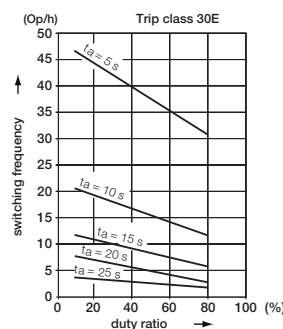
Trip class 10E

2CDC233002F0214



Trip class 20E

2CDC233002F0214



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	B600, Q600		
	N.O., 97-98	B600, Q600		
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	-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	25g / 11 ms		
Resistance to vibrations acc. to IEC 60068-2-6	5g / 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)

