Data sheet

Electronic overload relays EF205 and EF370

Electronic overload relays are the alternative to the thermal overload relays. An electronic overload relay offers reliable and fast protection for motors in the event of overload or phase failure. Starter combinations are setup together with contactors.

Description

- Overload protection – trip class 10E, 20E, 30E selectable
- Phase loss sensitivity
- Temperature compensation from -25 … +70 °C
- Adjustable current setting for overload protection
- Automatic or manual reset selectable
- Trip-free mechanism
- Status indication
- STOP and TEST function
- Direct mounting onto block contactors
- Sealable operating elements
- Self-supplied devices

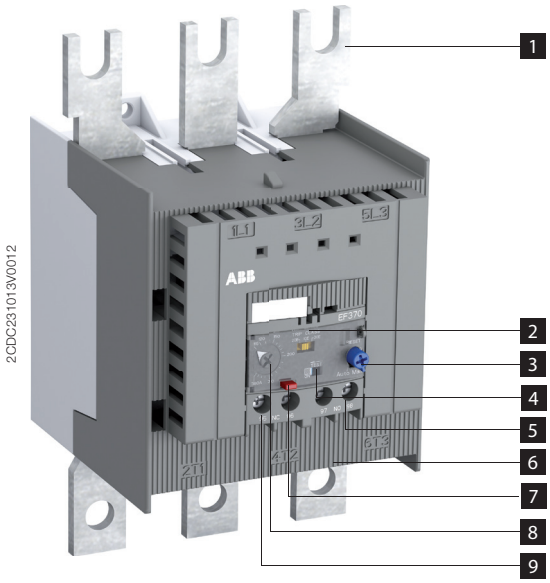
Order data

EF205, EF370 screw terminal
For A145 … AF370 block contactors

Setting range A	Type	Order code	Suitable for	Packing unit PCE	Weight per PCE kg
63 ... 210	EF205-210	1SAX531001R1101	A145, A185, AF145, AF180, AF185, AF205	1	1.210
115 ... 380	EF370-380	1SAX611001R1101	A210, A260, A300, AF210, AF260, AF265, AF300, AF305, AF370	1	1.430

Suitable for mounting on:
A145, A185, AF145, AF180, AF185, AF205
A210, A260, A300, AF210, AF260, AF265, AF300, AF305, AF370

Functional description



1 **Terminals (1L1, 3L2, 5L3)**

2 **Trip class 10E, 20E, 30E selectable**

3 **RESET button**
Automatic or manual reset selectable

4 **Status indication**

5 **Signaling contacts 97-98**

6 **Terminals 2T1, 4T2, 6T3**

7 **STOP button**

8 **Current setting range**
Adjustable current setting for overload protection

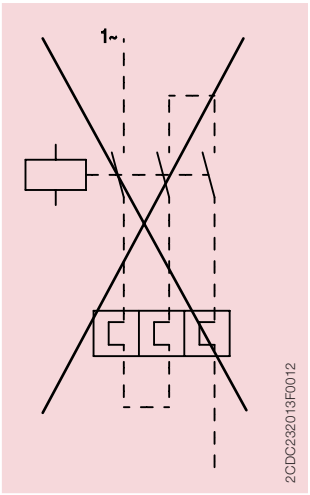
9 **Tripping contacts 95-96**

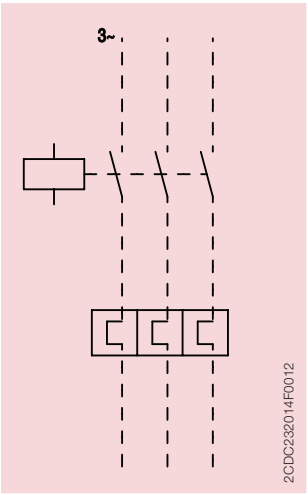
Application / internal function

The self-supplied electronic overload relays are three pole electronic/mechanical devices. The motor current flows through build-in current transformers and an evaluation circuit will recognize an overload (over current). This will lead to a release of the relay and a change of the contacts switching position (95-96 / 97-98). The contact 95-96 is used to control the load contactor. The electronic overload relay is self-supplied, which mean no extra external supply is needed.

The overload relays have a setting scale in Amperes, which allows the direct adjusting of the relay without any additional calculation. In compliance with international and national standards, the setting current is the rated current of the motor and not the tripping current (no tripping at 1.05 x I, tripping at 1.2 x I; I = setting current). The relays are constructed in a way that they protect themselves in the event of an overload. The overload relay has to be protected against short-circuit. The appropriate short-circuit protective devices are shown in the table.

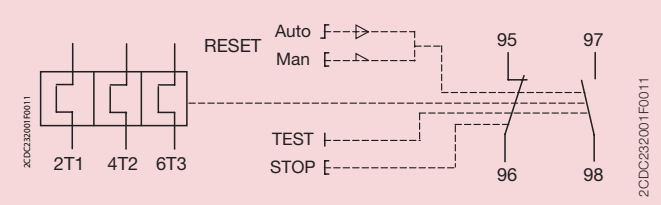
Operation mode





	Contact 95-96	Contact 97-98	Opto-mechanical slide	Comment
Trip state	open	closed		
RESET state	closed	open	ON	
TEST manual reset mode	open	closed		
TEST auto reset mode	open	closed		
STOP while device is in trip state	open	closed		STOP button has no function
STOP while device is in RESET state	open	open		while STOP button is pressed

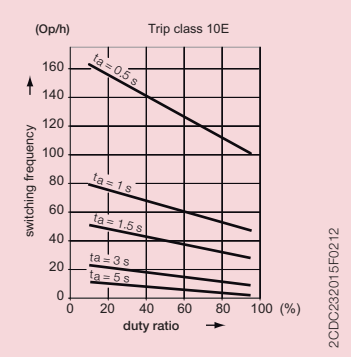
Wiring diagram



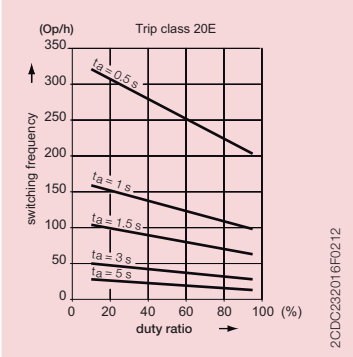
Resistance and power loss per pole and short-circuit protective devices

Type	Setting range		Resistance per pole	Power loss per pole		Short-circuit protection device
	lower value A	upper value A	 mΩ	at lower value W	at upper value W	coordination type 2
EF205-210	63	210	0.027	0.107	1.191	Fuse 1250 A, Type gG
EF370-380	115	380	0.028	0.370	4.043	Fuse 1600 A, Type gG

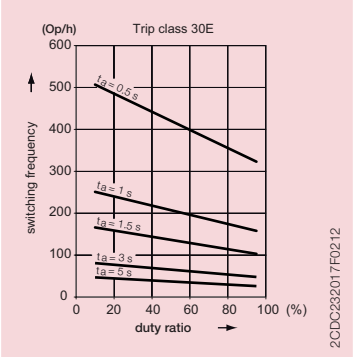
Intermittent periodic duty



Trip class 10E

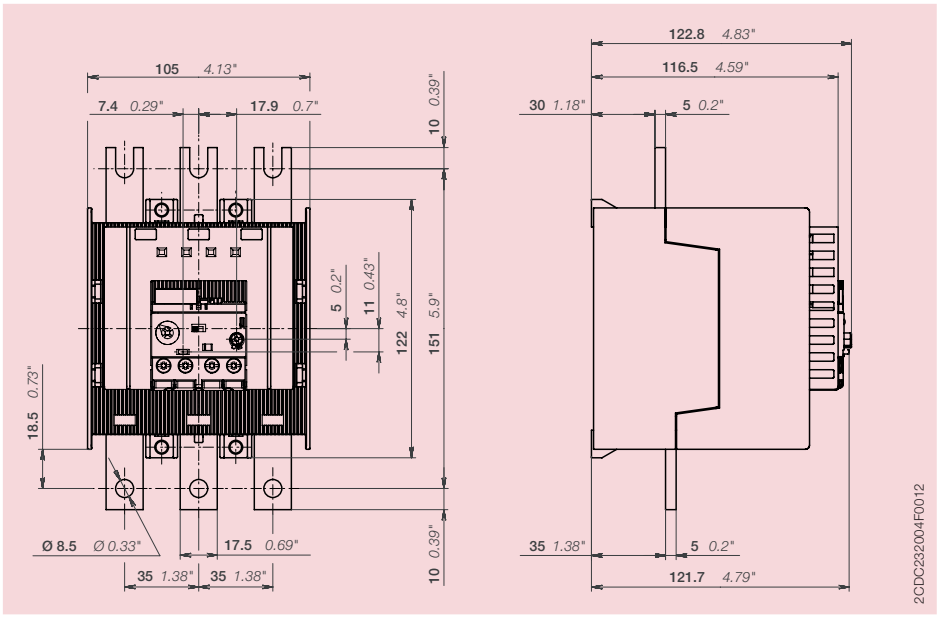


Trip class 20E

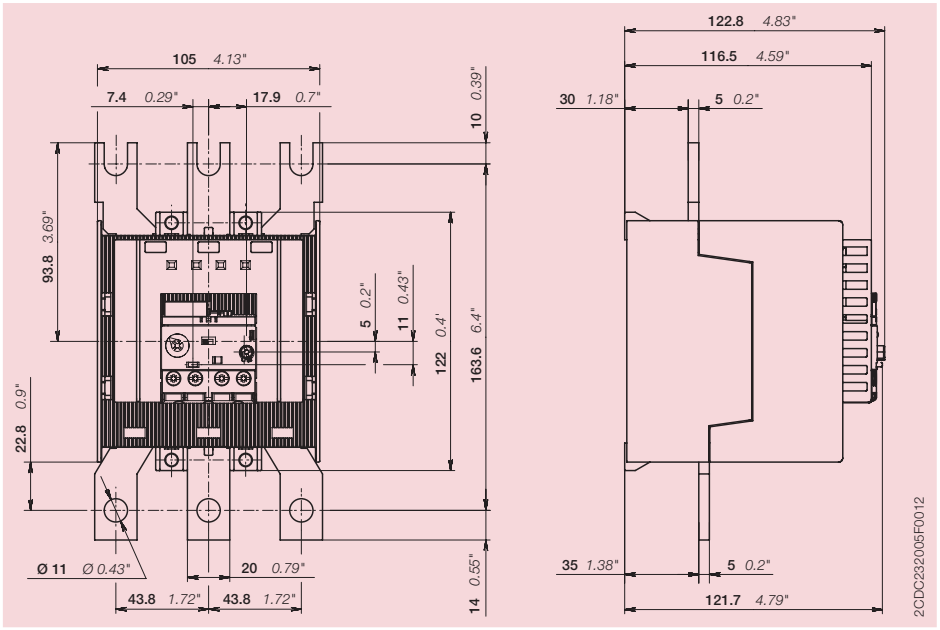


Trip class 30E

Dimensions



EF205-210



EF370-380

Technical data IEC/EN

Data at T_A = 40 °C and at rated values, if nothing else indicated

Main circuit

	EF205, EF370
Rated operational voltage U_e	1000 V AC
	- V DC
Setting range - electronic overload protection	see table on page 1
Rated operational current AC-3 I_e	see upper value of setting range, table on page 3
Trip class	10E, 20E, 30E, selectable
Rated frequency	50/60 Hz
Number of poles	3
Resistance per pole	see table on page 3
Power loss per pole	see table on page 3
Short-circuit protective devices	see table on page 3

Isolation data	EF205, EF370
Rated impulse withstand voltage U_{imp}	8 kV
Rated insulation voltage U_i	1000 V
Pollution degree	3
Overvoltage category	up to III

Electrical connection			EF205	EF370
Connecting capacity	rigid with cable lug	1x	16 ... 185 mm²	50 ... 240 mm²
		2x	16 ... 120 mm²	50 ... 150 mm²
	flexible with cable lug	1x	16 ... 185 mm²	50 ... 240 mm²
		2x	16 ... 120 mm²	50 ... 150 mm²
Stripping length			-	-
Tightening torques			18 Nm	28 Nm
Connection screw			M8	M10
Lug/Bar		L ≤	24 mm	32 mm
		Ø >	8 mm	10 mm

Auxiliary circuit

		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		1NC + 1NO
Rated operational current I_e		
acc. to IEC/EN 60947-5-1 for utilization category		
at AC-15 at 110-120 V	NC, 95-96	3.00 A
	NO, 97-98	3.00 A
at AC-15 at 220-230-240 V	NC, 95-96	3.00 A
	NO, 97-98	3.00 A
at AC-15 at 400 V	NC, 95-96	1.10 A
	NO, 97-98	1.10 A
at AC-15 at 480-500 V	NC, 95-96	0.75 A
	NO, 97-98	0.75 A
at DC-13 at 24 V	NC, 95-96	1.50 A
	NO, 97-98	1.50 A
at DC-13 at 60 V	NC, 95-96	0.55 A
	NO, 97-98	0.55 A
at DC-13 at 110-120-125 V	NC, 95-96	0.55 A
	NO, 97-98	0.55 A
at DC-13 at 250 V	NC, 95-96	0.27 A
	NO, 97-98	0.27 A
Minimum switching capacity		12 V / 3 mA
		$\lambda = 10^{-7}$; U_{kq} = 3 V / 500.000 operating cycles
Short-circuit protective devices		fuse 6 A, Type gG

Isolation data	EF205, EF370
Rated impulse withstand voltage U_{imp}	6 kV
Rated insulation voltage U_i	690 V
Pollution degree	3
Overvoltage category	up to III

Electrical connection			EF205, EF370
Connecting capacity	rigid	1x	1 ... 4 mm²
		2x	1 ... 4 mm²
	flexible with ferrule	1x	0.75 ... 2.5 mm²
		2x	0.75 ... 2.5 mm²
	flexible with insulated ferrule	1x	0.75 ... 2.5 mm²
		2x	0.75 ... 2.5 mm²
	flexible	1x	0.75 ... 2.5 mm²
		2x	0.75 ... 2.5 mm²
Stripping length			9 mm
Tightening torques			0.8 ... 1.2 Nm
Connection screw			M3.5 (Pozidriv 2)

General data

Duty time		100 %
Operating frequency without early tripping		see diagrams on page 3
Dimensions (W x H x D)		see dimension drawing
Weight		see ordering data
Mounting		screw with two screws on plate and tighten the screws of the main circuit terminals
Mounting on plate		M5 2 Nm / 18 lb.in
Mounting position		optional, position 1-6
Minimum distance to other units same type	horizontal	none
	vertical	not applicable
Minimum distance to electrical conductive board	horizontal	1.5 mm
	vertical	1.5 mm
Degree of protection	housing	IP20
	main circuit terminals	IP10
Altitude		up to 2000 m

Electromagnetic compatibility

Immunity acc. to IEC 60947-1		Environment A
Emission acc. to IEC 60947-1		Environment B

Environmental data

Ambient air temperature		
Operation	open - compensated	-25 ... +70 °C
	open	-25 ... +70 °C
Storage		-50 ... +85 °C
Ambient air temperature compensation		acc. to IEC/EN 60947-4-1
Vibration (sinusoidal) acc. to IEC/EN 60068-2-6 (Fc)		5g / 3 ... 150 Hz
Shock (half-sine) acc. to IEC/EN 60068-2-27 (Ea)		25g / 11 ms

Standards / directives

Product standard		IEC/EN 60947–4–1 IEC/EN 60497-5-1 IEC/EN 60947-1 UL 508, CSA22.2 No. 14
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
RoHS Directive		2002/95/EC

Technical data UL/CSA

Full load amps and short-circuit protective devices

Type	Full load amps (FLA)	Short-circuit protective devices 480 V AC SCCR	Fuse type	600 V AC SCCR	Fuse type	600 V AC SCCR	Fuse type
EF205-210	210 A	10 kA	400 A, K5/RK5	10 kA	400 A, U5/RK5	100 kA	400 A, Class J
EF370-380	380 A	18 kA	800 A, L/T	18 kA	800 A, L/T	-	-

Main circuit

Maximum operational voltage	600 V AC
Trip rating	125 % of FLA
Full load amps (FLA)	see table above
Short-circuit rating RMS symmetrical	see table above
Short-circuit protective devices	see table above

Electrical connection			EF205	EF370
Connecting capacity	stranded with cable lug	1x	AWG 6 ... 0000	AWG 1 ... 500 kcmil
		2x	AWG 6 ... 0000	AWG 1 ... 500 kcmil
	flexible with cable lug	1x	6 ... 0000	AWG 1 ... 500 kcmil
		2x	6 ... 0000	AWG 1 ... 500 kcmil
Lug/Bar		L ≤	24 mm	32 mm
		Ø >	8 mm	10 mm
Stripping length			-	-
Tightening torques			160 lb.in	247 lb.in
Connection screw			M8	M10

Auxiliary circuit

Conventional thermal current		6 A
Making and breaking capacity	NC / NO	B600, Q600

Electrical connection			EF205	EF370
Connecting capacity	stranded	1x	AWG 18 ... 10	AWG 18 ... 10
		2x	AWG 18 ... 10	AWG 18 ... 10
	flexible	1x	AWG 18 ... 10	AWG 18 ... 10
		2x	AWG 18 ... 10	AWG 18 ... 10
Stripping length			9 mm	9 mm
Tightening torques			7 ... 11 lb.in	7 ... 11 lb.in
Connection screw			M3.5 (Pozidriv 2)	M3.5 (Pozidriv 2)

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