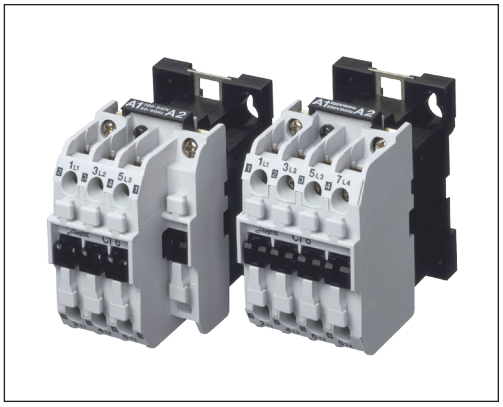
Contactors CI 6 – CI 50 for AC coil voltage (no built-in auxiliary contacts)

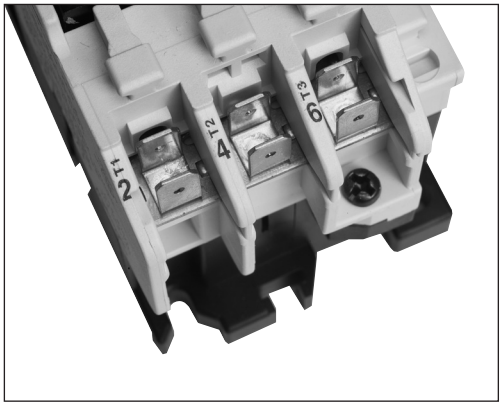


Danfoss contactors CI 6 – CI50 cover the power range 2.2 – 25 kW.
CI 6 is built up as a combined contactor/control relay.
CI 9 DC – CI 30 DC and CI 9 EI – CI 30 EI are contactors for DC coil voltage within the power range 2.2 – 15 kW. The range CI 9 EI – CI 30 EI has built-in interface relay for PLC application with 24 V DC output.
Accessories include a wide selection of clip-on auxiliary contact blocks and timers, interface modules and RC links.
The CI 6 – CI 50 range also includes thermal overload relays for protection of squirrel-cage motors.

	Main circuit							Auxiliary contacts	
	AC-3 load			I_{th}[4]	I_{the}[5]	Max. I_{th}[6]	Main		
Type	U_e 220 – 240 V [kW]	U_e 380 – 690 V [kW]	I_e [A]	(AC-1) Open [A]	(AC-1) Encl. [A]	(AC-1) Open [A]	contacts (make) Number	Add-on options Number	Code no.[1]
CI 6[2]	1.5	2.2	6	20	16	–	3	1 – 4	**037H0015**
	1.5	2.2	6	20	16	–	4	1 – 4	**037H0018**
CI 9	2.2	4.0	9	25	16	–	3	1 – 4	**037H0021**
	2.2	4.0	9	25	16	–	4	1 – 4	**037H0022**
CI 12	3.0	5.5	12	25	20	–	3	1 – 4	**037H0031**
	3.0	5.5	12	25	20	–	4	1 – 4	**037H0032**
CI 15	4.0	7.5[3]	16	25	20	30	3	1 – 4	**037H0049**
	4.0	7.5[3]	16	25	20	30	4	1 – 4	**037H0050**
CI 16	4.0	7.5	16	40	25	45	3	1 – 4	**037H0041**
CI 20	5.5	10.0	20	40	25	45	3	1 – 4	**037H0045**
CI 25	5.5	11.0	25	40	25	45	3	1 – 4	**037H0051**
CI 30	8.5	15.0	32	40	30	50	3	1 – 4	**037H0055**
CI 32	8.5	15.0[3]	32	63	63	–	3	1 – 4	**037H0061**
CI 37	10.0	18.5[3]	37	80	63	–	3	1 – 4	**037H0056**
CI 45	11.0	22.0[3]	45	80	80	90	3	1 – 4	**037H0071**
CI 50	15.0	25.0[3]	52	80	80	90	3	1 – 4	**037H0080**

1) Suffix defining coil voltage/frequency must be added to the Danfoss code no. (see table on page 4).
2) AC-15 operation: max. 500 VA/6A
3) U_e max.: 500 V
4) The thermal current value I_{th} represents the maximum load at 40 °C, which corresponds to installing the contactor in air (open).
5) The thermal current value I_{the} represents the maximum load at 60 °C, which corresponds to installing the contactor inside an enclosure.
6) Heat-resistant leads (min. 75 °C) must be used.

Contactors CI 6 – CI 30 for AC coil voltage with AMP connections



The CI 6 – CI 30 contactors are also available with AMP connections in main circuits.
Coils are equipped with standard screw connections.

This version can be especially useful in the applications where contactors are installed in the large number of standardized machines (welding machines or A/C units).

	Main circuit						
	AC-3 load			AC-1 load			
Type	U_e 220 – 240 V [kW]	U_e 380 – 690 V [kW]	I_e [A]	I_{th}[4] Open [A]	I_{the}[5] Encl. [A]	max. I_{th}[6] (make) [A]	Code no.[1) 2)]
CI 6[3]	1.5	2.2	6	20	16	–	**037H4016**
CI 9	2.2	4.0	9	25	16	–	**037H4023**
CI 12	3.0	5.5	12	25	20	–	**037H4033**
CI 15	4.0	7.5	15	25	20	30	**037H4042**
CI 16	4.0	7.5	16	40	25	45	**037H4040**
CI 20	5.5	10.0	20	40	25	45	**037H4060**
CI 25	5.5	11.0	25	40	25	45	**037H4052**
CI 30	8.5	15.0	32	40	30	50	**037H4057**

1) Suffix defining coil voltage/frequency must be added to the Danfoss code no. (see table on page 4).
2) The minimum order size is 30 pcs. for CI 6 to CI 15 and 25 pcs. for CI 16 to CI 30 in industrial packs. Industrial packs should be ordered as **037H40xxxx.**
3) AC-15 Operation: max. 500 VA/6A
4) The thermal current value I_{th} represents the maximum load at 40 °C, which corresponds to installing the contactor in air (open).
5) The thermal current value I_{the} represents the maximum load at 60 °C, which corresponds to installing the contactor inside an enclosure.
6) Heat-resistant leads (min. 75 °C) must be used.

AC coil voltages and coils for CI 6 – CI 30

Coil voltage *	Suffix no.	Code no.
24 V, 50 – 60 Hz	13	**037H6484**[1)]
24 V, 50 Hz / 29 V, 60 Hz	16	**037H6462**
42 V, 50 Hz / 50 V, 60 Hz	17	**037H6463**
110 V, 50 Hz / 110 – 120 V, 60 Hz	23	**037H6487**[1)]
208 – 230 V, 60 Hz	28	**037H6450**[2)]
220 – 230 V, 50 Hz / 220 V, 60 Hz	32	**037H6488**[1)]
220 – 240 V, 50 Hz	31	**037H6472**
380 – 400 V, 50 Hz / 440 V, 60 Hz	37	**037H6478**
415 V, 50 Hz / 500 V, 60 Hz	38	**037H6479**
500 V, 50 Hz / 600 V, 60 Hz	94	**037H6481**

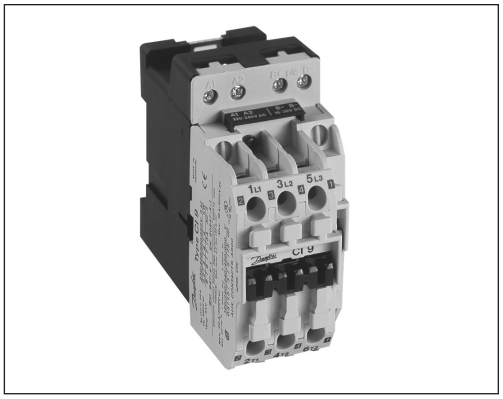
AC coil voltages and coils for CI 32 – CI 50

Coil voltage *	Suffix no.	Code no.
24 V, 50 – 60 Hz	13	**037H6084**[1)]
42 V, 50 Hz / 50 V, 60 Hz	17	**037H6063**
110 V, 50 Hz / 110 – 120 V, 60 Hz	23	**037H6087**[1)]
208 – 230 V, 60 Hz	28	**037H6050**[2)]
220 – 230 V, 50 Hz / 220 V, 60 Hz	32	**037H6088**[1)]
220 – 230 V, 50 Hz	31	**037H6072**
380 – 400 V, 50 Hz / 440 V, 60 Hz	37	**037H6078**
415 V, 50 Hz / 500 V, 60 Hz	38	**037H6079**
500 V, 50 Hz / 600 V, 60 Hz	94	**037H6081**

*) Standard coil voltage from -15% to 10%.
1) Double frequency coil: voltage range ±10%.
Continuous operation: ambient temperature max. 55 °C, non-enclosed
Intermittent operation: energized for 30 min/hour: ambient temperature max. 65 °C
2) Operating conditions and tolerances as for double frequency coils.

Correct ordering of contactors
Example: CI 9 with four main contacts and
24 V, 50 Hz coil voltage.
Select one of the following two forms of ordering:
1. Danfoss code no. + Suffix no.:
   037H002216
   or
2. Danfoss code no. + coil voltage/frequency:
   037H0022, 24 V/50 Hz

Interface contactors CI 9 EI – CI 30 EI (no built-in auxiliary contacts)



Contactors CI 9 EI – CI 30 EI cover the power range 4 – 15 kW.
The operation of the coil is controlled by an electronic circuit.
The range CI 9 EI – CI 30 EI has a built-in interface relay for PLC application with 24 V DC output.
Accessories include a wide selection of clip- on auxiliary contact blocks and timers.
The CI 9 EI – CI 30 EI range also includes thermal overload relays for protection of squirrel-cage motors.

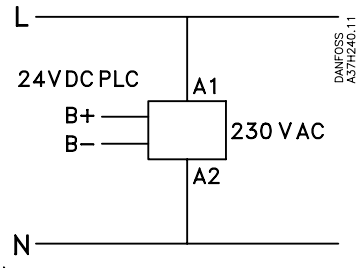
	Main circuit					Control circuit		
	AC-3 load			AC-1 load		Coil	PLC[5]	
Type	U_e 220 – 240 V [kW]	U_e 380 – 690 V [kW]	I_e [A]	I_{th}[1] Open [A]	I_{the}[2] Encl. [A]	A1 – A2 [V]	B+ - B– [V]	Code no.
CI 9 EI 24	2.2	4.0	9	25	16	24 DC	24 DC	**037H801166**
CI 9 EI 230	2.2	4.0	9	25	16	220 – 240 AC[4]	24 DC	**037H806166**
CI 15 EI 24	4.0	7.5[3]	15	25	20	24 DC	24 DC	**037H801366**
CI 15 EI 230	4.0	7.5[3]	15	25	20	220 – 240 AC[4]	24 DC	**037H806366**
CI 25 EI 24	5.5	11.0	25	40	25	24 DC	24 DC	**037H801666**
CI 25 EI 230	5.5	11.0	25	40	25	220 – 240 AC[4]	24 DC	**037H806666**
CI 30 EI 24	8.5	15.0	32	40	30	24 DC	24 DC	**037H801766**
CI 30 EI 230	8.5	15.0	32	40	30	220 – 240 AC[4]	24 DC	**037H806766**

1) The thermal current value I_{th} gives the maximum load at 40°C, which corresponds to installing the contactor in air (open).
2) The thermal current value I_{the} gives the maximum load at 60°C, corresponding to installing the contactor inside an enclosure.
3) U_e max 500 V
4) Coils are dual frequency coils
5) Cable length from PLC to B+ and B- max. 50 m because of risks of interference.

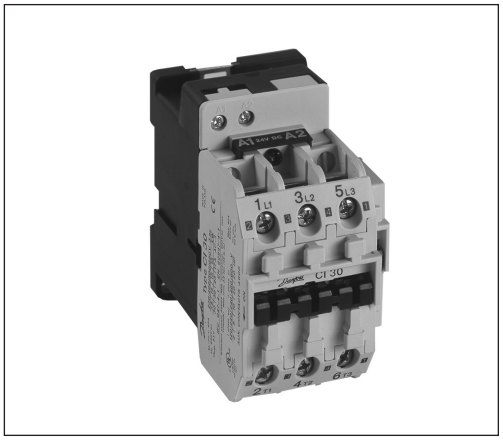
Ordering example
CI 9 EI with 230 V AC coil
and 24 V DC PLC interface:

Danfoss code number:
037H8061

(Type: CI 9 EI230)



Contactors CI 9 DC – CI 30 DC (no built-in auxiliary contacts)



Contactors CI 9 DC – CI 30 DC cover the range 4 – 15 kW.
The operation of the coil is controlled by an electronic circuit.
The control voltage is 12 V DC or 24 V DC.
A typical application is transport cooling.
Accessories include a wide selection of clip-on auxiliary contact blocks and timers.
The CI 9 DC – CI 30 DC range also includes thermal overload relays for protection of squirrel-cage motors.

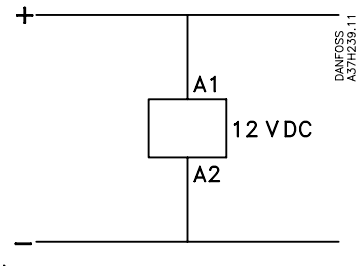
	Main circuit					Control circuit	
	AC-3 load			AC-1 load		Coil[4])	
Type	U_e 220 – 240 V [kW]	U_e 380-690 V [kW]	I_e [A]	I_{th}[1]) Open [A]	I_{the}[2]) Encl. [A]	A1 – A2 [V]	Code no.
CI 9 DC 24	2.2	4.0	9	25	16	24 DC	**037H807166**
CI 15 DC 12	4.0	7.5[3])	16	25	20	12 DC	**037H800366**
CI 15 DC 24	4.0	7.5[3])	16	25	20	24 DC	**037H807366**
CI 25 DC 24	5.5	11.0	25	40	25	24 DC	**037H807666**
CI 30 DC 24	8.5	15.0	32	40	30	24 DC	**037H807766**

1) The thermal current value I_{th} gives the maximum load at 40 °C, which corresponds to installing the contactor in air (open).
2) The thermal current value I_{the} gives the maximum load at 60 °C, corresponding to installing the contactor inside an enclosure.
3) U_e max 500 V.
4) Standard coil voltage from -15% to 10%.

Ordering example
CI 9 DC with 12 V DC coil:

Danfoss code number:
037H800166

(Type: CI 9 DC12)



Auxiliary contact blocks CB for CI 6 – CI 50



Type	Contact function	Load I_e (AC - 15) [A]	Load I_{th} [1] (AC-1) Open [A]	Load I_{the} [2] (AC-1) Enc. [V]	Load U_e	Colour code	Code no.
CB-S	start	6	10	10	500	green	**037H0110**
CB-I	start pulse[3]	6	10	10	500	green	**037H0117**
CB-NO	make	6	10	10	500	green	**037H0111**
CB-NC	break	6	10	10	500	red	**037H0112**
CB-EM	early make	6	10	10	500	white	**037H0113**
CB-LB	late break	6	10	10	500	blue	**037H0114**

1) The thermal current value I_{th} gives the maximal load at 40 °C, which corresponds to installing the contactor in air (open).
2) The thermal current value I_{the} gives the maximal load at 60 °C, corresponding installing the contactor inside an enclosure.
3) Without self-holding function.

Auxiliary contact block CB- with gold-plated contacts (PLC-compatible)



Type	Contact function	Load I_e mA	Load U_e V	Colour code	Code no.
CB-NO	make	1 – 30	5 – 30	white	**037H0121**
CB-NC	break	1 – 30	5 – 30	blue	**037H0122**

CB auxiliary contact blocks are force-actuated when mounted on CI 6 – CI 30 and can therefore form part of safety switching.

In the standard auxiliary contact CB - the silver tips on the moreable contact is cross stamped and PLC - compatible.
Min. load 24 V, 10 mA.

Accessories for contactors CI 6 – CI 50



Mech. interlock
CI 9 DC – CI 30 DC
CI 9 EI – CI 30 EI



Mech. interlock
CI 32 – CI 50



RC Element
CI 6 – CI 30



RCB-



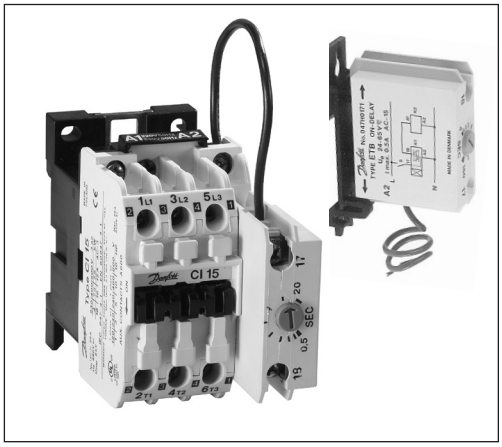
Rating plate
CI 6 – CI 50



Clip-on markers
CI 6 – CI 50 and CB-

Description	Comments	Code no.
Mech. interlock for CI 6 – CI 30 CI 9 DC – CI 30 DC, CI 9 EI – CI 30 EI	Mech. interlock can be established between pairs (1-off).	**037H009166**
Mech. interlock for CI 32 – CI 50	Mech. interlock can be established between	**037H010666**
RC Element for CI 6 – CI 30	Reduces overvoltage on de-energization of coils	
	Type RC 250 (110 – 250 V, 50/60 Hz)	**037H0076**
	Type RC 415 (380 – 415 V, 50/60 Hz)	**037H0077**
Rating plate for CI 6 - 50	Rating plate, can be mounted in auxiliary contact space (10-off)	**037H010166**
Clip-on markers for CI 5 – CI 60 and auxiliary contact blocks	Clip-on markers can be mounted on CI 6 – CI 50 and auxiliary contact blocks type CB- (250-off)	**037H010566**

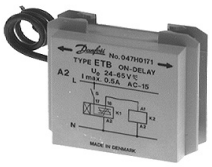
ON-delay clip-on timers for AC control voltage 50/60 Hz



ETB electronic clip-on timers are for use with Danfoss contactors to delay contactor close and open.

The clip-on timers can be clipped direct onto contactors CI 6 – CI 50 and occupy as little space as one auxiliary contact.
Where separate mounting at the side of contactors is required, a DIN rail mounting base is available.

ETB



Type	Time range	Voltage range [V]	Code no.
ETB	0.5 – 20 s	24 – 65	**047H0170**
	4 – 160 s	24 – 65	**047H0171**
	0.5 – 20 s	110 – 240	**047H0173**
	4 – 160 s	110 – 240	**047H0174**
	0.5 – 20 min	110 – 240	**047H0175**

OFF-delay clip-on timers for AC control voltage 50/60 Hz

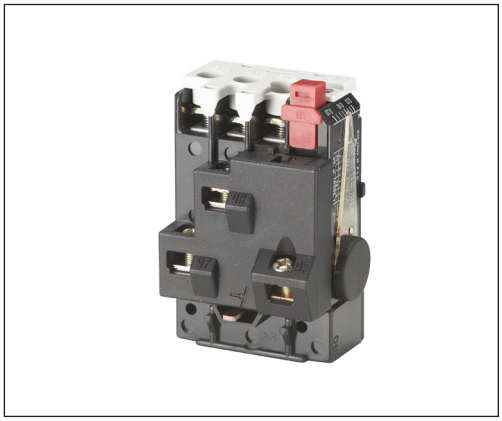
Type	Time range	Voltage range [V]	Code no.
ETB	0.5 – 20 s	24 – 65	**047H0180**
	4 – 160 s	24 – 65	**047H0181**
	0.5 – 20 min	24 – 65	**047H0182**
	0.5 – 20 s	110 – 240	**047H0183**
	4 – 160 s	110 – 240	**047H0184**
	0.5 – 20 min	110 – 240	**047H0185**

Accessory for ETB



Description	Comments	Code no.
DIN rail base for ETB	For separate mounting of clip-on timers ETB	**047H016466**

Thermal overload relays TI 16C, TI 25C, TI 30C for contactors CI 6 – CI 30



Thermal overload relays TI 16C, TI 25C and TI 30C are used with contactors CI 6 – CI 30 to give protection of squirrel-cage motors of 0.09 kW to 15 kW.
The relays have single-phase protection, i.e. accelerated release if phase drop-out occurs. This is particularly important for motors with delta-connected windings.

Other features of TI 16C/25C/30C:
- stop/reset button
- manual/automatic reset
- test button
- double scale for direct start or Y/D start
- galvanically isolated signal contact

Type	Range		Max. fuse[1]				HRC[2] II	Code no.
	Motor-starter [A]	Y/D-starter [A]	gI, gL, gG		BS 88, type T			
			Type 1 [A]	Type 2 [A]	Type 1 [A]	Type 2 [A]	[A]	
TI 16C	0.13 – 0.20	–	25	–	32	–	1	**047H0200**
	0.19 – 0.29	–	25	–	32	2	1	**047H0201**
	0.27 – 0.42	–	25	2	32	2	1	**047H0202**
	0.4 – 0.62	–	25	2	32	4	1	**047H0203**
	0.6 – 0.92	–	25	4	32	6	3	**047H0204**
	0.85 – 1.3	–	25	4	32	6	3	**047H0205**
	1.2 – 1.9	–	25	6	32	10	6	**047H0206**
	1.8 – 2.8	3.2 – 4.8	25	6	32	10	15	**047H0207**
	2.7 – 4.2	4.7 – 7.3	25	16	32	20	15	**047H0208**
	4.0 – 6.2	6.9 – 10.7	35	20	40	25	15	**047H0209**
	6.0 – 9.2	10 – 16	50	20	50	25	35	**047H0210**
	8.0 – 12	13 – 20.8	63	25	63	32	35	**047H0211**
	11 – 16	19 – 27	80	25	80	32	50	**047H0212**
TI 25C	15 – 20	26 – 35	80	35[3]	80	40	60	**047H0213**
	19 – 25	33 – 43	80	63	80	63	60	**047H0214**
TI 30C	24 – 32	41 – 55	80	63	80	63	60	**047H0215**

1) To IEC 947-4 coordination types 1 and 2:
Coordination type 1: Any type of damage to the motor starter is permissible. If the motor starter is in an enclosure, no external damage to the enclosure is permissible. After a short-circuit the thermal overload relay shall be partially or wholly replaced.
Coordination type 2: No damage to the motor starter is permissible, but slight contact burning and welding is permissible.
2) In accordance with HRC form II, TI 16C, TI 25C and TI 30C are suitable for operation in Canada and the USA.
3) 50 A in Norway.

Selection of thermal overload relay
The selection of a thermal overload relay must be based on the motor full load current and the method of starting:
- With direct start the range for motor starter is used.
- With star-delta start the range for Y/D starter is used.

Example:
Full load current: 16 A
- With direct start, the suitable motor starter range is 11 – 16 A, i.e. thermal overload relay **047H0212.**
- With star-delta start, the suitable Y/D starter range is 10 – 16 A, i.e. thermal overload relay **047H0210**.
  The range 13 – 20.8 A could also be used, but thermal overload relay 047H0211 will not release as quickly if one phase drops out.

Thermal overload relays TI 80



Thermal overload relays TI 80 are used with contactors CI 32 – 50 to give protection of squirrel-cage motors of 7.5 kW to 25 kW.
The relays have single-phase protection, i.e. accelerated release if phase drop-out occurs. This is particularly important for motors with delta-connected windings.

Other features of TI 80:
- stop/reset button
- manual/automatic reset
- test button
- double scale for direct start or Y/D start
- signal contact with changeover

Type	Range		Max. fuse[1)]				Code no.
	Motor-starter [A]	Y/D-starter [A]	gl, gL, gG		BS 88, type T		
			Type 1 [A]	Type 2 [A]	Type 1 [A]	Type 2 [A]	
TI 80	16 – 23	28 – 40	125	63	125	63	**047H1013**
	22 – 32	38 – 56	125	63	125	63	**047H1014**
	30 – 45	52 – 78	125	100	125	100	**047H1015**
	42 – 63	75 – 109	–	100	–	125	**047H1016**

1) To IEC 947-4 coordination types 1 and 2:
Coordination type 1: Any type of damage to the motor starter is permissible. If the motor starter is in an enclosure, no external damage to the enclosure is permissible. After a short-circuit the thermal overload relay shall be partially or wholly replaced.
Coordination type 2: No damage to the motor starter is permissible, but slight contact burning and welding is permissible.

Selection of thermal overload relay
The selection of a thermal overload relay must be based on the motor full load current and the method of starting:
- With direct start the range for motor starter is used.
- With star-delta start the range for Y/D starter is used.

Example:
Full load current: 45 A
- With direct start, the suitable motor starter range is 30 – 45 A, i.e. thermal overload relay **047H1015.**
- With star-delta start, the suitable Y/D starter range is 38 – 56 A, i.e. thermal overload relay **047H1014**.

Accessories for thermal overload relays TI 16C - 30C

Type	Description	Comments	Code no.
	Clip-on marker	For thermal overload relays TI 16C, 25C and 30C (250-off)	**037H010566**
	Holder for sep. mounting	Mounting of thermal overload relays TI 16C, 25C and 30C on 35 mm DIN rail	**047H016566**
	Base for TI 16C	Separate mounting of thermal overload relays TI 16C	**047L040566**
	Base for TI 80	Separate mounting of thermal overload relays TI 80 (20-off)	**047L045666**
	Stop-pushbutton extension	For thermal overload relays TI 16C-80 (3 mm)	**047L040666**
	Current rail set	For direct mounting of thermal overload relay TI 80 on contactors	**037H010866**

Enclosures for the CI range up to 30 A



Enclosures for the CI range up to 30 A are made of plastic and offer a very high degree of enclosure (IP 55 to IEC 529).
They are fitted with a DIN rail and there is ample space for a timer block (ETB) at the side of the contactor. There is an earth terminal and a loop terminal in the bottom of the enclosure. There are versions with four knockouts for M20/25 cable entries.

Enclosure BCI and BCI 1: Up to four auxilliary contact blocks can be fitted on each contactor.
Box BCI 2: Ub addition to the start contact, two auxiliary contact blocks can be fitted to a three-pole contactor.

Plastic enclosures for motor starters up to 30 A (IP 55)

Type	Application	Pushbuttons	Knockouts	Code no.
BCI	Control relay/Contactor	None	4 M 20/4 M 25	**047B010666**
BCI 1	Motor starter	Stop/reset	4 M 20/4 M 25	**047B010466**
BCI 2	Motor starter	Start-Stop/reset	4 M 20/4 M 25	**047B010266**

Ordering of motor starter components
DOL starters (contactors CI 6 – CI 30 + thermal overload relays TI 16C – TI 30C + enclosure) 3 x 380-415 V

Motor[3]		Thermal overload relay			Contactor		Max. fuse[1]		Enclosure				Start contact	
Output	Fulload current	Range					gI, gL, gG Type 2	gI, gL gG Type 1	with stop-reset		with start-stop/reset		Necessary only with start-stop/reset	
[kW]	[A]	[A]	Type	Code no.	Type	Code no.[4]	[A]	[A]	Type	Code no.	Type	Code no	Type	Code no
0.09	0.35	0.27 – 0.42	TI 16C	**047H0202**	CI 6	**037H0015**	2	25	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
0.12	0.46	0.4 – 0.62	TI 16C	**047H0203**	CI 6	**037H0015**	2	25	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
0.18	0.62	0.4 – 0.62	TI 16C	**047H0203**	CI 6	**037H0015**	2	25	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
0.25	0.82	0.6 – 0.92	TI 16C	**047H0204**	CI 6	**037H0015**	4	25	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
0.37	1.3	0.85 – 1.3	TI 16C	**047H0205**	CI 6	**037H0015**	4	25	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
0.55	1.7	1.2 – 1.9	TI 16C	**047H0206**	CI 6	**037H0015**	6	25	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
0.75	2.1	1.8 – 2.8	TI 16C	**047H0207**	CI 6	**037H0015**	6	25	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
1.1	2.9	2.7 – 4.2	TI 16C	**047H0208**	CI 6	**037H0015**	16	25	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
1.5	3.7	2.7 – 4.2	TI 16C	**047H0208**	CI 6	**037H0015**	16	25	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
2.2	5.3	4.0 – 6.2	TI 16C	**047H0209**	CI 6	**037H0015**	20	35	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
3	7.0	6.0 – 9.2	TI 16C	**047H0210**	CI 9	**037H0021**	20	50	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
4	9.0	6.0 – 9.2	TI 16C	**047H0210**	CI 9	**037H0021**	20	50	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
5.5	12	8.0 – 12	TI 16C	**047H0211**	CI 12	**037H0031**	25	63	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
7.5	16	11 – 16	TI 16C	**047H0212**	CI 16	**037H0041**	25	80	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
10	20	15 – 20	TI 25C	**047H0213**	CI 20	**037H0045**	35[2]	80	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
11	22	19 – 25	TI 25C	**047H0214**	CI 25	**037H0051**	63[2]	80	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**
15	32	24 – 32	TI 30C	**047H0215**	CI 30	**037H0055**	63[2]	80	BCI 1	**047B010466**	BCI 2	**047B010266**	CB-S	**037H0110**

[1] To IEC 60947-4 coordination types 1 and 2:
Coordination type 1: Any type of damage to the motor starter is permissible. If the motor starter is in an enclosure, no external damage to the enclosure is permissible. After a short-circuit the thermal overload relay shall be partially or wholly replaced.
Coordination type 2: No damage to the motor starter is permissible, but slight contact burning and welding is permissible.
[2] 50 A in Norway
[3] For each application, check full load current and start current of motor concerned.
[4] State the required coil voltage and frequency by suffix no.

Thermal overload relays



Type	Range Motor starter [A]	Code no.
TI 16C	0.13 – 0.20	**047H0200**
	0.19 – 0.29	**047H0201**
	0.27 – 0.42	**047H0202**
	0.4 – 0.62	**047H0203**
	0.6 – 0.92	**047H0204**
	0.85 – 1.3	**047H0205**
	1.2 – 1.9	**047H0206**
	1.8 – 2.8	**047H0207**
	2.7 – 4.2	**047H0208**
	4.0 – 6.2	**047H0209**
	6.0 – 9.2	**047H0210**
	8.0 – 12	**047H0211**
	11 – 16	**047H0212**
TI 25C	15 – 20	**047H0213**
	19 – 25	**047H0214**
TI 30C	24 – 32	**047H0215**

Construction standards

Contactors, thermal overload relays and accessories are designed and tested in accordance with IEC 60947-4-1/EN 60947-4-1.

Environment
Temperate climate
Tested and passed in accordance with DIN 50 016 and 40 046 part 38 and IEC 68
Max. installation height: 2000 NN, in accordance with IEC 60947-4-1

Pulse voltage

Type	U_{imp} [kV]
CI 6 – CI 15	8
CI 16 – CI 30	8
CI 32 – CI 50	8
CI 9 DC	8
CI 9 EI – CI 30 EI	8

Ambient temperature

Type	Ambient temperature	
	Operation [°C]	Storage/Transport [°C]
CI 6 – CI 50	-30 – 70	-30 – 70
CI 9 DC – CI 30 DC	-40 – 80	-40 – 80
CI 9 EI – CI 30 EI	-30 – 60	-40 – 80

Vibration and shock Tested and passed in accordance with IEC 68-2-6 and IEC 68-2-7

Type	Vibration[1)]	Shock[2)]
CI 6 – CI 15	4 g, 10 – 200 Hz	9 g in 11 ms
CI 16 – CI 30	4 g, 10 – 200 Hz	9 g in 11 ms
CI 32 – CI 50	1 g, 5 – 1000 Hz	6 g in 11 ms
CI 9 DC – CI 30 DC	4 g, 5 – 200 Hz	10 g in 10 ms
CI 9 EI – CI 30 EI	4 g, 5 – 200 Hz	10 g in 10 ms

1) Operating conditions: All directions with de-energized coil.
2) Operating conditions: Parallel with armature and with de-energized coil

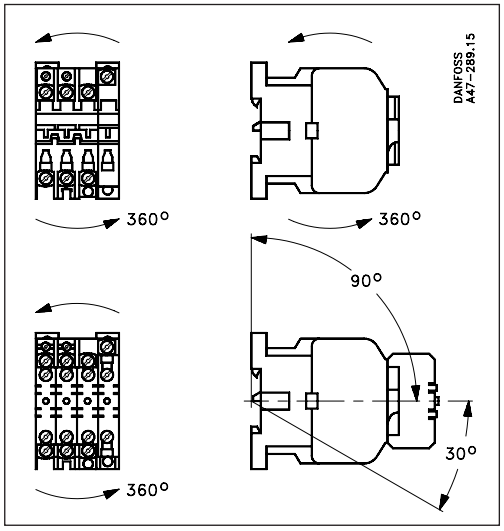
Environment

Type	Temperature compensated [°C]	Ambient temperature [°C]	Vibration	Shock perpendicular to contact system	Max. operations per hour
TI 16C	-5 – 40	-50 – 60	2 g at 200 Hz	9 g for 7.5 ms	30
TI 25C	-5 – 40	-50 – 60	2 g at 200 Hz	9 g for 7.5 ms	30
TI 30C	-5 – 40	-50 – 60	2 g at 200 Hz	9 g for 7.5 ms	30
TI 80	-5 – 40	-50 – 60	2 g at 200 Hz	9 g for 7.5 ms	30

Electromagnetic compatibility

Type	Emission	Immunity
CI 9 DC – CI 30 DC	EN 50081-1	EN 50082-2
CI 9 EI – CI 30 EI	EN 50081-1	EN 50082-2

Mounting direction



Rated life

Type	Mechanical life Operations	Electrical life AC-3 load Operations	Switching per hour AC-3 load Operations
CI 6 – CI 30	10 x 10^6	1 x 10^6	1200
CI 32	5 x 10^6	1 x 10^6	300
CI 37 – CI 50	5 x 10^6	0.5 x 10^6	300

Approvals & Certificates

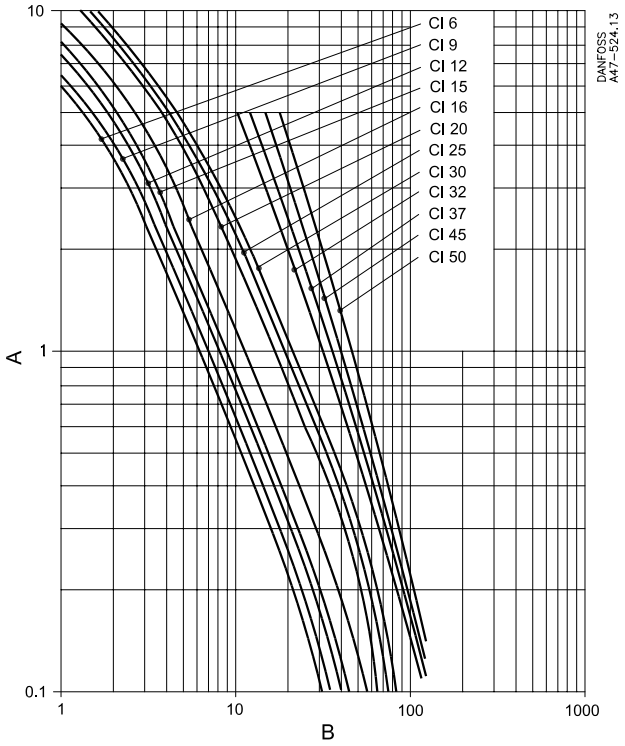
Type	Approval authority			
	CE marked in accordance with LVD 2014/35/EU	cULus	EAC	LLC CDC TYSK
CI 6	●	●	●	●
CI 9	●	●	●	●
CI 12	●	●	●	●
CI 15	●	●	●	●
CI 16	●	●	●	●
CI 20	●	●	●	●
CI 25	●	●	●	●
CI 30	●	●	●	●
CI 32	●	●	●	●
CI 37	●	●	●	●
CI 45	●	●	●	●
CI 50	●	●	●	●
TI 16C/25C/30C	●	●	●	●
TI 80	●	●	●	●
CB-	●	●	●	☐
ETB	●	☐	✓	☐
CI 9DC – CI 30 DC	●	●	●	☐
CI 9EI – CI 30 EI	●	●	●	☐

● Approved

☐ No approval applied

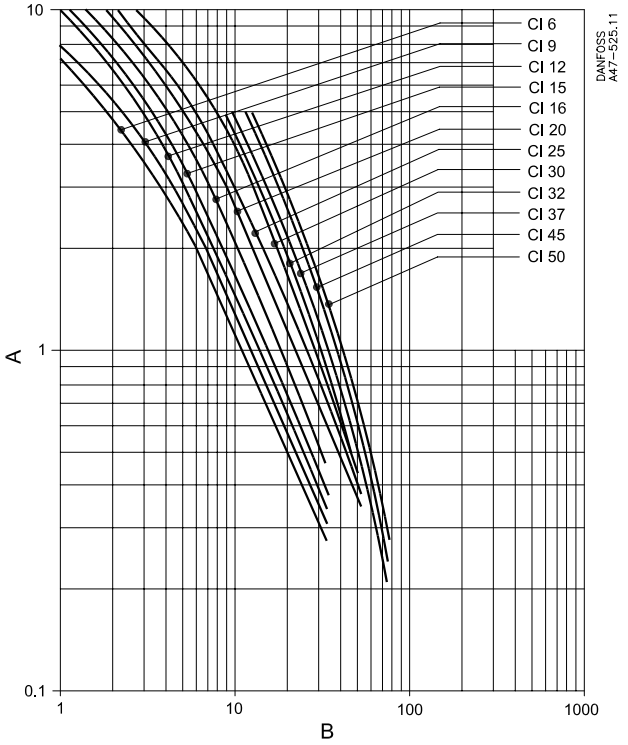
Electrical life curves

Contactors CI 6/9/12/15, CI 16/20/25/30, CI 37/45/50, load categories AC-3



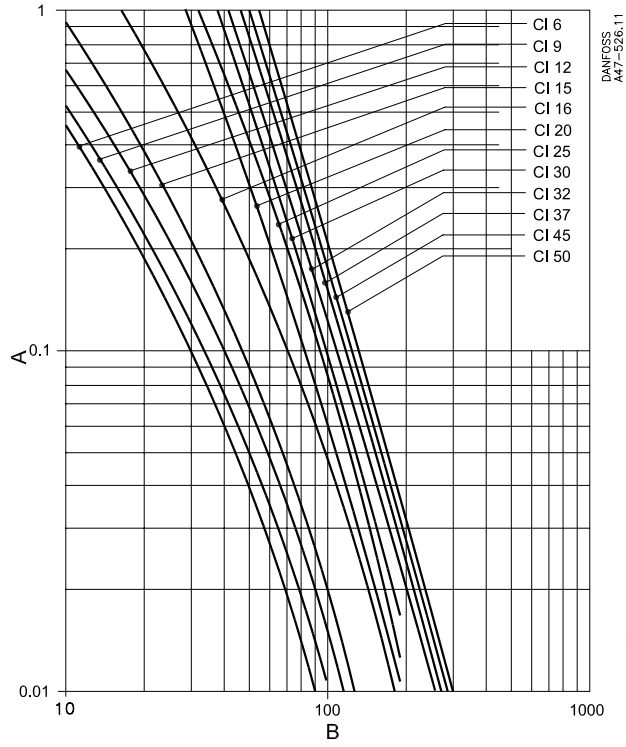
A: Electrical life in millions of make/break operations
B: Breaking current (A)

Contactors CI 6/9/12/15, CI 16/20/25/30, CI 37/45/50, load categories AC-1



A: Electrical life in millions of make/break operations
B: Breaking current (A)

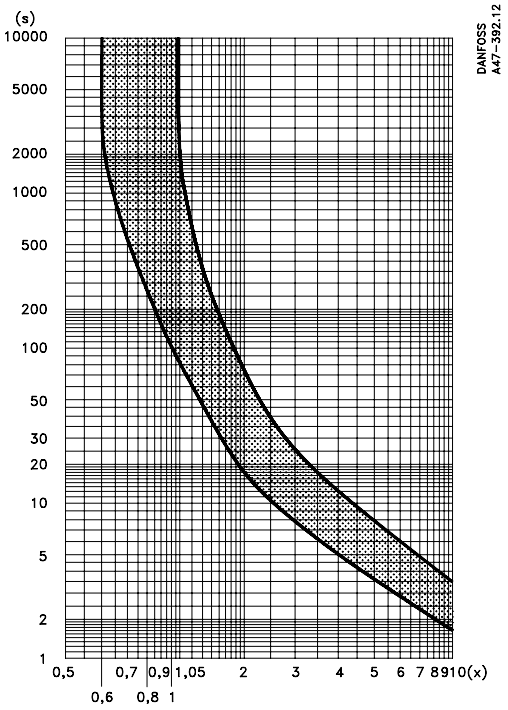
Contactors CI 6/9/12/15, CI 16/20/25/30, CI 37/45/50, load categories AC-4

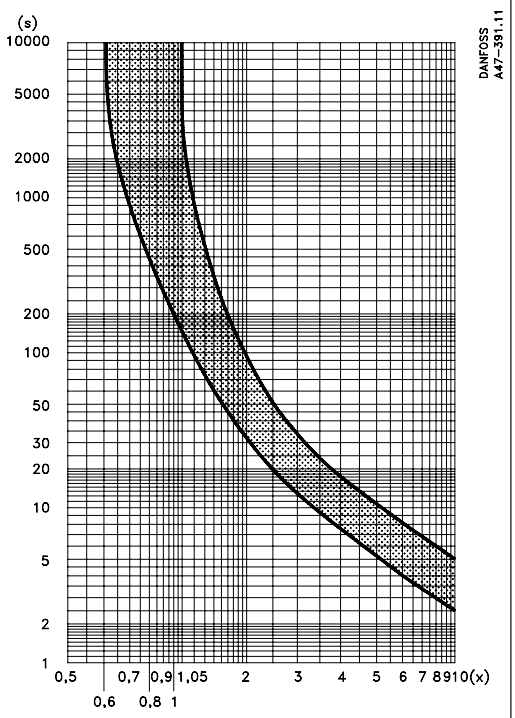


A: Electrical life in millions of make/break operations
B: Breaking current (A)

Tripping graphs

TI16C, TI 25C, TI 30C





Explanation of graphs
Mean value curves
Upper curve:3-phase tripping and asymmetric load tripping at min. setting.
Lower curve: Asymmetric load tripping at max. setting.

When tripping from the operationally warm condition, the tripping times are approx. 30% of the values shown. These values apply at an ambient temperature = 20 °C.

3-phase tripping: x = measured current / rated motor current

Asymmetric load tripping: x = measured current / max. scale value on overload relay

3-phase overload

1) Measure overload current
2) Find the overload factor (x) by dividing the measured value by the set value of the thermal overload relay (motor full load current).
3) Find (x) on the horizontal axis and follow a line vertically up until it intersects the upper curve.
4) From the intersection point, follow a horizontal line to the left and read off on the vertical axis the time that will elapse before the thermal overload relay cuts out the motor.

Asymmetric load tripping

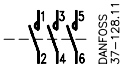
1) Measure the current the motor draws from one of the intact phases.
2) Find the overload factor (x) by dividing the measured value by the maximum scale value of the thermal overload relay.
3) Find (x) on the horizontal axis and follow a line vertically up until it intersects the lower curve.
4) From the intersection point, follow a horizontal line to the left and read off on the vertical axis the time that will elapse before the thermal overload relay switch off the motor.

Terminal marking

Terminal marking in Danfoss contactors conforms to **EN 50005**. The idea of this marking is as follows:

1. From the marking it is possible to read which terminals are associated and which functions the contacts have.
2. Control relays and contactors of different makes but with the same number of contacts must have identical terminal markings.

Terminal markings on *main contacts* must have a single-digit number.

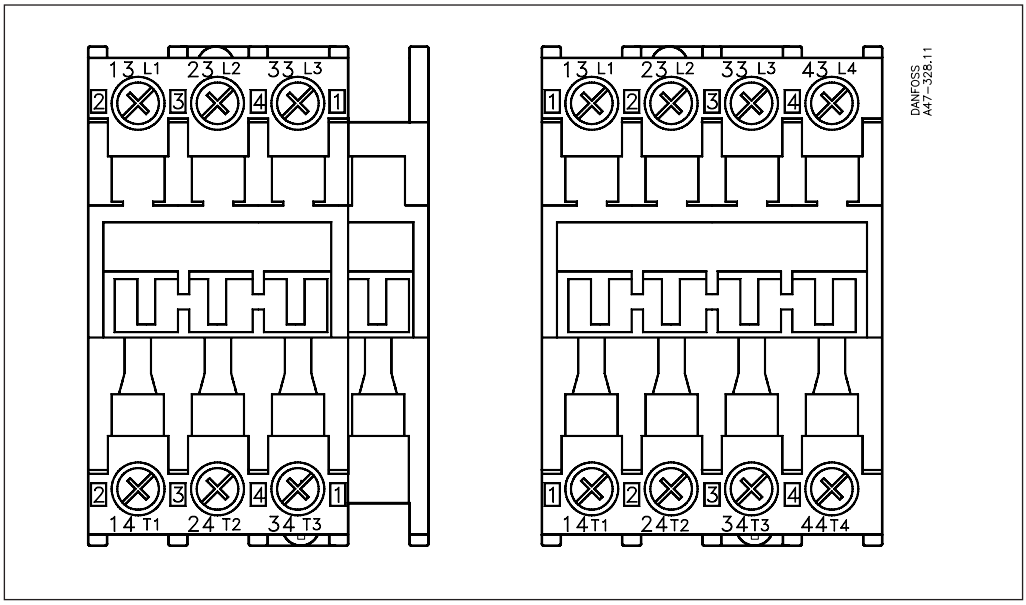


Contact set with three main contacts.

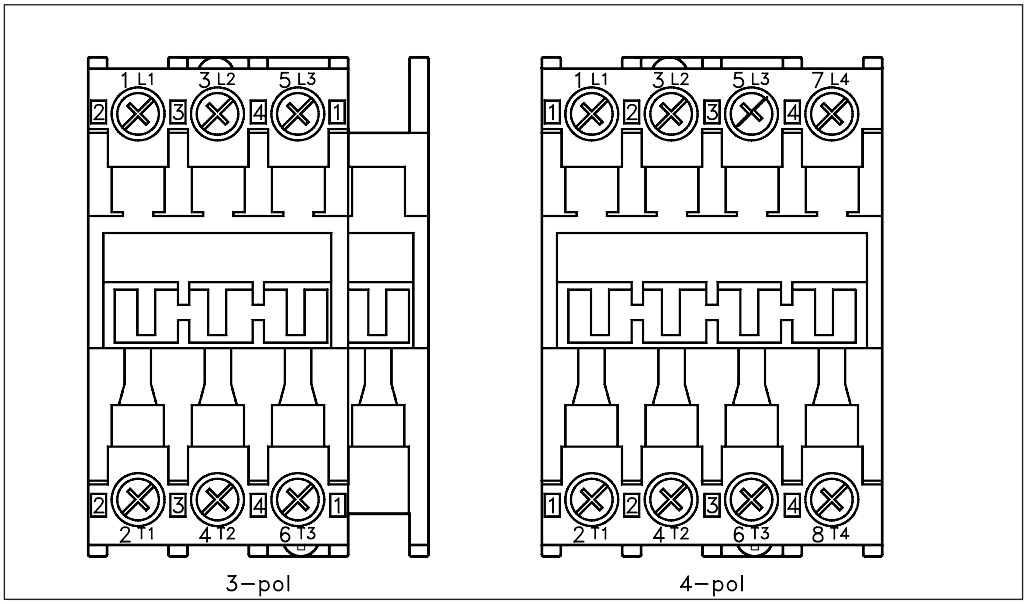


Thermal overload relay with three bimetal elements.

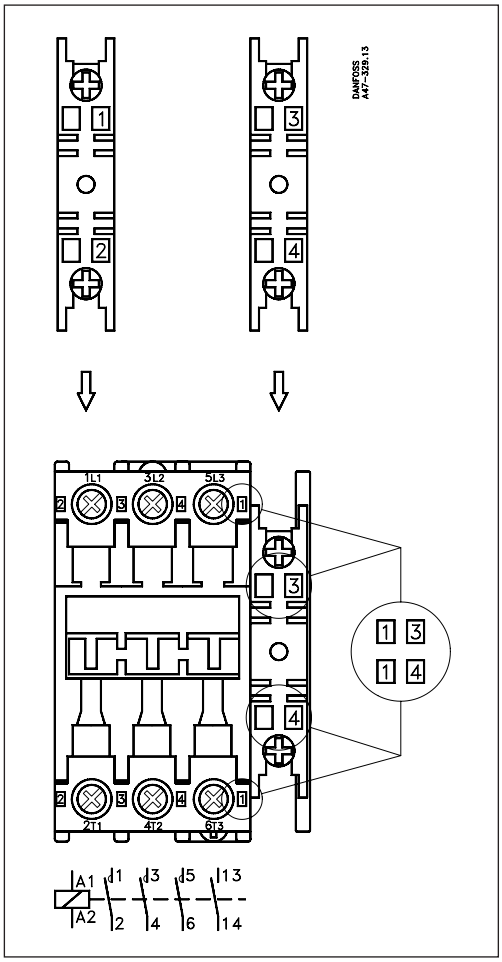
Relay marking



Contactor marking



Terminal marking



Auxiliary contacts must be marked with a two-digit number.
The first digit = contact position (position digit)
The second digit = contact function (function digit)
Function digits have been given the following standardized designations:



Break contacts must have function digits 1 and 2.



Make contacts should have function digits 3 and 4.



Special break contacts (early or late break) must have function digits 5 and 6.

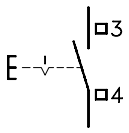
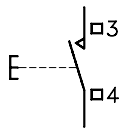
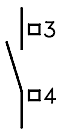
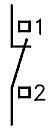
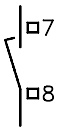
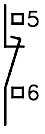


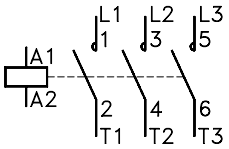
Special make contacts (early or late make) must have function digits 7 and 8.

The placing of auxiliary contacts on contactors is clearly indicated by the position digits stamped on both parts.

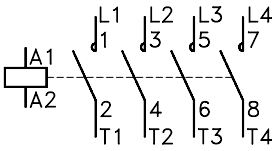
Contact symbols and terminal markings

Control relays and auxiliary contacts

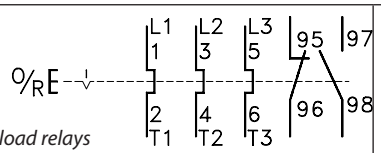
 *Start contact (1 NO)* *CB-S*	 *Impulse contact (1 NO)* *CB-I*
 *Auxiliary contact (1 NO)* *CB-NO*	 *Auxiliary contact (1 NO)* *CB-NC*
 *Auxiliary contact (1 EM)* *CB-EM*	 *Auxiliary contact (1 LB)* *CB-LB*



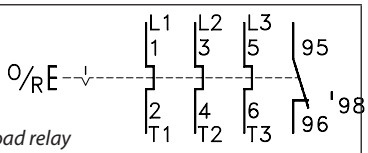
Contactors
CI 6/9/12/15/16/20/25/30/32/37/45/50



Contactor
CI 6/9/12/15



Thermal overload relays
TI 16C/25C/30C



Thermal overload relay
TI 80

Loads

Connections, main contacts and contactor coils

Type	Connection method	Single core [mm²]	Multi core without terminal sleeve [mm²]	Multi core with terminal sleeve [mm²]	Recommended Tightening torque [Nm]
CI 6, CI 9, CI 12, CI 15	Screw and clamp washer	0.75 - 2.5	0.75 - 2.5	0.5 - 2.5	0.8 - 2
CI 16, CI 20, CI 25, CI 30	Screw and clamp washer	1.5 - 10	2.5 - 6	1.5 - 4	0.8 - 2.5
CI 32, CI 37, CI 45, CI 50	Box terminal	1.5 - 35	1.5 - 25	-	0.8 - 5
CI 9 DC, CI 15 DC	Screw and clamp washer	0.75 - 2.5	0.75 - 2.5	0.5 - 2.5	0.8 - 2
CI 25 DC, CI 30 DC	Screw and clamp washer	1.5 - 10	2.5 - 6	1.5 - 4	0.8 - 2.5
CI 9 EI, CI 15 EI	Screw and clamp washer	1.5 - 10	0.75 - 2.5	0.5 - 2.5	0.8 - 2
CI 25 EI, CI 30 EI	Screw and clamp washer	1.5 - 10	2.5 - 6	1.5 - 4	0.8 - 2.5
TI 16C, TI 25C, TI 30C	Screw and clamp washer	0.75 - 4	0.75 - 4	1 - 4	0.8 - 2
TI 80	Box terminal	1.5 - 35	1.5 - 25	-	0.8 - 3.5
Coils	Screw and clamp washer	0.75 - 1.5	0.75 - 1.5	0.75 - 1.5	0.5 - 1.4

Direct start, load categories AC-2, AC-3, AC-4

Type		Rated loads at 50-60 Hz					
		220-230 V	240 V	380-400 V	415 V	500 V	690 V
CI 6	A	6	6	6	6	4	2.7
	kW	1.5	1.5	2.2	2.2	2.2	2.2
CI 9	A	9	9.	9	9	7	5
	kW	2.2	2.2	4	4	4	4
CI 9 EI/ DC	A	9	9	9	9	7	5
	kW	2.2	2.2	4	4	4	4
CI 12	A	12	12	12	12	9	7
	kW	3	3	5.5	5.5	5.5	5.5
CI 15	A	16	16	16	16	12	-
	kW	4	4	7.5	7.5	7.5	-
CI 15 EI/ DC	A	16	16	16	16	12	-
	kW	4	4	7.5	7.5	7.5	-
CI 16	A	16	16	16	16	12	9
	kW	4	4	7.5	7.5	7.5	7.5
CI 20	A	20	20	20	20	15	11
	kW	5.5	5.5	10	10	10	10
CI 25	A	25	25	25	25	18	14
	kW	5.5	5.5	11	11	11	11
CI 25 EI/ DC	A	25	25	25	25	18	14
	kW	5.5	5.5	11	11	11	11
CI 30	A	32	32	32	30	23	17
	kW	8.5	8.5	15	15	15	15
CI 30 EI/ DC	A	32	32	32	30	23	17
	kW	8.5	8.5	15	15	15	15
CI 32	A	32	32	32	30	25	-
	kW	8.5	9	15	15	15	-
CI 37	A	37	37	37	37	29	-
	kW	10	11	18.5	18.5	18.5	-
CI 45	A	45	45	45	45	35	-
	kW	11	12.5	22	22	22	-
CI 50	A	52	52	52	52	40	-
	kW	15	16	25	25	25	-

Table (continued)

Star-delta start, load categories AC-3

Type		Rated loads at 50-60 Hz					
		220-230 V	240 V	380-400 V	415 V	500 V	690 V
CI 6	A	10	10	10	10	7	5
	kW	2.2	2.2	4	4	4	4
CI 9	A	16	16	16	16	12	9
	kW	4	4	7.5	7.5	7.5	7.5
CI 9 EI/ DC	A	16	16	16	16	12	9
	kW	4	4	7.5	7.5	7.5	7.5
CI 12	A	21	21	21	21	16	12
	kW	5.5	5.5	10	10	10	10
CI 15	A	27	27	27	27	21	-
	kW	7.5	7.5	11	11	11	-
CI 15 EI/ DC	A	27	27	27	27	21	-
	kW	7.5	7.5	11	11	11	-
CI 16	A	27	27	27	27	21	16
	kW	7.5	7.5	11	11	11	11
CI 20	A	35	35	35	35	26	19
	kW	10	10	15	15	15	15
CI 25	A	43	43	43	43	31	24
	kW	11	11	22	22	22	22
CI 25 EI/ DC	A	43	43	43	43	31	24
	kW	11	11	22	22	22	22
CI 30	A	52	52	52	52	40	30
	kW	15	15	25	25	25	25
CI 30 EI/ DC	A	52	52	52	52	40	30
	kW	15	15	25	25	25	25
CI 32	A	56	56	56	56	43	-
	kW	15	15	30	30	30	-
CI 37	A	64	64	64	64	50	-
	kW	18.5	18.5	33	33	33	-
CI 45	A	78	78	78	78	55	-
	kW	22	22	37	37	37	-
CI 50	A	85	85	85	85	65	-
	kW	25	25	45	45	45	-

Three phase ohmic load, load category AC-1

Type		Operating temperature max. 40 °C (Open condition)					
		220-230 V	240 V	380-400 V	415 V	500 V	690 V
CI 6	A	20	20	20	20	20	20
	kW	8	8	14	14	17	22
CI 9/CI 12/CI 15	A	25	25	25	25	25	25
	kW	9	10	16	17	20	28
CI 9 EI/ DC CI 15 EI/ DC	A	25	25	25	25	25	25
	kW	9	10	16	17	20	28
CI 16/CI 20/ CI 25/CI 30	A	40	40	40	40	40	40
	kW	15	16	26	27	33	45
CI 25 EI/ DC CI 30 EI/ DC	A	40	40	40	40	40	40
	kW	15	16	26	27	33	45
CI 32	A	63	63	63	63	63	-
	kW	23	24	41	43	51	-
CI 37/CI 45/CI 50	A	80	80	80	80	80	-
	kW	30	31	52	54	65	-

Table (continued)

Three phase ohmic load, load category AC-1

Type		Operating temperature max. 60 °C (Enclosed condition)					
		220 – 230 V	240 V	380 – 400 V	415 V	500 V	690 V
CI 6/CI 9	A	16	16	16	16	16	16
	kW	6.4	6.7	11	12	14	18
CI 9 EI CI 9 DC	A	16	16	16	16	16	16
	kW	6.4	6.7	11	12	14	18
CI 12/CI 15	A	20	20	20	20	20	20
	kW	7	8	13	14	16	22
CI 15 EI CI 15 DC	A	20	20	20	20	20	20
	kW	7	8	13	14	16	22
CI 16/CI 20/CI 25	A	25	25	25	25	25	25
	kW	9	10	16	17	20	28
CI 25 EI CI 25 DC	A	25	25	25	25	25	25
	kW	9	10	16	17	20	28
CI 30	A	30	30	30	30	30	30
	kW	11	12	19	20	24	35
CI 30 EI CI 30 DC	A	30	30	30	30	30	30
	kW	11	12	19	20	24	35
CI 32/CI 37	A	63	63	63	63	63	–
	kW	23	24	41	43	51	–
CI 45/CI 50	A	80	80	80	80	80	–
	kW	30	31	52	54	65	–

Three phase ohmic load, load category AC-1

Type		Operating temperature max. 40 °C (Open condition) Heat resistant cable only (min. 75 °C)					
		220 – 230 V	240 V	380 – 400 V	415 V	500 V	690 V
CI 15	A	30	30	30	30	30	30
	kW	11	12	19	20	24	34
CI 15 EI CI 15 DC	A	30	30	30	30	30	30
	kW	11	12	19	20	24	34
CI 16/CI 20/ CI 25	A	45	45	45	45	45	45
	kW	17	18	29	30	37	51
CI 25 EI CI 25 DC	A	45	45	45	45	45	45
	kW	17	18	29	30	37	51
CI 30	A	50	50	50	50	50	50
	kW	18	19	32	34	41	56
CI 30 EI CI 30 DC	A	50	50	50	50	50	50
	kW	18	19	32	34	41	56
CI 45/CI 50	A	90	90	90	90	90	–
	kW	34	35	59	61	74	–

Switching three phase power transformers (AC-6a)

Type		Transformer load, (factor n = 30, inrush current = n x rated transformer current)					
		220 – 230 V	240 V	380 – 400 V	415 V	500 V	690 V
CI 6	A	3	3	3	30	3	3
	kVA	1	1	2	2	2	3
CI 9	A	4	4	4	4	4	4
	kVA	1	1	2	2	3	4
CI 9 EI CI 9 DC	A	4	4	4	4	4	4
	kVA	1	1	2	2	3	4
CI 12	A	5	5	5	5	5	5
	kVA	2	2	3	3	4	5
CI 15	A	6	6	6	6	6	6
	kVA	2	2	4	4	5	7
CI 15 EI CI 15 DC	A	6	6	6	6	6	6
	kVA	2	2	4	4	5	7
CI 16	A	7	7	7	7	7	7
	kVA	2	2	4	5	6	8
CI 20	A	9	9	9	9	9	9
	kVA	3	3	6	6	7	10
CI 25	A	11	11	11	11	11	11
	kVA	4	4	7	7	9	13
CI 25 EI CI 25 DC	A	11	11	11	11	11	11
	kVA	4	4	7	7	9	13
CI 30	A	13	13	13	13	13	13
	kVA	5	5	9	9	11	15
CI 30 EI CI 30 DC	A	13	13	13	13	13	13
	kVA	5	5	9	9	11	15
CI 32	A	14	14	14	14	14	–
	kVA	5	5	9	10	12	–
CI 37	A	17	17	17	17	17	–
	kVA	6	7	11	12	14	–
CI 45	A	20	20	20	20	20	–
	kVA	7	8	13	14	17	–
CI 50	A	23	23	23	23	23	–
	kVA	9	9	15	16	19	–

Load category

Switching lighting

Type	Incandescent lamps (AC-5b) Max. operating current	Fluorescent lamps, individually compensated (AC-5a)				
		Max. operat. current [A] at operat. temperature[1]		Max. capacity [µF] at I_{cc} =		
	A	40 °C	60 °C	10 kA	20 kA	50 kA
CI 6/9/12/15	12	20	12	1000	500	200
CI 9 EI/15 EI	12	20	12	1000	500	200
CI 9 DC/15 DC	12	20	12	1000	500	200
CI 16/20/25/30	20	33	22	2700	1350	540
CI 25 EI/30 EI	20	33	22	2700	1350	540
CI 25 DC/30 DC	20	33	22	2700	1350	540
CI 32	35	40	27	3200	1600	540
CI 37/45/50	45	47	33	3200	1600	640

[1] 40 °C is defined as non-enclosed installation
60 °C is defined as enclosed installation

Switching capacitor loads, individual capacitors Inductance in leads between capacitors connected in parallel min. 6 µH.

Type	Max. reactive power [kVAr][1]							
	220 – 240 V		380 – 415 V		500 V		690 V	
	40 °C	60 °C	40 °C	60 °C	40 °C	60 °C	40 °C	60 °C
CI 6/9/12/15	6	4	10	6	12	8	16	10
CI 9 EI/15 EI	6	4	10	6	12	8	16	10
CI 9 DC/15 DC	6	4	10	6	12	8	16	10
CI 16/20/25/30	10	6	16	10	22	15	30	20
CI 25 EI/CI 30 EI	10	6	16	10	22	15	30	20
CI 25 DC/CI 30 DC	10	6	16	10	22	15	30	20
CI 32	11	7	18	12	22	15	–	–
CI 37/45/50	14	10	24	18	31	21	–	–

[1] 40 °C is defined as non-enclosed installation
60 °C is defined as enclosed installation

Switching capacitor loads, regulating capacitors Inductance in leads between parallel-connected capacitors must be min. 6 µH

Type	Max. reactive power [kVAr][1]							
	220 – 240 V		380 – 415 V		500 V		690 V	
	40 °C	60 °C	40 °C	60 °C	40 °C	60 °C	40 °C	60 °C
CI 6/9/12/15	5	4	6	6	6	6	6	6
CI 9 EI/15 EI	5	4	6	6	6	6	6	6
CI 9 DC/15 DC	5	4	6	6	6	6	6	6
CI 16/20/25/30	10	6	12	11	12	11	12	11
CI 25 EI/30 EI	10	6	12	11	12	11	12	11
CI 25 DC/30 DC	10	6	12	11	12	11	12	11
CI 32	11	7	12	12	12	12	–	–
CI 37/45/50	14	10	18	16	18	16	–	–

[1] 40 °C is defined as non-enclosed installation
60 °C is defined as enclosed installation

Switching direct current load Load categories DC-3 and DC-5, contacts connected in series

Type	Max. operating current [A]									
	DC-3, 3-pole in series					DC-5, 3-pole in series				
	24 V	48 V	110 V	220 V	440 V	24 V	48 V	110 V	220 V	440 V
CI 6/9	9	9	4.5	1.8	0.6	9	5	2	0.8	0.3
CI 9 EI/15 EI	9	9	4.5	1.8	0.6	9	5	2	0.8	0.3
CI 9 DC/15 DC	9	9	4.5	1.8	0.6	9	5	2	0.8	0.3
CI 12/15	16	16	6.5	2.5	0.6	16	8	3	1.2	0.4
CI 15 EI	16	16	6.5	2.5	0.6	16	8	3	1.2	0.4
CI 15 DC	16	16	6.5	2.5	0.6	16	8	3	1.2	0.4
CI 16/20/25/30	30	30	22	6	0.6	30	16	6	2.5	0.85
CI 25 EI/30 EI	30	30	22	6	0.6	30	16	6	2.5	0.85
CI 25 DC/30 DC	30	30	22	6	0.6	30	16	6	2.5	0.85

Switching direct current load Load category DC-1, contacts connected in series

Type	Max. operating current [A]														
	24 V			48 V			110 V			220 V			440 V		
	1-pole	2-pole	3-pole	1-pole	2-pole	3-pole	1-pole	2-pole	3-pole	1-pole	2-pole	3-pole	1-pole	2-pole	3-pole
CI 6/CI 9	9	9	9	9	9	9	3.5	8	9	0.55	3.5	6	0.2	0.55	2
CI 9 EI	9	9	9	9	9	9	3.5	8	9	0.55	3.5	6	0.2	0.55	2
CI 9 DC	9	9	9	9	9	9	3.5	8	9	0.55	3.5	6	0.2	0.55	2
CI 12/CI 15	16	16	16	16	16	16	5.2	15	16	0.8	5.2	10	0.2	0.8	3
CI 15 EI	16	16	16	16	16	16	5.2	15	16	0.8	5.2	10	0.2	0.8	3
CI 15 DC	16	16	16	16	16	16	5.2	15	16	0.8	5.2	10	0.2	0.8	3
CI 16/CI 20/CI 25/CI 30	30	30	30	25	30	30	8	22	30	1.5	8	16	0.3	1.2	4.5
CI 25 EI/ 30 EI	30	30	30	25	30	30	8	22	30	1.5	8	16	0.3	1.2	4.5
CI 25 DC/30 DC	30	30	30	25	30	30	8	22	30	1.5	8	16	0.3	1.2	4.5

Power loss

Contact resistance and power losses

Type	Typical impedance pr pole [mΩ]	Power losses all 3 poles AC-3 [W]	Power losses all 3 poles AC-1 [W]	Coil consumption a.c. [W]	Total power losses AC-3 [W]	Total power losses AC-1 [W]
CI 6	2.1	0.2	2.5	2.7	2.9	5.2
CI 9	1.8	0.4	3.4	2.7	3.1	6.1
CI 12	1.6	0.7	3.0	2.7	3.4	5.7
CI 15	1.6	1.1	3.0	2.7	3.8	5.7
CI 16	1.1	0.8	5.3	2.7	3.5	8
CI 20	1.1	1.3	5.3	2.7	4	8
CI 25	1.1	2.1	5.3	2.7	4.8	8
CI 30	0.8	2.2	3.8	2.7	4.9	6.5
CI 32	0.9	2.8	11	3	5.8	14
CI 37	0.8	3.3	15	3	6.3	18
CI 45	0.8	4.9	15	3	7.9	18
CI 50	0.8	6.0	15	3	9	18
CI 9DC	1.8	0.4	3.4	1.5	1.9	5.3
CI 15DC	1.6	1.1	3	1.5	2.6	4.5
CI 25DC	1.1	2.1	5.3	1.5	3.6	6.8
CI 30DC	0.8	2.2	3.8	1.5	3.7	5.3
CI 9EI	1.8	0.4	3.4	1.5	1.9	5.3
CI 15EI	1.6	1.1	3	1.5	2.6	4.5
CI 25EI	1.1	2.1	5.3	1.5	3.6	6.8
CI 30EI	0.8	2.2	3.8	1.5	3.7	5.3

Type	Average power Min. setting	Average power Max. setting
TI 16C	Typically 2.15 W	Typically 4.87 W
TI 25C	Typically 2.15 W	Typically 4.87 W
TI 30C	Typically 2.15 W	Typically 4.87 W
TI 80	Typically 5.17 W	Typically 10.8 W

Short time withstand current I_{cw}

Type	Current transfer time in sec. 0.2	1	2	4	10	100	1000	Min. cooling in min.
	Short time withstand current in Amps (I_{CW})							
CI 6, CI 9, CI 12, CI 15	550	250	200	160	120	60	40	3
CI 9 EI, CI 15 EI	550	250	200	160	120	60	40	3
CI 9 DC, CI 15 DC	550	250	200	160	120	60	40	3
CI 16, CI 20, CI 25, CI 30	1000	700	500	360	240	110	80	6
CI 25 EI, CI 30 EI	1000	700	500	360	240	110	80	6
CI 25 DC, CI 30 DC	1000	700	500	360	240	110	80	6
CI 32	–	1000	800	580	380	200	100	12
CI 37, CI 45, CI 50	–	1300	1000	900	580	240	120	12

Connections, auxiliary contacts

Type	Connection method	Single core [mm²]	Multi core		Tightening torque [Nm]
			without terminal sleeve [mm²]	with terminal sleeve [mm²]	
CB- for CI 6 – CI 50	Screw and clamp washer	0.75 – 2.5	0.75 – 2.5	0.75 – 1.5	1 – 1.5
TI 16C, TI 25C, TI 30C, TI 80	Screw and clamp washer	0.75 – 1.5	0.75 – 1.5	0.5 –1.5	0.3 – 1

Coils, consumption and operating times

Type	Inrush power			Holding power			Pull-in voltage		Drop-out voltage		Make time		Break time	
	AC		DC	AC		DC	AC	DC	AC	DC	AC	DC	AC	DC
	VA	W	W	VA	W	W	V	V	V	V	ms	ms	ms	ms
CI 6 – CI 30	75	65		9	2.7		(0.85 – 1.1) × U_s		(0.35 – 0.65) × U_s		10 – 17		8 – 10	
CI 32 – CI 50	140	80		11	3		(0.85 – 1.1) × U_s		(0.35 – 0.65) × U_s		9 – 16		7 – 13	
CI 9DC – CI 30DC			65			1.5		0.7-1.33		0.4-0.55		12 – 18		80 – 120
CI 9 EI – CI 30 EI	50	65	3.5 mA	2.8	1.5	3.5 mA	(0.75 – 1.1) × U_s	(0.6 – 1.2)× U_s	(0.4 – 0.55) × U_s	(0.3 – 0.5) × U_s		12 – 18		10 – 16

RC Element (charge suppressor)

Type	Comments	Overvoltage factor $n = \frac{U_{max}}{U_n}$
RC	Suitable for contactors CI 6 – CI 30	1 – 1.5
RCB	Suitable for contactors CI 32 – CI 50	1 – 2.0

Max. load control circuit (contact system)

Type	Load		Max fuse	
	AC-15	DC-13	gI, gL, gG	BS 88 type T
TI 16C TI 25C TI 30C	500 V 2 A 200 VA	250 V 2 A 20 W	4 A	6 A
TI 80	500 V 2 A 200 VA	250 V 2 A 20 W	4 A	6 A

UL/CSA specifications
UL/CSA approved loads

Type	Motor load (AC-3) [hp]						Other loads (AC-1) [A]			
	1-phase		3-phase				UL		CSA	
	115 V	230 V	200 V	240 V	460 V	575 V	40 °C[1)]	60°C[1)]	40 °C[1)]	60 °C[1)]
CI 6	0.5	1	1.5	2	3	5	16	16	20	20
CI 9	0.5	1.5	2	3	5	7.5	16	16	20	20
CI 12	0.75	2	3	4	7.5	10	20	20	20	20
CI 15	1	3	3	5	10	10	25	25	25	25
CI 16	1	3	5	5	10	15	40	40	40	40
CI 20	1.5	3	5	5	10	15	40	40	40	40
CI 25	2	4	7.5	7.5	15	20	40	40	40	40
CI 30	2	5	10	10	20	20	40	40	40	40
CI 32	3	5	10	10	20	25	70	63	70	63
CI 37	3	7.5	15	15	25	30	80	70	80	70
CI 45	4	7.5	15	15	30	30	80	70	80	70
CI 50	5	10	15	15	30	40	80	70	80	70

[1)] 40 °C is defined as non-enclosed installation
60 °C is defined as enclosed installation

Auxiliary contacts, UL/CSA-approved loads

Type	Comments	Load capacity	
		AC	
		Category	VA
CB-	For contactors CI 6..CI 50	A600	720

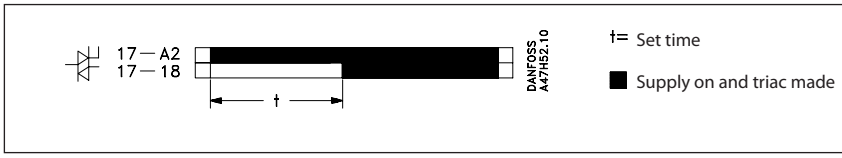
Clip-on timer type ETB

Specification	
Contact functions	1-pole contact without galvanic isolation (Triac)
Time ranges	0.5 – 20 s, 4 – 160 s, 0.5 – 20 min.
Voltage range AC	24 – 65 V/50 – 60 Hz and 110 – 240 V/50 – 60 Hz
Voltage range DC	24 – 65 V and 110 – 240 V
Voltage tolerance	-15 – 10%
Ambient temperature (operation)	-10 – 55%
Ambient temperature (storage and transport)	-40 – 70 °C
Repeat accuracy	± 2% at constant voltage and temperature
Time for reset (dwell time)	Min. 400 ms
Lead cross-section	0.75 – 2.5 mm^2

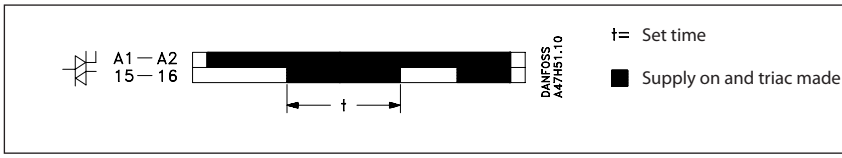
Load		
Max. load AC	I_{th} = 0,5 A AC-15	
Min. load AC	15 mA	
Max. load DC	I_{th} = 0,5 A, I_{max} = 7 A for 20 ms	
Min. load DC	5 mA	
Consumption	**Voltage [V]**	**Power [mW]**
Delayed cut-in AC	65	300
Delayed cut-in AC	240	370
Delayed cut-out AC	65	720
Delayed cut-out AC	240	900
Delayed cut-in AC	65	520
Delayed cut-in AC	240	810

Function description

ON delay
When voltage is applied to terminals 17 and A2, the set time interval begins. When the set time elapses, terminal 18 is powered and the contactor is energised. When voltage to the Clip-on timer is disconnected, the contactor drops out.

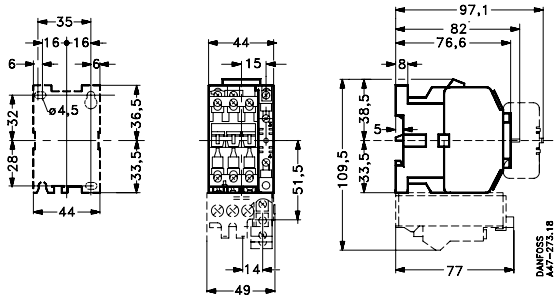


OFF delay
Voltage is applied to terminals A1 and A2.
When terminal 15 receives voltage, terminal 16 is powered and the contactor is energised.
When terminal 15 is disconnected, the time interval begins.
When the time interval elapses, the contactor is de-energised.
If voltage to A1 – A2 is cut off, the contactor drops out.

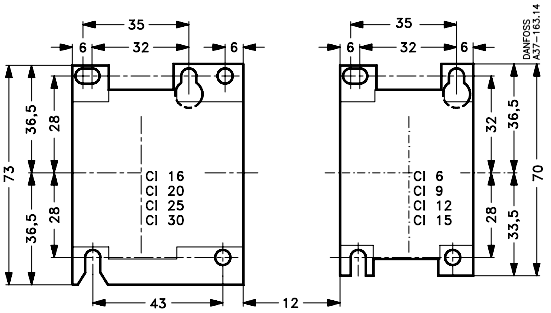


Dimensions

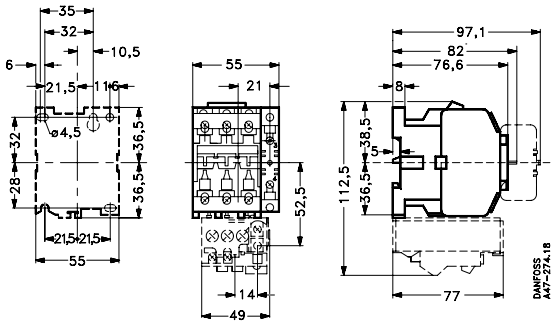
Control relays, contactors and motor starters, CI 6, 9, 12, 15
Drilling dimensions



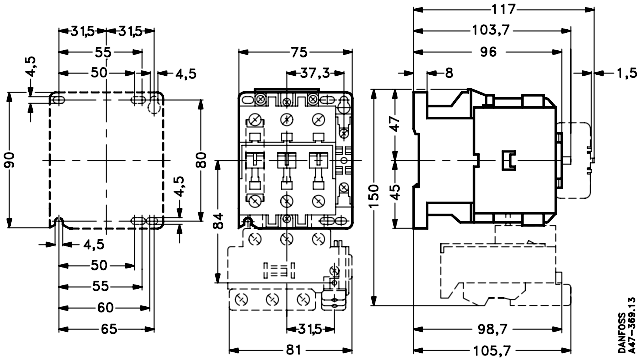
CI 6 – CI 30 with mechanical interlock
Drilling dimensions



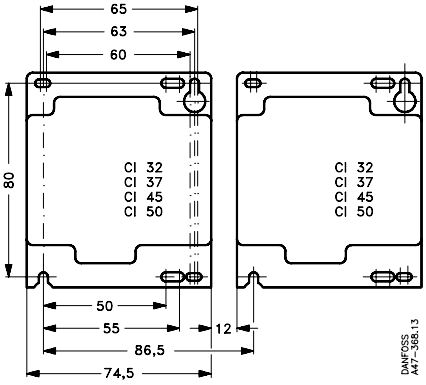
Contactors and motor starters CI 16, 20, 25, 30
Drilling dimensions



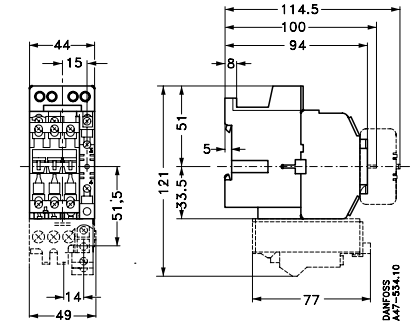
Contactors and motor starters CI 32, 37, 45, 50
Drilling dimensions



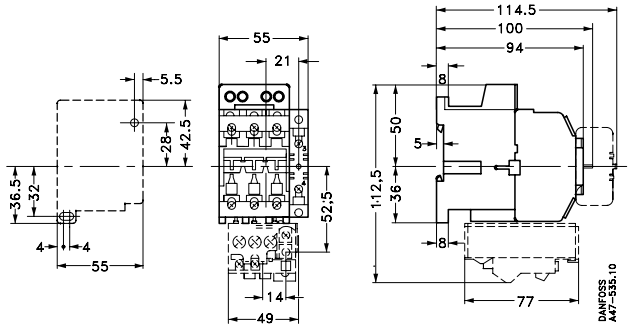
CI 32 – CI 50 with mechanical interlock
Drilling dimensions



Contactors and motorstarters
CI 9EI, 15EI, 9DC, 15DC

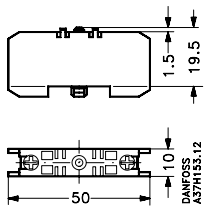


Contactors and motor starters
CI 25EI, 30 EI, 25DC, 30DC

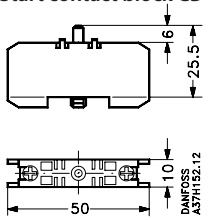


Dimensions, Accessories

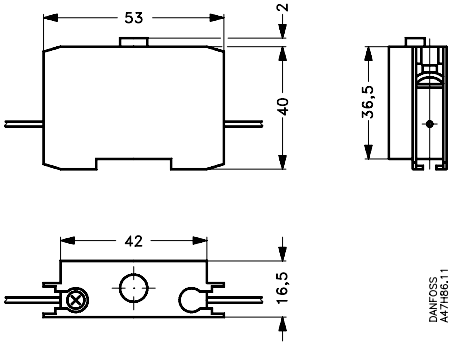
Auxiliary contact block CB



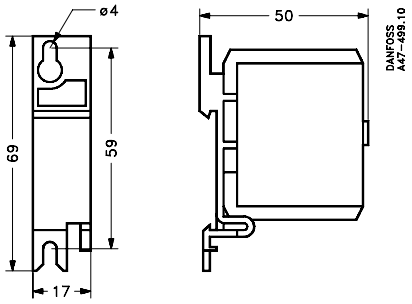
Start contact block CB-S



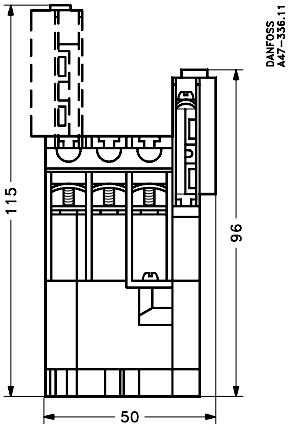
Electronic clip-on timer ETB



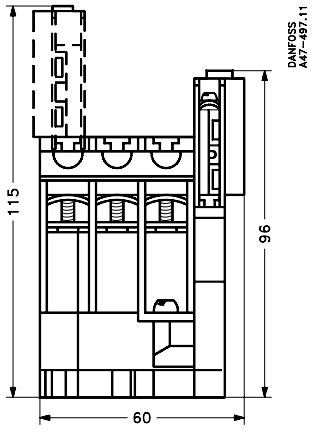
Separate mounting of electronic clip-on timer ETB



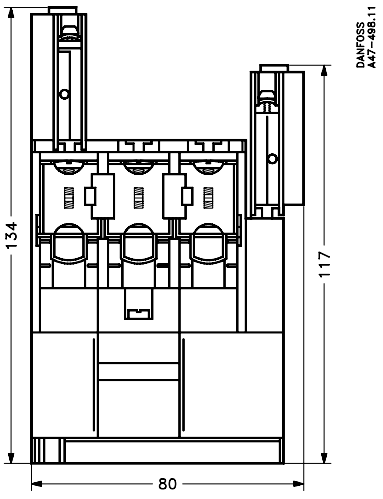
Electronic clip-on timer ETB clipped onto CI 6, 9, 12, 15



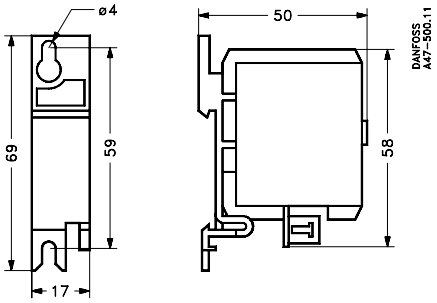
Electronic clip-on timer ETB clipped onto CI 16, 20, 25, 30



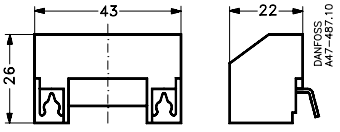
Electronic clip-on timer ETB clipped onto CI 32, 37, 45, 50



Separately mounted Interface module IFB on base



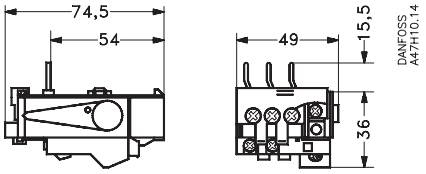
RC Element for contactors CI 6, 9, 12, 15, 16, 20, 25, 30



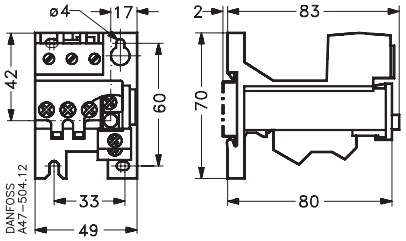
Dimensions
Thermal overload relays
TI 16C – TI 30C

Thermal overload relays for contactors CI 6, 9, 12, 15, 16, 20, 25, 30

Thermal overload relays TI 16C, 25C, 30C



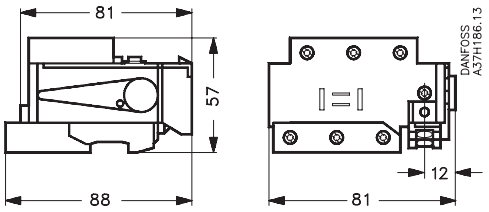
Holder for thermal overload relays TI 16C, 25C, 30C



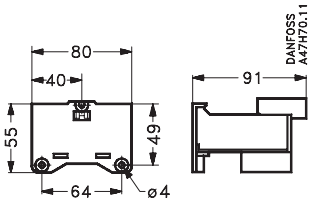
Dimensions
Thermal overload relays
TI 80

Thermal overload relays for contactors CI 32, 37, 45, 50

Thermal overload relay TI 80

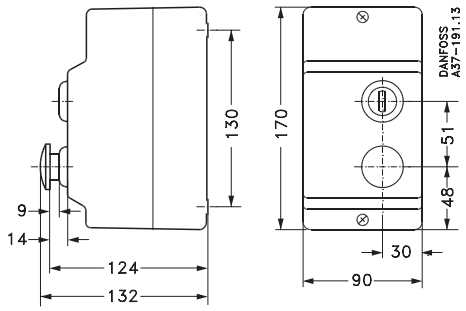


Thermal overload relay TI 80 on base plate

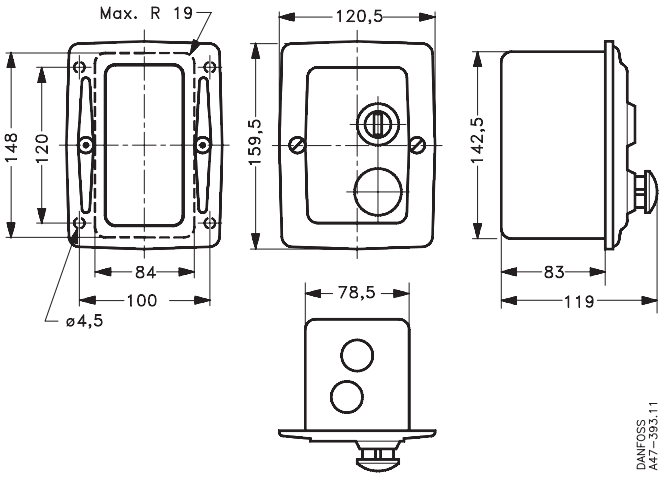


Enclosures

Plastic enclosure BCI, BCI 1, BCI 2
for contactors CI 6, 9, 12, 15, 16, 20, 25, 30



Flush-mounted metal enclosure CITF 2
for contactors CI 6, 9, 12, 15, 16



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