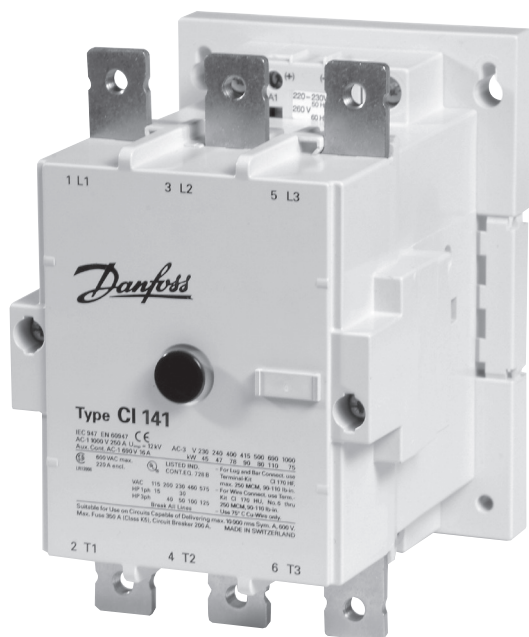


Data sheet

CI-TI™ Contactors and motor starters

Type CI 141-420 EI



CI-TI™ contactors and motor starters provide trouble-free switching and maximum protection for costly motors and other electrical equipment.

The components are compact, easy to install and extremely reliable.

They are designed to meet demanding requirements, based on comprehensive application experience.

More than sixty years of manufacturing experience ensure that our contactors and motor starters stand out with regards to quality and long life.

Contactors CI 141-180 EI



Contactors CI 141-180 and CI 210-420 EI are intended for AC coil voltages and cover the power range 55-220 kW. The largest types, CI 210-420 EI have electronic control circuits that mean low holding power and wide coil voltage ranges on both 50 and 60 Hz. The "EI" version is supplied with an integrated interface relay for PLC applications with 24 V DC output.

Accessories include a wide selection of clip-on auxiliary contact blocks and timers.

Type	Main circuit						Auxiliary contacts	Code no. ¹⁾
	AC-3 load			I _{th} ²⁾ (AC-1) Open [A]	I _{the} ³⁾ (AC-1) Encl. [A]	Main contacts (make) Number	Add-on options Number	
	U _e 220-240 V [kW]	U _e 380-1000 V [kW]	I _e [A]					
CI 141	45	75	140	250	210	3	2-6	037H3339
CI 180	55	90	180	250	210	3	2-6	037H3082
CI 210 EI	63	110	210	350	300	3	2-6	037H3259
CI 250 EI	80	132	250	350	300	3	2-6	037H3267
CI 300 EI	90	160	300	450	380	3	2-6	037H3269
CI 420 EI	132	220	420	500	425	3	2-6	037H3279

¹⁾ Coil voltage / frequency or Suffix no. (see table below) must be added to the Danfoss code no.

²⁾ The thermal current value I_{th} gives the maximum load at 40 °C, which corresponds to installing the contactor in air (open).

³⁾ The thermal current value I_{th} gives the maximum load at 60 °C, corresponding to installing the contactor inside an enclosure.

Coil voltages and coils for CI 141 - 180

Coil voltage *)	Suffix no.	Code no.
110 V, 50 Hz / 120 V, 60 Hz	22	037H3261
220-230 V, 50 Hz / 240 V, 60 Hz	31	037H3262
380-400 V, 50 Hz / 440, 60 Hz	37	037H3264

Coil voltages and coils for CI 210 EI - 300 EI

Coil voltage *)	Suffix no.	Code no.
110-130 V, 50/60 Hz	23	037H3413
208-277 V, 50/60 Hz	32	037H3415

Coil voltages and coils for CI 420 EI

Coil voltage *)	Suffix no.	Code no.
208-277 V, 50/60 Hz	32	037H3423

*) Standard coil voltage -15%, +10%.

Correct ordering of contactors

Example: CI 210EI for 230 V, 50 Hz coil voltage.

Select one of the following two forms of ordering:

1. Danfoss code no. + Suffix no.:

037H325932

or

2. Danfoss code no. + coil voltage / frequency:

037H3259, 230 V / 50 Hz

Left or right auxiliary contact blocks CBC for CI 141 - 420 EI contactors



Type	Contact function	Load				Code no.
		I_e (AC - 15)	$I_{th}^{(2)}$ (AC-1) Open	$I_{the}^{(3)}$ (AC-1) Enc.	U_e	
		[A]	[A]	[V]		
CBC-11 ¹⁾	1 NO+1NC inside mounting	5.5	16	12	690	037H3358
CBC-11 ¹⁾	1 NO+1NC outside mounting	5.5	16	12	690	037H3348

¹⁾ Force-actuated contacts suitable for safety switching.

²⁾ The thermal current value I_{th} gives the maximum load at 40 °C, which corresponds to installing the contactor in air (open).

³⁾ The thermal current value I_{the} gives the maximum load at 60 °C, corresponding to installing the contactor inside an enclosure.

Accessories for contactors CI 141 - 420



Mech. interlock



RC Element / varistor element
RCC-/VRC-



Clip-on markers



Terminal block for
CI 141 - 420 EI



Terminal cover for
CI 141 - 420 EI

Description	Comments	Code no.
Mech. interlock for CI 141 - 420 EI	Mech. interlock can be established between pairs	037H3232
RC Element for CI 141 - 180	Reduces overvoltage on de-energization of coils:	
	- Type RCC 240 (190-240 V, 50 Hz / 220-277 V, 60 Hz)	037H3236
VRC-Varistor Element for CI 141 - 180	Reduces overvoltage on de-energization of coils:	
	- Type VRC 277 (137-277 V, AC)	037H3407
	- Type VRC 575 (278-575 V, AC)	037H3241
Terminal cover	Finger protection of terminals:	
	- Transparent cover CI 141, CI 180 (set of 2)	037H3409
	- Transparent cover CI 210 EI-420 EI (set of 2)	037H3406
Clip-on markers for CI 4 and CI 141 - 420 EI	Rating plate with cover (100-off)	037H3142

Construction standards

Contactors 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 141 - 420 EI	12

Ambient temperature

Type	Ambient temperature	
	Operation [°C]	Storage / Transport [°C]
CI 141 - 420 EI	-25 – 60	-40 – 80

Vibration

Tested and passed in accordance with IEC 68-2-6

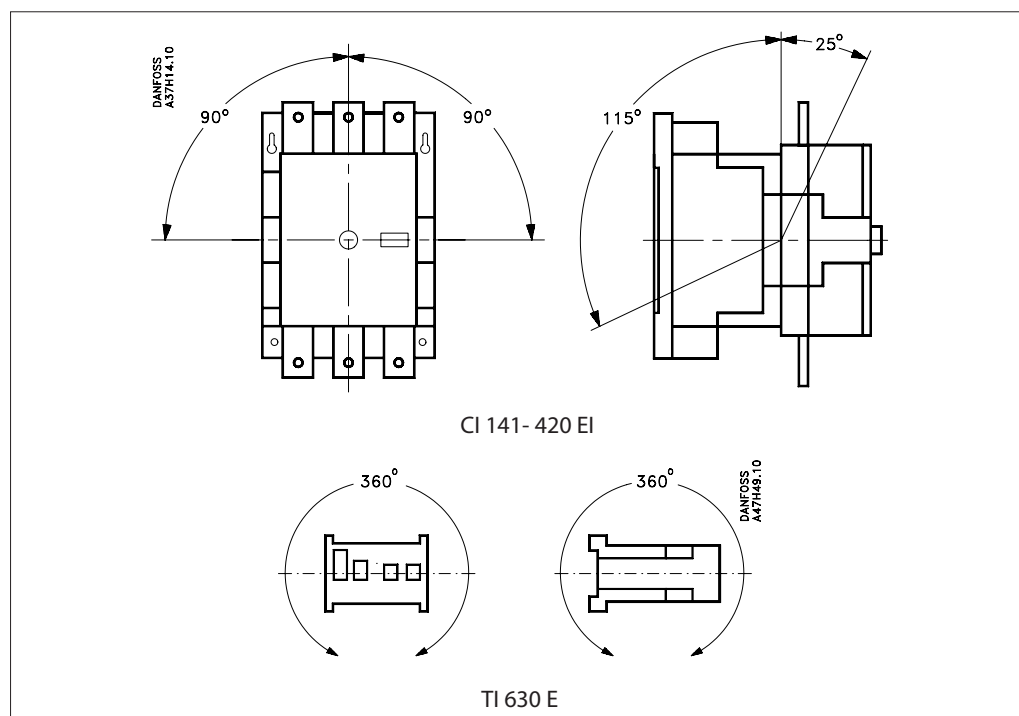
Type	Vibration ¹⁾
CI 141 - 420 EI	2 g, 10 – 150 Hz

¹⁾ Operating conditions: All directions with de-energized coil.

Short circuit protection of contactors without thermal overload relay
Max. fuse type gG at 3 x 380-690 V

Contacteur type	Short circuit co-ordinator type 1 [A]	Short circuit co-ordinator type 2 [A]
CI 141	315	250
CI 180	355	315
CI 210 EI - 250 EI	500	400
CI 300 EI - 420 EI	630	500

Mounting direction



Rated life

Type	Mechanical life Operations	Electrical life AC-3 load Operations	Switching per hour AC-3 load Operations
CI 141-420 EI	10 x 10 ⁵	1 x 10 ⁶	200

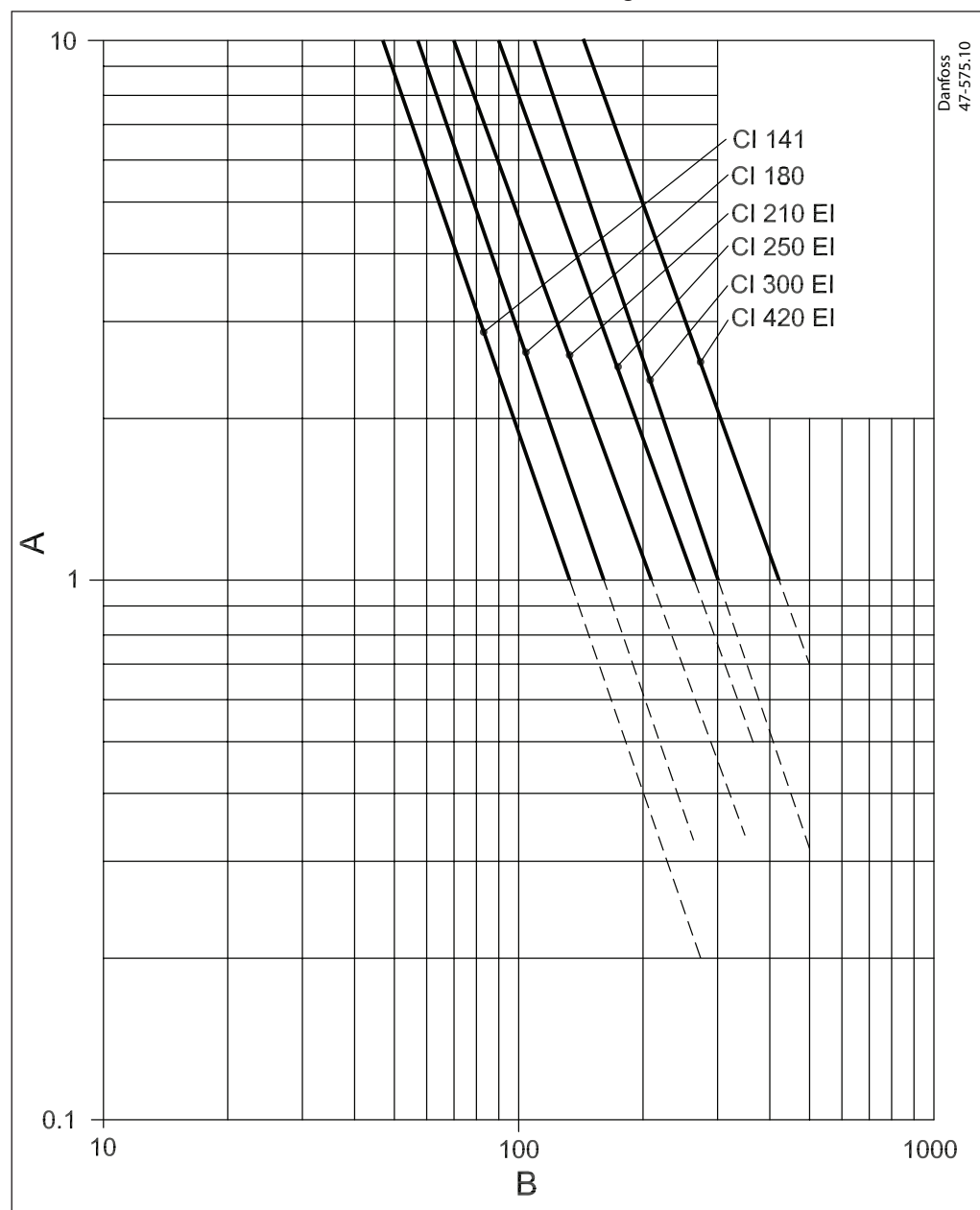
Approvals & Certificates

Type	Approval authority			
	EN 60947	cULus listed	EAC	LLC CDC TYSK
CI 141	●	●	●	●
CI 180	●	●	●	●
CI 210 EI	●	●	●	●
CI 250 EI	●	●	●	●
CI 300 EI	●	●	●	●
CI 420 EI	●	●	●	●
CBC-	●	●	●	□
RCC-	●	●	□	□

- Approved
- No approval requirement
- No approval applied

Electrical life curve

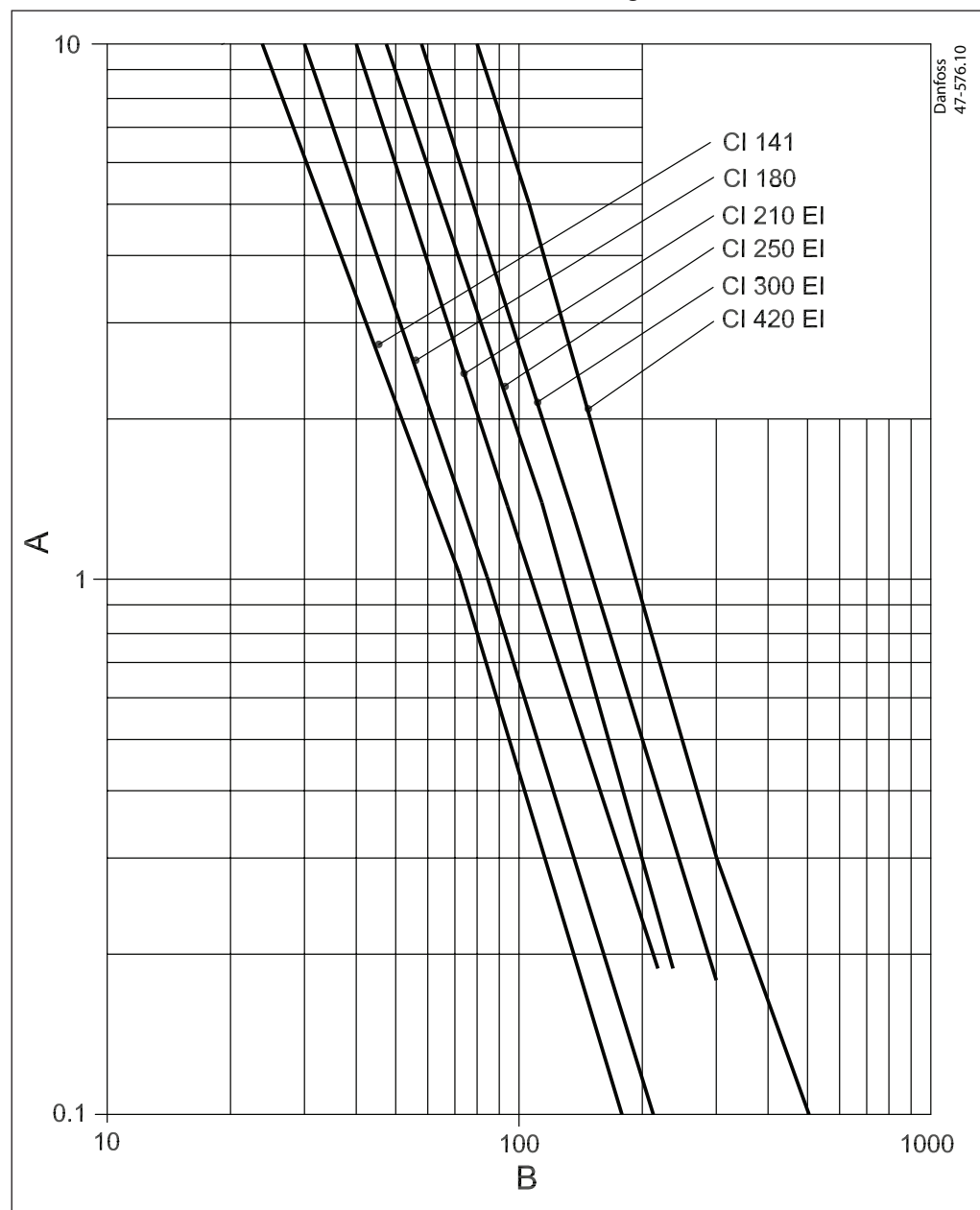
Contactors CI 141, CI 180, CI 210 EI/250 EI/300 EI/420 EI load categories AC-1, AC-3



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

Electrical life curve

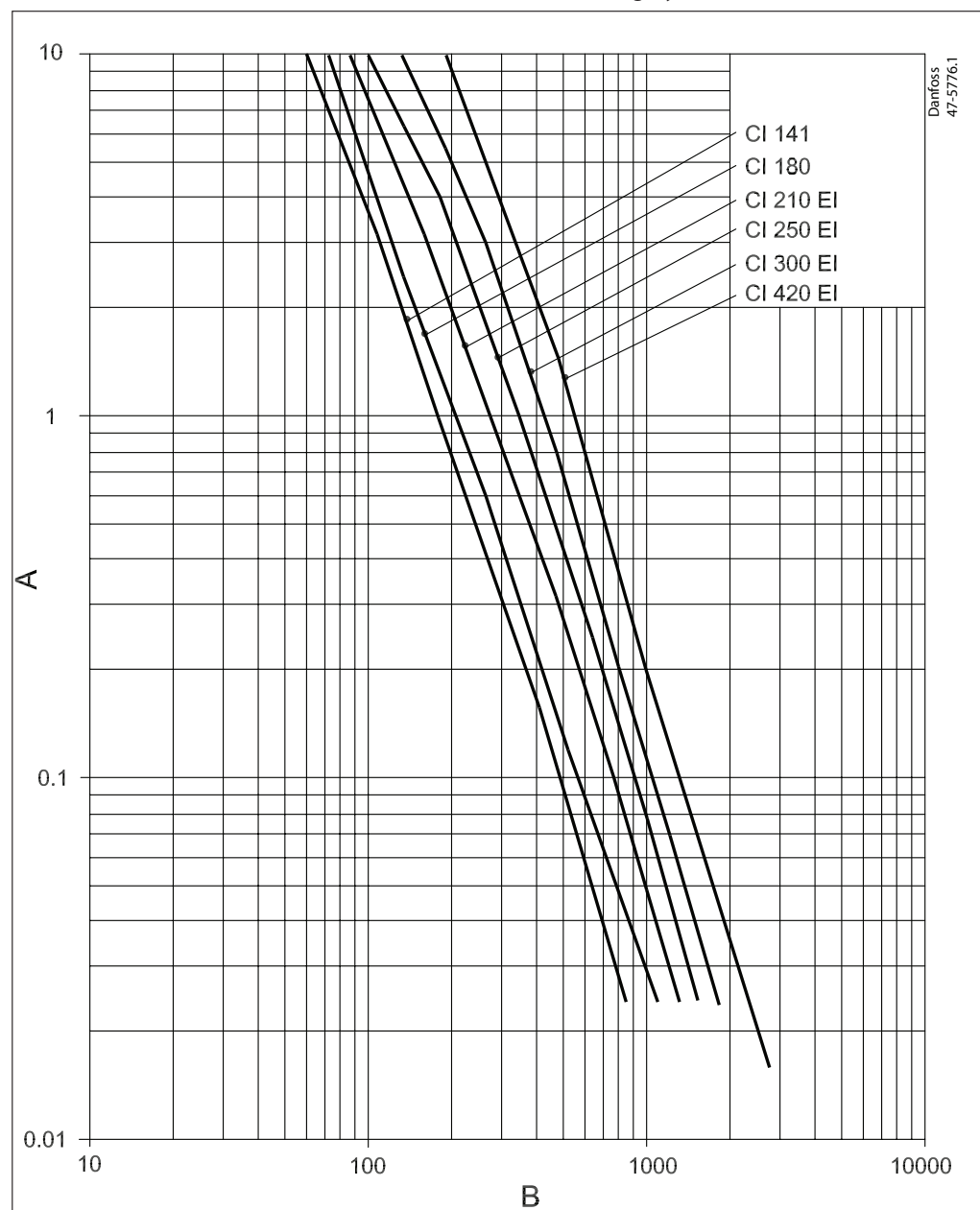
Contactors CI 141, CI 180, CI 210 EI/250 EI/300 EI/420 EI load categories 90% AC-3, 10% AC-4



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

Electrical life curve

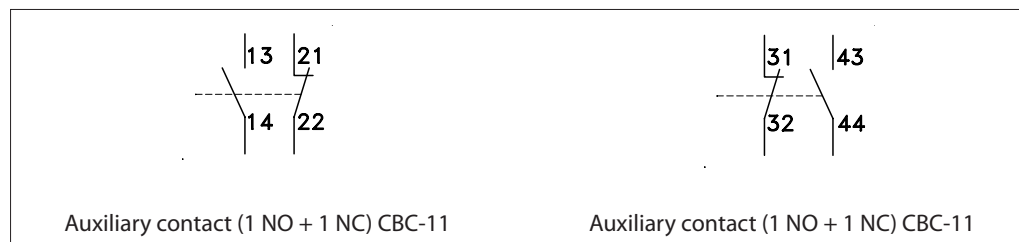
Contactors CI 141, CI 180, CI 210 EI/250 EI/300 EI/420 EI load category AC-4



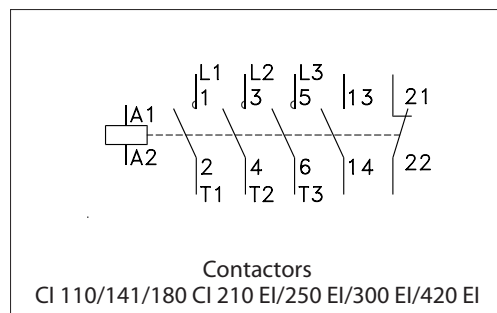
A: Electrical life in millions of make / break operations
B: Breaking current (A)

Contact symbols and terminal markings

Auxiliary contacts



Contactors



**Loads
Main circuit
Connections, main contacts**

Type	Connection method	Single core [mm ²]	Multi core		Recommended Tightening torque [Nm]
			without terminal sleeve [mm ²]	with terminal sleeve [mm ²]	
CI 141, CI 180	Screw and lug	25 - 120	25 - 120	-	10 - 12
	Terminal block	25 - 120	25 - 95	-	10 - 12
CI 210 EI, CI 250 EI, CI 300 EI, CI 420 EI	Screw	25 - 300	25 - 300	-	43
	Terminal block	25 - 240	-	25-185	25

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

Type	Rated loads at 50/60 Hz							
		220-230 V	240 V	380-400 V	415 V	500 V	690 V	1000 V
CI 141	A	140	140	140	155 ¹⁾	115	115	55
	kW	45	47	78	90 ¹⁾	98	135	75
CI 180	A	180	180	180	189 ¹⁾	170	170	65
	kW	57	60	101	110 ¹⁾	98	135	90
CI 210 EI	A	210	210	210	227 ¹⁾	210	210	30
	kW	67	70	118	132 ¹⁾	147	205	110
CI 250 EI	A	250	250	250	258 ¹⁾	250	250	95
	kW	80	83	140	150 ¹⁾	177	250	132
CI 300 EI	A	300	300	300	315 ¹⁾	300	300	115
	kW	97	101	170	185 ¹⁾	213	293	160
CI 420 EI	A	420	420	420	420	360	360	160
	kW	135	141	238	250	298	424	225

¹⁾ Typical electrical life time –25%

Switching lighting

Type	Incandescent lamps	Fluorescent lamps, individually compensated	
	A	Max. operat. current [A] at operat. temperature ¹⁾	
		40 °C	60 °C
CI 141	140	225	189
CI 180	170	225	189
CI 210 EI/250 EI	273	315	270
CI 300 EI	300	405	342
CI 420 EI	420	450	383

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

**Switching capacitor loads, individual capacitors (AC-6b)
Inductance in leads between capacitors connected in parallel min. 6 µH.**

Type	Max. reactive power [kVAr]									
	220-240 V		380-415 V		500 V		690 V		1000 V	
	Max. operat. current [A] at operat. temperature ¹⁾									
	40 °C	60 °C	40 °C	60 °C	40 °C	60 °C	40 °C	60 °C	40 °C	60 °C
CI 141	70	59	121	102	152	127	209	176	303	255
CI 180	70	59	121	102	152	127	209	176	303	255

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

**Switching capacitor loads, regulating capacitors (ac-6b)
Inductance in leads between parallel-connected capacitors must be min. 6 µH**

Type	Max. reactive power [kVAr]							
	220-240 V		380-415 V		500 V		690 V	
	Max. operat. current [A] at operat. temperature ¹⁾							
	40 °C	60 °C	40 °C	60 °C	40 °C	60 °C	40 °C	60 °C
CI 141	70	59	76	76	76	76	78	78
CI 180	70	59	111	102	113	113	114	114

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 141/180	210	210	210	210	3.5	210	210	210	210	2.1

**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 141/180	210	210	210	210	210	210	210	210	210	3.3	210	210	0.75	3.3	11

Contact resistance and power losses

Type	Typical impedance per pole [mΩ]	Power losses all 3 poles		Coil consumption AC [W]	Total power losses	
		AC-3 [W]	AC-1 [W]		AC-3 [W]	AC-1 [W]
CI 141	0.42	24.6	79	7.0	31.6	86.0
CI 180	0.42	36.3	79	7.0	43.3	86.0
CI 210 EI	0.22	29.4	81	7.0	36.4	88.0
CI 250 EI	0.22	41.7	81	7.0	48.7	88.0
CI 300 EI	0.18	48.6	109	7.0	55.6	116.0
CI 420 EI	0.15	79.5	112.5	7.0	86.5	119.5

Data sheet | CI-TI™ Contactors and motor starters, Types CI 141-420 EI

Short time withstand current I_{cw}

Type	Current transfer time in sec.							Min. cooling in min.
	1	4	10	15	60	240	900	
	Short time withstand in Amps (I _{cw})							
CI 141	2550	1970	1240	1130	850	600	440	20
CI 180	2550	1970	1360	1130	850	600	440	20
CI 210 EI	3405	3150	2360	2000	1215	705	460	20
CI 250 EI	3870	3870	2570	2110	1300	750	500	20
CI 300 EI	4727	4100	2840	2270	1500	840	590	20
CI 420 EI	6375	6375	4700	3460	1820	1280	840	20

Connections, auxiliary contacts

Type	Connection method	Single and multi core [mm ²]	High capacity		Tightening torque [Nm]
			without terminal sleeve [mm ²]	with terminal sleeve [mm ²]	
Coil terminals for CI 420 EI	Screw and clamp washer	1 - 4	1 - 4	1 - 2.5	1.4 - 2.3

Auxiliary contacts, load categories: AC-15 and AC-1

Type	Comments	Max. operating current [A]							
		AC-15						AC-1	
		220/230 V	240 V	380/400 V	415 V	500 V	690 V	40 °C ¹⁾	60 °C ¹⁾
CBC-	For contacts CI 141...CI 420 EI	5.5	5	3	2.5	1.6	1	16	12

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

Auxiliary contacts, load categories DC-12, DC-13, DC-14

Type	Comments	Max. operating current [A]													
		DC-12					DC-13					DC-14			
		24 V	48 V	110 V	220 V	440 V	24 V	48 V	110 V	220 V	440 V	24 V	48 V	110 V	220 V
CBC-	For contacts CI 141...CI 420 EI	16	9	3.5	0.55	0.2	5	2	0.7	0.25	0.12	9	5	2	0.4

Coils, consumption and operating times

Type	Inrush power		Holding power		Pull-in voltage	Drop-out voltage	Make time	Break time
	AC	AC	AC	AC	AC	AC		
	VA	W	VA	W	V	V	ms	ms
CI 141 - CI 180	380	240	13	6	$(0.85-1.1) \times U_S$	$(0.35-0.65) \times U_S$	20-45	25-110
CI 210 EI - CI 300 EI	380	240	13	6	$0.85 \times U_{min}$ $\dots 1.1 \times U_{max}$	$0.3 \dots 0.5 \times U_{min}$	20-45	25-110
CI 420 EI	490	270	18	7	$0.85 \times U_{min}$ $\dots 1.1 \times U_{max}$	$0.3 \dots 0.5 \times U_{min}$	20-45	25-110

RC element (charge suppressor)

Type	Comments	Overvoltage factor $n = \frac{U_{max}}{U_n}$
RCC	Suitable for contactors CI 141-180	1-2.0
VRC	Suitable for contactors CI 141-180	1-2.5

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 141	15	30	40	50	100	125	250	220	250	220
CI 180		40	50	60	150	150	250	220	250	220
CI 210 EI		50	60	75	150	200	350	300	350	300
CI 250 EI			75	100	200	250	350	300	350	300
CI 300 EI			100	125	250	300	420	340	420	340
CI 420 EI			150	175	350	400	420	420	420	420

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		DC	
		Category	VA	Category	W
CBC-	For contactors CI 141..CI 420 EI	A600	720	P600	138

Connections, main contacts

Type	Connection method	Cross section [AWG]	Recommended tightening torque [lb-in]
CI 141, CI 180	Screw and lug	6 - 250 MCM	90 - 110
	Terminal block top	6 - 1/0	90 - 110
	Terminal block bottom	6 - 250 MCM	90 - 110
CI 210 EI, CI 250 EI	Screw and lug	8 - 600 MCM	180 - 200
	Terminal block top	4 - 600 MCM	180 - 220
CI 300 EI, CI 420 EI	Terminal block bottom	4 - 600 MCM	180 - 220

Dimensions

