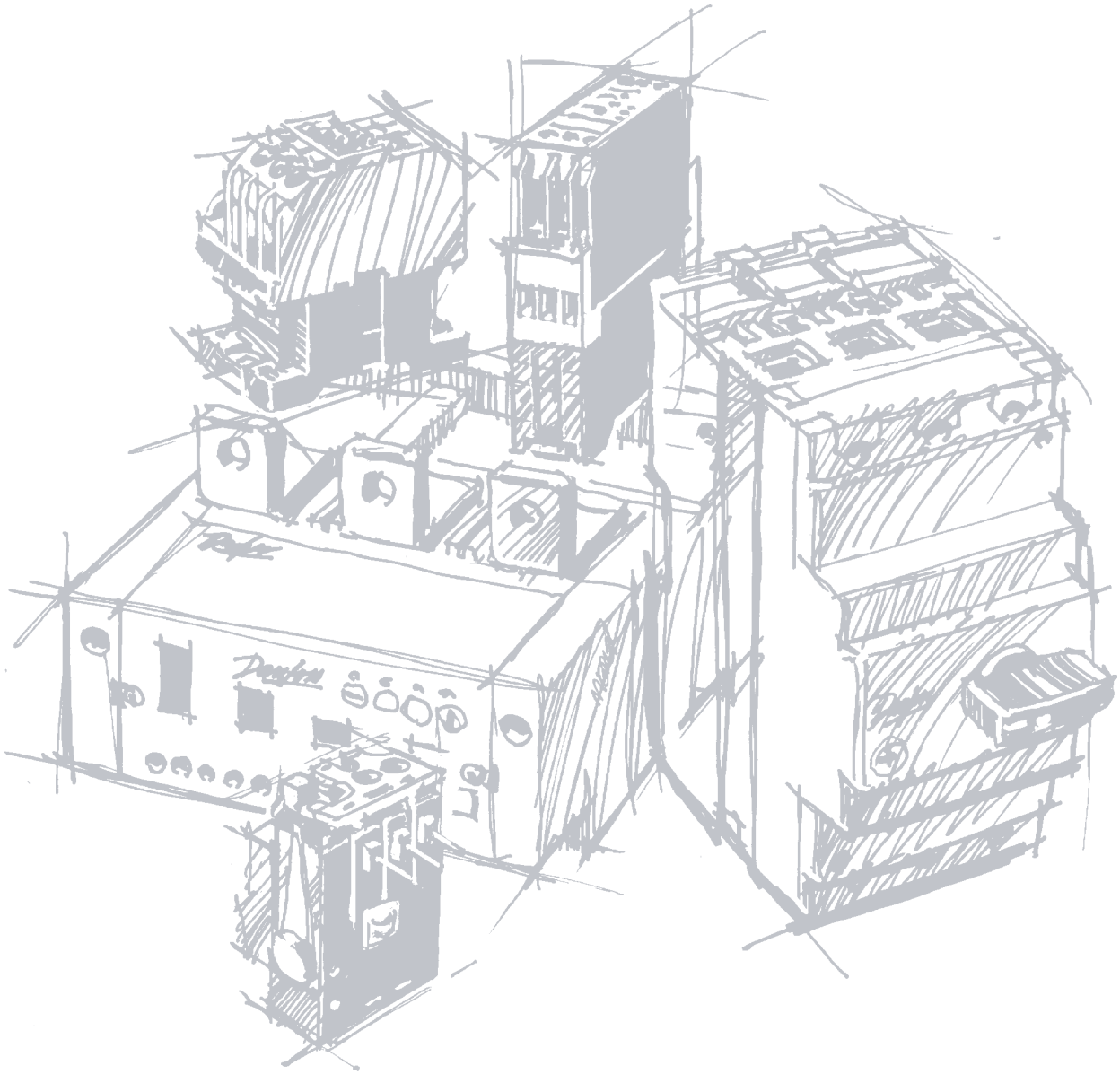
Data sheet

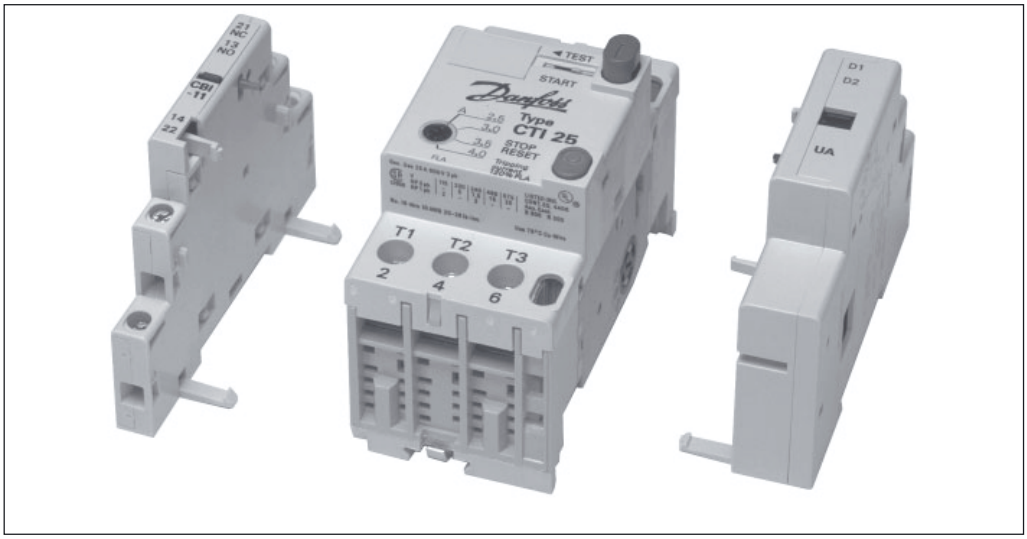


CI-TI ™ Contactors and Motor Starters
Circuit Breakers CTI 25

November 2002

DKACT.PD.C00.L2.02
520B1427

Introduction



Circuit breakers/Manual motor starters CTI 25 cover the power ranges 0.09-12.5 kW
This product range is modular, flexible, and offers a large selection of clip-on auxiliary functions and accessories: auxiliary contact blocks, alarm contact blocks, shunt releases, current limiters, connection blocks, bus bars and enclosures.

Other features of CTI 25

- Short-circuit protection: An advanced and fast reacting contact system with arc-control devices give CTI high short-circuit break capability which makes them very suitable for the protection of electrical panels.
- Supply isolation:
  - operation switch (manual motor starter)
  - isolation switch (with locking device)
  - emergency stop switch (with undervoltage trip)
- Indicating functions:
  - condition (ON or OFF)
  - alarm (short-circuiting or thermal trip)
  - recoupling prevention (manual reset)

Ordering

CTI 25

Circuit breakers/Manual motor starters CTI 25

AC-3 load U_e 380-415 V kW	Range Motor starter A	Electromagnetic trip current A	**Code no.**	Type
0.09	0.25 - 0.4	4.4	**047B3022**	CTI 25
0.12	0.4 - 0.63	6.9	**047B3023**	
0.37	0.63 - 1.0	11	**047B3024**	
0.55	1.0 - 1.6	18	**047B3025**	
0.75	1.6 - 2.5	28	**047B3026**	
1.5	2.5 - 4.0	44	**047B3027**	
2.5	4.0 - 6.3	69	**047B3028**	
5.5	6.3 - 10	110	**047B3029**	
7.5	10 - 16	176	**047B3030**	
10	16 - 20	220	**047B3031**	
12.5	20 - 25	275	**047B3032**	

CBI - NO
- NC
Auxiliary contact block

CBI - 11
Auxiliary contact block

CBI - UA/ CBI - AA
Undervoltage trip/ Shunt trip

CTS 54-
Bus bar

CTT 25
Terminal block

Terminal cover for CTS

Enclosure BXI
For CTI 25

Accessories for circuit breakers/manual motor starters CTI 25

Description	Comments	Code no.
Auxiliary contact blocks for CTI 25	Auxiliary contact blocks for building in	
	CBI-NO (make) terminal 13-14	**047B3040**
	CBI-NO (make) terminal 23-24	**047B3041**
	CBI-NC (break) terminal 11-12	**047B3042**
	Auxiliary contact blocks for lefthand mounting	
	CBI 11 (1 make + 1 break), terminal 13-14, 21-22	**047B3049**
Alarm contact block for CTI 25	Alarm contact for building in	
	CBI UI-NC, terminal 51-52	**047B3075**
Undervoltage for CTI 25	Undervoltage trip for righthand mounting	
	CBI-UA 220-230 V, 50 Hz - 254 V, 60 Hz, D1-D2	**047B3061**
	CBI-UA 240 V, 50 Hz - 277 V, 60 Hz, D1-D2	**047B3062**
Shunt trip for CTI 25	Shunt trip for righthand mounting	
	CBI-AA 220-230 V, 50 Hz - 254 V, 60 Hz, C1-C2	**047B3067**
	CBI-AA 240 V, 50 Hz - 277 V, 60 Hz, C1-C2	**047B3068**
Terminal block for CTI 25	For mounting direct on CTI 25, max. 16 mm², CTT 25	**047B3076**
Lockable bracket for CTI 25	For locking CTI 25 mounted in panel (up to three padlocks) Type CBI LB	**047B3093**
Bus bars for CTI 25	For parallel connection fo CTI 25 in panel	
	CTS 45-2 (2 x 45 mm)	**047B3084**
	CTS 45-3 (2 x 45 mm)	**047B3096**
	CTS 45-4 (2 x 45 mm)	**047B3085**
	CTS 45-5 (2 x 45 mm)	**047B3086**
	For CTI 25 with auxiliary contact mounted on side	
	CTS 54-2 (2 x 54 mm)	**047B3087**
	CTS 54-3 (3 x 54 mm)	**047B3097**
	CTS 54-4 (4 x 54 mm)	**047B3088**
	CTS 54-5 (5 x 54 mm)	**047B3089**
Terminal cover	Finger protection of terminals on CTS	**047B3101**

Plastic enclosures for circuit breakers/manual motor starters CTI 25 (IP 55)

Application	Pushbuttons	Knockouts	Code no.	Type [1] [2]
CTI 25	Start-Stop/reset	4 Pg 16/4 Pg 21	**047B3091**	BXI 55

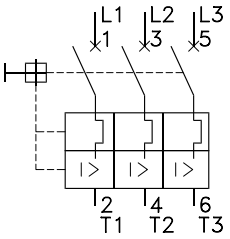
[1]) With neutral and earth terminals
[2]) The enclosure also leaves space for a shunt release or an undervoltage release.

Accessories for enclosures and circuit breakers

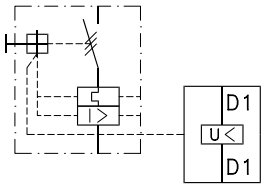
Description	Comments	Code no.
Lock fittings for boxes BXI	for use in servicing and inspection on BXI enclosures, type CBI LA	**047B3092**
Diaphragm for BXI 55	For replacement in BXI enclosure	**047B3099**

Contact symbols and terminal markings

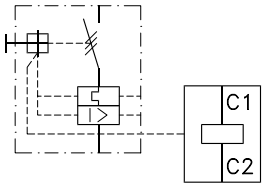
Circuit breakers



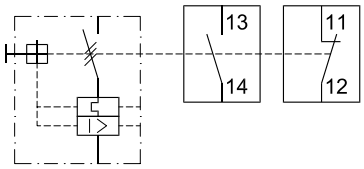
Circuit breakers CTI 25



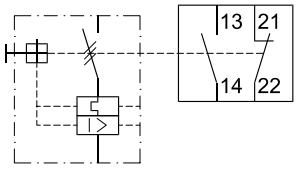
Under voltage trip for CTI 25 CBI-UA



Shunt trip for CTI 25 CBI-AA



Auxiliary contacts for CTI 25 CBI-NO, CBI-NC



Auxiliary contacts for CTI 25 CBI 11

Approvals

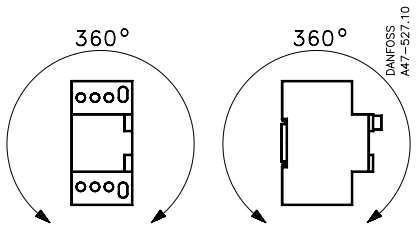
Product type \ Approval authority	CE EN 60947	CSA Canada	UL-listed USA	Lloyds Register of Shipping, UK	Germanischer Lloyd, Germany	Bureau Veritas France
CTI 25	●	●	●	●	●	●
CTS-	●	●	●	▲	▲	●
CTT 25	●	●	●	▲	▲	▲
CBI-	●	●	●	●	●	●

● Approved
▲ No approval requirement

General data

Parameters		Type
		CTI 25
Isolation voltage	IEC, SEV, VDE 0660	690 V
	UL, CSA	600 V
Pulse voltage		8 kV
Rated frequency range		40-60 Hz
Ambient temperature	Storage/transport	-25 °C - +80 °C
	Operation	-25 °C - +60 °C
Temperature compensated		-20 °C - +60 °C
Weather resistance	(IEC 68) Temp./rel. humidity	40 °C, 92% RH: 56 days
	Temperate climate	23 °C, 83% RH/40 °C, 93% RH
Vibration (IEC 68) (all directions)		> 7,5 g, 10 - 150 Hz
Shock (IEC 68-2-27)		30 g, 20 ms
Degree of protection		IP 20
Installation orientation		Any direction
Rated current		0.1 - 25 A
Release range		13
Differential release		no
Magnetic trip (I_{eF} max. = setting range max. value)		11 x I_{eF}max
No. of operations per hour		30
Mechanical life (operations)		100.000
Electrical life (operations)		100.000
Release time on short-circuiting		2 ms
Power loss, typical		7 W

Mounting direction



CTI 25

Max. motor load AC-2 and AC-3 operation

Type	Setting range A	Motor on operating voltage - Rated output in kW							
		220-240 V		380-415 V		500 V		690 V	
		AC-2	AC-3	AC-2	AC-3	AC-2	AC-3	AC-2	AC-3
CTI 25	0.25 - 0.4			0.06	0.09				
	0.4 - 0.63	0.06	0.09	0.09	0.12		0.25		0.25
	0.63 - 1.0	0.09	0.12	0.18	0.37		0.37	0.37	0.55
	1.0 - 1.6	0.18	0.25	0.37	0.55	0.55	0.75	0.75	1.1
	1.6 - 2.5		0.37	0.55	0.75		1.1		1.5
	2.5 - 4.0	0.55	0.75	1.1	1.5	1.5	2.2	2.2	3
	4.0 - 6.3	1.1	1.5	2.2	2.5	2.5	3.0	3.7	4
	6.3 - 10	1.5	3	3	5.5	3.7	6.3	5.5	7.5
	10 - 16	3.7	4	5.5	7.5	7.5	10	10	12.5
	16 - 20		5.5	7.5	10.0		11.0	15	16
	20 - 25	5.5	7.5	11.0	12.5	12.5	16	18.5	22

Accessories for circuit breaker CTI 25
Max. load on supply block, current limiter, connection terminal and bus bar.

Application	Type	Descriptiion	Thermal current I_{th} A	Voltage supply V
CTI 25	CTT 25	Connection terminal	63	690
	CTS-	Bus bars	63	

Accessories for circuit breakers

Loads on auxiliary contact blocks

Application	Type	Description	I_{th}		Load [A]							
					AC-15				DC-13			
			40°C	60°C	220 - 240 V	380 - 415 V	500 V	690 V	24 V	48 V	110 V	220 V
CTI 25	CBI-NO/NC	Auxiliary contact for building in	6	4	2	1	0.8	0.5	2	0.6	0.2	0.1
	CBI 11	Auxiliary contact for building on (force-actuated PLC-compatible H contact)	10	6	2	1	0.8	0.5	2	0.6	0.2	0.1

Power consumption, undervoltage and shunt trip

Application	Type	Description			
CTI 25	CBI-UA	Undervoltage trip for building on	Rated control voltage U_s		24-380 V/50 Hz, 28-440 V/60 Hz
			Function voltage	Make	0.8 to 1,1 x U_s
				Break	0.35 to 0.7 x U_s
					100% make, max. 1.2 U_s
	CBI-AA	Shunt trip for building on	Coil consumption	Make	5 VA, 6 W
				Holding	3 VA, 1.2 W

Terminations

Application	Type	Comments	Terminals		Single and multi core [mm²]	High capacity [mm²]	Tightening torque [Nm]
			1-3-5	2-4-6			
CTI 25	CTI 25	Circuit breaker 25 A	●	●	1 - 6	1 - 4	2.5
	CBI-NO/NC	Auxiliary contacts for CTI 25			0.75 - 4	0.75 - 2.5	2.5
	CBI 11	Auxiliary contacts for CTI 25			0.75 - 4	0.75 - 2.5	2.5
	CBI - AA	Shunt release for CTI 25			0.75 - 4	0.75 - 2.5	2.5
	CBI - UA	Undervoltage release for CTI 25			0.75 - 4	0.75 - 2.5	2.5
	CTT 25	Connection block for CTI 25	●		6 - 25	4 - 16	4

UL/CSA-approved loads

Type	Setting range	Motor load in hp (AC-3)					
		1-phase operation			3-phase operation		
	A	115 V	230 V	200 V	230 V	460 V	575 V
CTI 25	1.6 - 2.5	0.10	0.166	0.5	0.5	1	1.5
	2.5 - 4	0.125	0.333	0.75	1	2	3
	4 - 6.3	0.25	0.5	1.5	1.5	3	5
	6.3 - 10	0.5	1.5	2	3	5	7.5
	10 - 16	1	2	3	5	10	10
	16 - 20	1.5	3	5	5	10	15
	20 - 25	2	3	5	7.5	15	20

Terminations UL/CSA

Application	Type	Comments	Terminals		Single and multi core	Tightening torque
			1-3-5	2-4-6	[AWG]	[lb-in]
CTI 25	CTI 25	Circuit breaker 25 A	●	●	16 - 10	20 - 26
	CBI-NO/NC	Auxiliary contacts for CTI 25			18 - 14	20 - 26
	CBI 11	Auxiliary contacts for CTI 25			48 - 14	20 - 26
	CBI-AA	Shunt release for CTI 25			18 - 14	20 - 26
	CBI-UA	Undervoltage release for CTI 25			18 - 14	20 - 26
	CTT 25	Connection block for CTI 25	●		14 - 6	36

UL/CSA approved loads

Application	Type	Description	Load	
			a.c.	d.c.
CTI 25	CBI-NO/NC	Auxiliary contact for building in	Standard pilot	Light pilot
	CBI 11	Auxiliary contact for building in	duty B600	dutyR300

Short circuit protection

Short circuit coordination is the connection between the specifications of the protection devices, such as fuses, circuit breakers, MCCB and its ability to resist short circuit.

Short circuit coordination type 1
Test demand
O-t-CO
O = Breaking a short circuiting
CO = Making and breaking a short circuiting
t =Defined pause (3 min)

No damage to equipment or personal injury may occur in the event of short circuit. However, contactors and thermal overload relays are not required to remain functional after short circuit.

It is typical the maximum short circuit breaking capacity I_{cu} in use when a plant is dimensioned according to coordination type 1

Short circuit coordination type 2
Test demand
O-t-CO-t-CO
O = Breaking a short circuiting
CO = Making and breaking a short circuiting
t =Defined pause (3 min)

t= Defined pause (3 min)
No damage to equipment or personal injury may occur in the event of short circuit. However, light contact welding is permissible, provided that contacts can be separated without deformation, using a screwdriver for example. Contactors and thermal overload relays must remain completely functional after short circuit.
It is typical the short circuit breaking capacity during operation I_{cs} in use when a plant is dimensioned according
to coordination type 2.

Terms	Remarks
Prospective short circuit current (I_{cc})	The prospective short circuit current is the current that flows during a bolt short circuiting without any short circuit protection device mounted.
Rated ultimate short circuit breaking capacity (I_{cu})	The ultimate short circuitbreaking capacity is the maximum short circuit current specified by the manufacturer that a circuit breaker can handle under circumstances specified in IEC 947-2 and in EN 60947-2
Rated service short circuit breaking capacity (I_{cs})	The rated service short circuit breaking capacity is the maximum short circuit current specified by the manufacturer that a circuit breaker can handle under circumstances specified in IEC 947-2 and in EN 60947-2
”r”-current	The ”r”-current is a short circuit test current. The size of the “r”-current is determent by the nominal current of the product. (See below)
I_q current	I_q –current is the maximum prospective short circuiting current stated by the manufacturer and often at the value 50 kA.
gI fuse	Indicates full short circuit protection at voltages 250V, 400V, 500V and 690V.
gL fuse	Indicates full shoert circuit protection of wires.
gG fuse	Indicates full short circuit protection at general applications. (Will replace gI- and gL –fuses)
T fuse	Description of an English standard fuse.
BS 88	British Standard for smeltesikringer

Contactor size	Prospektive short circuit test current
Rated current at AC-3 load	“r” in kA
$0 < I_e \leq 16$	1
$16 < I_e \leq 63$	3
$63 < I_e \leq 125$	5
$125 < I_e \leq 315$	10
$315 < I_e \leq 630$	18
$630 < I_e \leq 1000$	30

Fuses

Type	Setting range A	Fuses gI, aM, gL, gG and BS 88 type T when Icc > Icn [A			
		220-240 V	380-415 V	500 V	690 V
CTI 25	0.25 - 0.4				
	0.4 - 0.63				
	0.63 - 1.0				
	1.0 - 1.6				
	1.6 - 2.5				50
	2.5 - 4.0				50
	4.0 - 6.3			100	63
	6.3 - 10.0		125	100	80
	10.0 - 16.0	125	125	100	80
	16.0 - 20.0	125	125	100	80
	20.0 - 25.0	125	125	100	80

= Short-circuit-proof without fuse

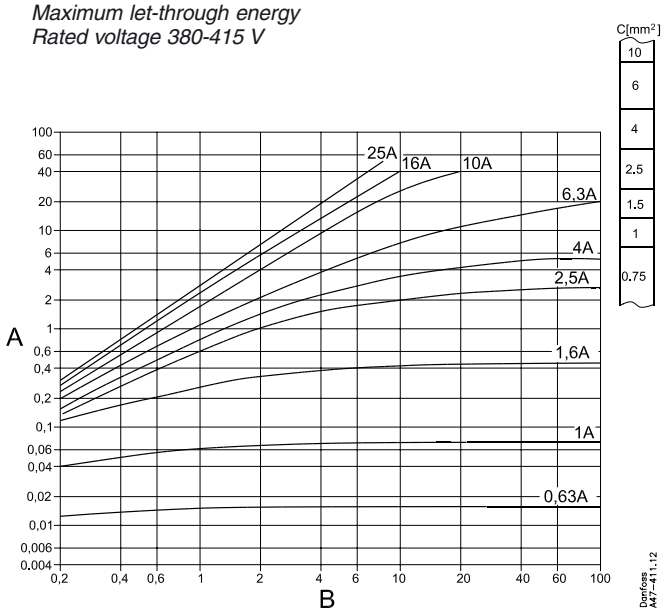
Rated short-circuit breaking capacity I_{cn}

Circuit breaker

Type	Thermal overload relay Setting range A	Magnetic trip Release current A	Breaking capacity I_{cn} in kA Short-circuit category I_{cu} and I_{cs} to IEC 947-2/EN 60947-2 40 - 60 Hz without current limiter CTL 65							
			220 - 240 V		380 - 415 V		500 V		690 V	
			I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
CTI 25	0.25 - 0.4	4.4	100	100	100	100	100	100	100	100
	0.4 - 0.63	6.9	100	100	100	100	100	100	100	100
	0.63 - 1.0	11	100	100	100	100	100	100	100	100
	1.0 - 1.6	18	100	100	100	100	100	100	100	100
	1.6 - 2.5	28	100	100	100	100	100	100	4.5	4.5
	2.5 - 4.0	44	100	100	100	100	100	100	8	6
	4.0 - 6.3	69	100	100	100	100	30	20	8	6
	6.3 - 10	110	100	100	20	16	6	4.5	4.5	3
	10 - 16	176	30	20	10	6	4.5	4.5	3	3
	16 - 20	220	20	16	8	6	4.5	4.5	3	3
	20 - 25	275	20	16	8	6	4.5	4.5	3	3

Let-through graphs for circuit breaker CTI 25

Maximum let-through energy
Rated voltage 380-415 V



A: *Max. let-through energy* $\int i^2 \times dt$ *[10³ × A² × s]*
B: *Prospective short-circuit current* I_{cc} *[kA]*

The energy graph can be used to assess whether a lead is correctly protected against the thermal effect of a short-circuit current.
Column C shows the cross-sectional area of lead protected by the CTI 25 concerned.
The graph can be read as follows:
If the expected short-circuit current at the point of installation is set at 20 kA, and a CTI 25 - 10 A is required, the let-through energy will be 4000 A² and the necessary cross-section 2.5 mm².

Calculation example:

The following generally applies to leads subject to brief overload:

$t = \left(\frac{k \times S}{I}\right)^2$ which gives $I^2 \times t = k^2 \times S^2$

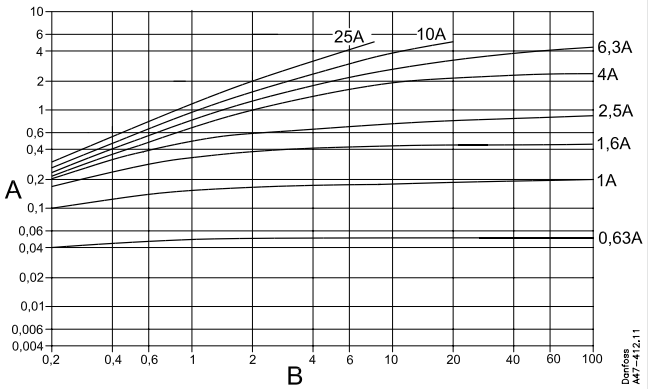
Where t = duration of short-circuit current in seconds
S = cross-section of lead in mm²
I = short-circuit current in A_{eff}
k = a constant which for PVC-insulated Cu wire = 115

Thus, for a 1.5 mm² PVC-insulated Cu wire, $I^2 \times t = (115 \times 1.5)^2 = 29756$ A²s.

From the energy graph it can be seen that with I_{cc} = 10 kA a CTI 25 with max. range setting = 10 A only allows about 23000 A²s through and therefore protects the lead satisfactorily.

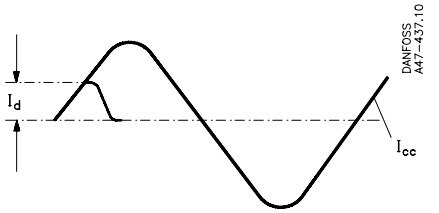
If the same calculation is performed for I_{cc} = 6 kA, the same lead is correctly protected by a CTI 25 with a range of 16 A.
The graphs can also be used for selectivity calculations.

Maximum let-through current
Rated voltage 380-415 V



A: *Max. let-through current* I_D *[kA]*
B: *Prospective short-circuit current* I_{cc} *[kA]*

The theoretical short-circuit current I_{cc} (prospective short-circuit current) is limited by CTI 25. I_d is the maximum let-through current (highest momentary value of the limited short-circuit current). This value is given in the graph as a function of the prospective short-circuit current.
The graphs have been plotted for eight different CTI 25 ranges.



Short-circuit protection of wiring

Type	Max. setting	Protected min. cross-section (mm^2) at 380 / 415 V, 50 Hz					
		6	4	2.5	1.5	1	0.75
CTI 25	4.0	●	●	●	●	●	●
	6.3	●	●	●	●	●	●
	10.0	●	●	●	●	●	
	16.0	●	●	●	●		
	20.0	●	●	●			
	25.0	●	●	●			

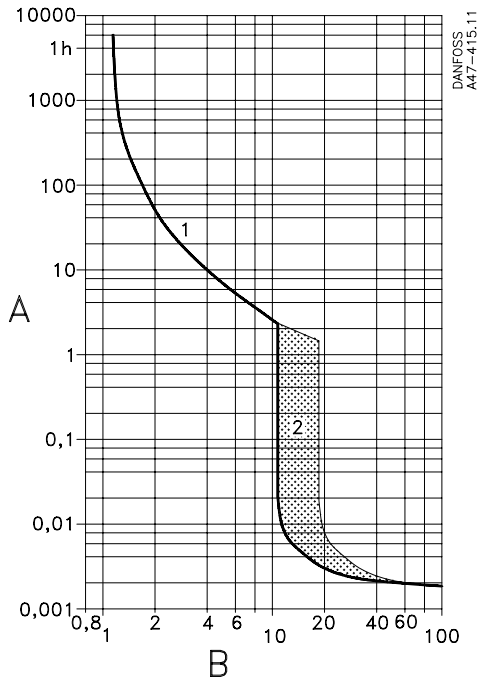
Protection of PVC-insulated wires against overload and short-circuiting, in accordance with IEC 364 and CENELEC harmonizing documents 384-3 and 384-4.

Overload protection is given by the adjustable thermal circuit breakers in CTI 25 motor starters. The highest possible release current is therefore significantly lower than with overload protection by fuses. The magnetic trips with fixed setting that rapidly open the main contacts take over protection in the event of short-circuiting. The low total release time ensures that heating generated in leads by short-circuiting is limited to a minimum. Further information is contained in national regulations.

Setting in short-circuit protection application
In many cases, CTI 25 are used exclusively for short-circuit protection - overload protection being provided by thermal overload relays, e.g. in multi stage motors or star-delta starters with heavy start, and/or in reducing motor lead cross-section. Here, the current value can be set 20% higher than the operating current so that only the thermal overload relays release when overload occurs.

Overload protection of motors

Tripping characteristic of CTI 25



A. *Tripping time (s)*
B: *Times the adjustable current I_{eF}*

1. Thermal tripping current
The adjustable, current-dependent, delayed bimetal breakers guarantee motor overload protection.
The graph gives the average value at 20°C ambient temperature, from the cold condition. When the unit has warmed up, the release time is less or equal to the release time in the cold condition.
The accurate adjustment ensures motor protection even in the event of phase failure.

2. Magnetic tripping current
The electromagnetic, instantaneous high-speed trips react at a fixed response current. At the highest setting value this corresponds to 11 times the set current for CTI 25. At a lower setting it is correspondingly higher.

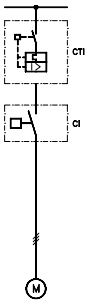
Protection of motors, EEX ell:
According to VDE 0165/83, the release time for the cold overcurrent release must be less than the permissible warming-up time of the motor, time t_E.
The specific release curves must be available at the point of application. These can be ordered from Danfoss as required.
In respect of new equipment, according to VDE 0165/83, subsection 6.1.4.3.3, the motor protection used must also protect the motor against phase failure.
CTI 25 circuit breakers from Danfoss meet these requirements where motors with outputs up to 3 kW are concerned.
For motors with rated output higher than 3 kW, extra protection covering phase failure must be provided.

Short-circuit protection

It has become more and more general to short-circuit-protect panels with circuit breakers rather than fuses. The clear advantages of “fuse-free” installations are:
- Space saving
- Cut-out in all three phases in the event of short-circuiting.
- No problems with non-convertible fuse types when exporting electrical equipment.

Danfoss circuit breakers CTI 25 conform to IEC 947-2 and are tested in accordance with EN 60947-2. Because of their fast reaction times and reliability they are particularly suitable for the short-circuit-protection of panels.

Fuseless coordination tables



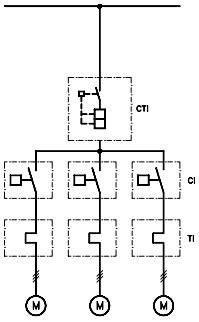
Circuit breakers and contactors

Prospective short circuit current: I_q = 10/ 50 kA
Voltage: 380 - 415 V/ 50 Hz
Overload and short circuit protection with circuit breaker type: CTI
Short circuit coordination: T1 and T2

Contactor type	Short circuit coordination type T1	Short circuit coordination type T2	
	Test current "r"[1] and I_q = 50 kA	Test current "r"[1] and I_q = 10 kA	Test current "r"[1] and I_q = 50 kA
	Maximum CTI - range (A)		
CI 4-2, CI 4-5, CI 4-9	25[2]	2.5	2.5
CI 6, CI 9	25[2]	2.5	2.5
CI 12, CI 15	25[2]	2.5	2.5
CI 16	25[2]	2.5	2.5
CI 20, CI 25	25[2]	4	2.5

[1] Short circuit test current according to EN 60947-4 (see table page 8)
[2] You must mount CTL 65 at front of CTI 25 with higher ratings than 10 A or fuses when rated service breaking capacity exceed values in tables page 9.

Fuseless coordination tables



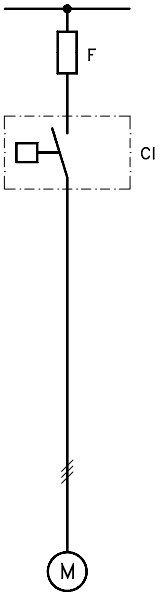
Circuit breakers, contactors and thermal overload relays (several groups)

Prospective short circuit current: I_q = 50 kA
Voltage: 380-415 V/ 50 Hz
Overload protection with thermal overload relay type: TI
Short circuit protection with circuit breaker type: CTI
Short circuit coordination: T1

Contactor type	Thermal overload relay Range A	Test current "r"[1] and I_q = 50 kA Maximum CTI - range A
CI 4-5, CI 6, CI 9	0.13 - 0.20	CTI 25 - 25 A[2]
CI 4-5, CI 6, CI 9	0.19 - 0.29	
CI 4-5, CI 6, CI 9	0.27 - 0.42	
CI 4-5, CI 6, CI 9	0.4 - 0.62	
CI 4-5, CI 6, CI 9	0.6 - 0.92	
CI 4-5, CI 6, CI 9	0.85 - 1.3	CTI 25 - 25 A[2]
CI 4-5, CI 6, CI 9	1.2 - 1.9	
CI 4-5, CI 6, CI 9	1.8 - 2.8	
CI 4-5, CI 6, CI 9	2.7 - 4.2	
CI 4-5, CI 6, CI 9	4 - 6.2	
CI 4-9, CI 9	6 - 9.2	
CI 12, CI 15	8 - 12	
CI 15, CI 16	11 - 16	CTI 25 - 25 A[2]
CI 16, CI 20	15 - 20	
CI 25	19 - 25	

[1] Short circuit test current according to EN 60947-4 (see table page 8)
[2] You must mount fuses at front of CTI 25 with higher ratings than 10 A when rated service breaking capacity exceed values in tables on page 9.

Coordination tables with fuses



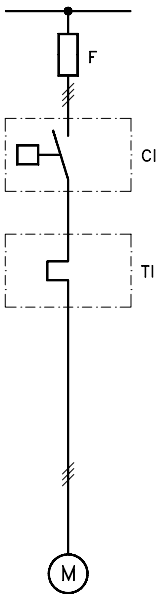
Contactors

Prospective short circuit current: I_q = 10/ 50 kA
Voltage: 380 - 415 V/ 50 Hz
Overload and short circuit protection with fuse types: gI, gL, gG and 'T' (BS 88)
Short circuit coordination: T1 and T2

Contactor type	Short circuit coordination type					
	T1		T2			
	Test Current					
	"r"[1] and I_q = 50 kA		"r"[1] and I_q = 10 kA		"r"[1] and I_q = 50 kA	
	gI,gL,gG A	'T' A	gI,gL,gG A	'T' A	gI,gL,gG A	'T' A
CI 4-2, CI 4-5, CI 4-9	50	63	16	20	16	20
CI 6, CI 9, CI 12, CI 15	50	63	25	32	25	32
CI 16	80	80	25	32	25	32
CI 20, CI 25	80	80	25	32	25	32
CI 30	80	80	35	40	25	32
CI 32	125	125	50	63	35	40
CI 37, CI 45, CI 50	125	125	80	80	80	80
CI 61, CI 73	250				160	
CI 105	250				200	
CI 141	315				250	
CI 170 EI	355				315	
CI 210 EI, CI 250 EI	500				400	
CI 300 EI, CI 420 EI	630				500	

[1] Short circuit test current according to EN 60947-4 (see table page 8)

Coordination tables with fuses



Thermal overload relays and contactors

Prospective short circuit current: I_q = 10/ 50 kA
Voltage: 380 - 415 V/ 50 Hz
Overload and short circuit protection with fuse types: gI, gL, gG and 'T' (BS 88)
Short circuit coordination: T1 and T2

Contactor type	Thermal overload relay A	Short circuit coordination type					
		T1		T2			
		Test Current					
		"r"[1] and I_q = 50 kA		"r"[1] and I_q = 10 kA		"r"[1] and I_q = 50 kA	
		gI,gL,gG A	'T' A	gI,gL,gG A	'T' A	gI,gL,gG A	'T' A
CI 4-5, CI 4-9, CI 6, CI 9	0.13- 0.20	25	32	2	2	-	-
CI 4-5, CI 4-9, CI 6, CI 9	0.19- 0.29	25	32	2	2	-	2
CI 4-5, CI 4-9, CI 6, CI 9	0.27- 0.42	25	32	2	2	2	2
CI 4-5, CI 4-9, CI 6, CI 9	0.42- 0.60	25	32	4	4	4	4
CI 4-5, CI 4-9, CI 6, CI 9	0.60- 0.92	25	32	4	6	4	6
CI 4-5, CI 4-9, CI 6, CI 9	0.85- 1.3	25	32	4	6	4	6
CI 4-5, CI 4-9, CI 6, CI 9	1.2 - 1.9	25	32	6	10	6	10
CI 4-5, CI 4-9, CI 6, CI 9	1.8 - 2.8	25	32	6	10	6	10
CI 4-5, CI 4-9, CI 6, CI 9	2.7 - 4.2	25	32	16	20	16	20
CI 4-5, CI 4-9, CI 6, CI 9	4 - 6.2	35	40	20	25	20	25
CI 4-9, CI 9	6 - 9.2	50	50	20	25	20	25
CI 12, CI 15	8 - 12	63	63	25	32	25	32
CI 15, CI 16	11 - 16	80	80	25	32	25	32
CI 16, CI 20	15 - 20	80	80	35	40	35	40
CI 25	19 - 25	80	80	35	40	35	40
CI 30	24 - 32	80	80	35	40	35	40
CI 32	16 - 23	125	125	50	63	35	40
CI 32	22 - 32	125	125	63	63	35	40
CI 37, CI 45	30 - 45	125	125	80	80	63	63
CI 50	42 - 63	125	125	80	80	63	63
CI 61	42 - 63			100	100	100	100
CI 73	60 - 80			125		125	
CI 86	74 - 85			125		125	
CI 105	68 - 90					200	
CI 105	85 - 110					200	
CI 85, CI 105	20 - 180	250				200	
CI 140, CI 140 EI	20 - 180	315				250	
CI 170, CI 170 EI	20 - 180	355				315	
CI 210, CI 250 EI	160 - 630	500				400	
CI 300, CI 420 EI	160 - 630	630				500	

[1] Short circuit test current according to EN 60947-4 (see table page 8)

Coordination tables with fuses or circuit breakers/ MCB

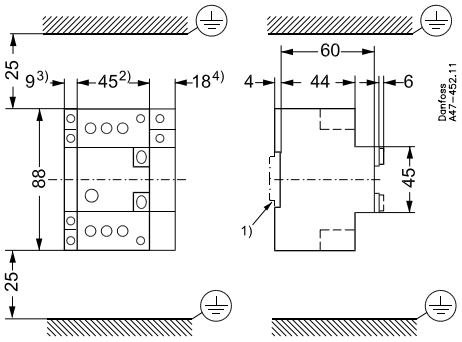
Auxiliary contacts
Prospective short-circuit current: I_q = 1 kA
Coordination type *"weld-free"*
Fuse, types gl, gL, gG, 'T' (BS 88)

For unit type	Auxiliary contacts			Max. permissible fuse		MCCB	
	Clip-on		Build-in	gl, gL, gG	'T'	Let-throug energy	Max. CTI-range
				A	A	A^2s	A
CI 6			●	10	16	400	2
CI 4-2, CI 4-5, CI 4-9	CBM-			10	16	400	2
			●	16	20	900	4
CI 6, CI 9, CI 12, CI 15	CB-	S		6	10	130	1
CI 16, CI 20, CI 25, CI 30		NO-NC		16	20	900	4
CI 32, CI 37, CI 45, CI 50		EM-LB		25	32	3000	25
CI 61, CI 73, CI 86	CBD -			10	16	400	2
			●	25	32	3000	25
CI 105, CI 141, CI 170 EI	CBC -		●	16	20	900	4
CTI 25	CBI -			16	20	900	4
CTI 100	CBI 100 -			16	20	900	4

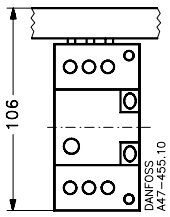
Dimensions

Circuit breakers CTI

Circuit breaker CTI 25



Circuit breaker CTI 25 with bus bars CTS 45 or CTS 54



1) Possibility of fixing on DIN rail EN 50022-35
2) Circuit breaker CTI 25, incl. auxiliary contact block CBI for building in.
3) Auxiliary contact block CBI for building on.
4) Shunt release CBI AA or undervoltage release CBI UA.