



CI-TI™ Contactors and Motor Starters

Circuit Breakers CTI 25M - 100

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Features


- Overload protection and short circuit protection of motor installations.
- Test function for thermal trip
- Manual reset function
- Indication for thermal trip
- Indication for magnetic trip (short circuiting)
- Single phase protection (Differential trip)
- Temperature compensated (-20 °C to + 60 °C)
- Tripping class 10

Description

Circuit breakers for short circuit- and overload protection of motor applications cover together with the circuit breaker CTI 100 the current range 0.1-90A AC-3 rating. The product range is split in three product sizes. The smallest size is CTI 25M. It consists of 13 code numbers and covers the current range 0.1 – 25A. The next size is called CTI 25MB. It has a higher short circuit breaking capacity than CTI 25M because the current limiter

is built-in. It consists of seven code numbers and cover the current range 1.6 – 25A. The biggest size is called CTI 45MB. It consists of six code numbers and covers the current range from 10 – 45A.

The program is very flexible and consist of add-on accessories such as auxiliary contacts, alarm contacts, voltage- and under voltage trips, connection terminals and bus bars.

Ordering
Circuit Breakers /Manual Motor Starters CTI 25M, CTI 25MB, CTI 45MB, CTI 100

AC-3 Load 380-415V kW	Range Motor Starter A	Electromagnetic Trip current A	Code number	Type
0.02	0.1-0.16	2.1	047B3140	CTI 25M
0.06	0.16-0.25	3.3	047B3141	
0.09	0.25-0.40	5.2	047B3142	
0.18	0.4-0.63	8.2	047B3143	
0.25	0.63-1.0	13	047B3144	
0.55	1.0-1.6	21	047B3145	
0.75	1.6-2.5	33	047B3146	
1.5	2.5-4.0	52	047B3147	
2.2	4.0-6.3	82	047B3148	
4.0	6.3-10	130	047B3149	
7.5	10-16	208	047B3150	
10	14.5-20	260	047B3151	
11	18-25	325	047B3152	
0.75	1.6-2.5	33	047B3153	CTI 25MB
1.5	2.5-4.0	52	047B3154	
2.2	4.0-6.3	82	047B3155	
4.0	6.3-10	130	047B3156	
7.5	10-16	208	047B3157	
10	14.5-20	260	047B3158	
11	18-25	325	047B3159	
4.0	6.3-10	130	047B3160	CTI 45MB
7.5	10-16	208	047B3161	
10	14.5-20	260	047B3162	
11	18-25	325	047B3163	
15	23-32	416	047B3164	
22	32-45	585	047B3165	
31.5	40-63	882	047B3014	CTI 100
45	63-90	1260	047B3015	

Ordering
*Auxiliary contacts and Alarm contacts to circuit breakers
CTI 25M-MB, CTI 45MB*


Type	Remarks	Code no.
CBA-10	Auxiliary contact, 1NO (13-14), front mounting, max one pr circuit breaker	047B3198
CBA-01	Auxiliary contact, 1NC (11-12), front mounting, max one pr circuit breaker	047B3199
CBA-11	Auxiliary contact, 1NO+1NC (13-14, 21-22), front mounting, max one pr circuit breaker	047B3200
CBA-20	Auxiliary contact, 2NO (13-14, 23-24), front mounting, max one pr circuit breaker	047B3201
CBA-02	Auxiliary contact, 2NC (11-12, 21-22), front mounting, max one pr circuit breaker	047B3202
CBA S-11	Auxiliary contact, 1NO+1NC (33-34, 41-42), side mounting, max one pr circuit breaker. Can also be mounted onto an alarm contact CBT S-	047B3203
CBA S-20	Auxiliary contact, 2NO (33-34, 43-44), side mounting, max one pr circuit breaker. Can also be mounted onto an alarm contact CBT S-	047B3204
CBA S-02	Auxiliary contact, 2NC (31-32, 41-42), side mounting, max one pr circuit breaker. Can also be mounted onto an alarm contact CBT S-	047B3205
CBT 1T-1A	Trip alarm contact (make, 27-28) + Auxiliary contact 1NC (11-12), front mounting max one pr circuit breaker.	047B3206
CBT 2TA	Trip alarm contact (make, 27-28) + Auxiliary contact 1NO (13-14), front mounting max one pr circuit breaker.	047B3207
CBT S-2TM	Trip alarm contact (make, 57-58) + Magnetic alarm contact (make, 67-68), side mounting always direct onto the circuit breaker. Can also be mounted together with CBA S-	047B3208
CBT S-1T-1M	Trip alarm contact (make, 57-58) + Magnetic alarm contact (break, 65-66), side mounting always direct onto the circuit breaker. Can also be mounted together with CBA S-	047B3209
CBT S-1M-1T	Magnetic alarm contact (make, 67-68) + Trip alarm contact (break, 55-56), side mounting always direct onto the circuit breaker. Can also be mounted together with CBA S-	047B3210
CBT S-TM2	Trip alarm contact (make, 55-56) + Magnetic alarm contact (break, 65-66), side mounting always direct onto the circuit breaker. Can also be mounted together with CBA-S	047B3211
CBT S-1M-1M	Magnetic alarm contact (make, 77-78) + Magnetic alarm contact (break, 65-66), side mounting always direct onto the circuit breaker. Can also be mounted together with CBA S-	047B3212

*Under voltage- and voltage trips to circuit breakers
CTI 25M-MB, CTI 45MB*


VTU-



VT-

Type	Remarks	Code no.
VTU	Under voltage trip, 21V/50Hz-24V/60Hz, D1-D2	047B3213
VTU	Under voltage trip, 24V/50Hz-28V/60Hz, D1-D2	047B3214
VTU	Under voltage trip, 105V/50Hz-120V/60Hz, D1-D2	047B3215
VTU	Under voltage trip, 220-230V/50Hz, D1-D2	047B3217
VTU	Under voltage trip, 240-260V/60Hz, D1-D2	047B3218
VTU	Under voltage trip, 240V/50Hz-277V/60Hz, D1-D2	047B3219
VTU	Under voltage trip, 380-400V/50Hz, 440-460V/60Hz, D1-D2	047B3220
VTU	Under voltage trip, 415V/50Hz-480V/60Hz, D1-D2	047B3221
VT	Voltage trip, 21V/50Hz-24V/60Hz, C1-C2	047B3231
VT	Voltage trip, 24V/50Hz-28V/60Hz, C1-C2	047B3232
VT	Voltage trip, 105V/50Hz-120V/60Hz, C1-C2	047B3233
VT	Voltage trip, 220-230V/50Hz, C1-C2	047B3235
VT	Voltage trip, 240-260V/60Hz, C1-C2	047B3236
VT	Voltage trip, 240V/50Hz-277V/60Hz	047B3237
VT	Voltage trip, 380-400V/50Hz, 440-460V/60Hz, C1-C2	047B3238
VT	Voltage trip, 415V/50Hz-480V/60Hz, C1-C2	047B3239

Ordering


Anti tamper shield


 BLK
RLK-


LA

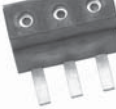

 BDH
RDH

 BMP
RMP

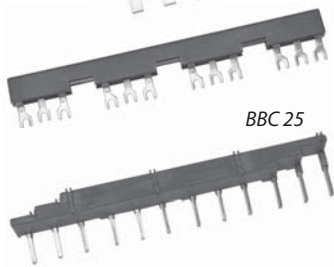
Door handle extension



BBT 25



BBT 45



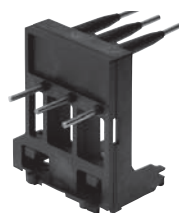
BBC 25


Accessories for circuit breakers CTI 25M-MB, CTI 45MB

Type	Remarks	Code no.
	Anti tamper shield against inadvertent adjustment of current setting	047B3241
BLK	Black lockable rotary handle	047B3243
RLK 25	Red/ yellow lockable rotary handle for CTI 25M-MB	047B3245
RLK 45	Red/yellow lockable rotary handle for CTI 45MB	047B3247
LA	Locking bracket for max three padlock	047B3248
BDH	Black door handle for mounting in panel doors IP 66	047B3249
RDH	Red/ yellow door handle for mounting in panel doors IP 66	047B3250
	Extension rod for door handle BDH and RDH	047B3136
BMP	Black marking plate for BDH	047B3252
RMP	Red/ yellow marking plate for RDH	047B3254
	Screw mounting bracket for circuit breaker	047B3256
	Connection module between CTI 25MB and CI 4- contactors	047B3258
CTC 25-15	Connection module between CTI 25M-MB and CI 6-15 contactors	047B3290
CTC 25-30	Connection module between CTI 25M-MB and CI 16-30 contactors	047B3291

Connection terminal blocks and bus bars for circuit breakers CTI 25M-MB, CTI 45MB

Type	Remarks	Code no.
BBT 25	Connection terminal block for CTI 25M-MB	047B3259
BBT 45	Connection terminal block for CTI 45MB	047B3260
BBC 25 45-2	Bus bar for CTI 25M-MB	047B3261
BBC 25 45-3	Bus bar for CTI 25M-MB	047B3262
BBC 25 45-4	Bus bar for CTI 25M-MB	047B3263
BBC 25 45-5	Bus bar for CTI 25M-MB	047B3264
BBC 25 54-2	Bus bar for CTI 25M-MB	047B3265
BBC 25 54-3	Bus bar for CTI 25M-MB	047B3266
BBC 25 54-4	Bus bar for CTI 25M-MB	047B3267
BBC 25 54-5	Bus bar for CTI 25M-MB	047B3268
BBC 25 54-2B	Bus bar for CTI 25M-MB	047B3269
BBC 25 63-2	Bus bar for CTI 25M-MB	047B3270
BBC 25 63-3	Bus bar for CTI 25M-MB	047B3271
BBC 25 63-4	Bus bar for CTI 25M-MB	047B3272
BBC 25 63-5	Bus bar for CTI 25M-MB	047B3273
BBC 45 54-3	Bus bar for CTI 45MB	047B3274
BBC 45 54-4	Bus bar for CTI 45MB	047B3275
BBC 45 63-3	Bus bar for CTI 45MB	047B3276
BBC 45 63-4	Bus bar for CTI 45MB	047B3277
	Terminal covers for bus bars BBC 25	047B3279
	Terminal covers for bus bars BBC 45	047B3281



CTC

Ordering

 CBI 100-
CBI 100 UI-

 CBI 100 UA-
CBI 100 AA-


CBI 100- LK


 CBI 100-BDH
CBI 100-RDH

 BMP
RMP

 Door handle
extension

Accessories for circuit breaker CTI 100

Type	Remarks	Code no.
CBI 100-20	Auxiliary contact, 2NO (13-14, 23-24), for front mounting	047B3110
CBI 100-02	Auxiliary contact, 2NC (11-12, 21-22), for front mounting	047B3111
CBI 100-11	Auxiliary contact, 1NO+1NC (13-14, 21-22), for front mounting	047B3112
CBI 100 UI-20	Thermal alarm contact (make, 37-38) + Magnetic alarm contact (make, 43-44)	047B3116
CBI 100 UI-02	Thermal alarm contact (break, 35-36) + Magnetic alarm contact (break, 41-42)	047B3117
CBI 100 UI-11	Thermal alarm contact (break, 35-36) + Magnetic alarm contact (make, 43-44)	047B3118
CBI 100 UI2-11	Thermal alarm contact (make, 37-38) + Magnetic alarm contact (break, 41-42)	047B3119
CBI 100-UA	CBI 100-UA Under voltage trip, 24V/50Hz-28V/60Hz, D1-D2, (with 1NO, 43-44)	047B3123
CBI 100-UA	Under voltage trip, 110V/50Hz-127V/60Hz, D1-D2, (with 1NO, 43-44)	047B3124
CBI 100-UA	Under voltage trip, 220-230V/50Hz-240-260V/60Hz, D1-D2, (with 1NO, 43-44)	047B3125
CBI 100-AA	Voltage trip, 24V/50Hz-28V/60Hz, C1-C2, (with 1NO, 43-44)	047B3130
CBI 100-AA	Voltage trip, 110V/50Hz-127V/60Hz, C1-C2, (with 1NO, 43-44)	047B3131
CBI 100-AA	Voltage trip, 220-230V/50Hz-240-260V/60Hz, C1-C2, (with 1NO, 43-44)	047B3132
CBI 100-LK	Black lockable knob for mounting direct on CTI 100	047B3127
CBI 100-LK	Red/yellow lockable knob for mounting direct on CTI 100	047B3129
CBI 100-BDH	Black lockable door handle for mounting on panel doors IP 66	047B3133
CBI 100-RDH	Red/yellow lockable door handle for mounting on panel doors IP 66	047B3134
	Door handle extension rod for CBI 100-BDH	047B3136

Features


- Status indication ON-OFF-TRIP
- For maintenance purposes locking facility up to 3 padlocks
- Sealed cover
- High protection degree IP 65
- Cable entries top and bottom M20/25

- Mounted with DIN-rail
- Mounted with earth terminal
- Possible installation of auxiliary and trip contacts
- Space for under voltage and voltage trips

Used as

- manual motor starter
- mains isolator
- maintenance switch
- emergency switch together with under voltage trip

Used on

- Small workshops for drilling machines
- Concrete mixer
- Air handling units
- Water booster systems
- Fan systems
- Transport belt

Description

Enclosures for the circuit breaker CTI 25M is made of deform-resistant grey ABS thermoplast.

The enclosures are available with black rotary handle on a grey background or with red rotary handle on a yellow background.

Circuit breaker type CTI 25M for overload protection of electric motors from 0.1 to 25 Amp. full load current can be mounted into the enclosure.

Ordering

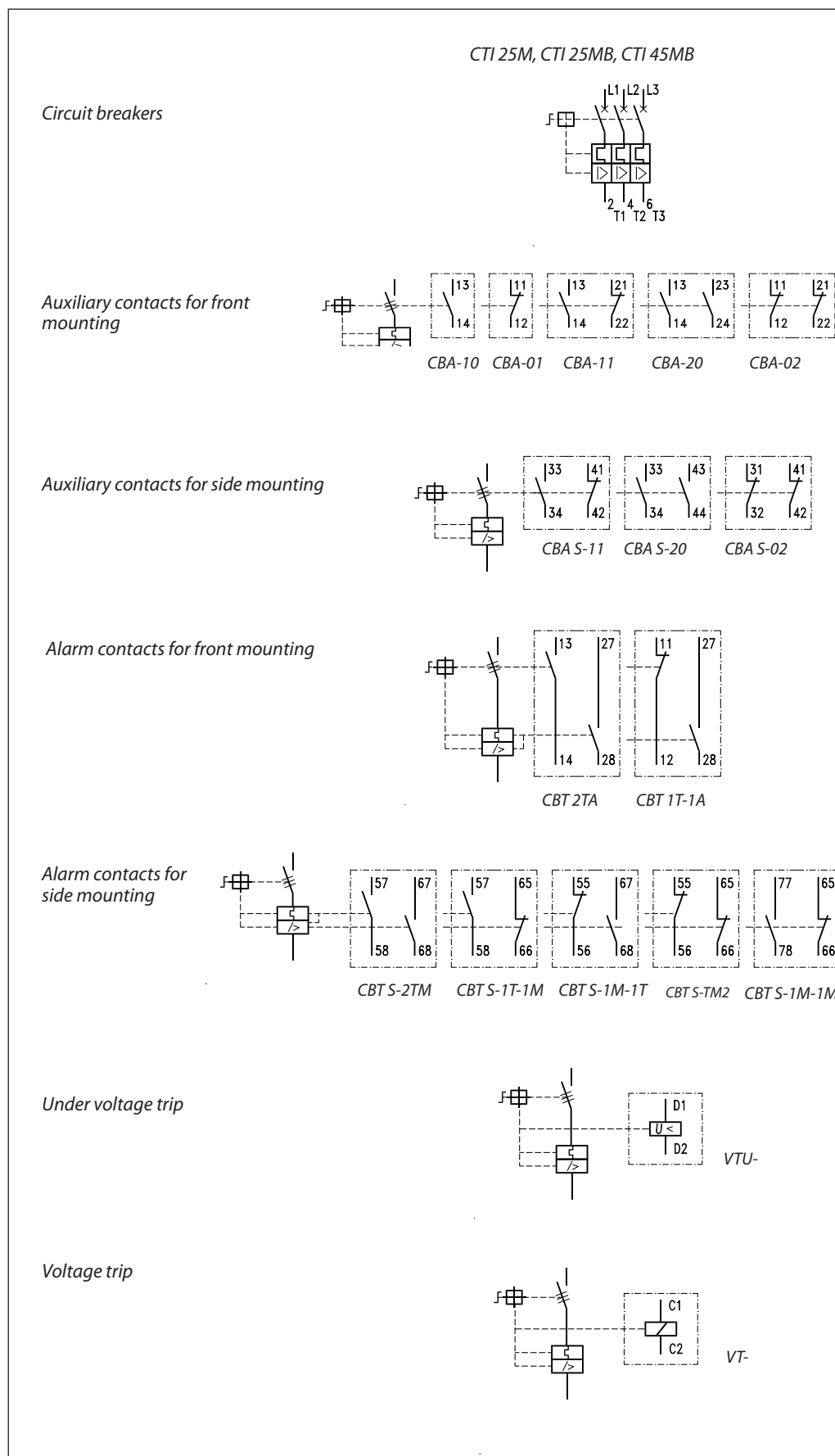
Enclosures for CTI 25M

Application	Rotary handle	Cable entries	Code no.	Type
Motor starter/ Main switch	Black/gey	4 M20/25	047B3284	BMG
Motor starter/ Emergency switch	Red/grey	4 M20/25	047B3285	BMY

Note!

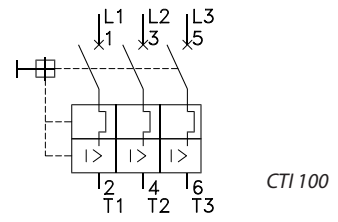
For motors with full load currents higher or equal with 19 Amp., CTI 25M 047B3152 (18-25A) must be selected.

Contact symbols for CTI and accessories

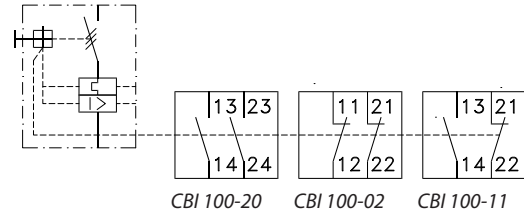


Contact symbols for CTI 100 and accessories

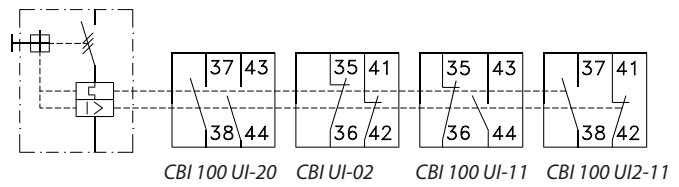
Circuit breaker



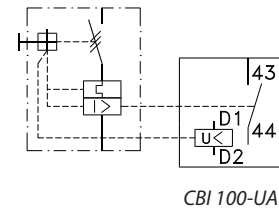
Auxiliary contacts



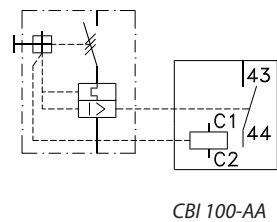
Alarm contacts



Under voltage trip



Voltage trip



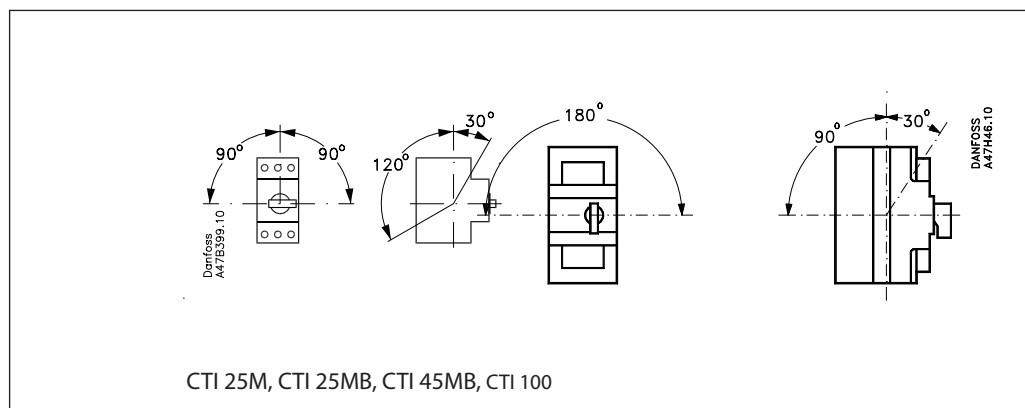
Approvals

Product type \ Approval institute				UK	Germany	France
	EN60947	Canada	USA	Lloyds Register of Shipping	Germanischer Lloyd	Bureau Veritas
CTI 25M	●	●	●	□	□	□
CTI 25MB	●	●	●	□	□	□
CTI 45MB	●	●	●	□	□	□
CBA-	●	●	●	□	□	□
CBA S-	●	●	●	□	□	□
CBT-	●	●	●	□	□	□
CBT S-	●	●	●	□	□	□
VTU-	●	●	●	□	□	□
VTU 2EM-	●	●	●	□	□	□
VT-	●	●	●	□	□	□
BLK	●	●	●	□	□	□
RLK	●	●	●	□	□	□
BDH	●	●	●	□	□	□
RDH	●	●	●	□	□	□
BMP	●	●	●	□	□	□
RMP	●	●	●	□	□	□
BBT-	●	●	●	□	□	□
BBC-	●	●	●	□	□	□
CTI 100	●	●	●	●	●	●
CBI 100-	●	●	●	●	●	●
CBI 100 UI-	●	●	●	●	●	●
CBI 100 UA-	●	●	●	●	●	●
CBI 100 AA-	●	●	●	●	●	●
CTC	●	●	●	□	□	□

- Approved
- Approvals applied for

General specifications

Parametre	CTI 25M, CTI 25MB CTI 45MB	CTI 100
Isolation voltage IEC, SEV, VDE 0660 UL, CSA	690V 600V	
Impulse voltage U_{imp} /pollution degree	6kV/3	8kV/3
Rated frequency range	50-60 Hz	40-60 Hz
Ambient temperature Storage Operation Temperature compensation	-40 ⁰ C ... +80 ⁰ C -25 ⁰ C ... +60 ⁰ C -20 ⁰ C ... +60 ⁰ C	
Utilization category	As circuit breaker IEC 947-2 As motor starter IEC 947-4-1	
Overload protection	Motors	Motors
Trip class	10	10
Magnetic trip	13 x (max. value of the setting range) CTI 25M, CTI 25MB, CTI 45MB	14x (max. value of setting range)
Phase failure protection	Yes	Yes
Mechanical operations	100000	30000
Electrical operations	30000	10000 5000 (63-90)
Switching frequency	Max 25 operations/hour	20 operations./hour
Resistance to climate change	according to IEC 68-2	
Site altitude	2000 m N.N	
Protection class	IP 20	
Resistance to vibration	IEC 68-2	
Resistance to shock	30g, 11 ms	30 g, 11 ms
Life span	0.1...25A	40...90A
Total power loss	6-8 W	33W

Mounting direction


Max. motor load

*Circuit breaker for overload- and short circuit protection of motor applications
CTI 25M, CTI 25MB, CTI 45MB, CTI 100*

Type	Setting A	Motor operating voltage – Rated output in kW							
		220-240V		380-415V		500V		690V	
		AC-2	AC-3	AC-2	AC-3	AC-2	AC-3	AC-2	AC-3
CTI 25M	0.1-0.16	-	-	-	0.02	-	-	-	-
	0.16-0.25	-	-	-	0.06	-	-	-	-
	0.25-0.4	-	-	-	0.09	-	-	-	-
	0.40-0.63	0.06	0.09	0.12	0.18	-	0.18	-	0.25
	0.63-1.0	-	0.12	-	0.25	0.25	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	-	0.75	-	1.1	-	1.8
	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	3	-	4
	6.3-10	-	2.2	3	4	4	6.3	5.5	7.5
	10-16	3	4	5.5	7.5	7.5	10	11	13
	14.5-20	4	5.5	7.5	10	-	11	15	17
18-25	-	-	-	11	-	15	18.5	22	
CTI 25MB	1.6-2.5	-	0.37	-	0.75	-	1.1	-	1.8
	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	3	-	4
	6.3-10	-	2.2	3	4	4	6.3	5.5	7.5
	10-16	3	4	5.5	7.5	7.5	10	11	13
	14.5-20	4	5.5	7.5	10	-	11	15	17
	18-25	-	-	-	11	-	15	18.5	22
CTI 45MB	6.3-10	-	2.2	3	4	4	6.3	5.5	7.5
	10-16	3	4	5.5	7.5	7.5	10	11	13
	14.5-20	4	5.5	7.5	10	-	11	15	17
	18-25	5.5	6.3	-	11	-	15	18.5	22
	23-32	-	7.5	-	15	15	20	22	25
CTI 100	32-45	11	13	18.5	22	22	30	30	40
	40-63	12.5	20	25	31.5	30	40	37	55
	63-90	22	25	37	45	45	55	63	75

Accessories for circuit breakers CTI 25M-MB
Auxiliary and trip contacts CBA-, CBA S-, CBT-, CBT S-

Type	Description	I _{th}		AC-15					DC-13			
		40°C A	60°C A	24V A	120V A	220-240V A	380-415V A	690V A	24V A	120V A	240V A	415V A
CBA-	Auxiliary contacts for front mounting	5	4	4	3	1.5	-	-	2	0.5	0.25	-
CBT-	Trip contacts for front mounting	5	4	4	3	1.5	-	-	2	0.5	0.25	0.15
CBA S-	Auxiliary contacts for side mounting	10	6	6	5	3	2	0.7	2	0.5	0.25	0.15
CBT S-	Trip contacts for side mounting	10	6	6	5	3	2	0.7	2	0.5	0.25	0.15

Bus bar terminal and Bus bar connection

Type	Description	Max. load I _{th} at 60°C A
BBT 25	Bus bar terminal for CTI 25M, CTI 25MB	63
BBC 25	Bus bar connection for CTI 25M, CTI 25MB	63
BBT 45	Bus bar terminal for CTI 45MB	120
BBC 45	Bus bar connection for CTI 45MB	120

Voltage- and under voltage trip VT-, VTU-, VTU 2EM

Type	Description	Operating voltage range	Coil consumption
VT-	Voltage trip 21 V/50Hz-415V/50Hz 24V/60Hz-480V/60Hz (max 300V UL) Endurance 100%	Pull-in 0.85-1.1xU _S Drop-out 0.7-0.35x U _S	Pull-in: 8.5VA, 6W Hold: 3VA, 1.2W
VTU-	Under voltage trip 21 V/50Hz-415V/50Hz 24V/60Hz-480V/60Hz (max 300V UL) Endurance 100%	Pull-in 0.85-1.1xU _S Drop-out 0.7-0.35x U _S	Pull-in: 8.5VA, 6W Hold: 3VA, 1.2W
VTU 2EM-	Under voltage trip with two EM contact 21 V/50Hz-415V/50Hz 24V/60Hz-480V/60Hz (max 300V UL) Endurance 100%	Pull-in 0.85-1.1xU _S Drop-out 0.7-0.35x U _S	Pull-in: 8.5VA, 6W Hold: 3VA, 1.2W

Accessories for circuit breaker CTI 100
Auxiliary contacts and alarm contacts CBI 100-, CBI 100 UI-

Type	Description	I _{th}		AC-15				DC-13			
		40°C	60°C	220-240V	380-415V	500V	690V	24V	48V	110V	220V
		A	A	A	A	A	A	A	A	A	A
CBI 100-	Auxiliary contact	10	6	3	2.5	1.5	0.75	2	0.6	0.2	0.1
CBI 100 UI-	Alarm contact	10	6	3	2.5	1.5	0.75	2	0.6	0.2	0.1

Alarm contact in undervoltage- and voltage trip

Type	Description	I _{th}	AC-14					DC-13			
		60°C	24V	110V	220-240V	380-415V	500V	24V	48V	60V	110V
		A	A	A	A	A	A	A	A	A	A
CBI 100- AA	Voltage trip	2	1.5	1.5	1	1	0.75	1.5	0.5	0.4	0.2
CBI 100- UA	Undervoltage trip	2	1.5	1.5	1	1	0.75	1.5	0.5	0.4	0.2

Voltage- and under voltage trip CBI 100-AA and CBI 100-UA

Type	Remarks	Voltage range	Coil consumption
CBI 100-AA	Voltage trip 21 V/50Hz-415V/50Hz Switch-in voltage 24V/60Hz-480V/60Hz (max 300V UL) Endurance 100%	Switch-in power: 0.85-1.1xU _s Drop-out voltage 0.7-0.35x U _s 3VA, 1.2W	8.5VA, 6W Holding power
CBI 100-UA	Under voltage trip 21 V/50Hz-415V/50Hz Switch-in voltage 24V/60Hz-480V/60Hz (max 300V UL) Endurance 100%	Switch-in power: 0.85-1.1xU _s Drop-out voltage 0.7-0.35x U _s 3VA, 1.2W	8.5VA, 6W Holding power

Terminals

Type	Comments	Recommended screwdriver size	Solid wire mm ²	Stranded wire mm ²	Stranded wire with sleeve mm ²	Tightening torque Nm
CTI 25M	1 conductor or 2 conductors	Pozi 2/ blade 3	1.5-6	1-6	1-4	1-2.5
CTI 25MB	1 conductor or 2 conductors	Pozi 2/ blade 3	1.5-6	1-6	1-4	1-2.5
CBA-	1 conductor or 2 conductors	Pozi 2/ blade 3	0.75-2.5	0.75-2.5	0.5-2.5	1.5
CBA S-	1 conductor or 2 conductors	Pozi 2/ blade 3	0.75-2.5	0.75-2.5	0.5-2.5	1.5
CBT-	1 conductor or 2 conductor s	Pozi 2/ blade 3	0.75-2.5	0.75-2.5	0.5-2.5	1.5
CBT S-	1 conductor or 2 conductors	Pozi 2/ blade 3	0.75-2.5	0.75-2.5	0.5-2.5	1.5
VT-	1 conductor or 2 conductors	Pozi 2/ blade 3	0.75-2.5	0.75-2.5	0.5-2.5	1.5
VTU-	1 conductor or 2 conductors	Pozi 2/ blade 3	0.75-2.5	0.75-2.5	0.5-2.5	1.5
CBA-	1 conductor or 2 conductors	Pozi 2/ blade 3	0.75-2.5	0.75-2.5	0.5-2.5	1.5
BBT 25	1 conductor	Pozi 2/ blade 3	6-25	6-25	4-16	3
BBT 25	2 conductors	Pozi 2/ blade 3	6-16	6-16	4-10	3
BBT 45	1 conductor	Pozi 2/ blade 4	10-50	10-50	6-35	3
BBT 45	2 conductors	Pozi 2/ blade 4	10-25	10-25	6-16	3
CTI 100	1 conductor	Allen key 5	-	4-50	2.5-35	6-10
CBI 100-	2 conductors	Pozi 2/ blade 3	-	0.75-2.5	0.75-2.5	1-1.5
CBI 100 UI-	2 conductors	Pozi 2/ blade 3	-	0.75-2.5	0.75-2.5	1-1.5
CBI 100 UA-	2 conductors	Pozi 2/ blade 3	-	0.75-2.5	0.75-2.5	1-1.5
CBI 100 AA-	2 conductors	Pozi 2/ blade 3	-	0.75-2.5	0.75-2.5	1-1.5

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)

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 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
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
I_r -current	The I_r -current is a short circuit test current. The size of the I_r -current is determined 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.
gL fuse	Indicates full short circuit protection at voltages 250V, 400V, 500V and 690V
gL fuse	Indicates full short circuit protection of wires.
gG fuse	Indicates full short circuit protection at general applications. (Will replace gL- and gL-fuses)
T fuse	Description of an English standard fuse.
BS 88	British Standard for smeltesikringer

Contactor size	Prospective short circuit test current
Rated current at AC-3 load	I_r in kA
$0 < I_e < 16$	1
$16 < I_e < 63$	3
$63 < I_e < 125$	5
$125 < I_e < 315$	10
$315 < I_e < 630$	18
$630 < I_e < 1000$	30

Back-up fuses type gG, gL
and $I_{cc} > I_{cu}$

Type	Setting A	220-240 V A	380-415V A	440-460V A	500V A	690V A	
CTI 25M	0.1-0.16						
	0.16-0.25						
	0.25-0.4						
	0.4-0.63						
	0.63-1.0						
	1.0-1.6					16	
	1.6-2.5					20	
	2.5-4.0					35	
	4.0-6.3					50	
	6.3-10				63	80	50
	10-16			80	63	80	63
14.5-20		100	100	80	80	63	
18-25		100	100	80	80	63	
CTI 25MB	1.6-2.5					20	
	2.5-4.0					35	
	4.0-6.3					50	
	6.3-10					50	
	10-16				80	80	63
	14.5-20			100	100	80	63
	18-25			100	100	80	63
CTI 45MB	6.3-10		80	80	80	63	
	10-16		100	100	100	80	
	14.5-20		100	100	100	80	
	18-25		100	100	100	80	
	23-32		125	125	125	100	
CTI 100	32-45		125	125	125	100	
	40-63		160	160	160	160	
	63-90		160	160	160	160	

■ No fuse required

Circuit breaker for motor
applications

Type	Thermal setting range A	Magnetic Trip current A	Breaking capacity in kA									
			220-240V		380-415V		440-460V		500V		690V	
			I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
CTI 25M	0.1-0.16	2.1	100	100	100	100	100	100	100	100	100	100
	0.16-0.25	3.3	100	100	100	100	100	100	100	100	100	100
	0.25-0.40	5.2	100	100	100	100	100	100	100	100	100	100
	0.40-0.63	8.2	100	100	100	100	100	100	100	100	100	100
	0.63-1.0	13	100	100	100	100	100	100	100	100	100	100
	1.0-1.6	21	100	100	100	100	100	100	100	100	8	8
	1.6-2.5	33	100	100	100	100	100	100	100	100	8	8
	2.5-4.0	52	100	100	100	100	100	100	100	100	8	8
	4.0-6.3	82	100	100	100	100	100	100	100	100	4	4
	6.3-10	130	100	100	100	100	50	50	50	50	4	4
	10-16	208	100	100	50	50	10	6	10	6	3	3
	14.5-20	260	50	50	15	15	10	6	6	6	3	3
18-25	325	50	50	15	15	10	6	6	6	3	3	
CTI 25MB	1.6-2.5	33	100	100	100	100	100	100	100	100	10	10
	2.5-4.0	52	100	100	100	100	100	100	100	100	10	10
	4.0-6.3	82	100	100	100	100	100	100	100	100	10	10
	6.3-10	130	100	100	100	100	100	100	100	100	6	6
	10-16	208	100	100	100	50	65	50	50	50	6	4
	14.5-20	260	100	100	65	25	65	25	50	25	6	4
	18-25	325	100	100	65	25	65	25	50	25	6	4
CTI 45MB	6.3-10	130	100	100	65	50	65	50	50	50	10	6
	10-16	208	100	100	65	50	65	50	50	50	10	6
	14.5-20	260	100	100	65	25	65	50	50	50	10	6
	18-25	325	100	100	65	50	65	50	50	50	10	6
	23-32	416	100	100	65	50	65	50	50	50	10	6
CTI 100	32-45	585	100	100	65	50	50	50	50	50	10	6
	40-63	882	100	100	65	50	30	25	30	25	8	6
	63-90	1260	100	100	50	25	25	13	25	13	6	6

UL/CSA specifications
Auxiliary contacts and alarm contacts CBA-, CBA S-, CBT-, CBT S-, CBI 100-, CBI 100 UI-

Type	Description	AC	DC	Max back up fuse type gG, gL
CBA-	Auxiliary contacts for front mounting	B300	Q300	0A
CBT-	Alarm contacts for front mounting	B300	Q300	
CBA S-	Auxiliary contacts for side mounting	B600	Q600	
CBT S-	Alarm contacts for side mounting	B600	Q600	
CBI 100-	Auxiliary contacts for front mounting	B600	R300	
CBI 100 UI-	Alarm contacts for front mounting	B600	R300	

Terminals

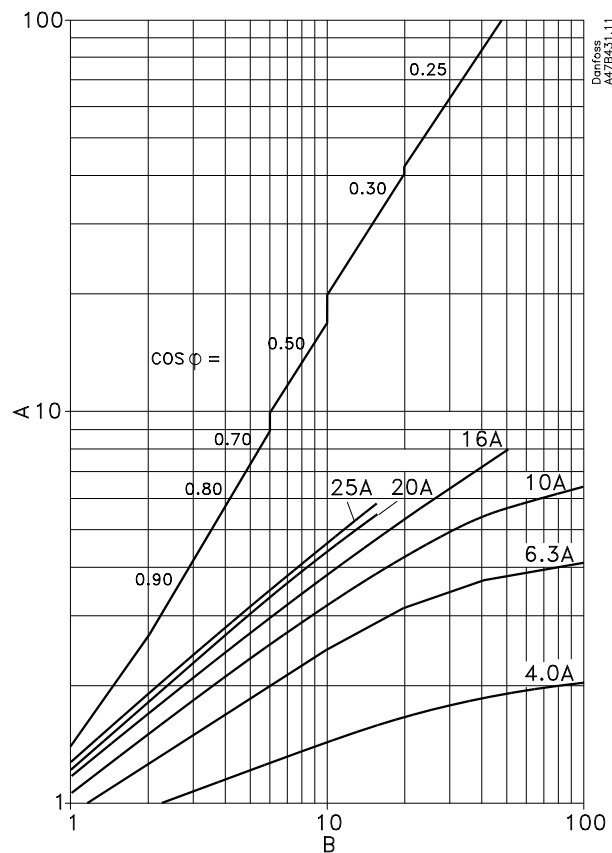
Type	Comments	Recommended screwdriver size	Solid wire AWG	Stranded wire AWG	Stranded wire with sleeve AWG	Tightening torque lb-in
CTI 25M	1 conductor or 2 conductors	Pozi 2/ blade 3	No. 16-8	No. 16-8	No. 16-12	8.9-22
CTI 25MB	1 conductor or 2 conductors	Pozi 2/ blade 3	No. 16-8	No. 16-8	No. 16-12	8.9-22
CTI 45MB	1 conductor	Pozi 2/ blade 4	No. 14-6	No. 14-6	No. 14-8	13-31
CTI 45MB	2 conductors	Pozi 2/ blade 4	No. 14-4	No. 14-4	No. 14-6	13-31
CBA-	1 conductor or 2 conductors	Pozi 2/ blade 3	No. 14-6	No. 14-6	No. 14-8	13.3
CBA S-	1 conductor or 2 conductors	Pozi 2/ blade 3	No. 18-14	No. 18-14	No. 18-14	13.3
CBT-	1 conductor or 2 conductors	Pozi 2/ blade 3	No. 18-14	No. 18-14	No. 18-14	13.3
CBT S-	1 conductor or 2 conductors	Pozi 2/ blade 3	No. 18-14	No. 18-14	No. 18-14	13.3
VT-	1 conductor or 2 conductors	Pozi 2/ blade 3	No. 18-14	No. 18-14	No. 18-14	13.3
VTU-	1 conductor or 2 conductors	Pozi 2/ blade 3	No. 18-14	No. 18-14	No. 18-14	13.3
CBA-	1 conductor or 2 conductors	Pozi 2/ blade 3	No. 18-14	No. 18-14	No. 18-14	13.3
BBT 25	1 conductor	Pozi 2/ blade 3	No. 18-14	No. 18-14	No. 18-14	27
BBT 25	2 conductors	Pozi 2/ blade 3	No. 14-6	No. 14-6	No. 14-8	27
BBT 45	1 conductor	Pozi 2/ blade 4	No. 14-4	No. 14-4	No. 14-6	27
BBT 45	2 conductors	Pozi 2/ blade 4	No. 14-6	No. 14-6	No. 14-8	27
CTI 100	1 conductor	Allen key 5	-	No. 12-2	-	53-120
CBI 100-	2 conductors	Pozi 2/ blade 3	-	No. 18-14	-	8.8-10.3
CBI 100 UI-	2 conductors	Pozi 2/ blade 3	-	No. 18-14	-	8.8-10.3
CBI 100 UA-	2 conductors	Pozi 2/ blade 3	-	No. 18-14	-	8.8-10.3
CBI 100 AA-	2 conductors	Pozi 2/ blade 3	-	No. 18-14	-	8.8-10.3

UL/CSA specifications
Circuit breaker for overload- and short circuit protection of motor applications

Type	Range A	Motor rating in hp							Protection device Max. current A
		1-phase run		3-phase run			Prospective short circuit current kA		
		115V	230V	230V	460V	575V	480V	600V	
CTI 25M	0.1-0.16	-	-	-	-	-	65	47	400
	0.16-0.25	-	-	-	-	-	65	47	
	0.25-0.4	-	-	-	-	-	65	47	
	0.4-0.63	-	-	-	-	-	65	47	
	0.63-1.0	-	-	-	-	1/2	65	47	
	1.0-1.6	-	1/10	-	3/4	3/4	65	47	
	1.6-2.5	-	1/6	1/2	1	1 1/2	65	30	
	2.5-4.0	1/8	1/3	3/4	2	3	65	25	
	4.0-6.3	1/4	1/2	1 1/2	3	5	65	30	
	6.3-10	1/2	1	3	5	7 1/2	65	30	
CTI 25MB	10-16	3/4	2	5	10	10	30	30	400
	14-5-20	1	3	5	-	15	10	10	
	18-25	1 1/2	-	7 1/2	15	20	10	5	
	1.6-2.5	-	1/6	1/2	1	1 1/2	65	30	
	2.5-4.0	1/8	1/3	3/4	2	3	65	30	
	4.0-6.3	1/4	1/2	1 1/2	3	5	65	30	
CTI 45MB	6.3-10	1/2	1	3	5	7 1/2	65	30	500
	10-16	3/4	2	5	10	10	65	30	
	14-5-20	1	3	5	-	15	65	30	
	18-25	1 1/2	-	7 1/2	15	20	65	30	
	23-32	2	5	10	20	25	65	30	
	32-45	3	7 1/2	15	30	40	65	18	
CTI 100	40-63	5	12	22	45	60	65	42	500
	63-90	7.2	20	30	70	85	65	30	

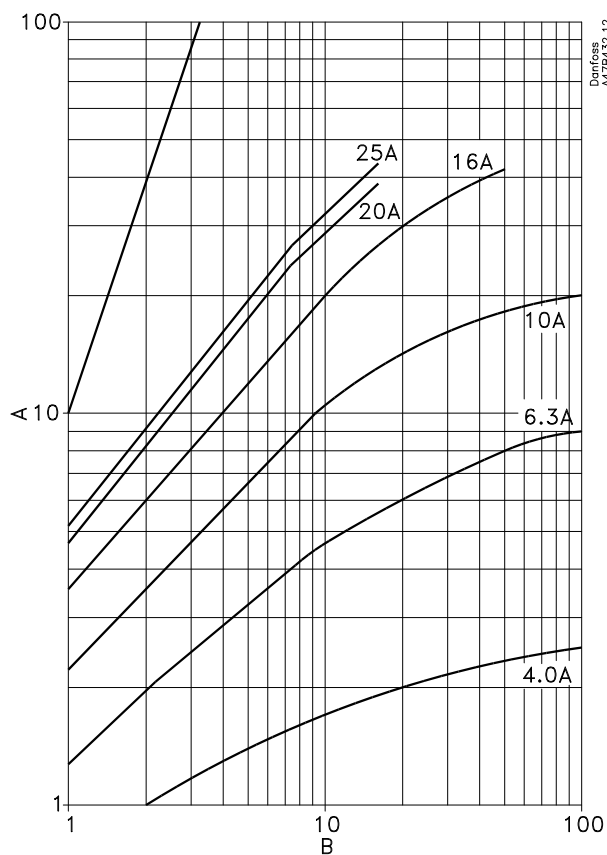
Let-through curves for circuit breakers CTI 25M

Max let-through current for circuit breakers CTI 25M



A: Max let-through current I_D [kA]
 B: The prospective short circuit current at 415V I_{cc} [kA]

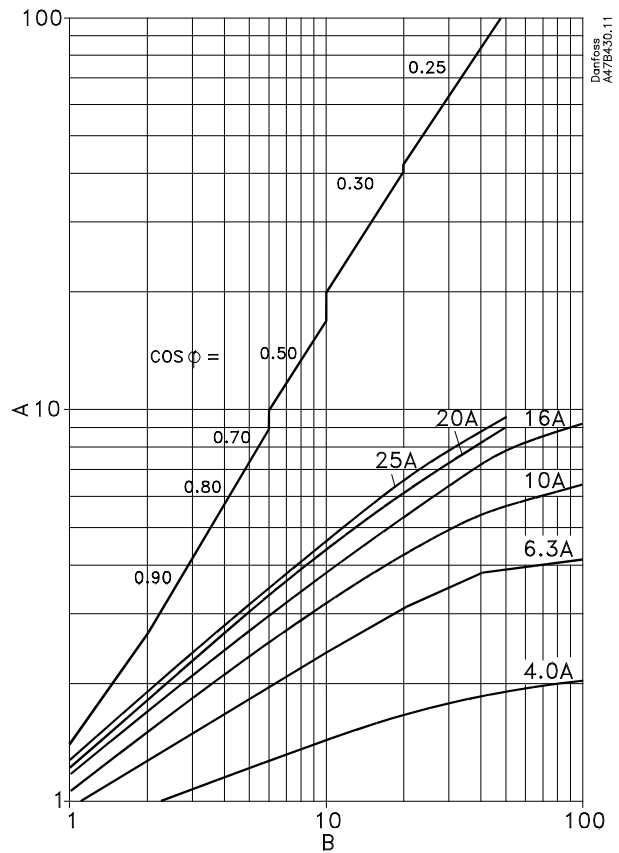
Max let-through energy for circuit breakers CTI 25M



A: Max let-through energy I^2t [kA²s]
 B: The prospective short circuit current at 415V I_{cc} [kA]

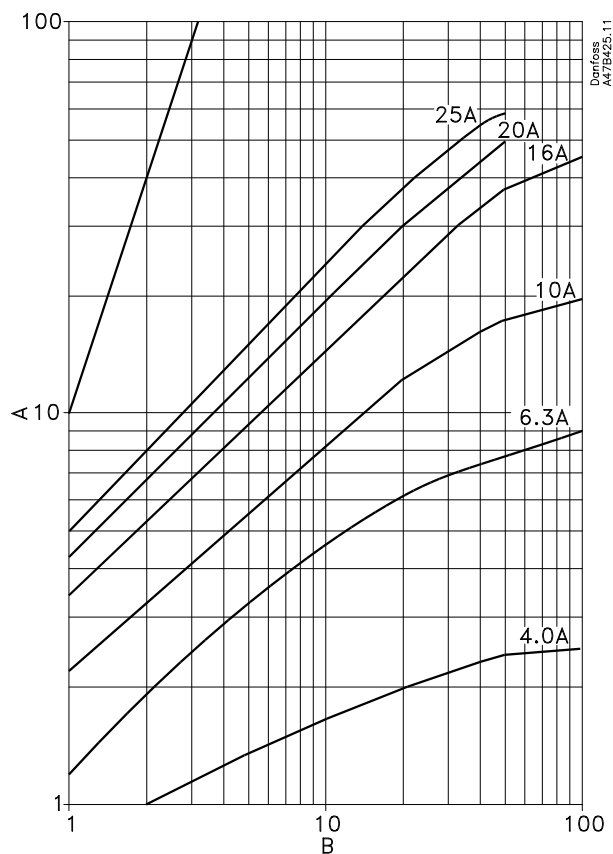
Let-through curves for circuit breakers CTI 25MB

Max let-through current for circuit breaker for circuit breakers CTI 25MB



A: Max let-through current I_D [kA]
 B: The prospective short circuit current at 415V I_{cc} [kA]

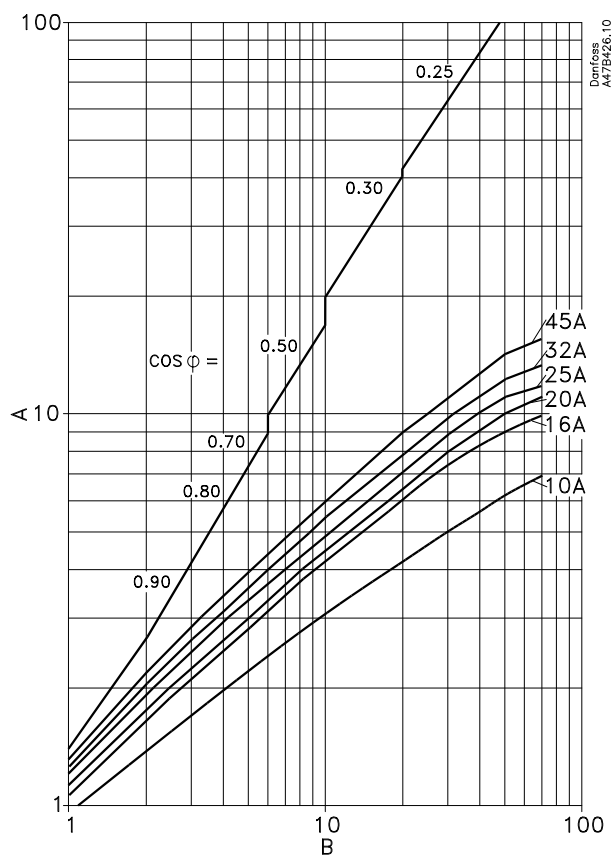
Max let-through energy for circuit breakers CTI 25MB



A: Max let-through energy I^2t [kA²s]
 B: The prospective short circuit current at 415V I_{cc} [kA]

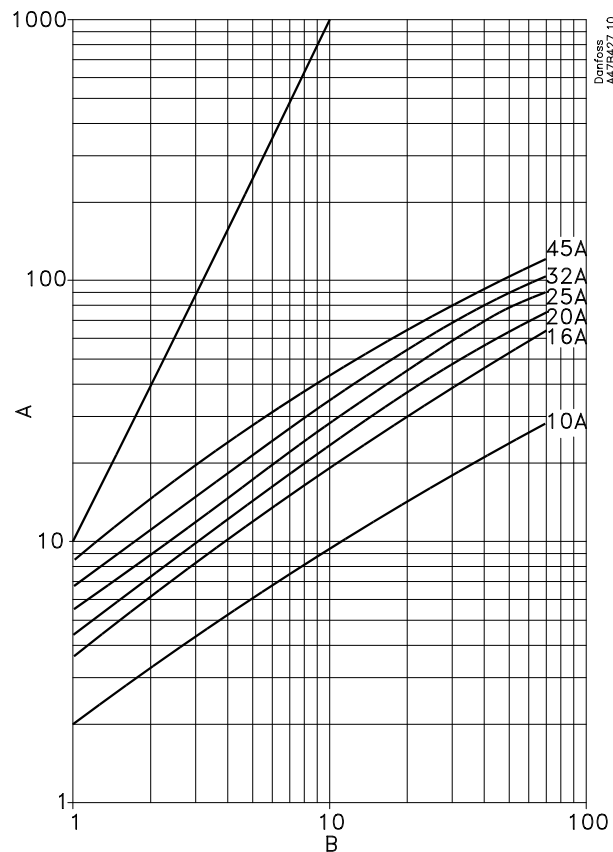
Let-through curves for circuit breakers CTI 45MB

Max let-through current for circuit breakers CTI 45MB



A: Max let-through current I_D [kA]
 B: The prospective short circuit current at 415V I_{cc} [kA]

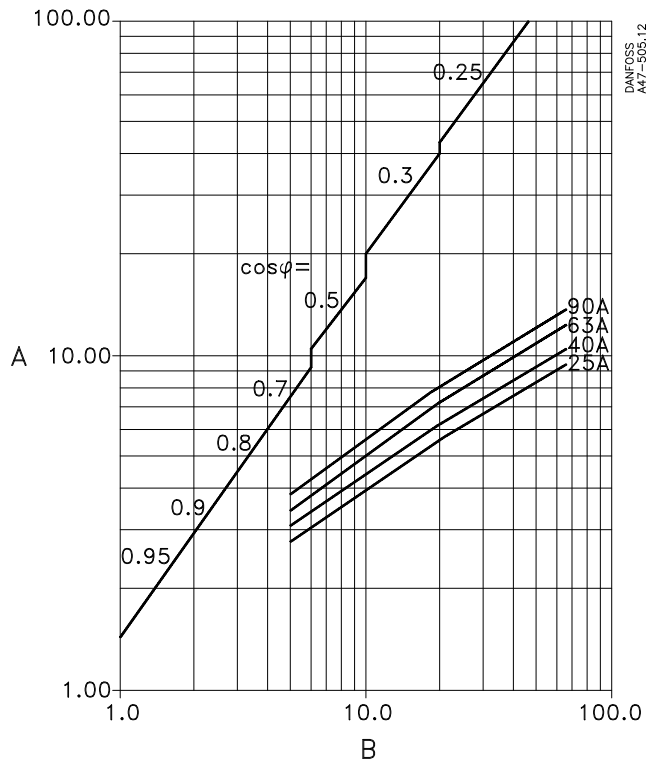
Max let-through energy for circuit breakers CTI 45MB



A: Max let-through current I^2t [kA²s]
 B: The prospective short circuit current at 415V I_{cc} [kA]

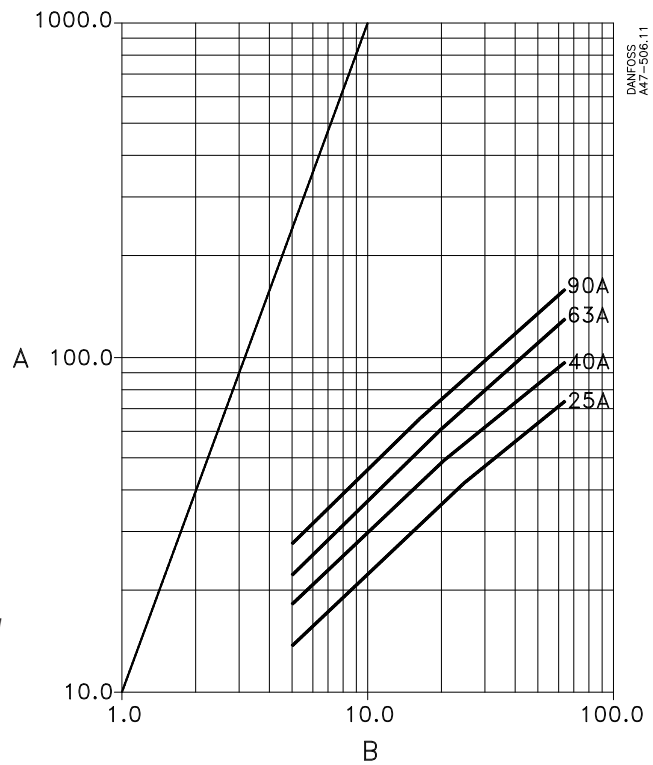
Let-through curves for circuit breakers CTI 100

Max let-through current for circuit breaker CTI 100



A: Max let-through current I_D [kA]
B: The prospective short circuit current at 415V I_{cc} [kA]

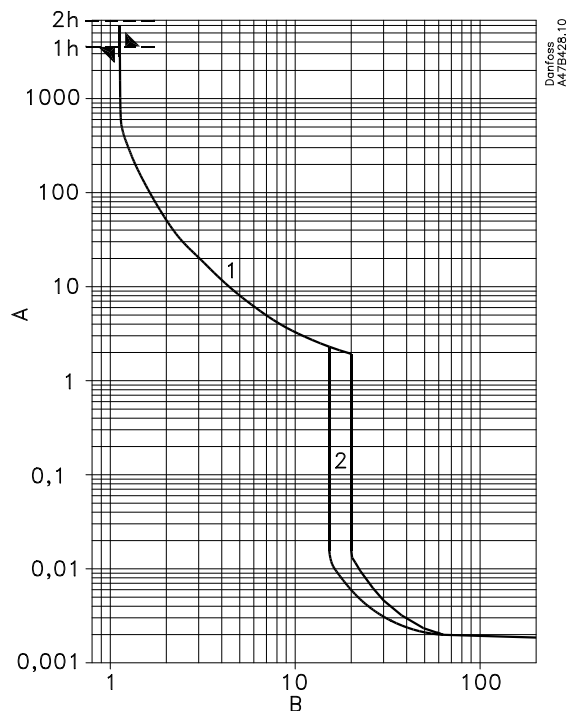
Max let-through energy for circuit breaker CTI 100



A: Max let-through energy I^2t [kA²s]
B: The prospective short circuit current at 415V I_{cc} [kA]

Overload protection of motors

Tripping characteristic for CTI 25M, CTI 25MB



A: Trip time in sec.
B: Times the adjustable current I_{ef}

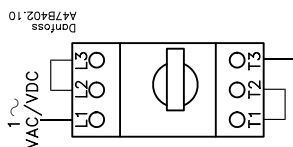
1) Thermal trip

The adjustable bimetals ensure a reliable overload protection of motors. The curve is mean value curve at 20 °C ambient temperature from cold state. It also ensures protection of motors by phase failure (differential trip).

All three bimetals must be connected in series by overload protection of 1-phase motors.

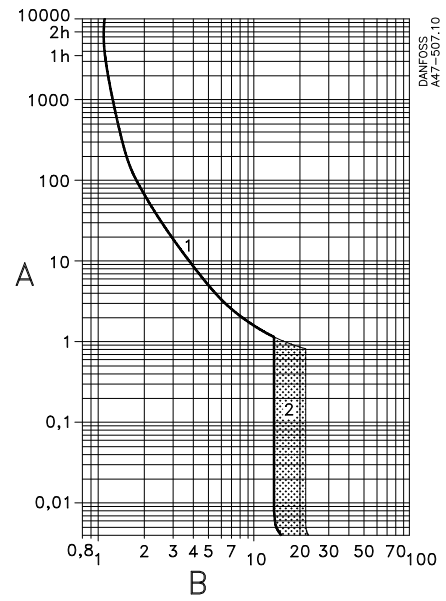
2) Magnetic trip

The electromagnetic trips react at a fixed response current. The size of the fixed response current corresponds typical to 13 times of the maximum range of the circuit breakers CTI 25M, CTI 25MB, CTI 45MB.



Overload protection of motors

Tripping characteristic for CTI 100



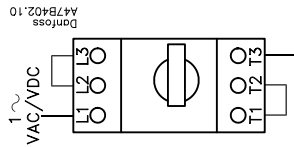
A: Trip times in sec.
B: Times the adjustable current I_{ef}

1) Thermal trip

The adjustable bimetals ensure a reliable overload protection of motors. The curve is mean value curve at 20 °C ambient temperature from cold state. It also ensures protection of motors by phase failure (differential trip). All three bimetals must be connected in series by overload protection of 1-phase motors.

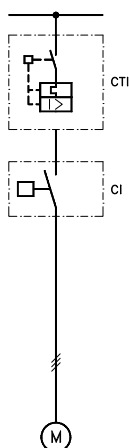
2) Magnetic trip

The electromagnetic trips react at a fixed response current. The size of the fixed response current correspond typical to 13 times of the maximum range of the circuit breakers CTI 25M, CTI 25MB, CTI 45MB.



Coordination without fuse
Circuit breakers and contactors

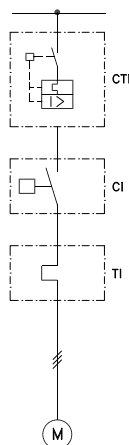
Max. prospective short circuit-current $I_q = 50 \text{ kA}$
 Voltage 380-415 V/50 Hz
 Overload protection CTI 25M-MB, CTI 45MB, CTI 100
 Short-circuit protection CTI 25M-MB, CTI 45MB, CTI 100,
 Short-circuit coordination T1 and T2



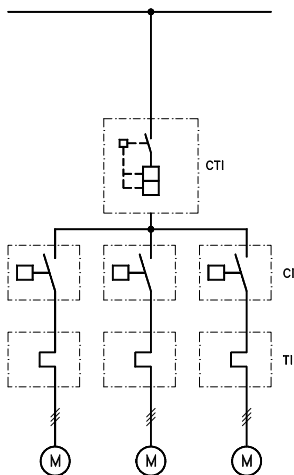
Contactor	Coordination type 1		Coordination type 2	
	$I_r^{(1)}$ and $I_q = 50 \text{ kA}$			
	CTI 25M CTI 25MB	CTI 45MB CTI 100	CTI 25 M	CTI 25MB CTI 45MB CTI 100
Max. CTI range (A)				
CI 4-2, CI 4-5, CI 4-9, CI 4-12	25	45	2.5	2.5
CI 6, CI 9	25	45	2.5	2.5
CI 12, CI 15	25	45	4.0	4.0
CI 16	25	45	6.3	20
CI 20, CI 25	25	45	6.3	25
CI 30	25	45	10	25
CI 32	-	45	-	32
CI 37, CI 45, CI 50	-	90	-	45
CI 61, CI 73, CI 86	-	-	-	90

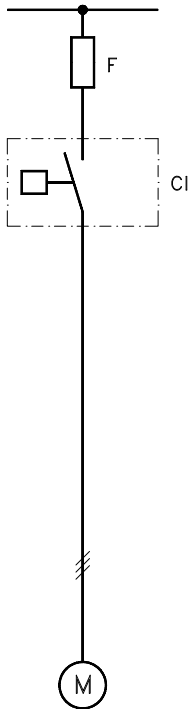
Circuit breakers, contactors and thermal overload relays

Max. prospective short-circuit current $I_q = 50 \text{ kA}$
 Voltage 380-415 V/50 Hz
 Overload protection Thermal overload relay type T1 9C, T1 16C, T1 25C, T1 30C, T1 80
 Short-circuit protection CTI 25M-MB, CTI 45MB, CTI 100
 Short-circuit coordination T1



Contactor	Thermal overload relay range (A)	Coordination type T1 Test current $I_r^{(1)}$ and $I_q = 50 \text{ kA}$ Max. CTI range (A)
CI 4-5, CI 4-9, CI 6, CI 9	0.13 - 0.20	45A
CI 4-5, CI 4-9, CI 6, CI 9	0.19 - 0.29	
CI 4-5, CI 4-9, CI 6, CI 9	0.27 - 0.42	
CI 4-5, CI 4-9, CI 6, CI 9	0.4 - 0.62	
CI 4-5, CI 4-9, CI 6, CI 9	0.6 - 0.92	
CI 4-5, CI 4-9, CI 6, CI 9	0.85 - 1.3	
CI 4-5, CI 4-9, CI 6, CI 9	1.2 - 1.9	63A
CI 4-5, CI 4-9, CI 6, CI 9	1.8 - 2.8	
CI 4-5, CI 4-9, CI 6, CI 9	2.7 - 4.2	
CI 4-5, CI 4-9, CI 6, CI 9	4 - 6.2	
CI 4-9, CI 9	6 - 9.2	
CI 4-12, CI 12, CI 15	8 - 12	
CI 15, CI 16	11 - 16	90A
CI 16, CI 20	15 - 20	
CI 25	19 - 25	
CI 30	24 - 32	
CI 32	22 - 32	
CI 37, CI 45	30 - 45	
CI 50, CI 61	42 - 63	
CI /3	60 - 80	
CI 86	74 - 85	



Coordination with fuse

Contactors

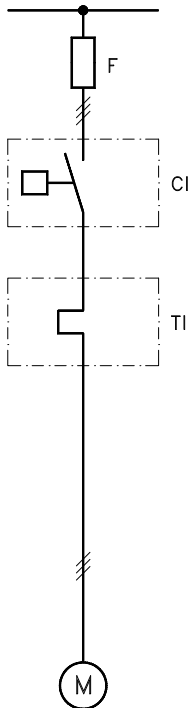
Max. prospective short-circuit current $I_q = 50 \text{ kA}$
 Voltage 380-415 V/50 Hz
 Overload/short-circuit protection gG and T (BS88)
 Short-circuit coordination T1 and T2

Contactor	Short-circuit coordination					
	T1		T2			
	Test current					
	$I_r^{1)}$ and $I_Q = 50 \text{ kA}$		$I_r^{1)}$ and $I_Q = 10 \text{ kA}$		$I_r^{1)}$ and $I_Q = 50 \text{ kA}$	
	gG A	T A	gG A	T A	gG A	T A
CI 4-2, CI 4-5, CI 4-9, CI 4-12	25	32	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	08	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, CI 86	250	-	-	-	160	-
CI 110	250	-	-	-	200	-
CI 141	315	-	-	-	250	-
CC 180 EI	355	-	-	-	315	-
CI 210 EI, CI 250 EI	500	-	-	-	400	-

¹⁾ Short-circuit current according to EN60947-4 (see page 16)

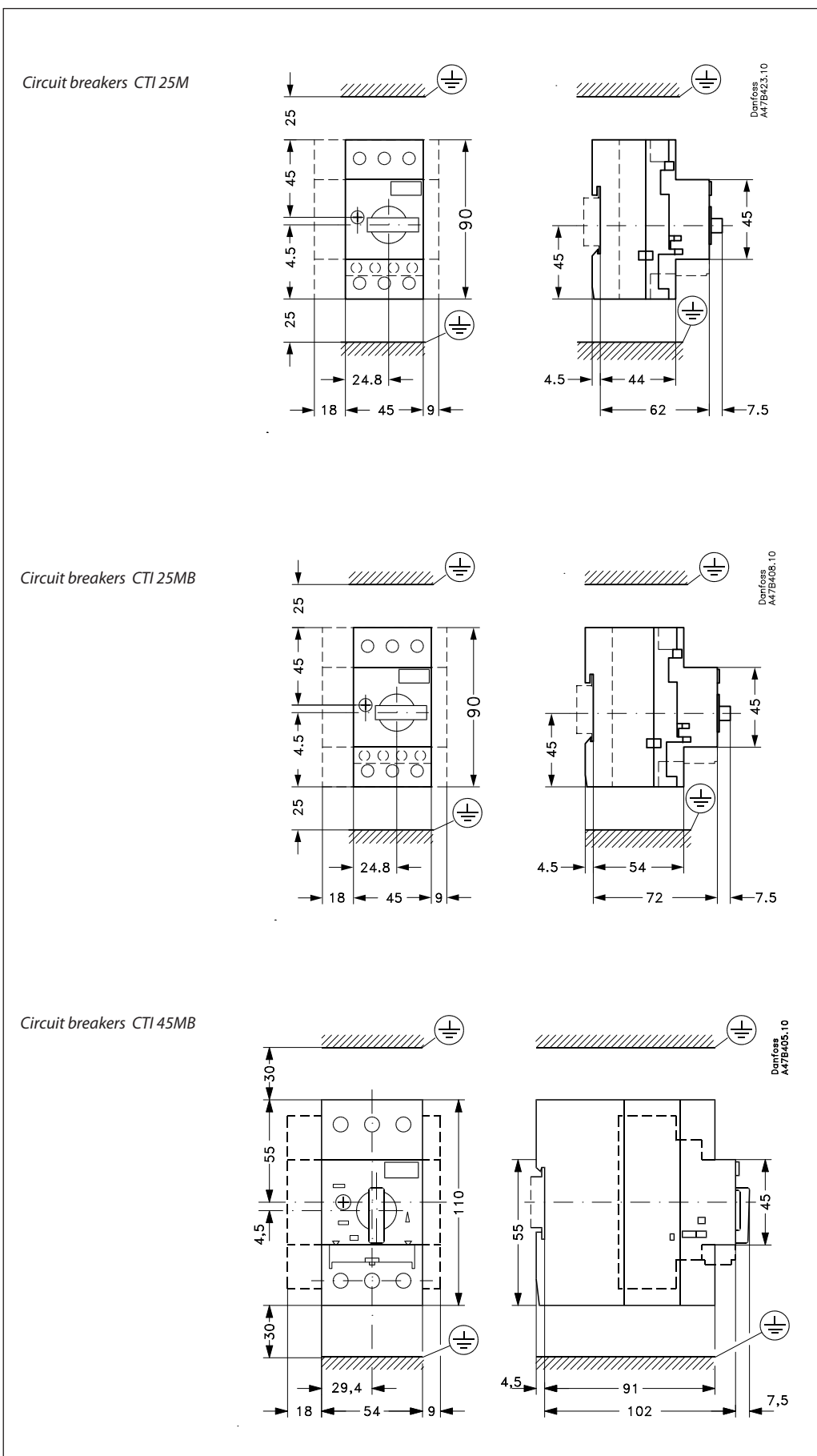
Contactors and thermal overload relays

Max. prospective short-circuit current $I_q = 50 \text{ kA}$
 Voltage 380-415 V/50 Hz
 Overload/short-circuit protection gG and T (BS88)
 Short-circuit coordination T1 and T2

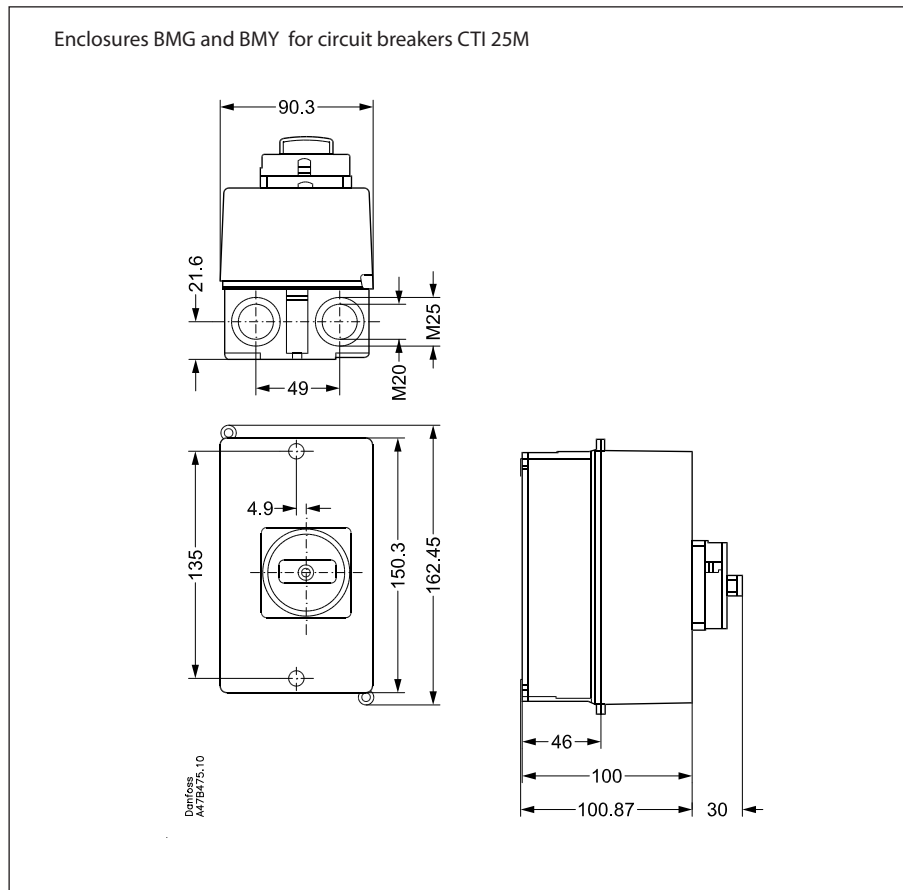
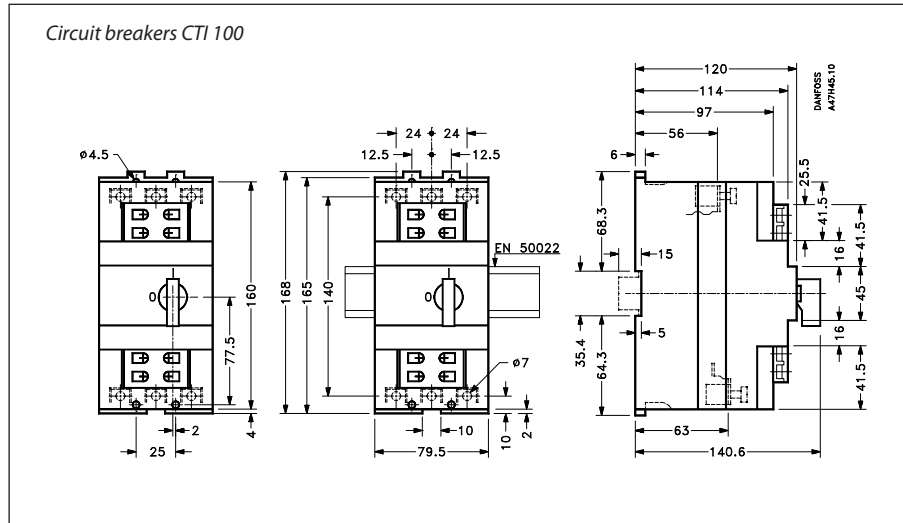


Contactor	Thermal overload relay A	Short-circuit coordination					
		T1		T2			
		Test current					
		$I_r^{1)}$ and $I_Q = 50 \text{ kA}$		$I_r^{1)}$ and $I_Q = 10 \text{ kA}$		$I_r^{1)}$ and $I_Q = 50 \text{ kA}$	
		gG A	T A	gG A	T A	gG A	T A
CI 4-5, CI 4-9, CI 6, CI 9	0.13 - 0.20	25	32	2	2	-	-
CI 4-5, 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	0.4 - 0.62	25	32	4	4	4	4
CI 4-5, CI 4-9, CI 6, CI 9	0.6 - 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 4-5, CI 4-9, CI 6, CI 9	6 - 9.2	50	50	20	25	20	25
CI 4-12, CI 12	8 - 12	63	63	25	32	25	32
CI 15, CI 16	11 - 16	80	80	25	32	25	32
CI 20, CI 25	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	160	-	-	-	80	-
CI 73	60 - 80	160	-	-	-	125	-
CI 86	74 - 85	160	-	-	-	160	-
CI 110	20 - 180	250	-	-	-	200	-
CI 141	20 - 180	315	-	-	-	250	-
CI 180 EI	20 - 180	355	-	-	-	315	-
CI 210 EI, CI 250 EI	160 - 630	500	-	-	-	400	-
CI 300 EI, CI 420	160 - 630	630	-	-	-	500	-

Dimensions



Dimensions



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