Miniature circuit breakers

Din-T10 series 10 kA MCB

- Standard AS/NZS 4898 [1])
- Approval No. N17481
- Short circuit breaking capacity - 10000 Amps
- Current range 0.5 - 63 Amps 1, 2, 3 and 4 pole
- Sealable and lockable handle
- Modular design
- Available in curve type B, C and D
- Mounts on CD chassis (250 A and 355 A)

DTCB10
1 pole

1 pole 1 module

In (A)	D – Curve 10-20 I_n
0.5	[i] DTCB10105D
1	DTCB10101D
2	DTCB10102D
3	-
4	DTCB10104D
6	DTCB10106D
10	DTCB10110D
13	DTCB10113D
16	DTCB10116D
20	DTCB10120D
25	DTCB10125D
32	DTCB10132D
40	DTCB10140D
50	DTCB10150D
63	DTCB10163D

Short circuit capacity 10 kA

In (A)	0.5 - 63
1 P	240 V AC
2 P	240/415 V AC
3 P	240/415 V AC
4 P	240/415 V AC

Use at DC

	1 P	2 P [2])
Short circuit	25 kA	30 kA
Max voltage	48 V DC	110 V DC

2 pole 2 modules

0.5	[i] DTCB10205D
1	DTCB10201D
2	[i] DTCB10202D
4	[i] DTCB10204D
6	[i] DTCB10206D
10	DTCB10210D
13	DTCB10213D
16	DTCB10216D
20	DTCB10220D
25	DTCB10225D
32	DTCB10232D
40	DTCB10240D
50	DTCB10250D
63	DTCB10263D

Notes: [1]) A range of UL standard MCBs is available on indent. (ref DTCBUL10_ _ _ C).
[2]) 2 pole MCB connected in series.
The line side is the "OFF" (bottom) side of the MCB, and connects to CD chassis tee-offs.
[i] Available on indent only.

Miniature circuit breakers

Din-T10 series 10 kA MCB (cont.)

3 pole 3 modules

In (A)	D – Curve 10-20 I_n
0.5	i DTCB10305D
1	i DTCB10301D
2	i DTCB10302D
4	i DTCB10304D
6	i DTCB10306D
10	DTCB10310D
13	i DTCB10313D
16	DTCB10316D
20	DTCB10320D
25	DTCB10325D
32	DTCB10332D
40	DTCB10340D
50	DTCB10350D
63	DTCB10363D

DTCB10
1 - 4 pole types

4 pole 4 modules [1])

6	i DTCB10406D
10	i DTCB10410D
13	i DTCB10413D
16	i DTCB10416D
20	i DTCB10420D
25	i DTCB10425D
32	i DTCB10432D
40	DTCB10440D
50	DTCB10450D
63	DTCB10463D

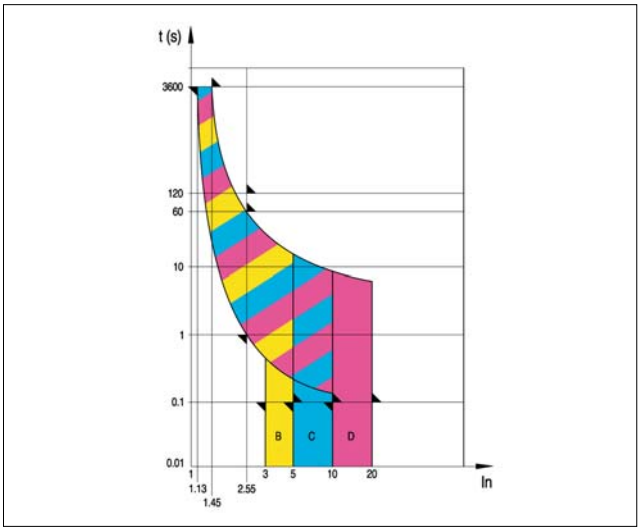
Notes: [1]) All poles include overcurrent and short circuit protection.
i Available on indent only.

Din-T MCBs Technical data

Characteristics according to BS EN 60898

Miniature Circuit Breakers are intended for the protection of wiring installations against both overloads and short-circuits in **domestic** or **commercial** wiring installations where operation is possible by **uninstructed** people

Tripping characteristic curves



Magnetic release

An electromagnet with plunger ensures instantaneous tripping in the event of short-circuit. The NHP Din-T range has 3 different types, following the current for instantaneous release: types B, C and D curve.

Icn (A)	Test current	Tripping time	Applications
B	3 x In 5 x In	0.1<t<45 s (In≤32 A) 0.1<t<90 s (In>32 A) t<0.1 s	Only for resistive loads eg: • electrical heating • water heater • stoves.
C	5 x In 10 x In	0.1<t<15 s (In≤32 A) 0.1<t<30 s (In>32 A) t<0.1 s	Usual loads such as: • lighting • socket outlets • small motors
D	10 x In 20 x In	0.1<t<4 s(**) (In≤32 A) 0.1<t<8 s (In>32 A) t<0.1 s	Control and protection of circuits having important transient inrush currents (large motors)

Thermal release

The release is initiated by a bimetal strip in the event of overload. The standard defines the range of releases for specific overload values. Reference ambient temperature is 30 °C.

Test current	Tripping time
1.13 x In	t ≥ 1 h (In ≤ 63 A) t ≥ 2 h (In > 63 A)
1.45 x In	t < 1 h (In ≤ 63 A) t < 2 h (In > 63 A)
2.55 x In	1 s < t < 60 s (In ≤ 32 A) 1 s < t < 120 s (In >32 A)

Rated short-circuit breaking capacity (Icn)

Is the value of the short-circuit that the MCB is capable of withstanding in the following test of sequence of operations: O-t-CO.

After the test the MCB is capable, without maintenance, to withstand a dielectric strength test at a test voltage of 900 V. Moreover, the MCB shall be capable of tripping when loaded with 2.8 In within the time corresponding to 2.55 In but greater than 0.1s.

Service short-circuit breaking capacity (Ics)

Is the value of the short-circuit that the MCB is capable of withstanding in the following test of sequence of operations: O-t-CO-t-CO.

After the test the MCB is capable, without maintenance, to withstand a dielectric strength test at a test voltage of 1500 V. Moreover, the MCB shall not trip at a current of 0.96 In. The MCB shall trip within 1h when current is 1.6 In.

O - Represents an opening operation

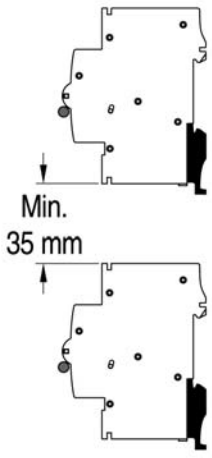
C - Represents a closing operation followed by an automatic opening.

t - Represents the time interval between two successive short-circuit operations: 3 minutes.

The relation between the rated short-circuit capacity (Icn) and the rated service short-circuit breaking capacity (Ics) shall be as follows:

Icn (A)	Ics (A)
≤ 6000	6000
> 6000 ≤ 10000	0.75 Icn min. 6000
> 10000	0.75 Icn min. 7500

In both sequences all MCBs are tested for emission of ionized gases during short-circuit (grid distance), in a safety distance between two MCBs of 35 mm when devices are installed in two different rows in the enclosure. This performance allows the use of any NHP/Terasaki enclosure.

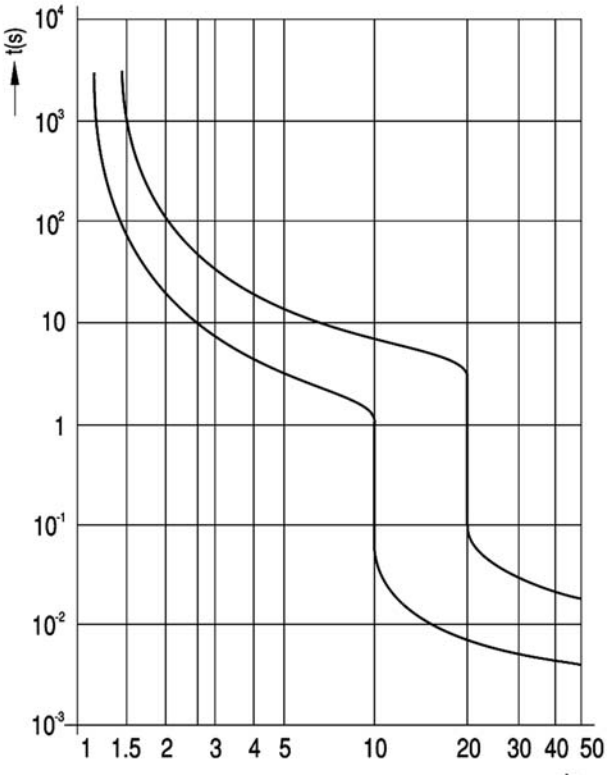


Din-T MCBs Technical data

Tripping curves according to EN 60898

The following tables show the average tripping curves of the Terasaki Din-T MCBs based on the thermal and magnetic characteristics.

Curve D

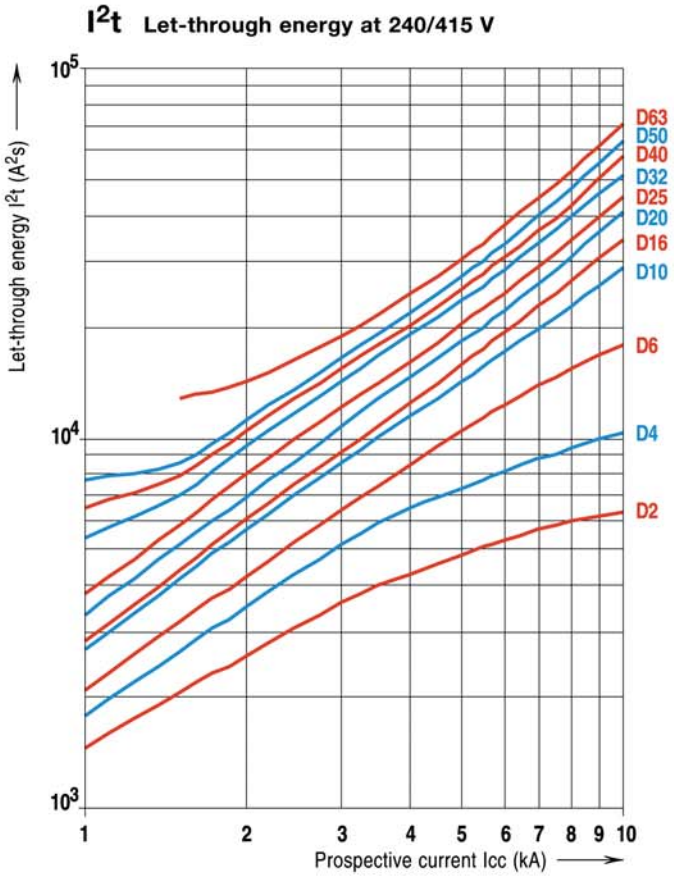


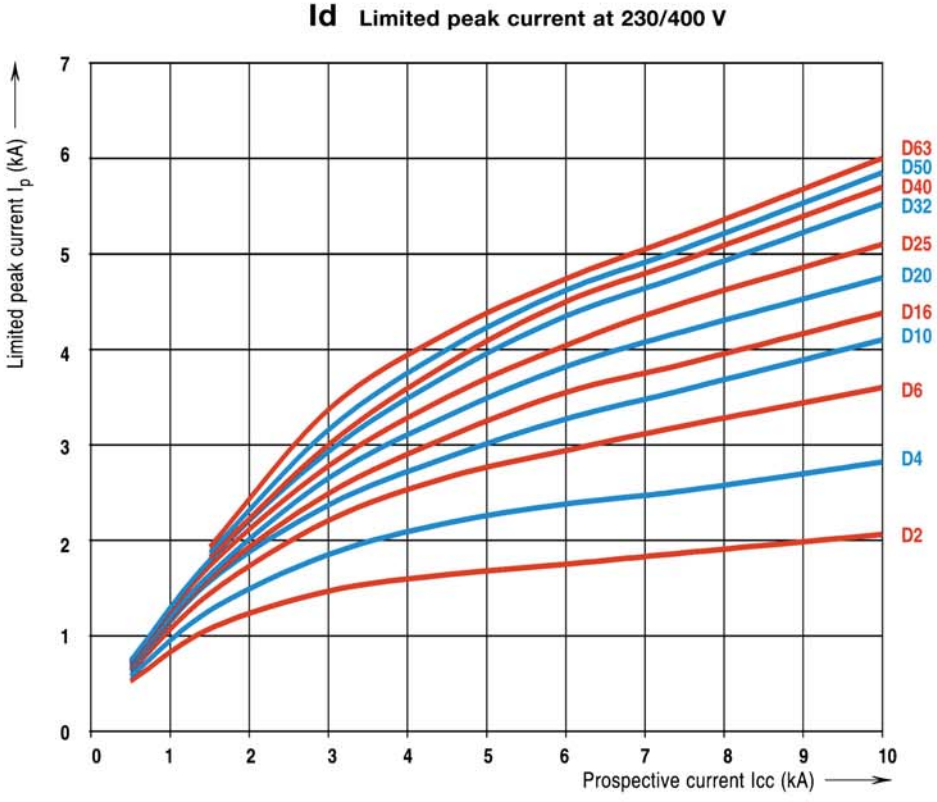
Din-T MCBs Technical data

Din-T 10

10 kA

D curve





Din-T MCBs Technical data

Influence of ambient air temperature on the rated current

The maximum value of the current which can flow through an MCB depends on the nominal current of the MCB, the conductor cross-section and the ambient air temperature.

The values shown in the table below are for devices in free air. For devices installed with other modular devices in the same switchboard, a correction factor (K) shall be applied relative to the mounting situation of the MCB, the ambient temperature and the number of main circuits in the installation.

No of devices	K [1])
2 or 3	0.9
4 or 5	0.8
6 or 9	0.7
> 10	0.6

Calculation example

Within a distribution board consisting of eight 2 Pole, 16 A, 'C' curve type MCBs, with an operating ambient temperature of 45 °C, which is the highest temperature the MCB can operate at without unwanted tripping?

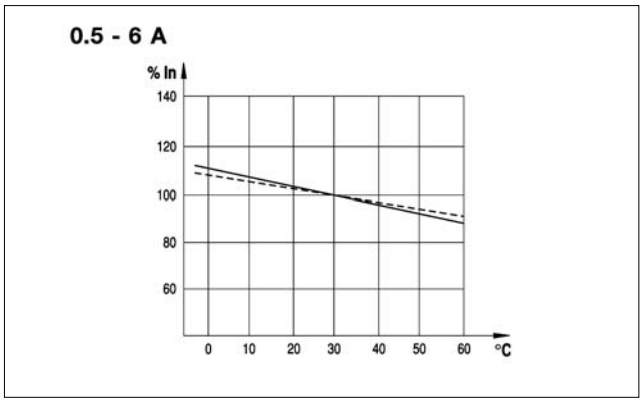
Calculation

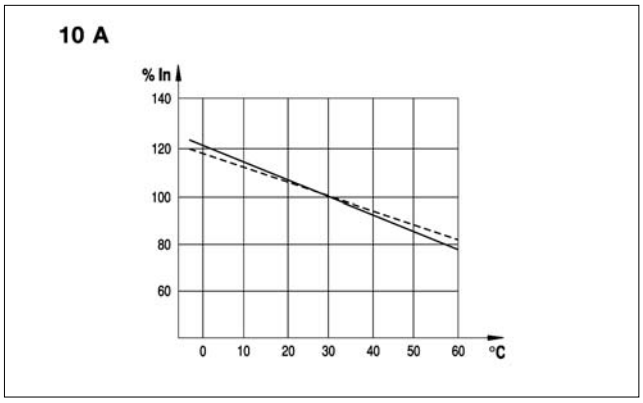
The correction factor K = 0.7, for use in an eight circuit installation: 16 A x 0.7 = 11.2 A

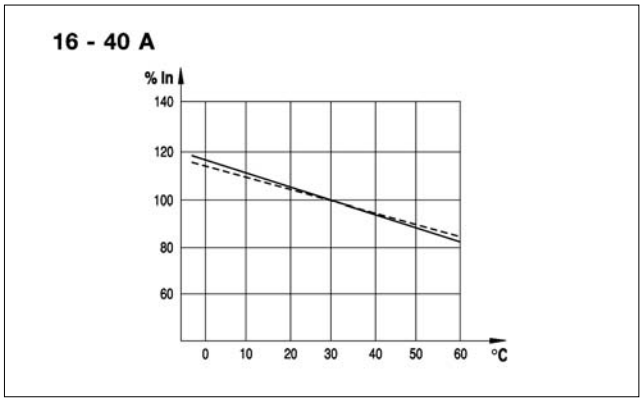
As the MCB is working at 45 °C it shall be given another factor (90 % = 0.9):
In at 45 °C = In at 30 °C x 0.9 = 11.2 A x 0.9 = 10.1 A.

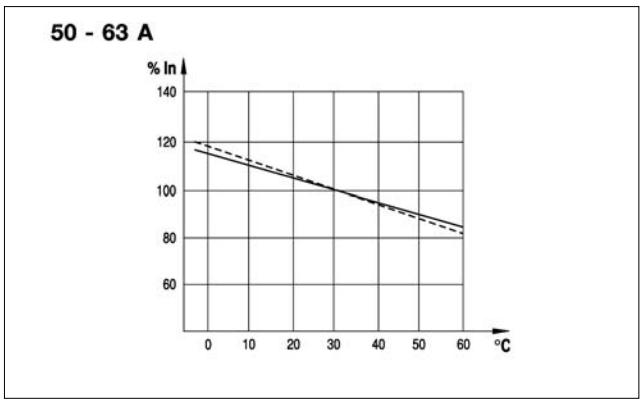
Note: [1]) Applicable for MCBs working at maximum rated currents.

The thermal calibration of the MCBs was carried out at an ambient temperature of 30 °C. Ambient temperatures different from 30 °C influence the bimetal and this results in earlier or later thermal tripping.









——— : 1P (single pole)

- - - - - - - - : mP (multi-pole)

Din-T MCBs Technical data

Effects of frequency on the tripping characteristic

All the MCBs are designed to work at frequencies of 50-60 Hz, therefore to work at different values, consideration must be given to the variation of the tripping characteristics. The thermal tripping does not change with variation of the frequency but the magnetic tripping values can be up to 50 % higher than the ones at 50-60 Hz.

Tripping current variation

60 Hz	100 Hz	200 Hz	300 Hz	400 Hz
1	1.1	1.2	1.4	1.5

Power losses

The power losses are calculated by measuring the voltage drop between the incoming and the outgoing terminals of the device at rated current.

Power loss per pole

In (A)	Voltage drop (V)	Energy loss (W)	Resistance (mOhm)
0.5	2.230	1.115	4458.00
1	1.270	1.272	1272.00
2	0.620	1.240	310.00
3	0.520	1.557	173.00
4	0.370	1.488	93.00
6	0.260	1.570	43.60
8	0.160	1.242	19.40
10	0.160	1.560	15.60
13	0.155	2.011	11.90
16	0.162	2.586	10.10
20	0.138	2.760	6.90
25	0.128	3.188	5.10
32	0.096	3.072	3.00
40	0.100	4.000	2.50
50	0.090	4.500	1.80
63	0.082	5.160	1.30
80	0.075	6.000	0.90
100	0.075	7.500	0.75
125	0.076	9.500	0.60

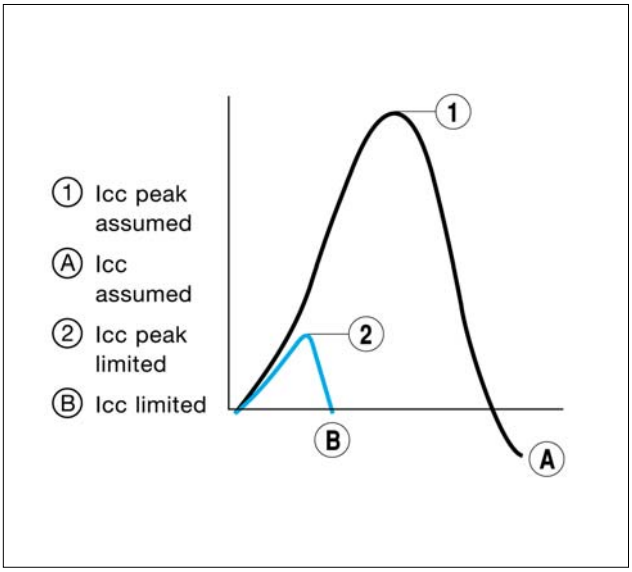
Limitation curves

Let-through energy I^2t

The limitation capacity of an MCB in short-circuit conditions, is its capacity to reduce the value of the let-through energy that the short-circuit would be generating.

Peak current Ip

Is the value of the maximum peak of the short-circuit current limited by the MCB.



See following pages

Din-T MCBs Technical data

Use of standard MCB for DC use

For MCBs designed to be used in alternating current but used in installations in direct current, the following should be taken into consideration:

- For protection against overloads it is necessary to connect the two poles to the MCB. In these conditions the tripping characteristic of the MCB in direct current is similar to alternating current.
- For protection against short-circuits it is necessary to connect the two poles to the MCB. In these conditions the tripping characteristic of the MCB in direct current is 40% higher than the one in alternating current.

Use in DC selection table

Series	Rated current (A)	48 V 1 pole Icu (kA)	110 V 2 poles in series Icu (kA)	250 V 1 pole Icu (kA)	440 V 2 poles in series Icu (kA)
Din-T 10	0.5....63 A	25	30	-	-

Installation of Din-T DC MCBs in direct current

Din-T MCBs Technical data

Text for specifiers

MCB Series Din-T 10

- According to EN 60898 standard
- For DIN rail mounting according to DIN EN 50022; EN 50022; future EN 60715; IEC 60715 (top hat rail 35 mm)
- Grid distance 35 mm
- Working ambient temperature from -25 °C up to +50 °C
- Approved by CEBEC, VDE, KEMA, IMQ.
- 1 pole is a module of 18 mm wide
- Nominal rated currents are: 0.5/1/2/3/4/6/10/13/16/20/25/32/40/50/63 A
- Tripping characteristics: B,C,D (B curve Din-T 10 only).
- Number of poles: 1 P, 1 P+N, 2 P, 3 P, 3 P+N, 4 P
- The short-circuit breaking capacity is: 6/10k A, energy limiting class 3
- Terminal capacity from 1 up to 35 mm^2 rigid wire or 1.5 up to 25 mm^2 flexible wire.
- Screw head suitable for flat or Pozidrive screwdriver
- Can be connected by means of both pin or fork busbars
- The toggle can be sealed in the ON or OFF position
- Rapid closing
- Both incoming and outgoing terminals have a protection degree of IP 20 and they are sealable
- Isolator function thanks to Red/Green printing on the toggle.
- Maximum voltage between two phases; 440 V~
- Maximum voltage for utilisation in DC current: 48 V 1 P and 110 V 2 P
- Two position rail clip
- Mechanical shock resistance 40 g (direction x, y, z) minimum 18 shocks 5 ms half-sinusoidal acc. to IEC 60068-2-27
- Vibration resistance: 3 g (direction x, y, z) minimum 30 min. according to IEC 60068-2-6
- Extensions can be added on both left or right hand side
  - Auxiliary contact
  - Shunt trip
  - Undervoltage release
  - Motor operator
  - Panelboard switch
- Add-on RCD can be coupled.

Din-T MCBs Technical data

Series					Din-T10 AS/NZS 4898
Standards (Aust / NZ / International)					IEC 60898
Tripping characteristics					B, C, D
Nominal current				A	B(6-63), C/D(0.5-63)
Calibration temperature				°C	30
Number of poles (# mod)					1/2/3/4
Neutral pole protected					yes
Nominal voltage Un	AC	1 P		V	240/415
		3 P/4 P		V	415
	DC	1 P [1]		V DC	48
		2 P (in series) [1]		V DC	110
Frequency				Hz	50/60
				Hz	DC: magn.trip +40%
				Hz	400: magn.trip +50%
Maximum service voltage Ubmax between two wires				V	250/440; 53/120
Minimum service voltage Ubmin				V	12; 12
Selectivity class (IEC 60898)					3
Isolator application		IEC 60947-2			yes
Rated insulation voltage		Pollution degree 2		V	500
		Pollution degree 3		V	440
Impulse withstand test voltage				kV	6
Insulation resistance				mOhm	10,000
Dielectric rigidity				kV	2.5
Vibration resistance (in x, y, z direction) (IEC 77/16.3)					3 g
Endurance		Electrical at Un, In			10,000
		mechanical			20,000
Utilisation category (IEC 60947-2)					A
Protection degree (outside / inside, in enclosure with door)					IP 20/IP 40
Self-extinguish degree (according to UL94)					V2
Tropicalisation (according to IEC 60068-2 / DIN 40046)				°C/RH	+55 °C/95 % RH
Operating temperature				°C	-25/+55
Storage temperature				°C	-55/+55
Terminal capacity Rigid cable min/max (top)				mm²	1/35
		Flexible cable min*/max (top)		mm²	0.75/25
		Rigid cable min/max (bottom)		mm²	1/35
		Flexible cable min*/max (bottom) (* Flexible cable 0.75/1/1.5 mm² with cable lug)		mm²	0.75/25
		Torque		Nm	4.5
Add-on devices (side add-on)		Auxiliary contacts			yes
		UVT			yes
		Shunt trip			yes
		Motor operator			yes
		Panelboard switch			yes
Busbar systems		Pin (top/bottom)			yes/yes
		Fork (top/bottom)			-/yes
Accessories					yes
Dimensions, weights, packaging					
		(HxDxW) 86x68xW		mm/mod.	18
		Weight/mod.		g	120
		Package		mod.	12
Short-circuit capacity AC				**(kA)**	**AS/NZS 4898**
IEC 60898	Icn		1 P	230/400 V	10
			2 P	230/400 V	10
			3 P/4 P	230/400 V	10
	Ics (service)				75 % Icn
IEC 60947-2	Icu (ultimate)		1 P	127 V	30
				240 V	15
				415 V	4
			2 P	127 V	40
				240 V	30
				415 V	15
			3 P, 4 P	240 V	30
				415 V	15
				440 V	10
	Ics (service)				50 % Icu
	NEMA AB1 (120/240V)				30
Short-circuit capacity DC				**(kA)**	
IEC 60947-2	Icu (ultimate)		1 P	≤60 V	25
				≤220 V	-
			2 P	≤125 V	30
				≤440 V	-
	Ics (service)				100 % Icu

Notes Refer pages 3 - 23, 24 for information on SAFE-T MCBs.

[1]) Preferred values of rated control supply voltage (IEC 60947 - 2): 24 V, 48 V, 110 V, 125 V, 250 V

[2]) 0.5-4 A/6-25 A/32-40 A/50-63 A

[3]) 10 (125 V DC)

[4]) 10 (250 V DC)

[5]) On request.

Din-T MCBs Technical data

Miniature circuit breakers - Din-T 10

Dimensions in mm.