

Energy

Technical characteristics



90 MCB

Circuit breakers for circuit protection

GEWISS

90 MCB

Technical data - Modular circuit breakers for circuit protection MCB - MTC - MT - MTHP

		MTC						MT				
		MTC 45		MTC 60		MTC 100		MT 4		MT 6		
												
Standards:		IEC EN 60898-1 IEC EN 60947-2										
Rated current (In):	(A)	2-32		6-32		6-32		6-63		6-63		
Utilization category:	A	A		A		A		A		A		
Rated operational voltage (Ue):	(V)	230/400 - 240/415		230/400 - 240/415		230 - 240		230/400 - 240/415		230/400 - 240/415		
Minimum operating voltage (Ue min):	(V)	12 ac/dc		12 ac/dc		12 ac/dc		12 ac		12 ac		
Maximum operating voltage (Ue max):	(V)	440 ac/ 250 dc		440 ac/ 250 dc		253 ac/ 125 dc		440 ac		440 ac		
Insulation voltage (Ui):	(V)	500		500		500		500		500		
Rated frequency:	(Hz)	50/60		50/60		50/60		50/60		50/60		
Rated impulse withstand voltage (Uimp):	(kV)	4		4		4		4		4		
Overvoltage category:	III	III		III		III		III		III		
Number of poles:		1P, 1P+N	2P	3P, 4P	1P+N	2P	3P, 4P	2P	1P, 1P+N	2P, 3P, 4P	1P, 1P+N	2P, 3P, 4P
Energy limiting class (B and C curve):		3	3	3	3	3	3 (≤16A) 1 (>16A)	3	3	3	3	3
Breaking capacity												
Alternating current:	IEC/EN 60898-1	Icn	(A)	4500		6000 ⁽¹⁾		6000	10000 ⁽¹⁾		4500	6000
		Ics	(A)	1 Icn		1 Icn			0.75 Icn		1 Icn	
	IEC/EN 60947-2	Icu	230/240 V (kA)	4.5	6	6	10	10	15	6	6	6
		Ics	400/415 V (kA)	-	-	4.5	-	-	6	-	6	6
Direct current:	IEC/EN 60947-2	Ics	(kA)	100% Icu		100% Icu	75% Icu	100% Icu	50% Icu	100% Icu		100% Icu
		Icu (1 pole)	72 V (kA)	6		10			-	-		-
		Ics	(kA)	6		10			-	-		-
		Icu (2 poles in series) ⁽²⁾	125 V (kA)	6		10			10 (15 a 72V)	-		-
		Ics	(kA)	6		10			10 (15 a 72V)	-		-
		Icu (4 poles in series)	250 V (kA)	4.5		6			-	-		-
Wiring:	cable section (mm²) ⁽³⁾	rigid		≤ 1x16 - ≤ 1x10+1x6		≤ 1x16 - ≤ 1x10+1x6		≤ 1x16 - ≤ 1x10+1x6	≤ 1x25 - ≤ 2x10 ≤ 1x16+1x10	≤ 1x25 - ≤ 2x10 ≤ 1x16+1x10		
		flexible		≤ 1x10 - ≤ 2x6		≤ 1x10 - ≤ 2x6		≤ 1x10 - ≤ 2x6	≤ 1x35 - ≤ 2x16 ≤ 1x16+2x10	≤ 1x35 - ≤ 2x16 ≤ 1x16+2x10		
Screwdriver suggested:		PZ2		PZ2		PZ2		PZ2		PZ2		
Electrical endurance:		10000		10000		10000		8000		8000		
Mechanical endurance:		20000		20000		20000		20000		20000		
Max. no. of usable modular accessories:		2 ⁽⁵⁾		2 ⁽⁵⁾		2		-		-		
Upline/downline power supply:		yes		yes		yes		yes		yes		
ON/OFF status displayed:		yes		yes		yes		yes		yes		
Mounting position:		any		any		any		any		any		
Type of residual current device:		-		-		-		-		-		
Rated tightening torque:		(Nm)	1.2	1.2		1.2		2		2		
Degree of protection:	terminals	IP20		IP20		IP20		IP20		IP20		
	front	IP40		IP40		IP40		IP40		IP40		
Pollution degree:		2		2		2		2		2		
Tropicalization:		55°C - UR 95%		55°C - UR 95%		55°C - UR 95%		55°C - RH 95%		55°C - UR 95%		
Reference temperature:		(°C)	30	30		30		30		30		
Operating temperature:		(°C)	-25 +70 ⁽⁶⁾	-25 +70 ⁽⁶⁾		-25 +70 ⁽⁶⁾		-25 +70 ⁽⁶⁾		-25 +70 ⁽⁶⁾		
Stocking temperature:		(°C)	-40 +70	-40 +70		-40 +70		-40 +70		-40 +70		
Double connection (cable+fork busbar):		no		no		no		yes (upstream and downstream)		yes (upstream and downstream)		
Weight:	(g)	135 (per module)		135 (per module)		135 (per module)		115 (per pole)		115 (per pole)		
Curve:	(A)	C		C		C		C		C		
		-		-		-		-		-		
		2		-		-		-		-		
		-		-		-		-		-		
		-		-		-		-		-		
		6		6		6		6		6		
		10		10		10		10		10		
		13		13		13		13		13		
		16		16		16		16		16		
		20		20		20		20		20		
		25		25		25		25		25		
		32		32		32		32		32		
		-		-		-		40		40		
		-		-		-		50		50		
		-		-		-		63		63		
		-		-		-		-		-		
-		-		-		-		-				
Grid distance		(mm)	35	35		35		40		40		

⁽¹⁾ Breaking capacity of the single pole Icn=4500A

⁽²⁾ 1P+N version not allowed

⁽³⁾ Minimum cable section is 1mm² for MTC and MT, 1.5mm² for MTHP

⁽⁴⁾ ≤95mm² with reduced connection terminal (width flap connection < 17mm)

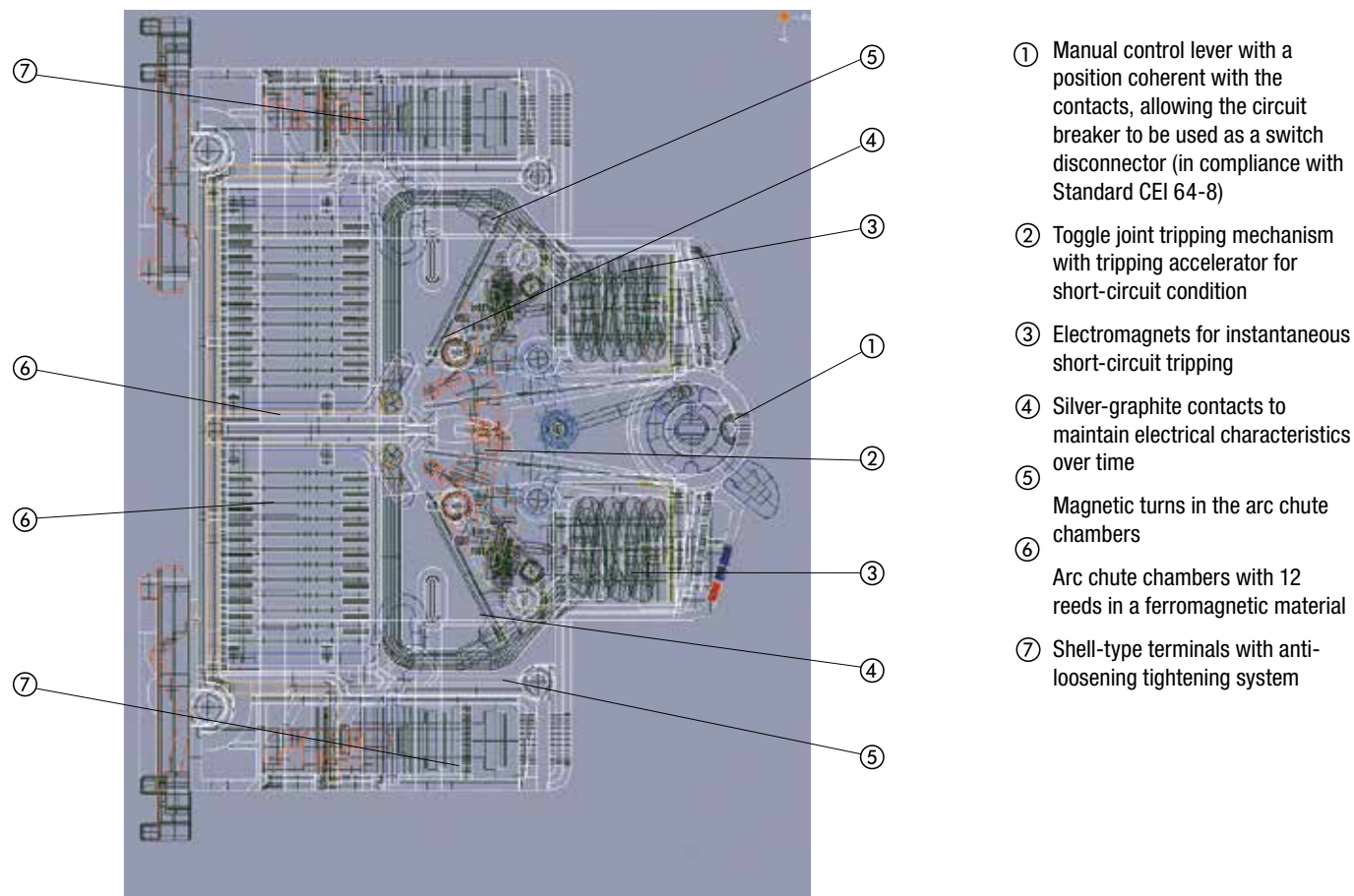
⁽⁵⁾ 1P+N versions cannot be accessorised

⁽⁶⁾ With temperatures greater than 30°C, derating of In rated current is expected

[illegible]

Characteristics of the kinematic mechanism of the MTC compact circuit breakers

The position of the releases on the front, with magnetic turns and opposing arc chute chambers, allows a notable reduction in arc time and short-circuit strain on the mechanism. It has therefore been possible to halve the system and lighten the mechanism, which has short pre-arc times thanks to the reduced energy. The new mechanism has been sized and optimised by means of a sophisticated planning, engineering and testing programme.



Power loss values and temperature performance

MTC 45 - 60 - 100 Compact miniature circuit breakers

General characteristics

The MTC compact miniature circuit breakers are characterised by the reduced overall dimensions they occupy in the board, and their full modularity with electrical auxiliaries and modular accessories. It is therefore possible to position all the equipment necessary to protect and control the service electrical system centrally, in small spaces. The innovations are based on a new kinematic mechanism for activating the circuit breaker (with a world-wide Gewiss patent) which helps to increase normal performance while reducing the occupied overall dimensions by 50%. This new device makes it possible to include a bipolar circuit breaker in a single 18mm module, with both poles protected by both magnetic and thermal release.

Temperature performance

In plant engineering situations where the ambient temperature is higher than the standard 30°C reference temperature, the circuit breakers may be subject to untimely tripping, i.e. inappropriate switch-off, because the rise in temperature is interpreted as overcurrent. In fact ambient temperature affects the initial deformation of the bimetal; at a temperature above 30°C, the thermal release intervenes more quickly, acting like a relay with a lower rated current.

It is therefore imperative to take into consideration the temperature performance of the rated current if the circuit breaker is installed in a place with a temperature above 30°C. The following tables show the max. operating currents corresponding to the different temperatures.

MTC 45 - 60 - 100 TEMPERATURE DERATING

In (A)	Temperature (°C)						
	10	20	30	40	50	60	70
2	2.1	2.05	2	1.9	1.8	1.55	1.4
6	7.2	6.6	6	5.7	5.3	5	4.7
10	11.8	10.8	10	9.6	9.1	8.6	8.2
13	14.8	14	13	12.2	11.2	10.3	9.3
16	18.2	17.2	16	15.2	14.3	13.4	12.5
20	22.8	21.4	20	19.5	18.9	18.4	17.8
25	28.5	26.8	25	24	23	22	21
32	36.5	34.2	32	30.8	29.5	28.2	26.9

Power loss per pole

The following table shows the power loss values for the MTC miniature circuit breakers in order to check the overtemperature values inside the distribution board in relation to what Standards require.

MTC 45 - 60 - 100 POWER LOSS PER POLE

In (A)	1P		1P+N								2P - 3P - 4P	
	Tripping characteristic											
	C		B				C				B e C	
	-		Pole		Neutral		Pole		Neutral		-	
	R [mΩ]	P [W]	R [mΩ]	P [W]	R [mΩ]	P [W]	R [mΩ]	P [W]	R [mΩ]	P [W]	R [mΩ]	P [W]
2	-	-	-	-	-	-	450	1.8	2.5	0.01	-	-
6	43.33	1.56	52.78	1.9	2.78	0.1	52.78	1.9	2.78	0.1	29.44	1.06
10	19.8	1.98	17	1.7	2	0.2	15	1.5	3	0.3	20.3	2.03
13	11.66	1.97	11.24	1.9	2.37	0.4	9.47	1.6	2.37	0.4	14.2	2.4
16	9.73	2.49	11.33	2.9	2.34	0.6	9.77	2.5	2.34	0.6	8.67	2.22
20	6.18	2.47	5.68	2.27	2.6	1.04	4.75	1.9	1	0.4	5.68	2.27
25	3.58	2.24	5.34	3.34	3.2	2	4.64	2.9	0.96	0.6	5.34	3.34
32	2.95	3.02	3.37	3.45	2.6	2.66	3.42	3.5	0.98	1	3.37	3.45

MT 4 - MT 6 - MT 60 - MT 100 - MT 250 Miniature circuit breakers

General characteristics

Thanks to a wide range and excellent performance, the MT miniature circuit breakers allow the protection of electrical systems in which the use of MTCs alone would be insufficient.

The MT range, with rated current from 1 to 63A, characteristics B, C and D, and a breaking capacity of 4.5, 6, 10 and 25 kA, satisfies all installation needs in the commercial, advanced commercial and industrial sectors. Thanks to the full modularity with the residual current devices, electrical auxiliaries and modular accessories, the MT range guarantees the optimum solution for every plant engineering context.

MT 4 - 6 TEMPERATURE DERATING

In (A)	Temperature (°C)						
	10	20	30	40	50	60	70
6	7.33	6.67	6	5.52	5.03	4	3.37
10	11.6	10.8	10	8.9	7.95	7.16	6.21
13	14.9	13.9	13	11.9	10.9	10	9
16	18.1	17.1	16	14.9	14.8	14.1	13.4
20	22.7	21.3	20	19.3	18.6	17	16
25	27.8	27.1	25	23.4	19	18.8	16.6
32	35.6	33.8	32	30	28	26	23
40	46.7	43.3	40	36.4	34.6	31.1	27.6
50	60	55	50	45.5	40.5	36.5	33.5
63	69	67.7	63	59	52.6	46.8	42.1

MT 60 - 100 - 250 TEMPERATURE DERATING

In (A)	Temperature (°C)						
	10	20	30	40	50	60	70
1	1.1	1.04	1	0.97	0.93	0.9	0.86
2	2.21	2.07	2	1.93	1.86	1.79	1.72
3	3.31	3.11	3	2.9	2.79	2.69	2.58
4	4.42	4.14	4	3.86	3.72	3.58	3.44
6	7.33	6.67	6	5.52	5.03	4.6	4.17
10	11.6	10.8	10	8.9	7.95	7.16	6.21
13	14.9	13.9	13	11.9	10.9	10	9
16	18.1	17.1	16	14.9	13.9	12.8	11.7
20	22.7	21.3	20	17.8	16.1	15.1	13.5
25	29.3	27.1	25	23.4	21.3	18.8	16.6
32	35.6	33.8	32	30	28	26	23
40	46.7	43.3	40	36.4	32.8	29.2	25.6
50	60	55	50	45.5	40.5	35.5	30
63	72.3	67.7	63	59	54.6	50	45.4

POWER LOSS PER POLE

In (A)	MT 4 - 6		MT 60 - 100 - 250			
	Tripping characteristics					
	B and C		B and C		D	
	R [mΩ]	P [W]	R [mΩ]	P [W]	R [mΩ]	P [W]
1	-	-	2200	2.2	-	-
2	-	-	675	2.7	-	-
3	-	-	256	2.3	-	-
4	-	-	138	2.2	-	-
6	30.6	1.1	43.3	1.6	20.3	0.7
10	14.0	1.4	19.8	2.0	11.5	1.2
13	8.9	1.5	11.7	2.0	7.7	1.3
16	9.0	2.3	9.7	2.5	5.8	1.5
20	5.8	2.3	6.2	2.5	4.1	1.6
25	4.3	2.7	3.6	2.2	2.6	1.6
32	3.6	3.7	3.0	3.0	2.3	2.3
40	2.1	3.3	2.3	3.7	2.0	3.1
50	1.5	3.7	1.9	4.8	1.9	4.8
63	1.4	5.4	1.2	4.9	1.2	4.9

NOTE: power loss values are valid also for 1P+N versions.

MTHP 160 - MTHP 250 High performance miniature circuit breakers

General characteristics

Thanks to a wide range and excellent performance, the MTHP miniature circuit breakers allow the protection of electrical systems in which the use of MTCs and MTs alone would be insufficient. The MTHP range, with rated current from 20 to 125A, characteristics C and D, and a breaking capacity of 10 and 25 kA, satisfies all installation needs in the commercial, advanced commercial and industrial sectors. Thanks to the full modularity with the residual current devices, electrical auxiliaries and modular accessories, the MTHP range guarantees the optimum solution for every plant engineering context.

MTHP 160 - 250 TEMPERATURE DERATING

In (A)	Temperature (°C)					
	20	30	40	50	60	70
20	21.4	20	18.2	16.6	15	13.2
25	26	25	24	22.5	20.5	19
32	34	32	30	28	25	22
40	43	40	36	32	28	24
50	53	50	47	44	41	37
63	66	63	59	54	49	44
80	85	80	75	70	63	56
100	107	100	93	86	78	70
125	132	125	118	111	104	97

MTHP 160 - 250 POWER LOSS PER POLE

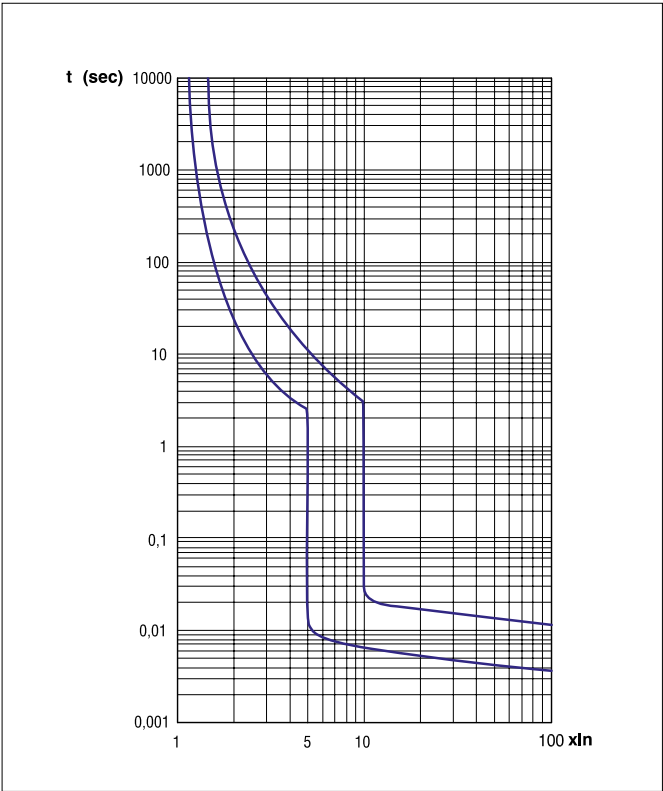
In (A)	Tripping characteristic C and D	
	R [mΩ]	P [W]
20	7	2.8
25	4.32	2.7
32	3.03	3.1
40	2.19	3.5
50	1.68	4.2
63	1.41	5.6
80	0.88	5.6
100	0.74	7.4
125	0.7	11

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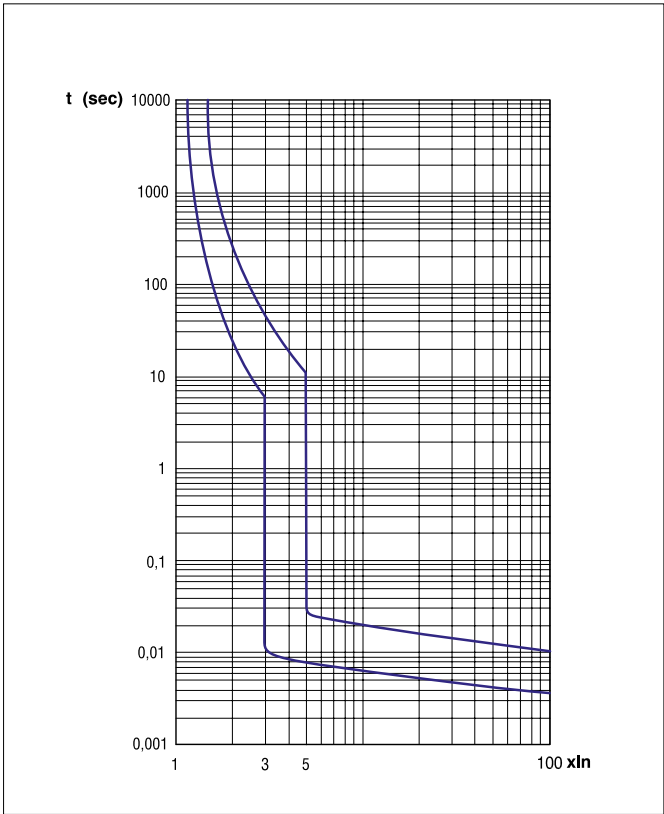
Characteristic curves

Tripping characteristics in alternating current (EN 60898)

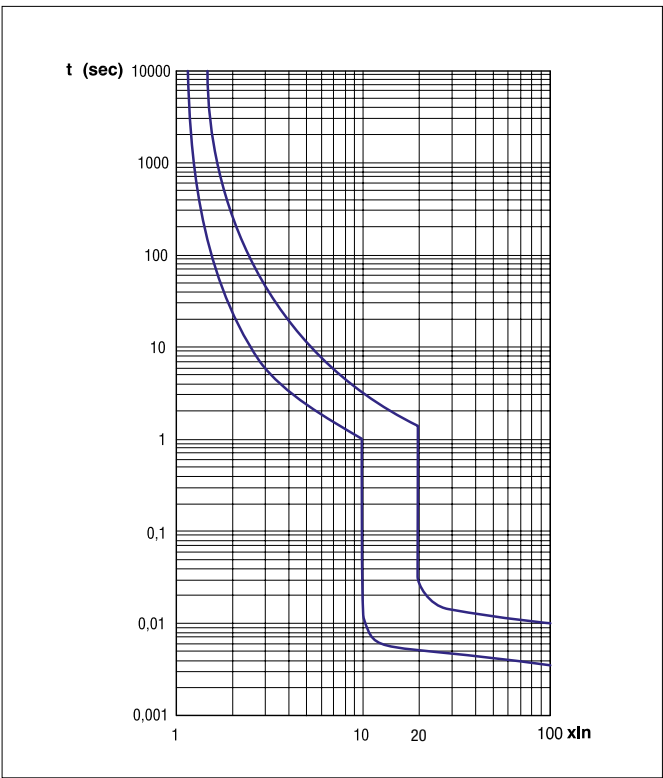
MTC 45 - 60 - 100 Characteristic C
MT 4 - 6 - 60 - 100 - 250 Characteristic C
MTHP 160 - 250 Characteristic C



MT 4 - 6 - 60 - 100 Characteristic B
MTC 60 Characteristic B



MT 60 - 100 Characteristic D
MTHP 160 Characteristic D



Tripping characteristic	B	C	D
I_n	from 6 to 63 A	from 1 to 125 A	from 6 to 100 A
Thermal release			
I_{nf}	$1.13 I_n$	$1.13 I_n$	$1.13 I_n$
I_{ft}	$1.45 I_n$	$1.45 I_n$	$1.45 I_n$
t	$< 1 \text{ h}$	$< 1 \text{ h}$	$< 1 \text{ h}$
Magnetic release			
I_{nf}	$3 I_n$	$5 I_n$	$10 I_n$
I_{ft}	$5 I_n$	$10 I_n$	$20 I_n$
t	instantaneous	instantaneous	instantaneous

I_n = rated current
 I_{nf} = conventional non-tripping current
 I_{ft} = conventional tripping current
 t = tripping time

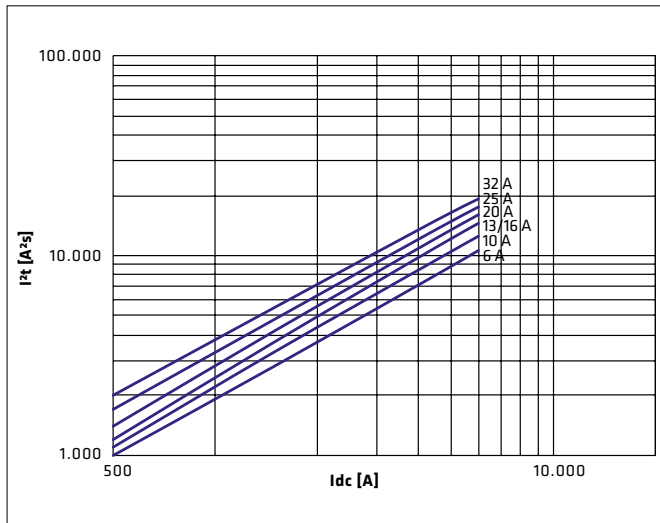
B tripping curve: tripping characteristic for the protection of electrical resistive loads (for example: heating) and very long electrical distribution lines.

C tripping curve: tripping characteristic for the protection of general electrical resistive or slight inductive loads (for example: fluorescent lamps).

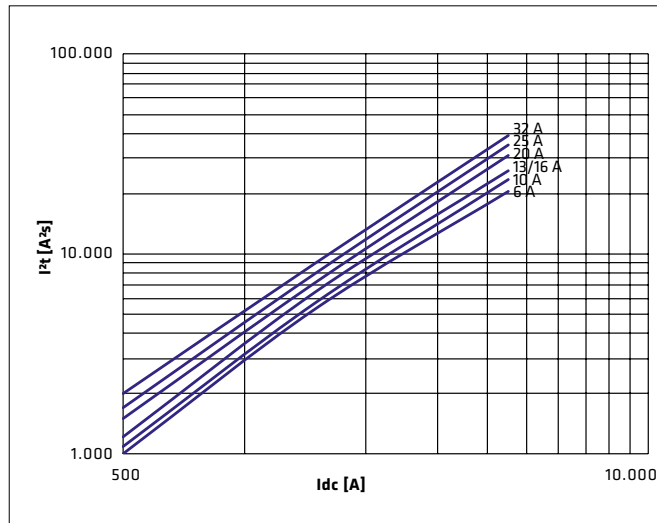
D tripping curve: tripping characteristic for the protection of electrical heavy inductive loads or high starting currents (for example: electrical engines).

Specific let-through energy characteristics - MTC modular compact circuit breakers

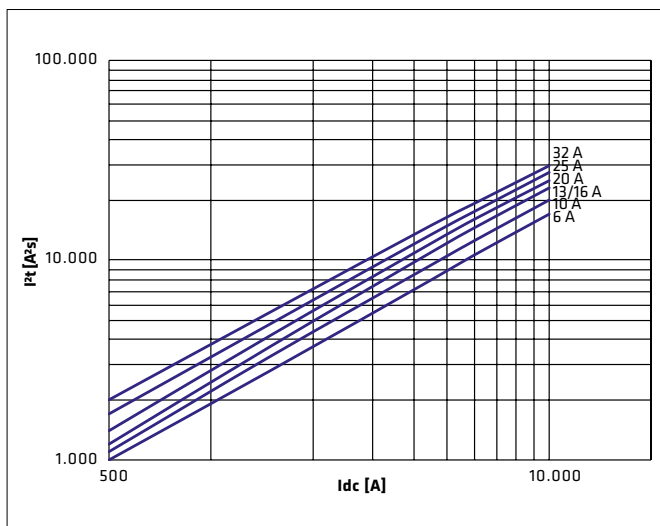
MTC 45 - 2P 230V



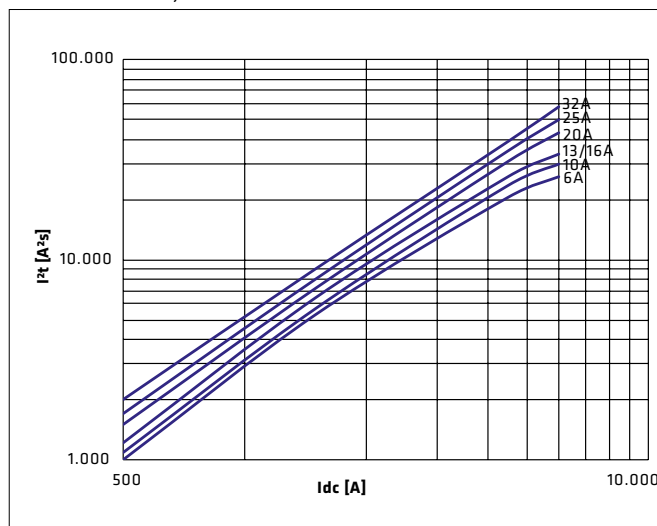
MTC 45 - 1P-1P+N 230V, 3P-4P 400V



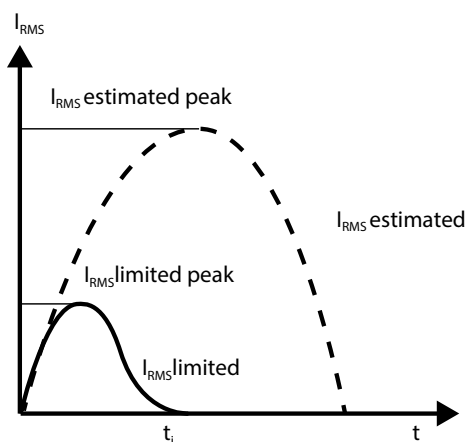
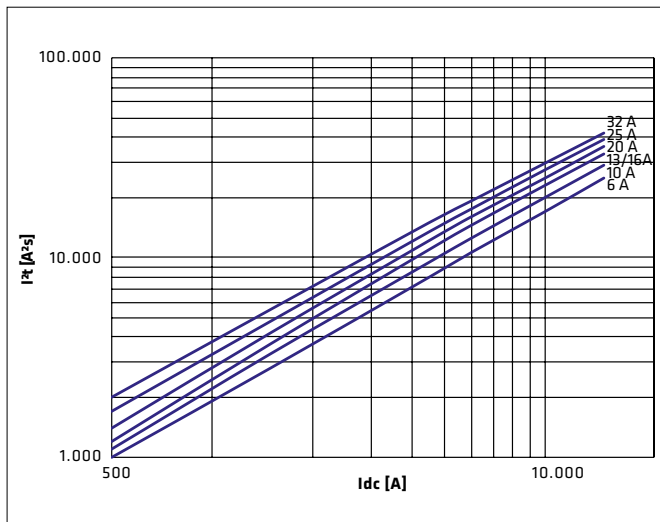
MTC 60 - 2P 230V



MTC 60 - 1P+N 230V, 3P-4P 400V



MTC 100 - 1P+N, 2P - 230V

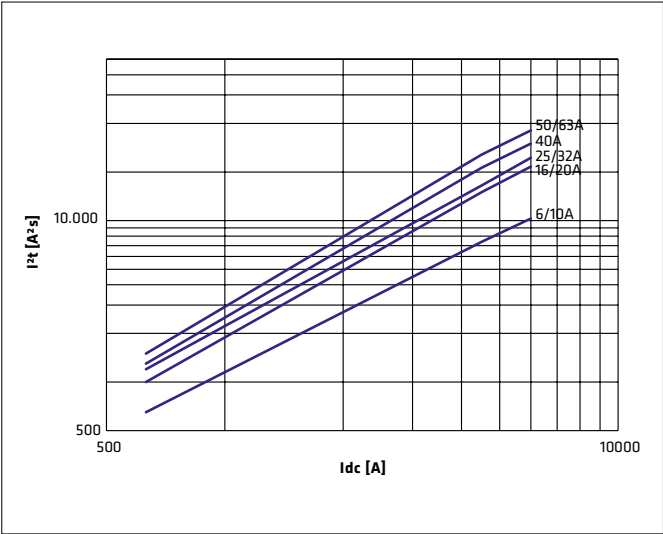


The curves above give the values of the specific let-through energy in relation to the short-circuit current expressed in A. Every curve refers to each rated current value of circuit breaker.

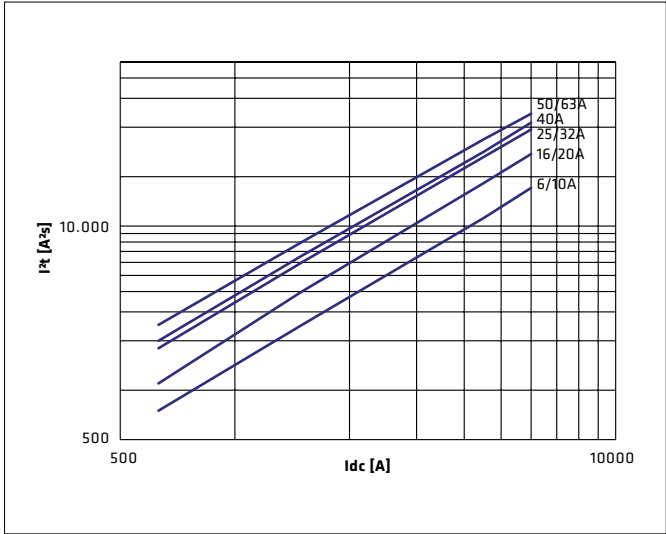
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Specific let-through energy characteristics - MT 4 MT 6 modular circuit breakers

MT 4 - MT 6 - 1P+N-2P 230V

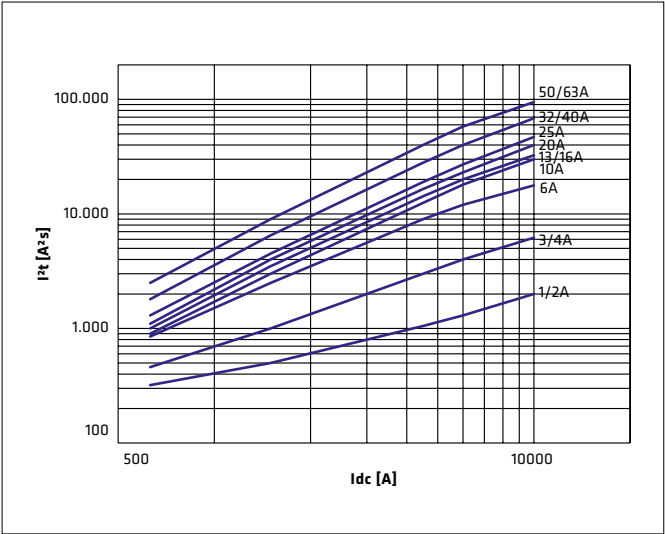


MT 4 - MT 6 - 1P 230V, 2P-3P-4P 400V

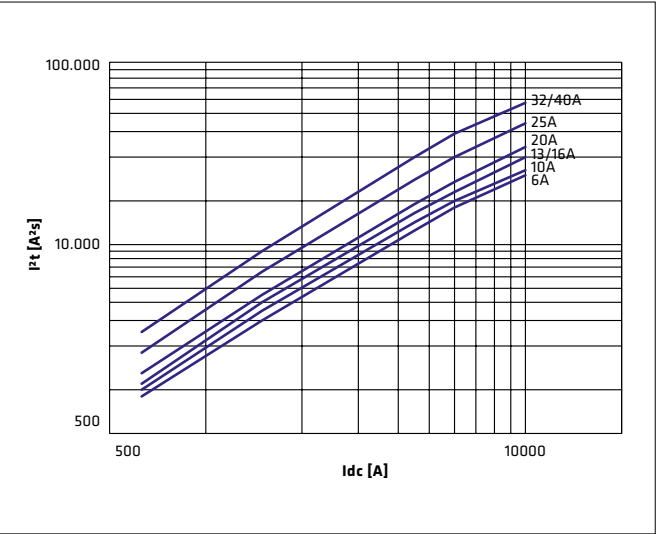


Specific let-through energy characteristics - MT 60 modular circuit breakers

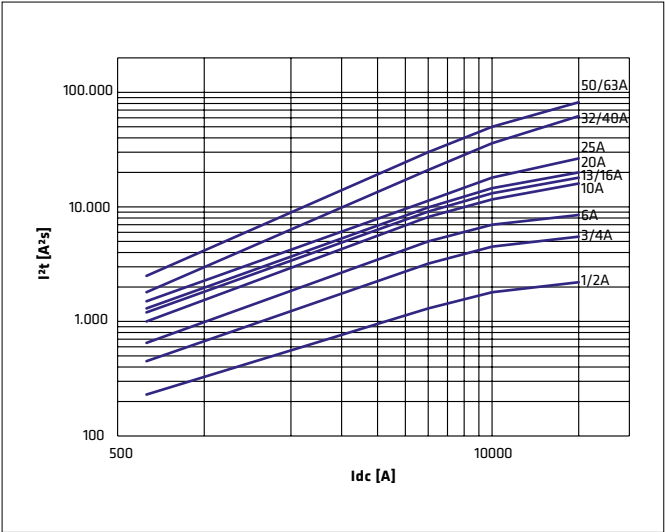
MT 60 - 1P 230V, 2P-3P-4P 400V - CHARACTERISTICS C AND B



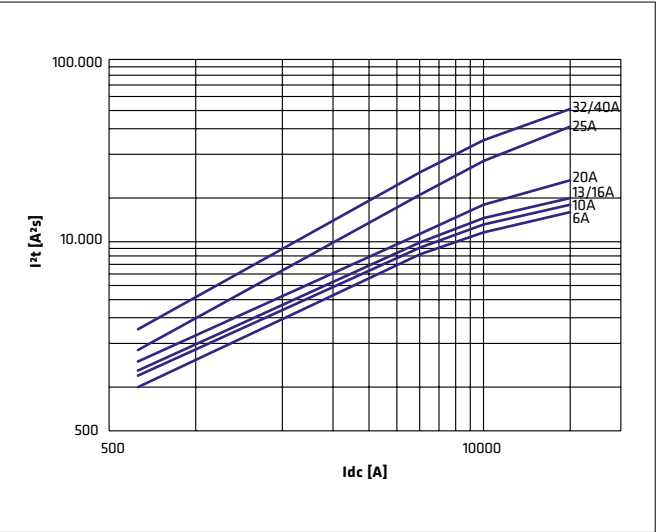
MT 60 - 1P 230V, 2P-3P-4P 400V - CHARACTERISTIC D



MT 60 - 1P+N-2P 230V - CHARACTERISTICS C AND B



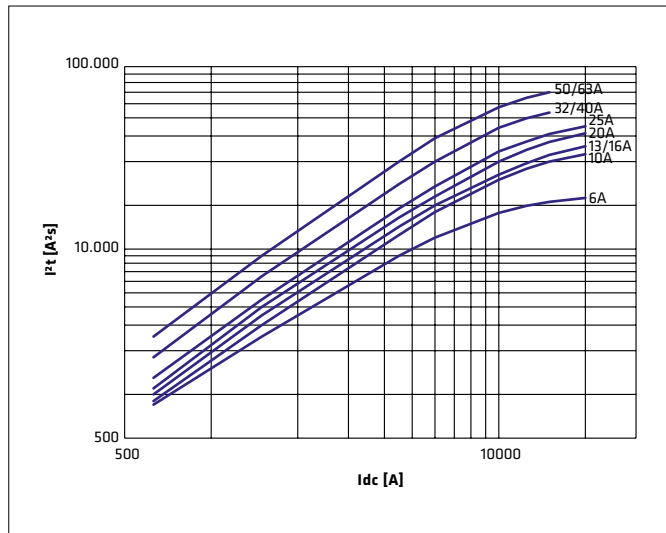
MT 60 - 2P 230V - CHARACTERISTIC D



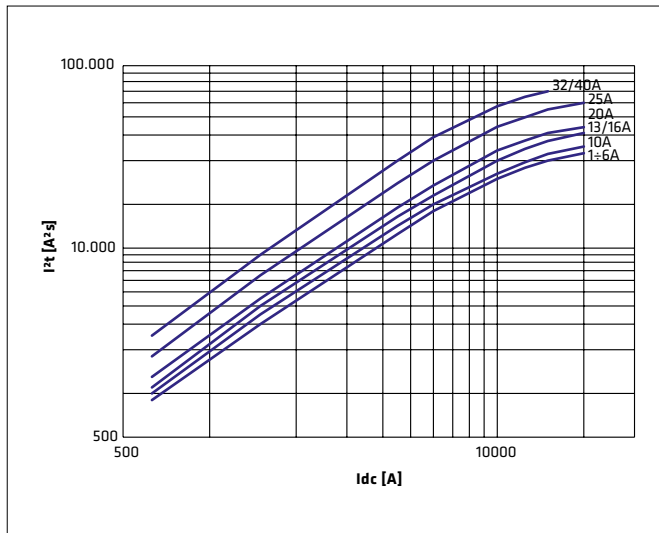
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Specific let-through energy characteristics - MT 100 modular circuit breakers

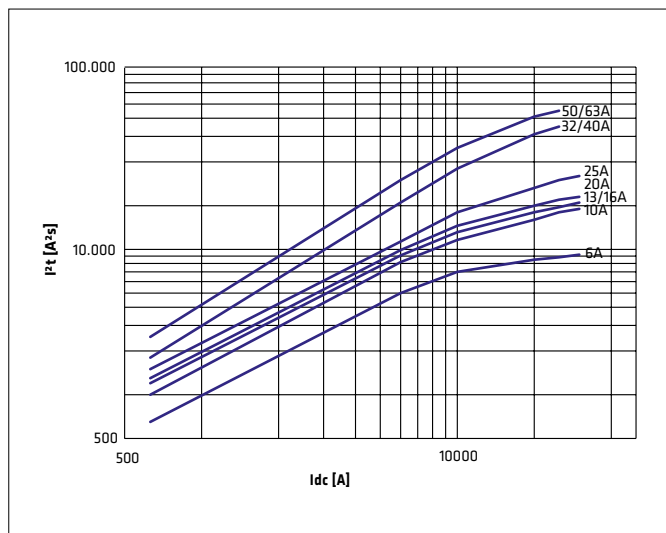
MT 100 - 1P 230V, 2P-3P-4P 400V - CHARACTERISTICS C AND B



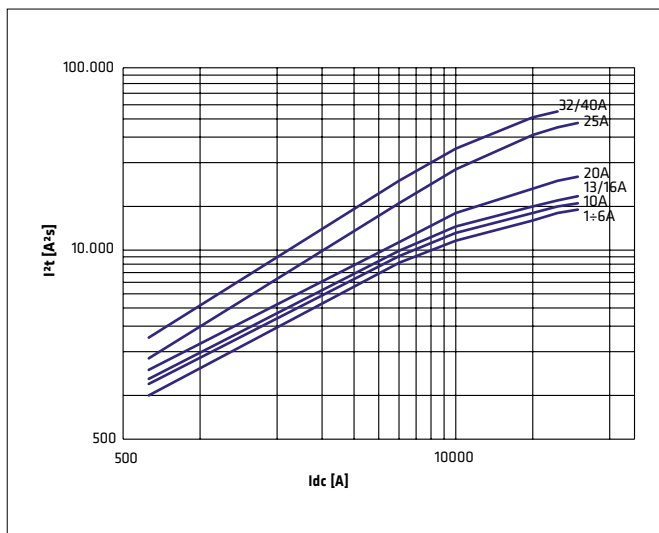
MT 100 - 1P 230V, 2P-3P-4P 400V - CHARACTERISTIC D



MT 100 - 2P 230V - CHARACTERISTICS C AND B

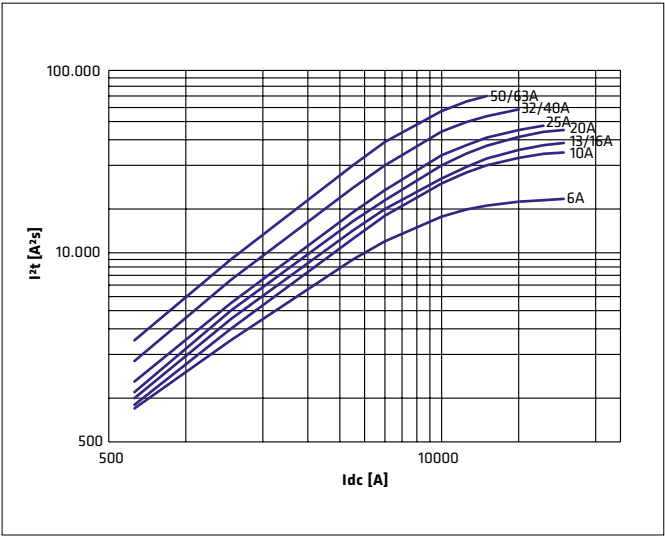


MT 100 - 2P 230V - CHARACTERISTIC D

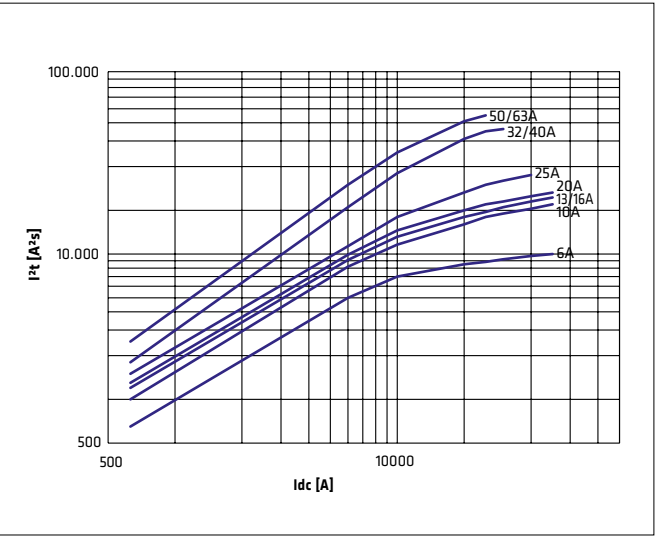


Specific let-through energy characteristics - MT 250 modular circuit breakers

MT 250 - 1P 230V, 2P-3P-4P 400V - CHARACTERISTIC C

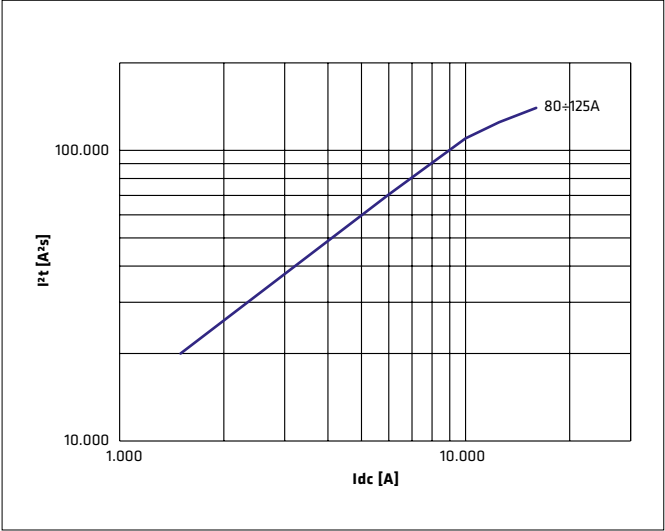


MT 250 - 2P 230V - CHARACTERISTICS C AND B

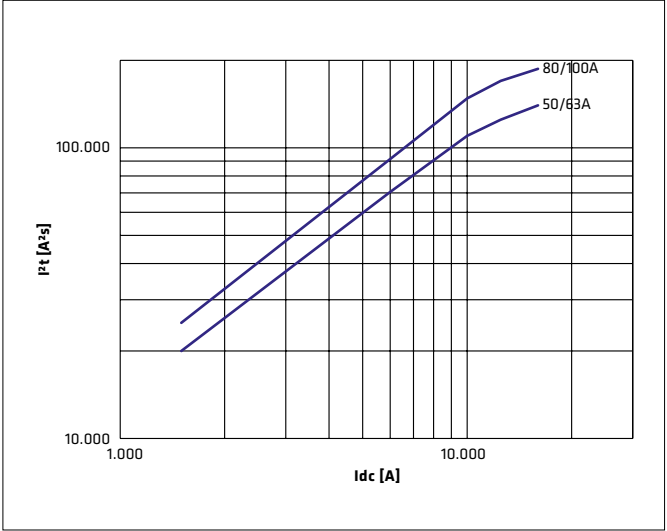


Specific let-through energy characteristics - MTHP 160 modular circuit breakers

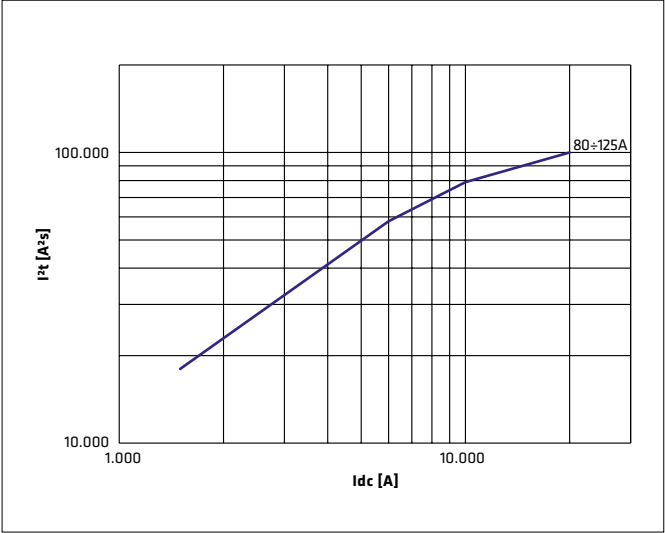
MTHP 160 - 1P 230V, 2P-3P-4P 400V - CHARACTERISTIC C



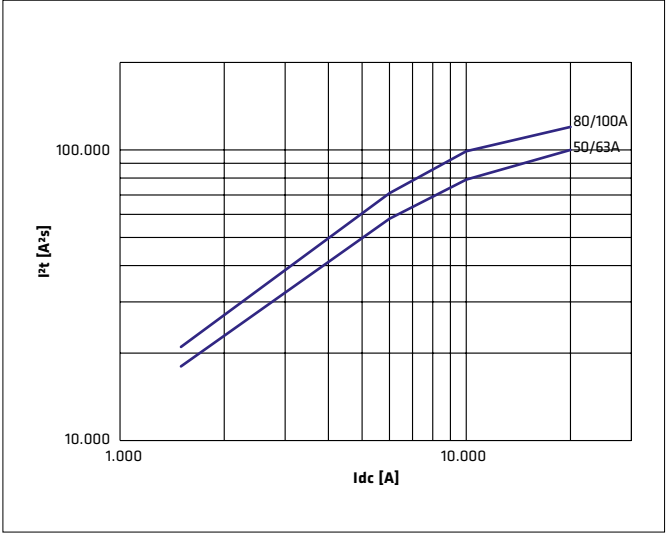
MTHP 160 - 1P 230V, 2P-3P-4P 400V - CHARACTERISTIC D



MTHP 160 - 2P 230V - CHARACTERISTIC C

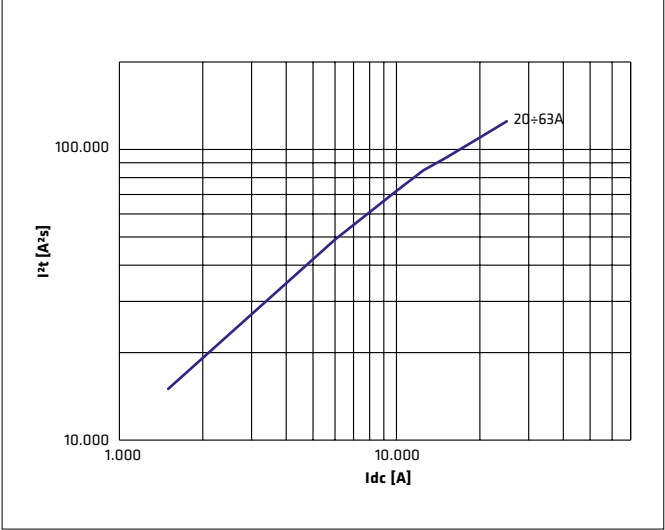


MTHP 160 - 2P 230V - CHARACTERISTIC D

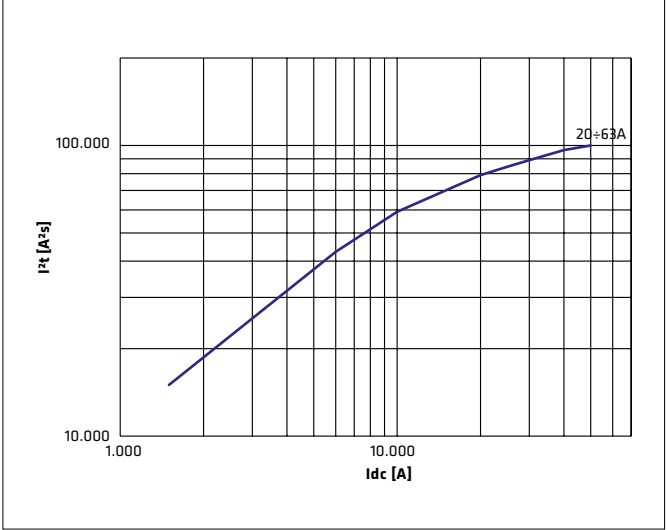


Specific let-through energy characteristics - MTHP 250 modular circuit breakers

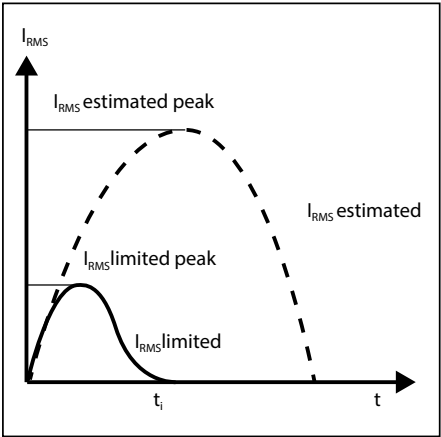
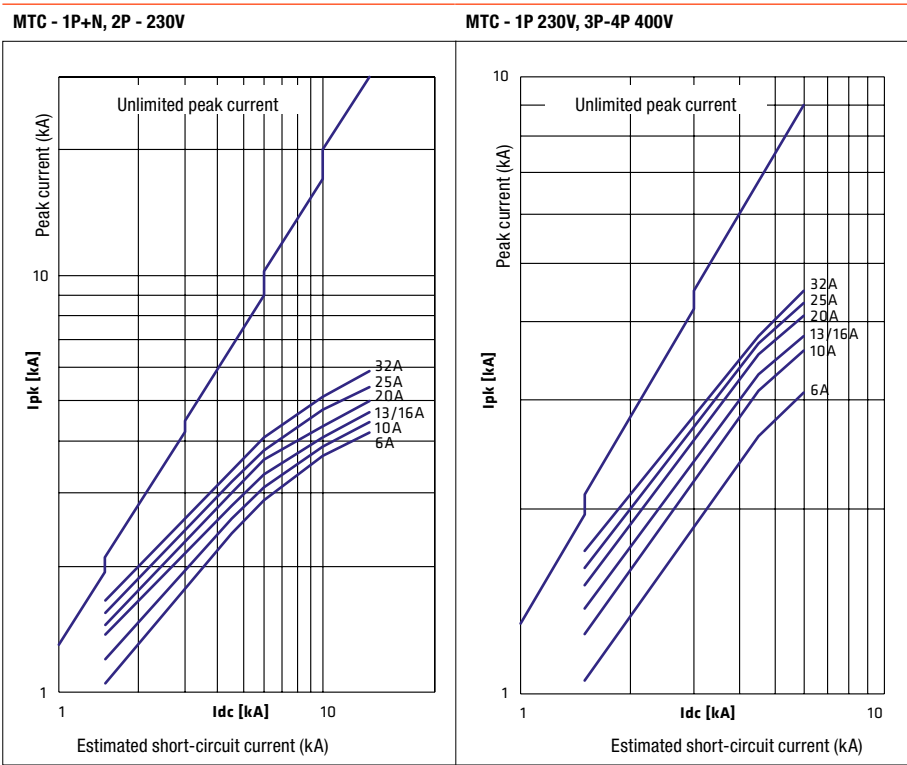
MTHP 250 - 1P 230V, 2P-3P-4P 400V - CHARACTERISTIC C



MTHP 250 - 2P 230V - CHARACTERISTIC C



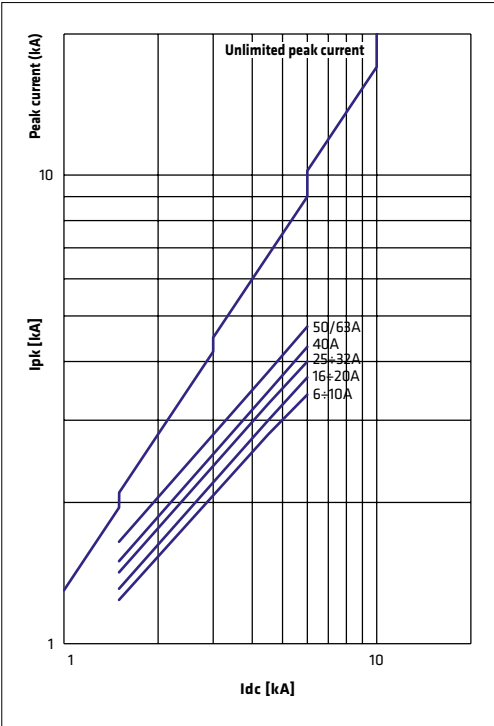
Peak current limitation characteristics - MTC modular compact circuit breakers



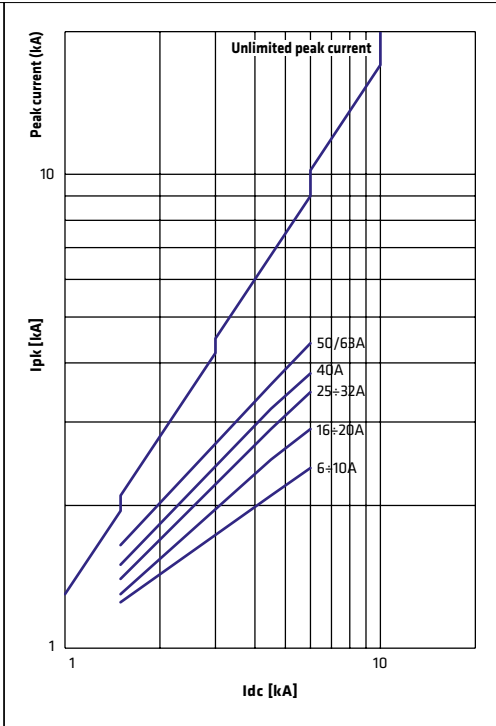
The following curves give the values of the peak current in relation to the estimated short-circuit current expressed in kA. Every curve refers to each rated current value of circuit breaker.

Peak current limitation characteristics - MT modular circuit breakers

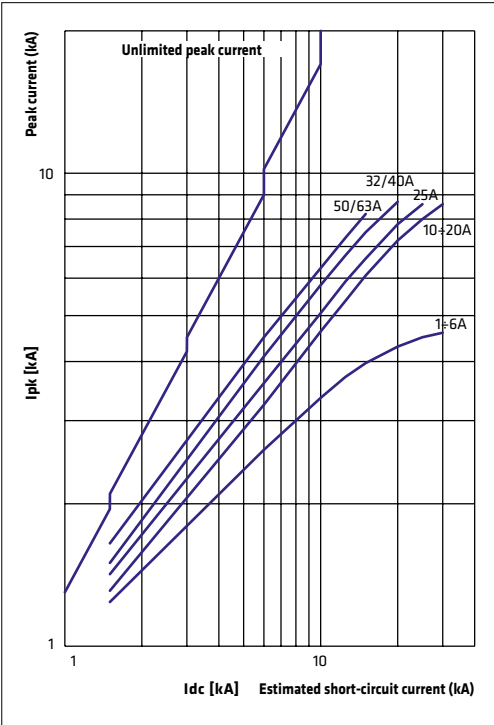
MT 4 - MT6 - 1P 230V, 2P-3P-4P 400V -
CHARACTERISTICS C AND B



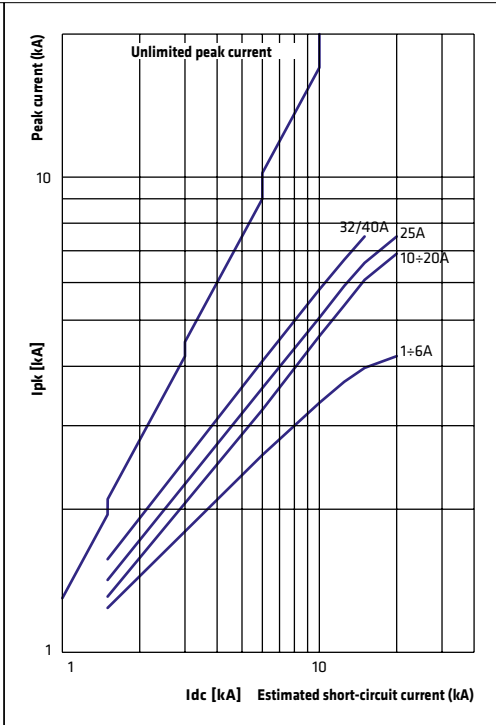
MT 4 - MT6 - 1P+N, 2P 230V -
CHARACTERISTICS C AND B



MT 60, MT 100, MT 250 - 1P 230V, 2P-3P-4P 400V -
CHARACTERISTICS C AND B

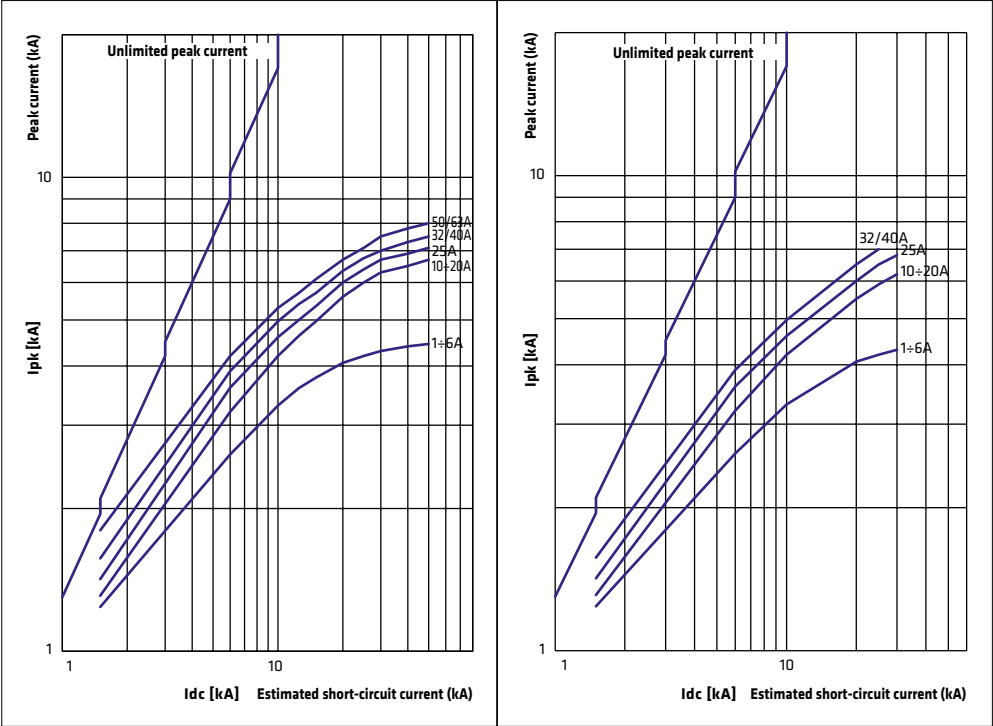


MT 60, MT 100 - 1P 230V, 2P-3P-4P 400V -
CHARACTERISTIC D

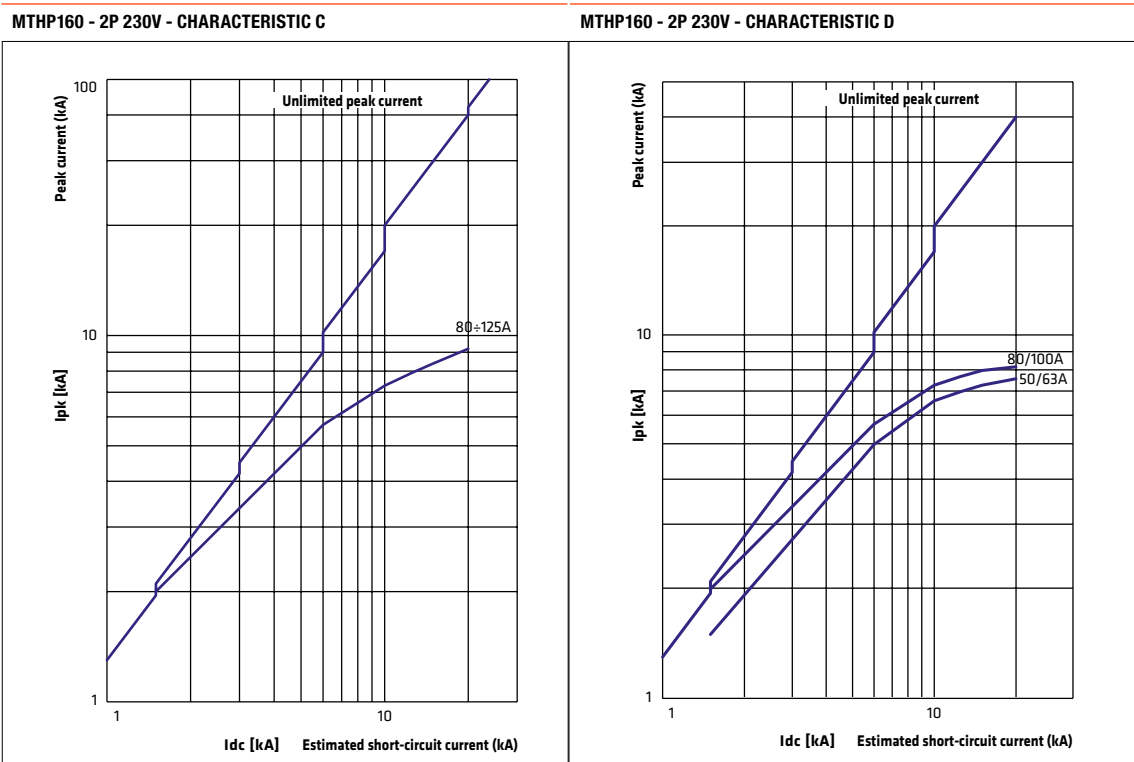
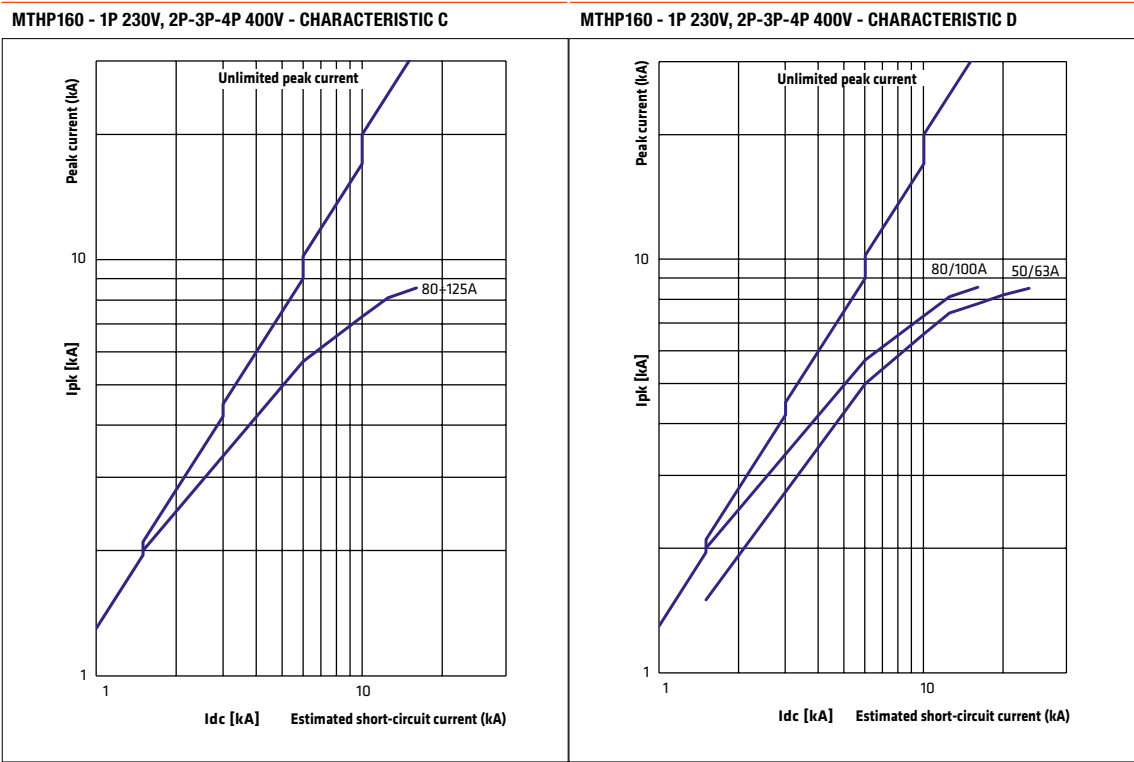


MT 60, MT 100, MT 250 - 1P+N, 2P 230V -
CHARACTERISTICS C AND B

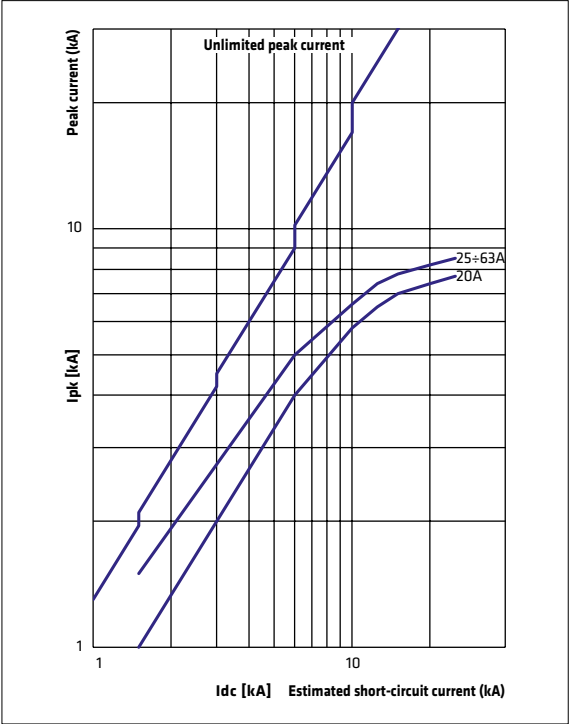
MT 60, MT 100 - 1P+N, 2P 230V - CHARACTERISTIC D



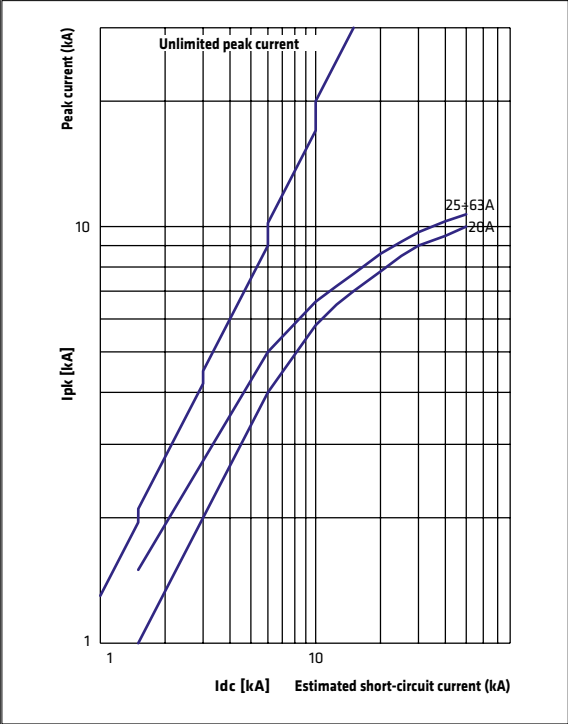
Peak current limitation characteristics - MTHP modular circuit breakers



MTHP250 - 1P 230V, 2P-3P-4P 400V - CHARACTERISTIC C



MTHP250 - 2P 230V - CHARACTERISTIC C



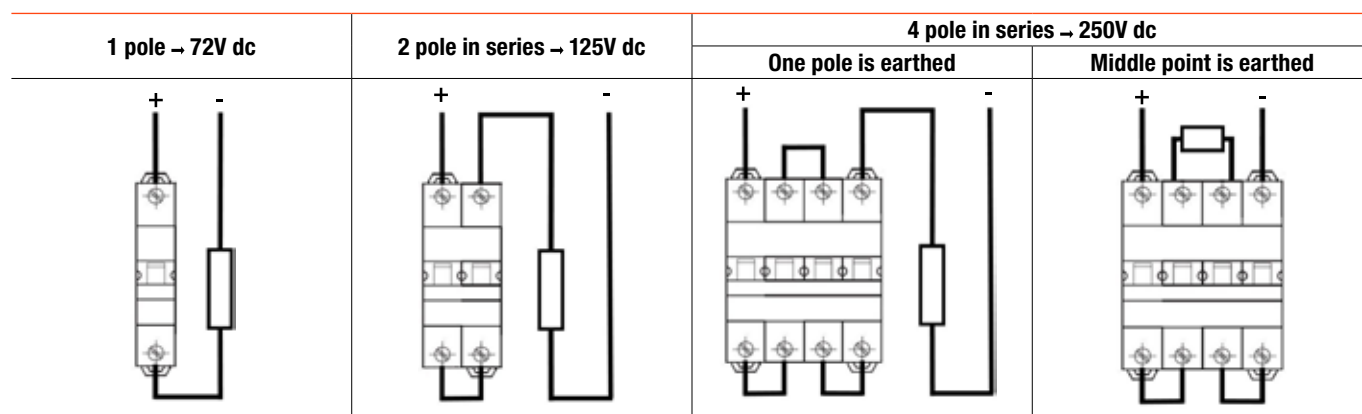
How to choose circuit breakers for direct current applications

The interruption of direct current is more difficult to achieve than the alternating current because the direct current doesn't go through zero at each half cycle. Therefore, it is necessary to connect in series the poles of the same circuit breaker so that the increase of the resistance, thus created, causes the decrease of the current until its cancellation.

Moreover, if the operating voltage of the system increases, also the number of poles connected in series must increase.

For a correct choice of a circuit breaker to protect dc electrical loads, it's suggested to keep in mind these following 3 factors:

- 1. Operating voltage**, which effects the number of poles to be connected in series. The maximum operating voltage in direct current for Gewiss circuit breaker is equal to 250V by connecting 4 poles in series (max 72V per pole).



NOTE: MTC 1P+N compact circuit breakers cannot be used in dc application.

- 2. Short-circuit current**, alleged in the installation point that effects the choice of circuit breaker type.

Circuit breaker type	BREAKING CAPACITY Icu (kA)		
	Operating voltage (V)		
	72	125	250
MTC 45	6	6	4.5
MTC 60	10	10	6
MTC 100	-	10 ^(*)	-
MT 60	10	10	10
MT 100	10	15	15
MT 250	20	25	25
MTHP 160	10	15	15
MTHP 250	25	30	25

^(*) 15 kA at 72V

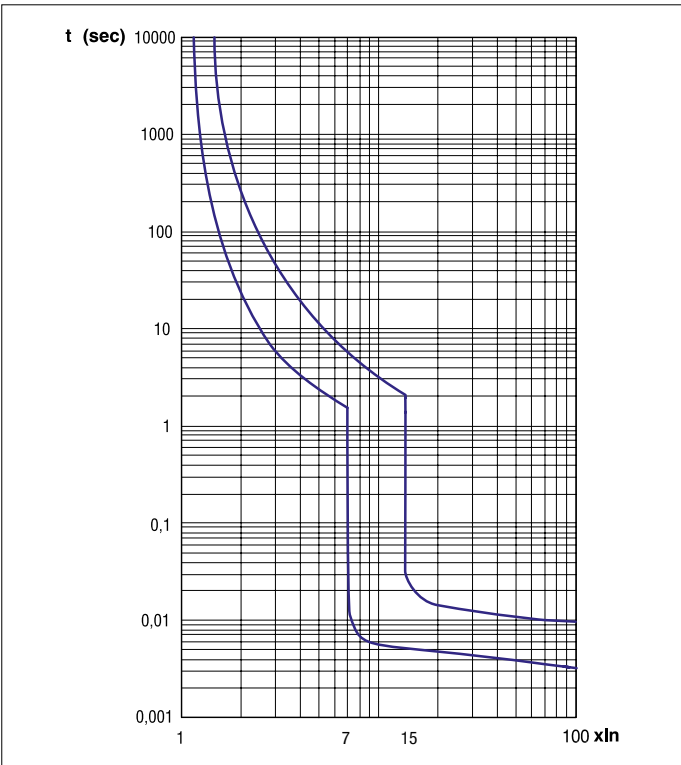
- 3. Operating current and the type of electrical load**, which effect the rated current of the circuit breaker and its tripping characteristic.

The rated current of the circuit breaker for dc application must be higher than the operating current of electrical load and must be lower or equal to the capacity of the cable, as well as alternating current situation.

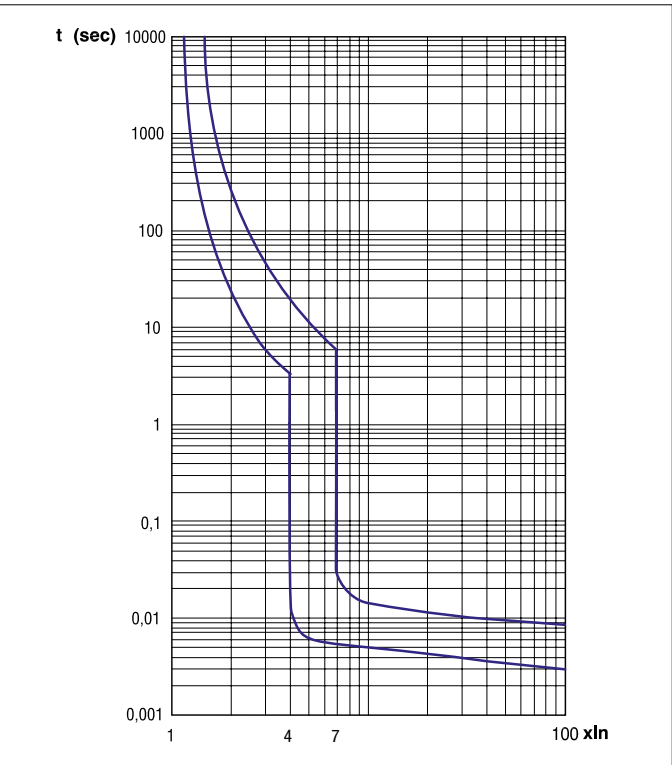
In addition to inrush current, the choice of tripping characteristics must consider that the dc magnetic trip threshold is greater than alternating current. Hereafter the tripping characteristics according to EN 60898 of circuit breakers used in direct current.

Tripping characteristics in direct current (EN 60898)

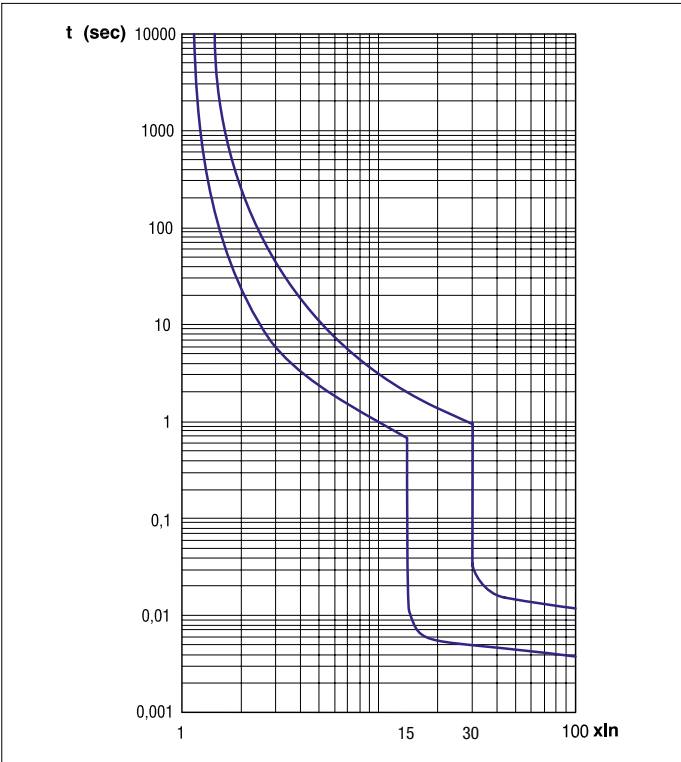
MTC 45 - 60 - 100 Characteristic C
MT 60 - 100 - 250 Characteristic C
MTHP 160 - 250 Characteristic C



MT 60 - 100 Characteristic B
MTC 60 Characteristic B



MT 60 - 100 Characteristic D
MTHP 160 Characteristic D



Tripping characteristic	B	C	D
I_n	from 6 to 63 A	from 1 to 125 A	from 6 to 100 A
Thermal release			
I_{nf}	$1.13 I_n$	$1.13 I_n$	$1.13 I_n$
I_f	$1.45 I_n$	$1.45 I_n$	$1.45 I_n$
t	< 1 h	< 1 h	< 1 h
Magnetic release			
I_{nf}	$4 I_n$	$7 I_n$	$15 I_n$
I_f	$7 I_n$	$15 I_n$	$30 I_n$
t	instantaneous	instantaneous	instantaneous

I_n = rated current
 I_{nf} = conventional non-tripping current
 I_f = conventional tripping current
t = tripping time

B tripping curve: tripping characteristic for the protection of electrical resistive loads (for example: heating) and very long electrical distribution lines.

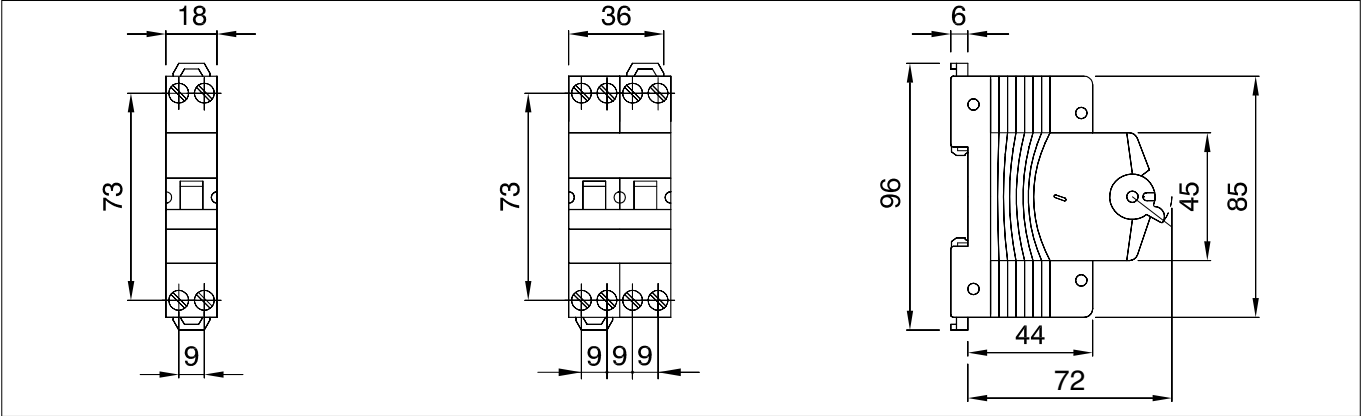
C tripping curve: tripping characteristic for the protection of general electrical resistive or slight inductive loads (for example: fluorescent lamps).

D tripping curve: tripping characteristic for the protection of electrical heavy inductive loads or high starting currents (for example: electrical engines).

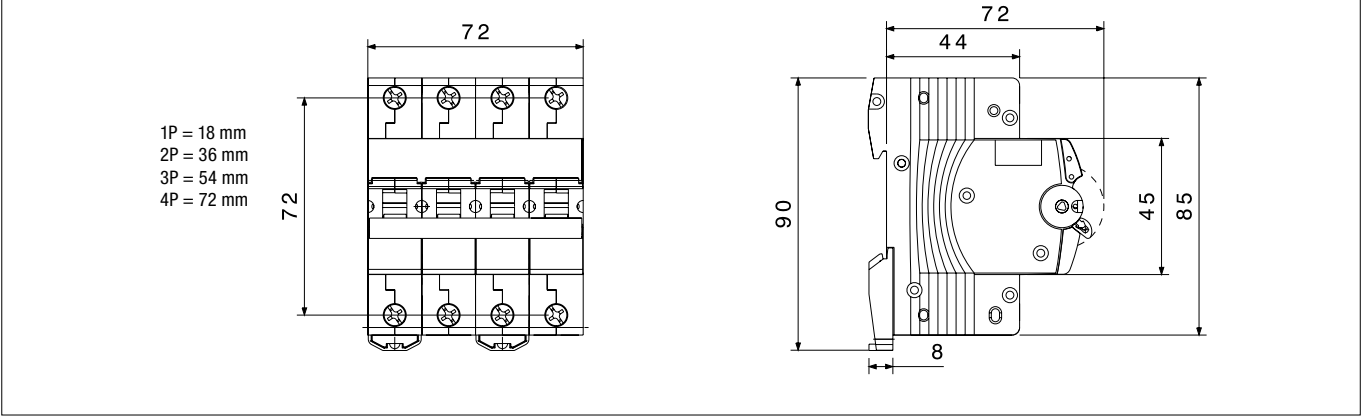
90 MCB

Dimension tables

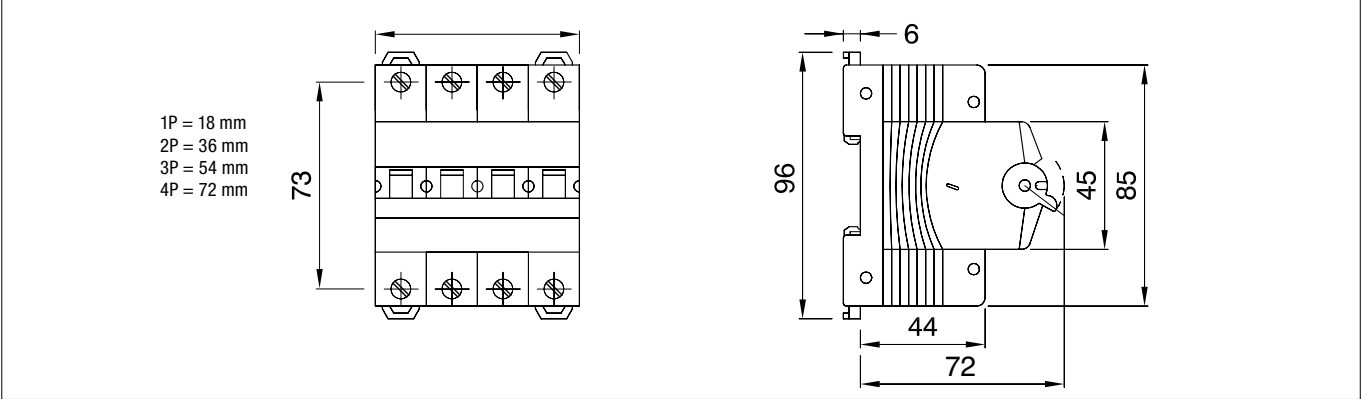
MTC 45 - MTC 60 - MTC 100



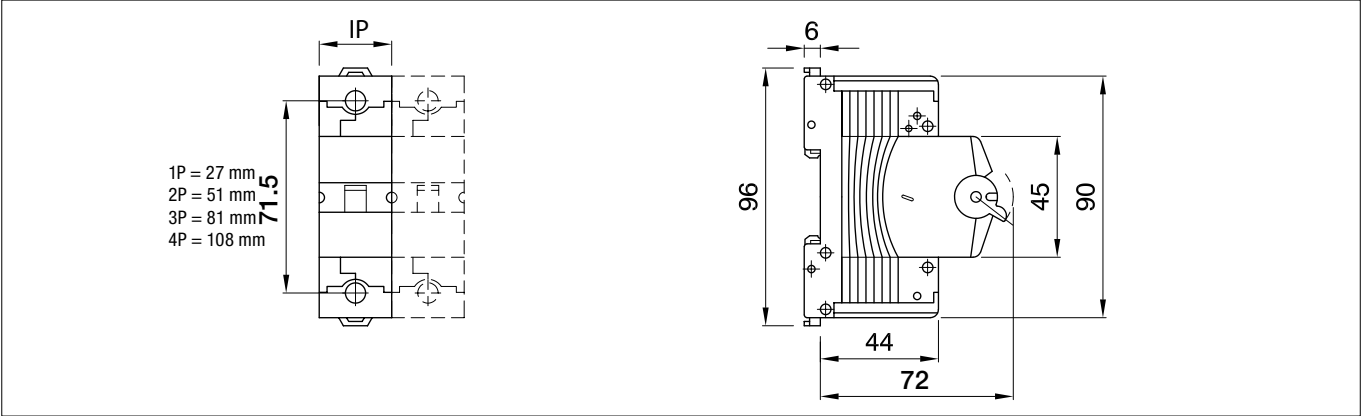
MT 4 - MT 6



MT 60 - MT 100 - MT 250



MTHP 160 - MTHP 250



Technical data - AFDD modular circuit breakers

				AFDD	
					
Standards:				IEC/EN 62606; IEC/EN 60898-1	
Rated current (In):		(A)	6-20		
Utilization category:			A		
Rated operational voltage (Ue):		(V)	230 - 240		
Minimum operating voltage (Ue min):		(V)	170 ac		
Threshold for protection against overvoltage:		(V)	275 ac		
Insulation voltage (Ui):		(V)	500		
Rated frequency:		(Hz)	50 / 60		
Rated impulse withstand voltage (Uimp):		(kV)	4		
Overvoltage category:			III		
Number of poles:			1+N		
Energy limiting class:			3		
Breaking capacity:					
		IEC/EN 60898-1	Icn	(A)	6000
Alternating current:		IEC/EN 60947-2	Icu	(kA)	7.5
			Ics	(kA)	6
Electrical endurance:					10000
Mechanical endurance:					20000
Max. no. of usable modular accessories:					-
Upline/downline power supply:					yes
ON/OFF status displayed:					yes
Mounting position:					any
Wiring:		max cable section (mm²)		rigid	25
				flexible	25
Screwdriver suggested:					PZ2
Rated tightening torque:				(Nm)	2.8
Stripping length of the cable:				(mm)	12
Degree of protection:		terminals			IP20
		front			IP40
Pollution degree:					2
Tropicalization:					55°C - RH 95%
Reference temperature:				(°C)	30
Operating temperature:				(°C)	-25 +55 ⁽¹⁾⁽²⁾
Stocking temperature:				(°C)	-40 +70
Weight:				(g)	180 (per device)
Curve:					C
Rated currents available In:		(A)	6		
			10		
			13		
			16		
			20		
Grid distance:		(mm)	35		

⁽¹⁾ With temperatures greater than 30°C, derating of In rated current is expected⁽²⁾ Average daily temperature ≤ 35°C

90 MCB

Power loss values and temperature performance

AFDD modular circuit breakers

Temperature performance

The maximum operating current depends on the ambient temperature (daily average $\leq 35^{\circ}\text{C}$).

AFDD TEMPERATURE DERATING										
In (A)	Temperature ($^{\circ}\text{C}$)									
	-25	-20	0	10	20	25	30	40	50	55
6	7.2	6.8	6.4	6.3	6.1	6	6	6	5.8	5.8
10	12.2	11.9	10.8	10.7	10.5	10.2	10	10	9.8	9.6
13	15.6	15.2	14.2	13.8	13.4	13.2	13	12.9	12.7	12.6
16	19.5	18.9	17.9	17.3	16.7	16.3	16	15.8	15.5	15.4
20	24.4	24	22.4	21.6	21	20	20	19.8	19.5	19.4

Power loss per device

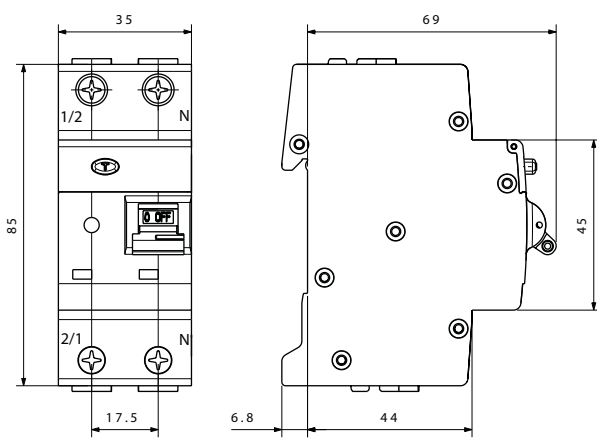
The following table shows the power loss values for the AFDD modular circuit breakers in order to check the overtemperature values inside the distribution board in relation to what Standards require.

POWER LOSS PER DEVICE				
In (A)	Voltage drop (mV)	Internal res. ($\text{m}\Omega$)	Power dissipation (W)	Consumption (W)
6	380	63.3	2.3	0.5
10	203	20.3	2	0.5
13	166	12.8	2.2	0.5
16	175	10.9	2.8	0.5
20	182	9.1	3.6	0.5

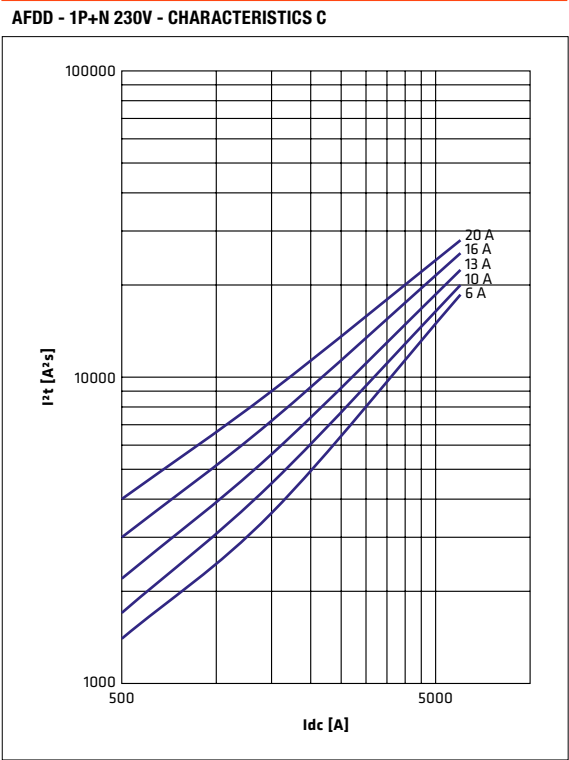
Influence of side-by-side devices

Number of devices installed side by side	1	3	5	7	9
Correction factor	1	0.92	0.88	0.85	0.84

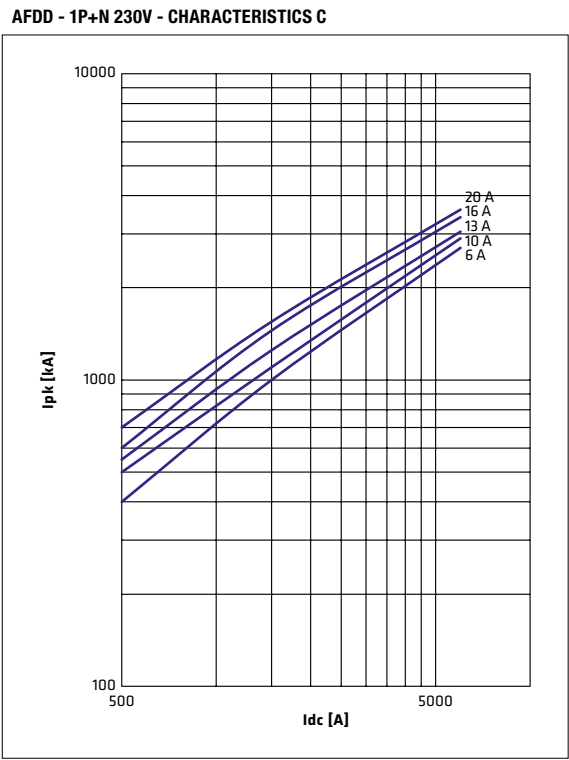
Dimension tables

AFDD


Specific let-through energy characteristics - AFDD modular circuit breakers



Peak current limitation characteristics - AFDD modular circuit breakers



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Economic and Administrative Index 107496 - Share Capital 60,096,000.00 EUR fully paid up

Company subject to the management and coordination of Polifin S.p.A.

