Product Data Sheet TD3 M06

Type : **1 to 4 poles and switched neutral MCB**

Summary :

1 General Characteristics

Protection against overloads and short circuits, switch control and isolation.
In commercial and industrial electrical distribution systems.

Curve : B & C (see ***appendix 1***)

Pôles : 1P, P+N, 2P, 3P, 4P, 3P+N

Current rating : 6 to 63 A

Voltage rating : 230V to 240V / 400V to 415V and +10%

Breaking capacity (Icn) 60898 :

Number of poles	Voltage (V)	Breaking capacity (A)
1P, P+N	230 to 240	6 000
2P, 3P, 4P, 3P+N	230 to 240	10 000
	400 to 415	6 000

Breaking capacity (Ics) 60898 : 100% of Icn

Frequency : 50 – 60 Hz

If the frequency is different, it's necessary to multiplied the magnetic value by coefficient K. But the thermal value is unchanged.

F (Hz)	$16^{2/3}$ Hz – 60 Hz	100 Hz	200 Hz	400 Hz
K	1	1,1	1,2	1,5

Rating insulation voltage (Ui) : 500 V according to EN60898-1

Rated impulse voltage (Uimp) : 4 kV

Electrical endurance : 10 000 cycles (O-C) up 25A to In *according to EN60898*
4 000 cycles (O-C) up 63A to In *according to EN60898*

Mechanical endurance : 20 000 cycle without load

IP rating : IP2x of terminals IP40 of enclosure

Temperature :

Calibration temperature : 30°C according to IEC / EN 60898
Working temperature : - 25°C to + 60 °C
Storage temperature : - 25°C to + 80 °C

Temperature derating :

MCBs are designed and calibrated to carry their rated current and to operate within their designated thermal time/current zone at 30 °C.
Testing is carried out with the breaker mounted singly in a vertical plane in a controlled environment. Therefore if the circuit breaker is required to operate in conditions which differ from the reference conditions, certain factors have to be applied to the standard data.
For instance if the circuit breaker is required to operate at higher ambient temperature than 30 °C it will require progressively less current to trip within the designated time/current zone.

Temperature Correction factor :

You will find in ***Appendix 1*** the correction values considering the ambient temperature

Grouping factor :

Rated current reduced by factor K
Consideration should also be given to the proximity heating effect of the breakers themselves when fully loaded and mounted together in groups.
There is a certain amount of watts loss from each breaker depending on the trip rating which may well elevate the ambient air temperature of the breaker above the ambient air temperature of the enclosure

No. of units n	K (grouping factor)
n = 1	1
$2 \leq n < 4$	0,95
$4 \leq n < 6$	0,9
$6 \leq n$	0,85

Note :If the design current of a circuit (Ib) is less than 0,85 times the nominal setting of the circuit breaker (In) grouping can be ignored.

Pollute degree :

3

Dielectric strength :

2,5kV *according to EN 60898*

Case material :

Thermoplastic (Polyamide)
Compliance with IEC 695-2-1

Glow-wire test :

960°C for case *according to IEC 60695-2-1*
650°C for toggle *according to IEC 60695-2-1*

Tropicalisation :

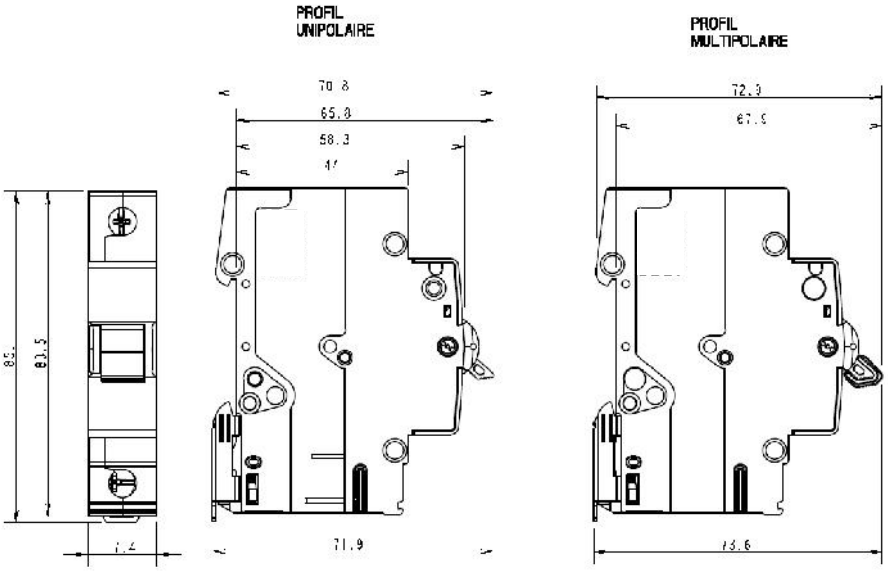
All climates, treatment 2 (relative humidity = 95% at 55°C)

2 Dimensional characteristics

2.1 Dimensions

Poles	Lg (Nb. Modules)*
1P	1
2P, 1P+N	2
3P	3
4P, 3P+N	4

* Width of 1 Mod 17,6 $^{\pm 0,1}$



2.2

2.2 Weight & packaging

No. of pole	1P	1P+N	2P	3P	4P
Weight (g)	118	237	237	354	475
Number of products per box	x12	x6	x6	x4	x3

3 Marking

On the shoulder :

On the face :

4 Installation

Mounting :	Din rail EN 50.022-35
Supply :	Feed either top or bottom
Connection capacity :	Rigid conductor : 25 mm² Flexible conductor : 16 mm² On a bottom, there is a bi-connect terminal
Tightening torque :	2,5 Nm nominal with Screw head pozidrive size 2 and slot 6 mm 3,15 Nm maximal with Screw head pozidrive size 2 and slot 6 mm
Type of cable :	Copper
Sealable :	The locking kit allows locking MCB in the “OFF” and “ON” position. The locking kit is sealable. The MCB can be lock in the “OFF” and “ON” position with max.∅ 1,5mm leading wire
Flag indicator :	No flag
Installation altitude :	2 000 meters max
Working position :	Product performances not affected if installed vertically, horizontally or flat
Din clip type :	Metal Din clip with 2 positions
Auxiliaries :	Yes

5 Options

5.1 Auxiliaries :

Earth leakage add-on blocks : please see the catalogue
Auxiliary contacts :
Auxiliary contact
+ alarm indication :
Shunt trip :
Under voltage release :

Remote control :

5.2 Accessories :

Locking kit :
Locking wire :
Fork Busbar :
Connectors :

6 Standards

Complies with : EN 60898 and IEC 60898

Approval laboratory	Logo	Countries
Kema	KEMA KEUR	Netherland

7 Power loss :

The power loss of MCB's is closely controlled by the standards and is calculated on the basic of the voltage drop across the main terminals measured at rated current.
The table below gives the watts loss per pole at rated current.

MCB rated current (A)	**0,5A**	**1A**	**2A**	**3A**	**4A**	**6A**	**10A**	**13A**	**16A**	**20A**	**25A**	**32A**	**40A**	**50A**	**63A**
Watts loss per pole (W)	**1.2**	**1.3**	**1.5**	**2.0**	**1.8**	**1.4**	**1.9**	**2.2**	**3**	**2.8**	**3.2**	**3.8**	**4.5**	**5.1**	**6.4**
Resistance R (mΩ)	4800	1300	375	222	113	113	39	19	13	13.3	11.7	7	5.1	3.7	2.8
Inductance L (µH)	174	42	42	13	4.2	4.2	7.2	3.5	2.4	3.1	2.7	1.54	1.5	1.21	1.29
Reactance Lω (mΩ)	55	13	13	4.1	1.32	1.32	2.26	1.1	0.75	0.97	0.85	0.48	0.47	0.38	0.41
Impedance Z (mΩ)	4800	1300	375	222	113	**113**	**39.1**	**19**	**13**	**13.3**	**11.7**	**7.02**	**5.12**	**3.72**	**2.83**

8 Operation in DC current

Because of their quick make and break design and excellent arc quenching capabilities Terasaki circuit breakers are suitable for DC applications.

The following parameters must be considered :

Max voltage per pole : 60V (6kA)

Network voltage : determined by the number of poles connected in series.

Short circuit current : determined the breaking capacity in relation to the network voltage and the number of poles connected in series.

No. of poles in series	**Breaking capacity (kA) L/R= 15 ms**		
	≤ 60 V	**≤ 125 V**	**≤ 250 V**
1	**6**	**-**	**-**
2	**6**	**6**	**-**

Tripping characteristics : the thermal trip remains unchanged.
the magnetic trip will become less sensitive requiring derating by √2 the AC value.

Magnetic trip	**C Curve**	
	50 Hz	**DC**
Irm1	5 In	5 In
Irm2	10 In	15 In

9 References

10 Tripping curve of MCB :

The curve in ***Appendix 2*** gives the time of tripping in relation to the prospective current.

11 Energy let-through (I^2t) : under 400V

The energy let-through of a circuit breaker is expressed in ampere squared seconds and referred as to as I^2t.
The curve in ***Appendix 3*** gives the maximum values of I^2t as a function of the prospective current.

12 Current limitation : under 400V

The energy limiting characteristics of circuit breakers reduce the damage that might otherwise be caused by short-circuits.
The curves in ***Appendix 4*** show energy limiting characteristics of our circuit breakers.

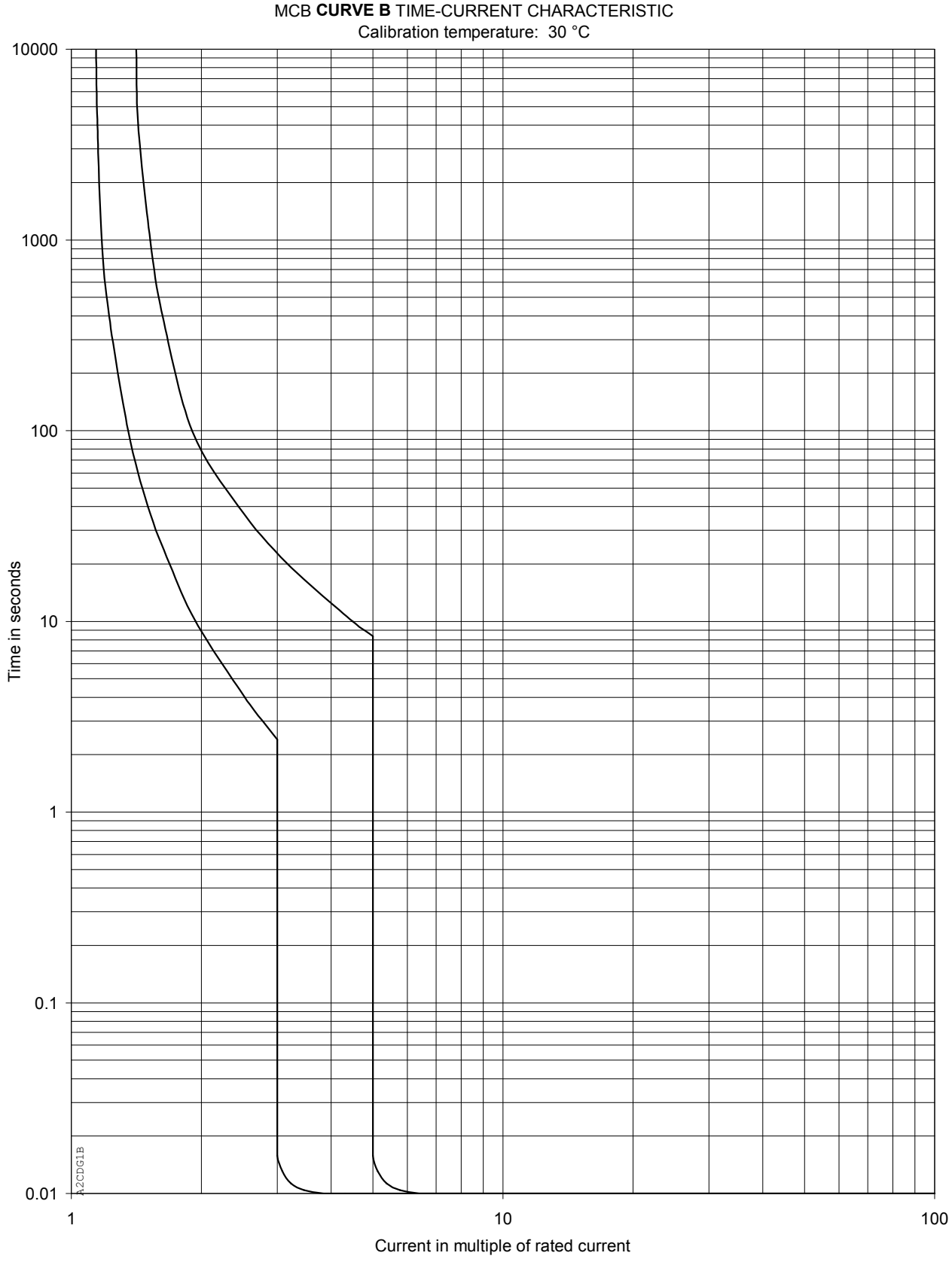
Appendix 1 : Temperature correction factor table

Miniature circuit breaker
Standard EN 60898
Curve B and C

In (A)	-25°C	-20°C	-15°C	-10°C	-5°C	0°C	5°C	10°C	15°C	20°C	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C
0.5	0.72	0.7	0.68	0.66	0.64	0.62	0.6	0.58	0.56	0.54	0.52	0.5	0.48	0.46	0.44	0.42	-	-
1	1.44	1.4	1.36	1.32	1.28	1.24	1.2	1.16	1.12	1.08	1.04	1	0.96	0.92	0.88	0.84	0.8	0.76
2	2.88	2.8	2.72	2.64	2.56	2.48	2.4	2.32	2.24	2.16	2.08	2	1.92	1.84	1.76	1.68	1.6	1.52
3	4.32	4.2	4.08	3.96	3.84	3.72	3.6	3.48	3.36	3.24	3.12	3	2.88	2.76	2.64	2.52	2.4	2.28
4	5.76	5.6	5.44	5.28	5.12	4.96	4.8	4.64	4.48	4.32	4.16	4	3.84	3.68	3.52	3.36	3.2	3.04
6	8.64	8.4	8.16	7.92	7.68	7.44	7.2	6.96	6.72	6.48	6.24	6	5.76	5.52	5.28	5.04	4.8	4.56
10	14.4	14	13.6	13.2	12.8	12.4	12	11.6	11.2	10.8	10.4	10	9.6	9.2	8.8	8.4	8	7.6
13	18.7	18.2	17.7	17.2	16.6	16.1	15.6	15.1	14.6	14.0	13.5	13	12.5	12.0	11.4	10.9	10.4	9.9
15	21.6	21	20.4	19.8	19.2	18.6	18	17.4	16.8	16.2	15.6	15	14.4	13.8	13.2	12.6	12	11.4
16	23.0	22.4	21.8	21.1	20.5	19.8	19.2	18.6	17.9	17.3	16.6	16	15.4	14.7	14.1	13.4	12.8	12.2
20	28.8	28	27.2	26.4	25.6	24.8	24	23.2	22.4	21.6	20.8	20	19.2	18.4	17.6	16.8	16	15.2
25	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19
32	46.1	44.8	43.5	42.2	41.0	39.7	38.4	37.1	35.8	34.6	33.3	32	30.7	29.4	28.2	26.9	25.6	24.3
40	57.6	56	54.4	52.8	51.2	49.6	48	46.4	44.8	43.2	41.6	40	38.4	36.8	35.2	33.6	32	30.4
50	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38
63	90.7	88.2	85.7	83.2	80.6	78.1	75.6	73.1	70.6	68.0	65.5	63	60.5	58.0	55.4	52.9	50.4	47.9

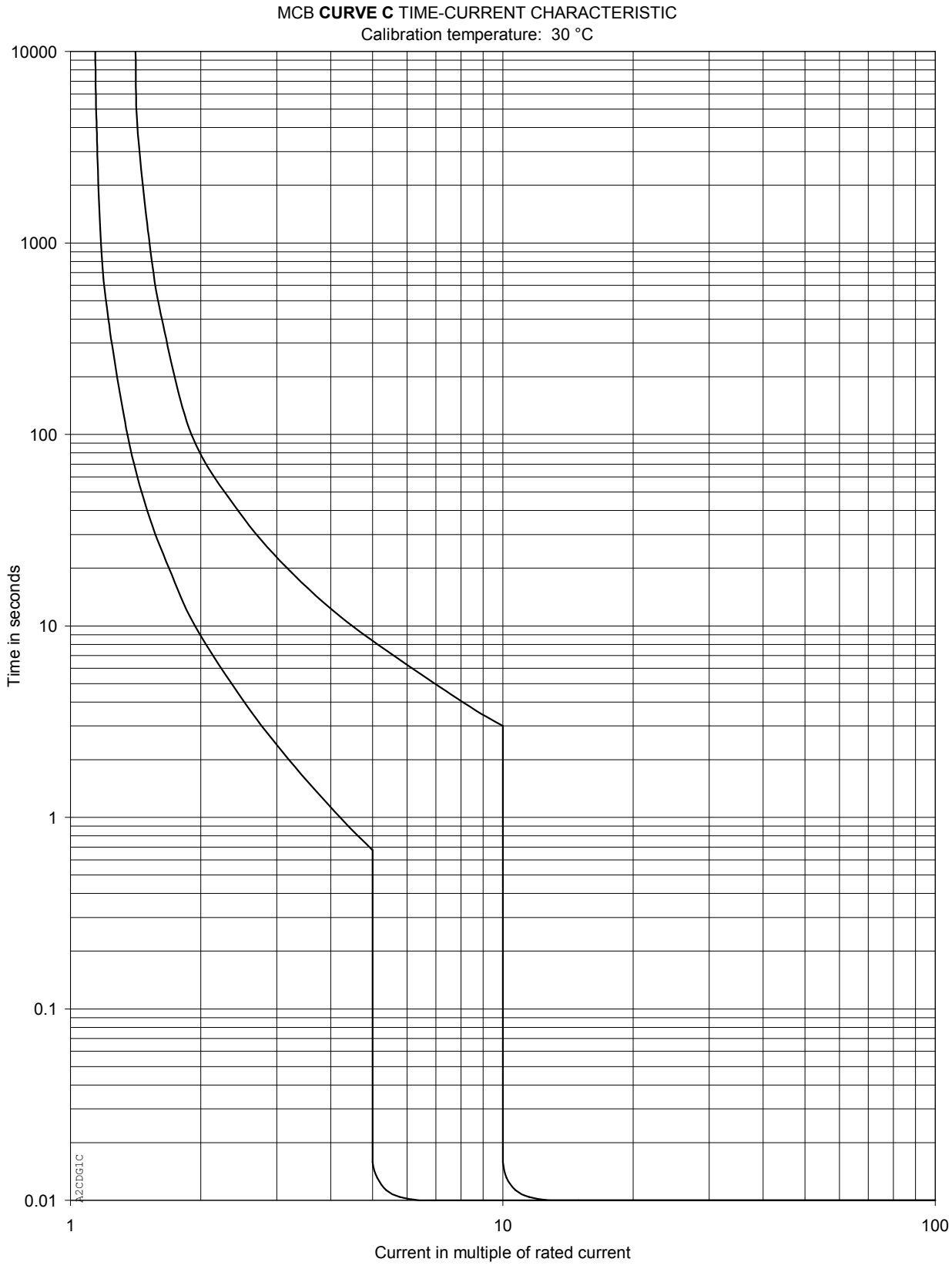
Appendix 2 : B Curve at 30 °C

Miniature circuit breaker
Standard EN 60898



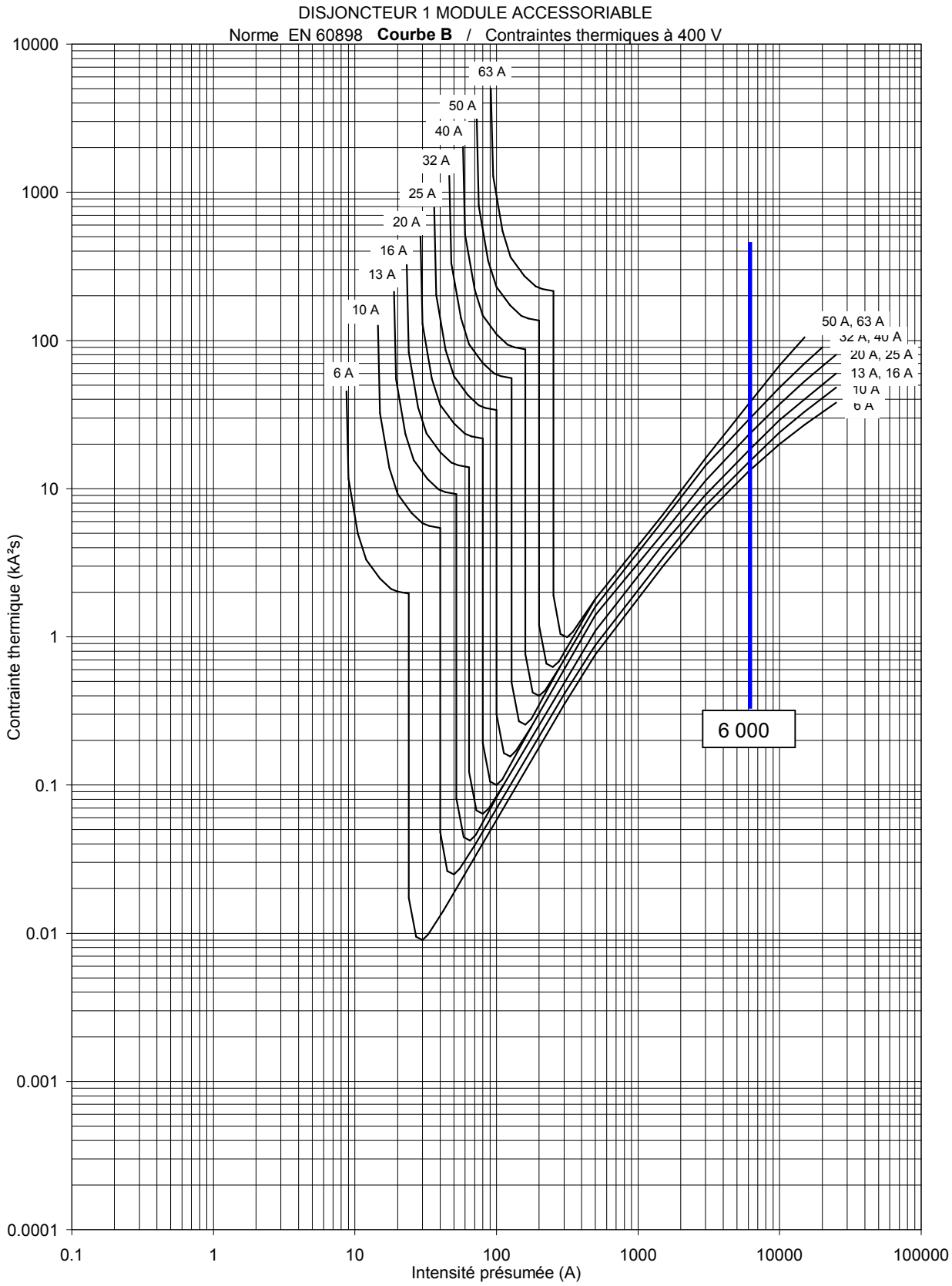
Appendix 2' : C Curve at 30 °C

Miniature circuit breaker
Standard EN 60898



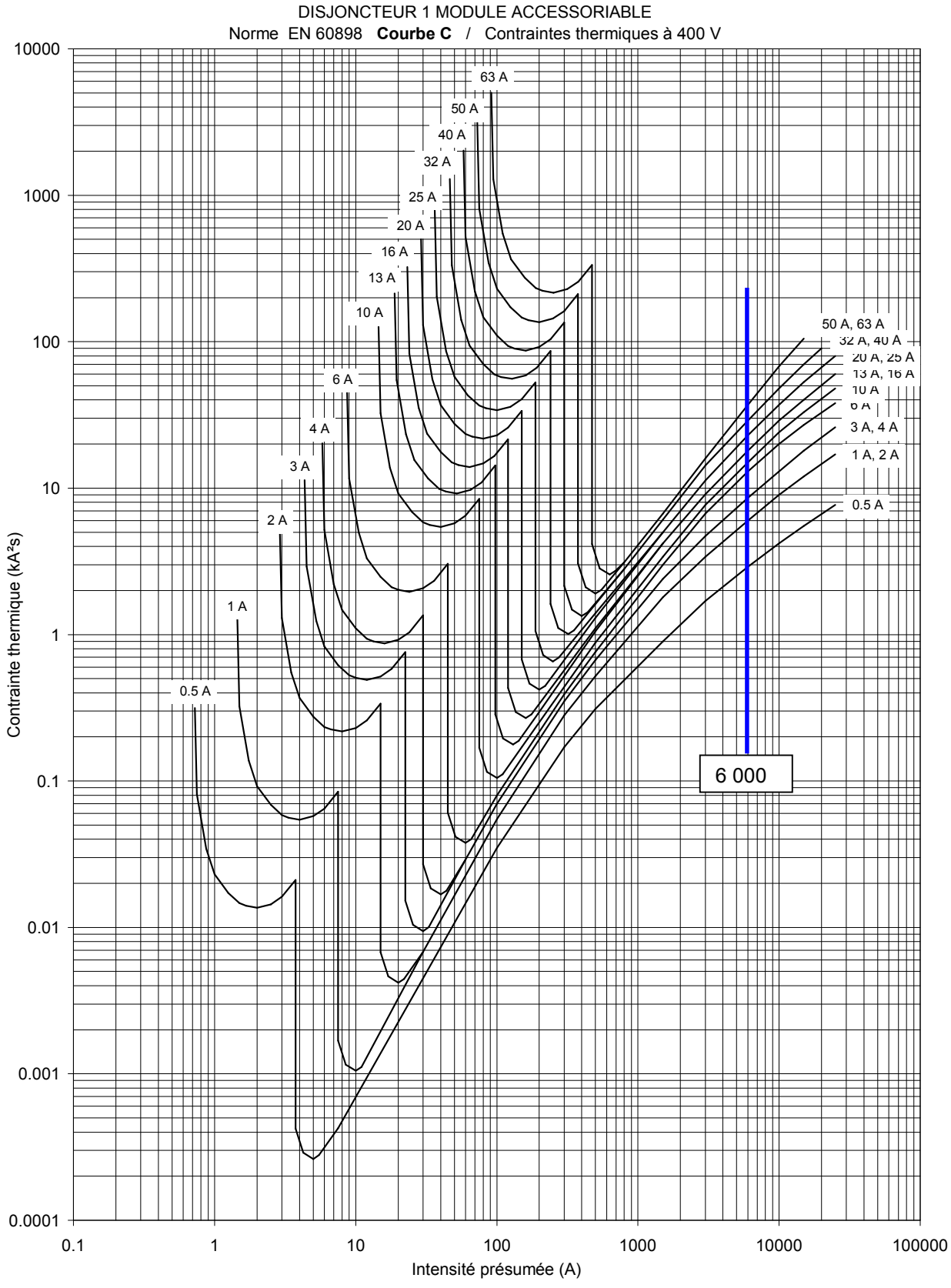
Appendix 3 : Energy let through at 400 V

Miniature circuit breaker
Standard EN 60898
Curve B

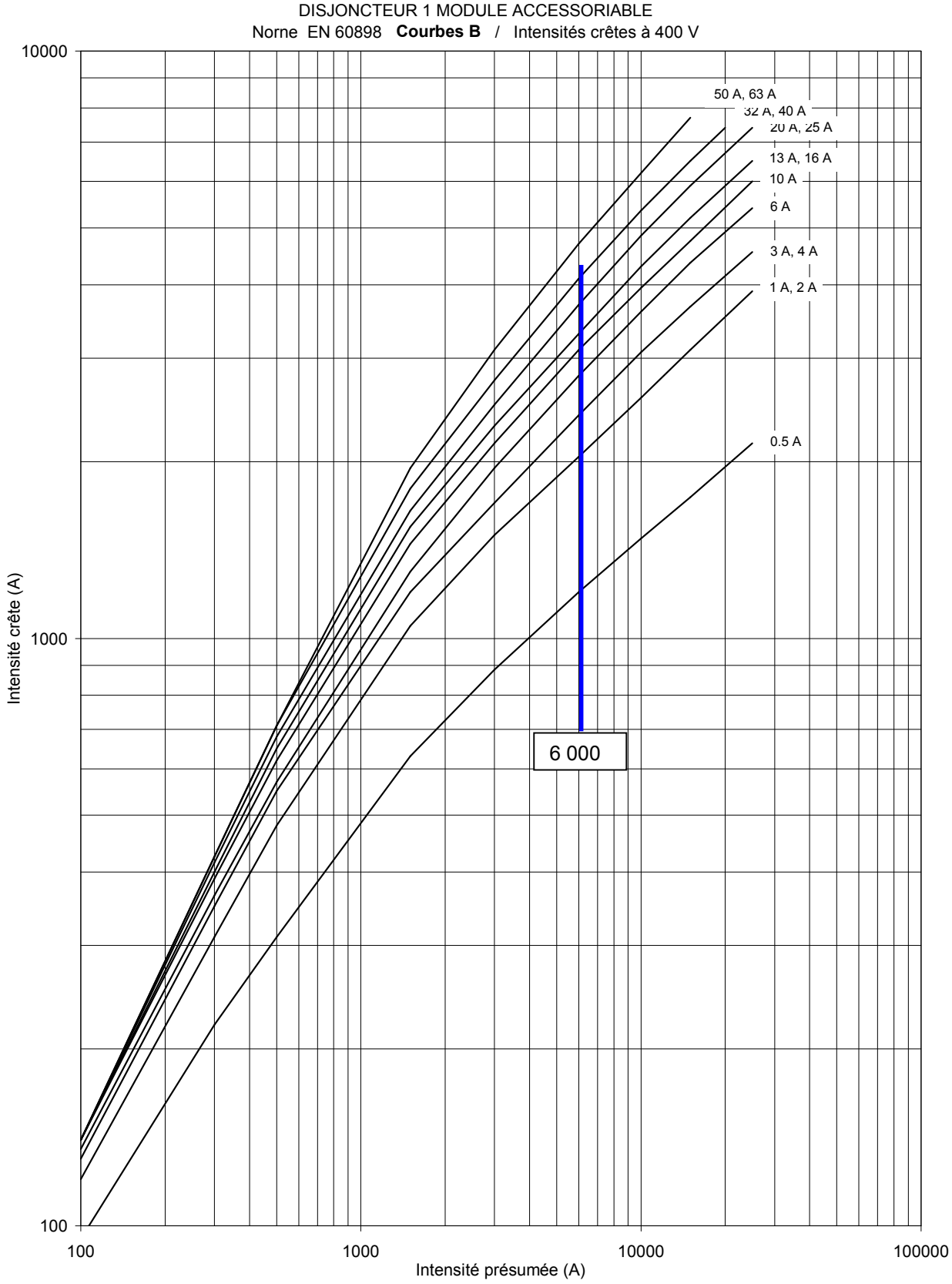


Appendix 3: Energy let through at 400 V

Miniature circuit breaker
Standard EN 60898
Curve C



Appendix 4: Current limitation at 400 V
Miniature circuit breaker
Standard EN 60898
Curve B



Appendix 4: Current limitation at 400 V

Miniature circuit breaker
Standard EN 60898
Curve C