

Tmax. T Generation.

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ABB



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Due to possible developments of standards as well as of materials, the characteristics and dimensions specified in the present catalogue may only be considered binding after confirmation by ABB SACE.



T GENERATION. COMPLETE

C

omplete Freedom is a fully coordinated family of moulded-case circuit-breakers up to 1600 A.

Complete Freedom is a family able to solve all performance, sizing and installation requirements efficaciously and intelligently.

Complete Freedom is a family with which you can choose any plant solution rapidly and easily.

It is called Tmax T Generation. The largest and most advanced family of moulded-case circuit-breakers. All the freedom you need.



FREEDOM.

Tmax is freedom. Freedom which reaches up to 1600 A today, with the new Tmax T7 circuit-breaker. Between 0 and 1600 A, there's a boundless and highly diversified world plants types, requirements, needs and problems. Everything becomes simple and rational with T Generation - seven sizes to find the solutions you're looking for.

Freedom to size any type of plant in the best way at all times, thanks to the seven sizes and a complete series of magnetic only, thermomagnetic and electronic trip units. There's also a varied range of accessories and you can select dedicated ranges for all market applications, even the most specific and advanced ones.

Freedom to install all the sizes without difficulty, because T Generation is the family of moulded-case circuit-breakers with absolutely the best performance-size ratio on the market, so can you imagine how much more space you can get for cabling and how easily you can carry it out? And further, what about the reduction in the switchboard dimensions?

The freedom of advanced technology. And it is thanks to this technology that T Generation offers you performances which were out of the question until now in circuit-breakers with these dimensions. Moreover, there are some exclusive technical solutions, which only ABB can offer you, such as the brand new electronic trip units designed for the new Tmax T7 or the new rapid accessory fitting system.

The freedom of choice in complete safety, because ABB's continual research and quality excellence lie behind Tmax. ABB quality.



COMPLETE FREEDOM FOR MAKING

T

max circuit-breakers have been designed profiting by the experience which, for dozens of years, has made ABB SACE recognised worldwide as a leader in constructing low voltage circuit-breakers.

It was not easy to find solutions which would allow all the Tmax circuit-breakers to achieve such high performances in such limited dimensions. A high breaking capacity and high limitation of the specific let-through energy, express the extremely advanced technological level reached by ABB.

Thanks to latest generation electronics, the new electronic trip units have many more functions. Amongst these, the brand new PR223EF stands out - the only one on the market able to offer high selectivity values and rapid tripping at the same time. Today more than yesterday, each installation, no matter what its type, has all the protection functions it needs. With T Generation, you are completely free.



GREAT TECHNOLOGICAL DEVELOPMENTS.





COMPLETE FREEDOM WITH

T

he key to greatly simplified installation is having circuit-breakers with smaller dimensions than all the others on the market (with the same performances). More space for the cabling operations, more compact and standardised switchboard compartments. And the result?

A sharp reduction in installation times.

All seven Tmax circuit-breakers follow the same design philosophy, offering a complete range of terminals for all installation requirements, as well as unified and standardised accessories.

Can you imagine circuit-breakers with reduced dimensions with ample and optimised terminal slots? Can you imagine the freedom of rapid accessory fitting? Have you any idea of the reduction in stock thanks to standardised accessories?

Being free also means having much more time for yourself.



A TOP LEVEL INSTALLATION.





COMPLETE FREEDOM FOR OPTIMAL

H

igher performances in less space. More applications, up to 1600 A, in seven sizes. Easier selection of the apparatus and accessories. Optimal sizing of the installation also comes from better protection of cables, busbar ducts and supports. Less space required in the metal structures. Less oversizing and therefore lower costs. Less time for coordinating the installations. Fewer stock complications.

With T Generation all the solutions needed can be chosen, as well as that of feeling freer to choose.



SIZING.



150 A 250 A

TMAX T1, T2, T3. ALL SOLUTIONS

Right from the beginning, Tmax T1, T2 and T3 - the three smallest sizes of the Tmax family - were thought up to work together. You can select functions and performances which until now couldn't be found in circuit-breakers of this size and, thanks to the numerous combinations Tmax offers you, you can deal with practically any application up to 250 A with just three sizes of apparatus.

There are so many characteristics common to the three sizes:

- The single depth (70 mm) for all three pieces of apparatus makes installation really simpler thanks to having more space for cabling, and fixing supports which are the same for all three sizes. For example, Tmax T3 becomes the first 250 A and 50 kA circuit-breaker which can be installed onto a DIN EN 50022 rail or on the Unifix rapid cabling system.

- The new arcing chambers are produced with a gasifying material and an innovative construction system allowing the arc extinction time to be reduced, so high limitation of short-circuit currents is guaranteed.

- All three sizes are fitted with adjustment of the thermal threshold as standard - a great advantage in terms of



flexibility for the various plant applications. Furthermore, the residual current protections have also been renewed. The new three-pole and four-pole residual current releases have been designed and constructed to optimise the space in the switchboard and simplify coupling with the circuit-breaker.

- Tmax T1, T2 and T3 have a completely standardised range of accessories which offers considerable benefits in terms of reduction in stocks and simplicity of selection.

TMAX T1. THE LITTLE ONE THAT'S REALLY BIG.

Thanks to its extremely compact dimensions, Tmax T1 is a unique circuit-breaker in its category.

Compared with any other circuit-breaker with the same performances (160 A - up to 36 kA at 415 V AC), the overall dimensions of the apparatus are notably smaller.



250 A



PERFECTLY COORDINATED, UP TO 250 A.

Thanks to its high performances, when used as a general switchboard circuit-breaker Tmax T1 does not have to undergo short-circuit withstand control tests.

TMAX T2. INTELLIGENCE AND HIGH PERFORMANCE IN THE PALM OF YOUR HAND.

Tmax T2 is the only 160 A circuit-breaker available with such high performances in such very limited overall dimensions. A breaking capacity of 85 kA at 415 V AC can be achieved.

■ Thanks to using the advanced double breaking system with “forked” moving contacts, Tmax T2 offers current-limiting performances which are exceptional for such a compact circuit-breaker, to great advantage of sizing the apparatus and the cables installed on the load side.

■ Tmax T2 can be fitted with the latest generation electronic trip unit. This is the first time that a circuit-breaker of this size can benefit from electronic



protection allowing such a wide and varied possibility of settings.

■ Furthermore, Tmax T2 allows particularly advantageous coordinations for motor protection up to a power of 45 kW at 415 V AC.

TMAX T3. 250 A IN A DEPTH OF 70 mm FOR THE FIRST TIME.

Tmax T3 is the first circuit-breaker which carries 250 A in considerably limited overall dimensions compared with any other similar apparatus - a real step forward for this type of apparatus.

■ Tmax T3 allows coordinations for motor protection up to a power of 90 kW at 415 V AC.

■ Standardisation of the front of the Tmax T3 circuit-breaker with that of the other two circuit-breakers of the family, provides great rationalisation of switchboard doors.

■ First to do so, ABB SACE offers the same terminals for both fixed apparatus and for fixed parts, with a connection capacity comparable to that of larger sized circuit-breakers.



TMAX T4, T5, T6. BE FREE

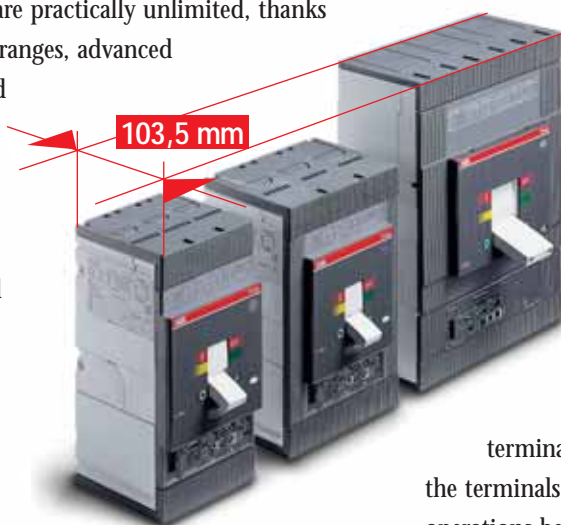
TMAX T4, T5 AND T6. BE FREE UP TO 1000 A.
Tmax T4, T5 and T6 are undeniably the moulded-case circuit-breakers with the best performance/size ratio on the market.

Their application possibilities are practically unlimited, thanks to their dedicated and specific ranges, advanced electronics, and a complete and standardised range of accessories. With Tmax T4, T5 and T6 it's easy to achieve your goal:

- The three sizes - T4, T5 and T6 - offered by ABB SACE up to 1000 A feature a really high rated current/volume ratio. Top quality materials and the innovative constructions techniques used mean Tmax circuit-breakers can guarantee truly exceptional performances. T4 and T5, for example, guarantee a breaking capacity up to 200 kA at 415 V AC as well as an extraordinary 80 kA at

690 V AC. The range for applications at 1000 V, in alternating and direct current, must be highlighted, with top level performances in their category for all three T4, T5 and T6 sizes.

- The range of electronic trip units, equipped with latest generation technology, offers solutions exclusive to ABB, such as the RC223 (B type) residual current release, sensitive to continuous fault currents and frequencies up to 1000 Hz.
- T4, T5 and T6 also have the same depth, simplifying their positioning in the switch-board compartments and allowing ever more compact and standardised cubicles to be constructed. And that's not all: thanks to their limited dimensions and the complete



range of connection terminals, there is better access to the terminals so connection and cabling operations become more convenient. This is the versatility of T Generation.

- Tmax T4, T5 and T6 also have a complete, standardised and unified





TO CHOOSE UP TO 1000 A.

range of accessories available, simplifying selection, making their use flexible, and reducing stocks. With Tmax you can choose accessories with your eyes shut.

New PR223EF trip unit. This is where the exclusive innovation is to be found.

The new PR223EF trip unit with the EFPD System offers two characteristics which until now were antithetic: selectivity and rapid tripping.

With the new PR223EF a new range up to 1000 A has been conceived for specific needs requiring high selectivity values, with unique characteristics on the market: rapid detection of the fault, selectivity up to more than 100 kA, and no limit to the number of hierarchical levels of the distribution plant. All these technical advantages mean notably simplifying selection of the circuit-breakers inside the installation and allowing their sizes to be reduced, as well as optimising cable and busbar sizing. And what is the outcome? Considerable reductions in plant costs.



New PR223DS trip unit. Freedom of control.

New electronic PR223DS trip unit. Freedom of control. The new PR223DS trip unit, available for T4, T5 and T6, has been conceived and built for power distribution circuit-breakers. Now all the different electrical values of the plant can be measured. And that's not all. There are LEDs available on the front of the trip unit which signal some configurations and the presence of any alarms (overload, incorrect connections, etc.).

1600A

TMAX T7. FREEDOM

Tmax T7 is the new circuit-breaker in the Tmax family. Two versions up to 1600 A, either with manual operating mechanism or motor operator. Tmax T7 has been conceived with a really revolutionary design for circuit-breakers of this type: advanced electronics, exceptional performances and new installation and accessory fitting solutions.

THE RAPIDITY OF AN INNOVATIVE INSTALLATION.

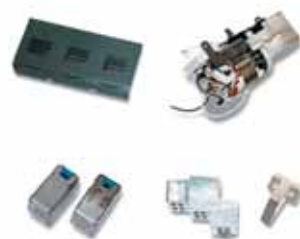
■ Flexibility is absolutely exceptional with Tmax T7. This is thanks to the possibility of both vertical and horizontal installation (in the withdrawable version, too), of all the types of terminals (among which, flat orientated rear terminals) and to the new racking-out system for the moving part. Now the racking-out operation is even safer and prevents accidental or unwarranted and potentially dangerous operations.

Cabling is also considerably simplified by the reduced height.

■ A great news is the latest rapid accessory wiring system. No wires inside the circuit-breaker, rapid, simple and safe connection to the external circuit, no screws for fixing the external power supply cables and no increase in the overall

dimensions of the circuit-breaker. This is all the fruit of long and careful research which has led ABB SACE to construct some really simple and ingenious solutions.

■ When the internal accessories are positioned in the circuit-breaker they are automatically ready to be supplied with power thanks to a connection to the outside by means of electric connections in the circuit-breaker itself. By means of a terminal box, external connection takes place on the upper part of the circuit-breaker, so Tmax T7 keeps its original dimensions whatever accessory is installed. Furthermore, the newly conceived terminals, without screws for connection, guarantee safer fixing even in the case of impact and vibrations.



GREAT VERSATILITY FOR OPTIMAL SIZING.

Considerable advantages in terms of optimal sizing are to be had with the exclusive new cable interlock. By using this accessory, it is possible to interlock two circuit-breakers in



TO THE NTH POWER.

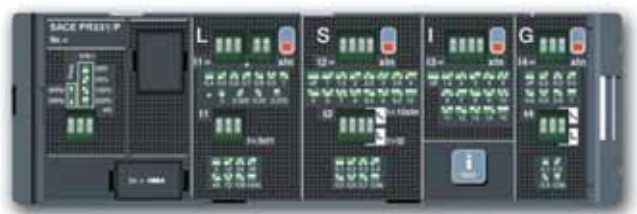
any position and, above all, to interlock a T7 even with an air circuit-breaker. Impossible until today, this solution is ideal for automatic transfer switch solutions where the emergency generator is small compared with the network power required by the plant during normal service.

1250 A current-limiting circuit-breaker.

In the best Tmax tradition, the new T7 – outcome of a long and careful design stage – achieves exceptional performances in incredibly compact dimensions. Tmax T7 is the first true current-limiting circuit-breaker up to 1250 A.

Technically state-of-the-art electronic trip units.

Special attention has been paid to the electronics and the results are there to be seen: interchangeable electronic trip units, modularity and rating plug which can be replaced by the customer. Starting from the PR231 trip unit, the rated current of the trip unit can be changed by means of the rating-plug. PR231, PR232 and PR331 are fitted with dip-switches to adjust the protection thresholds. Furthermore, for the PR232 and PR331, a signalling



led is available to signal protection tripped for each protection function: this means the reason for circuit-breaker tripping can always be found.

The PR332 trip unit is decidedly ahead of its time in the present panorama of protection trip units for low voltage circuit-breakers. PR332 is fitted with a large graphic display where all the information required can be displayed simply and clearly (protection function settings, alarms and electrical values). As well as the “classic” protection functions, PR332 also has advanced protection functions, which make this trip unit state-of-the-art technically. For example, the exclusive data logger function allowing all the events and values before the fault to be recorded for later analysis. Last but not least, there are the voltage and the communication modules according to the Modbus RTU standard protocol: modular and interchangeable by the customer. With Tmax T7 you choose the power of freedom.

Circuit-breakers for power distribution.

Electrical Characteristics.

		Tmax T1 1P		Tmax T1		Tmax T2			Tmax T3		
Rated uninterrupted current, I_u [A]	[A]	160		160		160			250		
Poles	[Nr]	1		3/4		3/4			3/4		
Rated service current, U_e	(AC) 50-60 Hz [V]	240		690		690			690		
	(DC) [V]	125		500		500			500		
Rated impulse withstand voltage, U_{imp}	[kV]	8		8		8			8		
Rated insulation voltage, U_i	[V]	500		800		800			800		
Test voltage at industrial frequency for 1 min.	[V]	3000		3000		3000			3000		
Rated ultimate short-circuit breaking capacity, I_{cu}		B	B	C	N	N	S	H	L	N	S
(AC) 50-60 Hz 220/230 V	[kA]	25*	25	40	50	65	85	100	120	50	85
(AC) 50-60 Hz 380/415 V	[kA]	-	16	25	36	36	50	70	85	36	50
(AC) 50-60 Hz 440 V	[kA]	-	10	15	22	30	45	55	75	25	40
(AC) 50-60 Hz 500 V	[kA]	-	8	10	15	25	30	36	50	20	30
(AC) 50-60 Hz 690 V	[kA]	-	3	4	6	6	7	8	10	5	8
(DC) 250 V - 2 poles in series	[kA]	25 (at 125 V)	16	25	36	36	50	70	85	36	50
(DC) 250 V - 3 poles in series	[kA]	-	20	30	40	40	55	85	100	40	55
(DC) 500 V - 2 poles in series	[kA]	-	-	-	-	-	-	-	-	-	-
(DC) 500 V - 3 poles in series	[kA]	-	16	25	36	36	50	70	85	36	50
(DC) 750 V - 3 poles in series	[kA]	-	-	-	-	-	-	-	-	-	-
Rated service short-circuit breaking capacity, I_{cs}											
(AC) 50-60 Hz 220/230 V	[%I _{cu}]	75%	100%	75%	75%	100%	100%	100%	100%	75%	50%
(AC) 50-60 Hz 380/415 V	[%I _{cu}]	-	100%	100%	75%	100%	100%	100%	75% (70 kA)	75%	50% (27 kA)
(AC) 50-60 Hz 440 V	[%I _{cu}]	-	100%	75%	50%	100%	100%	100%	75%	75%	50%
(AC) 50-60 Hz 500 V	[%I _{cu}]	-	100%	75%	50%	100%	100%	100%	75%	75%	50%
(AC) 50-60 Hz 690 V	[%I _{cu}]	-	100%	75%	50%	100%	100%	100%	75%	75%	50%
Rated short-circuit making capacity, I_{cm}											
(AC) 50-60 Hz 220/230 V	[kA]	52.5	52.5	84	105	143	187	220	264	105	187
(AC) 50-60 Hz 380/415 V	[kA]	-	32	52.5	75.6	75.6	105	154	187	75.6	105
(AC) 50-60 Hz 440 V	[kA]	-	17	30	46.2	63	94.5	121	165	52.5	84
(AC) 50-60 Hz 500 V	[kA]	-	13.6	17	30	52.5	63	75.6	105	40	63
(AC) 50-60 Hz 690 V	[kA]	-	4.3	5.9	9.2	9.2	11.9	13.6	17	7.7	13.6
Opening time (415 V)	[ms]	7	7	6	5	3	3	3	3	7	6
Utilisation category (IEC 60947-2)		A		A		A			A		
Reference Standard		IEC 60947-2		IEC 60947-2		IEC 60947-2			IEC 60947-2		
Isolation behaviour		■		■		■			■		
Trip units: thermomagnetic											
T fixed, M fixed	TMF	■	-	-	-	-	-	-	-	-	-
T adjustable, M fixed	TMD	-	■	-	-	-	■	-	-	■	-
T adjustable, M adjustable (5...10 x I _n)	TMA	-	-	-	-	-	-	-	-	-	-
T adjustable, M fixed (3 x I _n)	TMG	-	-	-	-	-	■	-	-	■	-
T adjustable, M adjustable (2.5...5 x I _n)	TMG	-	-	-	-	-	-	-	-	-	-
electronic											
PR221DS		-	-	-	-	-	■	-	-	-	-
PR222DS		-	-	-	-	-	-	-	-	-	-
PR223DS-EF		-	-	-	-	-	-	-	-	-	-
PR231/P		-	-	-	-	-	-	-	-	-	-
PR232/P		-	-	-	-	-	-	-	-	-	-
PR331/P		-	-	-	-	-	-	-	-	-	-
PR332/P		-	-	-	-	-	-	-	-	-	-
Interchangeability		-	-	-	-	-	-	-	-	-	-
Versions		F		F		F-P			F-P		
Terminals fixed		FC Cu		FC Cu-EF-FC CuAl-HR		FC Cu-FC CuAl-EF-ES			F-FC Cu-FC Cu Al-EF-ES-R		
plug-in		-		-		FC Cu-FC CuAl-EF-ES			F-FC Cu-FC Cu Al-EF-ES-R		
withdrawable		-		-		-			-		
Fixing on DIN rail		-		DIN EN 50022		DIN EN 50022			DIN EN 50022		
Mechanical life	[No. operations]	25000		25000		25000			25000		
	[No. Hourly operations]	240		240		240			240		
Electrical life @ 415 V AC	[No. operations]	8000		8000		8000			8000		
	[No. Hourly operations]	120		120		120			120		
Basic dimensions - fixed version											
	W [mm]	25.4 (1 pole)		76		90			105		
4 poles	W [mm]	-		102		120			140		
	D [mm]	70		70		70			70		
	H [mm]	130		130		130			150		
Weight fixed	3/4 poles [kg]	0.4 (1 pole)		0.9/1.2		1.1/1.5			1.5/2		
plug-in	3/4 poles [kg]	-		-		1.5/1.9			2.7/3.7		
withdrawable	3/4 poles [kg]	-		-		-			-		

KEY TO TERMINALS
 F = Front
 EF = Front extended

ES = Front extended spread
 FC Cu = Front for copper cables
 FC CuAl = Front for CuAl cables

R = Rear orientated
 MC = Multicable
 F = Fixed circuit-breaker

P = Plug-in circuit-breakers
 W = Withdrawable circuit-breakers
 HR = Rear flat horizontal

VR = Rear flat vertical
 HR/VR = Rear flat orientated

Tmax T4					Tmax T5					Tmax T6				Tmax T7			
250/320					400/630					630/800/1000				800/1000/1250/1600			
3/4					3/4					3/4				3/4			
690					690					690				690			
750					750					750				-			
8					8					8				8			
1000					1000					1000				1000			
3500					3500					3500				3500			
N	S	H	L	V	N	S	H	L	V	N	S	H	L	S	H	L	V ⁽⁶⁾
70	85	100	200	300	70	85	100	200	300	70	85	100	200	85	100	200	200
36	50	70	120	200	36	50	70	120	200	36	50	70	100	50	70	120	150
30	40	65	100	180	30	40	65	100	180	30	45	50	80	50	65	100	130
25	30	50	85	150	25	30	50	85	150	25	35	50	65	40	50	85	100
20	25	40	70	80	20	25	40	70	80	20	22	25	30	30	42	50	60
36	50	70	100	150	36	50	70	100	150	36	50	70	100	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	36	50	70	100	25	36	50	70	100	20	35	50	65	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	25	36	50	70	16	25	36	50	70	16	20	36	50	-	-	-	-
100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	100% ⁽¹⁾	100% ⁽²⁾	100%	100%	100%	75%	100%	100%	75%	100%
100%	100%	100%	100%	100%	100%	100%	100% ⁽¹⁾	100% ⁽²⁾	100% ⁽²⁾	75%	75%	75%	75%	100%	75%	75%	75%
154	187	220	440	660	154	187	220	440	660	154	187	220	440	187	220	440	440
75.6	105	154	264	440	75.6	105	154	264	440	75.6	105	154	220	105	154	264	330
63	84	143	220	396	63	84	143	220	396	63	94.5	105	176	105	143	220	286
52.5	63	105	187	330	52.5	63	105	187	330	52.5	73.5	105	143	84	105	187	220
40	52.5	84	154	176	40	52.5	84	154	176	40	48.4	55	66	63	88.2	105	132
5	5	5	5	5	6	6	6	6	6	10	9	8	7	15	10	8	8
A					B (400 A) ⁽³⁾ - A (630 A)					B (630A - 800A) ⁽⁵⁾ - A (1000A)				B ⁽⁷⁾			
IEC 60947-2					IEC 60947-2					IEC 60947-2				IEC 60947-2			
■					■					■				■			
-					-					-				-			
■ (up to 50 A)					-					-				-			
■					■					■ ⁽⁴⁾				-			
-					-					-				-			
■					■					■				-			
■					■					■				-			
-					-					-				■			
-					-					-				■			
-					-					-				■			
■					■					■				■			
F-P-W					F-P-W					F-W				F-W			
F-FC Cu-FC CuAl-EF-ES-R-MC					F-FC Cu-FC CuAl-EF-ES-RC					F-FC CuAl-EF-ES-R				F-EF-ES-FC CuAl-HR/VR			
EF-ES-HR-VR-FC Cu-FC CuAl					EF-ES-HR-VR-FC Cu-FC CuAl					-				-			
EF-ES-HR-VR-FC Cu-FC CuAl					EF-ES-HR-VR-FC Cu-FC CuAl					EF-HR-VR				F-HR/VR			
-					-					-				-			
20000					20000					20000				10000			
240					120					120				60			
8000 (250 A) - 6000 (320 A)					7000 (400 A) - 5000 (630 A)					7000 (630A) - 5000 (800A) - 4000 (1000A)				7000 (800/1000/1250) - 5000 (1600)			
120					60					60				60			
105					140					210				210			
140					184					280				280			
103.5					103.5					103.5				154 (manual)/178(motorizable)			
205					205					268				268			
2.35/3.05					3.25/4.15					9.5/12				9.7/12.5 (manual)/11/14(motorizable)			
3.6/4.65					5.15/6.65					-				-			
3.85/4.9					5.4/6.9					12.1/15.1				29.7/39.6 (manual)/32/42.6(motorizable)			

(*) The breaking capacity for settings
In=16 A and In=20 A is 16 kA

⁽¹⁾ 75% for T5 630

⁽²⁾ 50% for T5 630

⁽³⁾ Icw = 5 kA

⁽⁴⁾ Not available on T6 1000 A

⁽⁵⁾ Icw = 7.6 (630 A) - 10 (800 A)

⁽⁶⁾ Only for T7 800/1000/1250 A

⁽⁷⁾ Icw = 22 kA (S, H, L versions) - 15 kA (V version)

Note: in the plug-in version of T2, T3, T5 and in the withdrawable version of T5 the maximum setting is derated by 10% at 40 °C