Technical catalog

ABB molded case circuit breakers

UL 489 and CSA C22.2 Standard

1SDC210003D0203

ABB molded case circuit breakers - UL 489 and CSA C22.2 Standard

OVERVIEW

molded case

circuit breakers

COMPLETE AND PERFECTLY INTEGRATED

In the range of molded case circuit breakers conforming with the UL 489 and CSA C22.2 Standard, ABB proposes an entire range which covers current ratings between 15 A and 2500 A and interrupting ratings, at 480 V AC, which can reach 150 kA.

The ranges available are as follows:

– circuit breakers for power distribution (fitted with thermomagnetic or electronic trip units starting from 100 A)

– circuit breakers with adjustable magnetic only trip units for motor protection (MCP: Motor Control Protection)

– molded case switches for use as isolators or switching devices for lines, busbars or parts of a plant (MCS: Molded Case Switch)

With the introduction of the new Tmax UL series, a single-pole circuit breaker with interrupting rating of 18 kA at 277 V AC is available on the American market for the first time.

480 V

All ABB circuit breakers in accordance with the UL 489 and CSA C22.2 Standard can be used in installations with wye or delta distribution systems since use of the circuit breaker at 480 V AC is guaranteed, even for the smallest Tmax T1 size.

COMPACT DIMENSIONS

ABB molded case circuit breakers ensure high performances in extremely small and compact dimensions. Standardization of the depth of the smaller sizes allows more rational and less deep enclosure to be used than in the past.

DOUBLE INSULATION

Thanks to the double insulation technique, with all ABB molded case circuit breakers* the electrical accessories can be mounted directly on field with the circuit breaker installed: this allows considerable savings in time and therefore in costs.

* Except for Isomax S8.


Tmax T5H 400
ABB
Tmax
I
on
O
In= 400A
Test/Prg
PR222DS/PD
Tmax T4H 250
ABB
Tmax
I
on
O
In= 250A
PR221DS
Tmax T3N
ABB
Tmax
I
on
O
In= 250A
MIN 175A
MED 212A
MAX 250A
2500A
InN = 50%In

Tmax

T GENERATION

Tmax has grown. ABB experience in designing and manufacturing molded case circuit breakers has made it possible to create circuit breakers which, up to 600 A, allow any application to be faced practically and simply.

The new Tmax have been thought up to work together, to help you carry out selections and correct sizing, to make installation simpler, but above all to give you top level performances.

The latest generation technology is present for the first time even in the smallest sizes.

With Tmax you have everything you need at hand to make your job easier, from all types of accessories and terminals. The T Generation grows, and so does freedom.

TMAX.
BE FREE.

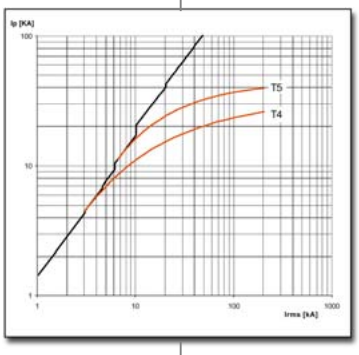
PREMIO INTEL DESIGN 2003
INNOVATION
TECHNOLOGY
DESIGN
"AUGUSTO MORELLO"

The Tmax T4 and T5 circuit breakers have obtained the prestigious "INTEL Design 2003 – Augusto Morello award" in the Product Technologies and Production processes section.


Tmax
Creation

TECHNOLOGY

TMAX. BE FREE TO RIDE THE MOST ADVANCED TECHNOLOGY.



It was not easy to find solutions which would allow the Tmax circuit breakers to achieve such high performances in such limited dimensions, but thanks to the experience which has been recognised to a leader such as ABB for decades, the objectives we had set ourselves have been achieved. So this has meant being able to equip such a small circuit breaker as the T2 with an electronic trip unit, to fit the circuit breakers with new arcing chambers which allow the arc extinction time to be reduced, or, still further, to provide double insulation for ever greater safety right from the smallest size. A complete series of latest generation trip units is available, from the electronic to the thermomagnetic or magnetic only ones - all interchangeable.

The new Tmax T4 and T5 are an example of the great technology expressed by this family of circuit breakers with high breaking capacity and high limitation of the specific let-through energy.

Being free is also all this.


Tmax
Enter

SIZING

TMAX. BE FREE TO CHOOSE OPTIMAL SIZING.

All the circuit breakers in the Tmax family come from optimisation of installation sizing. With T1,T2 and T3 you can find the ideal product for sizing an installation up to 225 A, and with T4 and T5 up to 600 A. Furthermore, with the latter, high selectivity values are obtained for optimal coordination with other circuit breakers. You can also choose the best solution for motor protection with the motor control protection (MCP).

Higher performances in less space. More applications up to 600 A. Easier selection of the circuit breakers and accessories. Optimal sizing of the installation and better protection of cables, busbar ducts and supports. Less space required in the switchgear and in the metal structures.

Less oversizing and therefore lower costs.

Less time for coordinating the installations.

Fewer stock complications. With Tmax, all the solutions needed can be chosen, as well as that of feeling freer to choose.


Transaction

INSTALLATION

TMAX. BE FREE TO DRIBBLE ROUND ALL INSTALLATION DIFFICULTIES.

Having circuit breakers available with smaller dimensions than all the others on the market undoubtedly offers great advantages - more space for cabling operations and simpler installation, therefore notable savings in time - five sizes, just two depths - 2.76 inches (70 mm) for T1, T2, T3 and 4.07 inches (103.5 mm) for T4 and T5, and the latter also have the same height. They are also available in all the versions: fixed, plug-in and draw out and, thanks to special kits, passing from a fixed circuit breaker to a plug-in/ draw out one is child's play. Flexibility of use over the whole series is ensured by the complete range of connection terminals and by the large number of accessories.

Being free also means having much more time for yourself.

from 800 A to


ABB
SACE S8
ABB S7H
ISOMAX
INSTANTANEOUS TRIP
ADJUSTABLE MAGNETIC RANGE
ABB
SACE S7
I
on
O
off
SACE PR211
SACE PR212/P
OFF
SPRINGS DISCHARGED
Push OFF
Push ON
ABB
S8V

2500 A with ISOMAX

100% UL RATED CIRCUIT BREAKERS

The 100% rated versions for Isomax circuit breakers are available thanks to the excellent thermal sizing of the latter.

ALL THE APPLICATIONS

ABB offers the right solution for any application up to 2500 A thanks to Isomax S6, S7 and S8 circuit breakers, perfectly integrated with the Tmax family:

– **MCCB**: S6, S7 and S8 molded case circuit breakers for power distribution;
– **MCP**: S6, S7 and S8 circuit breakers with magnetic only trip unit for motor control protection;
– **MCS**: S6, S7 and S8 molded case switches for using as isolators or switching devices for lines, busbars or parts of plants.

MAXIMUM VERSATILITY

Isomax circuit breakers can be fitted with a wide range of terminals for every kind of connections. Modular design also makes installation and assembly extremely simple.

COMPLETE RANGE OF ACCESSORIES

Isomax circuit breakers are complemented by a complete range of accessories to satisfy the widely differing operational and automation requirements. Accessories are standardized for groups of circuit breakers to streamline storage logistics and simplify installation.

Isomax circuit breakers can be customized as required under conditions of absolute safety.

All the accessories can be mounted with simple operations without exposing the main contacts (except for the Isomax S8).

Circuit breakers for power distribution

Electrical characteristics




UL 489 CSA C22.2

				Tmax T1 1P	Tmax T1	Tmax T2	Tmax T3
Frame size			[A]	100	100	100	225
Number of poles			[Nr]	1	3,4	3,4	3,4
Rated voltage	**AC (50-60Hz)**		[V]	277	600Y/347	480	600Y/347
	DC		[V]		500		500
Interrupting ratings				**B**	**N**	**S H**	**N S**
	AC	240 V	[kA]		50[2]	65 100	50 65
		277 V	[kA]	18[1]			
		480 V	[kA]		22[2]	35 65	25 35
		600Y/347 V	[kA]		10		10 10
		600 V	[kA]				
	DC	250 V - 2 poles in series	[kA]		25		25 35
		500 V - 3 poles in series	[kA]		25		25 35
		500 V - 2 poles in series	[kA]				
		600 V - 3 poles in series	[kA]				
Trip units			TMF	■	■	■	■
			TMD/TMA				
			ELT			■	
			MA			■	■
Versions			MCCB	■	■	■	■
			MCS		■		■
			MCP			■	■

IEC 60947-2

				Tmax T1 1P	Tmax T1	Tmax T2	Tmax T3
Rated uninterrupted current, **Iu**			[A]	160	160	160	250
Number of poles			[Nr]	1	3,4	3,4	3,4
Rated service voltage, **Ue**		**AC (50-60Hz)**	[V]	240	690	690	690
		DC	[V]	125	500	500	500
Rated ultimate short circuit breaking capacity, **Icu**				**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
		380/415 V	[kA]		16 25 36	36 50 70 85	36 50
		440 V	[kA]		10 15 22	30 45 55 75	25 40
		500 V	[kA]		8 10 15	25 30 36 50	20 30
		690 V	[kA]		3 4 6	6 7 8 10	5 8
	DC	250 V - 2 poles in series	[kA]		16 25 36	36 50 70 85	36 50
		250 V - 3 poles in series	[kA]		20 30 40	40 55 85 100	40 55
		500 V - 2 poles in series	[kA]				
		500 V - 3 poles in series	[kA]		16 25 36	36 50 70 85	36 50
		750 V - 3 poles in series	[kA]				
Trip units		TMF		■			
		TMD/TMA			■	■	■
		ELT				■	
		MF				■	
		MA				■	■

UL 489 CSA C22.2 and IEC 60947-2

Dimensions	H		[in/mm]	5.12/130	5.12/130	5.12/130	5.9/150
	W 1p or 3p		[in/mm]	1/25.4	3/76	3.54/90	4.13/105
	W 4p		[in/mm]		4/102	4.72/120	5.51/140
	D		[in/mm]	2.76/70	2.76/70	2.76/70	2.76/70
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

[1] In15A = 10kA @ 277 V AC
[2] In15A = 35 kA @ 240 V AC, 14 kA @ 480Y/277 V AC

TMF = Thermomagnetic trip unit with fixed thermal and magnetic threshold

TMD = Thermomagnetic trip unit with adjustable thermal threshold and fixed magnetic threshold





Tmax T4	Tmax T5	Isomax S6	Isomax S7	Isomax S8
250	400 - 600	800	1200	1600, 2000, 2500
3,4	3,4	2,3,4	2,3,4	3
600	600	600	600	600
600	600	600		
N S H L V	N S H L V	N H L	H	V
65 100 150 200 200	65 100 150 200 200	65 150 200	100	125
25 35 65 100 150	25 35 65 100 150	50 65 100	65	100
18 25 35 65 100	18 25 35 65 100	25 35 42	50	85
25 35 50 65 100	25 35 50 65 100	35 50 65		
16 25 35 50 65	16 25 35 50 65	20 35 50		
■				
■	■	■		
■	■	■	■	■
■	■	■	■	■
■	■	■	■	■
■	■	■	■	■

Tmax T4	Tmax T5	Isomax S6	Isomax S7	Isomax S8
250 - 320	400 - 630	630 - 800	1250 - 1600	2000, 2500, 3200
3,4	3,4	3,4	3,4	3,4
690	690	690	690	690
750	750	750		
N S H L V	N S H L V	N S H L	S H L	H V
70 85 100 200 300	70 85 100 200 300	65 85 100 200	85 100 200	85 120
36 50 70 120 200	36 50 70 120 200	35 50 65 100	50 65 100	85 120
30 40 65 100 180	30 40 65 100 180	30 45 50 80	40 55 80	70 100
25 30 50 85 150	25 30 50 85 150	25 35 40 65	35 45 70	50 70
20 25 40 70 80	20 25 40 70 80	20 22 25 30	20 25 35	40 50
36 50 70 120 200	36 50 70 120 200	35 50 65 100		
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 35 50		
■	■	■		
■	■	■	■	■
■				

8.07/205	8.07/205	10.55/268	15.98/406	15.75/400
4.13/105	5.51/140	8.27/210	8.27/210	15.98/406
5.51/140	7.24/184	11.02/280	11.02/280	21.89/556
4.07/103.5	4.07/103.5	4.07/103.5	5.45/138.5	9.53/242
20000	20000	20000	10000	10000
240	120	120	120	20
8000(250A)-6000(320A)	7000(400A)-5000(630A)	7000(630A)-5000(800A)	7000(1250A)-5000(1600A)	2500(2500A)-1500(3200A)
120	60	60	20	20(2500A)-10(3200A)

TMA = Thermomagnetic trip unit with adjustable thermal and magnetic threshold

MF = Magnetic fixed trip unit
MA = Magnetic adjustable trip unit

ELT = Electronic trip unit

Circuit breakers for specific applications in accordance with IEC 60947-2




Circuit breakers for distribution AC-DC

			Tmax T1 1P	Tmax T1			Tmax T2				Tmax T3	
Rated uninterrupted current		[A]	160	160			160				225	
Numbers of poles		Nr	1	3/4			3/4				3/4	
Rated voltage	(AC) 50-60Hz	[V]	240	690			690				690	
Icu		[kA rms]	**B**	**B**	**C**	**N**	**N**	**S**	**H**	**L**	**N**	**S**
	380/415 V AC	[kA rms]	25*	16	25	36	36	50	70	85	36	50
	440 V AC	[kA rms]		10	15	22	30	45	55	75	25	40
	690 V AC	[kA rms]		3	4	6	6	7	8	10	5	8
Ics/Icu @ 380/415 V AC %				100	100	50	100	100	100	75	75	50
Dimensions fixed version (3p)	H	[in-mm]	5.12-130	5.12-130			5.12-130				5.0-150	
	W	[in-mm]	1-25.4	3-76			3.54-90				4.13-105	
	D	[in-mm]	2.76-70	2.76-70			2.76-70				2.76-70	

Circuit breakers for motor protection

			T2	T3
Iu		[A]	160	250
Poles			3	3
In		[A]	1…100	100…200
Ue		[V]	690	690
Trip unit	Adjustable magnetic only	(6…12xIn)	■	■
	Electronic	PR221DS-I	■	
		PR222/MP (IEC 60947-4-1)		
		PR212/P-I		
		PR212/MP (IEC 60947-4-1)		

Switch-disconnectors

		T1D	T3D
Poles	[Nr]	3/4	3/4
Ith	[A]	160	250
Ue	[V]	690	690
Uimp	[KV]	8	8
Ui	[V]	800	800
Icm	[KA]	2.8	5.3
Icw (1s)	[KA]	2	3.6

* For In 16A and In 20A: Icu @ 220/230 V AC = 16 KA





Tmax T4					Tmax T5					Isomax S6				Isomax S7			Isomax S8	
250					400-630					800				1250-1600			2000-2500-3200	
3/4					3/4					3/4				3/4			3/4	
690					690					690				690			690	
N	**S**	**H**	**L**	**V**	**N**	**S**	**H**	**L**	**V**	**N**	**S**	**H**	**L**	**S**	**H**	**L**	**H**	**V**
36	50	70	120	200	36	50	70	120	200	35	50	65	100	50	65	100	85	120
30	40	65	100	180	30	40	65	100	180	30	45	50	80	40	55	80	70	100
20	25	40	70	80	20	25	40	70	80	20	22	25	30	20	25	35	40	50
100	100	100	100	100	100	100	100	100	100	100	100	100	75	100	75	50	50	50
8.07/205					8.07/205					14.25-268				16-406			15.75-400	
4.13/105					5.51/140					8.27-210				8.27-210			15.98-406	
4.07/103.5					4.07-103.5					4.07-103.5				5.45-138.5			9.25-235	

T4	T5	S7
250	400	1250-1600
3	3	3
80…250	320-400	1000…1600
690	690	690
■		
■	■	
■	■	
		■
		■

T4D	T5D	S6D	S7D	S8D
3/4	3/4	3/4	3/4	3/4
250-320	400-630	800	1000-1250-1600	2000-2500-3200
690	690	690	690	690
8	8	8	8	8
800	800	800	800	800
5.3	11	30	52.5	85
3.6	6	15	25	40

main characteristics

Main characteristics

1

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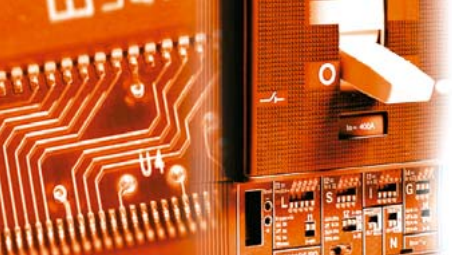
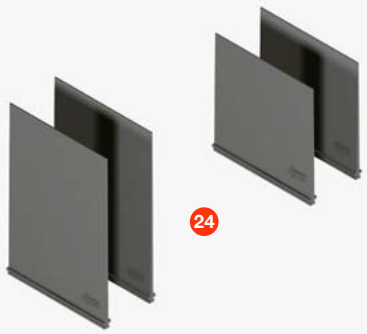
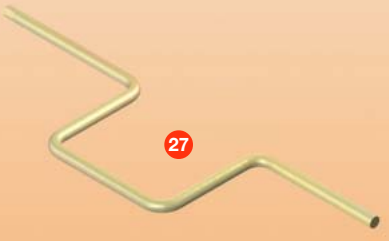


General information

1





The ABB family of molded case circuit breakers in conformity with UL 489 and CSA C22.2 No. 5.1 Standard - Tmax and Isomax - is divided into different, perfectly integrated, ranges (Tmax T1B 1p, T1, T2, T3, T4, T5 and Isomax S6, S7, S8), able to cover a range of service currents from 15 to 2500 A.
The power distribution circuit breakers are available, with UL 489 and CSA C22.2 approval, in the fixed, plug-in or draw out, two-pole, three-pole and four-pole versions.
The Tmax T1 circuit breaker is also available in the single pole Tmax T1B 1p version, with an interrupting rating of 18 kA at 277 V AC. The circuit breakers can be selected among different interrupting rating levels from 22 kA to 150 kA at 480 V AC and from 18 kA up to 100 kA at 600 V AC.

Starting from the fixed version circuit breaker, all the other versions used for various requirements are obtained by means of mounting conversion kits.
The following are available:
– kit for converting a fixed circuit breaker into the moving part of a plug-in and draw out one
– circuit breaker fixed parts for plug-in and draw out circuit breakers
– conversion kit for the connection terminals.

Various accessories are also available:
1. Breaking unit [1]
2. Trip units [1]
3. Front
4. Auxiliary contacts - AUX [2]
5. Undervoltage release - UVR [2]
6. Shunt trip - SOR [2]
7. Terminal covers
8. Front for lever operating mechanism - FLD [2]
9. Direct rotary handle - RHD [2]
10. Stored energy motor operator - MOE [2]
11. Key lock - KLF
12. Early auxiliary contact - AUE
13. Transmitted rotary handle - RHE [2]
14. Front terminal for copper cable - FC Cu (UL listed for Tmax T1)
15. Front extended terminal - EF
16. Multi-cable terminal (only for T4) - MC
17. Front terminal for copper-aluminium - FC CuAl (UL listed)
18. Front extended spread terminal - ES
19. Rear orientated terminal - R
20. Conversion kit for plug-in/draw out versions [2]
21. Guide of fixed part in the draw out version [2]
22. Fixed part - FP [2]
23. Auxiliary position contact - AUP
24. Phase separators
25. PR010T
26. TT1
27. Racking out crank
28. Residual current release.

[1] UL file E93565
[2] UL file E116596

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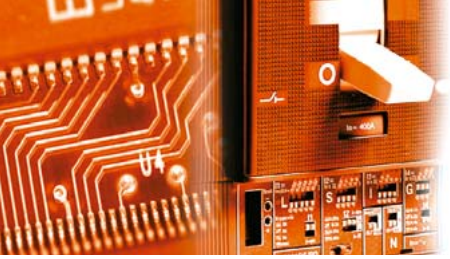


Construction characteristics

Distinguishing features of the series

1

1SDC210142F0023

Compliance with Standards and company Quality System

The Tmax and Isomax circuit breakers and their electrical accessories conform to the UL 489 (Underwriters Laboratories Incorporated) and CSA C22.2 No.5.1 (Canadian Standard Association) North American Standards, and to the international IEC 60947-2 Standards and comply with the EC directive:

– "Low Voltage Directives" (LVD) no. 73/23 EEC
– "Electromagnetic Compatibility Directive" (EMC) no.89/336 EEC.

Certification of compliance with the above-mentioned product Standards is carried out, in respect of the European EN 45011 Standard, by the Italian certification body ACAE (Association for Certification of Electrical Apparatus), a member of the European LOVAG organization (Low Voltage Agreement Group).

The ABB test laboratory is accredited by SINAL (certificate no. 062/2002).

The ABB Quality System complies with the international ISO 9001 - 2000 Standard (model for quality assurance in design, development, construction, installation and service) and with the equivalent European EN ISO 9001 and Italian UNI EN ISO 9001 Standards.

The independent certifying Body is RINA S.p.A. ABB obtained its first certification with three-year validity in 1990, and has now reached its fourth reconfirmation.

The new Tmax series has a hologram on the front, obtained using special anti-imitation techniques, which guarantees the quality and that the circuit breaker is an original ABB product.

Attention to protection of the environment and to health and safety in the work place is another priority commitment for ABB and, as confirmation of this, the company environmental management system has been certified by RINA in 1997, in conformity with the international ISO 14001 Standard. This certification has been integrated in 1999 with the Management System for Healt and Safety in the workplace, according to OHSAS 18001 (British Standards), obtaining one of the first certification of integrated management System, QES (Quality, Environment, Safety) issued by RINA. ABB - the first industry in the electromechanical section in Italy to obtain this recognition - thanks to a revision of the production process with an eye to ecology, has been able to reduce the consumption of raw materials and waste from processing by 20%.

ABB's commitment to safeguarding the environment is also shown in a concrete way by the Life Cycle Assessments of its products carried out directly by the ABB Research and Development in collaboration with the ABB Research Center. Selection of materials, processes and packing materials is made optimising the true environmental impact of the product, also foreseeing the possibility of its being recycled.


1SDC210143F0023

Double insulation*

This construction characteristic consists of the presence of double insulation between the live power parts (excluding the terminals) and the front parts of the apparatus where the operator works during normal operation of the installation. The seat of each electrical accessory is completely segregated from the power circuit, thereby preventing any risk of contact with live parts, and, in particular, the operating mechanism unit is completely insulated in relation to the powered circuits. As a consequence most accessories are field installable.
Furthermore, the insulation distances, both between the live internal parts and in the terminal connection area, comply with what is foreseen by the UL 489 Standard and are higher than those required by the international IEC Standards.

* Except for Isomax S8

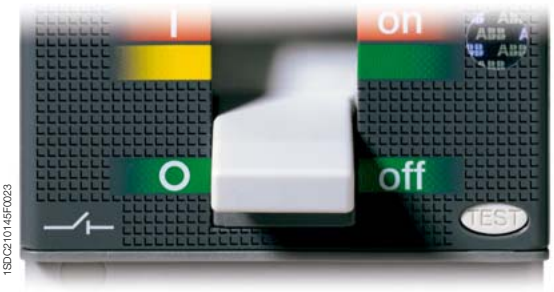
Positive operation

The operating lever always indicates the exact position of the circuit breaker moving contacts, thereby guaranteeing safe and reliable signals in compliance with the prescriptions of the IEC 60417-2 Standard (I = Closed; O = Open; yellow-green line = Open due to release trip). The circuit breaker operating mechanism has trip free operation. Trip unit intervention automatically opens the moving contacts: to close them again, the operating mechanism must be reset by pushing the operating lever from the intermediate position into the lowest open position.

1SDC210144F0023

Isolation behaviour

In the open position, the circuit breaker guarantees circuit isolation in compliance with the IEC 60947-2 Standard. The oversized insulating distances guarantee there are no leakage currents and dielectric resistance to any overvoltages between input and output. For plug in and draw out version circuit breakers, in the racked-out position, the power and auxiliary circuits are insulated, guaranteeing that no part is live. By means of special socket-plugs, it is possible to carry out blank tests under these conditions, operating the circuit breaker in complete safety.



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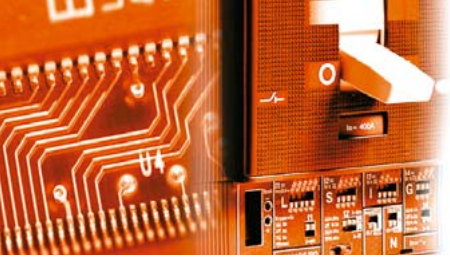

Construction characteristics

Distinguishing features of the series

1

Operating temperature

The Tmax and Isomax circuit breakers can be used in ambient conditions where the surrounding air temperature varies between –13 °F and +158 °F (–25 °C and +70 °C) and stored in ambient with temperatures between –40 °F and + 158 °F (–40 °C and +70 °C). The circuit breakers fitted with thermomagnetic trip unit have their thermal element set for a reference temperature of 104 °F (40 °C).

For temperatures other than 104 °F (40 °C), with the same setting, there is a variation of the thermal threshold as shown in the tables on page 4/38 and 4/39.

The electronic PR211/P, PR212/P, PR221DS and the new PR222DS/P electronic trip units do not undergo any variations in performance as the temperature varies but, in the case of temperatures exceeding 104 °F (40 °C), the maximum setting for protection against overloads, L, must be reduced, as indicated in the derating graphs on page 4/37, to take into account the heating phenomena which occur in the copper parts of the circuit breaker passed through by the phase current. For temperature above 158 °F (70 °C) the circuit breaker performances are not guaranteed.

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Altitude

Up to an altitude of 6600 ft (2000 m) the Isomax and Tmax do not undergo any alterations in their rated performances. As the altitude increases, the atmospheric properties are altered in terms of composition, dielectric resistance, cooling capacity and pressure. For this reason, the rated voltage and the nominal current at this altitudes must be derated to the values shown in the table.

Altitude	[ft]	6600	9900	13200	16500
Rated voltage	[V]	600	522	435	348
Continuous current rating	%	100	98	93	90

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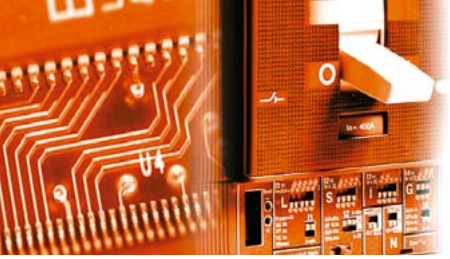
Electromagnetic compatibility

With the use of the PR211/P, PR212/P, PR221DS and PR222DS/P electronic trip units and the RC211, RC212, RC221, RC222 and RC223 electronic residual current releases, operation of the protections is guaranteed in the presence of interferences caused by electronic apparatus, atmospheric disturbances or electrical discharges. No interference with other electronic apparatus near the place of installation is generated either. This is in compliance with the IEC 60947-2 Appendix F Standards and European Directive No. 89/336 regarding EMC – electromagnetic compatibility.



Construction characteristics

Distinguishing features of the series

1

Tropicalization

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Circuit breakers and accessories in the ABB family of molded case circuit breakers have been tested in compliance with the IEC 60068-2-30 Standard, carrying out two cycles at 131 °F (55 °C) with the “variant 1” method (clause 6.3.3). The suitability of their use under the most severe environmental conditions is therefore ensured with the hot-humid climate defined in climatograph 8 of the IEC 60721-2-1 Standards thanks to:

– insulating cases made of synthetic resins reinforced with glass fibers;
– anti-corrosion treatment of the main metallic parts
– Fe/Zn 12 galvanization (ISO 2081), protected by a conversion layer mainly consisting of chromates (ISO 4520)
– application of anti-condensation protection for electronic trip units and relative accessories.

Resistance to shocks and vibrations

The circuit breakers are unaffected by vibrations generated mechanically and due to electromagnetic effects, in compliance with the IEC 60068-2-6 Standards and the regulations of the major classification organizations:

– ABS (American Bureau of Shipping)*
– RINA
– Det Norske Veritas
– Bureau Veritas
– Lloyd’s register of shipping
– Germanischer Lloyd.

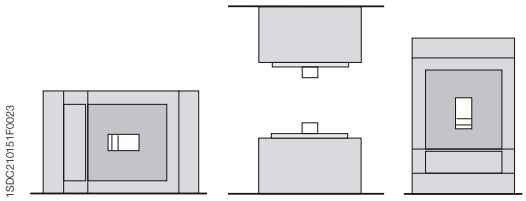
The Isomax and Tmax circuit breakers are also tested, according to the IEC 60068-2-27 Standard, to resist shocks up to 12g.

Please contact ABB for information regarding the types of circuit breakers approved, the performances approved and their relative validity.

*Most of ABB circuit breakers are certified with ABS approval, according to IEC 60947-2; the whole Tmax family has ABS approval according both with IEC 60947-2 and UL 489.

Installation

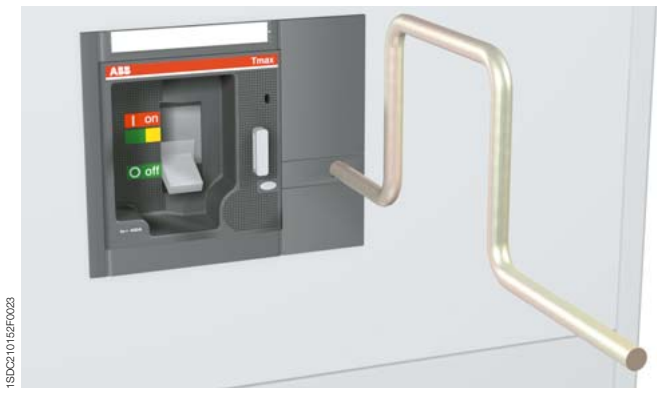
Molded case circuit breakers can be installed in the switchboards, mounted in any horizontal, vertical or lying down position on the back plate or on rails, without undergoing any derating of their rated characteristics(1). ABB circuit breakers can be installed easily in all types of switchboards, above all thanks to the possibility of being supplied either by top or bottom terminals, without jeopardising the apparatus functionality.
Apart from fixing on the base plate, T1, T2 and T3 can also be installed on DIN 50022 rails, thanks to the special fixing brackets. Furthermore, the depth of 2.76 inches (70 mm) takes Tmax T3 to the same standard as the two smaller sizes, making assembly of circuit breakers up to 225 A in standard switchboards even simpler. In fact, it is possible to prepare standardised support structures, facilitating the design stage and construction of the switchboard metalwork.



(1) Isomax S8 can be mounted just in vertical position.

Racking-out with the door closed

With Tmax T4 and T5 and Isomax S6 and S7 in the draw out version, the circuit breaker can be racked-in and out with the compartment door closed, thereby increasing operator safety and allowing rationalisation of low voltage arc proof switchboards. Racking out can only be carried out with the circuit breaker open (for obvious safety reasons), using a special racking-out crank supplied with the conversion kit from fixed circuit breaker to moving part of draw out circuit breaker.



the ranges


ABB
SACE S8
Push OFF
Push ON
SACE S6
Tmax T5N
Tmax T2S
Tmax T1N
Tmax

The ranges

Index

2

Circuit breakers for power distribution

Electrical characteristics




			T1 1P	T1	T2	T3
Frame size		[A]	100	100	100	225
Numbers of poles		Nr	1	3-4	3-4	3-4
Rated voltage	(AC) 50-60Hz	[V]	277	600Y/347	480	600Y/347
	(DC)	[V]		500		500
Test voltage (1min) 50-60 Hz		[V]	3000	3000	3000	3000
Interrupting ratings		[kA rms]	**B**	**N**	**S** **H**	**N** **S**
	240 V AC	[kA rms]		50 [2]	65 150	50 65
	277 V AC	[kA rms]	18 [1]			
	480 V AC	[kA rms]		22	35 65	25 35
	600Y/347 V AC	[kA rms]		10		10 10
	600 V AC	[kA rms]				
	250 V DC (2 poles in series)	[kA rms]		25		25 35
	500 V DC (3 poles in series)	[kA rms]		25		25 35
	500 V DC (2 poles in series)	[kA rms]				
	600 V DC (3 poles in series)	[kA rms]				
Trip units	Thermomagnetic		■	■	■	■
	Electronic				■	
Dimensions fixed version (3p)	H	[in-mm]	5.12-130	5.12-130	5.12-130	5.9-150
	W	[in-mm]	1-25.4	3-76	3.54-90	4.13-105
	D	[in-mm]	2.76-70	2.76-70	2.76-70	2.76-70
Mechanical life		[operations]	25000	25000	25000	25000
Weights (fixed 3p)		[lbs]	1.06	2.34	2.86	5.45

Note: for S6 4 poles only for N versions
[1] In 15A = 10 KA @ 277 V AC
[2] In 15A = 35 KA @ 240 V AC 14 KA @ 480Y/277 V AC
[3] Ask ABB for Tmax two-pole version availability





T4					T5					S6			S7	S8
250					400-600					800			1200	1600-2000-2500
3-4					3-4					2-3-4			2-3-4	3
600					600					600			600	600
600					600					600				
3500					3500					3000			3000	3000
N	**S**	**H**	**L**	**V**	**N**	**S**	**H**	**L**	**V**	**N**	**H**	**L**	**H**	**V**
65	100	150	200	200	65	100	150	200	200	65	150	200	100	125
25	35	65	100	150	25	35	65	100	150	50	65	100	65	100
18	25	35	65	100	18	25	35	65	100	25	35	42	50	85
25	35	50	65	100	25	35	50	65	100	35	50	65		
16	25	35	50	65	16	25	35	50	65	20	35	50		
■					■					■				
■					■					■			■	■
8.07/205					8.07/205					10.55-268			16-406	15.75-400
4.13/105					5.51/140					8.27-210			8.27-210	15.98-406
4.07/103.5					4.07-103.5					4.07-103.5			5.45-138.5	9.25-235
20000					20000					20000			10000	10000
6.18					8.55					22			37.5	135

Circuit breakers for power distribution

General characteristics

General characteristics

The ABB family of molded case circuit breakers, complying with the UL 489 and CSA C22.2 No. 5.1 Standards, is divided into different sizes, with an application range from 15 to 2500 A and interrupting ratings up to 150 kA at 480 V AC.
Selection of the size allows the basic electrical characteristics to be identified simply and immediately, whereas selection of the overcurrent trip unit is made according to the type of application required.
Furthermore, for the first time ABB has also developed a molded case circuit breaker with a single-pole construction characteristic: T1B 1p. This is a 100 A frame size circuit breaker, able to operate at rated voltages up to 277 V AC.
For protection of alternating current networks, the following are available:

- Tmax T1B 1p, T1, T2, T3 and T4 (15 A, 20 A) circuit breakers, equipped with TMF thermomagnetic trip units, with fixed thermal and magnetic threshold (I_3 = 10 x In);
- Tmax T4 (up to 50 A) circuit breaker equipped with TMD thermomagnetic trip units with adjustable thermal threshold (I_1 = 0.7…1 x In) and fixed magnetic threshold (I_3 = 10 x In).
- T4, T5 and Isomax S6 circuit breakers with TMA thermomagnetic trip units, with adjustable thermal threshold (I_1 = 0.7…1 x In) and adjustable magnetic threshold (I_3 = 5…10 x In).
- T2 with PR221DS electronic trip unit
- T4 and T5 with PR221DS, PR222DS/P and PR222DS/PD-A electronic trip unit
- Isomax S6, S7 and S8 with PR211/P and PR212/P electronic trip unit.

Interchangeability

Tmax T4 and T5 circuit breakers can be equipped either with TMD or TMA thermomagnetic trip units, PR221DS, PR222DS/P and PR222DS/PD-A electronic trip units. Thanks to their simplicity of assembly, the end customer can, in fact, change the type of trip unit extremely rapidly, according to their own requirements and needs: in this case, correct

	Trip unit													
	TMF		TMD			TMA								
Circuit breakers														
In [A]	15	20	30	40	50	80	100	125	150	200	250	300	400	
T4 250	■	■	■	■	■	■	■	■	■	■	■			
T5 400												■	■	
T5 600														

■ = complete circuit breaker already coded
▲ = circuit breaker to be assembled (separate codes of the circuit breaker part plus trip unit)

Range of application of the alternating and direct current circuit breakers

	Trip unit	Range [A]
AC		
T1B 1p	TMF	15…100
T1	TMF	15…100
T2	TMF	15…100
	PR221DS	25…100
T3	TMF	60…225
T4	TMF/TMD/TMA	15…250
	PR221DS	100…250
	PR222DS/P	100…250
	PR222DS/PD-A	100…250
T5	TMA	300-400
	PR221DS	300-400-600
	PR222DS/P	300-400-600
	PR222DS/PD-A	300-400-600
S6	TMA	600-800
	PR211/P	400…800
	PR212/P	400…800
S7	PR211/P	1000-1200
	PR212/P	1000-1200
S8	PR212/P	1600…2500
DC		
T1	TMF	15…100
T3	TMF	60…225
T4	TMF/TMD/TMA	15…250
T5	TMA	300-400
S6	TMA	800

TMF = Fixed thermomagnetic trip unit
TMD = Thermomagnetic trip unit with adjustable thermal and fixed magnetic threshold
TMA = Thermomagnetic trip unit with adjustable thermal and adjustable magnetic threshold
ELT = Electronic trip unit

Tmax T2 and T3 offer a magnetic-only trip unit: I_3 = 6…12 x In. Finally, Tmax T1, T2, T3, T4 and T5 and Isomax S6 circuit breakers fitted with thermomagnetic trip units can also be used in direct current plants, with an application range from 15 to 800 A and a minimum operating voltage of 24 V DC.

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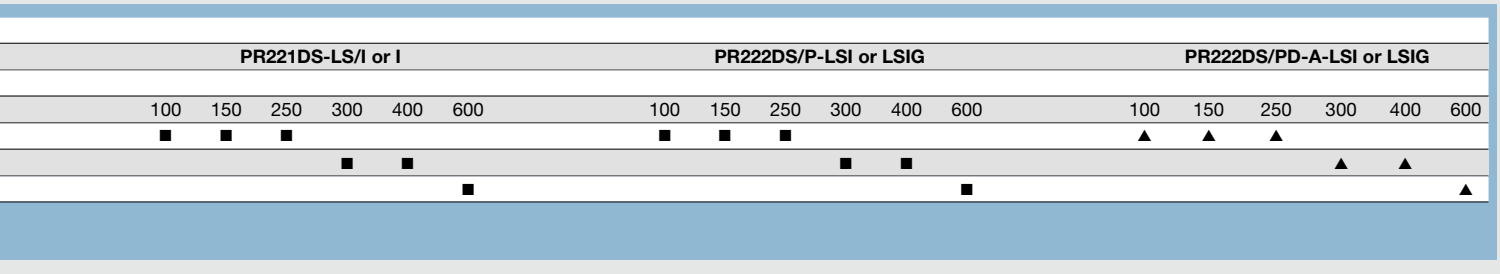
assembly is under the customer's responsibility. Above all, this means into increased flexibility of use of the circuit breakers with considerable savings in terms of costs thanks to better rationalisation of stock management.



Thermomagnetic trip units

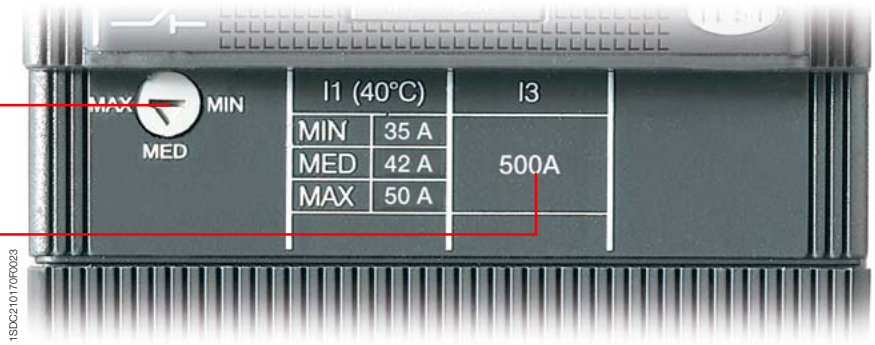
Tmax T1B 1p, T1, T2, T3, T4 and T5, and Isomax S6 circuit breakers can be fitted with thermomagnetic trip unit and are used in protection of alternating current networks or direct current networks with a range of application from 15 A to 800 A. They allow protection against overloads with a thermal device (fixed threshold for T1B 1P, T1, T2, T3, T4 up to 20 A; adjustable threshold between 0.7÷1 x In for T4, T5 and S6), made using the bimetal technique, and protection against

Thermomagnetic trip unit TMF, TMD and TMA

TMD

Thermal threshold
Adjustable from 0.7 to 1 x In

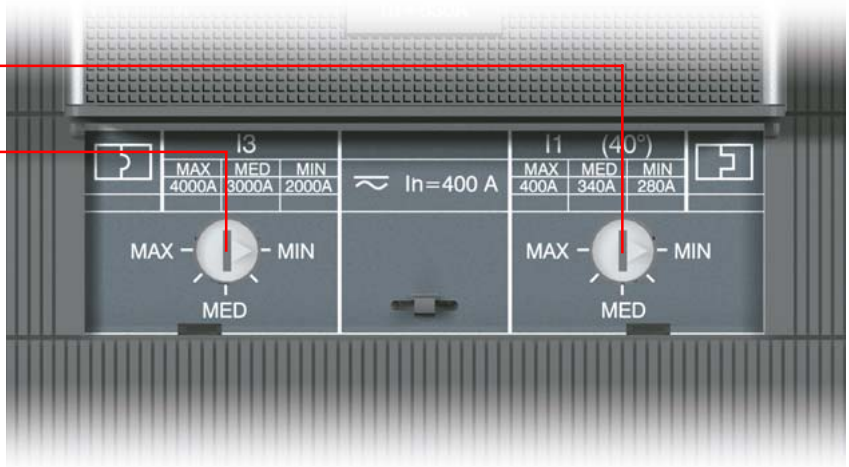
Magnetic threshold
Fixed (I_3 = 10 x In)



TMA

Thermal threshold
Adjustable from 0.7 to 1 x In

Magnetic threshold
Adjustable from 5 to 10 x In



TMF = thermomagnetic trip unit with fixed thermal threshold (I_1 = In) and fixed magnetic thresold (I_3 = 10 x In).
TMD = thermomagnetic trip unit with adjustable thermal threshold (I_1 = 0,7…1 x In) and fixed magnetic threshold (I_3 = 10 x In).
TMA = thermomagnetic trip unit with adjustable thermal threshold (I_1 = 0.7…1 x In) and adjustable magnetic threshold (I_3 = 5…10 x In).

short-circuit with a magnetic device (fixed threshold for T1 1P, T1, T2, T3 and T4 up to 50 A, adjustable threshold between 5÷10 x In for T4, T5 and S6; Isomax S6 can also offer a fixed magnetic threshold of 2.5 x In).
The four-pole circuit breakers are always supplied with the neutral protected by the trip unit and protection of the neutral at 100% of the phase setting.

Thermomagnetic trip units

In [A]	15	20	25	30	35	40	50	60	70	80	90	100	125	150	175	200	225	250	300	400	600	800
Neutral [A]	15	20	25	30	35	40	50	60	70	80	90	100	125	150	175	200	225	250	300	400	600	800
T1 (I_1=In)	■	■	■	■		■	■	■	■	■	■	■										
T2 (I_1=In)	■	■	■	■	■	■	■	■	■	■	■	■										
T3 (I_1=In)								■	■	■	■	■	■	■	■	■	■					
T4 (I_1=In)	■	■																				
T4 (I_1=0.7...1xIn)				■		■	■			■		■	■	■		■		■				
T5 400 (I_1=0.7...1xIn)																			■	■		
S6 (I_1=0.7...1 x In)																					■	■
T1																						
I_3 [A]	1000	1000	1000	1000		1000	1500	1500	1500	1500	1500	1500										
Neutral [A]	1000	1000	1000	1000		1000	1500	1500	1500	1500	1500	1500										
T2, T3																						
I_3 [A]	500	500	500	500	500	500	500	600	700	800	900	1000	1250	1500	1750	2000	2250					
Neutral [A]	500	500	500	500	500	500	500	600	700	800	900	1000	1250	1500	1750	2000	2250					
T4, T5, S6																						
I_3 [A]	500	500		500		500	500			400 800		500 1000	625 1250	750 1500		1000 2000		1250 2500	1500 3000	2000 4000	3000 6000	4000 8000
Neutral [A]	500	500		500		500	500			400 800		500 1000	625 1250	750 1500		1000 2000		1250 2500	1500 3000	2000 4000	3000 6000	4000 8000
S6																						
I_3 = 2.5 x In [A]																					1500	2000

General characteristics

Tmax T2, T4 and T5 circuit breakers for uses in alternating current can be equipped with PR221DS, the new PR222DS/P and PR222DS/PD-A electronic trip units. On the other hand, Isomax S6, S7 and S8 can be fitted with PR211/P and PR212/P. The electronic technology used to realise these trip units guarantees great reliability, trip precision and immunity to electromagnetic components in compliance with the standards on the matter. The power supply required for correct operation is supplied directly by the trip units current transformers and tripping is always guaranteed, even under single-phase load conditions and in correspondence with the minimum setting.

The protection trip units are made up of the current transformers (three or four depending on the number of conductors to be protected), the protection unit (PR221DS, PR222DS/P, PR222DS/PD-A, PR211/P or PR212/P), and of a trip coil with demagnetisation, which acts directly on the circuit breaker operating mechanism unit. It is possible to test the trip coil by means of the TT1 device. A positive test will trip the breaker.

The current transformers are housed inside the trip unit box and supply the energy required for correct operation of the protection and the signal needed to detect the current. They are available with primary rated current as indicated in the table.

Characteristics of PR221DS, PR222DS/P, PR222DS/PD-A, PR211/P, PR212/P electronic trip units	
Operating temperature	-13 °F...+158 °F (-25 °C...+70 °C)
Relative humidity	90%
Service Frequency	45...66 Hz able to measure harmonics up to 550 Hz
Electromagnetic compatibility (LF and HF)	IEC 60947-2 Annex F

Current transformers

PR221DS	**In [A]**	**25**	**60**	**100**	**150**	**250**	**300**	**400**	**600**
	T2	■	■	■					
	T4			■	■	■			
	T5 400						■	■	
	T5 600								■
	L	10…25	24…60	40…100	60…150	100…250	120…300	160…400	240…600
	S	25…250	60…600	100…1000	150…1500	250…2500	300…3000	400…4000	600…6000
	I	25…250	60…600	100…1000	150…1500	250…2500	300…3000	400…4000	600…6000

PR222DS/P or PR222DS/PD-A	**In [A]**	**100**	**150**	**250**	**300**	**400**	**600**
	T4	■	■	■			
	T5 400				■	■	
	T5 600						■
	L	40…100	60…150	100…250	120…300	160…400	240…600
	S	60…1000	90…1500	150…2500	180…3000	240…4000	360…6000
	I	150…1200	225…1800	375…3000	450…3600	600…4800	900…7200
	G	20…100	30…150	50…250	60…300	80…400	120…600

PR211/P	**In [A]**	**400**	**600**	**800**	**1000**	**1200**
	S6	■	■	■		
	S7				■	■
	L	160…400	240…600	320…800	400…1000	480…1200
	I	600…4800	900…7200	1200…9600	1500…12000	1800…14400

PR212/P	**In [A]**	**400**	**600**	**800**	**1000**	**1200**	**1600**	**2000**	**2500**
	S6	■	■	■					
	S7				■	■			
	S8						■	■	■
	L	160…400	240…600	320…800	400…1000	480…1200	640…1600	800…2000	1000…2500
	S	400…4000	600…6000	800…8000	1000…10000	1200…12000	1600…16000	2000…20000	2500…25000
	I	600…4800	900…7200	1200…9600	1500…12000	1800…14400	2400…19200	3000…24000	3750…30000
	G	80…400	120…600	160…800	200…1000	240…1200	320…1600	400…2000	500…2500

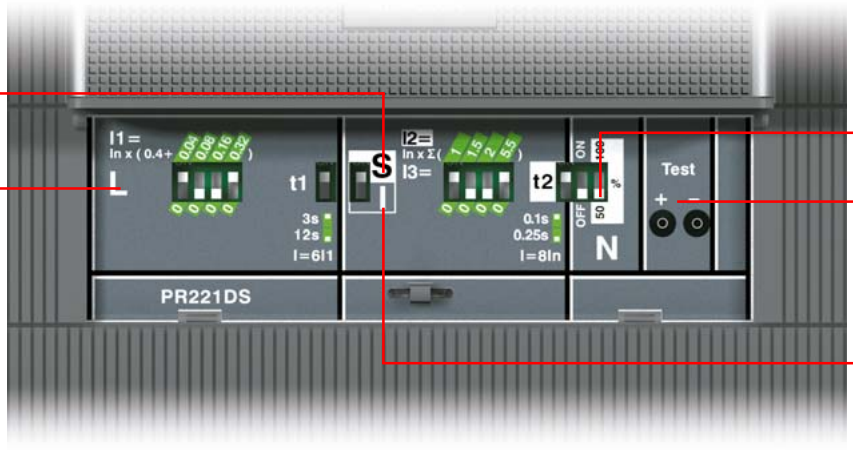
PR221DS - Tmax T2, T4 and T5

The PR221DS trip unit, available for T2, T4 and T5, provides protection functions against overload L, and short-circuit S or I (version PR221DS-LS/I): with this version, you can choose between protection S or I simply by moving the dip-switch. Alternatively, the version with only the function of protection against instantaneous short-circuit I is available (version PR221DS-I).
The PR221DS for Tmax T2 has some differences if compared with the one used with T4 and T5. With Tmax T2, the trip unit is not interchangeable, protection against overload L can be set manually at I_1 = 0.4…1 x In, with 16 thresholds by means of a dip switch on the front of the circuit breaker, and it is possible to select between 2 trip curves 3s at 6 x I_1 and 6s at 6 x I_1.
On the other side, with Tmax T4 and T5, the trip unit is interchangeable; furthermore, protection L can be set manually at I_1 = 0.4…1 x In with 16 thresholds by means of a dip switch and it is possible to select between 2 different trip curves 3s at 6 x I_1 and 12s at 6 x I_1.

PR221DS-LS/I

Protection S
Against short-circuit with delayed trip

Protection L
Against overload



Dip-switches for setting the neutral (only for T4 and T5)

Socket for TT1 test unit

Protection I
Against short-circuit with instantaneous trip

The protection function against short-circuit with delayed trip S, with inverse short time delay and trip characteristic with inverse time (I^2t = const), can be set to I_2 = 1…10 x In with 15 thresholds. This protection is selectable as an alternative to protection function I. The protection time delay can be selected by adjusting the dip switches on one of the two available curves (0.1s at 8 x In, 0.25s at 8 x In).
The protection function against instantaneous short-circuit I can be adjusted to I_3 = 1…10 x In with 15 thresholds.
Concerning to neutral protection, for Tmax T2 the protection of the neutral is set to 100% of the phase protection setting, whereas for T4 and T5 it is possible to select the protection threshold OFF, 50% or 100% directly from the front of the trip unit by means of the specific dip switch.

PR221DS - Protection functions and settings

Protection functions		Trip threshold	Trip curves[1]		
L **CANNOT BE EXCLUDED**	Against overload with long inverse time delay trip and trip characteristic according to an inverse time curve (I^2t=constant)	 I_1 = 0.40 - 0.44 - 0.48 - 0.52 - 0.56 - 0.60 - 0.64 - 0.68 - 0.72 - 0.76 - 0.80 - 0.84 - 0.88 - 0.92 - 0.96 - 1 x In Release between 1.1...1.3 x I_1 (IEC 60947-2 and UL 489)	at 6 x I_1 t_1 = 3s Tolerance:	at 6 x I_1 t_1 = 6s **only for T2** ± 10% up to 6 x In; ± 20% above 6 x In	at 6 x I_1 t_1 = 12s **only for T4, T5**
S **CAN BE EXCLUDED**	Against short-circuit with inverse short time delay trip and trip characteristic with inverse time (I^2t=constant) (selectable as an alternative to protection function I)	 I_2 = 1 - 1,5 - 2 - 2,5 - 3 - 3,5 - 4,5 - 5,5 - 6,5 - 7 - 7,5 - 8 - 8,5 - 9 - 10 x In Tolerance: ± 10% (T4-T5) ± 10% up to 2 x In (T2) ± 20% above 2 x In (T2)	a 8 x In t_2 = 0,1s	a 8 x In t_2 = 0,25s Tolerance: ± 10% up to 6 x In (T4-T5) ± 20% above 6 x In (T4-T5) ± 20% (T2)	
I **CAN BE EXCLUDED**	Against short-circuit with instantaneous trip (selectable as an alternative to protection function S)	 I_3 = 1 - 1,5 - 2 - 2,5 - 3 - 3,5 - 4,5 - 5,5 - 6,5 - 7 - 7,5 - 8 - 8,5 - 9 - 10 x In Tolerance: ± 10% (T4-T5) ± 20% (T2)	istantaneous ≤ 25ms		

[1] These tolerances hold in the following conditions:
– self-powered relay at full power and/or auxiliary supply;
– two or three-phase power supply.

In conditions other than those considered, the following tolerances hold:

	Trip threshold	Trip time
S	± 20 %	± 20 %
I	± 20 %	≤ 40ms

PR222DS/P - Tmax T4 and T5

The PR222DS/P trip unit, available for T4 and T5, has protection functions against overload L, delayed S and instantaneous I short-circuit (version PR222DS/P-LSI) and, alternatively, as well as the functions L, S, I also has protection against earth fault G (version PR222DS/P-LSIG).

Function L, which cannot be excluded, can be set manually to I_1 = 0.4…1 x In with 32 thresholds by means of the dip switches or electronically by means of the PR010T test and configuration unit: in this case the thresholds are 61 (steps of 0.01 In). Furthermore, it is possible to select among 4 different trip curves: 3s at 6 x I_1, 6s at 6 x I_1, 9s at 6 x I_1, 12s at 6 x I_1 for T4 In = 250 A and T5 = 600 A, and 18s at 6 x I_1 for all the other settings.

The protection function against short-circuit with delayed trip S, with inverse short time delay and trip characteristic with inverse time (I^2t = const) can be set to I_2 = 0.6…10 x In with 15 thresholds by means of the dip switches or electronically by means of the PR010T test and configuration unit, with 95 thresholds (steps of 0.1 x In). The time delay of the protection can be selected either manually by adjusting the dip switch to one of the 4 curves available (with delay of 0.05s at 8 x In, 0.1s at 8 x In, 0.25s at 8 x In or 0.5s at 8 x In) or electronically by means of PR010T between 0.05 and 0.5s at 8 x In with 46 thresholds (steps of 0.01s).

The protection function against instantaneous short-circuit I can be adjusted to I_3[(1)] = 1.5…12 x In with 15 thresholds, by means of the dip switches or electronically by means of the PR010T test and configuration unit, with 86 thresholds (steps of 0.1 x In).

The function of protection against earth fault G is adjustable either manually, by means of dip switches, to I_4 = 0.2…1 x In, with 7 thresholds or electronically with PR010T, with 81 thresholds (steps of 0.01 In). It is also possible to select among 4 different trip curves: 0.1 s at 3.25 x I_4, 0.2s at 2.25 x I_4, 0.4s at 1.6 x I_4 and 0.8s at 1.25 x I_4, or to set the trip time electronically between 0.1 and 0.8s with 71 thresholds (steps of 0.01s).

Concerning to neutral protection, it is possible to select the protection threshold OFF, 50% or 100% directly from the front of the release by means of the specific dip switch.

Furthermore, on the front of the trip unit, signalling of pre-alarm and alarm of protection L is available. The pre-alarm threshold value is equal to 0.9 x I_1 (cannot be modified or excluded).

(1) For T5 In = 600 A ⇒ I_3max = 10 x In

PR222DS/PD-A

Apart from the protection functions against overload L, delayed S and instantaneous I short-circuit (version PR222DS/PD-A-LSI) or, alternatively, plus the extra protection G (version PR222/PD-A-LSIG), the PR222DS/PD-A trip unit, available for T4 and T5, also has the dialogue unit integrated with Modbus RTU protocol.
PR222PD allows Tmax T4 and T5 circuit breakers to be integrated in a communication network based on the Modbus RTU protocol. The devices use the EIA RS485 standard as the physical means for data transmission at a maximum transmission speed of 19200 bit/sec.
If the power for protection function is supplied directly by the current transformers of the release, communication is only possible with an auxiliary power supply of 24 V DC.
All the information provided by the trip unit (measurement functions, alarms, maintenance data, state of the circuit breaker) can be consulted both locally, directly on the front of the circuit breaker, and remotely by means of supervision and control systems.
The PR222DS/PD-A trip unit can be associated with the AUX-E auxiliary contacts in electronic version, to know the state of the circuit breaker (open/closed).

Communication functions	PR222DS/P	PR222DS/PD-A
Protocol		Modbus RTU standard
Physical medium		EIA RS485
Speed (maximum)		19200bps
Measurement functions		
Phase currents	■	■
Neutral	■	■
Earth	■	■
Signalling functions		
L pre-alarm and alarm LED	■	■
L alarm output contact (1)	■	■
Data available		
State of the circuit-breaker (open, closed)		■
Mode (local, remote)		■
Protection parameters set	■	■
Alarms		
Protections: L, S, I, G	■	■
Release control for failed fault	■	■
Maintenance		
Total number of operations		■
Total number of trips		■
Number of trip tests		■
Number of manual operations		■
Number of trips for each individual protection function		■
Record of last trip data		■
Safety function		
Automatic opening in the case of failed release for fault (with motor operator)		■
Events		
Changes in circuit breaker state, in the protections and all the alarams		■

(1) Typical contact: MOS photo Vmax: 48 V DC/30 V AC
Imax: 50 mA DC/35 mA AC

Auxiliary power supply - Electrical characteristics

	PR222DS/PD-A
Auxiliary power supply (galvanically insulated)	24 V DC ± 20%
Maximum ripple	5%
Inrush current @ 24 V	1 A for 30 ms
Rated current @ 24 V	100 mA
Rated power @ 24 V	2.5 W

Circuit breakers for power distribution

Electronic trip units

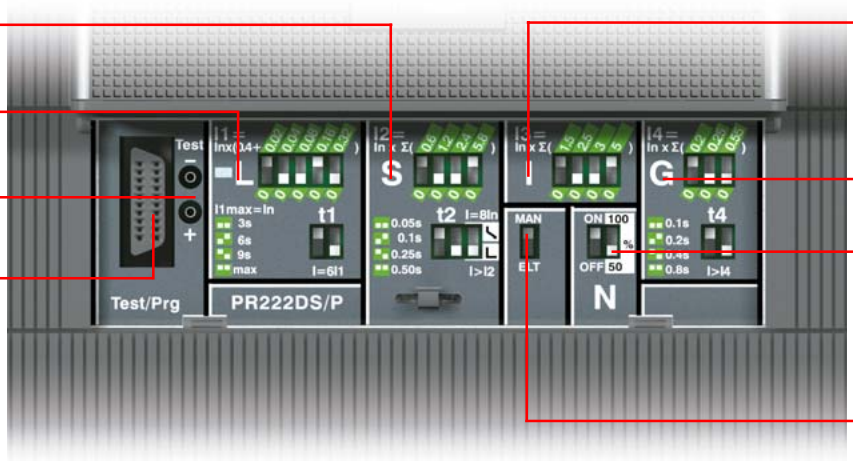
PR222DS/P

Protection S
Against short-circuit with delayed trip

Protection L
Against overload

Socket for test TT1 test unit

Socket for connection of PR010/T test unit



Protection I
Against short-circuit with instantaneous trip

Protection G
Against earth fault

Dip-switches for setting the neutral

Selection for electronic or manual setting

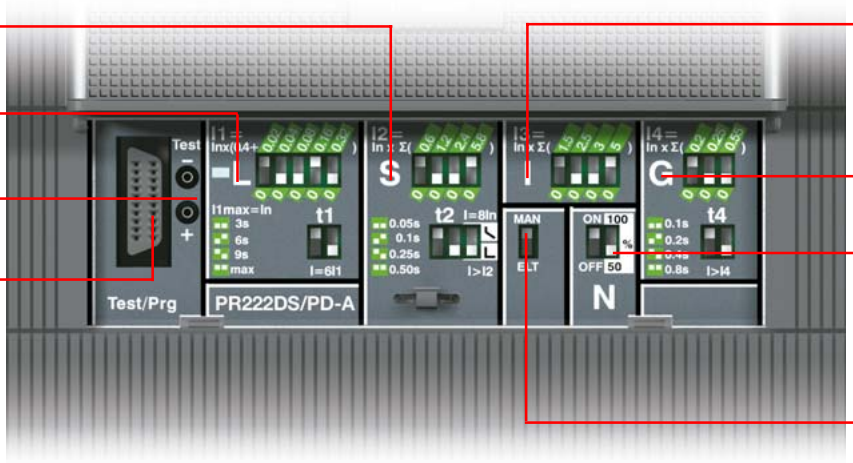
PR222DS/PD-A

Protection S
Against short-circuit with delayed trip

Protection L
Against overload

Socket for test TT1 test unit

Socket for connection of PR010/T test unit



Protection I
Against short-circuit with instantaneous trip

Protection G
Against earth fault

Dip-switches for setting the neutral

Selection for electronic or manual setting

PR222DS/P and PR222DS/PD-A - Protection functions and settings

Protection functions			Trip threshold	Trip curves[1]
L **CANNOT BE EXCLUDED**	Against overload with long inverse time delay trip and trip characteristic according to an inverse time curve (I^2t= constant)		**Manual setting** I_1 = 0.40 - 0.42 - 0.44 - 0.46 - 0.48 - 0.50 - 0.52 - 0.54 - 0.56 - 0.58 - 0.60 - 0.62 - 0.64 - 0.66 - 0.68 - 0.70 - 0.72 - 0.74 - 0.76 - 0.78 - 0.80 - 0.82 - 0.84 - 0.86 - 0.88 - 0.90 - 0.92 - 0.94 - 0.96 - 0.98 - 1 x In	**Manual setting** at 6 x I_1 t_1 = 3s; at 6 x I_1 t_1 = 6s; at 6 x I_1 t_1 = 9s; at 6 x I_1 t_1 = 18s[2]
			Electronic setting I_1= 0.40…1 x In (step 0.01 x In) Release between 1.1...1.3 x I_1 (IEC 60947-2 and UL 489)	**Electronic setting** at 6 x I_1 t_1 = 3…18s (step 0.5s)[2] Tolerance: ± 10%
S **CAN BE EXCLUDED**	Against short-circuit with inverse short time delay trip and trip characteristic with inverse time (I^2t= constant) or definite time	I^2t=const ON	**Manual setting** I_2 = 0.6 - 1.2 - 1.8 - 2.4 - 3.0 - 3.6 - 4.2 - 5.8 - 6.4 - 7.0 - 7.6 - 8.2 - 8.8 - 9.4 - 10 x In	**Manual setting** at 8 x In t_2 = 0.05s; at 8 x In t_2 = 0.1s; at 8 x In t_2 = 0.25s; at 8 x In t_2 = 0.5s
			Electronic setting I_2 = 0.60…10 x In (step 0.1 x In) Tolerance: ± 10%	**Electronic setting** at 8 x In t_2 = 0.05…0.5s (step 0.01s) Tolerance: ± 10% [4]
		I^2t=const OFF	**Manual setting** I_2 = 0.6 - 1.2 - 1.8 - 2.4 - 3.0 - 3.6 - 4.2 - 5.8 - 6.4 - 7.0 - 7.6 - 8.2 - 8.8 - 9.4 - 10 x In	**Manual setting** t_2 = 0.05s; t_2 = 0.1s; t_2 = 0.25s; t_2 = 0.5s
			Electronic setting I_2 = 0.60…10 x In (step 0.1 x In) Tolerance: ± 10%	**Electronic setting** t_2 =0.05…0.5s (step 0.01s) Tolerance: ± 10%[4]
I **CAN BE EXCLUDED**	Against short-circuit with instantaneous trip		**Manual setting** I_3 = 1.5 - 2.5 - 3 - 4 - 4.5 - 5 - 5.5 - 6.5 - 7 - 7.5 - 8 - 9 - 9.5 - 10.5 - 12 x In [3]	istantaneous ≤ 25 ms
			Electronic setting I_3 = 1.5…12 x In (step 0.1 x In) [3] Tolerance: ± 10%	
G **CAN BE EXCLUDED**	Against earth fault with inverse short time delay trip and trip characteristic according to an inverse time curve (I^2t= constant)		**Manual setting** I_4 = 0.2 - 0.25 - 0.45 - 0.55 - 0.75 - 0.8 - 1 x In	**Manual setting** up to 3.15 x I_4 t_4 = 0.1s; up to 2.25 x I_4 t_4 = 0.2s; up to 1.6 x I_4 t_4 = 0.4s; up to 1.10 x I_4 t_4 = 0.8s
			Electronic setting I_4 = 0.2…1 x In (step 0.01 x In) Tolerance: ± 10%	**Electronic setting** t_4 = 0.1...0.8 x In (step 0.01s) Tolerance: ± 20%

[1] These tolerances hold in the following conditions:
– self-powered relay at full power and/or auxiliary supply;
– two or three-phase power supply

In conditions other than those considered, the following tolerances hold:

	Trip threshold	Trip time
S	± 20 %	± 20 %
I	± 20 %	≤ 40ms

[2] for T5 In = 600 A ⇒ t_1 = 12s
[3] for T5 In = 600 A ⇒ I_3max = 10 x In
[4] tolerance: ± 10 ms up to t_2 = 0.1s

PR211/P - Isomax S6 and S7

PR211/P trip unit (available for Isomax S6 and S7) provides protection functions against overload L and instantaneous short-circuit I, and is available in the versions with functions I and LI.
Function L, which cannot be excluded, can be set manually to I_1 = 0.4…1 x In by means of the dip switches on the front of the circuit-breaker. Furthermore, it is possible to select among 4 different trip curves: 3s at 6 x I_1, 6s at 6 x I_1, 12s at 6 x I_1 and 18s at 6 x I_1.
The protection function against instantaneous short-circuit I can be adjusted to I_3 = 1.5…12 x In by means of the dip switches.
Neutral protection is set to 50% of the phase protection. Ask ABB for the 100% version.

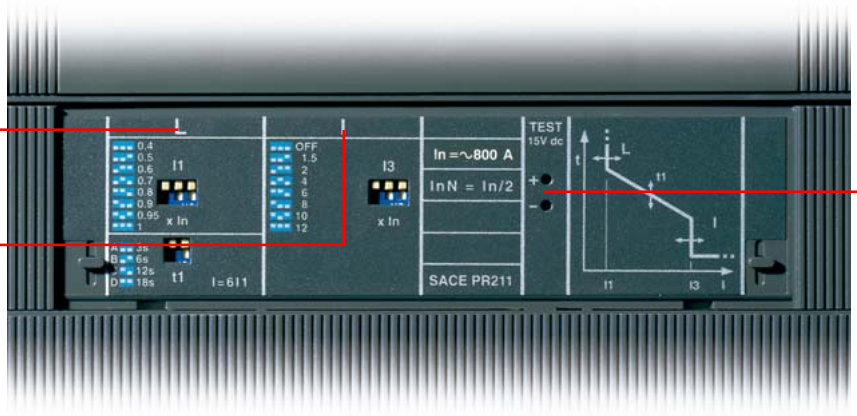
PR212/P - Isomax S6, S7 and S8

PR212/P trip unit (available from Isomax S6 to S8) provides protection functions against overload L, delayed short-circuit S and instantaneous short-circuit I, and against earth fault G. It is available in the versions PR212/P with functions LSI and LSIG.

PR211/P

Protection L
Against overload

Protection I
Against short-circuit with instantaneous trip



Socket for TT1 test unit

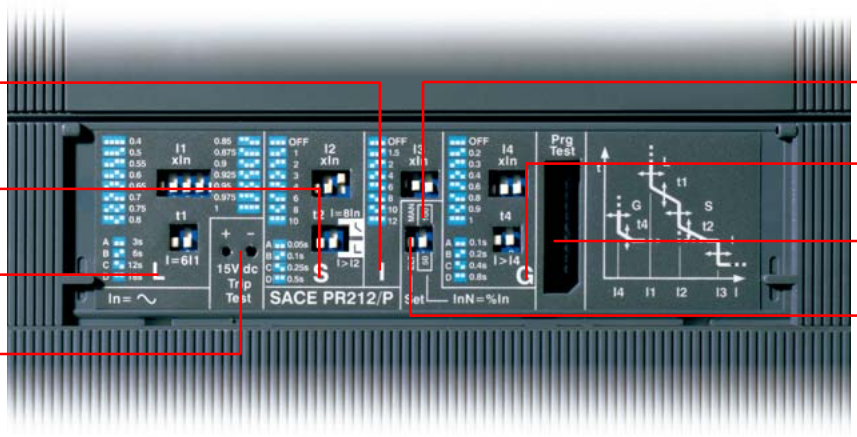
PR212/P

Protection I
Against short-circuit with instantaneous trip

Protection S
Against short-circuit with delayed trip

Protection L
Against overload

Socket for TT1 test unit



Dip-switch for setting the neutral

Protection G
Against earth fault

Socket for connection of PR010/T Test unit

Selection for electronic or manual setting

Function L, which cannot be excluded, can be set manually to I_1 = 0.4…1 x In by means of the dip switches on the front of the circuit-breaker. Furthermore, it is possible to select among 4 different trip curves: 3s at 6 x I_1, 6s at 6 x I_1, 12s at 6 x I_1 and 18s at 6 x I_1.
The protection function against short-circuit with delayed trip S, with inverse short time delay and trip characteristic with inverse time (I^2t = const), can be set to I_2 = 1…10 x In by means of the dip switches or electronically by means of the PR010T test and configuration unit. The time delay of the protection can be selected either manually by adjusting the dip switch to one of the 4 curves available (with delay of 0.05s at 8 x In, 0.1s at 8 x In, 0.25s at 8 x In or 0.5s at 8 x In) or electronically by means of PR010T between 0.05 and 0.5s at 8 x In. The protection functions against instantaneous short-circuit I and earth fault G can be adjusted respectively to I^3 = 1.5…12 x In and I_4 = 0.2…1 x In, by means of the dip switches or electronically by means of the PR010T.
For four-pole circuit breakers, protection of the neutral can be set to 50% or 100% of the phase protection setting, by means of dip-switches on the front of the trip unit.
Setting the adjustment parameters of the protection functions is carried out directly from the front of the trip unit or remotely, thanks to the use of the PR212/D (IEC only) dialogue unit, available with Modbus or LON communication protocols.

PR211/P and PR212/P - Protection functions and settings

Protection function		Trip threshold	Trip curves A	B	C	D
L **CANNOT BE EXCLUDED**	Against overload with inverse long time delay and trip characteristic according to a time dependent curve (I^2t = constant)	I_1 = 0.4 - 0.5 - 0.6 - 0.7 - 0.8 - 0.95 - 1 x In - **PR211/P** 0.4 - 0.5 - 0.55 - 0.6 - 0.65 - 0.7 - 0.75 - 0.8 - 0.85 - 0.875 - 0.9 - 0.925 - 0.95 - 0.975 - 1 x In - **PR212/P** Release between 1.05…1.30 x I1 (IEC 60947-2 and UL 489)	at 6 x I1 t1 = 3s	at 6 x I1 t1 = 6s	at 6 x I1 t1 = 12s	at 6 x I1 t1 = 18s
			(tolerance: ± 10% up to 2 x In; ± 20% above 2 x In)			
S **CAN BE EXCLUDED**	Against short-circuit with inverse short time delay and trip characteristic with dependent time (I^2t = constant) or independent time	I^2t=const ON I_2 = 1 - 2 - 3 - 4 - 6 - 8 - 10 x In Tolerance ± 10%	at 8 x In t2 = 0.05s	at 8 x In t2 = 0.1s	at 8 x In t2 = 0.25s	at 8 x In t2 = 0.5s
			(tolerance: ± 20%)			
		I^2t=const OFF I_2 = 1 - 2 - 3 - 4 - 6 - 8 - 10 x In Tolerance ± 10%	t2 = 0.05s	t2 = 0.1s	t2 = 0.25s	t2 = 0.5s
			(tolerance: ± 20%)			
I **CAN BE EXCLUDED**	Against short-circuit with adjustable instantaneous trip	I_3 = 1.5 - 2 - 4 - 6 - 8 - 10 - 12 x In Tolerance ± 20%				
G **CAN BE EXCLUDED**	Against earth fault with short inverse time delay and trip characteristic according to a dependent time curve (I^2t = constant)	I_4 = 0.2 - 0.3 -0.4 - 0.6 - 0.8 - 0.9 - 1xIn Tolerance ± 20%	up to 3.25 x I4 t4 = 100ms	up to 2.25 x I4 t4 = 200ms	up to 1.6 x I4 t4 = 400ms	up to 1.25 x I4 t4 = 800ms
			(tolerance: ± 20%)			

Motor control protection circuit breakers: MCP

Magnetic and electronic trip units

2

General characteristics

MCP circuit breakers are used to protect three phase asynchronous motors.

The traditional system used for this purpose is based on three different devices: a circuit breaker for protection against short-circuit, a thermal relay for protection against overload and phase loss or unbalance of phase, and a contactor for motor switching. All this has to take into account the problems that arise at the moment of the motor starting.

In particular, when selecting these devices, different factors must be taken into consideration, such as:

– the motor power
– the diagram and type of starting
– the type of motor: with cage rotor or with wound rotor
– the fault current at the point of the network where the motor is installed.

MCP	T2	T3	T4	T5	S6	S7	S8
Frame size	100	225	250	400-600	800	1200	1600-2000-2500
Poles	3	3	3	3	3	3	3
Ratings	20…100	100…200	100-150-250	300-400-600	800	1000-1200	1600-2000-2500
Interrupting ratings	**S H**	**S**	**N S H L**	**N S H L**	**N H L**	**H**	**V**
240 V AC	65 150	65	65 100 150 200	65 100 150 200	65 150 200	100	120
480 V AC	35 65	35	25 35 65 100	25 35 65 100	50 65 100	65	100
600Y/347 V AC		10					
600 V AC			18 25 35 65	18 25 35 65	25 35 42	50	85
500 V DC		35					
600 V DC							
Trip unit							
Adjustable magnetic only (6…12 x In)	■ ■	■					
Electronic PR221DS-I	■ ■		■ ■ ■ ■	■ ■ ■ ■			
PR211/P-I					■ ■ ■	■	■

ABB offers two different protection types:
- a magnetic only trip unit (MA) for Tmax T2 and T3, with adjustable threshold between 6…12 x In
- an electronic trip unit with only an instantaneous short-circuit protection function I, PR221DS-I for Tmax T2, T4 and T5, and PR211/P-I for Isomax S6, S7 and S8. For PR221DS-I, protection I is adjustable between 1…10 x In, whereas the range for PR211/P is 1.5…12 x In.

Electronic trip units

In [A]	25	60	100	150	250	300	400	600	800	1000	1200	1600	2000	2500
T2	■	■	■											
T4			■	■	■									
T5						■	■	■						
S6								■	■					
S7										■	■			
S8												■	■	■

Trip current function I

I_3 [A]	25 ÷ 250	60 ÷ 600	100 ÷ 1000	150 ÷ 1500	250 ÷ 2500	300 ÷ 3000	400 ÷ 4000	600 ÷ 6000	1200 ÷ 1600	1500 ÷ 12000	1800 ÷ 14400	2400 ÷ 19200	3000 ÷ 24000	3750 ÷ 30000

PR221DS-I (Tmax T2, T4 and T5) - Protection functions and settings

Protection function		Trip threshold
Against short-circuit with adjustable instantaneous trip		I_3 = 1 - 1.5 - 2 - 2.5 - 3 - 3.5 - 4.5 - 5.5 - 6.5 - 7 - 7.5 - 8 - 8.5 - 9 - 10 x In Tolerance ± 20%

PR211/P (Isomax S6…S8) - Protection functions and settings

Protection function		Trip threshold
Against short-circuit with adjustable instantaneous trip		I_3 = 1.5 - 2 - 4 - 6 - 8 - 10 - 12 x In Tolerance ± 20%

MA - Magnetic only trip unit

I_3 = 6...12 x In

In [A]	20	50	100	125	150	200
T2	■	■	■			
T3			■	■	■	■
I_3 [A]	120…240	300…600	600…1200	750…1500	900…1800	1200…2400

Molded case switches: MCS

Electrical characteristics

2

General characteristics

The MCS can be used as general circuit breakers in sub-switchboards, as switching and isolation parts for lines, busbars or groups of apparatus, or as bus-ties. They can be part of general isolation devices of groups of machines or of complexes for motor operation and protection.
The MCS are derived from the corresponding circuit breakers, of which they keep the overall dimensions, versions, fixing systems and the possibility of mounting accessories.
The MCS up to 1200 A are available in three-pole and four-pole versions, whereas the 2500 A size is only available in the three-pole version.
All the molded case switches in accordance with UL 489 and CSA C22.2 Standards are self protected.

MCS		T1N-D	T3S-D	T3S-D	T4H-D	T5H-D	S6H-D	S7H-D	S8V-D
Rating	[A]	100	150	225	250	400 600	800	1200	2500
Poles	[No]	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3
Magnetic override	[A]	1000	1500	2250	3000	5000 6000	10000	20000	35000
Rated Voltage									
AC (50-60 Hz)	[V]	600Y/347	600Y/347	600Y/347	600	600	600	600	600
DC	[V]	500	500	500	600	600	600	600	600

Accessories

Index

Accessories

3

1SDC210200F0023

Accessories

Versions and types

Fixed

Fixed ABB molded case circuit breakers, in accordance with UL/CSA standards up to 2500 A, are available in the two-pole, three-pole and four-pole version up to 1200 A and only in the three-pole version from 1600 A up to 2500 A.
The circuit breakers have:
- single depth of 2.76” (70 mm) up to 225 A and 4.07” (103.5 mm) from 150 to 800 A
- standardized front 1.77” (45 mm) up to 225 A
- possibility of assembly on back plate or on DIN rail up to 225 A (except T1B 1p)
- thermomagnetic or electronic trip units
- UL file: E93565 for circuit breakers and MCP; CSA file: LR54280
- UL file: E116595 for MCS; CSA file: LR54280.

Plug-in

The plug-in version circuit breaker consists of:
- fixed part to be installed directly on the back plate of the cubicle
- moving part, obtained from the fixed circuit breaker with addition of the isolating contacts (in correspondence with the connection terminals), of the rear frame (for fixing the fixed part), and of the terminal covers.

Circuit breaker removal is carried out by unscrewing the top and bottom fixing screws. A special lock prevents circuit breaker racking in and racking out with the contacts in the closed position.
Tmax T2 T3, T4 and T5 circuit breakers, starting from the fixed version, can be changed into the various types using the conversion kits.
When the circuit breaker has electrical accessories mounted (SOR, UVR, MOS, MOE, AUX, AUX-E, AUE and RC222), the socket-plug connectors or the adapters for isolation of the relative auxiliary circuits must also be ordered.

Accessories

Versions and types

Draw out

The draw out version circuit breaker consists of:

– fixed part to be installed directly on the back plate of the cubicle with the side group mounted on the fixed part to allow the racking-out/racking-in movement
– moving part, obtained from the fixed circuit breaker with addition of the isolating contacts (in correspondence with the connection terminals), of the rear frame (for fixing the fixed part), and of the terminal covers
– accessory to be mounted on the front of the circuit breaker, with selection between front flange for lever operating mechanism, motor operator and rotary handle operating mechanism; application of one of these accessories allows the circuit breaker lock to be made in the withdrawn position.

Racking-in/racking-out of the moving part is carried out by means of the special crank supplied with the conversion kit of the fixed circuit breaker into moving part of draw out circuit breaker. The special mechanism allows the circuit breaker to be racked out in the isolated position (with power and auxiliary circuits disconnected) with the compartment door closed, increasing the safety of the operation.

Once racked out or removed, the circuit breaker can be operated in open or closed position and, by means of the special connectors, blank operating tests of the auxiliary control circuits can be carried out.

The draw out version T4 and T5 circuit breaker can only be fitted with pre-cabled electrical accessories, provided with ADP adapters suitable for isolation of the relative auxiliary circuits.

Versions available

	F Fixed	P Plug-in	W Draw out
T1B 1p	■	–	–
T1	■	–	–
T2	■	■	–
T3	■	■	–
T4	■	■	■
T5	■	■	■
S6	■	–	■
S7	■	–	■
S8	■	–	–

Conversion kit into part of plug-in for T2, T3, T4 and T5

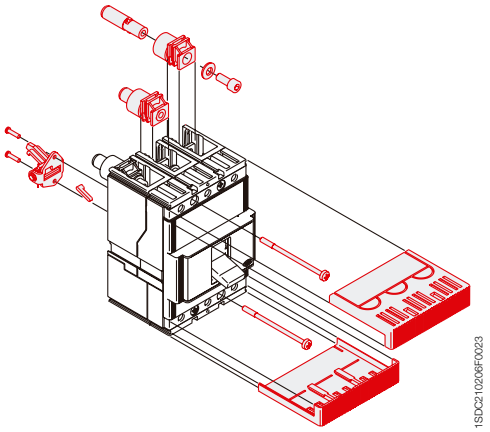
(UL file: E116596)

Allows conversion of a fixed circuit breaker with front terminals into the moving part of a plug-in circuit breaker. The kit consists of:
- isolating contacts
- anti-racking out safety device
- assembly nuts and screws
- terminals covers.

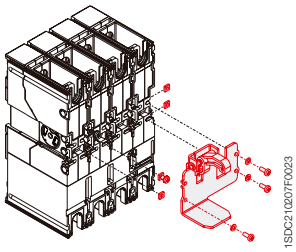
The circuit breaker is completed with the fixed part.

T2-T3

T4-T5



T2-T3

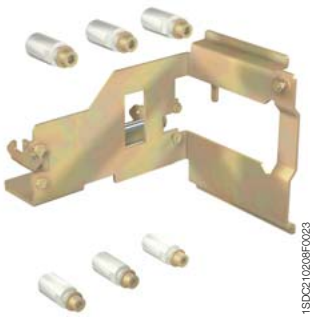


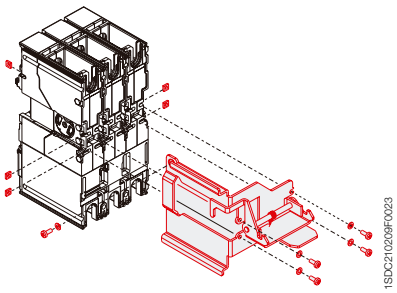
T4-T5

Conversion kit into moving part of draw out circuit breaker for Tmax T4, T5 and Isomax S6 and S7 (UL file: E116596 for Tmax)

This allows the fixed circuit breaker with front terminals to be converted into the moving part of a draw out circuit breaker. The kit consists of isolating contacts, frame, and assembly nuts and screws. The circuit breakers in the draw out version must be completed, alternatively, with one of the following accessories:
- front for lever operating mechanism
- rotary handle operating mechanism
- motor operator
- terminal covers

in order to prevent the racking-out operation with the circuit breaker closed. The circuit breaker is completed with the fixed part.



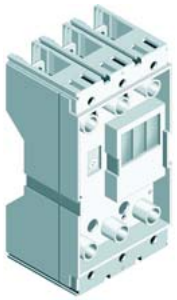


Accessories

Versions and types

Fixed part

(UL file: E116596 for Tmax)



The fixed part completes the circuit breaker in the plug-in or draw out version. For plug-in or draw out version circuit breakers, different positions are available:

– plug-in: plugged-in, unplugged
– draw out version: racked-in/racked-out, removed.

The fixed part for draw out version is fitted with a guide for supporting the moving part during the isolation or withdrawal operations. For Isomax S6 and S7 circuit breakers, there are two guides. For Tmax T2 and T3 circuit breakers, the fixed parts are available, in the standard version, with front terminals (F): a distinguishing characteristic of these two sizes of circuit breakers is the possibility of equipping the fixed parts with the same kit of terminals, terminal covers and phase separators, used for the fixed circuit breakers. With Tmax T4 and T5, codes of fixed parts are available with different types of terminals (EF, HR, VR). The fixed parts with EF terminals, moreover, can be also equipped with ES, FC Cu and FC CuAl terminals.

Conversion kit for fixed part of plug-in into fixed part of draw out for Tmax T4 and T5 (UL file: E116596)

A guide for converting the fixed part of a plug-in version circuit breaker into the fixed part of a draw out version circuit breaker is available for Tmax T4 and T5 circuit breakers.

Racking out crank

This allows racking out and racking in of the circuit breaker in the draw out version into the fixed part, with the door closed. The crank handle is the same for the whole range of circuit breakers and is automatically supplied with the fixed part of draw out circuit breakers or with the conversion kit for fixed part of plug-in into fixed part of draw out.

Accessories

Connection terminals

The basic version of the circuit breakers is supplied with:
– lugs for copper and aluminium cables (FC CuAl) or lugs for copper cables (FC Cu) for the Tmax T1 circuit breaker
– front terminals (F) for Tmax T2, T3, T4, T5 and Isomax S6, S7 and S8 circuit breakers.

Different types of terminals are also available and these can be combined in various ways (top of one type, bottom of a different type), allowing the circuit breaker to be connected to the plant in the most suitable way for the installation requirements.

The following distinctions can be made between:
– **front terminals**, which allow connection of cables or busbars by acting directly from the front of the circuit breaker
– **rear terminals**, which allow installation in switchboards with rear access to both cable and busbar connections. For Tmax T2, T3, T4 and T5 the rear terminals are adjustable.

Terminals are available for direct connection of bare copper or aluminium cables (UL listed) and terminals for connection of busbars or cables terminated with cable terminals.

An important feature of the Tmax T2 and T3 circuit breakers is that all the different types of terminals can be mounted either on the fixed version circuit breaker or on the fixed part of the plug-in circuit breaker. On the other hand, T4 and T5 fixed part can mount EF, HR or VR terminals, and, moreover, fixed part with EF terminals can be equipped also with ES, FC Cu and FC CuAl terminals.

The information needed to make the connections is given for each type of terminal on page 3/9 and following. The minimum and maximum cross-section of the cables, which can be tightened in the terminals and the diameter of the terminal, are indicated for connection with bare cables. Flat bars of different size and composition are recommended for connections with busbars. The required minimum depth is also indicated, if it is different to the one recommended.

The torque values to be applied to the tightening screws for cable terminals and to the screws used to connect the busbars to the flat bar terminals are given.

3

Insulating terminal covers

The terminal covers are applied to the terminals of the circuit breaker to prevent accidental contact with live parts.

The following are available:
– low terminal covers (LTC), which guarantee IP40 degree of protection for fixed circuit breakers with rear terminals and for moving parts of plug-in or draw out circuit breakers
– high terminal covers (HTC), for fixed circuit breakers with front, front extended, front for cables and rear terminals; guarantee IP40 degree of protection
– terminal covers for fixed parts, of plug-in or draw out circuit breakers for T4, T5, S6 and S7 circuit breakers, guarantee IP40 degree of protection on the front with moving part connected. They are available in a single version. The fixed parts of plug-in T2 and T3 circuit breakers can use the same terminal covers as the corresponding fixed circuit breakers. For fixed parts of T4 and T5 400, the proper terminal covers (TC-FP) are available.

The degrees of protection indicated are valid for circuit breaker installed in switchboards.

Accessories

Connection terminals

Phase separating partitions

These allow the insulation characteristics between the phases at the connections to be increased. They are mounted from the front, even with the circuit breaker already installed.
Two versions are available for Tmax circuit breakers:
– 3.94” (100 mm) high
– 7.87” (200 mm) high.
The H = 3.94” (100 mm) phase separators are supplied as standard with front extended type terminals (EF), whereas those with H = 7.87” (200 mm) are standard with the front extended spread type of terminals (ES).
They are incompatible with both the high and low insulating terminal covers.
The fixed parts of plug-in Tmax circuit breakers can use the same phase separating partitions as the corresponding fixed circuit breakers. With the phase separating partitions mounted, a special kit is available on request to reach IP40 degree of protection from the front of the circuit breaker.
Moreover, it is possible to mount the phase separating partitions between two circuit breakers or fixed parts side by side.
Phase separating partitions must always be requested for Isomax S6 and S7 circuit breakers. They are always an alternative to the high or low terminal covers.

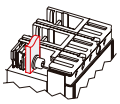
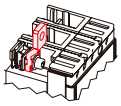
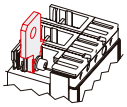
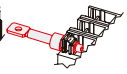
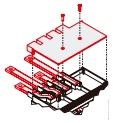
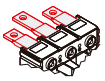
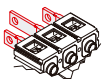
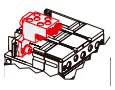
Screws for sealing the terminal covers

These are applied to the terminal covers of fixed circuit breakers or to the moving parts of plug-in or draw out circuit breakers. They prevent removal of both the high and low terminal covers and can be locked with a wire and lead seal.

Kit for taking up the auxiliary power supply

Special kits are available with the Tmax T2, T3, T4 and T5 circuit breakers for taking up the auxiliary power supply directly from the connection terminals. They can only be combined with the front terminals for copper cables (FC Cu) or with the front terminals (F) for T3, T4 and T5.

Connection terminals

	F	EF	ES	FC Cu	FC CuAl[1]	R	RC	HR	VR	MC
										
	Front	Extended front	Front extended spread	Front for copper cables	Front for copper and aluminium cables[3]	Rear[4]	Rear for Cu/Al cables	Rear flat horizontal	Rear flat vertical	Multi-cable terminals
T1		F		F[2]	F[2]			F		
T2	F - P[2]	F-P	F-P	F-P	F-P	F-P				
T3	F - P[2]	F-P	F-P	F-P	F-P	F-P				
T4	F[2]	F-P-W	F-P-W	F-P-W	F-P-W	F		P-W	P-W	F
T5	F[2]	F-P-W	F-P[5]-W[5]	F-P-W	F-P-W	F		P-W	P-W	
S6	F[2]	F-W	F		F	F	F	W	W	
S7	F[2]	F-W	F		F			F-W	F-W	
S8	F[2]								F	

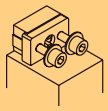
[1] UL listed
[2] Standard supply
[3] External and standard versions
[4] Orientated for Tmax and threaded for Isomax
[5] Only for T5 600

F = Fixed
P = Plug-in
W = Draw-out

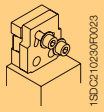
Front terminals - F

T1-T5

S6

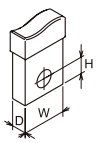


S7



Allow connection of busbars or cables terminated with cable terminals

Type	Version	Pieces	Busbars/cable terminals [in-mm]				Tightening [lbin-Nm]	Terminal covers			Phase separators
			W	H	D	Ø	B	high	low	fixed part	
T2	F - P	1	0.79-20	0.3-7.5	0.2-5	0.26-6.5	54-6	R	R	–	R
T3	F - P	1	0.94-24	0.37-9.5	0.31-8	0.33-8.5	71-8	R	R	–	R
T4	F	1	0.98-25	0.37-9.5	0.31-8	0.33-8.5	161-18	R	R	–	R
T5	F	1	1.38-35	0.43-11	0.40-10	0.41-10.5	250-28	R	R	–	R
S6	F	2	1.97-50	0.47-12	0.20-5	2 x 0.27-7	80-9	R	R	–	R
S7	F	2	1.97-50	0.79-20	0.31-8	2 x 0.43-11	161-18	–	R	–	R
S8 2000	F	3	3.94-100	–	0.20-5	4 x 0.59-15	625-70	–	R	–	–
S8 2500	F	4	3.94-100	–	0.20-5	4 x 0.59-15	625-70	–	R	–	–



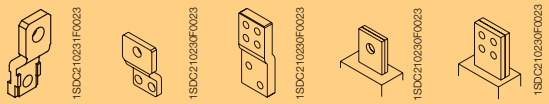
A = Tightening the terminal onto the circuit breaker
B = Tightening of the cable/busbar onto the terminal
R = On request
S = Standard

Accessories

Connection terminals

Front extended terminals - EF

T1-T5 S6 800 S7 PF S6 PF S7



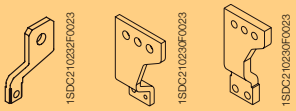
Allow connection of busbars or cables terminated with cable terminals

Type	Version	Pieces	Busbars [in-mm]			Cable terminals [in-mm]		Tightening [lbin-Nm]		Terminal covers			Phase separators
			W	D	Ø	L	Ø	A	B(1)	high	low	fixed part	
T1	F	1	0.59-15	0.20-5	0.33-8.5	0.59-15	0.33-8.5	63-7	80-9	R	–	–	S
T2	F-P	1	0.79-20	0.16-4	0.33-8.5	0.79-20	0.33-8.5	54-6	80-9	R	–	–	S
T3	F-P	1	0.79-20	0.24-6	0.39-10	0.79-20	0.39-10	71-8	161-18	R	–	–	S
T4	F	1	0.79-20	0.39-10	0.39-10	0.79-20	0.39-10	161-18	161-18	R	–	–	S
	P-W	1	0.79-20	0.39-10	0.31-8	0.79-20	0.31-8	–	80-9	–	–	R	R
T5	F	2	1.18-30	0.27-7	0.43-11	1.18-30	0.43-11	252-28	161-18	R	–	–	S
	P-W	2	1.18-30	0.59-15	0.39-10	1.18-30	0.39-10	–	161-18	–	–	–	S
S6	F-W	2	1.97-50	0.20-5	0.55-14	1.97-50	0.55-14	80-9	268-30	R	R	–	R
S7	F-W	2	1.97-50	0.31-8	4 x 0.43-11	1.97-50	4 x 0.43-11	402-45	161-18	–	R	–	R

3

Front extended spread terminals - ES

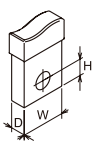
T1-T5 S6 S7



Allow connection of busbars or cables terminated with cable terminals

Type	Version	Pieces	Busbars [in-mm]			Cable terminals [in-mm]		Tightening [lbin-Nm]		Terminal covers			Phase separators
			W	D	Ø	L	Ø	A	B	high	low	fixed part	
T2	F-P	1	1.18-30	0.16-4	0.41-10.5	1.18-30	0.41-10.5	54-6	161-18	–	–	–	S
T3	F-P	1	1.18-30	0.16-4	0.41-10.5	1.18-30	0.41-10.5	71-8	161-18	–	–	–	S
T4	F-P-W	1	1.18-30	0.24-6	0.41-10.5	1.18-30	0.41-10.5	161-18	161-18	–	–	–	S
T5	F-P(1)-W(1)	1	1.57-40	0.39-10	0.43-11	0.43-11	0.43-11	252-28	161-18	–	–	–	S
S6	F	1	3.54-90	0.31-8	3 x 0.51-13	4x1.77-45	0.51-13	80-9	268-30	–	–	–	–
S7	F	1	3.54-90	0.59-15	3 x 0.51-13	4x1.77-45	0.51-13	402-45	179-30	–	–	–	–

(1) Only for T5 600



A = Tightening the terminal onto the circuit breaker
B = Tightening of the cable/busbar onto the terminal
R = On request
S = Standard

Front terminals for copper cables - FC Cu[1]

Allow connection of bare copper cables directly to the circuit breaker

Type	Version	Pieces	Cable [AWG or Kcmil-mm²]		Tightening [lbin-Nm]		Ø [in-mm]	Terminal covers			Phase separators
			rigid	flexible	A	B		high	low	fixed part	
T1/T1P	F	1	14…2/0-2.5…70	14…1-2.5…50	–	62-7	0.47-12	R	R	–	R
	F	2	–	14…1-2.5…50	–	62-7	0.47-12	R	R	–	R
T2	F-P	1	18…3/0-1…95	18…2/0-1…70	–	62-7	0.55-14	R	R	R	R
	F-P	2	–	18…0-1…50	–	62-7	0.55-14	R	R	R	R
T3	F-P	1	10…350-6…185	10…300-6…150	–	89-10	0.71-18	R	R	R	R
	F-P	2	–	10…2/0-6…70	–	89-10	0.71-18	R	R	R	R
T4	F-P-W	1	14…350-2.5…185	14…300-2.5…150	–	89-10	0.71-18	R	R	S	R
	F-P-W	2	–	14…3/0-2.5…95	–	89-10	0.71-18	R	R	S	R
T5	F-P-W	1	6…500-16…240	6…500-16…300	–	222-25	1.1-28	R	R	S	R
	F-P-W	2	–	6…300-16…150	–	222-25	1.1-28	R	R	S	R
	F	2	–	1…350-50…185	161-18	279-31	0.85-21.5	S	–	–	–

[1] UL listed for Tmax T1

Front terminals for copper/aluminium cables - FC CuAl (UL listed)

T2-T5 Standard

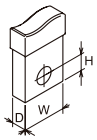
T4-T5 External

S6 800

S7

Allow connection of bare copper or aluminium cables directly to the circuit breaker (solid aluminium cables cannot be used)

Type	Assembly	Version	Pieces	Cable [AWG or Kcmil-mm²]	Tightening [lbin-Nm]		Ø [in-mm]	Terminal covers			Phase separators
				rigid	A	B		high	low	fixed part	
T1 1P/T1	standard	F	1	14…10-2.5…6	20-2.5		0.37-9.5	R	R		R
				8.0-10	40-4.5						
				6…1/0-16…50	45-5						
T2	standard	F-P	1	14…1/0-2.5…50	80-9	50-5.6		R	R	R	R
T3	standard	F-P	1	14…1/0-2.5…50	80-9	50-5.6	0.39-10	R	R	R	R
	standard	F-P	1	4…300-25…150	80-9	200-22.6	0.67-17	R	R	R	R
T4	standard	F-P-W	1	6…350-6…185	274-31	80-9	0.7-18	R	R	S	R
	standard	F	1	14…1/0-2.5…50	50-5.6	80-9	0.39-9.9	R	R		R
T5 400	external	F	2	3/0…250-95…120	274-31	159-18	0.61-15.5	S			R
	external	F	2	3/0…500-95…240	274-31	159-18	0.84-21.5	S			R
T5	standard	F-P-W	1	250…500-120…240	380-43	159-18	0.84-21.5	R	R	S	R
S6	standard	F	3	2/0…400-70…185	80-9	383-43	0.75-9	S			
	standard	F	2	250…500-120…240	44-5	276-31	0.87-22	S			
S7	standard	F	4	4/0…500-95…240	311-35	383-43	0.85-21.5	S			

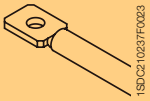


A = Tightening the terminal onto the circuit breaker
B = Tightening of the cable/busbar onto the terminal
R = On request
S = Standard

Accessories

Connection terminals

Rear orientated terminals for Tmax - R

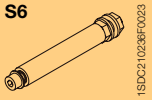


Allow connection of busbars or cable terminal at the rear

Type	Version	Pieces	Busbars [in-mm]			Tightening [lbin-Nm]		Terminal covers		Phase separators
			W	D	Ø	A	B	high	low	–
T2	F-P	1	0.79-20	0.16-4	0.33-8.5	54-6	80-9	–	S	–
T3	F-P	1	0.79-20	0.24-6	0.33-8.5	54-6	80-9	–	S	–
T4	F	1	0.79-20	0.39-10	0.33-8.5	54-6	80-9	–	S	–
T5	F	2	1.18-30	0.27-7	0.43-11	161-18	161-18	–	S	–

Threaded rear terminals for Isomax - R

S6

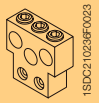


Allow connection of busbars at the rear

Type	Version	Pieces	Busbars [in-mm]			Cable terminals [in-mm]		Tightening [lbin-Nm]		Terminal covers			Phase separators
			W	D	Ø	L	Ø	A	B	high	low	fixed part	
S6	F	2	1.97-50	0.20-5	0.98-25	1.97-50	0.98-25	161-18	890-100	–	S	–	–

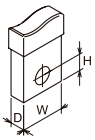
Rear terminals for copper/aluminium cables for Isomax - RC

S6 800



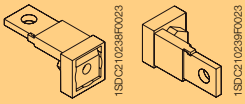
Allow connection of copper or aluminium cables directly to the circuit breaker

Type	Version	Pieces	Cable terminals [AWG or Kcmil-mm²]	Tightening [lbin-Nm]		Ø [in-mm]	Terminal covers			Phase separators
				A	B		high	low	fixed part	
S6	F	3	2/0…300-70…150	80-9	276-31	0.689-17.5	S	–	–	–

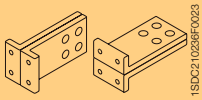


A = Tightening the terminal onto the circuit breaker
B = Tightening of the cable/busbar onto the terminal
R = On request
S = Standard

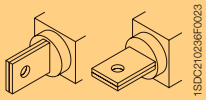
Rear flat horizontal and vertical terminals - HR/VR



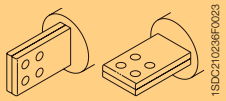
S7



S6



S7

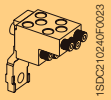


Allow connection of busbars at the rear.

Type	Version	Pieces	Busbars [in-mm]			Cable terminal [in-mm]		Tightening [lbin-Nm]		Terminal covers			Phase separators
			W	D	Ø	L	Ø	A	B	high	low	fixed part	
T1	F	1	0.55-14	0.20-5	0.24-6.2	0.55-14	0.24-6.2	63-7	45-5	–	S	–	–
T4	P-W	1	0.79-20	0.39-10	0.39-10	0.79-20	0.39-10	161-18	–	–	–	–	–
T5 400	P-W	1	0.98-25	0.39-10	0.47-12	0.98-25	0.47-12	161-18	–	–	–	–	–
T5 600	P-W	2	1.57-40	0.59-15	0.43-11	1.57-40	0.43-11	161-18	–	–	–	–	–
S6	W	2	1.97-50	0.20-5	0.55-14	1.97-50	0.55-14	–	267-30	–	–	–	–
S7	F-W	2	1.97-50	0.31-8	4 x 0.43-11	–	–	–	179-20	–	S	–	–
S8 2000	F	3	3.94-100	0.20-5	4 x 0.59-15	–	–	–	625-70	–	–	–	–
S8 2500	F	4	3.94-100	0.20-5	4 x 0.59-15	–	–	–	625-70	–	–	–	–

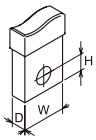
Note: for T1 and S8 only the terminals are available.

Multi-cable terminals for Tmax - MC



Allow connection of cables directly to the circuit breaker

Type	Version	Pieces	Cable [AWG or Kcmil-mm²]		Tightening [lbin-Nm]		Terminal covers			Phase separators
		max	flexible	rigid	A	B	high	low	fixed part	
T4	F	6	14…4-2.5…25	14…4-2.5…35	161-18	62-7	S	–	–	–

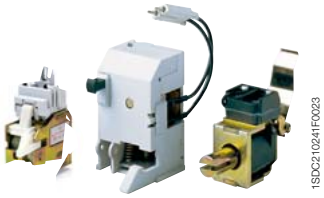


A = Tightening the terminal onto the circuit breaker
B = Tightening of the cable/busbar onto the terminal
R = On request
S = Standard

Accessories

Service releases

The shunt trip and undervoltage releases, housed and fixed in a slot on the left-hand side of the circuit breaker, are always alternative to each other. They are supplied in the pre-cabled version with 39.4” (1 m) long cables for Tmax T1, T2 and T3 circuit breakers, or socket-plug connectors, still with 39.4” (1 m) long cables, for T4 and T5. For Isomax S6 and S7, the power supply is made by means of special connectors.
Assembly is carried out by pressure into the appropriate seat located in the left-hand part of the circuit breaker and fixing with the screw provided.

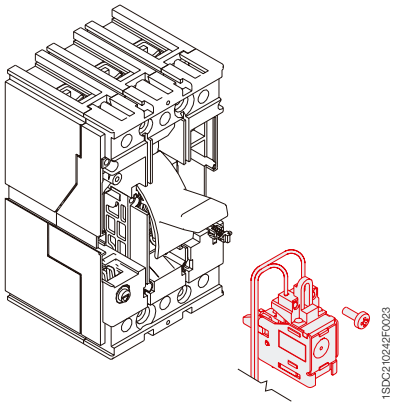


SOR - Shunt trip

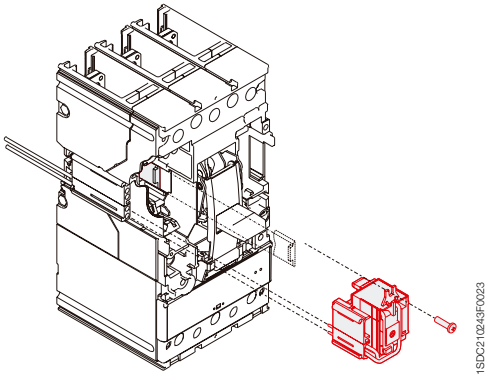
(UL file: E116596)

This allows circuit breaker opening by means of an electrical command. Operation of the release is guaranteed for a voltage between 75% and 110% of the value of the rated power supply voltage Un, both in AC and DC. It is always fitted with an auxiliary limit contact.
Furthermore, PS-SOR opening coils with permanent operation are also available for T4 and T5, with a much lower power consumption and these can be continuously supplied: in this case they are not, in fact, fitted with an auxiliary limit contact. Again for these coils, either the pre-cabled or uncabled version can be selected.

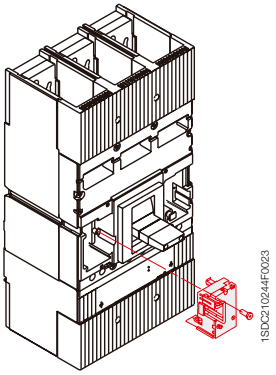
T1-T2-T3



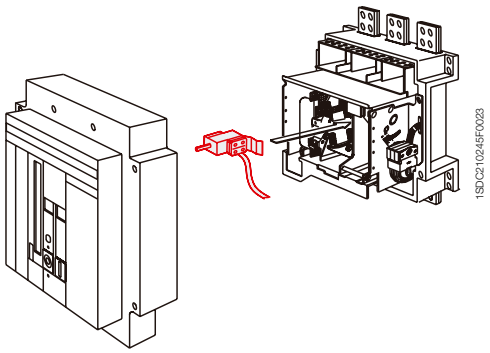
T4-T5



S6-S7



S8



SOR - Electrical characteristics

	Absorbed power on inrush			
	Tmax T1, T2, T3		Tmax T4 and T5	
Version	AC [VA]	DC [W]	AC [VA]	DC [W]
12 V DC	–	50	–	150
24…30 V AC/DC	50	50	150	150
48…60 V AC/DC	60	60	150	150
110…127 V AC-110…125 V DC	50	50	150	150
220…240 V AC-220…250 V DC	50	50	150	150
380…440 V AC	55	–	150	–
480…500 V AC	55	–	150	–
Opening times [ms]	15	15	15	15

	Absorbed power on inrush			
	Isomax S6, S7		Isomax S8	
Version	AC [VA]	DC [W]	AC [VA]	DC [W]
12 V DC	–	150	–	–
24 V AC/DC	150	150	–	150
30 V DC	–	–	–	150
48 V AC/DC	150	150	200	150
60 V DC	–	–	–	150
100…127 V AC/DC	–	–	200	150
110…120 V AC-110…125 V DC	150	150	–	–
127…150 V AC	–	–	200	–
160 V DC-150…180 V AC	–	–	200	150
200…250 V AC/DC	–	–	200	150
220…240 V AC-220…250 V DC	150	150	–	–
480 V AC	150	–	–	–
380…500 V AC	–	–	200	–
Opening times [ms]	≤15	–	–	–

PS-SOR - Electrical characteristics

	Absorbed power on inrush			
	Tmax T4 and T5		Isomax S6 and S7	
Version	AC [VA]	DC [W]	AC [VA]	DC [W]
24-30 V DC	–	4	–	–
110…120 V AC	4	–	–	–
24 V AC/DC	–	–	3.9	4.2

Accessories

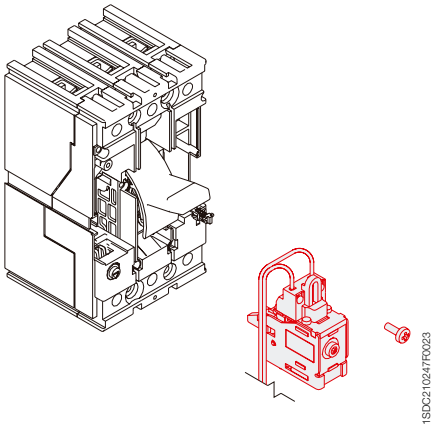
Service releases

UVR - Undervoltage release

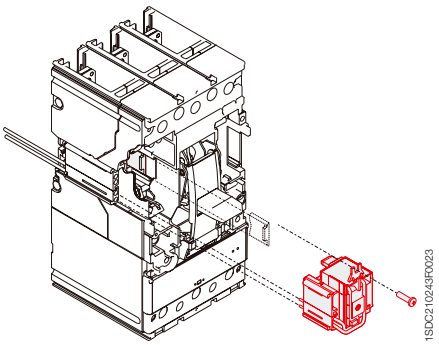
(UL file: E116596)

This opens the circuit breaker due to a power supply failure of the release or to voltage drops to values of less than 0.7 x Un with a trip range from 0.69 to 0.35 x Un.
After tripping, the circuit breaker can be closed again starting from a voltage higher than 0.85 x Un. With the undervoltage release de-energized, it is not possible to close the circuit breaker.

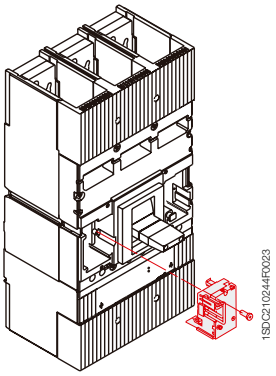
T1-T2-T3



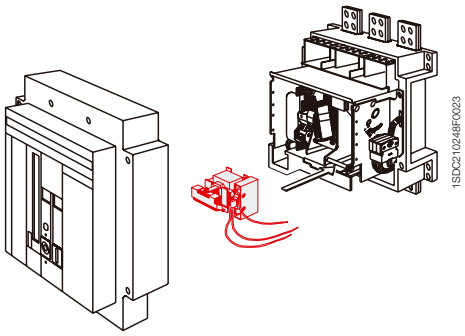
T4-T5



S6-S7



S8



3

UVR - Electrical characteristics

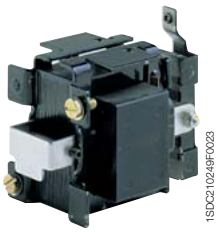
	Power consumption during permanent operation			
	Tmax T1, T2, T3		Tmax T4 and T5	
Version	AC [VA]	DC [W]	AC [VA]	DC [W]
24…30 V AC/DC	1.5	1.5	6	3
48 V AC/DC	1	1	6	3
60 V AC/DC	1	1	6	3
110…127 V AC-110…125 V DC	2	2	6	3
220…240 V AC-220…250 V DC	2.5	2.5	6	3
380…440 V AC	3	–	6	–
480…500 V AC	4	–	6	–
Opening times [ms]	15	15	≤25	≤25

	Power consumption during permanent operation			
	Isomax S6, S7		Isomax S8	
Version	AC [VA]	DC [W]	AC [VA]	DC [W]
24 V DC	–	4	–	15
24 V AC	10	–	30 (50 Hz)	–
30 V DC	–	–	–	15
30 V AC	–	–	30 (50 Hz)	–
48 V AC	10	–	30 (50 Hz)	–
48 V DC	–	4	–	15
60 V DC	–	–	–	15
60 V AC	–	–	30 (50 Hz)	–
100 V AC	–	–	30 (50 Hz)	–
110…115 V AC	–	–	30 (60 Hz)	–
110…115 V AC	–	–	30 (50 Hz)	–
110…127 V AC	10	–	30 (50 Hz)	–
125…127 V AC	–	–	30 (60 Hz)	–
110…125 V DC	–	–	–	15
120 V AC	–	–	30 (60 Hz)	–
127…130 V AC	–	–	30 (50 Hz)	–
125 V DC	–	4	–	–
240 V AC	10	–	30 (60 Hz)	–
250 V DC	–	4	–	–
480 V AC	10	–	–	–
208…220 V AC	–	–	30 (60 Hz)	–
220 V AC	–	–	30 (50 Hz)	–
220…250 V DC	–	–	–	15
230…240 V AC	–	–	30 (50 Hz)	–
277 V AC	–	–	30 (60 Hz)	–
380 V AC	–	–	30 (60 Hz)	–
380…400 V AC	–	–	30 (50 Hz)	–
440 V AC	–	–	30 (60 Hz)	–
480 V AC	–	–	30 (60 Hz)	–
500 V AC	–	–	30 (50 Hz)	–
Opening times [ms]	≤25	≤25	≤25	≤25

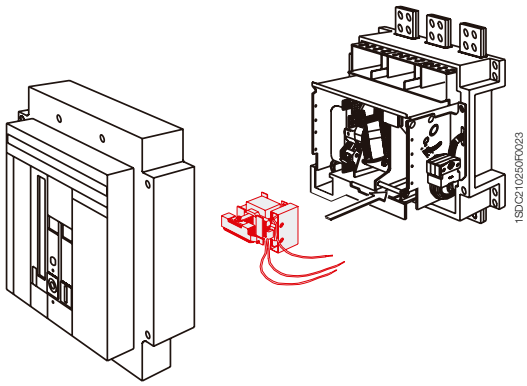
Accessories

Service releases

Closing coil



Used with Isomax S8 circuit breaker, this allows circuit breaker closing by means of an electrical contact. Operation of the release is guaranteed for a voltage between 80% and 110% of the value of the rated power supply voltage Un, both in AC and in DC.



Closing coil

Isomax S8

	Absorbed power on inrush	
Version	AC [VA]	DC [W]
24 V DC		220
24 V AC (60Hz)	200	
48 V DC		220
110…125 V DC		220
120 V AC (60Hz)	200	
208…220 V AC (60Hz)	200	
220…250 V DC		220
240 V AC (60Hz)	200	
415…440 V AC-480 V AC (60Hz)	200	
Opening times [ms]	≤ 25	≤ 25

UVD - Time delay device for undervoltage release

1SDC210251F0023

The undervoltage release can be combined with an external electronic power supply time delay device, which allows circuit breaker opening to be delayed in the case of a drop or failure in the power supply voltage of the release itself, according to preset and adjustable delays, in order to prevent unwarranted trips caused by temporary malfunctions. The delay device must be combined with an undervoltage release with the same corresponding voltage. This time delay device can also be combined either with the Tmax T1…T5 or Isomax circuit breakers.

Extension for testing releases


1SDC210252F0023

Available for Tmax T4 and T5 and Isomax S6 and S7 circuit breakers, this allows supply to the service releases with the circuit breaker in the racked out position. It is therefore possible to carry out blank operating tests of the circuit breaker in safe conditions, i.e. isolated in relation to the power circuits.

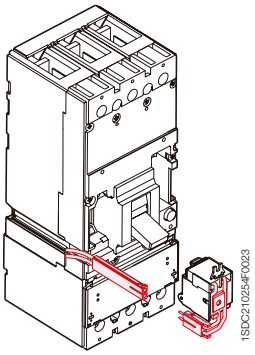
Connectors for service releases for Isomax


1SDC210253F0023

These allow the shunt trip or undervoltage release to be connected to the power supply circuit. They are available in the following versions:

– for Isomax S6 and S7 fixed circuit breakers
– for Isomax S6 and S7 draw out circuit breakers.

Assembly is by means of pressure into special slots in the left side of the circuit breaker.
Cables of different lengths (UL/CSA) are available.
Socket-plugs with 3, 6 or 12 poles and cable kit (UL/CSA) with a length of 78.8’ (2 meters) are available for Tmax: the socket-plugs are necessary only for plug-in version.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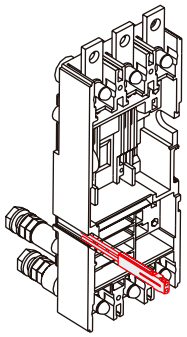
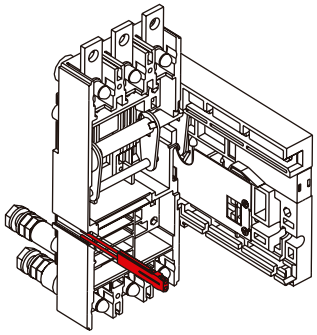
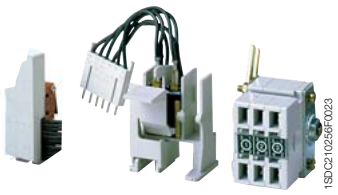



1SDC210255F0023

Accessories

Electrical signals

These allow information relative to the circuit breaker status to be taken outside the circuit breaker. Installation of these accessories takes place directly from the front of the circuit breaker, in special slots on the right-hand side of the circuit breaker, completely segregated from the live parts, with increased operator safety.
They are supplied in the pre-cabled version with 39.4” (1 m) long cables for the T1, T2 and T3 circuit breakers, or socket-plug connectors, still with 39.4” (1 m) long cables, for T4 and T5. For Isomax S6 and S7, the power supply is made by means of special connectors.



AUX - Auxiliary contacts and bell alarm

(UL file: E116596)

These carry out electrical signalling of the operating state of the circuit breaker:
- **open/closed**, which indicates the position of the main contacts
- **bell alarm**, which signals the circuit breaker open due to one of the following reasons:
  - overload or short circuit
  - shunt trip
  - UVR
  - residual current release
  - emergency opening pushbutton of the motor operator
  - operation of the circuit breakers test pushbutton.

Auxiliary contacts can be supplied (according to the type) in the pre-cabled version with 1 m long cables for T1, T2 and T3 or with connectors, still with 1m long cables, for T4, T5, S6 and S7.

AUX - Electrical characteristics

AUX 250 V - T1, T2, T3, T4 and T5		
Power supply voltage [V]	**Service current [A]**	
	AC	**DC**
125	6	0.3
250	5	0.15

AUX 400V - T4, T5		
Power supply voltage [V]	**Service current [A]**	
	AC	**DC**
125	–	0.5
250	12	0.3
400	3	–

AUX 24 V - T1, T2, T3, T4 and T5		
Power supply voltage [V]	**Service current [A]**	
	AC	**DC**
24	0.3	≥ 0.75 mA
5	–	≥ 1 mA

AUX 400V - S6, S7		
Power supply voltage [V]	**Service current [A]**	
	AC	**DC**
125	–	0.3
250	6	0.15
400	3	–

AUX 500 V - S8		
Power supply voltage [V]	**Service current [A]**	
	AC	**DC**
220	–	1
380	6	–
500	3	–

The auxiliary contacts are available for use with different voltages either in direct or alternating current:

T1, T2, T3, T4 and T5 (AUX) – 250 V AC/DC (UL file: E116596)
In the pre-cabled version:
– 1 contact for signalling (on changeover) open/closed plus 1 contact (on changeover) for bell alarm
– 3 contacts for signalling (on changeover) open/closed plus 1 contact (on changeover) for bell alarm.

T4 and T5 (AUX) – 400 V AC (UL file: E116596)
Only in the pre-cabled version:
– 1 contact for signalling (on changeover) open/closed plus 1 contact (on changeover) for bell alarm
– 2 contacts for signalling (on changeover) open/closed.

T1, T2, T3, T4 and T5 (AUX) – 24 V DC
Gold-plated in the pre-cabled and uncabled version for T4 and T5 and only in the uncabled version for T1, T2 and T3:
– 3 contacts for signalling (on changeover) open/closed plus 1 contact (on changeover) for bell alarm.

T2 with PR221DS electronic trip unit - 250 V AC/DC
In the pre-cabled version:
– a contact for signalling alarm which signals intervention of one of the protection functions of electronic trip unit plus a contact for signalling (on changeover) open/closed plus a contact for signalling (on changeover) release tripped
– two open/closed signalling contacts (on changeover) plus one release tripped signalling contact (on changeover).

T4 and T5 with PR221DS, PR222DS/P and PR222DS/PD-A (AUX-SA) – 250 V AC
Only in the pre-cabled version:
– 1 contact for bell alarm.

T4 and T5 (AUX-MO)
Only in the uncabled version, to be combined with the MOE or MOE-E motor operator:
– 1 contact for signalling the operating mode of the circuit breaker with the motor operator: manual or remote.

T4 and T5 with PR222DS/PD-A electronic trip unit (AUX-E)
Only in the uncabled version and only combined with the PR222DS/PD-A, they communicate the state of the circuit breaker to the electronic trip unit.
– 1 contact for signalling (on changeover) open/closed + 1 contact (on changeover) for bell alarm.

S6 and S7 (AUX) – 400 V AC/250 V DC (UL file: E116596)
In the pre-cabled and uncabled version:
– 1 contact during open/closed changeover + 1 bell alarm
– 2 contacts for signalling (on changeover) open/closed
– 1 open signal +1 closed signal +1 bell alarm.

S8 (AUX) – 500 V AC/220 V DC (UL file: E116596)
In the pre-cabled version:
– 3 contacts during open/closed changeover
– 1 bell alarm.

Signals

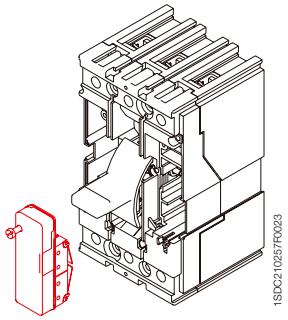
		T1	T2 TMF	T2 PR221DS	T3	T4	T5	S6	S7	S8
AUX 250 V AC/DC	1 open/closed changeover contact + 1 bell alarm contact	■	■		■	■	■			
AUX 250 V AC/DC	3 open/closed changeover contacts + 1 bell alarm contact	■	■		■	■	■			
AUX 250 V AC/DC	1 contact signalling coil tripped + 1 open/closed changeover contact + 1 bell alarm contact			■						
AUX 250 V AC/DC	2 open/closed changeover contacts + 1 bell alarm contact			■						
AUX 400 V AC	1 open/closed changeover contact + 1 bell alarm contact					■	■	■	■	
AUX 400 V AC	2 open/closed changeover contacts					■	■	■	■	
AUX 400 V AC/250 V DC	1 contact signalling coil tripped + 1 open/closed changeover contact + 1 bell alarm contact							■	■	
AUX 24 V AC/DC	3 open/closed changeover contacts + 1 bell alarm contact	■	■		■	■	■			
AUX-SA	1 contact signalling coil tripped					■	■			
AUX-MO	1 contact signalling manual/remote					■	■			
AUX 500 V AC/220 V DC	3 open/closed changeover contacts									■
AUX 500 V AC/220 V DC	1 bell alarm contact									■

Accessories

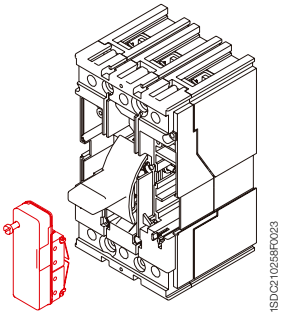
Electrical signals

A change-over contact signalling residual current protection trip is always supplied for the Tmax circuit breakers combined with the RC221 and RC222 residual current releases (in accordance with IEC 60947-2 Standard). Two change-over contacts for signalling pre-alarm and alarm are also available with RC222.

T1-T2-T3

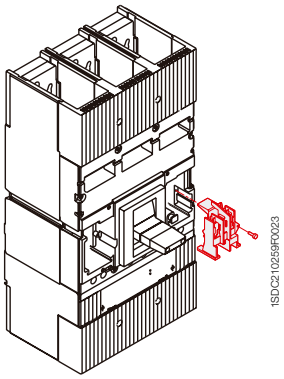


T4



AUX-C 250 V AC/DC

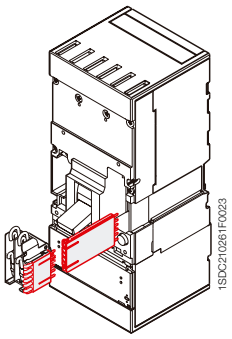
S6-S7

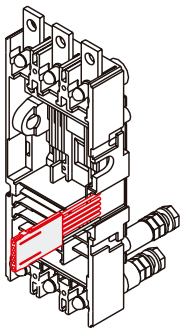


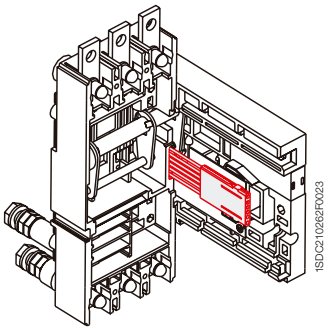
3

Connectors for auxiliary contacts for Isomax

These allow the auxiliary contacts to be connected to the relative power supply circuit.
For Isomax S6 and S7 circuit breakers, the auxiliary contacts (fitted with plug connector) can only be supplied by means of the specific connectors to be ordered specifying the size and version of the circuit breaker (fixed or plug-in/draw out).
Assembly is carried out by mounting into special slots on the right side of the circuit breaker.
Socket-plugs with 3, 6 or 12 poles and cable kit (UL/CSA) with a length of 78.8” (2 m) are available. For Tmax: the socket-plugs are necessary only for plug-in version.







Extension for testing auxiliary contacts

Available for Tmax T4 and T5, and Isomax S6 and S7 circuit breakers, this allows the auxiliary contacts to be connected to the relative power supply circuit with the circuit breaker in the withdrawn position. With the circuit breaker in safe conditions, i.e. isolated in relation to the power circuits, blank tests of circuit breaker operation can be carried out.

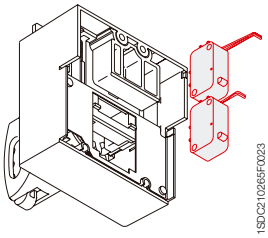
1SDC210264F0023

AUE - Early auxiliary contacts

One auxiliary contact for Isomax S6 and S7 and two contacts for Tmax T1, T2, T3, T4 and T5 allow the undervoltage release or a control device to be supplied in advance, in relation to closing of the main contacts, in compliance with the IEC 60204-1, and VDE 0113 Standards. They are mounted inside the direct rotary handle operating mechanism.

For Isomax S6 and S7, the contact is supplied complete with a socket connector with double slide for simultaneous connection of the undervoltage release and of the consent contact itself. With Tmax T1, T2 and T3, the early contacts are supplied in the cabled version with cables 39.4” (1 m) long, complete with socket-plug with 6 poles, whereas for T4 and T5 early contacts are provided with socket-plug connectors with 39.4” (1 m) cables.

T1-T5



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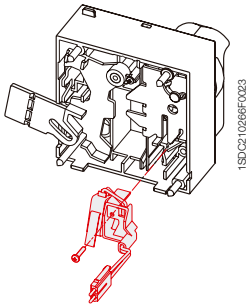
S6...S7



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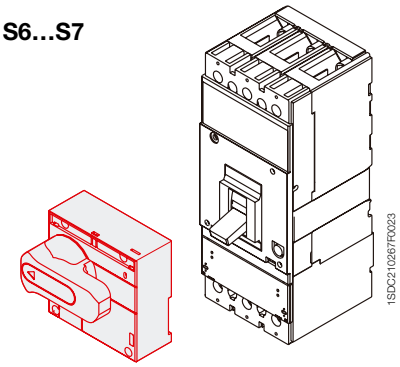

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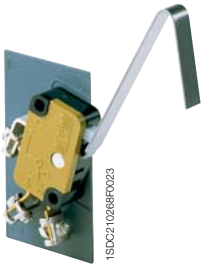
AUP - Auxiliary position contacts



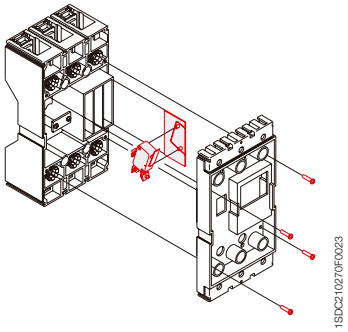
For the fixed part of circuit breakers Tmax T2, T3, T4 and T5, and Isomax S6 and S7 they provide electrical signalling of the circuit breaker position in relation to the fixed part: racked-in, drawn out and removed. They can only be connected by means of free wires and are available in the following versions:

– contacts signalling circuit breaker racked-in for Tmax and Isomax circuit breakers
– contacts signalling circuit breaker racked-out for Tmax T4 and T5 for the draw-out version
– contacts signalling circuit breaker racked-in for Tmax T4 and T5 in 24 V DC
– contacts signalling circuit breaker racked-out for Tmax T4 and T5 in 24 V DC for the draw-out version.

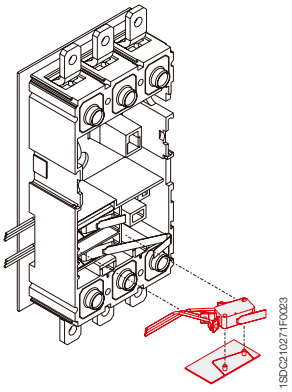
A maximum of three contacts for Tmax and a maximum of five contacts for S6 and S7, in any combination, can be installed on the fixed part.

The circuit breaker position contacts are also available in the gold-plated version for digital signals, also suitable for use for Un<24 V voltages with the same type of signaling and versions (for Isomax).

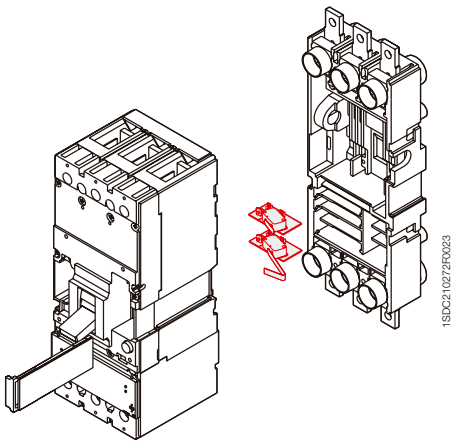
T2-T3



T4-T5



S6-S7



Accessories

Remote controls

These allow remote control of circuit breaker opening and closing and are particularly suitable for use in electrical network supervision and control systems.
A selector allows changeover from automatic to manual operation. They are always fitted with a padlock in the open position.

MOS - Solenoid operating mechanism for Tmax T1, T2 and T3

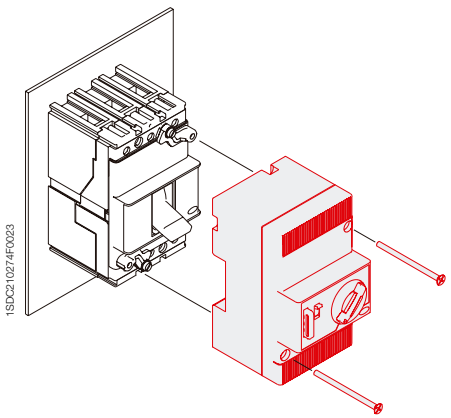
(UL file: E116596)

This operates both opening and closing of the circuit breaker, acting directly on its lever. It is proposed in two versions, one “side-by-side” (IEC only), with T1 and T2, for installation on a panel or DIN rail, the other on the front of the circuit breaker (UL file: E116596), with T1, T2 and T3. The latter is complete with operating handle. The front version can also be used with plug-in circuit breakers.

Coupling with the residual current release is only allowed for a circuit breaker with solenoid operator side-by-side, to allow access to the user interface of the residual current release from the front of the switchgear. In fact, using the solenoid operator superimposed would imply the circuit breaker position on the rear of the door and its residual current release and the interface would no longer be accessible. This combination can only be installed directly on the back plate of the switchboard.
Both versions can be used either in the three-pole or four-pole version.
The solenoid operator is supplied complete with free cables 39.4” (1 m) long and socket-plug connector with 3 poles just for the superimposed version.
The table gives the power supply voltage values Un [V].

Rated voltage, Un		
AC	[V]	110…250
DC	[V]	48…60 / 110…250
Operating voltage		85…110% Un
Inrush power consumption		2500 [VA] / 1000 [W]
Time	opening [s]	< 0.1
	closing [s]	< 0.1
Mechanical life	[no. Operations]	25000
	[no. Operations/h]	240 (T1 and T2); 120 (T3)
Degree of protection, on the front		IP30
Minimum control impulse time on opening and closing	[ms]	>100

Note: with the MOS in the 110...250 V AC/DC version, it is necessary to use the MOS-A adapter (supplied) for 220 V ≤ Un ≤ 250 V service voltage

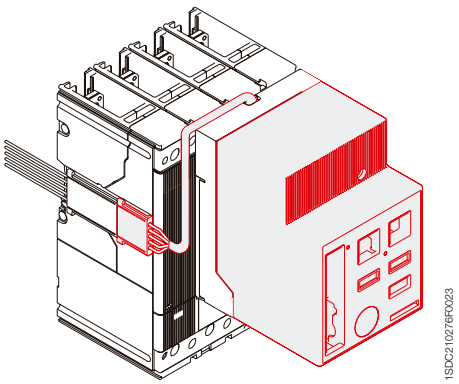


Stored energy motor operator for Tmax T4 and T5 – MOE

(MOE: UL file: E116596)

With the stored energy motor operator, it is possible to control both opening and closing of the circuit breaker on which it is installed. During opening of the circuit breaker, the spring system is recharged automatically: the stored energy is exploited in this way to close the circuit breaker.
The motor operator is always supplied complete with socket-plug connectors with 39.4" (1m) long cables and is always fitted with a padlock. The connectors, once inserted in the special slot on the right-hand side of the circuit breaker, extend in relation to the outline of the circuit breaker itself.
The device can be fitted both with a key lock in the open position (with the same MOL-S keys for groups of circuit breakers or different MOL-D keys) and with a MOL-M key lock against manual operation: in the former case, the lock in the open position is both of electrical and mechanical type, in the latter case, only of mechanical type, i.e. only closing from the front of the circuit breaker (remote closing is allowed).
The motor operator is always fitted with an auxiliary contact to signal "auto" or "manual (not on changeover). On request, it can also be fitted with an AUX-MO auxiliary contact (on changeover), which provides a signal of its service state: "auto" (remote control of the circuit breaker) or "manual".

MOE		**Tmax T4 and T5**	
Rated voltage, Un		AC [V]	DC [V]
		–	24
		–	48…60
		110…125	110…125
		220…250	220…250
		380	–
Operating voltage		85…110% Un	85…110% Un
Power consumption on inrush Ps		≤ 300 VA	≤ 300 W
Power consumption in service Pc		≤ 150 VA	≤ 150 W
Time	opening [s]	1.5	
	closing [s]	< 0.1	
	resetting [s]	3	
Mechanical life	[no. operations]	20000	
Degree of protection, on the front		IP30	
Minimum opening and closing control time	[ms]	≥ 150	



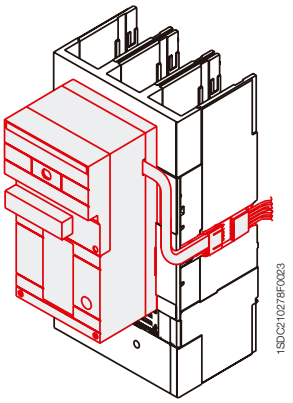
Stored energy motor operator for Isomax S6 and S7 circuit breakers

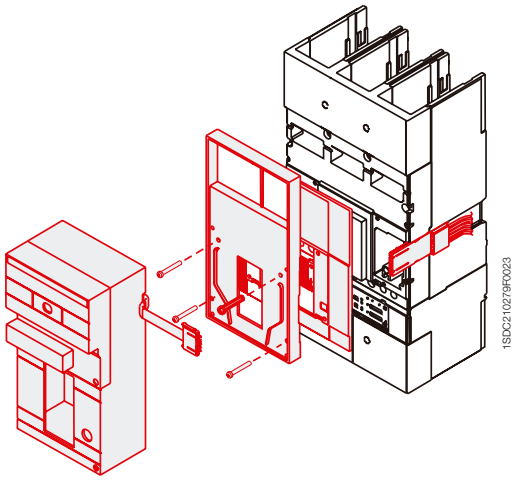
(UL file: E116596)

With the stored energy operating mechanism, during circuit breaker opening the release mechanism automatically pre-charges a system of springs: the stored energy is used for closing the circuit breaker. It is supplied complete with shunt opening release (Ps=100VA/100W) and flange for the compartment door. The table shows the power supply voltages values Un [V].
In case of interlocked circuit breakers, the key lock against manual operation is necessary.

Motor operator for S6, S7

		AC	DC
Rated voltage, Un	[V]		24
	[V]		48
	[V]	120	125
	[V]	240	250
Operating frequency		50…60	
Operating voltage		85…110% Un	85…110% Un
Power consumption on inrush Ps		660 VA	600 W
Power consumption in service Pc		180 VA	180 W
Time constant	[ms]	22	
Duration	opening [s]	1.2	
	closing [s]	0.09	
Mechanical life	[no. operations]	10000 (S6) - 5000 (S7)	
Degree of protection, on the front		IP30	
Minimum duration of the opening and closing command impulse	[ms]	≥ 100	



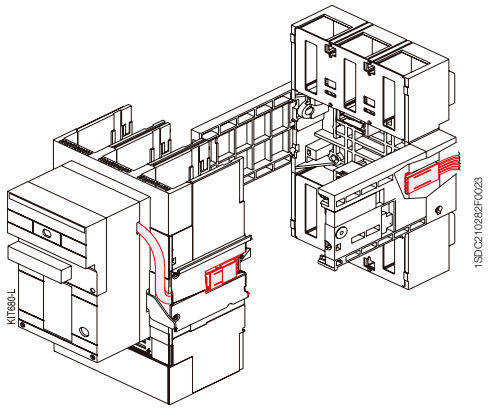


Geared motor for Isomax S8 circuit breaker

This allows the springs of the circuit breaker closing mechanism to be charged automatically, immediately following a closing operation. It includes a limit microswitch for electrical signalling of closing springs charged.

Connectors for Isomax S6 and S7 motor operators

The motor operators for S6 and S7 can only be supplied by means of the specific connectors. They are of the slide type and allow simultaneous connection of both the motor operator and the auxiliary contacts to the relative power supply circuit. They are an alternative to the corresponding connectors for the auxiliary contacts only since they are housed in the same seat. They must be ordered specifying the size and version of the circuit breaker (fixed or plug-in/draw out).



Extension for testing motor operators

For Tmax T4 and T5 and Isomax S6 and S7 circuit breakers, this allows both motor operators and the auxiliary contacts to be connected to the relative power supply circuit with the circuit breaker in the racked-out position. With the circuit breaker in safe conditions, i.e. isolated in relation to the power circuits, blank operating tests of the circuit breaker can be carried out. It must be ordered specifying the size and version of the circuit breaker (fixed or plug-in/draw out) and automatically excludes the corresponding extension for testing the auxiliary contacts.

Accessories

Operating mechanisms with locks

Rotary handle operating mechanism – RHD/RHE

(UL file: E116596 for Tmax)

The rotary handle operating mechanism facilitates operation thanks to its ergonomic handle. It is always fitted with a padlock in the open position, which prevents the circuit breaker being closed. The padlock slot can take up to three padlocks – stem Ø 0.27" (7 mm) for T1, T2, T3 T4 and T5, and 0.24" (6 mm) for S6 and S7 (not supplied).

The rotary handle operating mechanism for Tmax is always fitted with a compartment door lock and, on request, can be supplied with a key lock in the open position; for S6 and S7, on request, it can be supplied with a compartment door lock or key lock in the open position.

Application of the rotary handle operating mechanism is an alternative to the motor operator and to the front interlocking plate for Tmax T1, T2, T3 and to the front flange for the lever operating mechanism for Tmax T4, T5 and Isomax S6 and S7.

The rotary handle operating mechanism is available in either the direct version and in the transmitted version on the compartment door. The trip unit settings and the nameplate data remain accessible to the user.

For Isomax S6 and S7 circuit breakers, the direct rotary handle operating mechanism on the circuit breaker is always supplied complete with flange for the compartment door.

The rotary handle operating mechanism in the emergency version, complete with red-yellow handle and yellow plate, suitable for machine tool control, is also available for all the circuit breakers. For Tmax circuit breakers, the rotary handle operating mechanisms can be ordered by building up by ordering the following three devices:

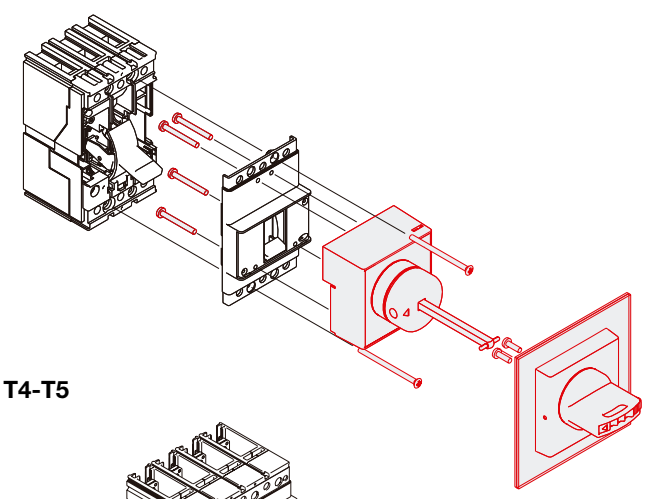
– rotary handle on the compartment door
– transmission rod (19.68" / 500 mm)
– base for circuit breaker

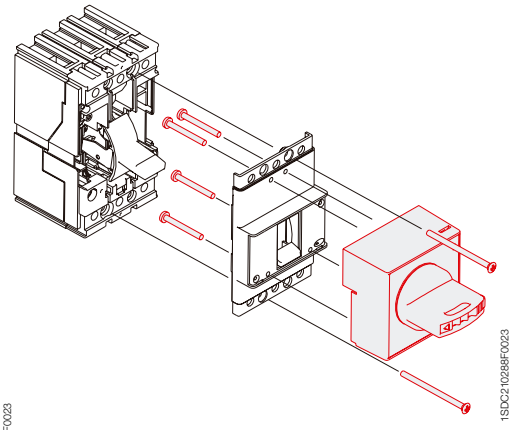
or, alternatively, by using the code of the ready-configured version.

Type of RH operating mechanism

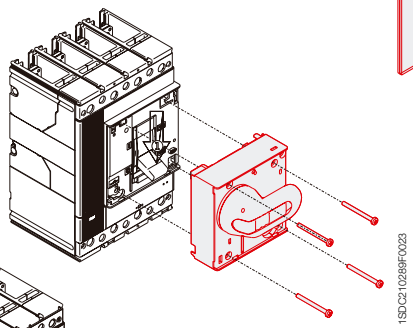
		T1, T2, T3	T4, T5		S6, S7	
		F/P	F/P	W	F	W
RHD	Direct	■	■	■	■	■
RHD_EM	Emergency direct	■	■	–	■	■
RHE	Transmitted with adjustable distance	19.68" - 500 mm	■	■	19.68" - 500 mm	19.68" - 500 mm
RHE_EM	Emergency transmitted with adjustable distance	19.68" - 500 mm	■	■	19.68" - 500 mm	–
RHE_S	Rod for transmitted adjustable handle	19.68" - 500 mm	■	–	–	–
RHE_B	Base for circuit breaker	■	■	■	–	–
RHE_H	Handle for transmitted RH with adjustable distance	■	■	■	–	–
RHE_H_EM	Emergency handle for transmitted RH with adjustable distance	■	■	■	–	–

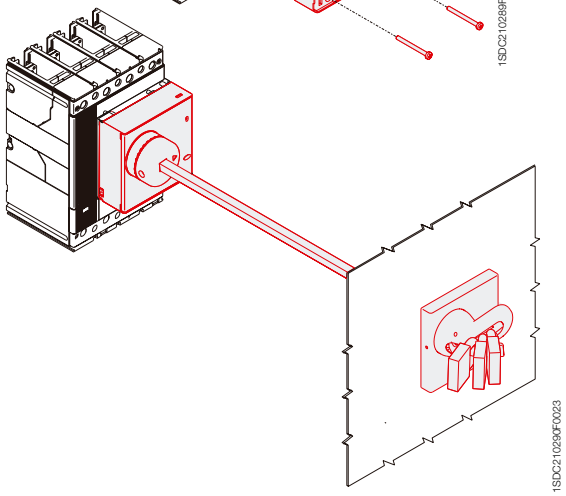
T2-T3



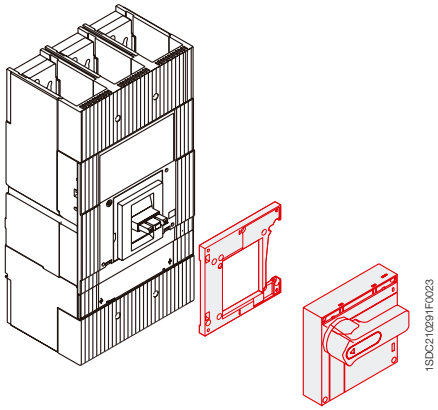


T4-T5





S6-S7



IP54 protection for rotary handle

(UL file: E116596 for Tmax T4-T5)

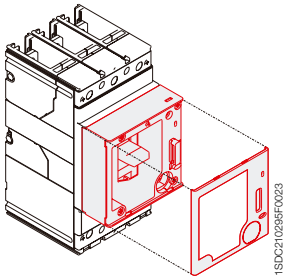
Allows IP54 degree of protection to be obtained. It is available for the transmitted rotary handle operating mechanism on the compartment door (RHE) for the Tmax and Isomax circuit breakers.

Accessories

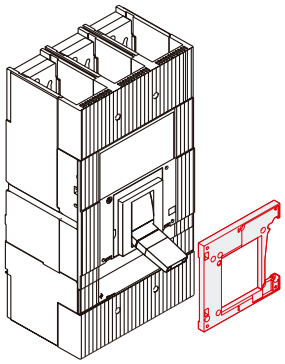
Operating mechanisms with locks

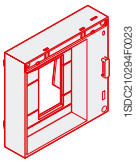
Front flange for lever operating mechanism – FLD (UL file: E116596 for Tmax)

This can be installed on Tmax T4 and T5, and on Isomax S6 and S7 fixed, plug-in or draw out circuit breakers. In case of draw out circuit breakers installed in compartments, it allows higher degree of protection to be maintained for the whole isolation run of the circuit breaker.
It is always fitted with a padlock in the open position (stem Ø 0.24" - 6 mm up to three padlocks - not supplied) which prevents closing of the circuit breaker.
On request, it can be fitted with a key lock in the open position for one or more circuit breakers and with the compartment door lock.
It is available in the following versions:
– for fixed or plug-in circuit breaker
– for draw out circuit breaker.
The front flange for lever operating mechanism is always an alternative to the motor operator, to the rotary handle and, for T4 and T5, to the front display unit FDU.



S6-S7

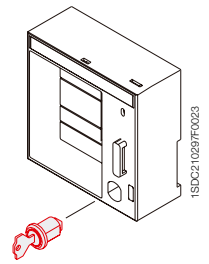


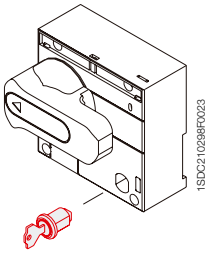


For Isomax S6 and S7 circuit breakers, it is always supplied complete with flange for the compartment door.

Key lock in open position

This allows the mechanical closing operation of the circuit breaker to be locked.
The following versions are available:
– lock with different key for each circuit breaker
– lock with the same key for groups of circuit breakers.
For Isomax S6 and S7 circuit breakers, different locks are supplied, for stored energy motor operator, for rotary handle or front for lever operating mechanism.
For Tmax T1, T2 and T3, the key lock is available for the rotary handle operating mechanism (RHL). Furthermore, it is also available in the version which allows the lock both in the open and in the closed position: the lock in the closed position does not prevent tripping of the mechanism following a fault or a remote control command.
For T4 and T5 key locks in the open position are available either with different keys (KLF-D) or with the same keys (KLF-S): in this case, up to four different key numbering codes are available.



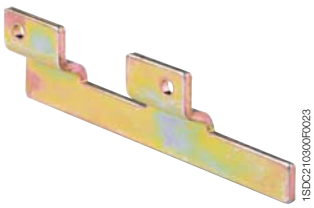


KLC - Key lock on the circuit breaker

Available for Tmax T1, T2 and T3, the key lock on the circuit breaker allows the mechanical closing operation of the circuit breaker to be locked and is installed directly on the front inside the slot in correspondence with the left pole. It cannot be mounted with a front operating mechanism, a rotary handle operating mechanism, a motor operator, or RC221/RC222 residual current releases and, only in the case of three-pole circuit breakers, with service releases (UVR, SOR).

The key lock is the Ronis 622 type and is available in two versions:

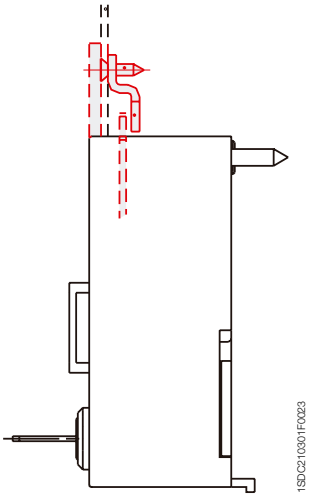
– standard type, with key only removable with the circuit breaker locked (KLC)
– special type, with key removable in both positions (KLC-S).



Compartment door lock

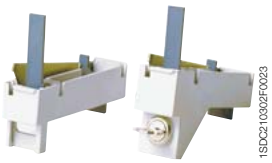
This prevents the compartment door being opened with the circuit breaker closed. It can be used with Isomax S6 and S7 circuit breakers in the fixed, plug-in or draw out version and fitted with rotary handle operating mechanism or front for lever operating mechanism. It consists of two elements: one applied to the rotary handle operating mechanism or to the front for the lever operating mechanism, the other, consisting of a metal striker, to be applied onto the compartment door.

For Tmax circuit breakers, the door lock is always supplied with the rotary handle operating mechanism.



Accessories

Operating mechanisms with locks



Lock for fixed part of draw out circuit breakers - Tmax T4, T5 and Isomax S6, S7

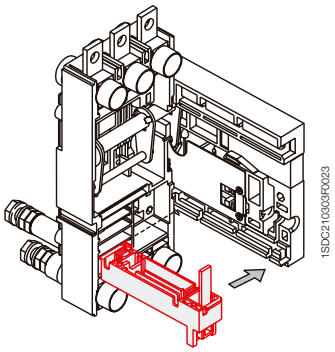
Key locks or padlocks are available to be applied to the guide of the fixed part of a draw out circuit breaker to prevent the moving part from being racked-in. The following different versions are available:

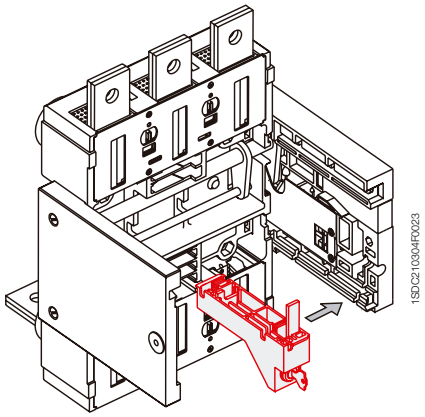
– padlock, which can take up to three padlocks with stem Ø 0.24” - 6 mm (not supplied);
– key lock in the open position with different key for each circuit breaker;
– key lock in the open position between two or more circuit breakers with the same key for groups of circuit breakers;
– key lock of Ronis type (without key).

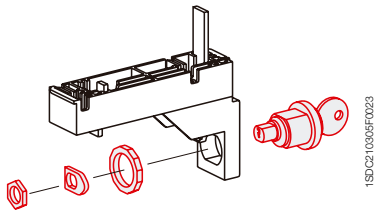
For T4 and T5 draw out circuit brakers, key or padlocks-locks are available to be applied onto the rail of the fixed part, to prevent racking-in of the withdrawable part.

Selection can be made among the following:

– key lock with different keys (KLF-D FP)
– key lock with the same keys for groups of circuit breakers (KLF-S FP)
– padlock, which can take up to three padlocks with 6 mm stem Ø, not supplied (PLL FP).







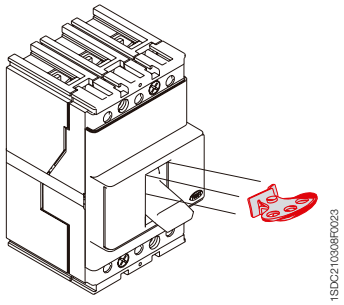
3

PLL - Padlock for operating lever for Tmax T1, T2, T3

This is applied to the Tmax T1, T2 and T3 covers to prevent the lever closing or opening operations. It allows installation of up to a maximum of three padlocks Ø 0.24" - 7 mm (not supplied).
It is available in the following versions:

– locking device only of the closing operation (it is applied with circuit breaker ON/OFF)
– locking device on the closing and opening operation according to its assembly position. The lock on the opening operation does not prevent release of the mechanism following a fault or remote control command.

* UL file E116596

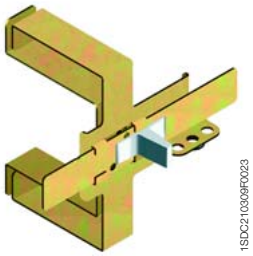


Operating mechanisms with locks

	T1	T2	T3	T4	T5	S6	S7
Sealable lock of thermal adjustment	■	■	■				
FDL_Key lock for fornt for lever operating mechanism				■	■	■	■
RHL_Key lock for rotary handle operating mechanism	■	■	■			■	■
KLC_Key lock on the circuit breaker	■	■	■				
Compartment door lock	■	■	■	■	■	■	■
KLF-FP and PLL-FP_locks in open position for fixed parts				■	■	■	■
PLL_Padlock for operating lever	■	■	■				
MOL-D and MOL-S_Key lock in open position for MOE				■	■		
MOL-M_Key lock against manual operation for MOE				■	■		

Accessories

Operating mechanisms with locks



Mechanical interlock between circuit breakers (for Tmax UL file E116596)

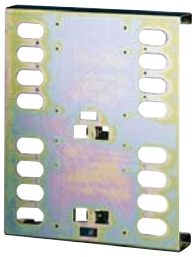
Tmax T1, T2, T3

For Tmax T1, T2 and T3 circuit breakers a front mechanical interlock (MIF) is available, which can be applied on the front of two (UL file E116596) both three-pole and four-pole fixed version circuit breakers, preventing simultaneous closing of the two circuit breakers. Fixing is carried out directly on the back plate of the switchboard. The front interlocking plate allows installation of a padlock in order to fix the position (possibility of fixing the O-O position as well). It is also possible to interlock three circuit breakers, even of different sizes, by using a special plate, making the following interlocking combinations: IOO-OIO-OOI-OOO.

Tmax T4, T5

The mechanical interlock for Tmax T4 and T5 allows installation of two circuit breakers on a single support and, by means of special lever mechanism, makes them mechanically interdependent. Unlike the interlock used with T1, T2 and T3 which is frontal, this is a rear interlock consisting of a vertical or horizontal frame group (MIR-HB or MIR-VB), made up of a metal frame and of the leverisms to interlock, and of two plates (MIR-P) on which the circuit breakers are housed. Types of back plates:

S6-S7



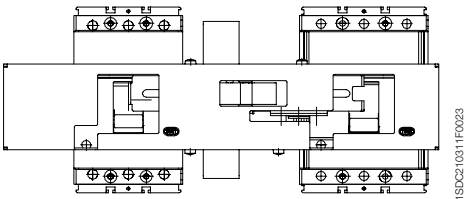
Interlock

Type			
A	T4 (F-P-W)	+	T4 (F-P-W)
B	T4 (F-P-W)	+	T5 400 (F-P-W) or T5 630 (F)
C	T4 (F-P-W)	+	T5 630 (P-W)
D	T5 400 (F-P-W) or T5 630 (F)	+	T5 400 (F-P-W) or T5 630 (F)
E	T5 400 (F-P-W) or T5 630 (F)	+	T5 630 (P-W)
F	T5 630 (P-W)	+	T5 630 (P-W)

Isomax S6, S7

For Isomax S6 and S7 circuit breakers, the rear mechanical interlock allows installation of two circuit breakers on a single support and, by means of a walking beam mechanism, makes them mechanically inter-dependent. It prevents operation in parallel of two power supply sources (e.g.: normal - emergency). It consists of a kit with levers and assembly accessories and a metallic support.
The mechanical interlock is available in the version for side-by-side circuit breakers and for superimposed circuit breakers. Only circuit breakers of the same size and in the same version can be interlocked.

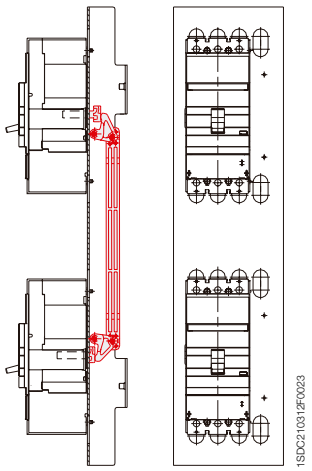
T1-T2-T3

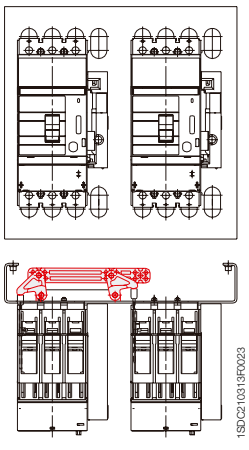


Mechanical interlocks

	T1	T2	T3	T4	T5	S6	S7
Front interlock between two fixed circuit breakers	■	■	■				
Front interlock among three fixed circuit breakers	■	■	■				
Rear interlock between two fixed or plug-in or draw out circuit breakers side by side				■	■	■	■
Rear interlock between two fixed or plug-in or draw out circuit breakers superimposed				■	■	■	■

S6-S7





Accessories

Residual current releases - IEC only

All the Tmax series of circuit-breakers are preset for combined assembly with residual current releases. In particular, the Tmax T1, T2 and T3 circuit-breakers can be combined with the new version of the SACE RC221 or RC222 series of residual current releases and four-pole T4 and T5 with RC222 or RC223 to be installed below the circuit-breaker.
Apart from the protection against overloads and short-circuits typical of automatic circuit-breakers, the residual current circuit-breakers derived from them also guarantee protection of people and protection against earth fault currents, thereby ensuring protection against direct contacts, indirect contacts and fire hazards. The residual current releases can also be mounted on the Tmax T1D, T3D, T4D and T5D switch-disconnectors. In that case, the derived apparatus is a "pure" residual current circuit-breaker, i.e. one which only guarantees residual current protection and not the protections typical of circuit-breakers. "Pure" residual current circuit-breakers are only sensitive to the earth fault current and are generally applied as main switch-disconnectors in small distribution switchboards towards end users.
The use of "pure" and "impure" residual current circuit-breakers allows continual monitoring of the state of plant insulation, ensuring efficient protection against fire and explosion hazards and, when the devices have $I\Delta n \leq 30$ mA, ensure protection of people against indirect and direct earth contacts to fulfil the compulsory measures foreseen by the accident prevention regulations and prescriptions.
The residual current releases are constructed in compliance with the following Standards:
– IEC 60947-2 appendix B
– IEC 60255-3 (SACE RCQ and RC223) and IEC 61000: for protection against unwarranted release
– IEC 60755 (SACE RCQ): for insensitivity to direct current components.

RC221 and RC222 residual current releases for T1, T2 and T3

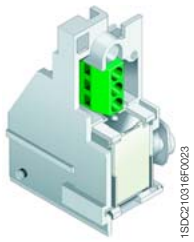

1SDC210314F0023


1SDC210315F0023

The RC221 and RC222 residual current releases can be installed either on the Tmax T1, T2 and T3 circuit-breakers, or on the T1D and T3D switch-disconnectors. The versions available make their use possible both with three-pole and four-pole circuit-breakers, in the fixed version.
They are constructed using electronic technology and act directly on the circuit-breaker by means of a trip coil, supplied with the residual current release, to be housed in the special slot made in the left-hand pole area. They do not require an auxiliary power supply as they are supplied directly by the network and their operation is guaranteed even with only a single phase plus neutral or only two phases supplied with voltage and in the presence of unidirectional pulsating currents with direct components.
All the possible connection combinations are allowed, except for guaranteeing, in the four-pole version, connection of the neutral to the first pole on the left.
The RC221 and RC222 residual current releases can either be supplied from above or from below.
The operating conditions of the apparatus can be continually controlled by means of the electronic circuit test pushbutton and the magnetic indicator of residual current trip.
A disconnection device of the power supply during the insulation test is available.
The four-pole circuit-breaker complete with residual current release can be fitted with the electrical accessories normally available for the circuit-breaker. The shunt opening and undervoltage releases are housed in the special slot made in the neutral pole for the four-pole circuit-breakers, whereas they are incompatible with the three-pole circuit-breakers.

Accessories

Residual current releases - IEC only



The residual current releases are supplied complete with:
- a trip coil to be housed in the area of the third pole, complete with an auxiliary contact signalling residual current release trip
- dedicated flange.

The bracket for fixing onto DIN 50022 rail is available on request.
The configuration foresees insertion of the circuit-breaker on the structure of the corresponding residual current release, making access to the adjustments on the left-hand side of the circuit-breaker available, whilst the toroid is in the underneath position.
A distinguishing characteristic is provided by the type of cable connection which is made directly on the circuit-breaker, once the residual current release has been mounted, thereby ensuring simplification and rationalisation of the installation procedure.
With Tmax T2 and T3, only front terminals for copper cables (FC Cu) at the bottom are mounted on the residual current releases. For this reason, when the residual current release is ordered, the FC Cu terminal semi-kit is always supplied (consult the code section on page 7/36).
On the other hand, for four-pole Tmax T1, it is also possible to mount the rear horizontal flat terminal kit below (HR for RC221/RC222).
Furthermore, still for four-pole T1, a version of the RC222 residual current release is available in 200 mm modules. This release keeps the same technical characteristics as the normal RC222 for T1, T2 and T3 but, thanks to its reduced height, allows installation in 200 mm modules. Its special shape also allows a reduction in the overall dimensions when two or more units are placed side by side.

3

RC222 residual current release for T4 and T5

With T4 and T5, in the four-pole version, it is possible to use an RC222 residual current release below the circuit-breaker.
This RC222 residual current release, in the fixed version, can easily be converted into plug-in by adding the special conversion kit.
The RC222 release is constructed using electronic technology and acts directly on the circuit-breaker by means of a trip coil, supplied with the residual current release, to be housed in the special slot made in the left-hand pole area.
It does not require an auxiliary power supply as they are supplied directly by the network and their operation is guaranteed even with only a single phase plus neutral or only two phases supplied with voltage and in the presence of unidirectional pulsating currents with direct components.
All the possible connection combinations are allowed as long as there is that of the neutral to the first pole on the left.
The RC222 residual current release can either be supplied from above or from below.
The operating conditions of the apparatus can be continually controlled by means of the electronic circuit test pushbutton and the magnetic indicator of residual current trip.
A disconnection device of the power supply during the insulation test is available.
The four-pole circuit-breaker complete with residual current release can be fitted with the electrical accessories normally available for the circuit-breaker.
The shunt opening and undervoltage releases are housed in the special slot made in the neutral pole for the four-pole circuit-breakers.
The residual current release is supplied complete with:
- a trip coil to be housed in the area of the third pole, complete with an auxiliary contact signalling residual current release trip
- dedicated flange.

The release is supplied with standard front terminals, but it can also be combined with all the terminals available for the corresponding circuit-breaker.

		RC221	RC222		RC223
Circuit-breakers size		**T1-T2-T3**	**T1-T2-T3**	**T4 and T5**	**T4 4p**
Type		"L" shaped	"L" shaped	Placed below	Placed below
Technology		microprocessor-based	microprocessor-based	microprocessor-based	microprocessor-based
Action		with solenoid	with solenoid	with solenoid	with solenoid
Primary service voltage [1]	[V]	85…500	85…500	85…500	110...500
Operating frequency	[Hz]	45…66	45…66	45…66	0-1000
Self-supply		■	■	■	■
Test operation range [1]		85…500	85…500	85…500	110...500
Rated service current	[A]	up to 250 A	up to 250 A	up to 630 A	up to 250 A
Rated residual current trip	[A]	0.03 - 0.1 - 0.3 - 0.5 - 1 - 3	0.03 - 0.05 - 0.1 - 0.3 - 0.5 - 1 - 3 - 5 - 10	0.03 - 0.05 - 0.1 - 0.3 - 0.5 - 1 - 3 - 5 - 10	0.03 - 0.05 - 0.1 0.3 - 0.5 - 1
Time limt for non-trip	[s]	istantaneous	istantaneous - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2 - 3	istantaneous - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2 - 3	istantaneous - 0 - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2 - 3
Tolerance over trip times			± 20%	± 20%	± 20%
Local trip signalling		■	■	■	■
Trip coil with changeover contact for trip signalling		■	■	■	■
Input for remote opening			■	■	■
NO contact for pre-alarm signalling			■	■	■
NO contact for alarm signalling			■	■	■
Indication of pre-alarm from 25% IΔn (tollerance ±3%)				■	■
Indication of alarm timing at 75% IΔn (tollerance ±3%)		■	■	■	■
Automatic residual current reset		■	■	■	■
"A" type for pulsanting alternating current, AC for alternating current		■	■	■	■
"AE" type for remote release device			■	■	■
Selective "S" type			■	■	■
Button for insulation test		■	■	■	■
Power supply from above and below		■	■	■	■
Assembly with three-pole circuit-breakers		■	■		
Assembly with four-pole circuit-breakers		■	■	■	■
Kit for conversion of circuit-breaker with residual current release from fixed to plug-in				■	■

[1] Operation up to 50 V Phase-Neutral

RC223 (B type) residual current release for T4

Along with the family of residual current releases illustrated previously, ABB SACE is developing the RC223 (B type) residual current release, which can only be combined with the Tmax T4 four-pole circuit-breaker in the fixed or plug-in version. The range of operation of the primary line-to-line voltage of this residual current release varies between 110 V and 440 V, with operation starting from 55 V phase-neutral. It is characterised by the same types of reference as the RC222 (S and AE type) release, but can also boast conformity with type B operation, which guarantees sensitivity to residual fault currents with alternating, alternating pulsating and direct current components. The reference Standards are: IEC 60947-1, IEC 60947-2 Appendix B, and IEC 60755.

Apart from the signals and settings typical of the RC222 residual current release, the RC223 also allows selection of the maximum threshold of sensitivity to the residual fault frequency (3 steps: 400 – 700 – 1000 Hz). It is therefore possible to adapt the residual current device to the different requirements of the industrial plant according to the prospective fault frequencies generated on the load side of the release. Typical installations which may require frequency thresholds different from the standard ones (50 – 60 Hz) are the welding plants for the automobile industry (1000 Hz), the textile industry (700 Hz), airports and three-phase drives (400 Hz).

All the functions of the apparatus - even the most advanced ones - can be checked by the user by means of a careful watchdog test which is carried out by a series of simple successive steps.

Accessories

Residual current releases - IEC only

SACE RCQ residual current relay

The Tmax T1, T2, T3 T4 and T5, and Isomax S6 and S7 circuit breakers can be combined with the RCQ relay with separate toroid (to be installed externally on the line conductors) and these fulfill requirements with thresholds up to 30 A trips and times up to 5 s or when the installation conditions are particularly restrictive, such as with circuit breakers already installed, or limited space in the circuit breaker compartment.

Thanks to the wide range of settings, the RCQ relay is suitable for applications where a system of residual current protection coordinated with the various distribution levels. It is particularly recommended when low sensitivity residual current protection is required, such as in partial (current) or total (chronometric) selective chains, and for high sensitivity applications (physiological sensitivity).

In case of drops in the auxiliary power supply voltage, the opening control intervenes after a minimum time of 100 ms and after the time set plus 100 ms.

The RCQ relay is suitable for use in the presence of alternating currents only (Type AC), for alternating and/or pulsating current with direct components (Type A) and allows residual current selectivity to be set up.

The RCQ relay is of the type with indirect action and acts on the circuit breaker release mechanism by means of the shunt trip of the circuit breaker itself (to be ordered by the user), to be housed in the special slot made on the left-hand pole of the circuit breaker.

Residual current relay		**RCQ**
Power supply voltage	AC [V]	80…500
	DC [V]	48…125
Operating frequency	[Hz]	50 ÷ 60 Hz ± 10%
Trip threshold adjustment $I_{\Delta n}$		
1st range of adjustments	[A]	0.03-0.05-0.1-0.3-0.5
2nd range of adjustments	[A]	1-3-5-10-30
Trip time adjustment	[s]	0-0.1-0.2-0.3-0;5-0.7-1-2-3-5
Pre-alarm threshold adjustment	[%] x $I_{\Delta n}$	25…75% x $I_{\Delta n}$
Range of use of closed transformers		
Toroidal transformer Ø 2.36” [60 mm]	[A]	0.03…30
Toroidal transformer Ø 4.33” [110 mm]	[A]	0.03…30
Toroidal transformer Ø 7.28” [185 mm]	[A]	0.1…30
Range of use of transformers which can be opened		
Toroidal transformer Ø 4.33” [110 mm]	[A]	0.03…30
Toroidal transformer Ø 7.09” [180 mm]	[A]	0.03…30
Toroidal transformer Ø 9.06” [230 mm]	[A]	1…30
Signalling for alarm pre-threshold		Yellow flashing LED 1 N.O. change-over contact
		6 A - 250 V AC 50/60 Hz
Residual current relay trip signalling		Yellow magnetic flag change-over contacts (N.O. N.C.; N.O.)
		6 A - 250 V AC 50/60 Hz
Remote opening control		N.O. contact
		Trip time 15 ms
Connection to the toroidal transformer		By means of 4 twisted conductors. Maximum length: 1270 in
Dimensions L x H x D	[in]	3.78 x 3.78 x 5.18
Drilling for assembly on door	[in]	3.62 x 3.62

SACE PR212/D-M Modbus and PR212/D-L Lon dialogue unit for S6 and S7- (IEC only)

The dialogue unit is a device which allows two-way communication from the circuit breaker to the outside and vice versa. ABB has built two distinct dialogue units able to support two different communication protocols: PR212/D-M (Modbus RTU protocol) and PR212/D-L (LonTalk protocol by Echelon). Both units are housed in external modules, which can be installed on DIN rails, and can be used with the Isomax S6 and S7 circuit breakers fitted with PR212/P electronic trip unit, both in the LSI and LSIG versions. They must be supplied with a stabilized voltage of 24 V DC (±20% with maximum ripple ±5%) and be earthed. Communication towards the outside is generally addressed to a supervision and control unit, which has the task of collecting and storing the information regarding the part of the plant controlled.
In the case of an error in the serial communication due to a fault in the dialogue unit or lack of auxiliary power supply, the PR212/P protection unit works according to the last parameters set and, in any case, in accordance with what has been set manually. The PR212/D-M and PR212/D-L dialogue units are always fitted in combination with the PR212/T actuator unit, which allows remote closing or opening operation of the circuit breaker (Remote Control) by means of two digital outputs which can be disabled thanks to the dip-switch (LOC/REM) positioned on LOC.

Information available

- State of the circuit breaker: open; closed; tripped
- installation alarms: pre-alarm L; tripped L-S-I-G-R-V-PTC
- measurements: currents; N° operations; N° trips
- reading and writing curves and trip thresholds: only manual reading (MAN), electronic or remote reading and writing (ELT)
- circuit breaker commands: opening; closing; reset.

Accessories

Accessories for electronic trip units

SACE PR212/T actuator unit for S6 and S7

The PR212/T actuator unit allows circuit breaker opening and closing by means of the motor operator mounted on the circuit breaker. It is always supplied in combination with the PR212/D dialogue unit for Isomax S6 and S7. An auxiliary power supply with a stabilized voltage of 24 V DC (±20%, with maximum ripple ±5%) and earthed is required for operation of the unit.
The PR212/D dialogue unit sends the digital opening and closing commands, received from the supervision and control system, to the inputs of the PR212/T actuator unit, which carries out circuit breaker closing and opening by means of a power relay. The motor operator of the circuit breaker (use the versions with power supply voltage at 110 V AC/DC or 220 V AC) must be connected to these relays.

SACE TT1 Test unit

This allows control of tripping of the PR211/P, PR212/P, PR221DS, PR222DS/P and PR222DS/PD-A electronic trip unit and the trip test of the trip coil. The device is supplied by means of a 12 V replaceable battery and is fitted with a two-pole polarized connector-tracer point housed on the bottom of the box, which allows connection of the device to the test input bushings located on the bottom of the electronic trip unit.
The limited dimensions of the accessory make it practically pocket-type.

SACE PR212/K signalling unit for S8

The PR212/K signalling unit, only available for Isomax S8, is able to convert the digital signals supplied by the PR212/P - (LSIG) protection unit into electric signals by means of normally open electrical contacts. An auxiliary power supply is needed to operate the unit. It is connected to the internal bus of the protection unit by means of a dedicated serial line over which the information regarding the state of activation of the protection functions passes, on the basis of which the relative power contacts are closed to signal:

- pre-alarm for protection function L (I>0.9 x I1)
- protection function L, S, I, G trip
- trip indication
- communication error with protection unit.

SACE PR021/K signalling unit

The SACE PR021/K signalling unit can convert the digital signals supplied by the PR222DS/PD-A (LSI or LSIG) protection unit into electrical signals, via normally open electrical contacts.
The unit is connected to the protection release by means of the Modbus RTU standard serial changeover line, on which all the information about the activation status of the protection functions flows. The corresponding power contacts are closed based on this information.
In particular, the following signals are available:

- the alarm signal remains active throughout the overload, until the release is tripped
- the trip signals of the protections remain active during the timing phase, and even after the release is tripped.

PR021/K (PR222DS/PD-A)	
Maximum changeover power (resistive load)	100W / 1250 VA (resistive load)
Maximum changeover voltage	130 V DC / 250 V AC
Maximum changeover current	5 A
Breaking capacity (resistive load) @ 30 V DC	3.3 A
Breaking capacity (resistive load) @ 250 V AC	5 A
Contact/coil insulation	2000 V eff (1 min @ 50 Hz)

Note: the PR021/K unit is an alternative to any supervision and control systems.

A reset pushbutton allows the state of all the signals to be reset.
The unit also has ten LEDs to visually signal the following information:

- "Power ON": auxiliary power supply present
- "TX (Int Bus)": flashing synchronised with dialogue with the internal Bus
- eight LEDs associated with the internal contacts.

The table indicates the characteristics of the signalling relays available in the SACE PR021/K unit.

Available signals

K51	PR222MP
1	Protection L alarm
2	Protection R alarm
3	Protection I alarm
4	Protection U alarm Welded conctactor alarm contacts (*)
5	Bus K.O.
6	PTC alarm (temperature sensor on motor) Generic input 0/1(*)
7	Release trip
8	Protection L pre-alarm Back-up protection alarm (*)

(*) alternatively by means of dip-switch.

K51	PR222DS
1	Protection L alarm
2	Protection S alarm
3	Protection I alarm
4	Protection G alarm
5	Bus K.O.
6-7	Release trip
8	Protection L pre-alarm

Accessories

Accessories for electronic trip units

SACE PR010/T Test and Configuration Unit

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The PR010/T unit is an instrument able to carry out the Test, programming and parameter readout functions for the protection units which equip the Tmax, the Isomax S molded case circuit breakers and the Emax air circuit breakers.
In particular, for circuit breakers fitted with PR212/P and PR222DS/P trip units, the test, programming and readout parameter functions are available.
All the functions mentioned can be carried out ON BOARD by connection of the PR010/T unit to the multipin front flange connector on the protection unit; connection is guaranteed by means of special interfacing cables supplied as standard with the unit.
The human-machine interface is guaranteed by using a membrane keyboard and a multi-line alphanumerical display.
There are also two LEDs on the unit which signal the following respectively:

- POWER-ON and STAND BY situation
- situation of the battery charging state.

Two different types of Test are provided: automatic and manual.
By means of connection to the PC (software provided), it is also possible to upgrade the SW of the PR010/T unit to allow adaptation of the Test unit to evolution of new products.
The most relevant test results can also be stored in the unit itself and sent to the Personal Computer on explicit request for "issue of report".
Both in automatic and manual mode, the PR010/T unit is able to test the following:

- protection functions L, S, I, G
- monitoring of correct operation of the microprocessor.

The same Tests can also be repeated using the manual method.
The PR010/T unit is of the portable type and operates with rechargeable batteries and/or with an external power supply.
In its standard supply, the unit includes:

- PR010/T Test unit complete with rechargeable batteries
- TT1 Test unit;
- 100...240 V AC/12 V DC external power supply
- connection cables between the unit and the multipin connector present on the ranges of releases which equip the Isomax S and the Emax series
- connection cable between the unit and the PC (serial RS232)
- power supply cable
- instruction manual and software
- plastic case.

EP 010 - FBP

1SDC210326F0023

It is the "e-plug" interface which can connect T4 and T5, equipped with the PR222DS/PD-A electronic trip unit, to the field bus plug system, allowing user to choose among several field bus system (ASI, Device Net, Profibus).
It must be connected to the trip unit by means of the specific X3 connector.

Front display unit - FDU

The front display is a display unit of the setting currents, alarms and parameters of the PR222DS/P and PR222DS/PD-A electronic trip units of T4 and T5. The display unit can operate correctly with self-supply with I ≥ 0.35 x In on at least one phase. If the display is used in combination with the PR222DS/PD-A trip unit, and therefore with an auxiliary power supply, it is also possible to detect the protection, which has caused the trip unit intervention and the fault current.
It is not compatible with the front accessories: rotary handle operating mechanism, motor operator and front for lever operating mechanism.

CT for external neutral (UL file: E116596)

This is mounted onto the external neutral conductor and allows protection against earth faults with three-pole circuit breakers. The circuit breaker must be fitted with PR212/P – LSIG, PR222DS/P or PR222DS/PD-A trip units. The transformer must be connected to the trip unit by means of the specific X3-X4 connectors, selected according to the version of the circuit breaker and the type of protection trip unit used.

CT ext

T4	T5	S6	S7	S8
100	300	600	1000	1600
150	400	800	1200	2000
250	600			2500

Connectors

Connectors X3 and X4 allow connection of the electronic trip unit with external plant units or components. In fact, they are used to make the L alarm signal available outside or to realise connection to the PR021/K signalling unit. Both connectors are available for fixed and plug-in or draw out version circuit breakers.

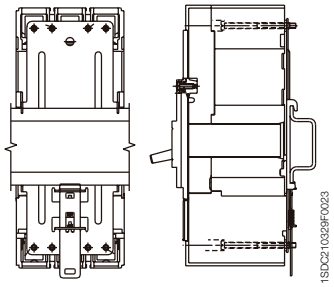
Connector	Function	Trip unit
X3	PR021/K	PR222DS/PD-A and PR211/P, PR212/P
	L alarm signal	PR222DS/P, PR222DS/PD-A, PR211/P, PR212/P
	Dialogue	PR222DS/PD-A, PR212/D
	Auxiliary supply	PR222DS/P, PR222DS/PD-A
	EP 010	PR222DS/PD-A
X4	External neutral	PR222DS/P, PR222DS/PD-A, PR212/P

Accessories

Installation and testing accessories

Bracket for fixing on DIN rail

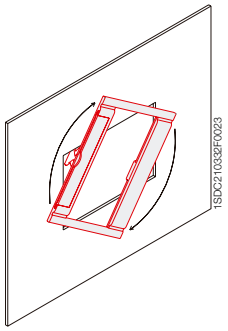
This is applied to the fixed circuit breaker and allows installation on DIN rails (1.38”/35 mm).
It simplifies assembly of circuit breakers up to 225 A (Tmax T1, T2 and T3, except for T1B 1p) in standard switchboards.
The bracket for fixing onto DIN rails is also available for Tmax circuit breakers combined with RC221 and RC222 residual current releases or with the solenoid operating mechanism of the side-by-side type.



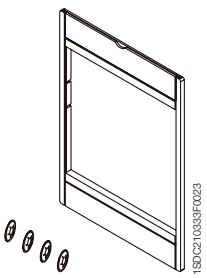
Flange for compartment door

For Isomax S6 and S7 circuit breakers with the rotary handle operating mechanism, front for lever operating mechanism and motor operator, a special flange is supplied for the purpose.
All the flanges of the Tmax series (to be ordered) are of new conception and do not require the use of screws for their installation: fixing is greatly simplified by means of a simple dove-tailing operation.
In the case of use of a rotary handle operating mechanism, solenoid operating mechanism or residual current releases, a special dedicated flange is supplied.
For T4 and T5 draw out circuit breakers, the flange supplied with the conversion kit must be used instead of the one supplied with the fixed circuit breaker.

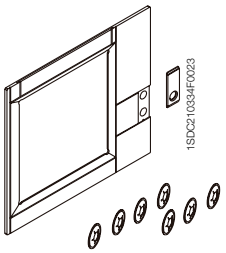
T1-T5



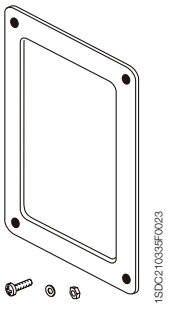
S6-S7 fixed



S6-S7 draw out



S8



Accessories

Spare parts

Spare parts

With Tmax series, the following spare parts are available:

- opening solenoid for the RC221 and RC222 residual current releases
- opening solenoid for PR221DS electronic trip unit
- kit with washers, screws and plugs for assembly of the front terminals (F)
- flange for compartment door.

For further details, please ask the Service Division of ABB for the spare parts catalogue.

Accessories

Controller for automatic transfer switch - ATS010

Control for automatic transfer switch - ATS010 (IEC only)

The ATS010 controller is the new network-group switching device offered by ABB. It is based on microprocessor technology in compliance with the leading electromagnetic compatibility and environmental standards (EN 50178, EN 50081-2, EN 50082-2, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-3).

The device is able to manage the entire switching procedure between the normal line and emergency line circuit breakers automatically, allowing great flexibility of settings.

In case of fault in the normal line voltage, in accordance with the delays set, the normal line circuit breaker is opened, the generator started and the emergency line circuit breaker closed. Similarly, when the normal line returns to range, the reverse switching procedure is automatically controlled.

It is especially suited for use in all emergency power supply systems requiring a solution that is ready to install, easy to use and reliable.

Some of the main applications include: power supply for UPS (Uninterrupted Power Supply) units, operating rooms and primary hospital services, emergency power supply for civilian buildings, airports, hotels, data banks and telecommunications systems, power supply of industrial lines for continuous processes.

The switching system consists of the ATS010 unit connected to two motor-driven and mechanically interlocked circuit breakers. Tmax T4 and T5, and Isomax S6 and S7 circuit breakers can be used.

The built-in main sensor of the ATS010 device makes it possible to detect faults in the mains voltage. The three inputs may be directly connected to the three phases of the normal power supply line for networks with rated voltage up to 500 V AC. Networks with a higher voltage require the insertion of potential transformers (PT), setting a rated voltage for the device that matches their secondary voltage (typically 100 V).

Two change-over contacts for each circuit breaker connect directly to the motor operator. The circuit breaker connection is completed by wiring the status contacts: Open/Closed, Relay tripped, Racked-in (for draw out/plug-in circuit breakers).

That is why on every circuit breaker connected to the ATS010 unit, the following are included in addition to the mechanical interlock accessories:

- motor operator from 48 V to 110 V DC or up to 250 V AC
- open/closed contact
- relay tripped contact
- racked-in contact (for draw out versions)
- signal and mechanical lock for protection relay tripped.

On the motor operator for S6 and S7, the key lock is needed.

The ATS010 device is designed to ensure extremely high reliability for the system it controls. It contains various safety systems intrinsically related to software and hardware operation.

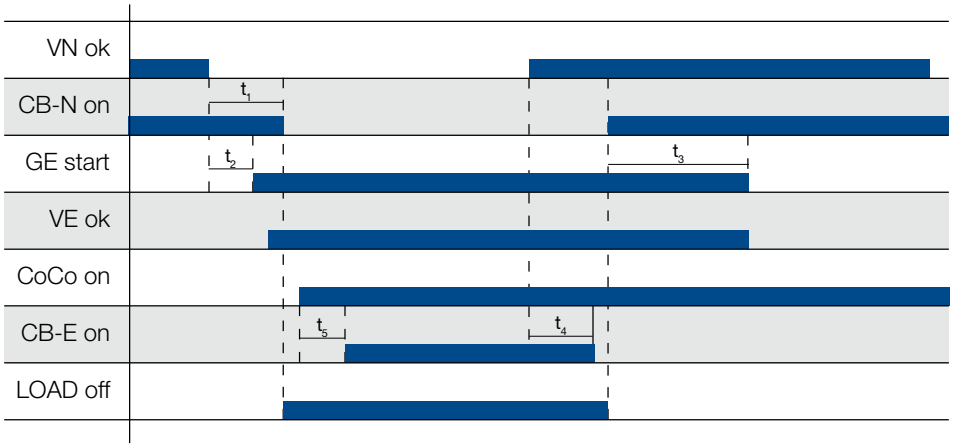
For software safety, a special logic prevents undesired operations, while a constantly operative watchdog system points out any microprocessor malfunctions via a LED on the front of the device.

Hardware safety allows integration of an electrical interlock via power relay, so that there is no need to use an external electrical interlock system. The manual selector on the front of the device can also control the entire switching procedure, even in the event of a microprocessor fault, by working electromechanically on the control relays.

General specifications		
Rated supply voltage (galvanically insulated from earth)		24 V DC ±20% 48 V DC ±10% (maximum ripple ±5%)
Maximum absorbed power		5 W @ 24 V DC 10 W @ 48 V DC
Rated power (mains present and circuit breakers not controlled)		1.8 W @ 24 V DC 4.5 W @ 48 V DC
Operating temperature		-25 °C…+70 °C
Maximum humidity		90% without condensation
Storage temperature		-25 °C…+80 °C
Protection rating		IP54 (front panel)
Protection rating	[mm]	144 x 144 x 85
Weight	[kg]	0.8

Setting range for thresholds and times		
Minimum voltage	Un Min	-5%…-30% Un
Maximum voltage	Un Max	+5%…+30% Un
Fixed frequency thresholds		10%…+10% fn
t_1: opening delay of the normal line circuit breaker due to network error	(CB-N)	0…32s
t_2: generator start-up delay due to network error		0…32s
t_3: stopping delay of the generator		0…254s
t_4: switching delay due to network stop		0…254s
t_5: closing delay of the emergency line circuit breaker after detecting the generator voltage	(CB-E)	0…32s

Operating sequence



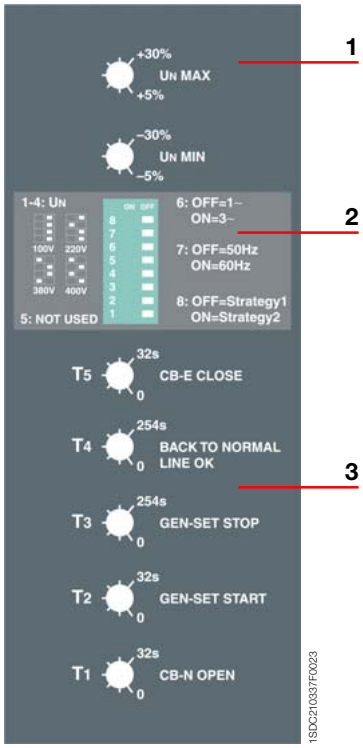
Caption

VN Main voltage
CB-N Normal line circuit breaker closed
GE Generator
VE Emergency line voltage
CoCo Enable switching to emergency line
CB-E Emergency line circuit breaker closed
LOAD Disconnection of lower priority connected loads

Accessories

Controller for automatic transfer switch - ATS010

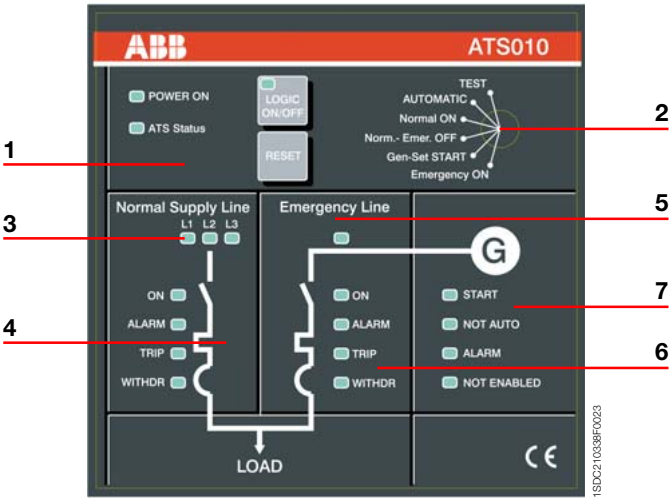
Side panel settings



Caption

1 Selectors to set the under- and over-voltage thresholds
2 Dip-switches to set:
– rated voltage
– normal single-phase or three-phase line
– mains frequency
– switching strategy
3 Switching delay time settings for T1...T5

Front panel



Caption

1 Status of the ATS010 unit and logic
2 Operating mode selector
3 Normal line check
4 Normal line circuit breaker status
5 Voltage on the emergency line
6 Emergency line circuit breaker status
7 Generator status

Characteristic curves and technical information

Index

Characteristic curves

Technical information

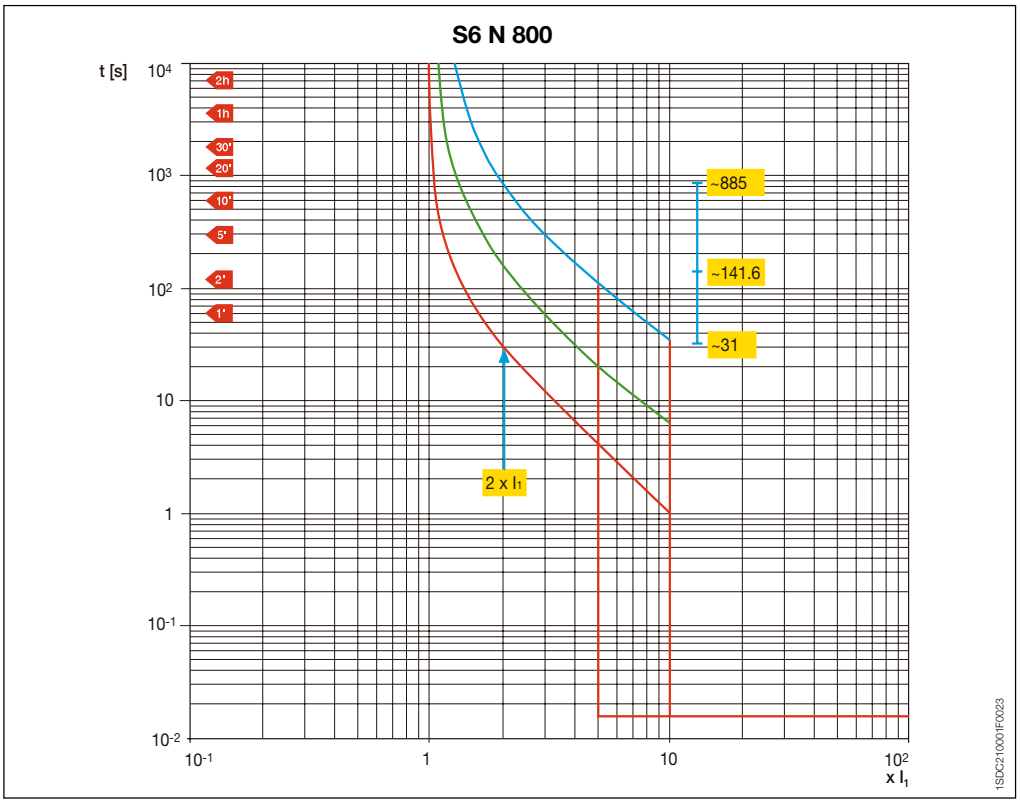
[1] For the T1 1P characteristic curves, please ask ABB directly

Examples of curve readout

Example 1

Trip curves for distribution (thermo-magnetic trip unit)

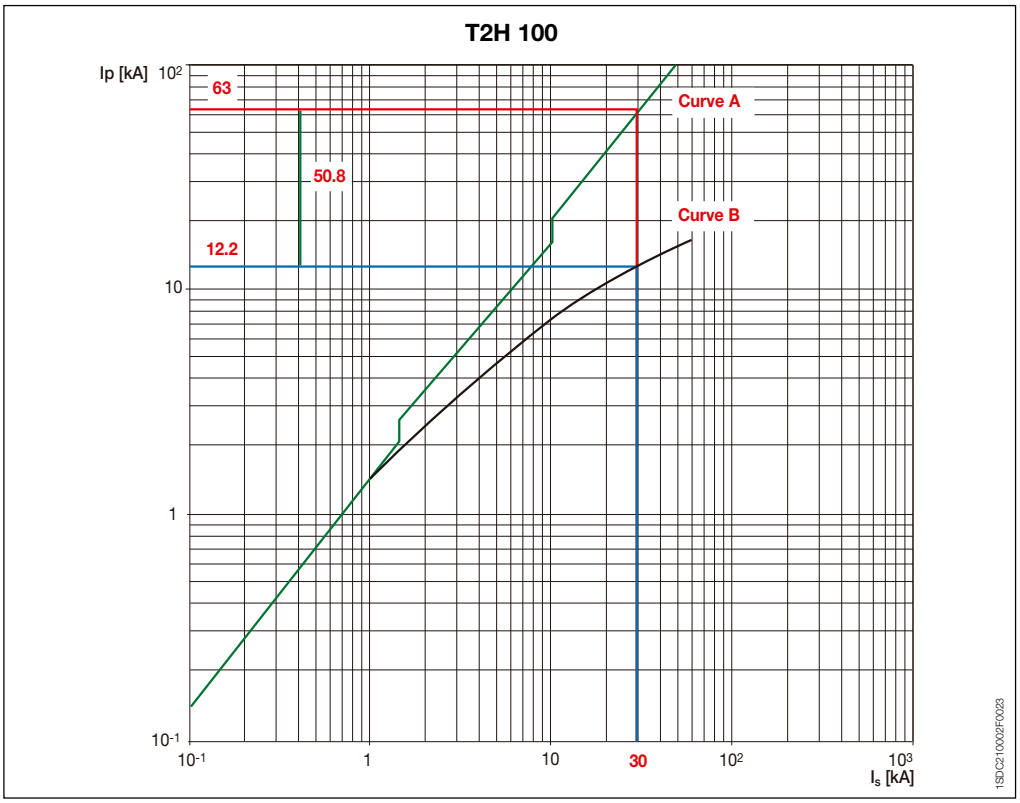
Considering a S6N 800 TMD In = 800 A circuit breaker. By means of the thermal adjustment trimmer, the current threshold I1 is selected, for example at 0.8 x In (640 A); the magnetic trip threshold I3, adjustable from 5 to 10 x In, we select at 8 x In, equal to 6400 A.
It can be noted that, on the basis of the conditions in which the overload is presented, i.e. with the circuit breaker at thermal running or not, the thermal relay trip varies considerably. For example, for an overload current of 2 x I1, the trip time is between 31 and 141.6 s for hot trip, and between 141.6 and 885 s for cold trip.
For fault current values higher than 6400 A, the circuit breaker trips instantaneously with the magnetic protection.



Example 2

Current-limiting curves

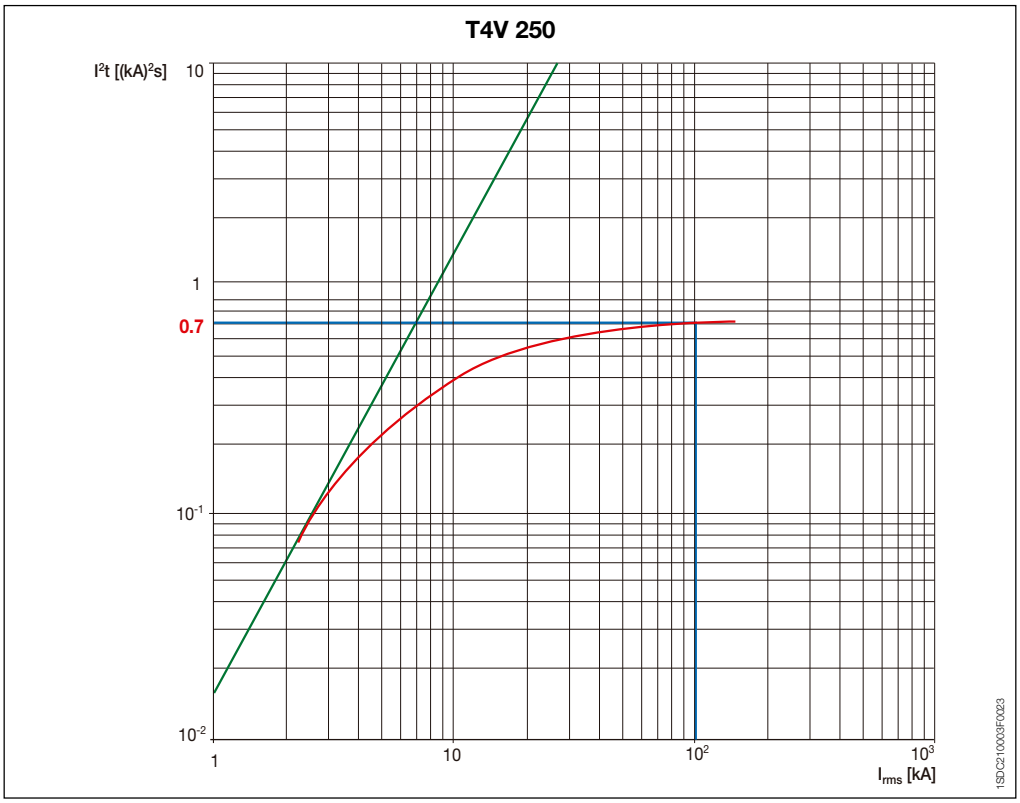
The following figure shows the trend of the Tmax T2H 100, In = 100 circuit breaker current-limiting curves. The r.m.s. of the prospective symmetrical short-circuit current is indicated on the abscissa of the diagram, whereas the peak short-circuit current value is indicated on the ordinates. The current-limiting effect can be assessed by comparing, at the same symmetrical short-circuit current value, the corresponding peak value at the prospective short-circuit current (curve A) with the limited peak value (curve B).
The T2H 100 circuit breaker with In 100 thermomagnetic trip unit at a voltage of 480 V, limits the short-circuit current to 12.2 kA for a fault current of 30 kA, with a reduction of about 50.8 kA compared with the peak value of the 63 kA prospective short-circuit current.



Example 3

Specific let-through energy curve

An example of reading the graph of the specific let-through energy curve of the T4V 250 In = 80 circuit breaker at a voltage of 490 V is given aside.
The prospective symmetrical short-circuit current is indicated on the abscissa of the diagram, whereas the ordinates show the specific let-through energy values expressed in $[kA]^2s$.
In correspondence with a short-circuit current of 100 kA, the circuit breaker lets through a value of I^2t equal to 0.7 $[kA]^2s$ (700000 A^2s).



Abbreviations used

In = Ampère rating of the thermomagnetic or electronic trip unit
I_1 = Long-time pick-up setting
I_3 = instantaneous pick up setting
I_{rms} = prospective symmetrical short-circuit current

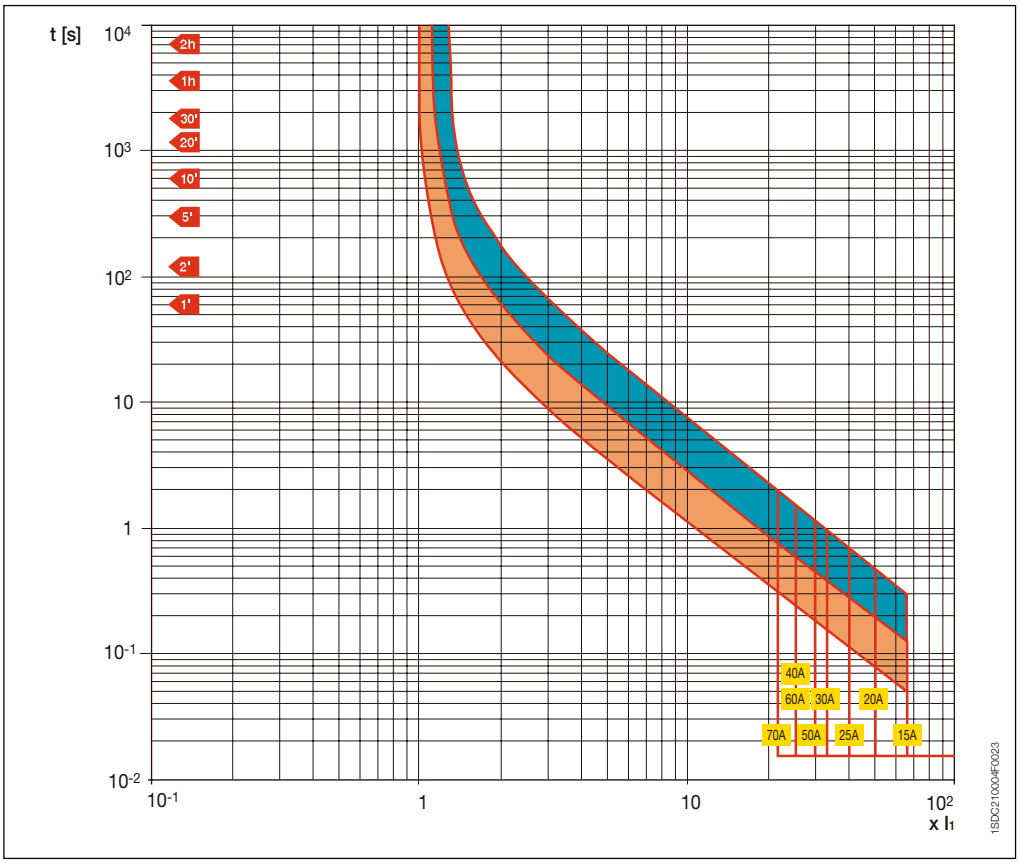
4

Trip curves for distribution

Circuit breakers with thermomagnetic trip units

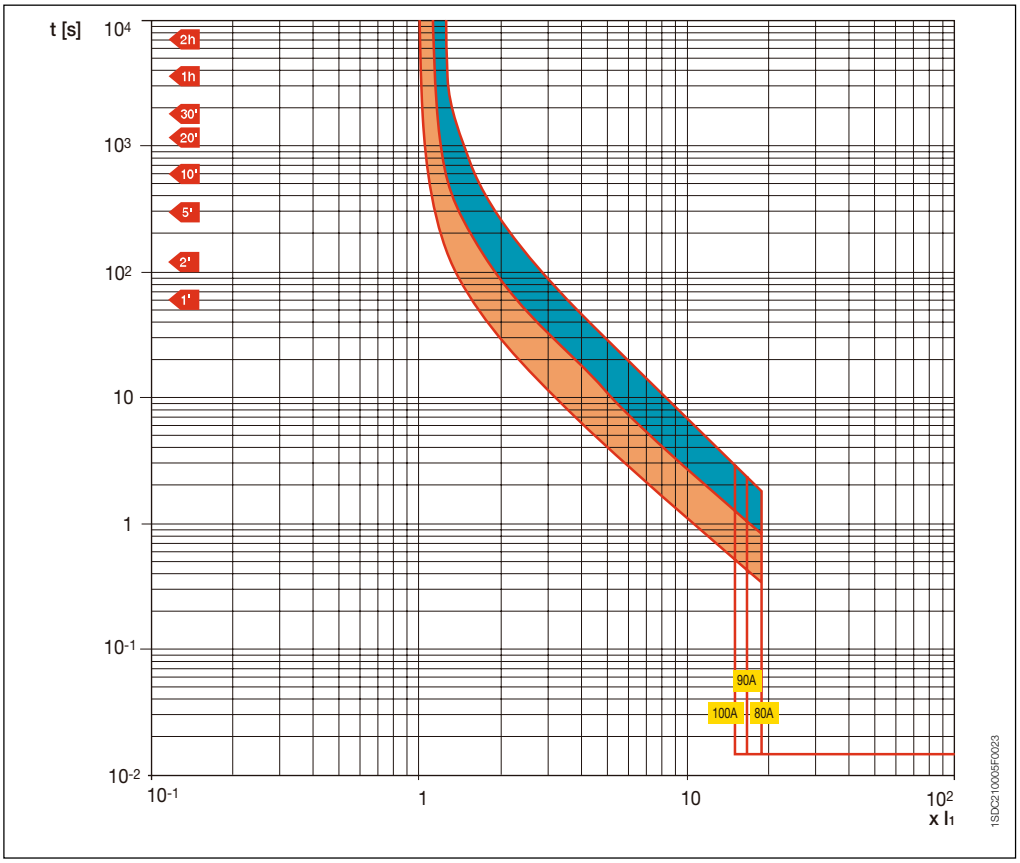
T1 100 - T1 100 1P TMF

In = 15 ÷ 70 A



T1 100 - T1 100 1P TMF

In = 80 ÷ 100 A



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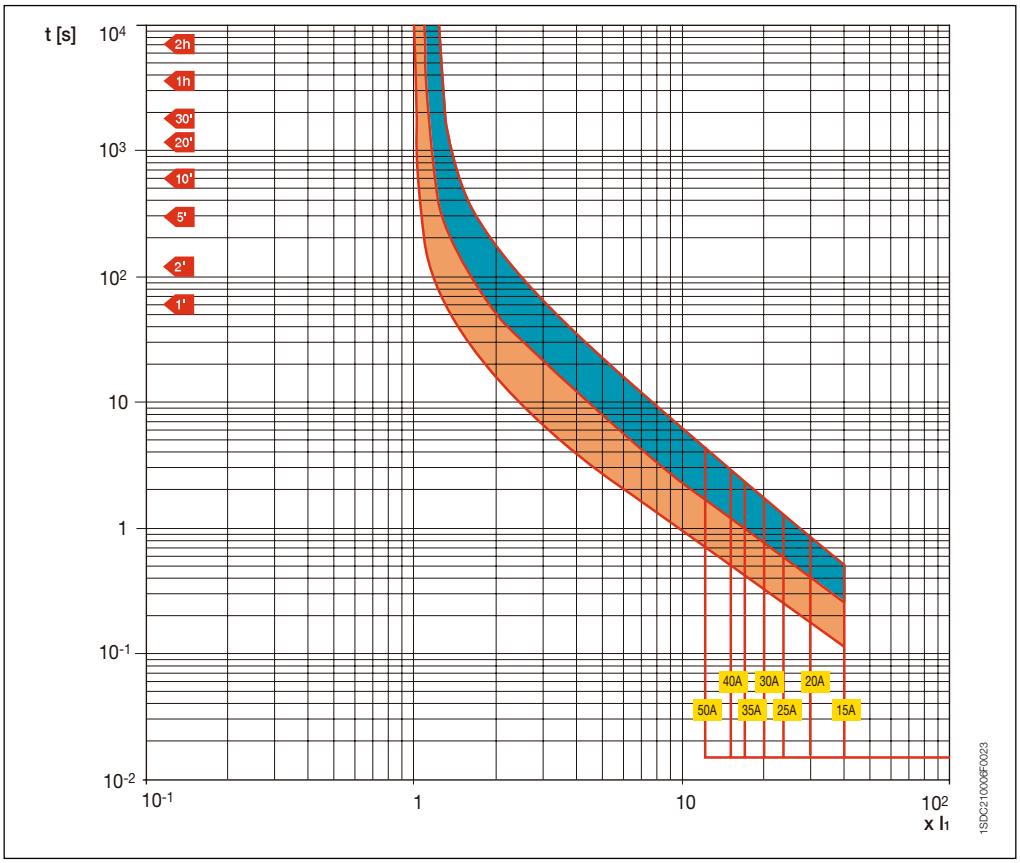
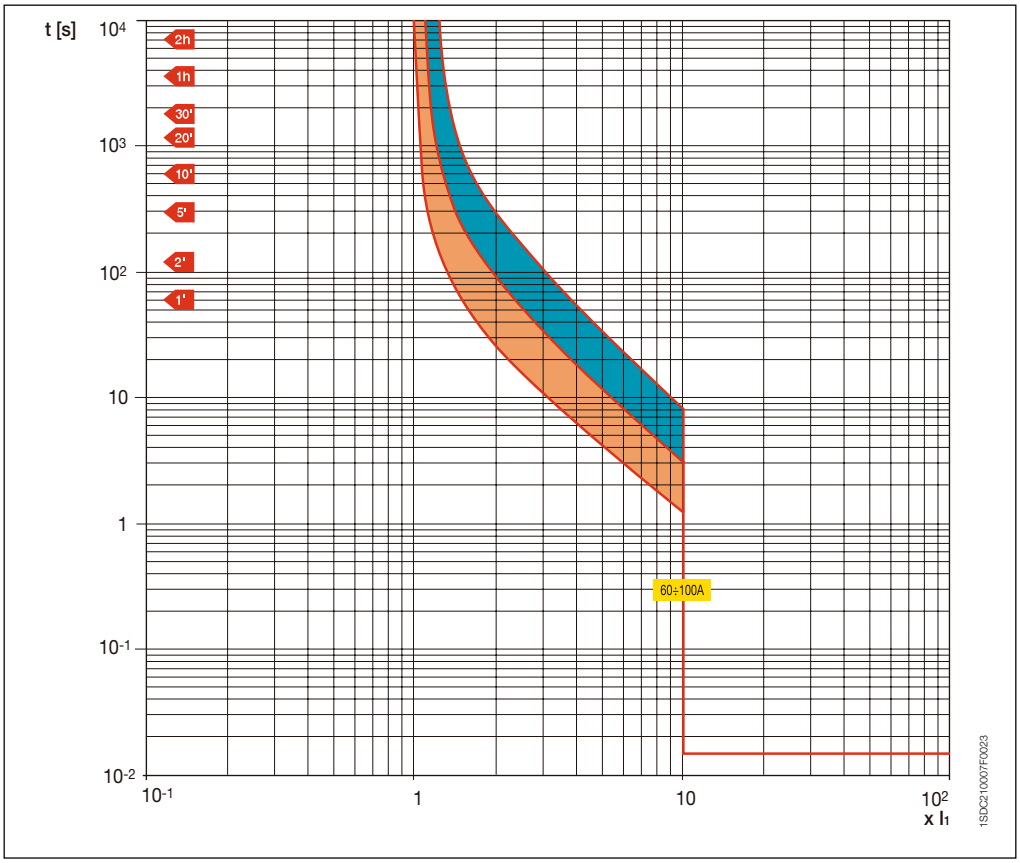
T2 100 TMF

In = 15 ÷ 50 A



T2 100 TMF

In = 60 ÷ 100 A



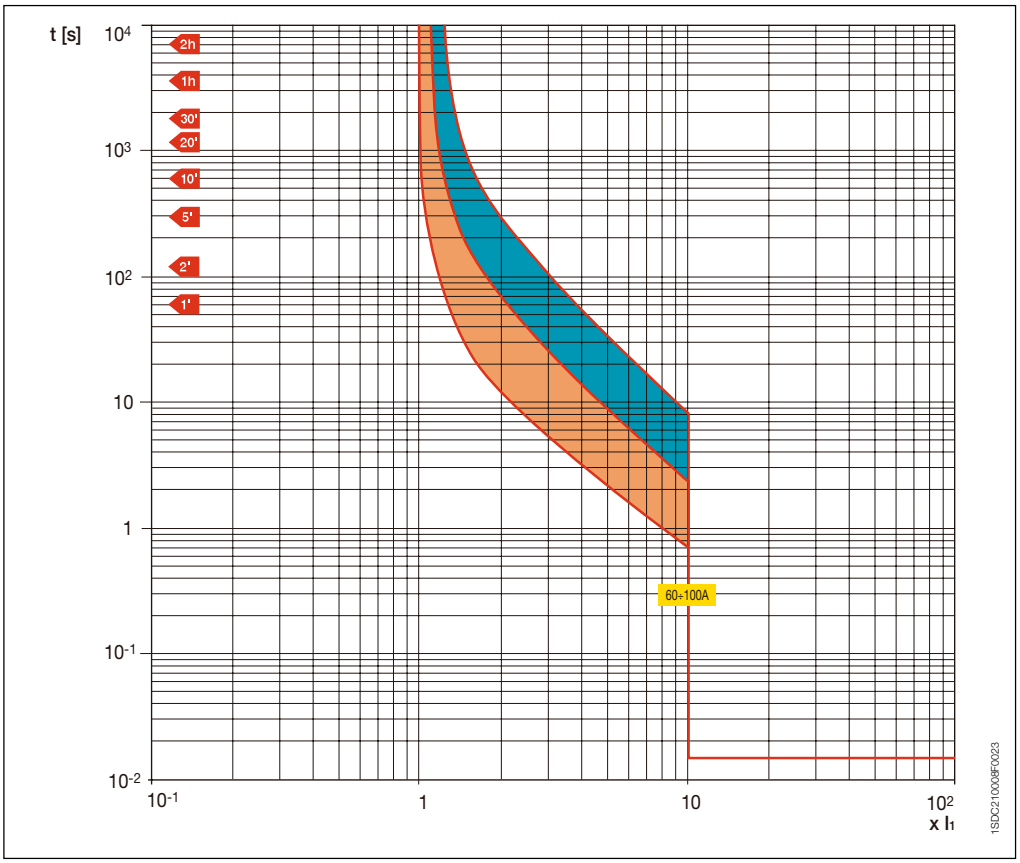
4

Trip curves for distribution

Circuit breakers with thermomagnetic trip units

T3 225 TMF

In = 60 ÷ 100 A



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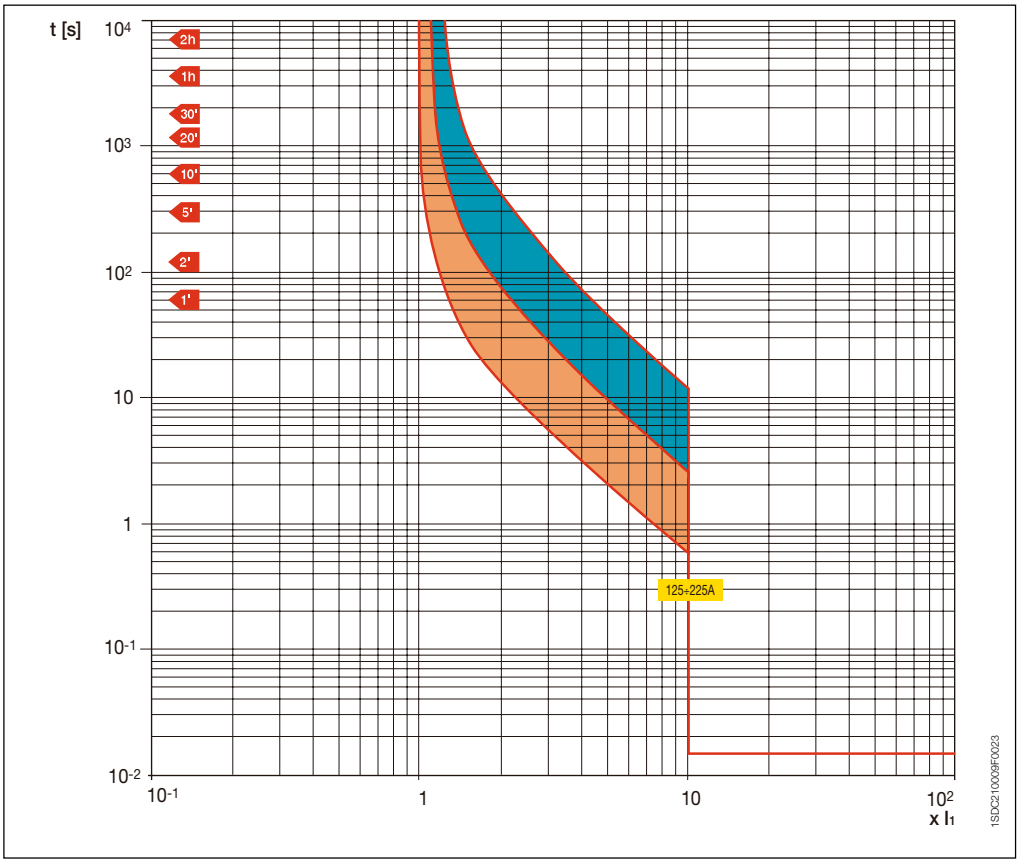
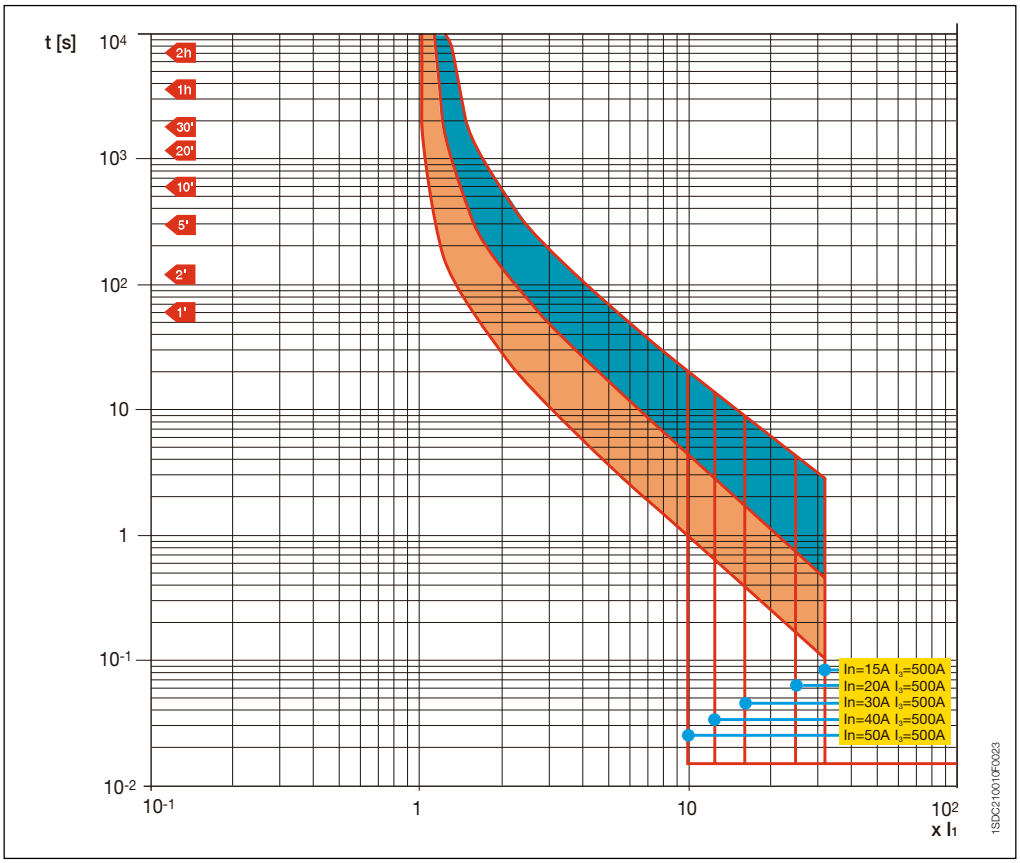
T3 225 TMF

In = 125 ÷ 225 A



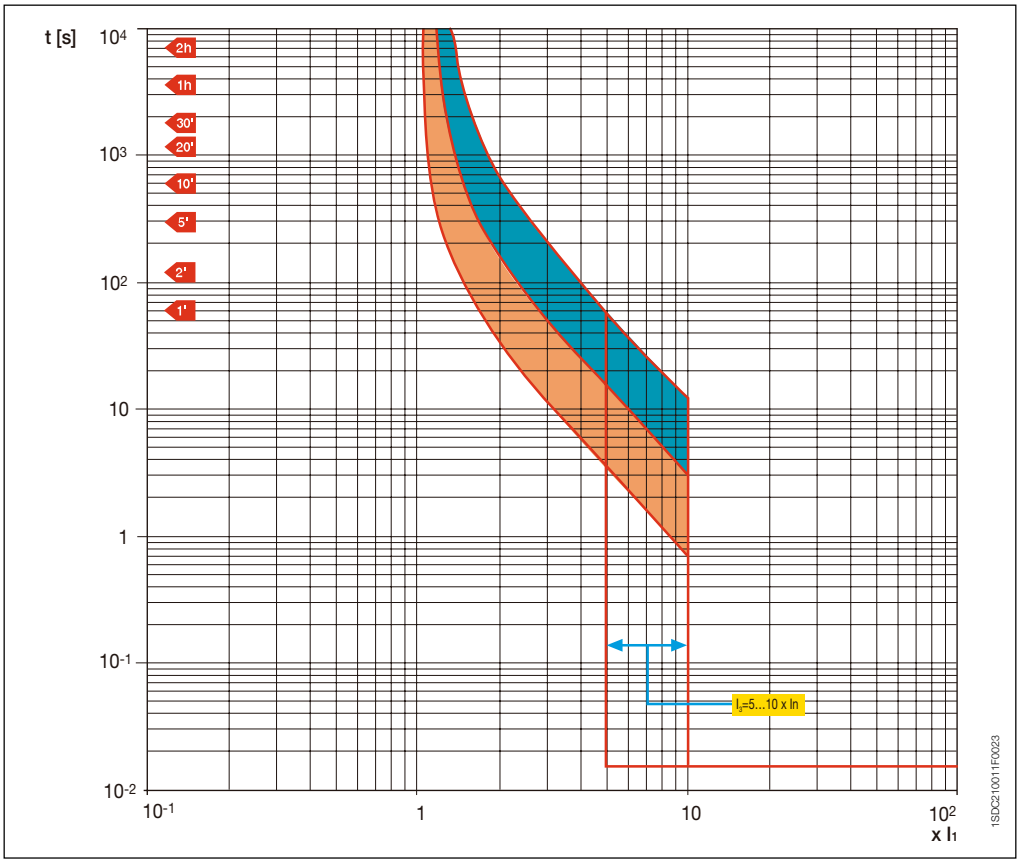
T4 250 TMF/TMD

In = 20 ÷ 50 A
In = 15, 20 TMF
In = 30, 40, 50 TMD



T4 250 TMA

In = 80 ÷ 250 A



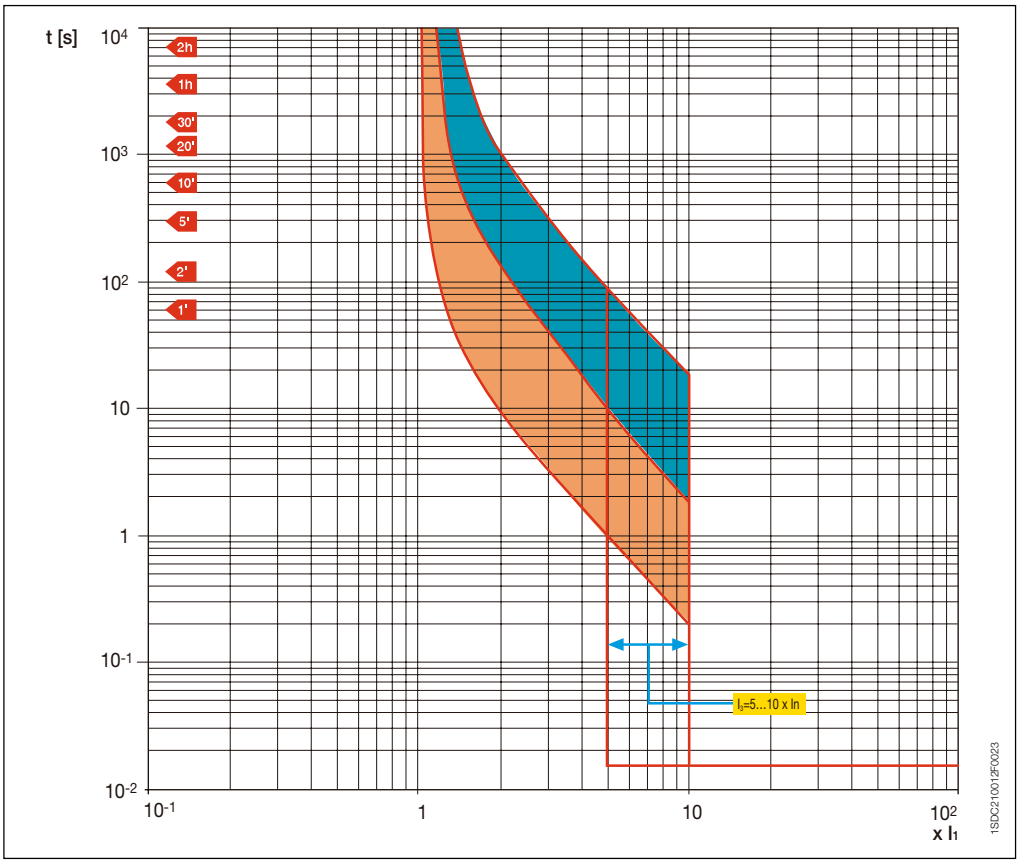
4

Trip curves for distribution

Circuit breakers with thermomagnetic trip units

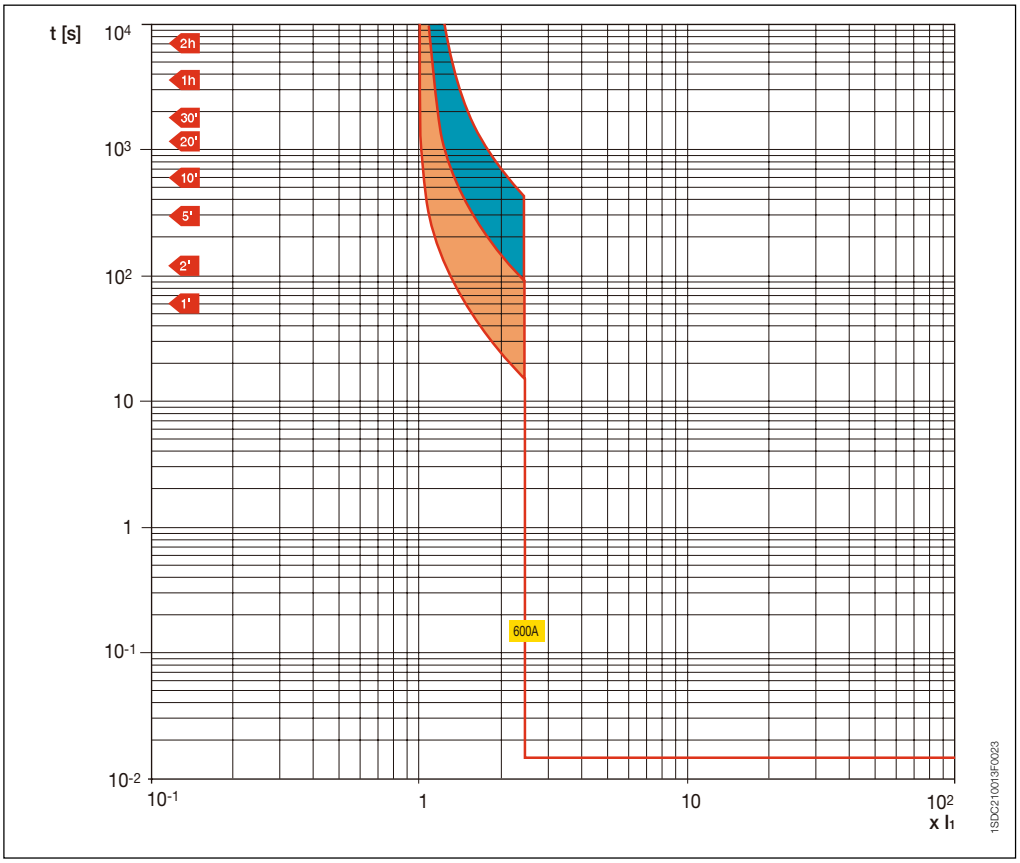
T5 400 TMA

In = 300, 400 A



S6 800 TMD

In = 600 A
I_3 = 2.5 In



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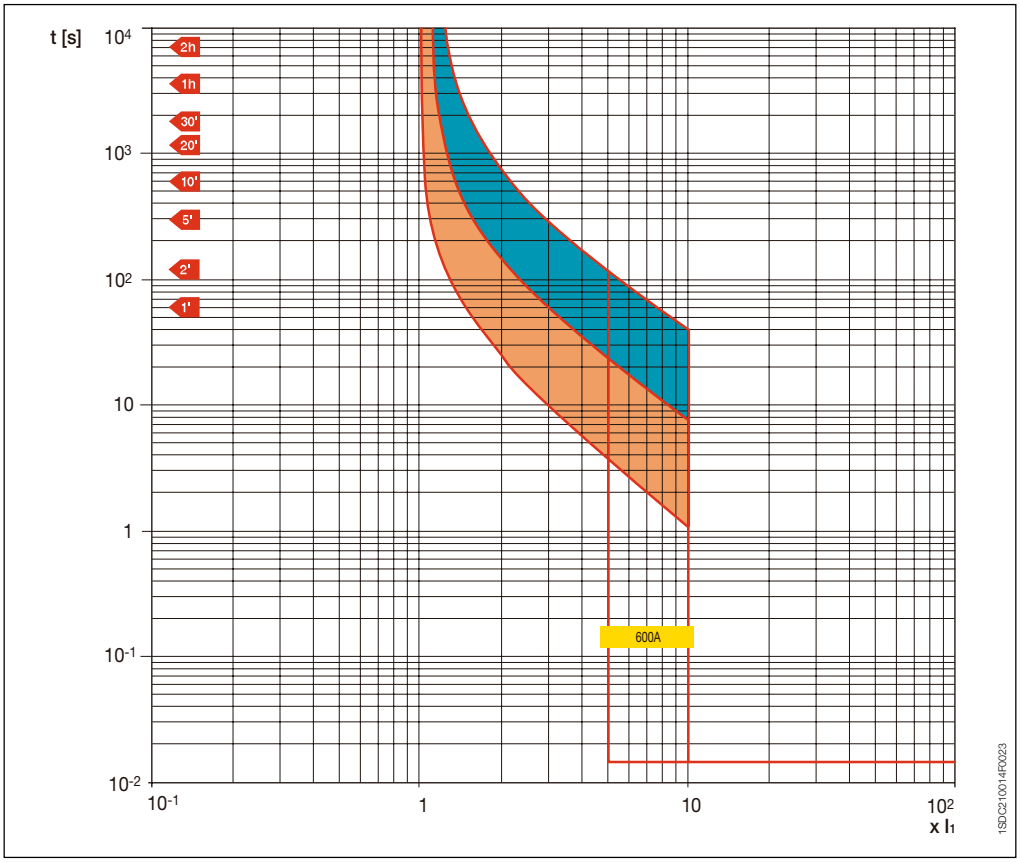
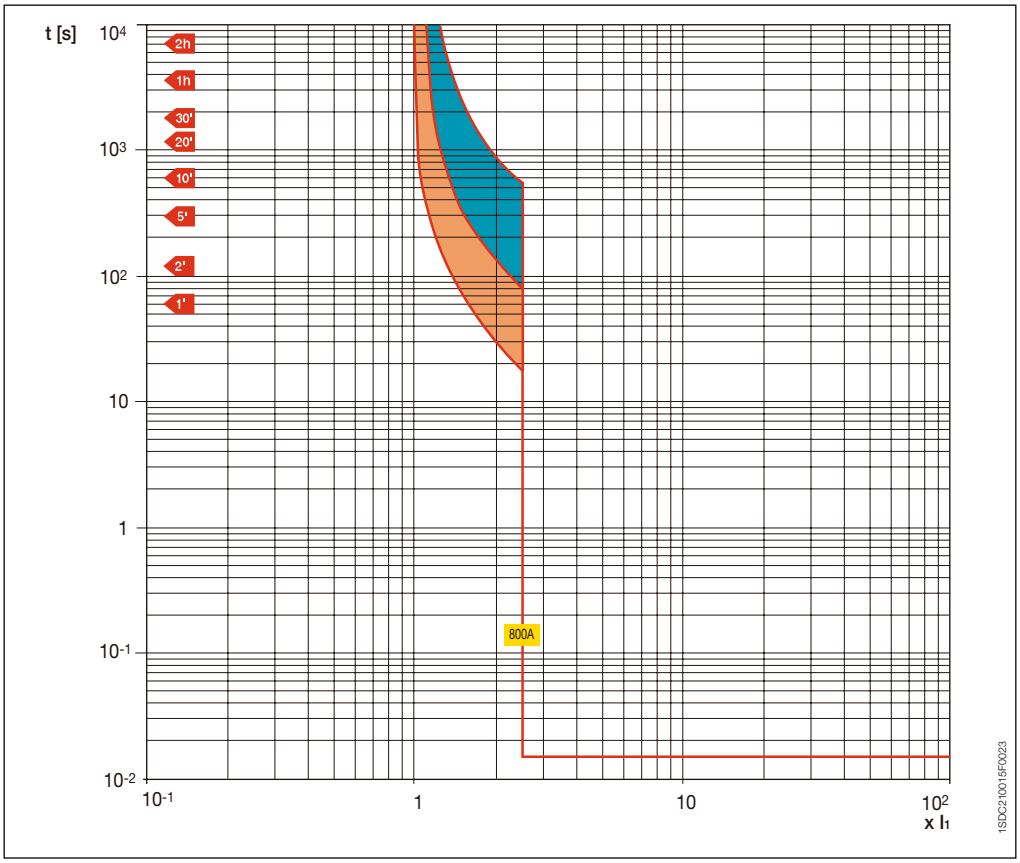
S6 800 TMD

In = 600 A
I_3 = 5 ÷ 10 In



S6 800 TMD

In = 800 A
I_3 = 2.5 In



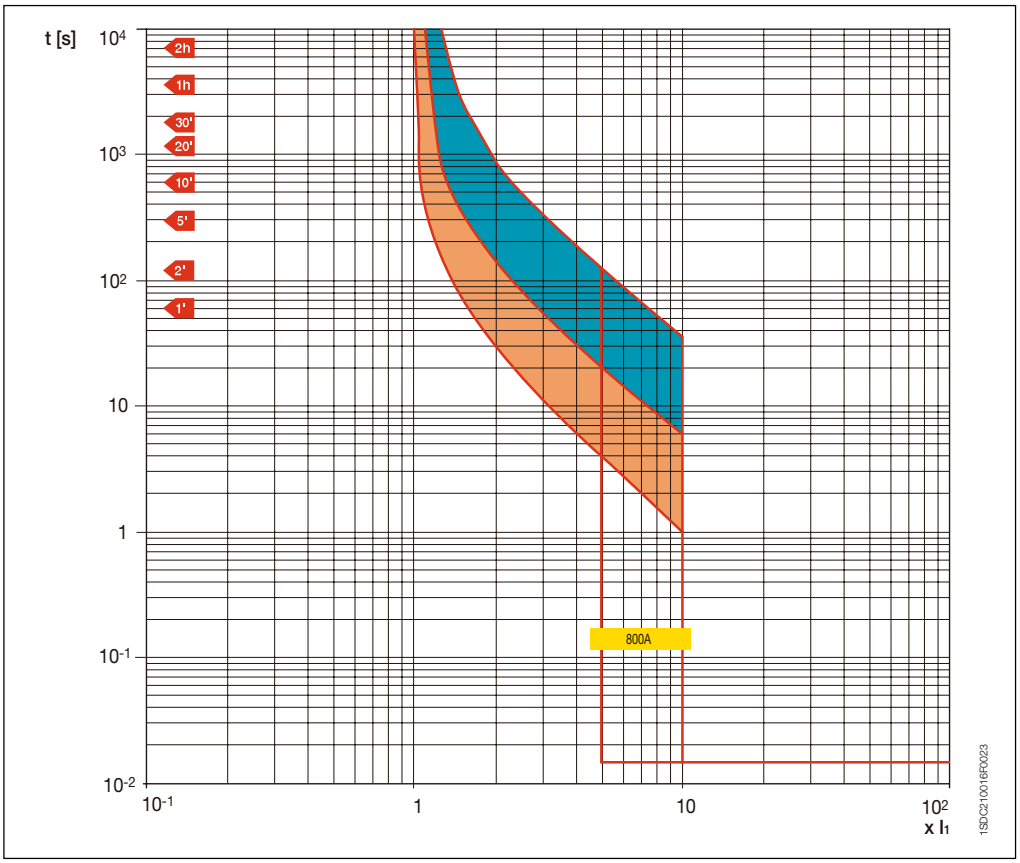
4

Trip curves for distribution

Circuit breakers with thermomagnetic trip units

S6 800 TMD

In = 800 A
I_3 = 5 ÷ 10 In



4

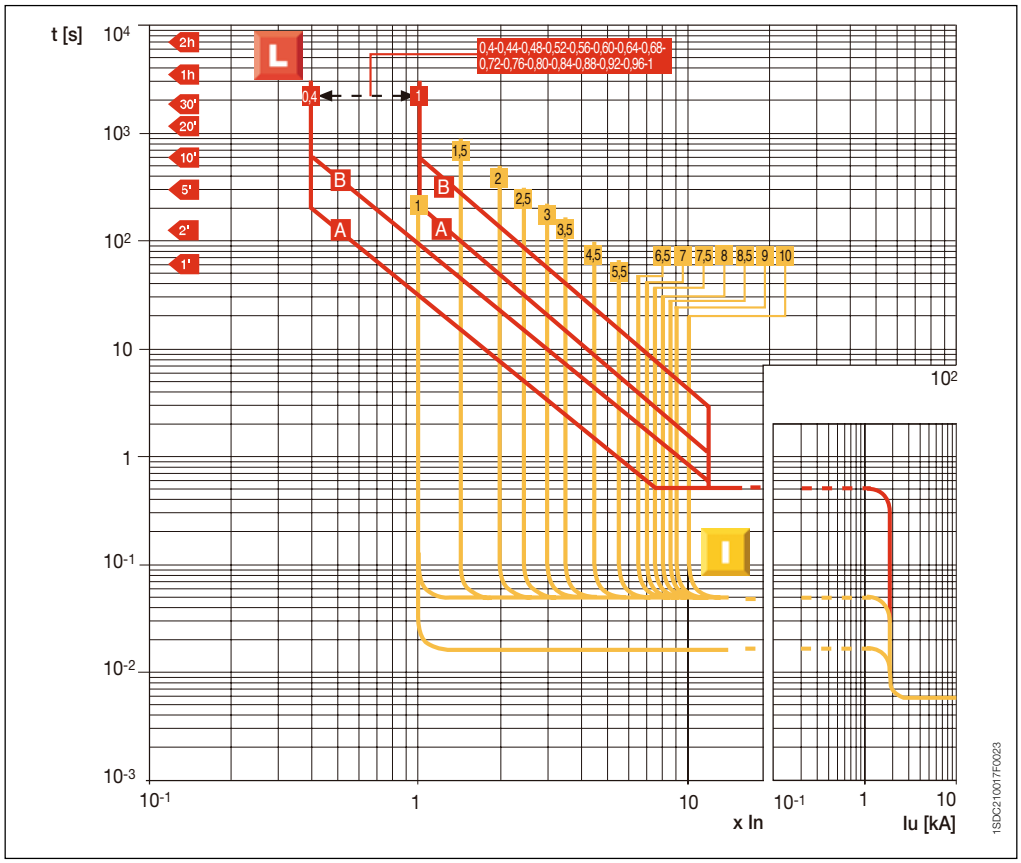
Trip curves for distribution

Circuit breakers with electronic trip units

T2 100

PR221DS-LS

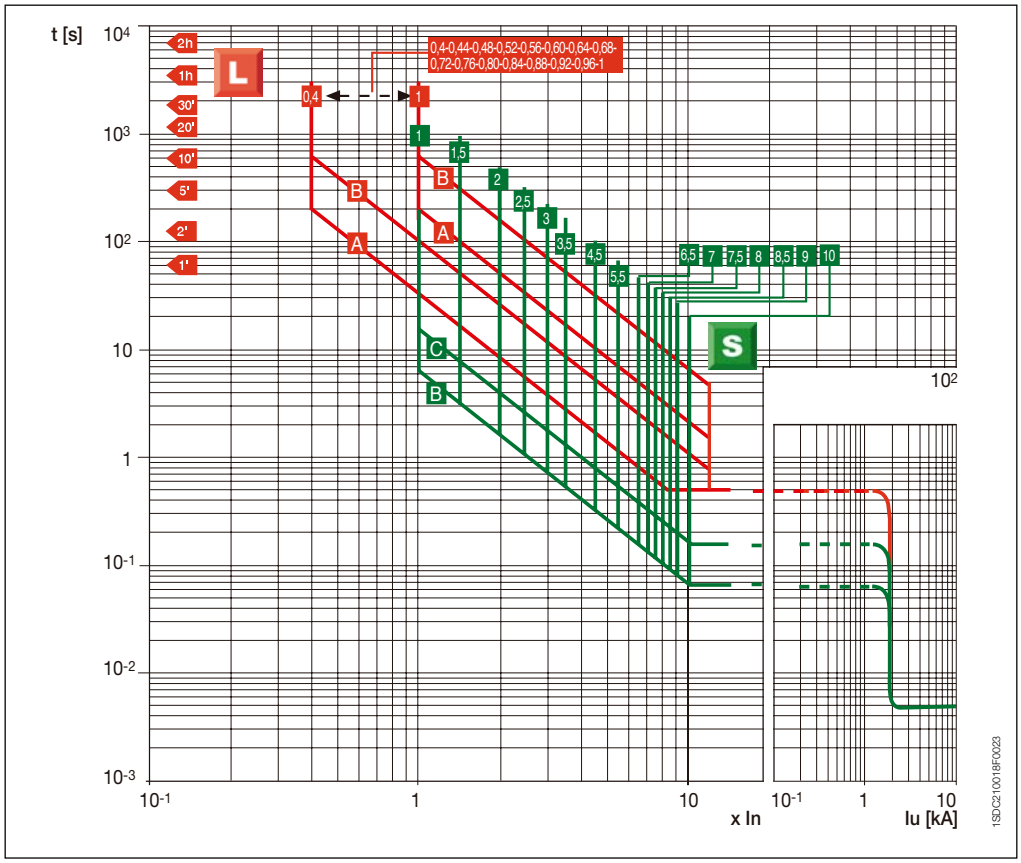
L-I Functions



T2 100

PR221DS-LS

L-S Functions



4

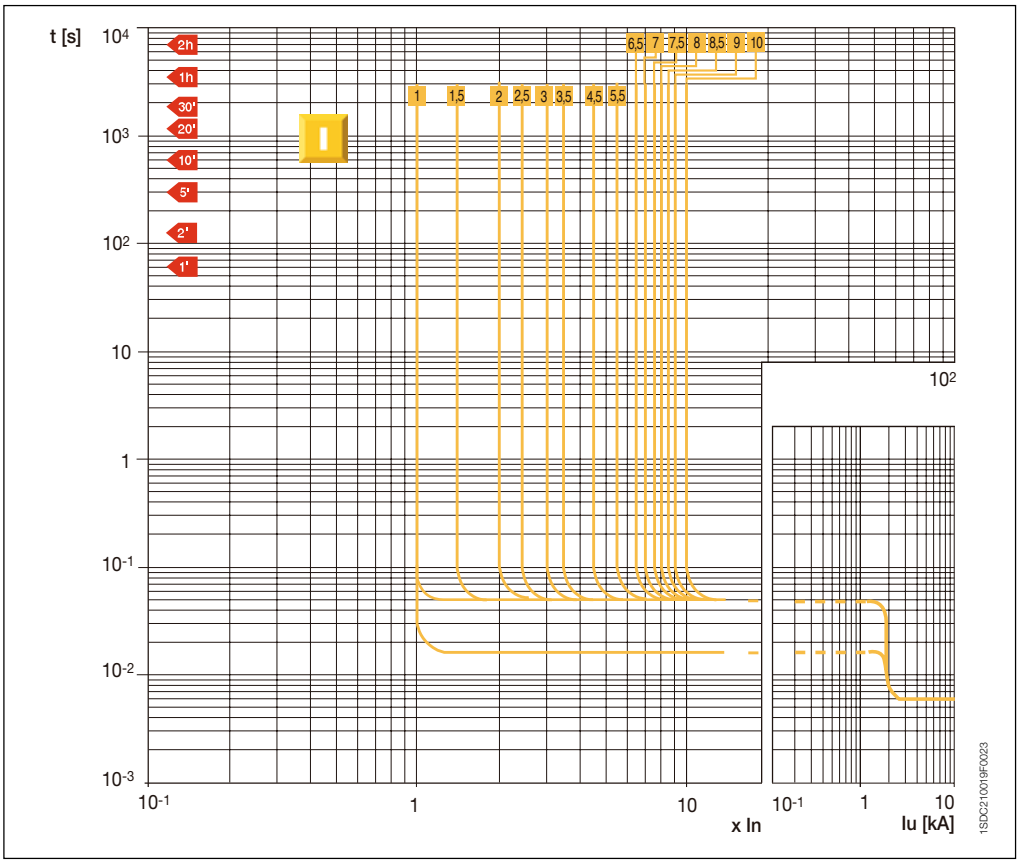
Trip curves for distribution

Circuit breakers with electronic trip units

T2 100

PR221DS-I

I Function



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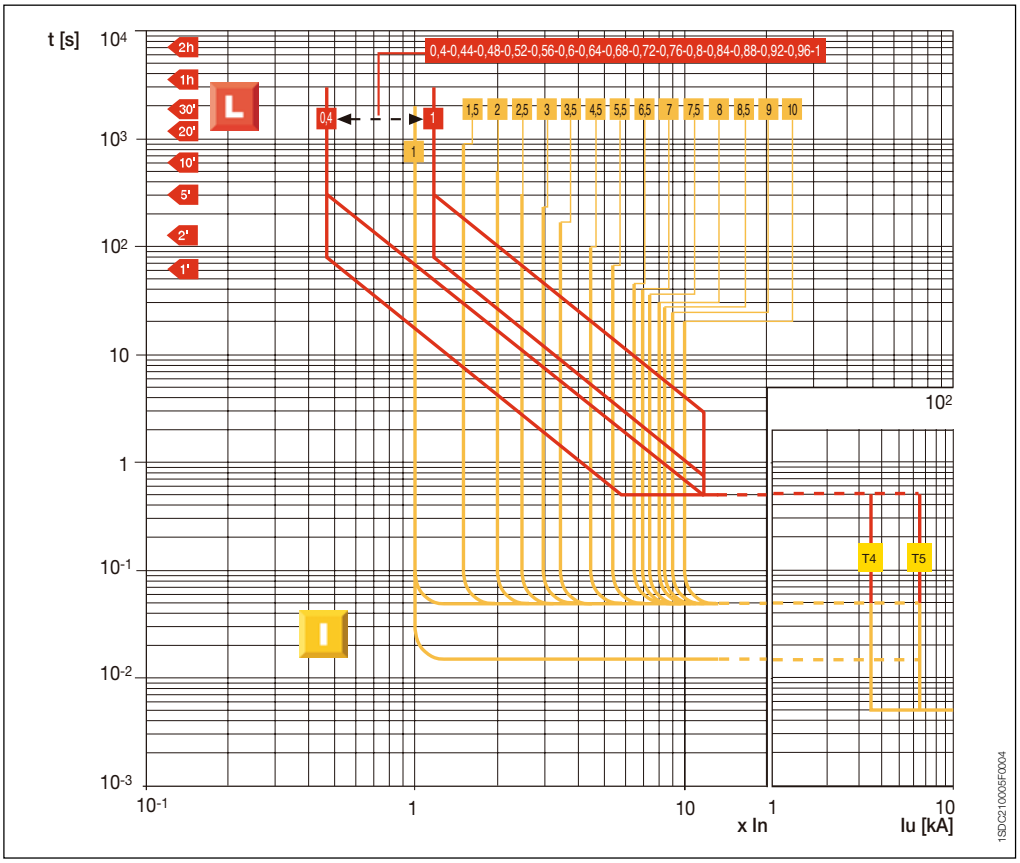
T4 250 - T5 400/600

PR221DS

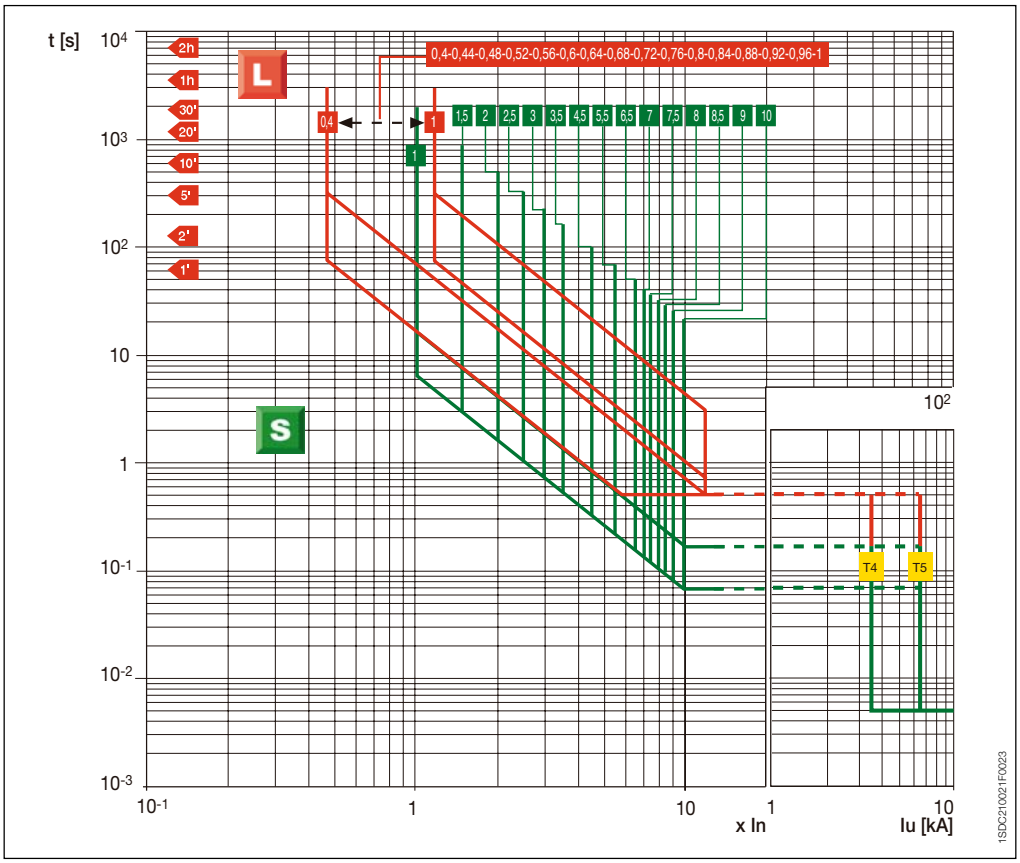
L-I Functions



T4 250 - T5 400/600

PR221DS

L-S Functions

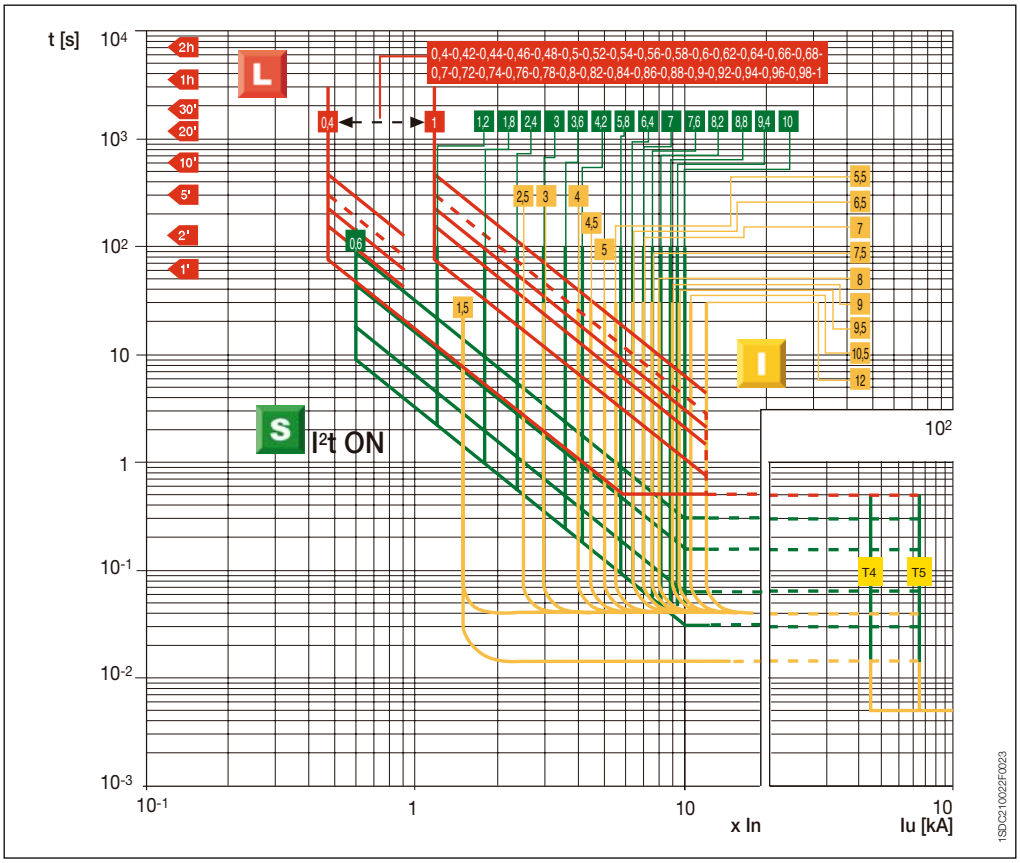


T4 250 - T5 400/600

PR222DS/P and PR222DS/PD-A

L-S-I Functions
(I^2t const = ON)

Note: For T5 In = 600 A ⇒ I_3max = 10 x In.



4

Trip curves for distribution

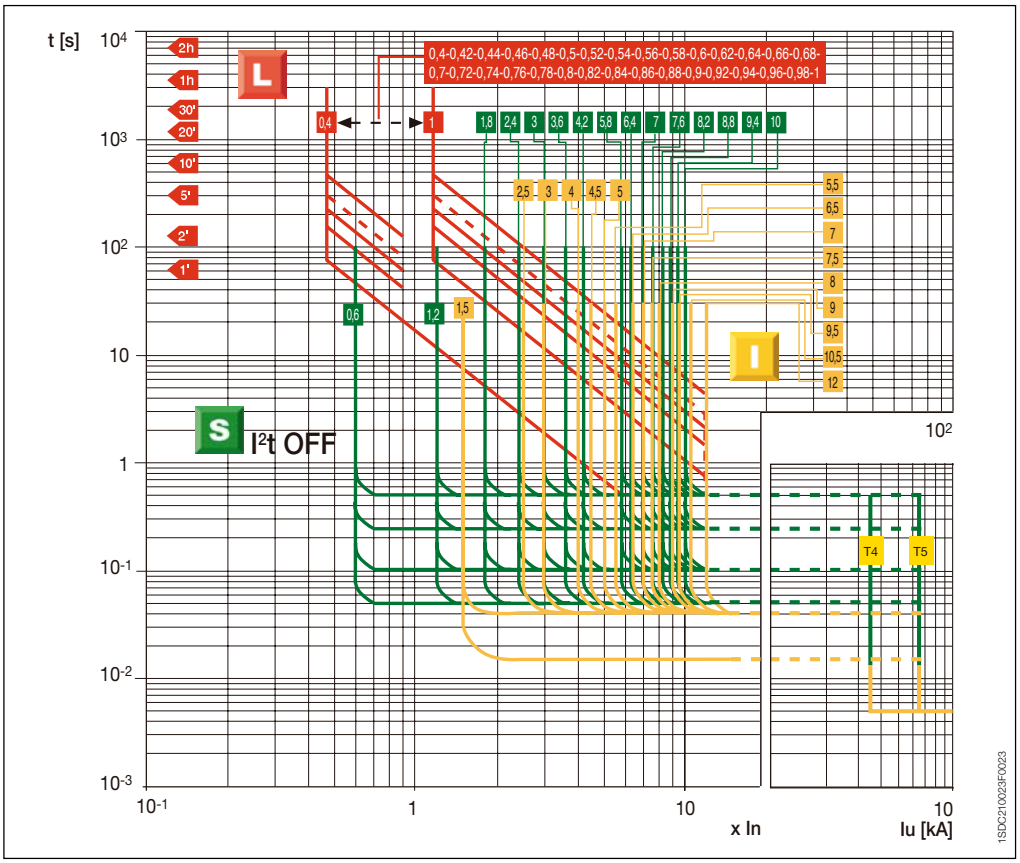
Circuit breakers with electronic trip units

T4 250 - T5 400/600

PR222DS/P and PR222DS/PD-A

L-S-I Functions
(I^2t const = OFF)

Note: For T5 In = 600 A ⇒ I_3max = 10 x In.



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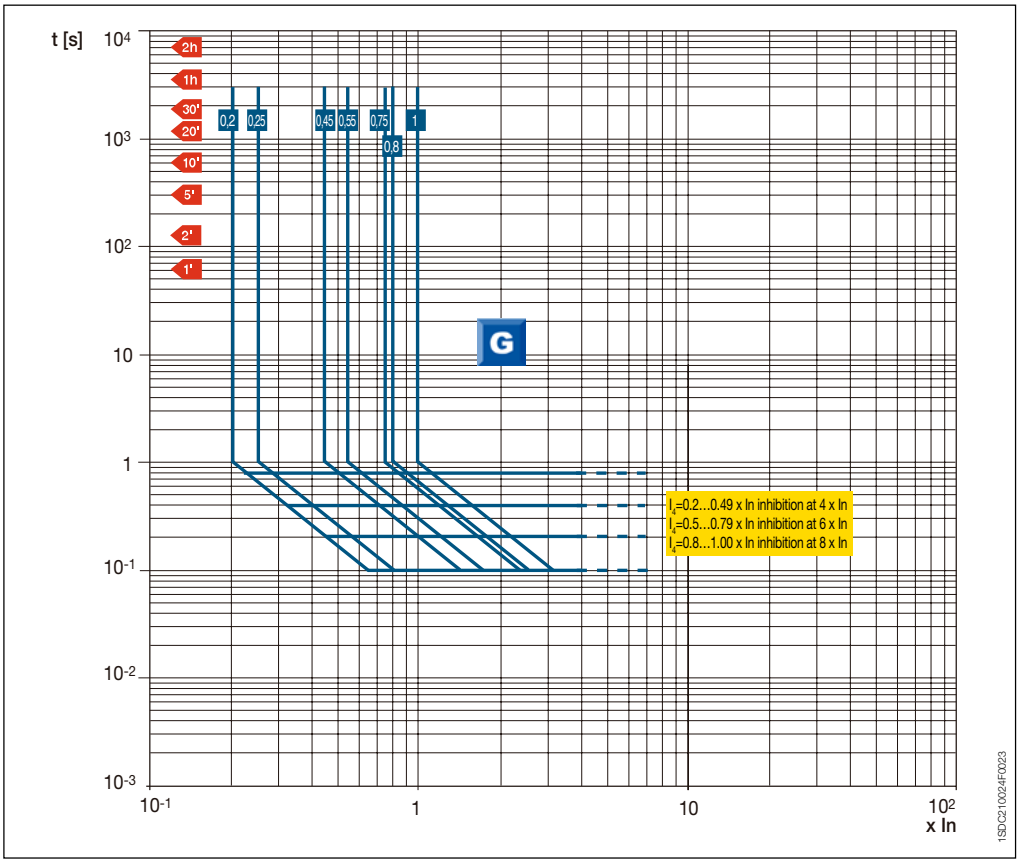
T4 250 - T5 400/600

PR222DS/P and PR222DS/PD-A

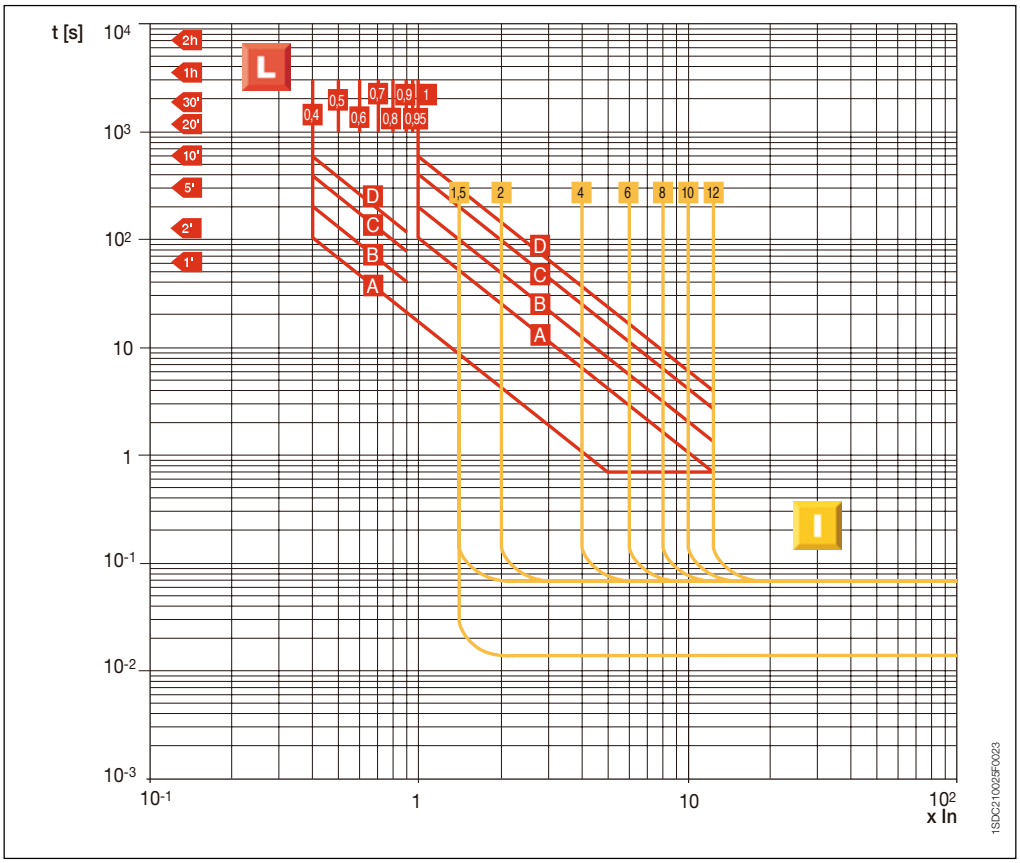
G Function



S6 800 - S7 1200

PR211/P

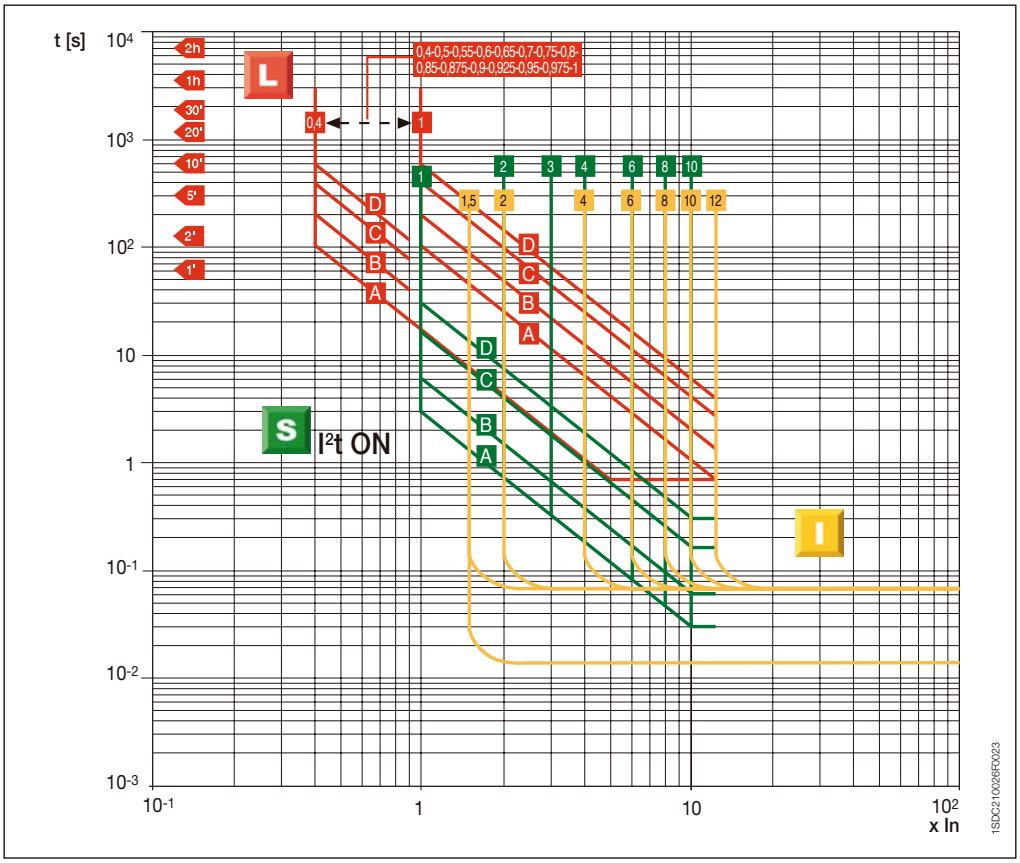
LI-I Functions



S6 800 - S7 1200 - S8 1600/2000/2500

PR212/P

L-S (I^2t ON)-I Functions



4

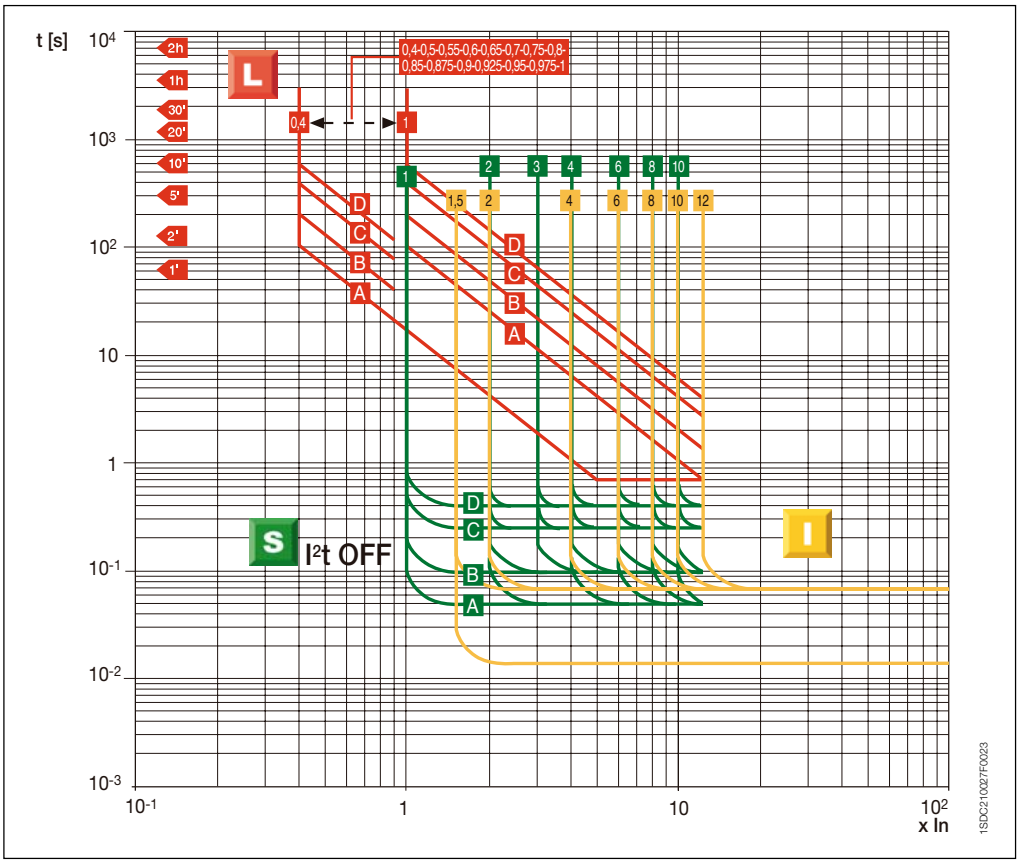
Trip curves for distribution

Circuit breakers with electronic trip units

S6 800 - S7 1200 - S8 1600/2000/2500

PR212/P

L-S (I^2t OFF)-I Functions

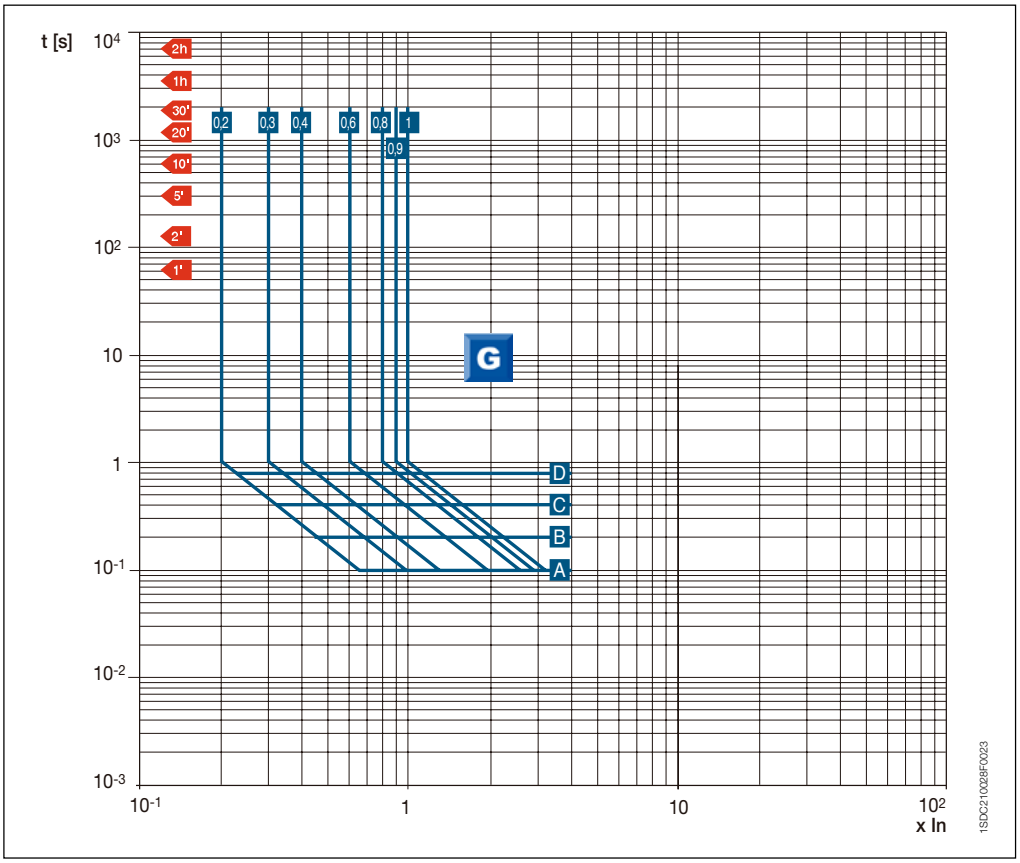


4

S6 800 - S7 1200 - S8 1600/2000/2500

PR212/P

G Function

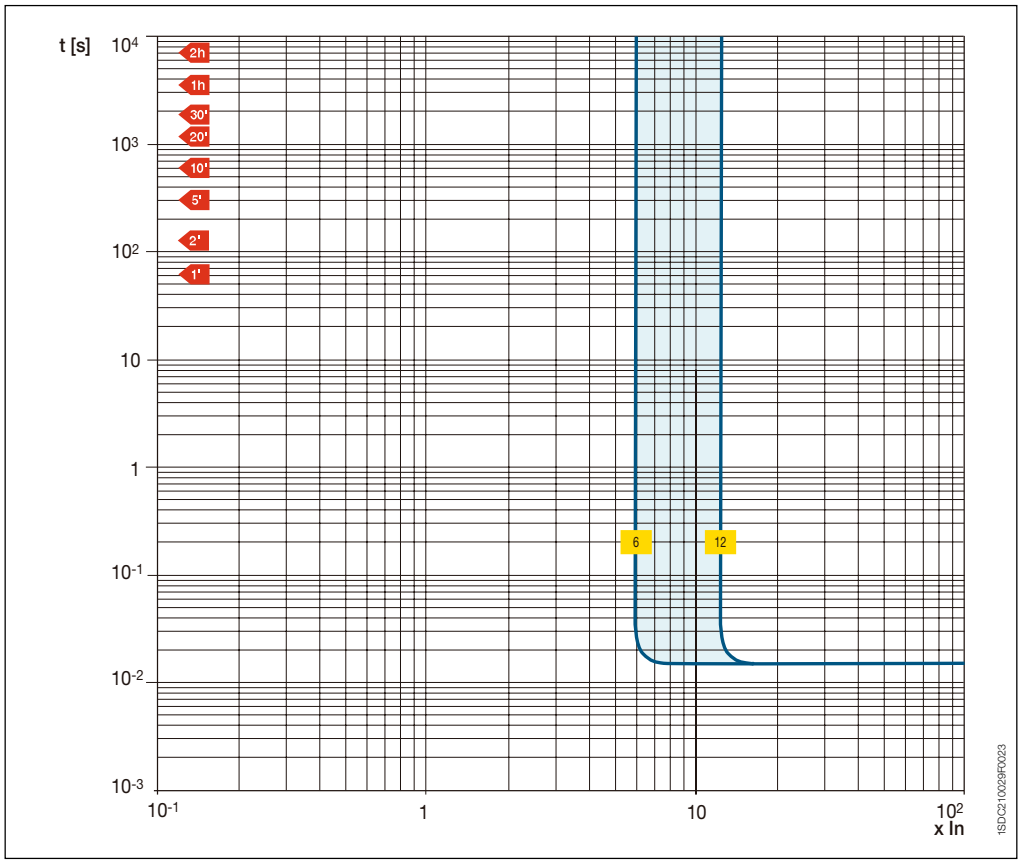


Trip curves for MCP

Circuit breakers with magnetic only trip units

T2-T3 100 MCP

Adjustable magnetic only trip unit
I_3 = 6…12 x In



4

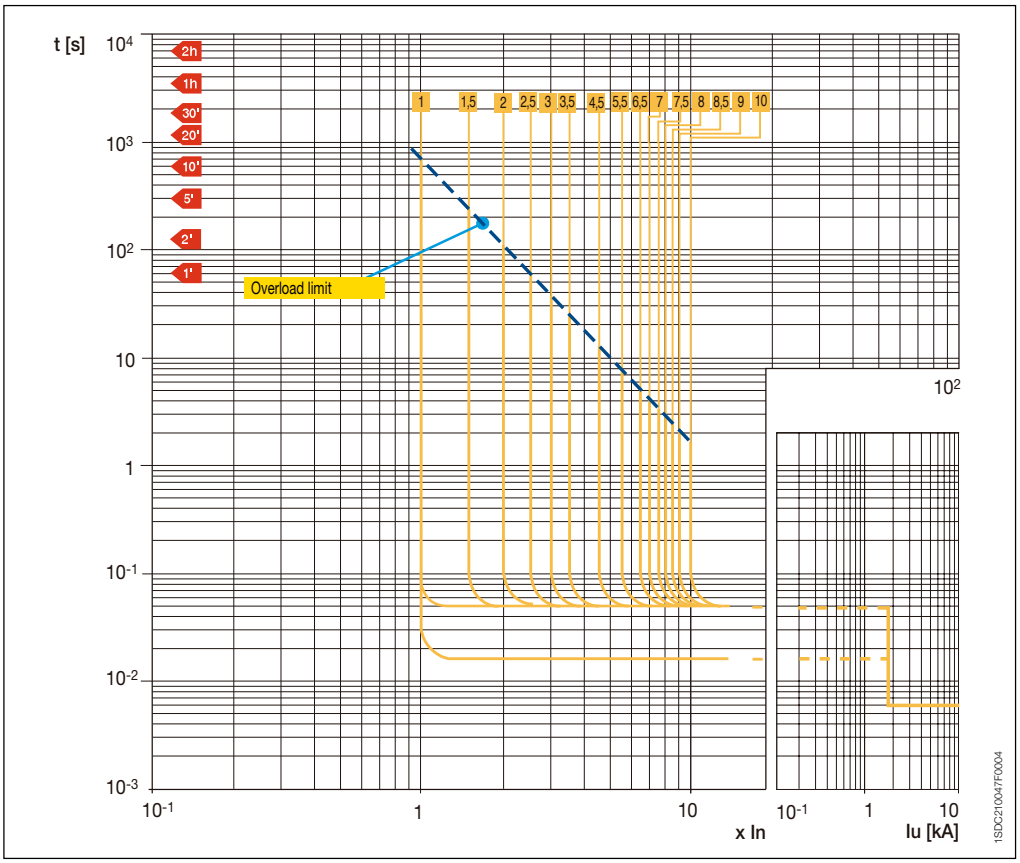
Trip curves for MCP

Circuit breakers with PR221DS-I electronic trip unit

T2 100

PR221DS-I

I Function



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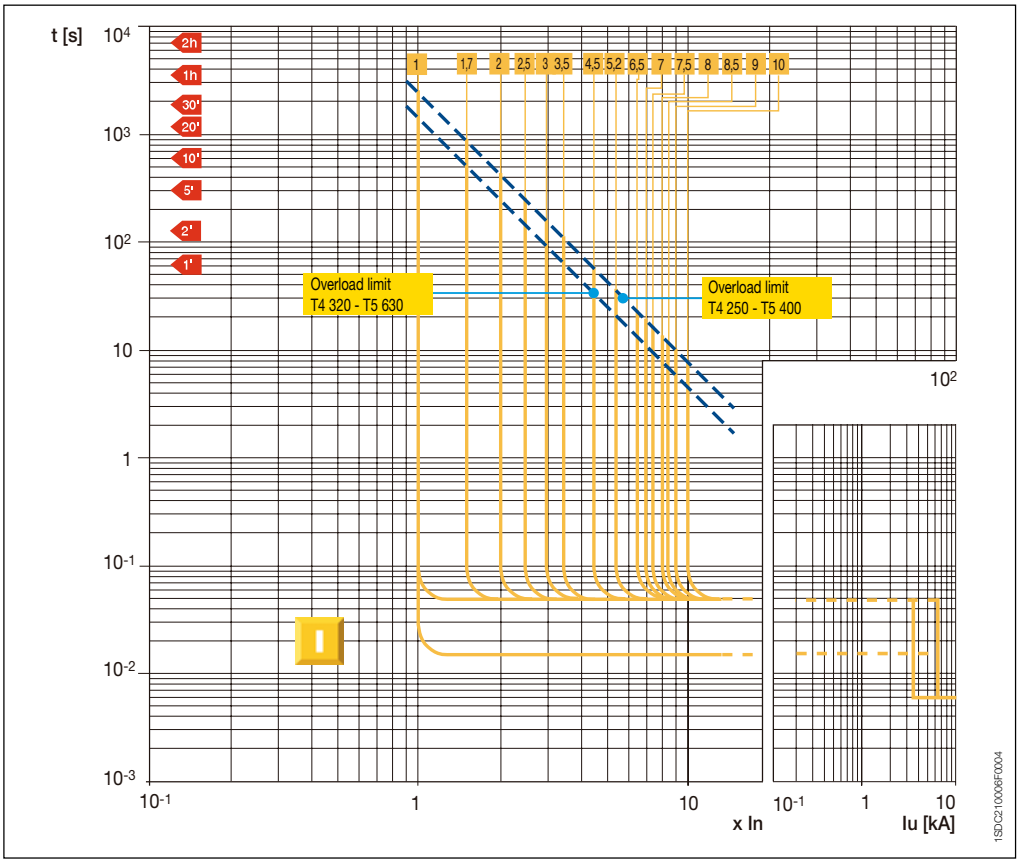
T4 250 - T5 400/600

PR221DS-I

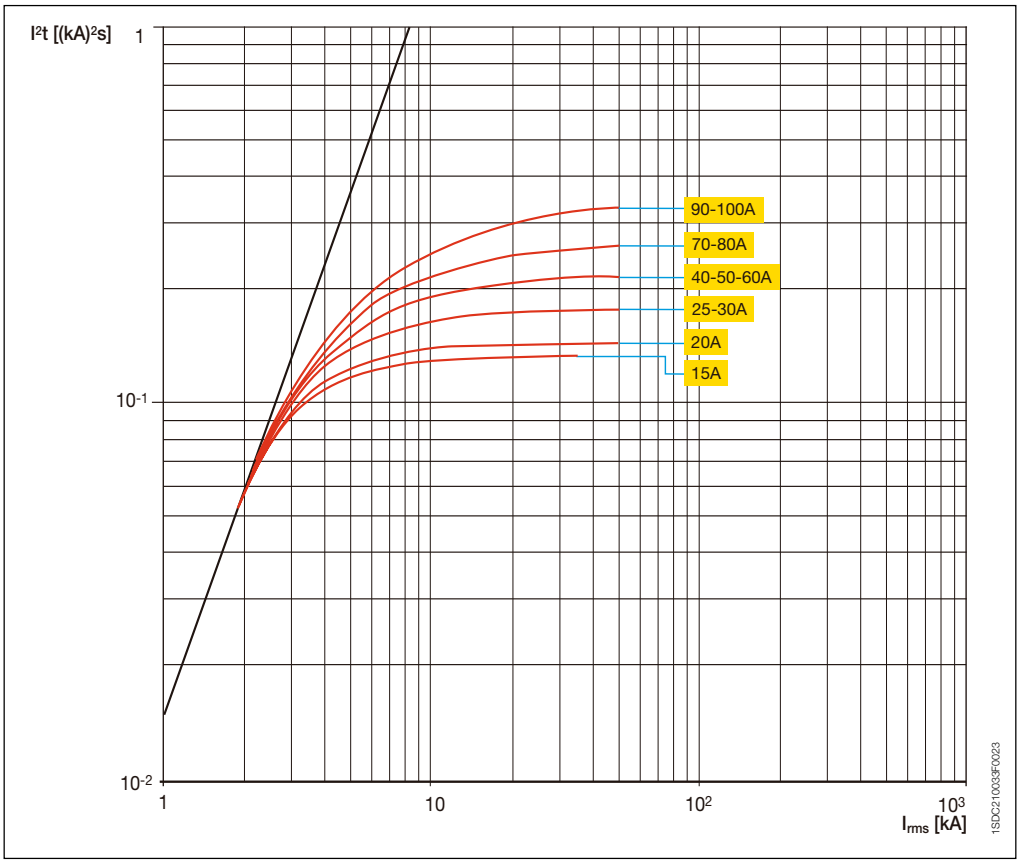
I Function



Specific let-through energy curves

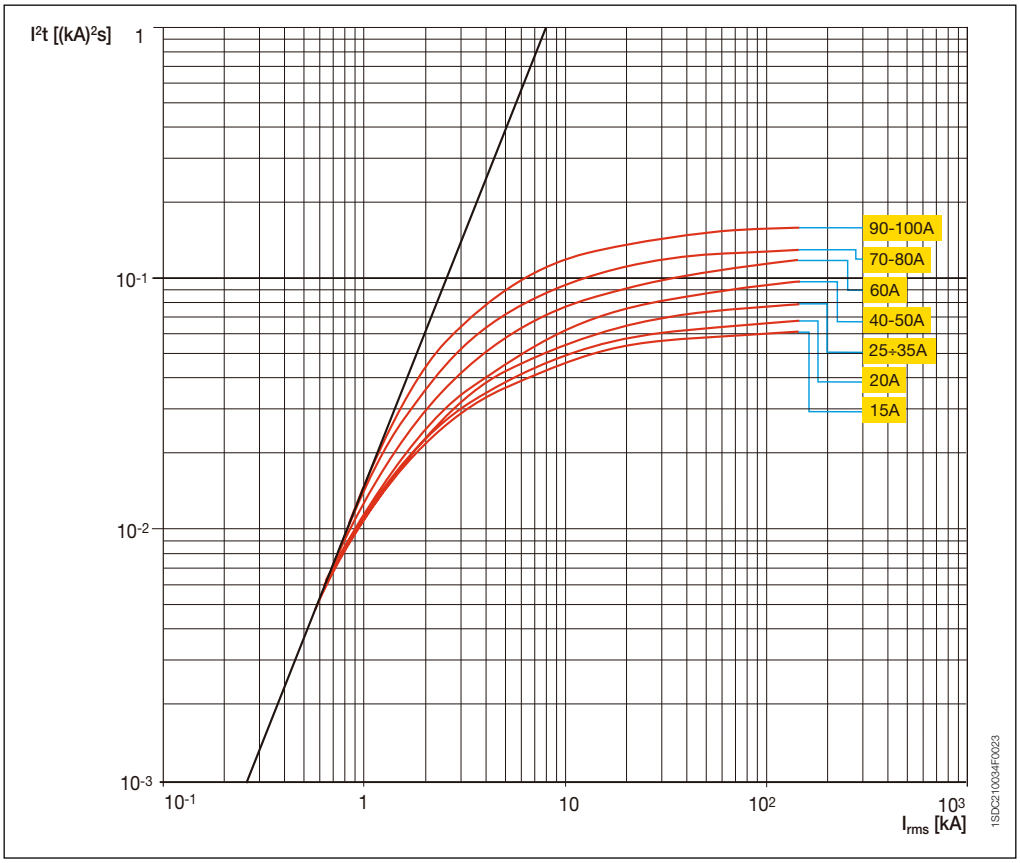
T1 100

240 V



T2 100

240 V

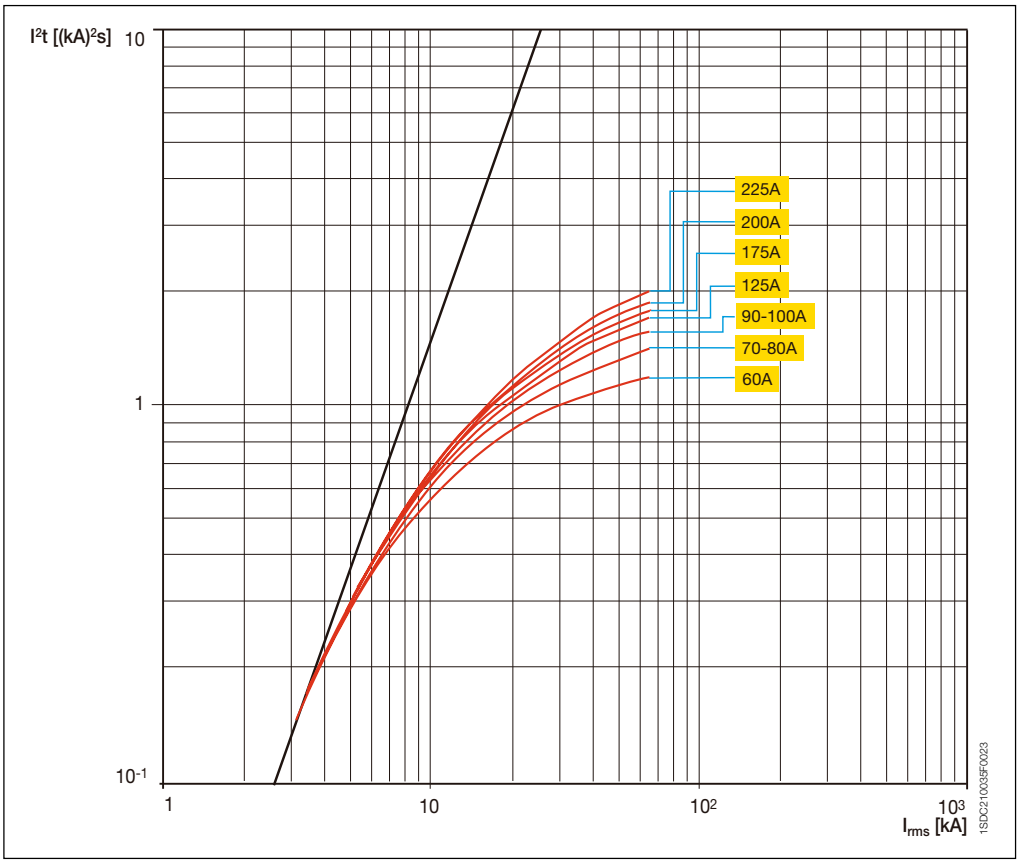


4

Specific let-through energy curves

T3 225

240 V



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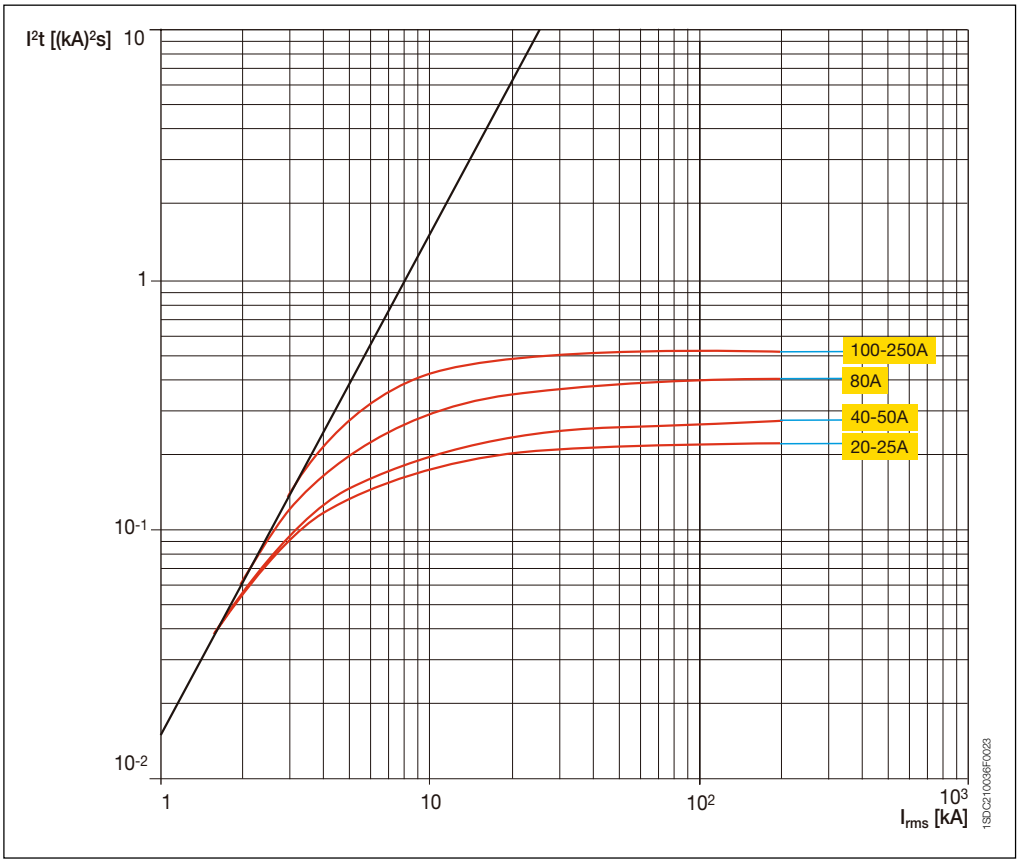
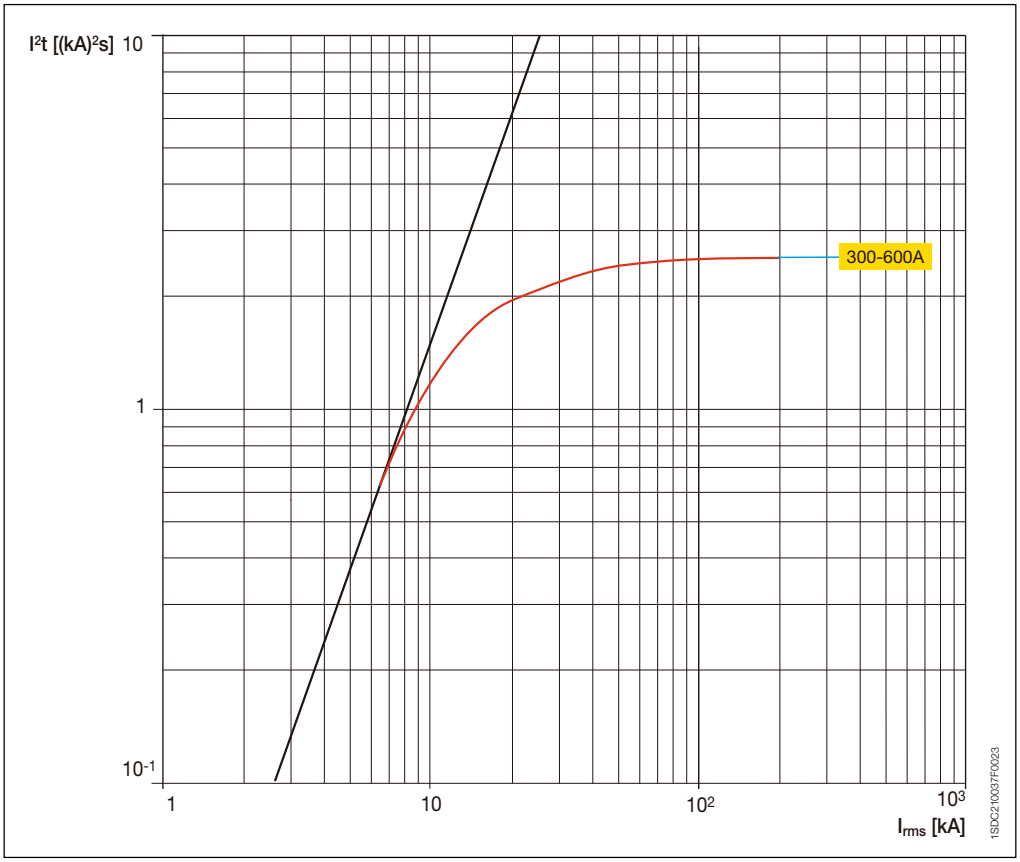
T4 250

240 V



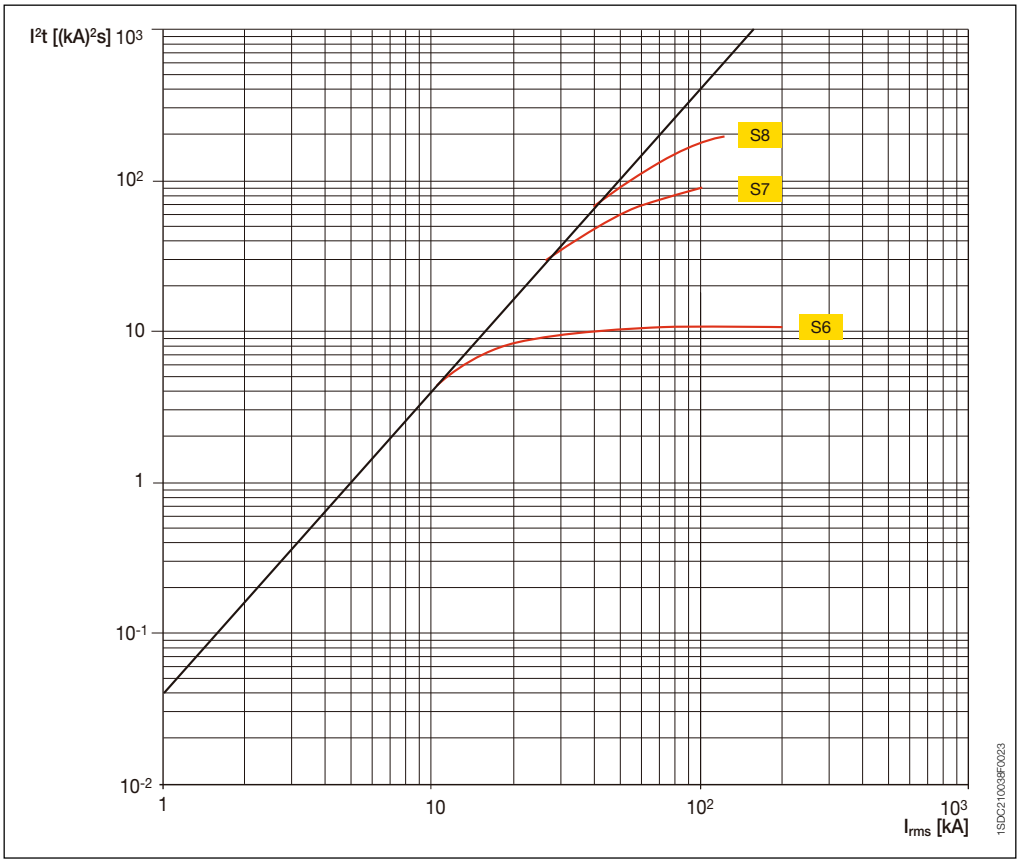
T5 400/600

240 V



S6 800 - S7 1200 - S8 1600/2000/2500

240 V



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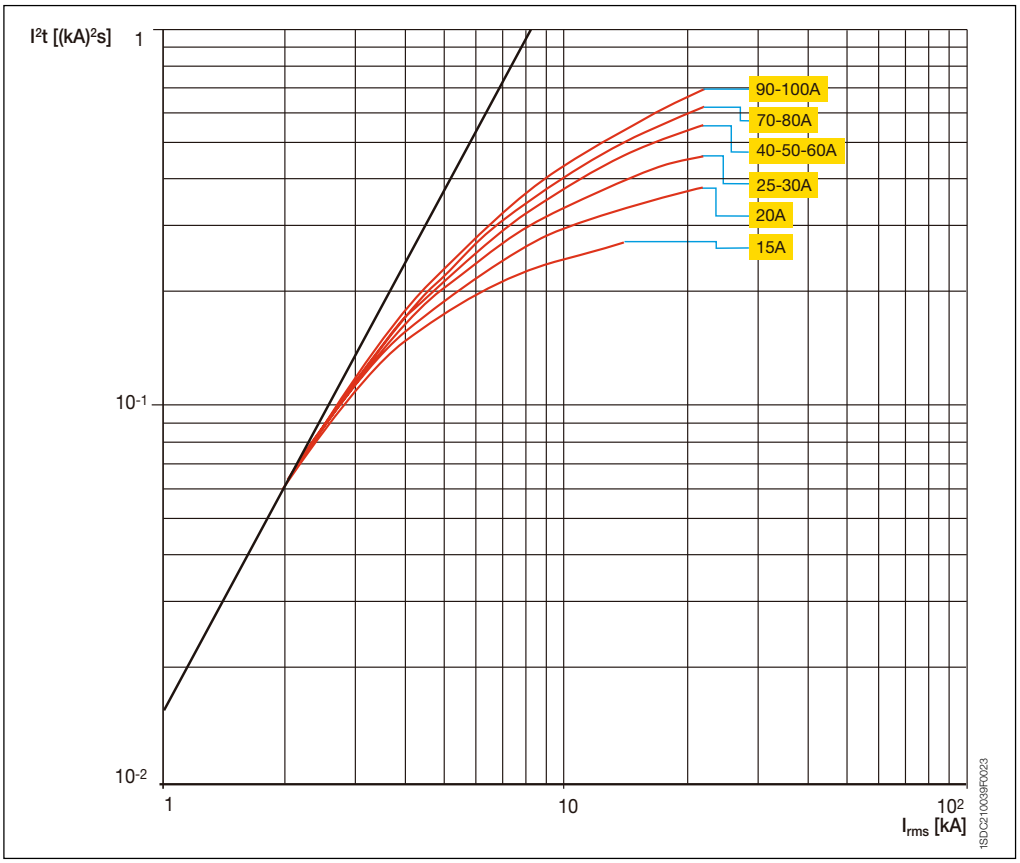
Specific let-through energy curves

T1 100

480 V



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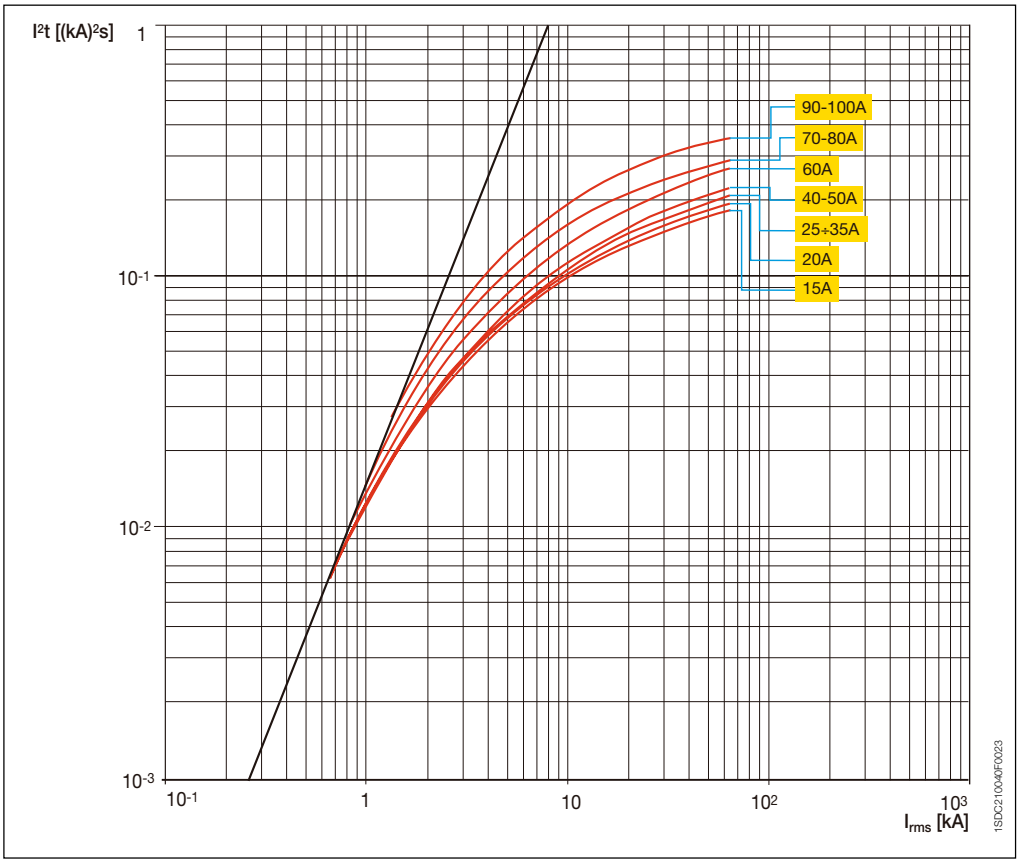
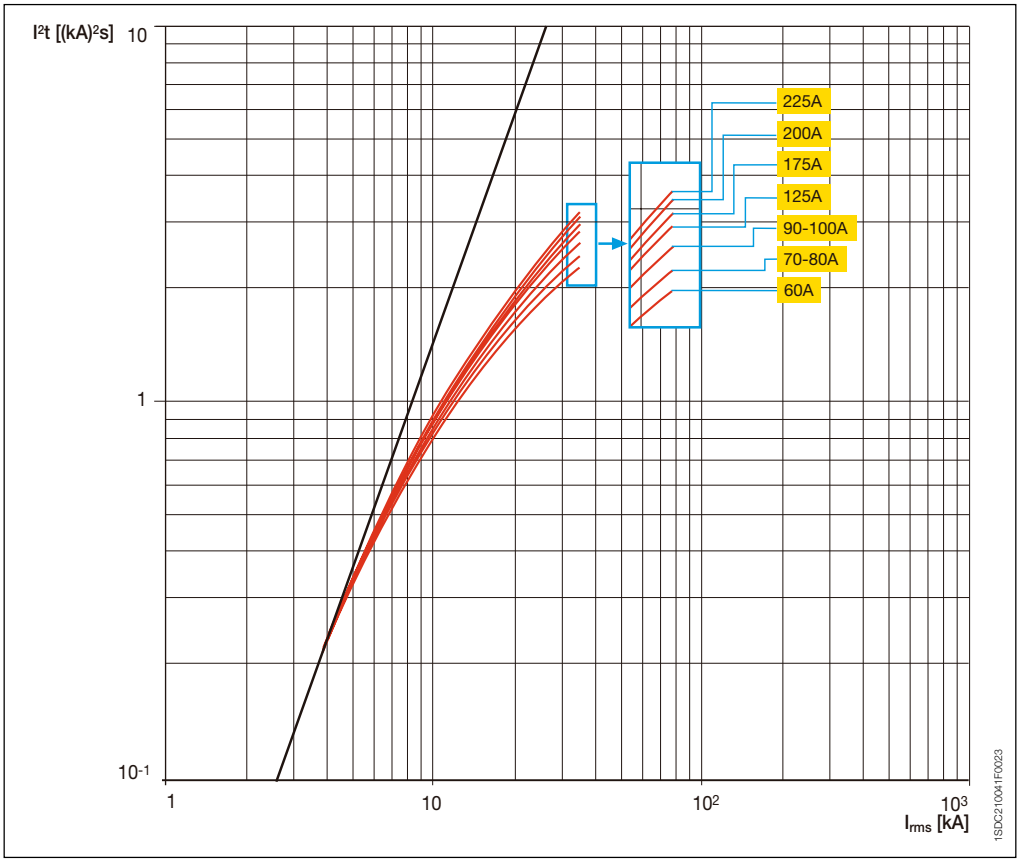
T2 100

480 V



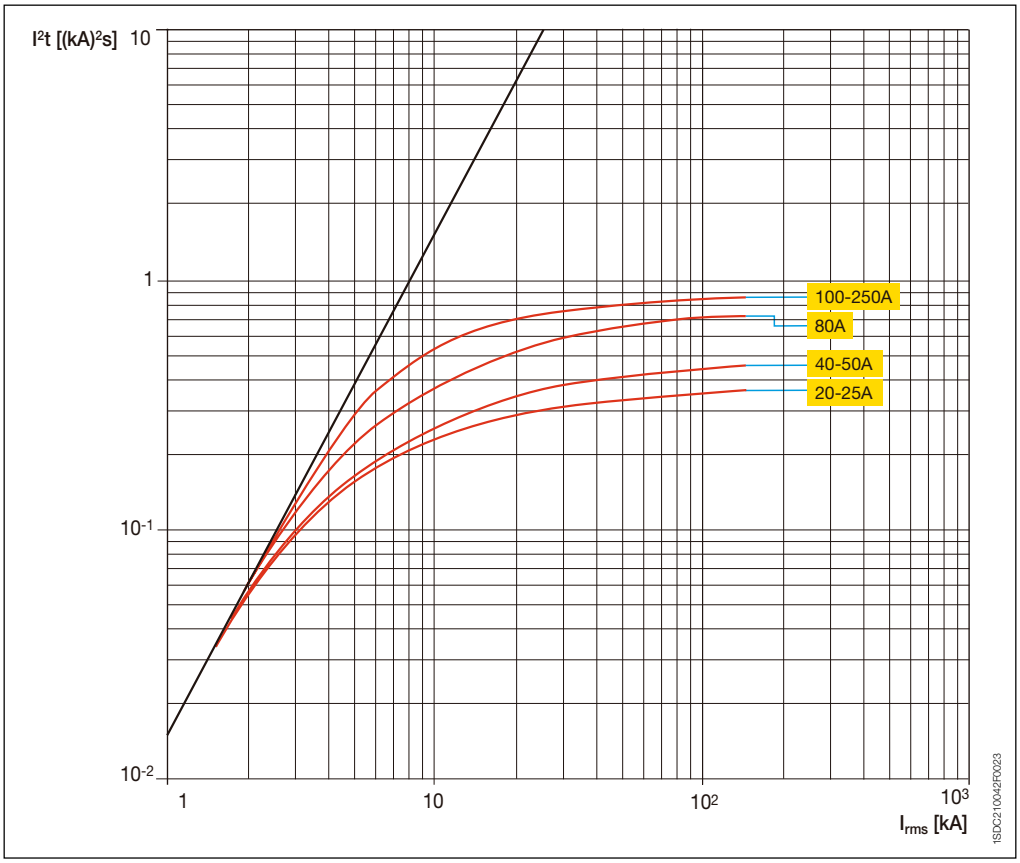
T3 225

480 V



T4 250

480 V

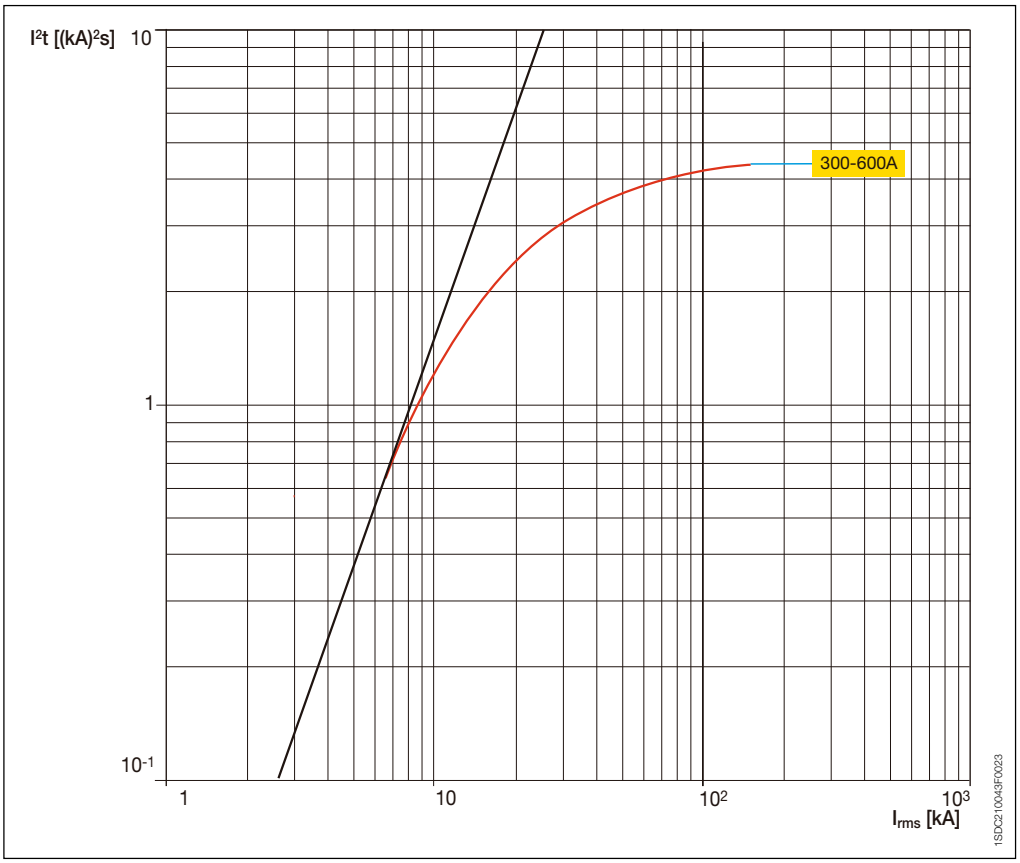


4

Specific let-through energy curves

T5 400/600

480 V



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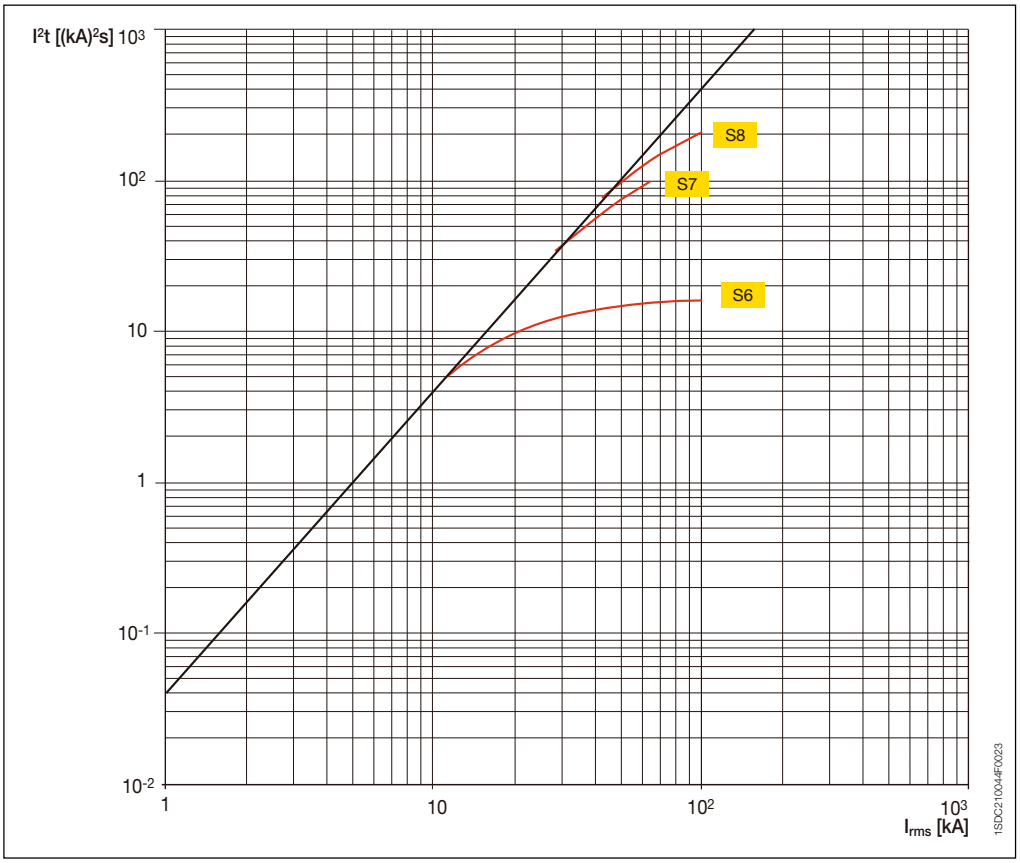
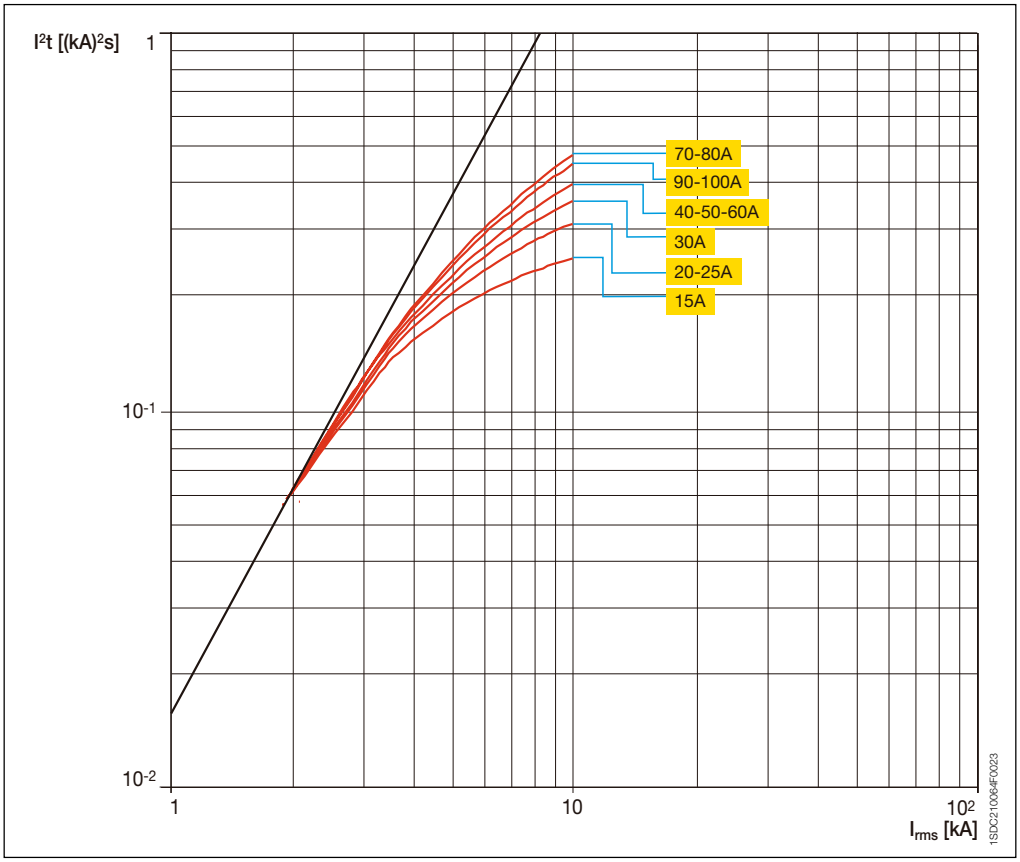
S6 800 - S7 1200 - S8 1600/2000/2500

480 V



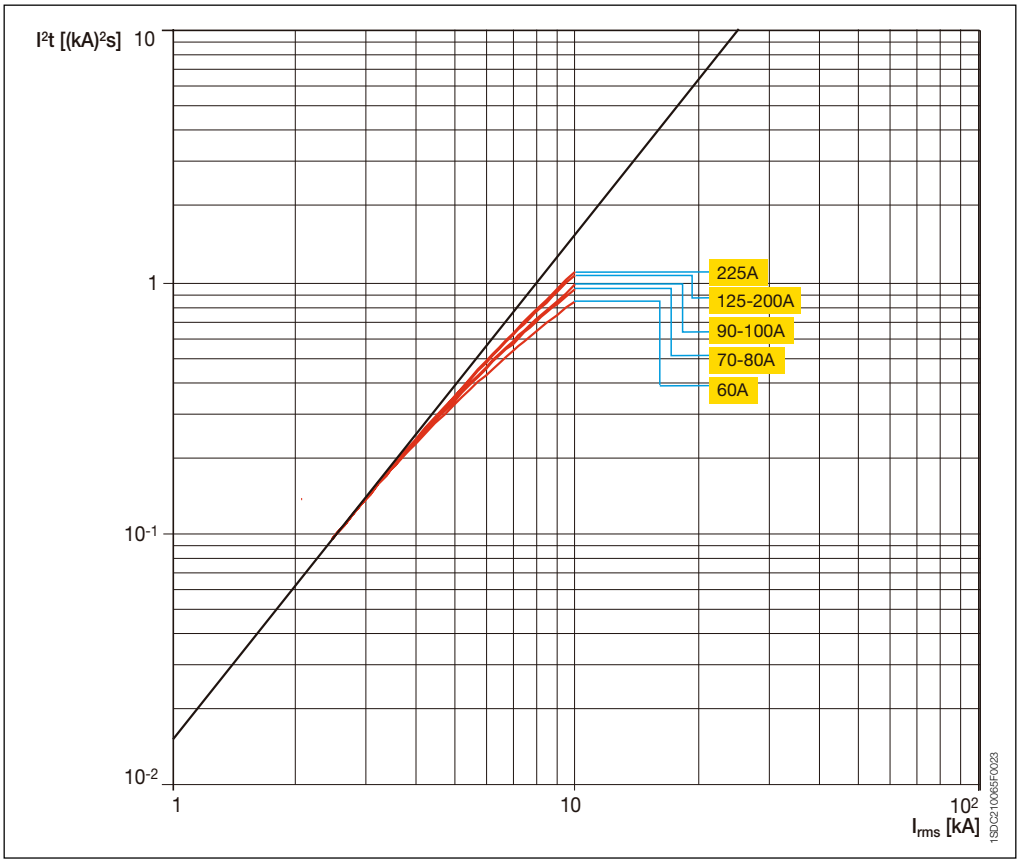
T1 R15...100

600Y/347 V



T3 R60...225

600Y/347 V

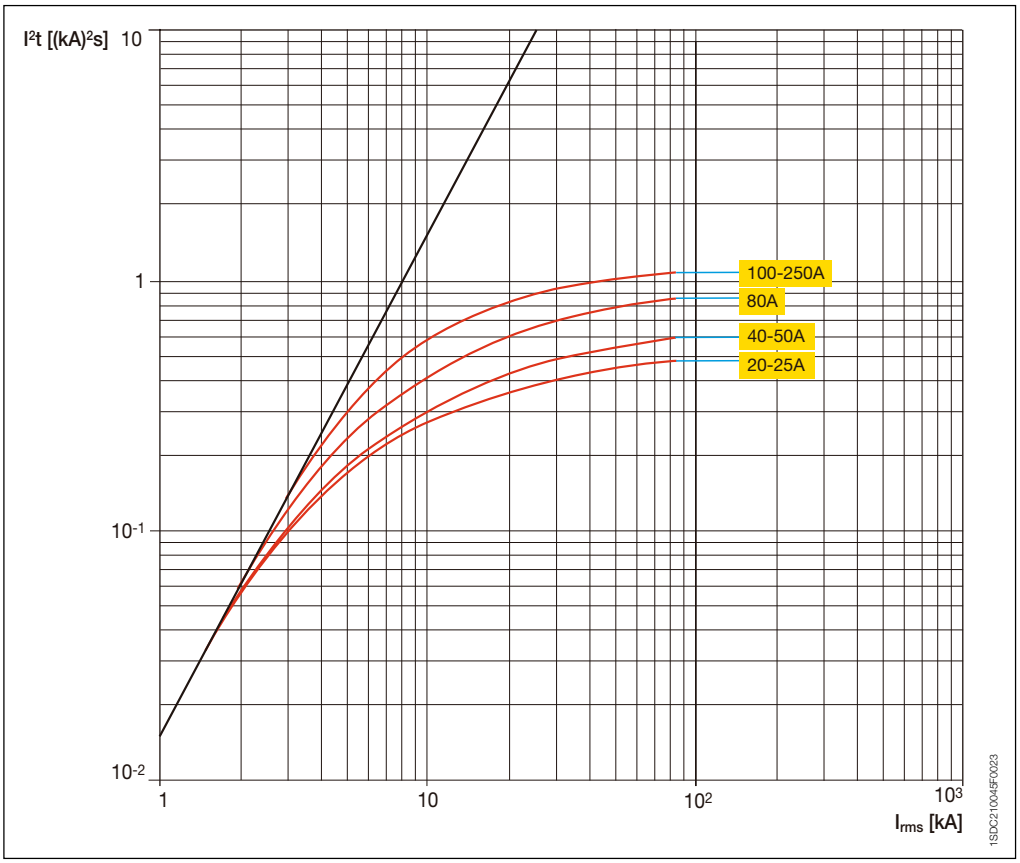


4

Specific let-through energy curves

T4 250

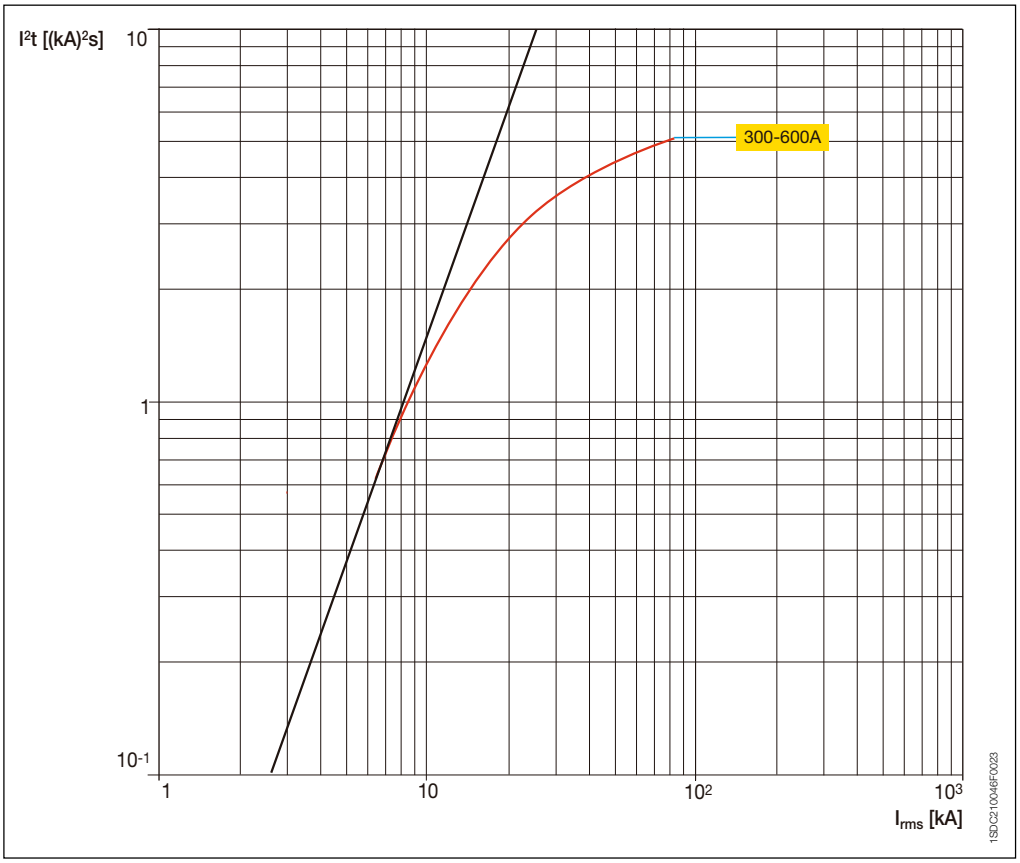
600 V



4

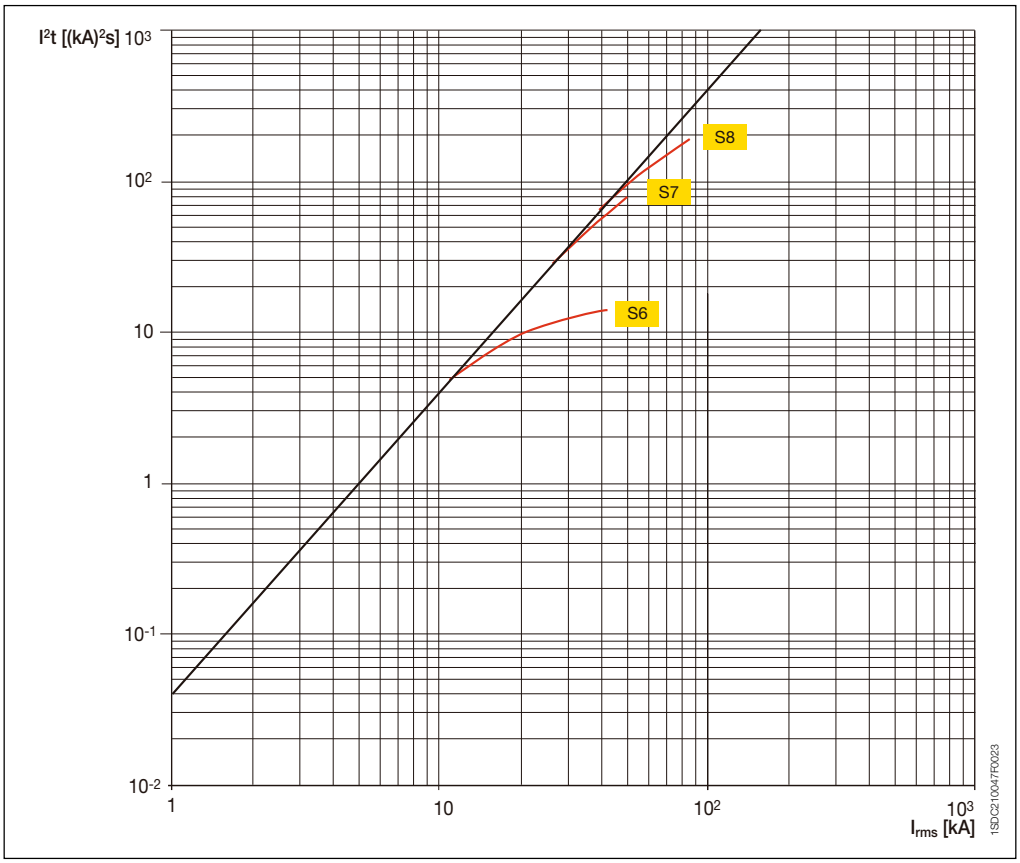
T5 400/600

600 V



S6 800 - S7 1200 - S8 1600/2000/2500

600 V



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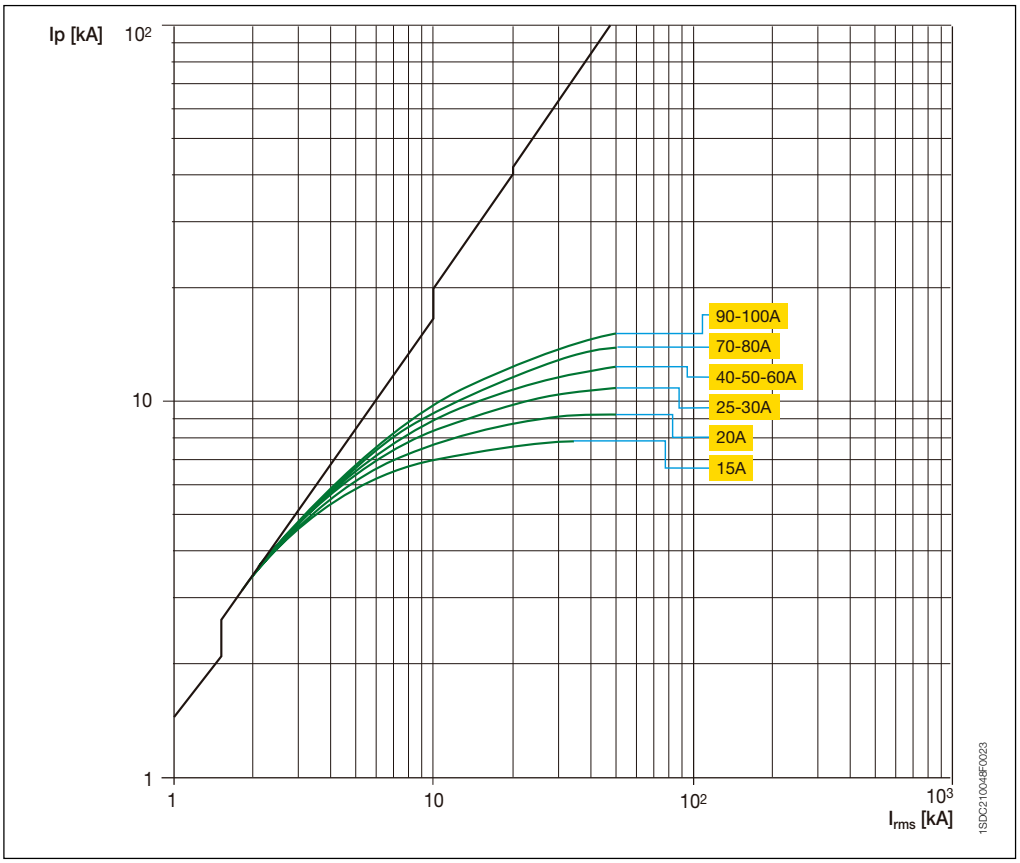
Limitation curves

T1 100

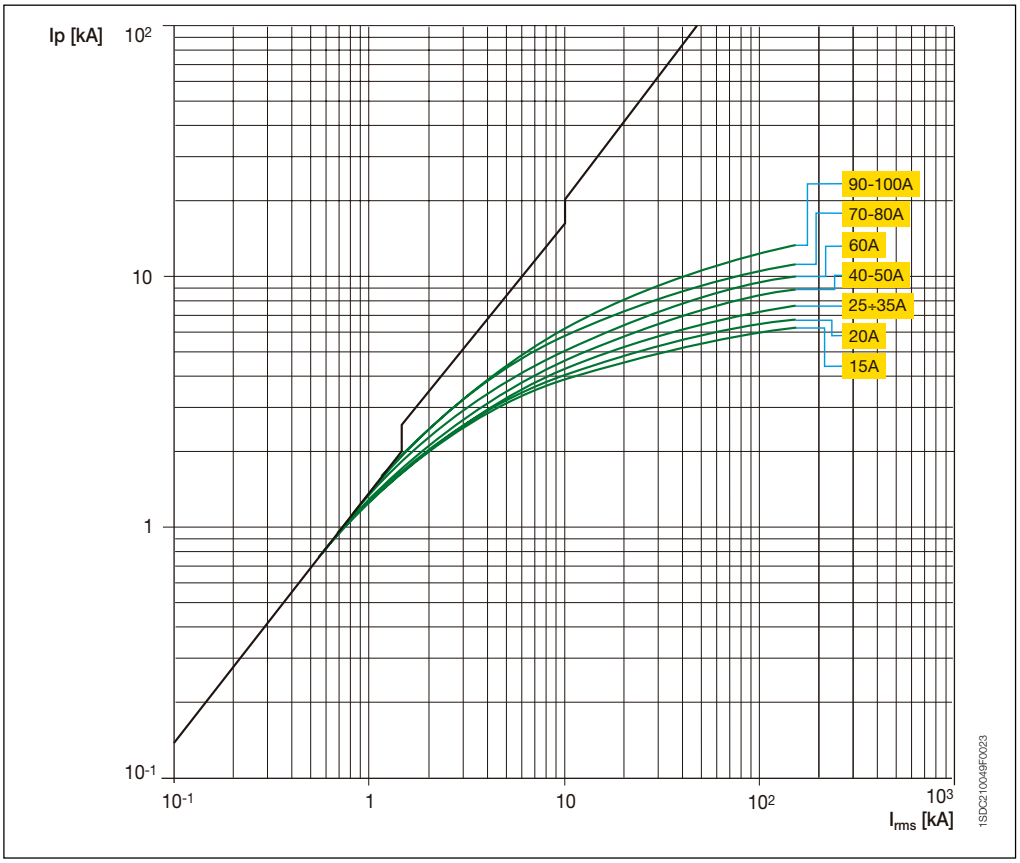
240 V



4

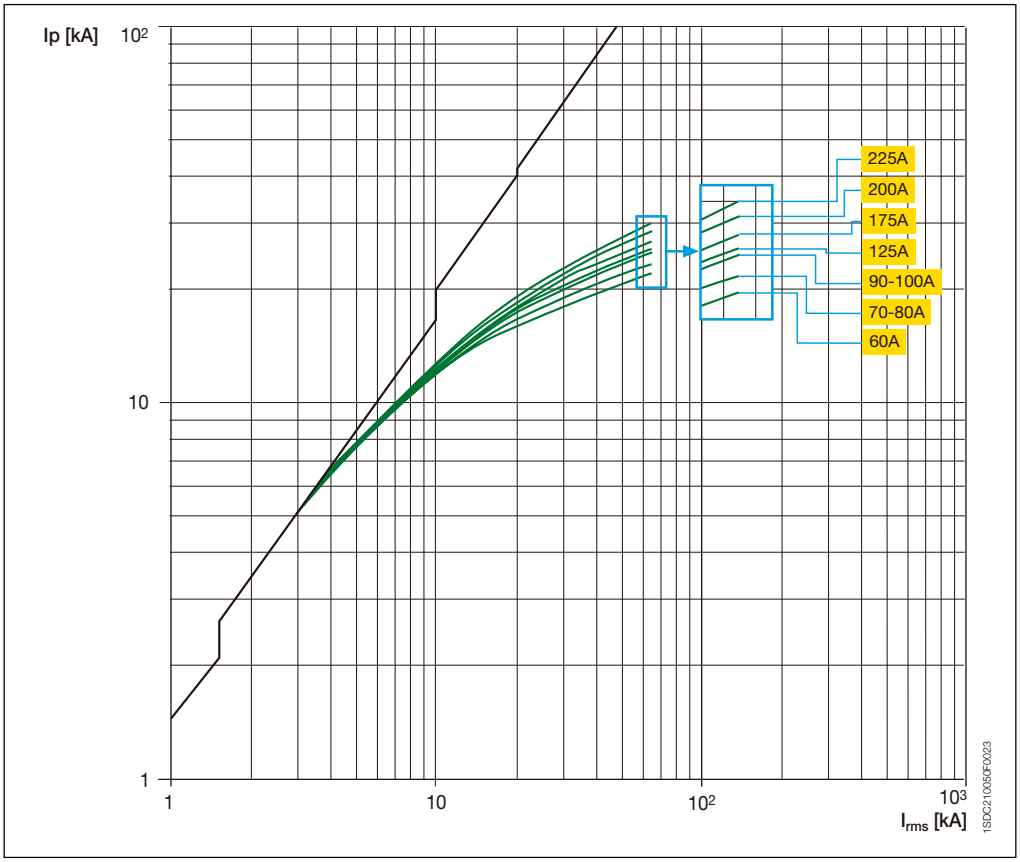
T2 100

240 V



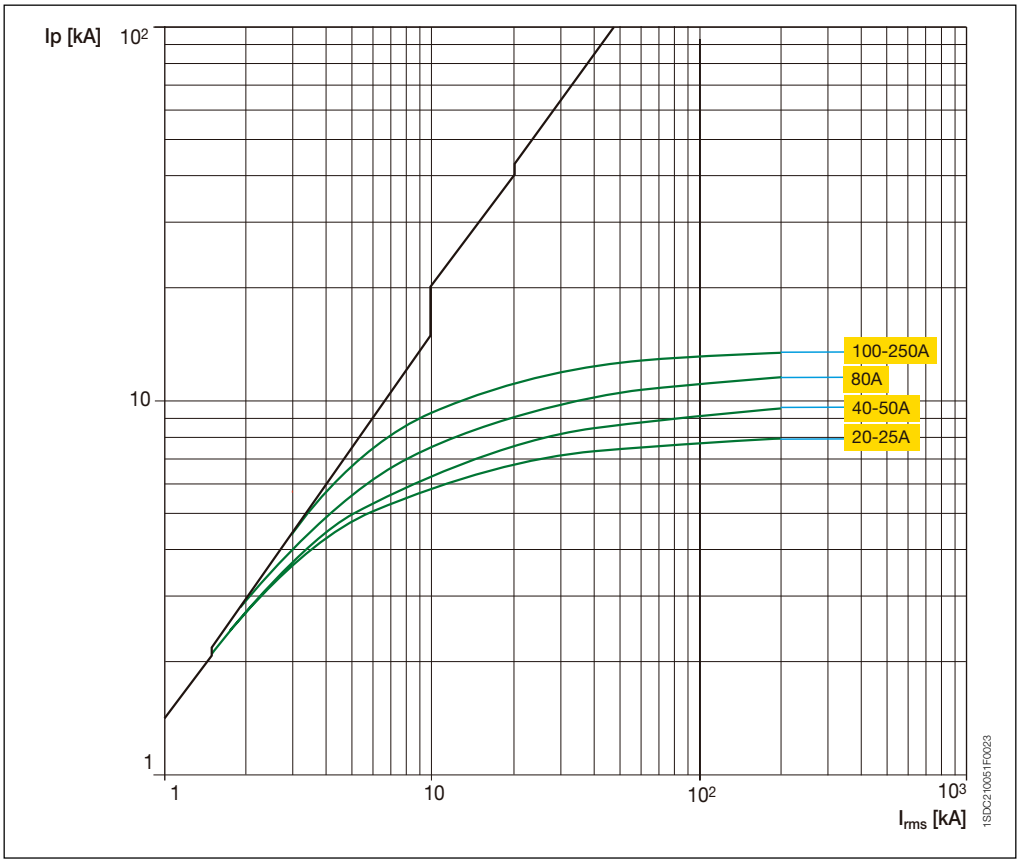
T3 225

240 V



T4 250

240 V

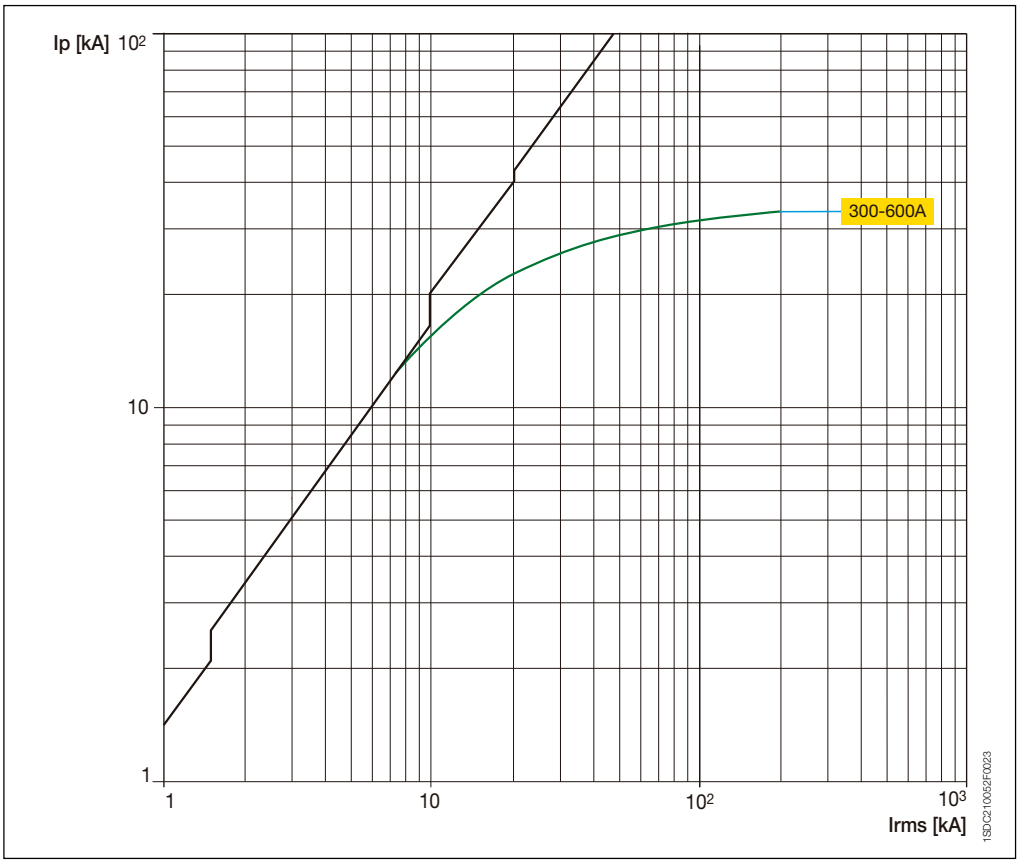


4

Limitation curves

T5 400/600

240 V



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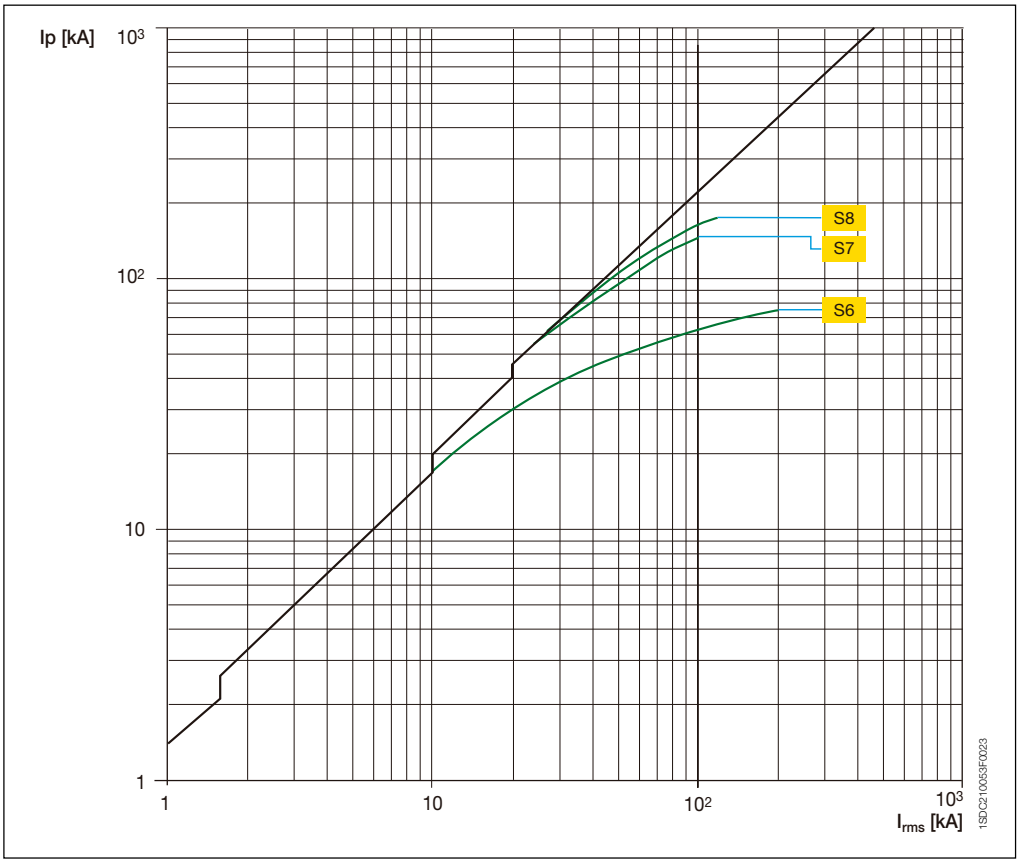
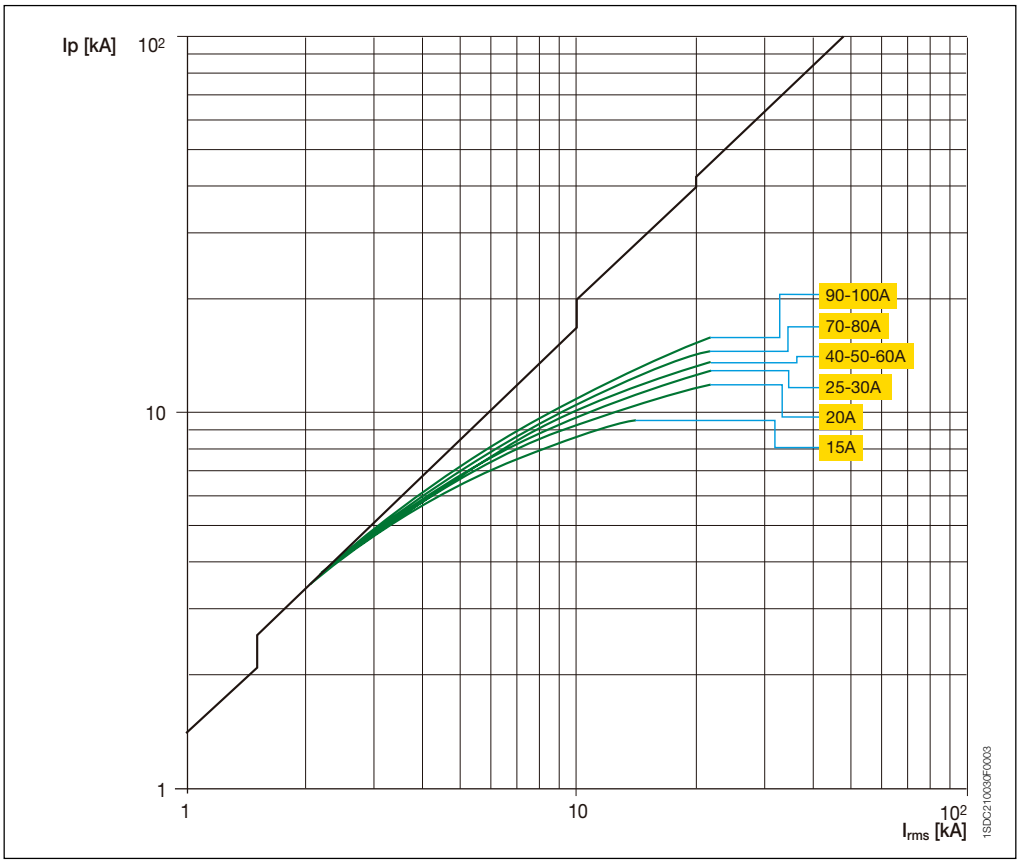
S6 800 - S7 1200 - S8 1600/2000/2500

240 V



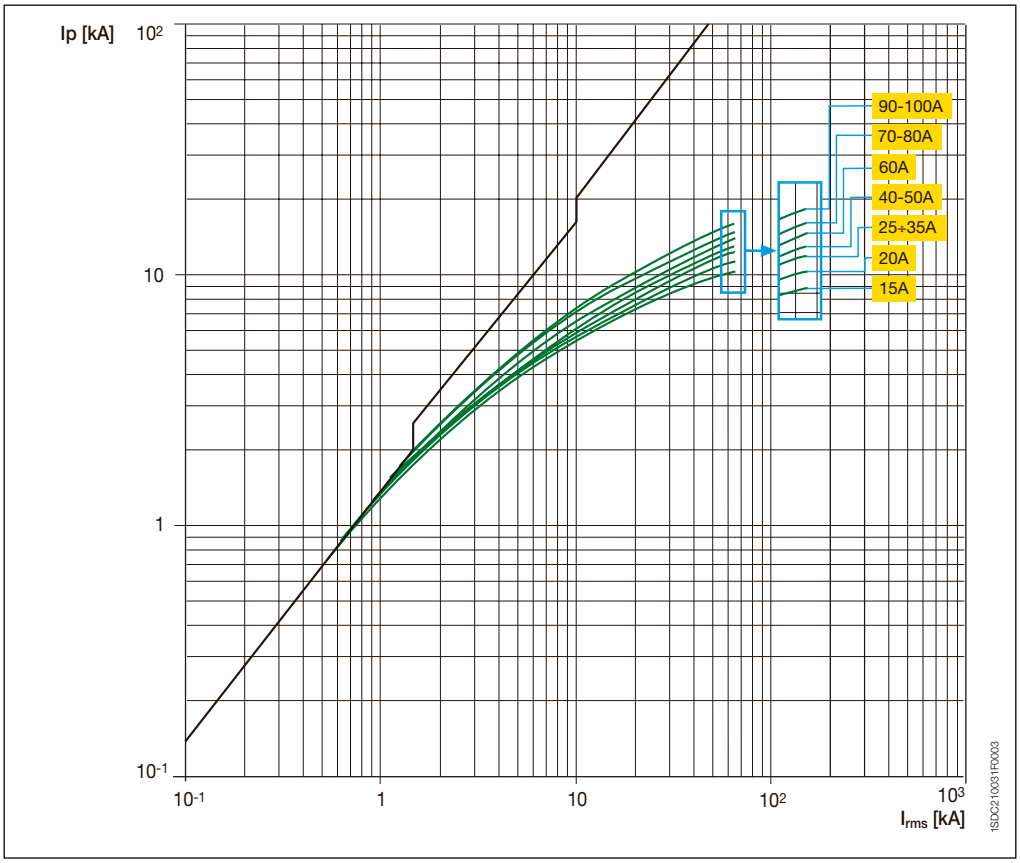
T1 100

480 V



T2 100

480 V



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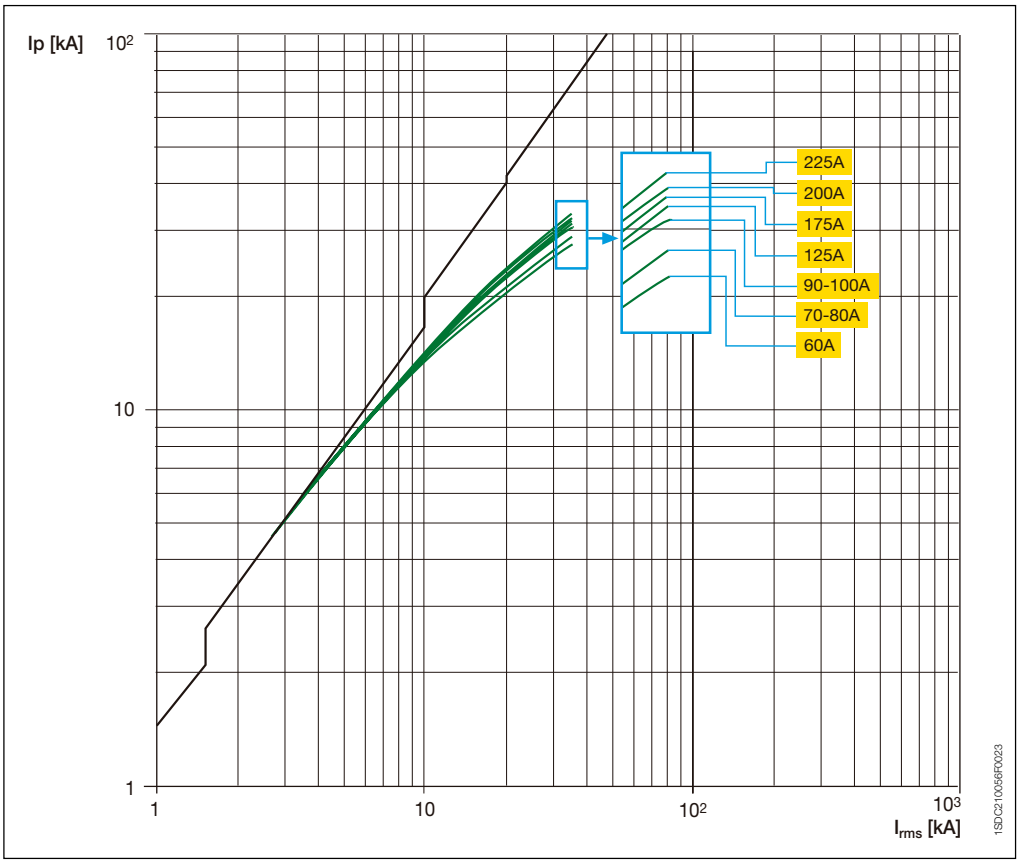
Limitation curves

T3 225

480 V



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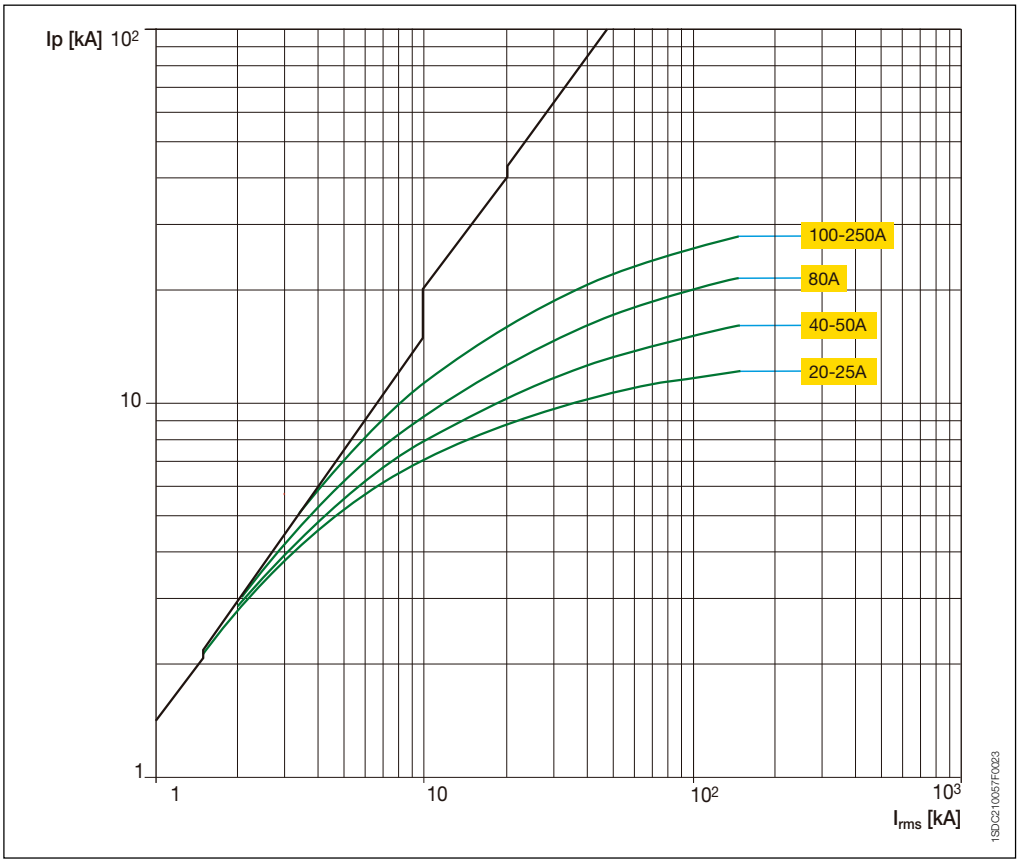
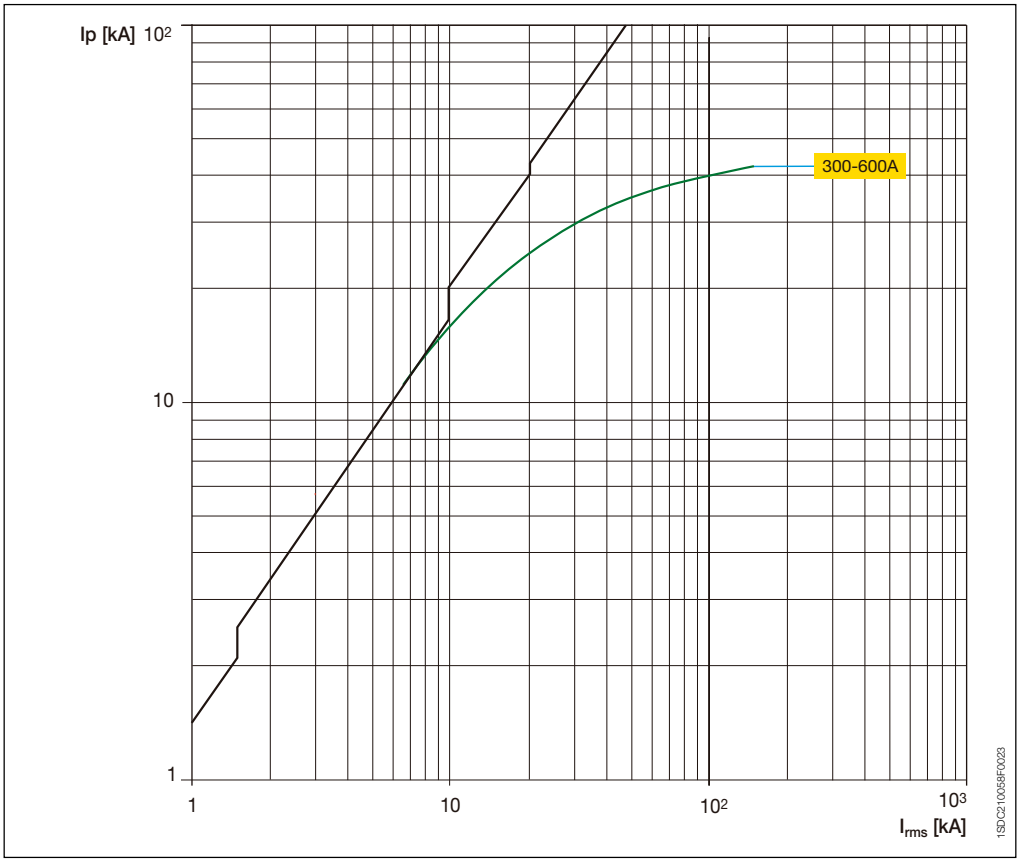
T4 250

480 V



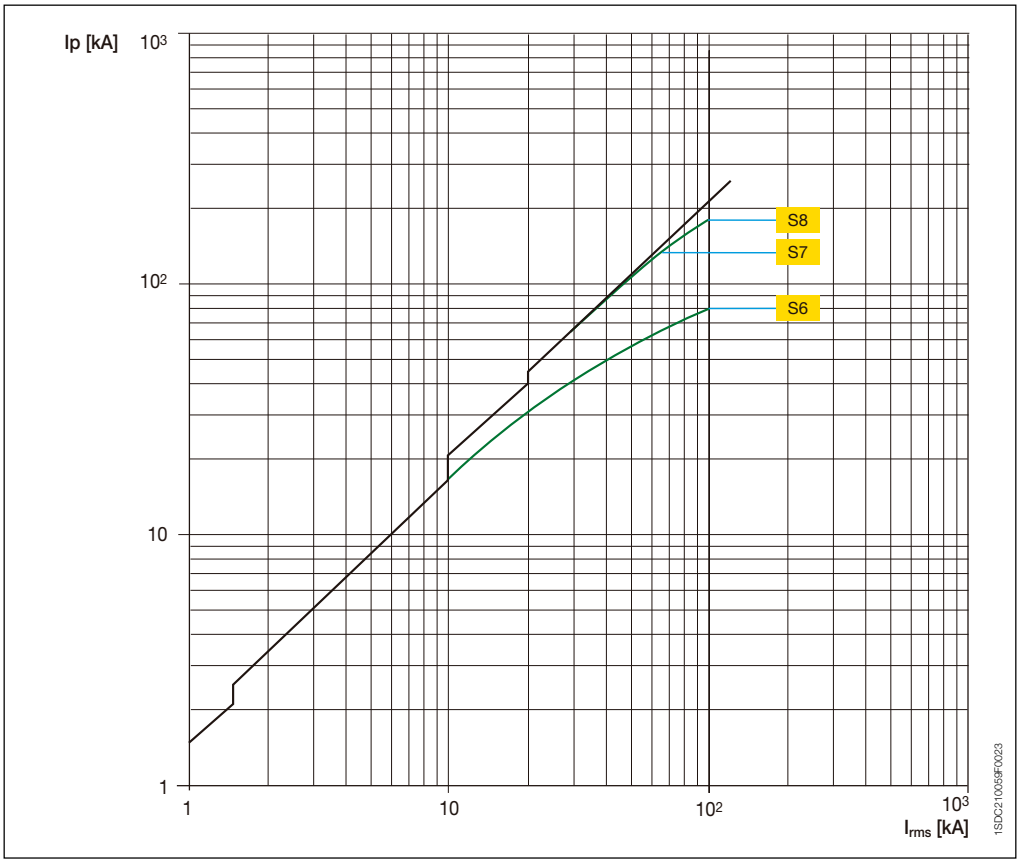
T5 400/600

480 V



S6 800 - S7 1200 - S8 1600/2000/2500

480 V

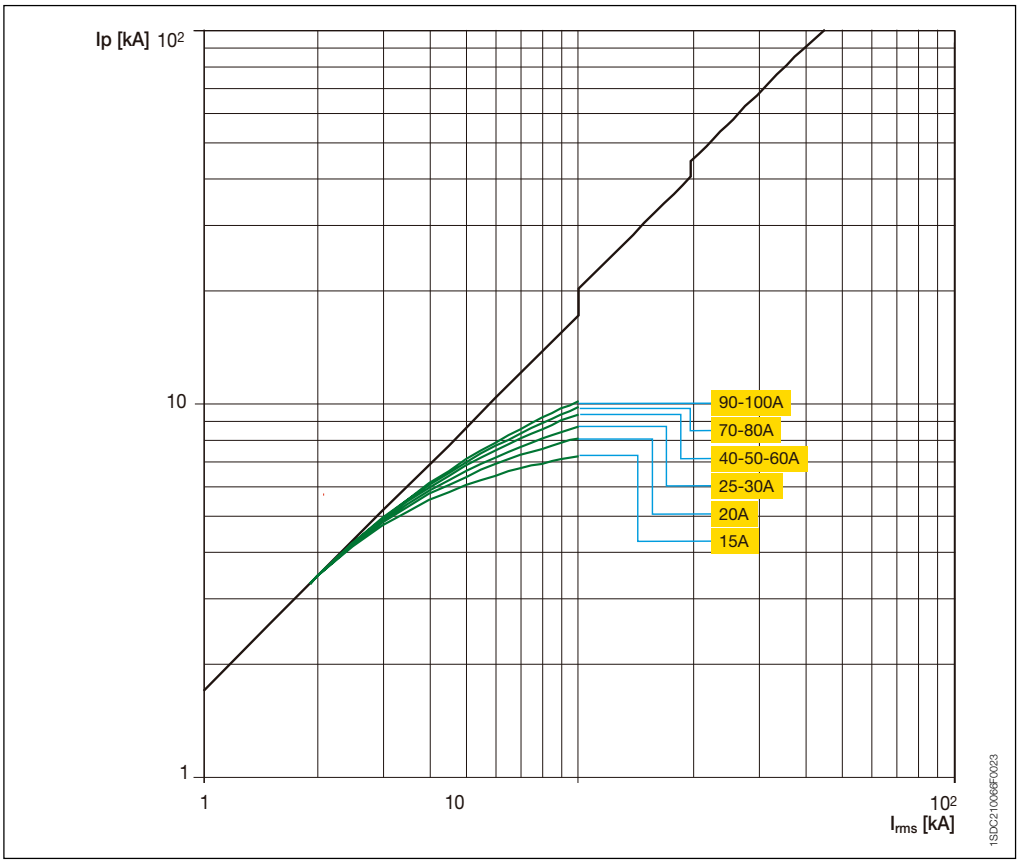


4

Limitation curves

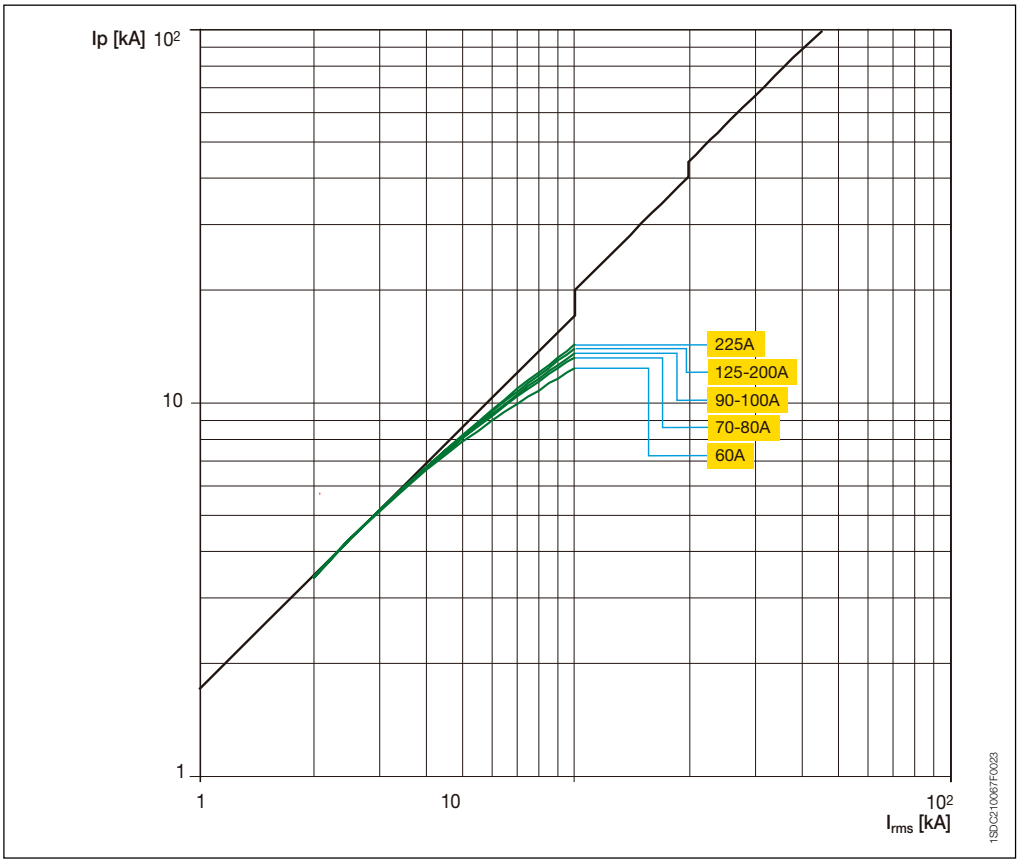
T1 R15...100

600Y/347 V



T3 R60...225

600Y/347 V



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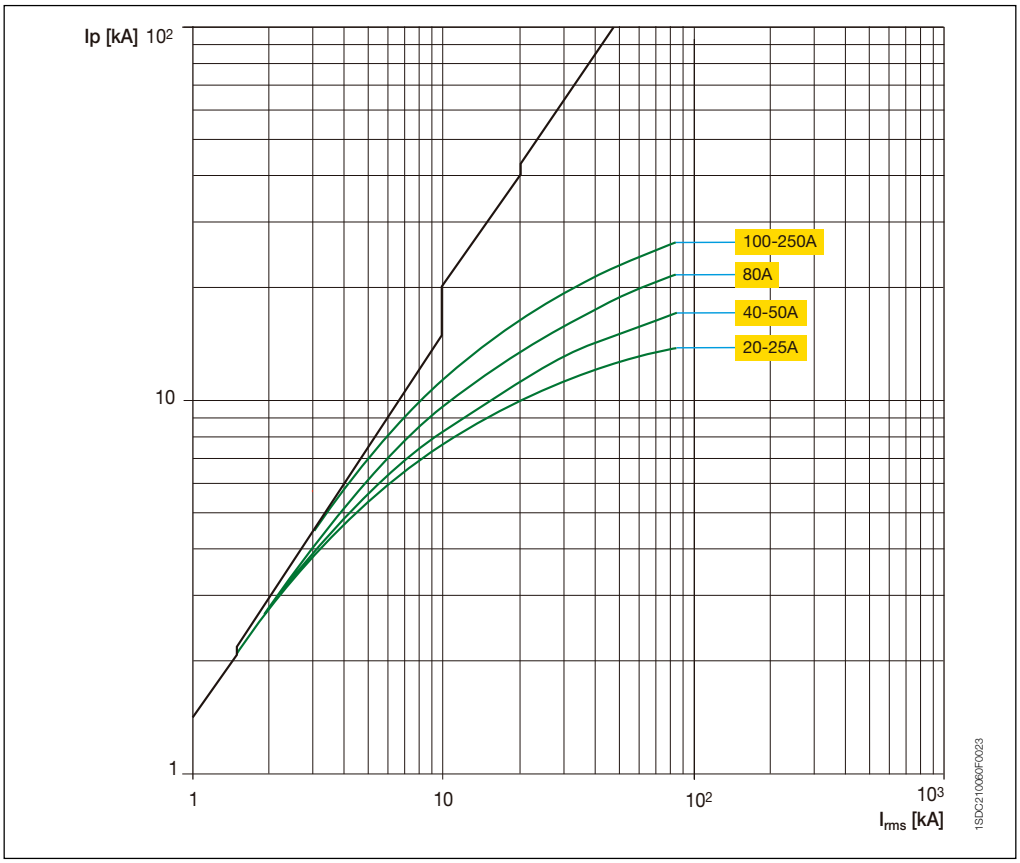
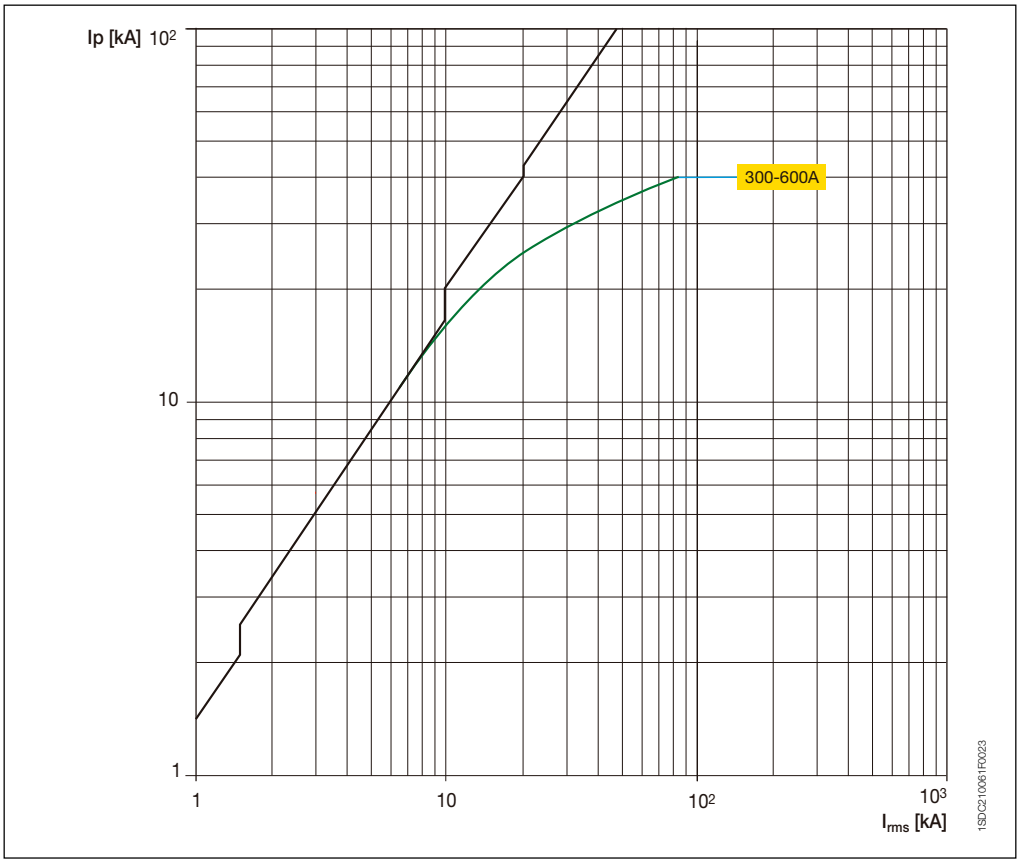
T4 250

600 V



T5 400/600

600 V

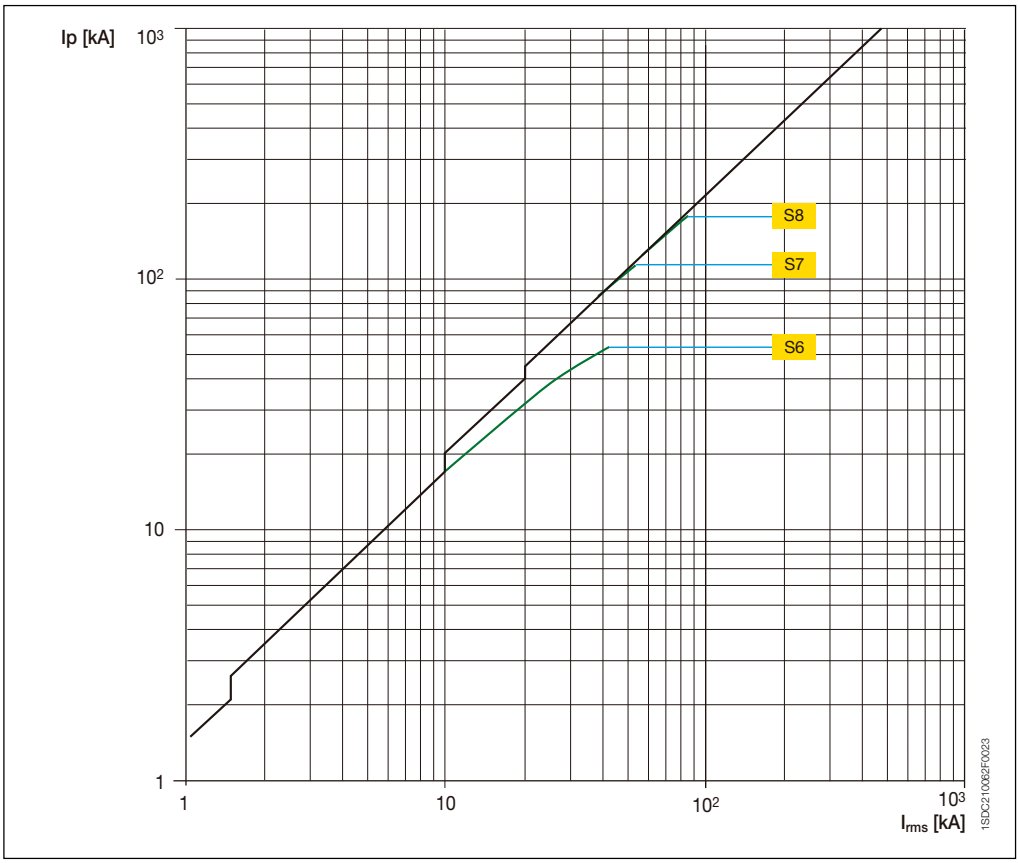


4

Limitation curves

S6 800 - S7 1200 - S8 1600/2000/2500

600 V



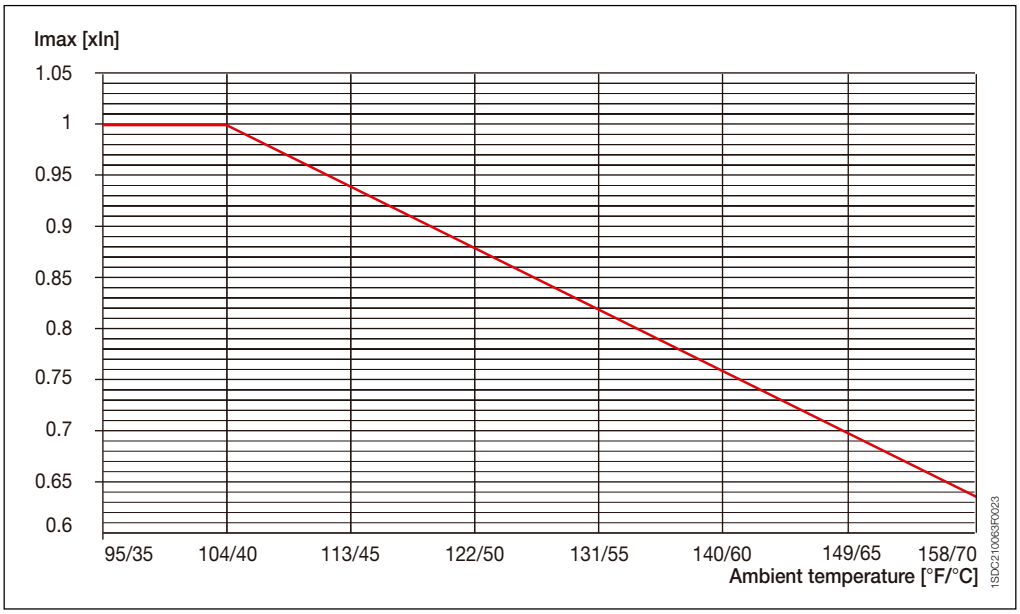
4

Temperature performances

Circuit breakers with electronic trip units

PR221DS

PR211/P
PR212/P
PR222DS



4

Temperature performances

Circuit breakers with thermomagnetic trip units

Tmax T1 and T1 1P

In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 °F / 60 °C
15	18	17	16	15	14	13
20	24	22	21	20	19	17
25	29	28	27	25	23	22
30	35	34	32	30	28	26
40	47	45	43	40	37	34
50	60	57	53	50	46	42
60	71	68	64	60	56	51
70	83	79	75	70	65	60
80	94	90	85	80	75	69
90	106	101	96	90	84	78
100	121	114	107	100	92	84

Tmax T2

In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 °F / 60 °C
15	18	17	16	15	14	12
20	24	23	21	20	18	17
25	30	28	27	25	23	21
30	35	33	32	30	28	26
35	40	39	37	35	33	31
40	46	44	42	40	38	35
50	56	54	52	50	48	45
60	71	68	64	60	56	51
70	83	79	75	70	65	60
80	96	91	86	80	74	67
90	109	103	97	90	83	75
100	115	110	105	100	95	89

Tmax T3

In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 °F / 60 °C
60	70	67	64	60	56	52
70	82	78	74	70	66	61
80	92	88	84	80	75	71
90	104	100	95	90	85	79
100	117	112	106	100	94	87
125	145	139	132	125	118	110
150	175	167	159	150	141	131
175	205	195	185	175	164	152
200	236	224	213	200	187	172
225	264	251	239	225	211	195

Tmax T4

In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 °F / 60 °C
20	24	22	21	20	19	17
25	30	28	27	25	23	21
40	47	44	42	40	37	34
50	59	56	53	50	47	43
80	94	90	85	80	75	68
100	118	112	106	100	95	85
125	148	140	133	125	119	106
150	177	168	159	150	143	127
200	236	224	212	200	190	170
250	266	252	239	225	214	191

Tmax T5 400/600

In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 °F / 60 °C
300	241…345	230…328	220…314	210…300	200…286	187…267
400	325…465	310…442	295…420	280…400	265…380	250…355
600	483…690	459…656	440…628	420…600	400…572	374…534

Isomax S6

In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 °F / 60 °C
600	483…690	459…656	440…628	420…600	400…572	374…534
800	685…965	640…900	605…855	560…800	520…740	470…670

Power losses

Type	Trip unit	In [A]	P [W/pole]
T1 - T1B 1p	TMF	15	1.3
		20	1.3
		25	2.0
		30	1.8
		40	2.6
		50	3.7
		60	3.9
		70	5.3
		80	4.8
		90	6.1
		100	6.8
T2	TMF	15	1.0
		20	1.7
		25	1.6
		30	2.4
		35	3.0
		40	2.8
		50	3.2
		60	4.6
		70	4.7
		80	5.4
		90	6.9
		100	7.7
	ELT	10	0.5
		25	1.0
		63	3.5
		100	8.0
T3	TMF	60	3.9
		70	4.2
		80	4.8
		90	5.0
		100	5.3
		125	6.6
		150	7.4
		175	11.6
		200	13.2
		225	15.0
T4	TMF	15	3.6
		20	3.6
	TMD	30	3.6
		40	3.8
		50	3.9
	TMA	80	4.6
		100	5.2
		125	5.7
		150	6.9
		200	9.9
		250	13.7
	ELT	100	1.7
		150	3.9
		200	10.7
T5	TMA	300	12.3
		400	19.5
		600	40.1
	ELT	300	9.3
		400	16.5
		600	37.1

4

Type	Trip unit	In [A]	P [W/pole]
S6	TMD	600	27.8
		800	31.0
	ELT	600	27.2
		800	32.0
S7	ELT	1200	49.2
S8	ELT	1600	42.7
		2000	67.2
		2500	101.7

Wiring diagrams

Index

Wiring diagrams

Tmax T1...T5

Isomax S6, S7 and S8

Wiring diagrams

Graphic symbols (IEC 60617 and CEI 3-14...3-26 Standards)

Thermal effect	Connection of conductors	Position switch (limit switch), break contact	Differential current relay
Electromagnetic effect	Terminal	Position switch (limit switch) change-over break before make contact	Phase-failure detection relay in a three-phase system
Delay	Plug and socket (male and female)	Contactor (contact open in the unoperated position)	Locked-rotor detection relay operating by current sensing
Mechanical connection (link)	Resistor (general symbol)	Circuit breaker disconnector with automatic release	Lamp, general symbol
Manually operated control (general case)	Temperature dependent resistor	Switch-disconnector (on-load isolating switch)	Mechanical interlock between two devices
Operated by turning	Motor (general symbol)	Operating device (general symbol)	Operated by electric motor
Operated by pushing	Induction motor, three-phase, squirrel cage	Thermal relay	Motor with series energization
Operated by key	Current transformer	Instantaneous overcurrent or rate-of-rise relay	
Operated by cam	Current transformer with four threaded winding and with one permanent winding with one tapping	Overcurrent relay with adjustable short time-lag characteristic	
Hearth, groung (general symbol)	Make contact	Overcurrent relay with inverse short time-lag characteristic	
Converter with galvanic separator	Break contact	Overcurrent relay with inverse long time-lag characteristic	
Conductors in a screened cable, two conductors shown	Change-over break before make contact	Earth fault overcurrent relay with inverse short time-lag characteristic	
Twisted conductors, two conductors shown	Position switch (limit switch), make contact	Phase-balance current relay	

Wiring diagrams

Information for reading – Tmax T1…T5

State of operation represented

The diagram is shown in the following conditions:
- fixed, plug-in or draw out version circuit breaker (depending on type of circuit breaker), open and racked-in
- contactor for motor starting open
- circuits de-energized
- releases not tripped
- motor operator with springs charged (for T4 and T5).

Version

The diagram shows a circuit breaker or MCS in the plug-in version (only T2, T3, T4 and T5), but is also valid for the fixed and draw out version circuit breakers or MCS.
With the fixed version circuit breakers or MCS, the applications indicated in figures 26-27-28-29-30-31 and 32 cannot be provided.

Caption

□	=	Figure number of the diagram
*	=	See note indicated by the letter
A1	=	Circuit breaker applications
A11	=	FDU unit (front display)
A12	=	AUX-E type auxiliary contacts, with auxiliary relays for electrical signalling of circuit breaker open and circuit breaker tripped
A13	=	PR021/K type signalling unit, with auxiliary relays for electrical signalling of the protection functions of electronic trip unit
A15	=	PR212/CI type contactor control unit for motor starting
A2	=	Applications of the solenoid operator or motor operator
A3	=	Applications of the RC221 or RC222 type residual current release
A4	=	Indication apparatus and connections for control and signalling, outside the circuit breaker
D	=	Electronic time-delay device of the undervoltage release (outside the circuit breaker)
H, H1	=	Signalling lamps
K	=	Contactor for motor starting
K51	=	Electronic trip unit: – PR221DS trip unit, with the following protection functions: - L against overload with inverse long time delay - S against short-circuit with inverse short time delay - I against short-circuit with tempo of instantaneous trip – PR222DS/P or PR222DS/PD-A trip unit, with the following protection functions: - L against overload with inverse long time delay - S against short-circuit with inverse or definite short time delay - I against short-circuit with instantaneous trip time - G against earth fault with short time trip
M	=	Motor for circuit breaker opening and circuit breaker closing spring charging
M1	=	Three-phase asynchronous motor
Q	=	Main circuit breaker
Q/1…3	=	Auxiliary circuit breaker contacts
R	=	Resistor (see note F)
S1, S2	=	Contacts controlled by the cam of the motor operator
S3	=	Contact controlled by the key lock of the solenoid operator or motor operator
S4/1-2	=	Contacts activated by the circuit breaker rotary handle (see note C)
K51/1…8	=	Contacts for electrical signalling of the protection functions of the electronic trip unit
S51/S	=	Contact for electrical signalling of overload in progress
S75I/1…3	=	Contacts for electrical signalling of circuit breaker in racked-in position (only provided with circuit breakers in plug-in version)
S751S/1…3	=	Contacts for electrical signalling of circuit breaker in racked-out position (only provided with circuit breakers in plug-in version)

Wiring diagrams

Information for reading – Tmax T1…T5

S87/1 = Contact for electrical signalling of RC222 type residual current release pre-alarm
S87/2 = Contact for electrical signalling of RC222 type residual current release alarm
S87/3 = Contact for electrical signalling of circuit breaker open due to RC221 or RC222 type residual current release trip
SC = Pushbutton or contact for closing the circuit breaker
SC3 = Pushbutton for motor starting
SO = Pushbutton or contact for opening the circuit breaker
SO3 = Pushbutton for stopping the motor
SQ = Contact for electrical signalling of circuit breaker open
SY = Contact (bell alarm) for electrical signalling of circuit breaker open due to YO, YO1, YO2 or YU thermomagnetic trip unit intervention (tripped position)
TI = Toroidal current transformer
TI/L1 = Current transformer placed on phase L1
TI/L2 = Current transformer placed on phase L2
TI/L3 = Current transformer placed on phase L3
TI/N = Current transformer placed on the neutral
W1 = Serial interface with the control system (EIA RS485 interface. See note D)
X1,X2,X5…X9 = Connectors for the circuit breaker auxiliary circuits (in the case of circuit breakers in plug-in version, removal of the connectors takes place simultaneously with that of the circuit breaker. See note E)
X11 = Back-up terminal box
X3,X4 = Connectors for the circuits of the electronic trip unit (in the case of circuit breakers in the plug-in version, removal of the connectors takes place simultaneously with that of the circuit breaker)
XA = Interfacing connector of the PR222DS/P or PR222DS/PD-A trip unit
XA1 = Three-way connector for YO/YU (see note E)
XA10 = Three-way connector for solenoid operator
XA2 = Twelve-way connector for auxiliary contacts (see note E)
XA5 = Three-way connector for contact of electrical signalling of circuit breaker open due to trip of the RC221 or RC222 type residual current release (see note E)
XA6 = Three-way connector for contact of electrical signalling of circuit breaker open due to trip of the overcurrent release (see note E)
XA7 = Six-way connector for auxiliary contacts (see note E)
XA8 = Six-way connector for contacts operated by the rotary handle or for the motor operator (see note E)
XA9 = Six-way connector for the electrical signalling of RC222 type residual current release pre-alarm and alarm and for opening by means of the release itself (see note E)
XB,XC,XE = Interfacing connectors of the AUX-E unit
XD = Interfacing connector of the FDU unit
X0 = Connector for the YO1 trip coil
X01 = Connector for the YO2 trip coil
XV = Terminal boxes of the applications
YC = Shunt closing release of the solenoid operator or motor operator
YO = Shunt trip
YO1 = Shunt trip coil of the electronic trip unit
YO2 = Shunt trip coil of the RC221 or RC222 type residual current release
YO3 = Shunt trip of the solenoid operator
YU = Undervoltage release (see note B).

Description of figures

Fig. 1 = Shunt trip.
Fig. 2 = Permanent shunt trip.
Fig. 3 = Instantaneous undervoltage release (see note B and F).
Fig. 4 = Undervoltage release with electronic time-delay device outside the circuit breaker (see note B).
Fig. 5 = Instantaneous undervoltage release in version for machine tools with one contact in series (see note B, C, and F).
Fig. 6 = Instantaneous undervoltage release in version for machine tools with two contacts in series (see note B, C, and F).
Fig. 7 = One changeover contact for electrical signalling of circuit breaker open due to RC221 or RC222 type residual current release trip.
Fig. 8 = RC222 type residual current release.
Fig. 9 = Two electrical signalling contacts for RC222 type residual current release pre-alarm and alarm.
Fig. 10 = Solenoid operator.
Fig. 11 = Stored energy motor operator.
Fig. 12 = One changeover contact for electrical signalling of motor operator locked with key.
Fig. 21 = Three changeover contacts for electrical signalling of circuit breaker open or closed and one changeover contact for electrical signalling of circuit breaker open due to YO, YO1, YO2 and YU thermomagnetic trip unit intervention (tripped position).
Fig. 22 = One changeover contact for electrical signalling of circuit breaker open or closed and a changeover contact for electrical signalling of circuit breaker open due to YO, YO1, YO2 or YU thermomagnetic trip unit intervention (tripped position).
Fig. 23 = Two changeover contacts for electrical signalling of circuit breaker open or closed.
Fig. 24 = One changeover contact for electrical signalling of circuit breaker open due to trip unit intervention.
Fig. 25 = One contact for electrical signalling of circuit breaker open due to trip unit intervention.
Fig. 26 = First position of circuit breaker changeover contact, for electrical signalling of racked-in.
Fig. 27 = Second position of circuit breaker changeover contact, for electrical signalling of racked-in.
Fig. 28 = Third position of circuit breaker changeover contact, for electrical signalling of racked-in.
Fig. 29 = First position of circuit breaker changeover contact, for electrical signalling of isolated.
Fig. 30 = Second position of circuit breaker changeover contact, for electrical signalling of isolated.
Fig. 31 = Third position of circuit breaker changeover contact, for electrical signalling of isolated.
Fig. 32 = Circuit of the current transformer on neutral conductor outside the circuit breaker (for plug-in version circuit breaker).
Fig. 41 = Auxiliary circuits of the PR222DS/P electronic trip unit connected with FDU front display unit.

Wiring diagrams

Information for reading – Tmax T1…T5

Incompatibility

The circuits indicated by the following figures cannot be supplied at the same time on the same circuit breaker:
1 - 2 - 3 - 4 - 5 - 6
5 - 6 - 11
10 - 11
10 - 12
21 - 22 - 23
24 - 25
26 - 32

Notes

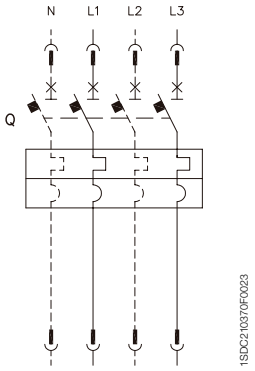
A) The circuit breaker is supplied fitted with the applications specified in the ABB order confirmation.
B) The undervoltage release is supplied for power supply branched on the supply side of the circuit breaker or from an independent source: circuit breaker closing is only allowed with the release energised (the lock on closing is made mechanically).
C) The S4/1 and S4/2 contacts shown in figures 5-6 open the circuit with the circuit breaker open and close it again when a manual closing command is given by means of the rotary handle, in accordance with the Standards regarding machine tools (in any case, closing does not take place if the undervoltage release is not supplied).
D) For connection of the EIA RS485 serial line, see the following documentation:
– ITSCE-RH0199 for MODBUS communication.
E) Connectors XA1, XA2, XA5, XA6, XA7, XA8 and XA9 are supplied on request. They are always supplied with T2 and T3 circuit breakers in the plug-in version.
Connectors X1, X2, X5, X6, X7, X8 and X9 are supplied on request. They are always supplied with circuit breakers in the plug-in version and with T4 and T5 circuit breakers in the fixed version.
F) Additional external resistor for undervoltage release supplied at 250 V DC, 380/440 V AC and 480/500 V AC.
G) In the case of fixed version circuit breaker with current transformer on external neutral conductor outside the circuit breaker, when the circuit breaker is to be removed, it is necessary to short-circuit the terminals of the TI/N transformer.
H) With MOS 110…250 V AC, only use MOS-A for 200 V ≤ Un ≤ 250 V.
I) SQ and SY are opto-insulated contacts.

Wiring diagrams

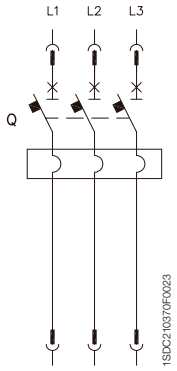
Circuit diagram – Tmax T1…T5

Tmax T1…T5

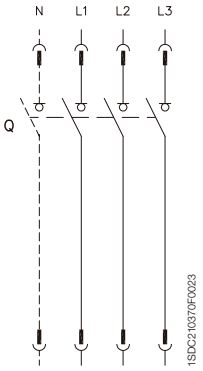
State of operation



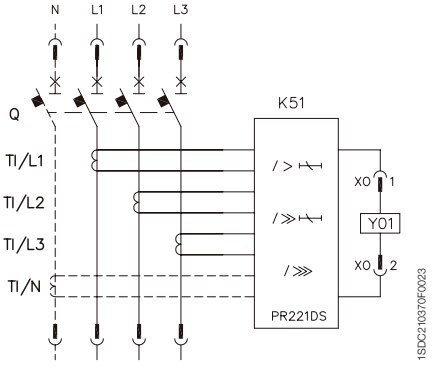
Two pole, three-pole or four-pole circuit breaker with thermomagnetic trip unit



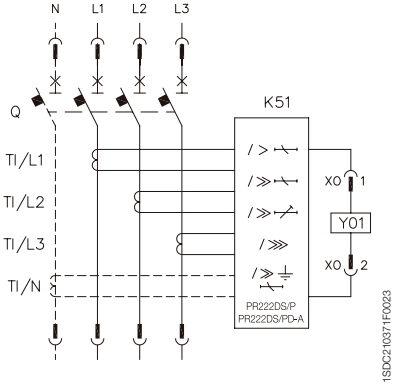
Three-pole circuit breaker with magnetic trip unit



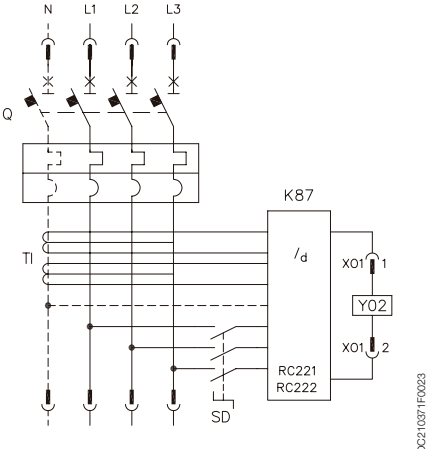
Three-pole or four-pole MCS (on-load isolating switch)



Three-pole or four-pole circuit breaker with PR222DS electronic trip unit



Three-pole or four-pole circuit breaker with PR222DS/P or PR222DS/PD-A electronic trip unit



Three-pole or four-pole circuit breaker with RC221 or RC222 residual current release

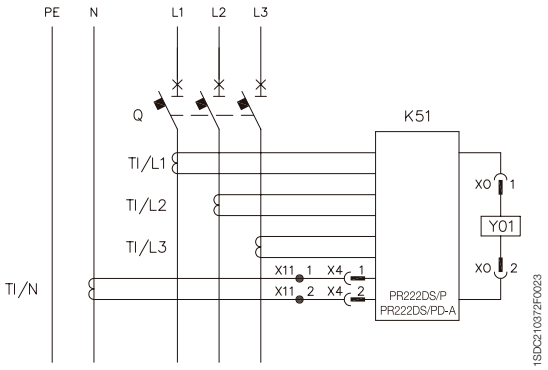
5

Wiring diagrams

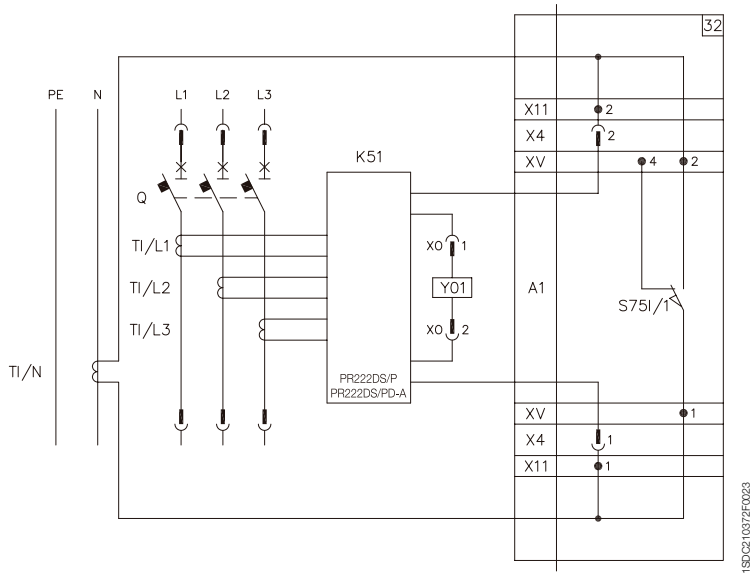
Circuit diagram – Tmax T1…T5

Tmax T1…T5

*c)



Fixed version three-pole circuit breaker with current transformer on neutral conductor, external to circuit breaker



Plug-in or draw out version three-pole circuit breaker with current transformer on neutral conductor, external to circuit breaker

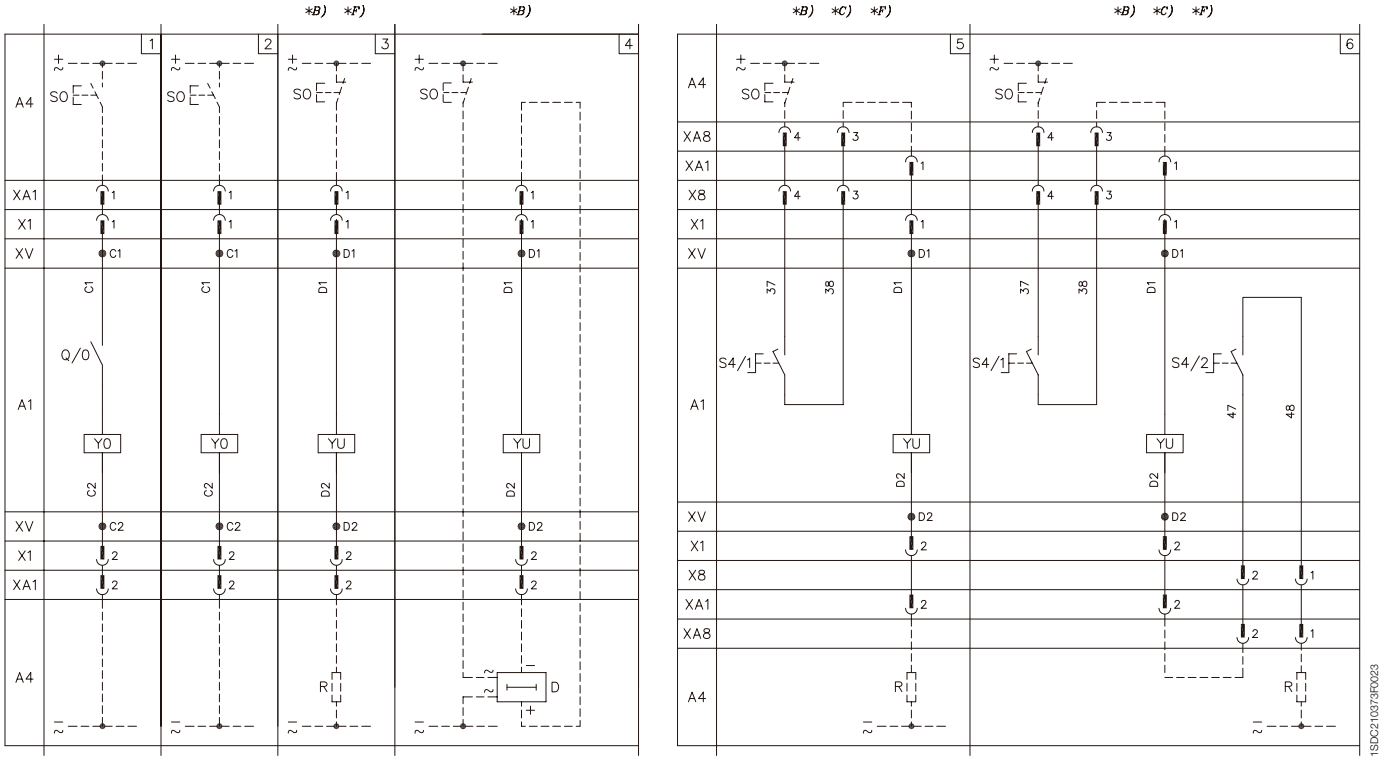
5

Wiring diagrams

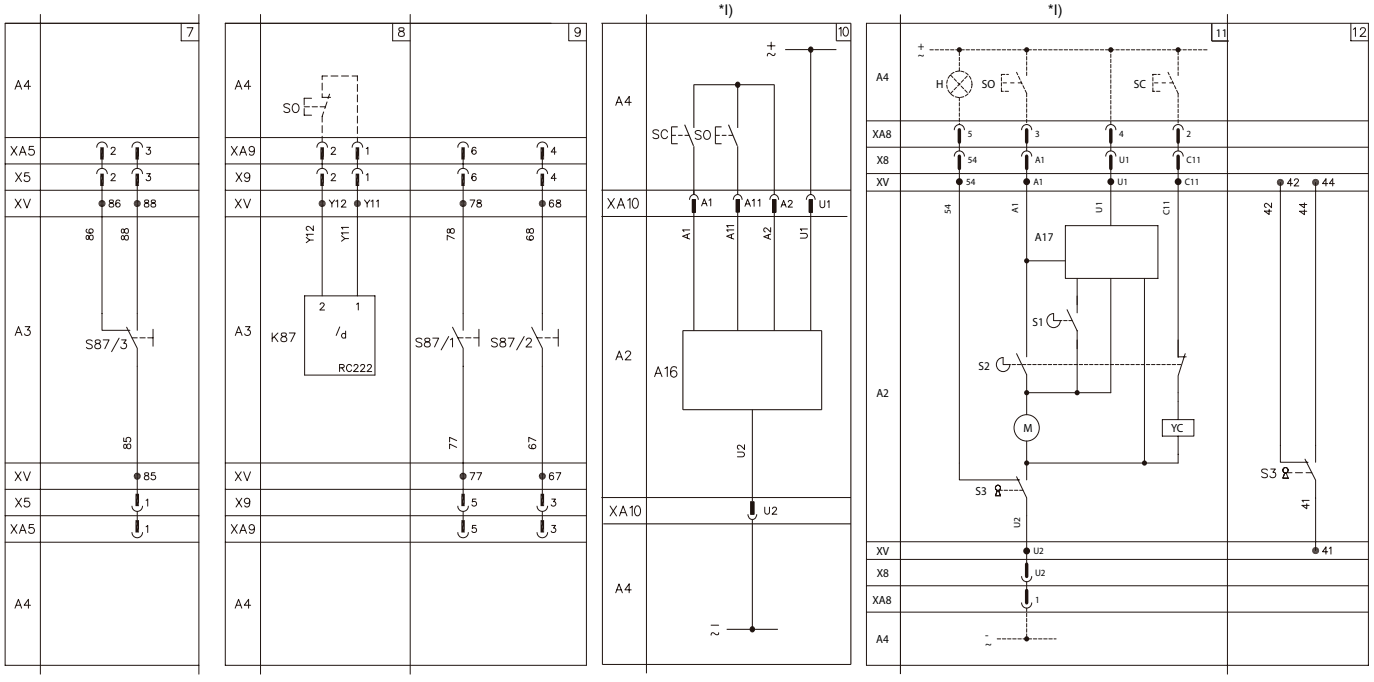
Electrical accessories – Tmax T1…T5

Tmax T1…T5

Shunt opening and undervoltage releases



Residual current releases and remote controls



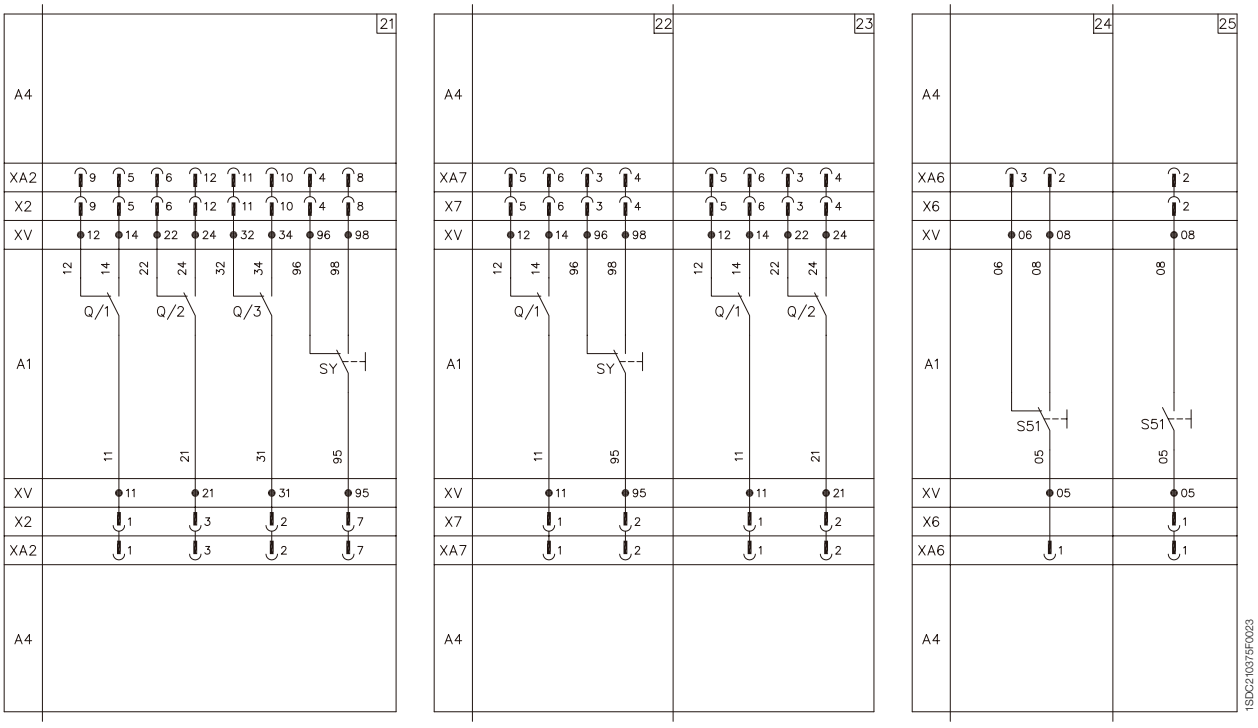
5

Wiring diagrams

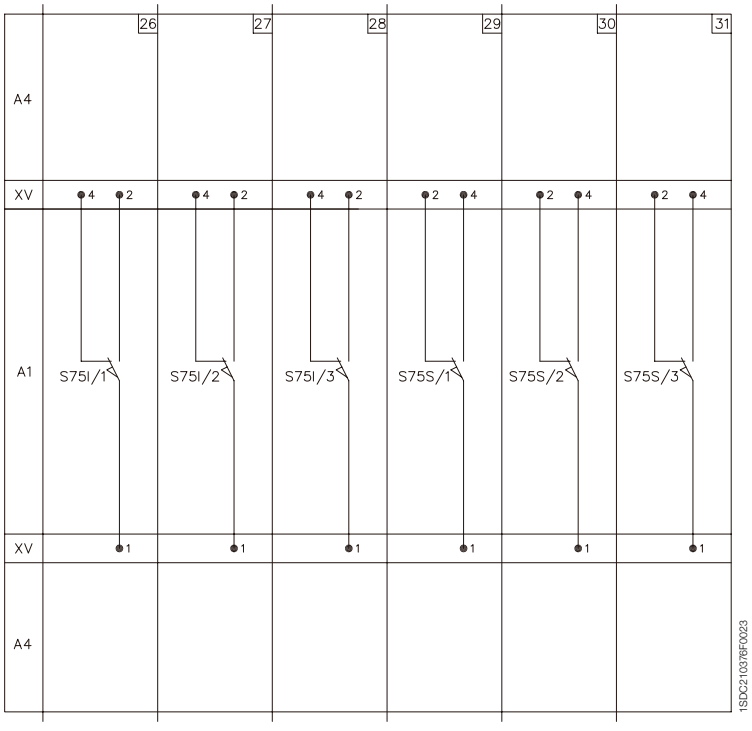
Electrical accessories – Tmax T1…T5

Tmax T1…T5

Auxiliary contacts



Position contacts



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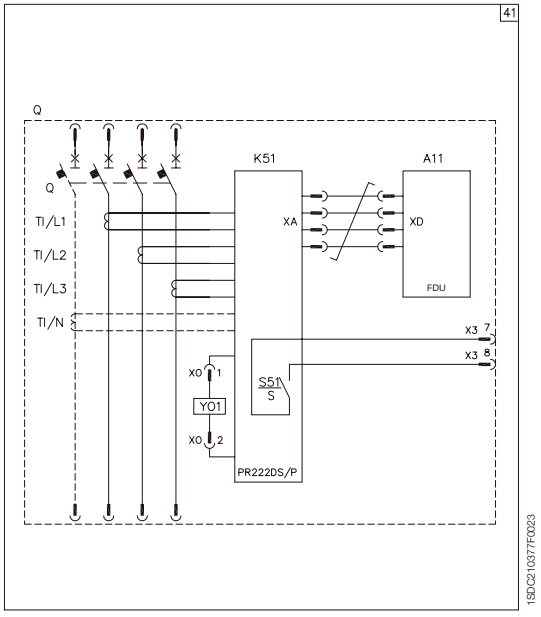
PR222DS/P electronic trip unit connected with the FDU front display unit



5

Wiring diagrams

Information for reading – Isomax S6, S7 and S8

State of the operation represented

The circuit is shown in the following conditions:
- fixed, plug in or draw out circuit breaker (depending on type of circuit breaker), open and racked in
- circuits de-energized
- releases not tripped
- motor operator with springs loaded (for S6-S7 circuit breakers).

Versions

The diagram indicates a circuit breaker or a MCS in draw out version but it may be applied to circuit breaker or a MCS in the fixed version too.
Circuits given in figures 21-22-23-24-25-31-32-33-34-35 cannot be supplied with circuit breaker or MCS in fixed version.

Caption

□	=	Reference number of diagram figure
*	=	See note indicated by the letter
A1	=	Circuit breaker accessories
A2	=	Motor operator accessories
A4	=	Indicative devices and connections for control and signallings, external to the circuit breaker
A11	=	Dialogue unit type PR212/D-L or PR212/D-M, for connection with a central control system
A12	=	Actuating unit type PR212/T, with auxiliary relays for the execution of dialogue unit controls
A12/KC	=	Closing control of the actuating unit
A12/KO	=	Opening control of the actuating unit
A13	=	Signalling unit type PR021/K, with auxiliary relays for electrical indication of the electronic trip unit protective functions
D	=	Solid-state time-delaying device for undervoltage release (external to the circuit breaker)
H1	=	Signalling lamp
K51	=	Electronic trip unit: – PR211/P trip unit, with the following protective functions: - L against overload with inverse long time-delay trip - I against short-circuit with instantaneous trip – PR212/P trip unit, with the following protective functions: - L against overload with inverse long time-delay trip - S against short-circuit with inverse or definite short time-delay trip - I against short-circuit with instantaneous trip - G against earth fault with inverse short time-delay trip
K51/1…B	=	Contacts for electrical indication of the electronic trip unit protective functions
K51/YO1	=	Alarm indication of YO1 release tripped (bell alarm) for overcurrent and for “trip test”
KO	=	Opening relay and spring charging device with a slay put make contact disengaged by a cam of the motor operating mechanism when the circuit breaker reaches the open position and the closing springs are charged
M	=	Motor for the circuit breaker opening and for the closing springs charging
M1	=	Induction motor
Q	=	Main circuit breaker
Q/O…2	=	Circuit breaker auxiliary contacts
R1	=	Thermistor
S1	=	Contact operated by the cam of the motor operating mechanism: it closes when the circuit breaker is in closed position and it opens when the circuit breaker is in open position (it does not switch when the circuit breaker is in tripped position)
S2	=	Contact operated by the cam of the motor operating mechanism: it opens when the circuit breaker is in closed position and it closes when the circuit breaker is in open position (it does not switch when the circuit breaker is in tripped position). The contact is also operated by the key lock device (if provided)
S3	=	Contact operated by the cam of the motor operating mechanism: it opens after closing of contact KO and it closes when the circuit breaker is in open position (it does not switch when the circuit breaker is in tripped position

S75I/1…5 = Contacts signalling circuit breaker in the connected position (provided with circuit breaker in draw out version only. See note D)
S75S/1…5 = Contacts signalling circuit breaker in the isolated position (provided with circuit breaker in draw out version only. See note D)
SC = Pushbutton or contact for circuit breaker closing
SC3 = Pushbutton for motor start
SO = Pushbutton or contact for circuit breaker opening
SO1,SO2 = Pushbutton or contact for circuit breaker opening
SO3 = Pushbutton for motor stop
SY = Contact signalling circuit breaker tripped through thermomagnetic, Y0, Y01, YU releases operation (bell alarm)
TI/L1 = Current transformer located on the phase L1
TI/L2 = Current transformer located on the phase L2
TI/L3 = Current transformer located on the phase L3
TI/N = Current transformer located on neutral
W1 = Serial interface with the remote supervision and control system (see note E)
X1, X2 = Connectors for the circuit breaker auxiliary circuits
X3, X4 = Connectors for the electronic trip unit circuits (in case of circuit breaker in draw out plug-in version the racking-out of the connectors occur simultaneoustly with the one of the circuit breaker)
X5, X6 = Delivery terminal boards for the electronic trip unit circuits
XO = Connector for opening solenoid YO1
XV = Terminal boards of the accessories
YC = Closing coil
YO = Shunt trip
YO1 = Shunt trip of electronic trip unit
YU = Undervoltage release (see note B).

Description of figures

Fig. 1 = Shunt trip
Fig. 4 = Instantaneous undervoltage release (see note B)
Fig. 6 = Undervoltage release with solid-state time-delaying device external to the circuit breaker (see note B)
Fig. 8 = Stored energy motor operator
Fig. 11 = Two change-over contacts signalling circuit breaker on/off
Fig. 12 = One change-over contact signalling circuit breaker on/off and one change-over contact signalling circuit breaker tripped through thermomagnetic YO, YO1, YU releases operation (bell alarm)
Fig. 13 = One contact for electrical signalling of circuit breaker on, one contact for electrical signalling of circuit breaker off and one contact for electrical signalling of circuit breaker not tripped through thermomagnetic, YO, YO1, YU releases operation (not tripped position) to be used for example, for the accept contact reported in fig. 8
Fig. 21 = First circuit breaker position contact, signalling the connected position (see note D)
Fig. 22 = Second circuit breaker position contact, signalling the connected position (see note D)
Fig. 23 = Third circuit breaker position contact, signalling the connected position (see note D)
Fig. 24 = Fourth circuit breaker position contact, signalling the connected position (see note D)
Fig. 25 = Fifth circuit breaker position contact, signalling the connected position (see note D)
Fig. 31 = First circuit breaker position contact, signalling the isolated position (see note D)
Fig. 32 = Second circuit breaker position contact, signalling the isolated position (see note D)
Fig. 33 = Third circuit breaker position contact, signalling the isolated position (see note D)
Fig. 34 = Fourth circuit breaker position contact, signalling the isolated position (see note D)
Fig. 35 = Fifth circuit breaker position contact, signalling the isolated position (see note D)
Fig. 41 = Contact signalling YO1 releases operated (for electrical characteristics of the contact see note G)
Fig. 48 = Auxiliary circuits of the electronic trip unit PR212/P connected to the dialogue unit type PR212/D-L or PR212/D-M and to the actuating unit type PR212/T
Fig. 49 = Auxiliary circuits of the electronic trip unit PR212/P connected to the dialogue unit type PR212/D-L or PR212/D-M, to signalling unit type PR021/K and to the actuating unit type PR212/T
Fig. 50 = Auxiliary circuits of the electronic trip unit PR212/P connected to signalling unit type PR021/K.

Note: figures are always valid for S6 and S7; figures 1, 4, 41, 48, 49 and 50 are also valid for S8.

Wiring diagrams

Information for reading – Isomax S6, S7 and S8

Incompatibility

The combinations of circuits given in the figures below are not possible on the same circuit breaker:
1 - 4 - 6
11 - 12 - 13
21 - 31
22 - 32
23 - 33
24 - 34
25 - 35
48 - 49 - 50

Notes

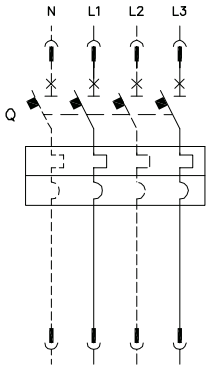
A) Circuit breaker is supplied complete with the accessories listed in the ABB order acknowledgement only.
B) Undervoltage release is suitable for circuit breaker supply side feeding or for feeding from an independent source: circuit breaker closes only if the undervoltage release is energized (lock on closing is achieved mechanically)
D) Circuit breaker can be equipped with S75I and S75S position contact, in whatever combination, with a maximum of 5 total contacts
E) To connect the serial communication line to the remote supervision and control system, see following documentation:
   – ITSCE-RH0298.001 for Modbus
   – ITSCE-RH0297.001 for Lon
F) In case of circuit breaker in fixed version with current transformer on external conductor, in order to remove the circuit breaker it is necessary to short-circuit the terminals of TI/N current transformer
G) Contact signalling electronic trip unit operated (see fig. 41) has the following electrical characteristics:
   – rated voltage = 24 V
   – breaking capacity (resistive load) = 3 W/VA
   – maximum current interrupted = 0.5 A.

Wiring diagrams

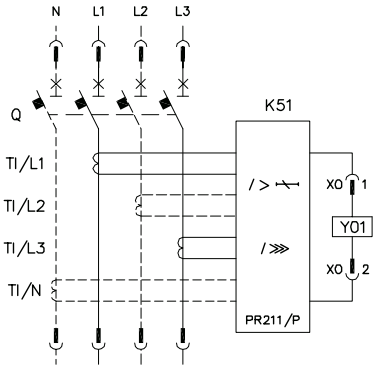
Circuit diagrams – Isomax S6, S7 and S8

Isomax S6-S7-S8

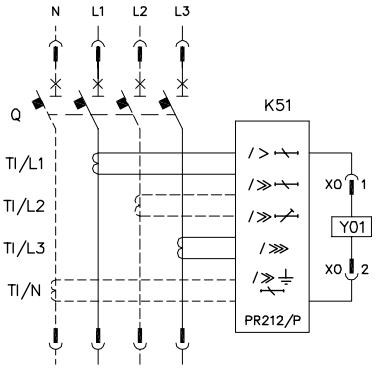
State of operation



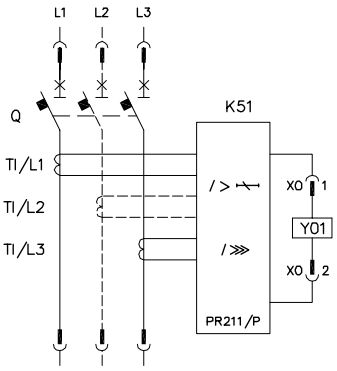
Two-pole, three-pole or four-pole S6 circuit breaker with thermomagnetic trip unit



Two-pole, three-pole or four-pole S6-S7 circuit breaker with PR211/P electronic trip unit

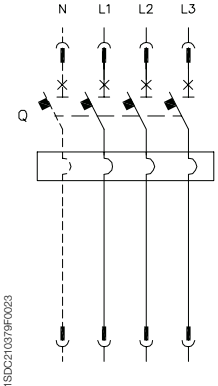


Two-pole, three-pole or four-pole S6-S7 circuit breaker with PR212/P electronic trip unit

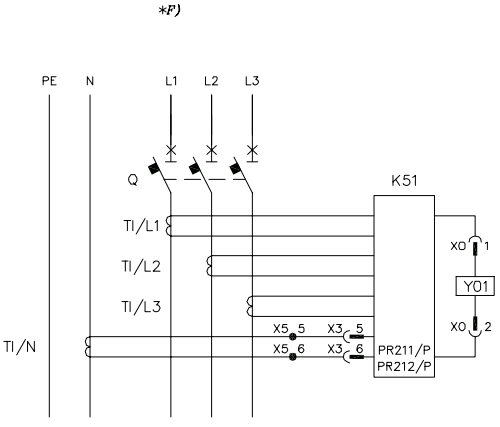


S6-S7-S8 MCP three-pole, with PR211/P (I) trip unit

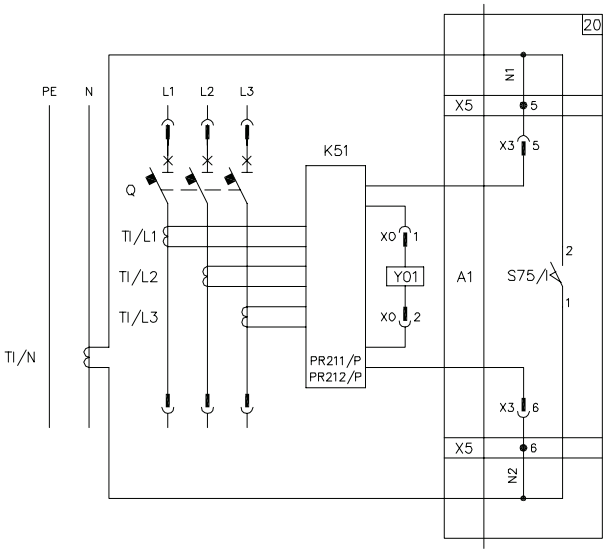
1SDC210378F0023



S6-S7-S8 MCS three-pole and four-pole



Fixed version three-pole S6-S7-S8 circuit breaker with current transformer on neutral conductor, external to circuit breaker



Draw out version three-pole S6-S7 circuit breaker with current transformer on neutral conductor, external to circuit breaker

1SDC210379F0023

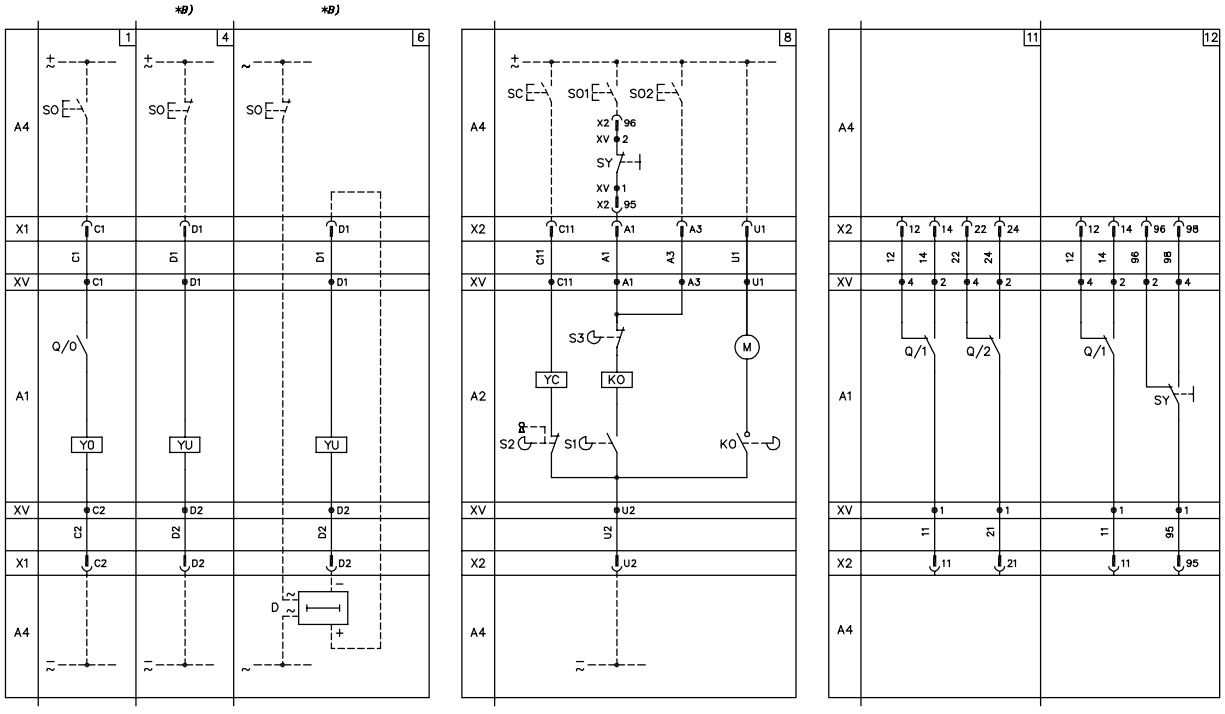
5

Wiring diagrams

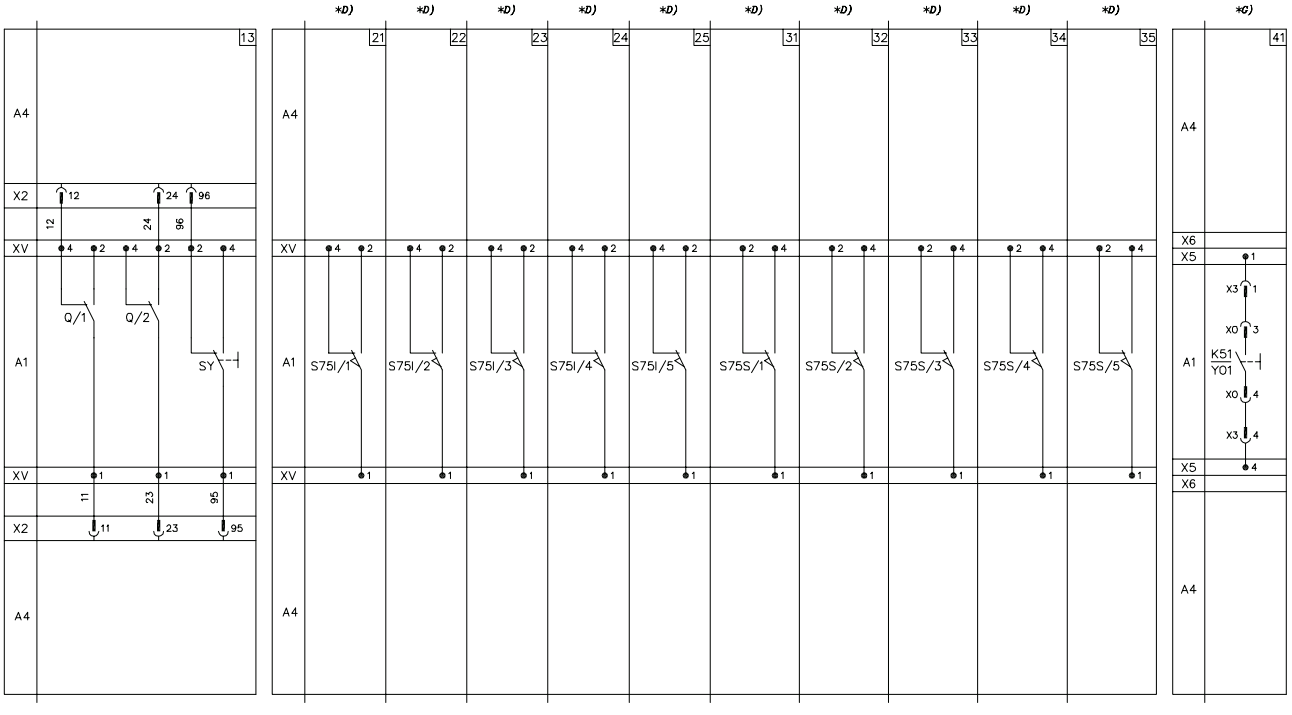
Electrical accessories – Isomax S6, S7 and S8

Isomax S6-S7-S8

Service releases, stored energy motor operator and auxiliary contacts

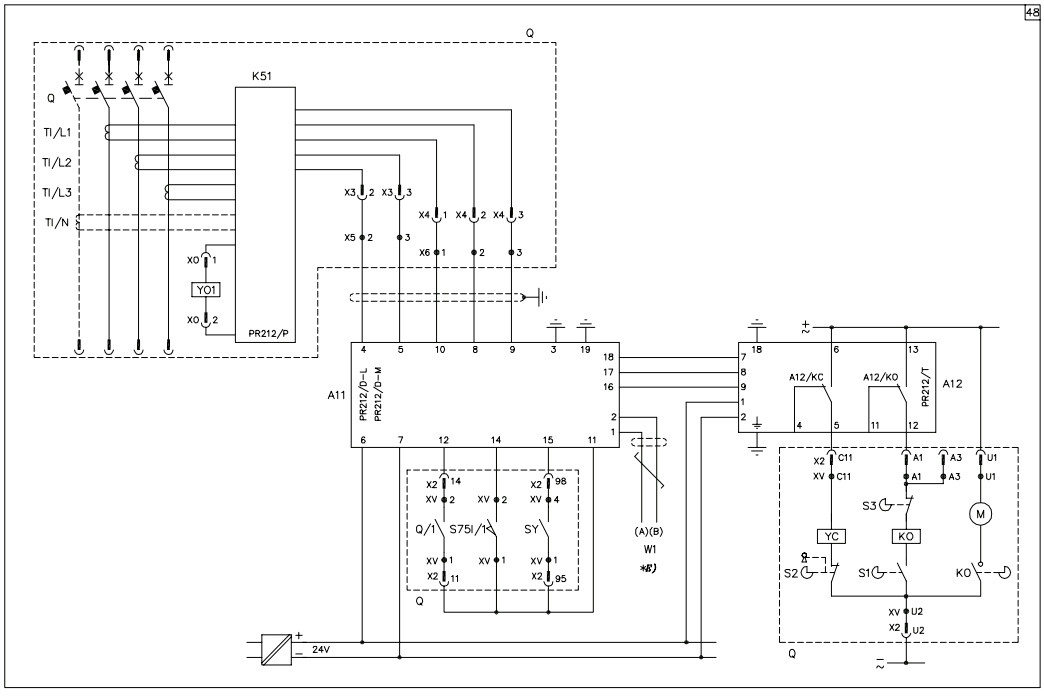


Auxiliary contacts

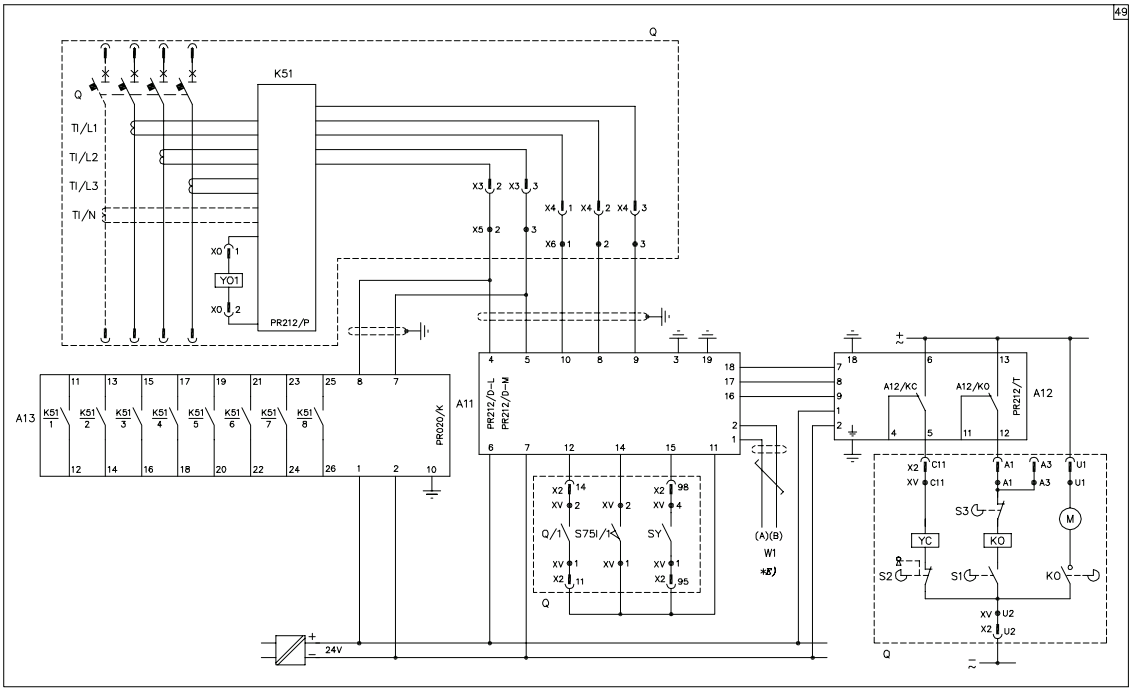


5

PR212/P trip unit connected to the dialogue unit PR212/D and actuator unit PR212/T



PR212/P trip unit connected to the dialogue unit PR212/D signalling unit PR021/K and actuator unit PR212/T



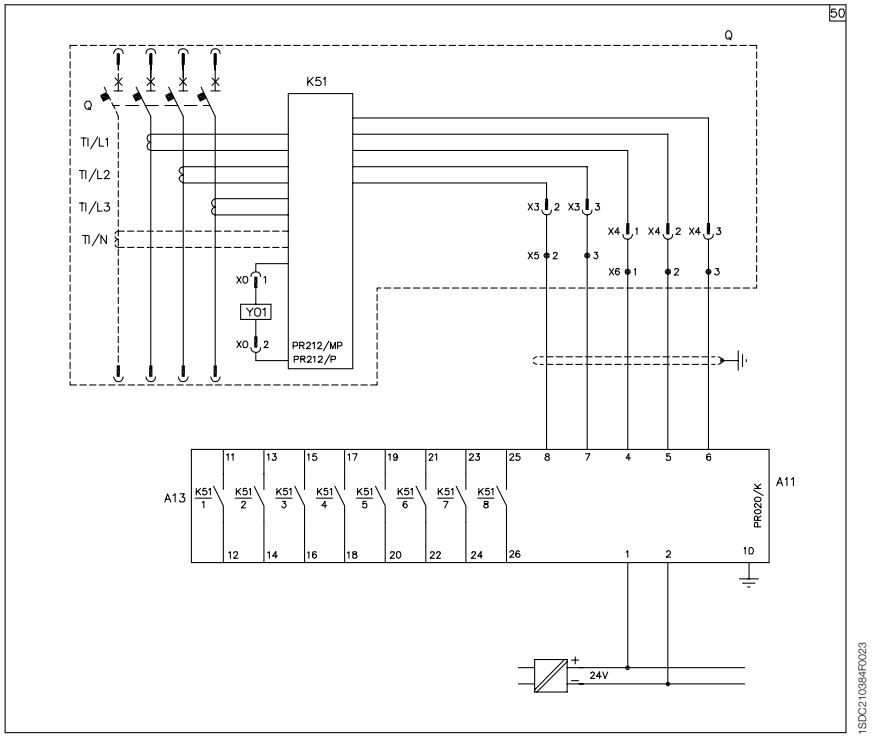
5

Wiring diagrams

Electrical accessories – Isomax S6, S7 and S8

Isomax S6-S7-S8

PR212/P trip unit connected to the signalling unit PR021/K



5

Overall dimensions

Index

Overall dimensions

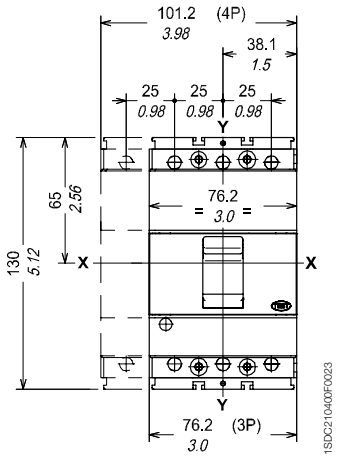
Overall dimensions

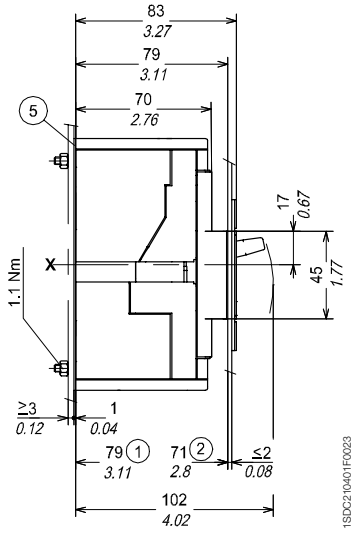
Tmax T1 and single-pole Tmax T1

Fixed circuit breaker

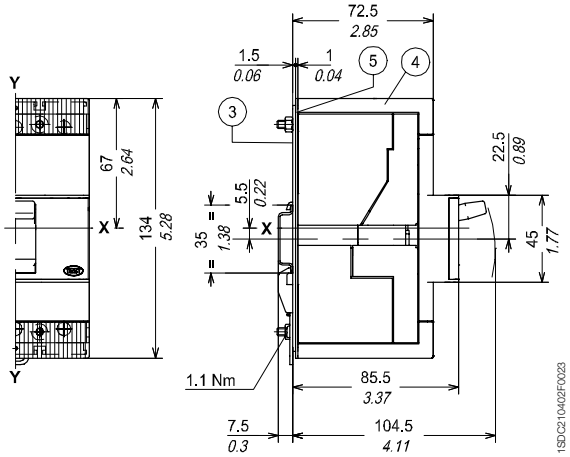
[mm/*in*]

Fixing on sheet

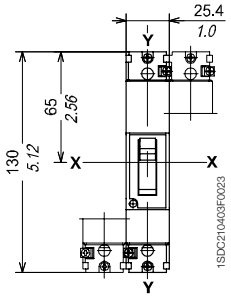




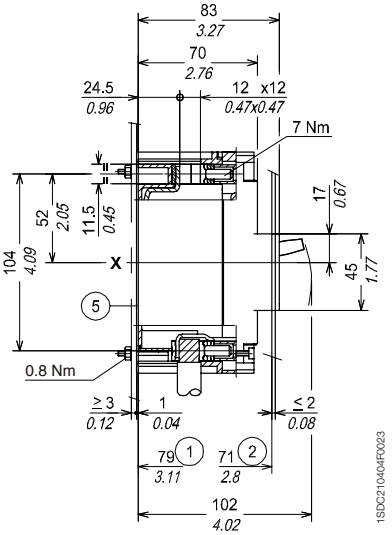
Fixing on DIN EN 50022 rail



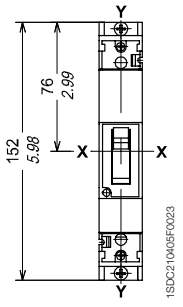
Without inserts



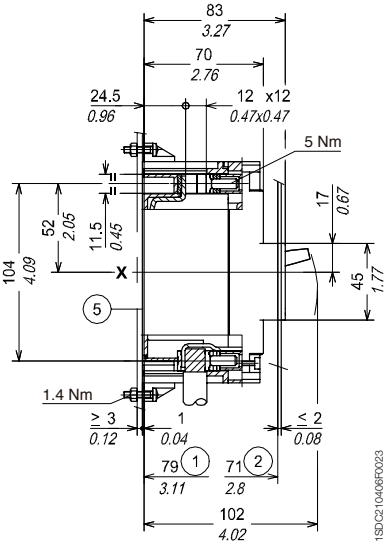
T1 1P (SINGLE-POLE)



With inserts



T1 1P (SINGLE-POLE)



Caption

(1) Depth of the switchboard in the case of circuit breaker with face not extending from the compartment door, with or without flange

(2) Depth of the switchboard in the case of circuit breaker with face extending from the compartment door, without flange

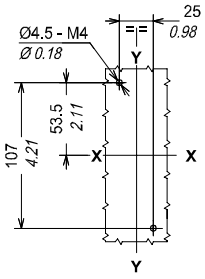
(3) Bracket for fixing onto rail

(4) Bottom terminal covers with IP40 degree of protection

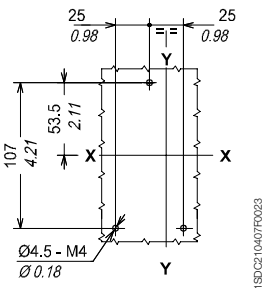
(5) Insulating plate

Drilling templates for support sheet

For front terminals

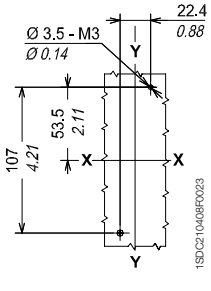


3 POLES

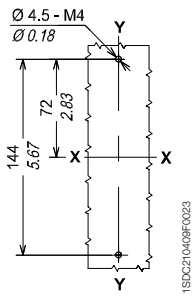


4 POLES

Without inserts



With inserts

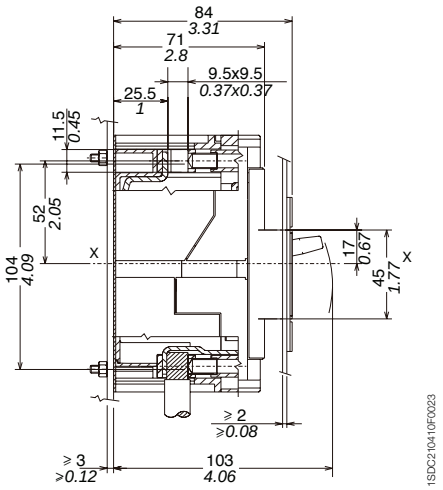


T1 1P (SINGLE-POLE)

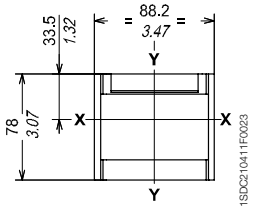
Terminals

[mm/*in*]

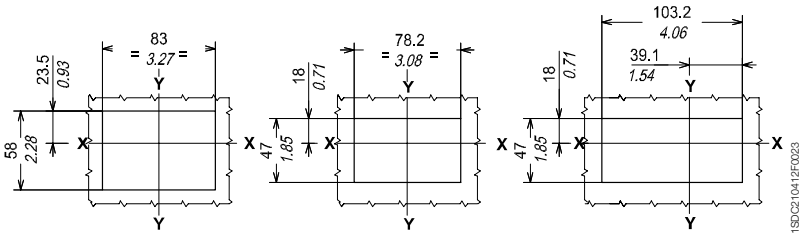
Front for copper/aluminium cables - FC CuAl



Flange for the compartment door



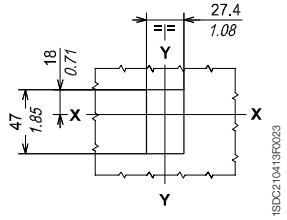
Drilling templates of the compartment door



With flange and circuit breaker face flush with door (3-4 POLES)

Without flange and circuit breaker face flush with door (3-4 POLES) or extending (3 POLES)

Without flange and circuit breaker face extending (4 POLES)



(SINGLE-POLE)

6

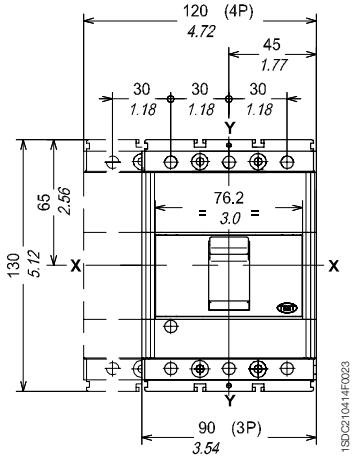
Overall dimensions

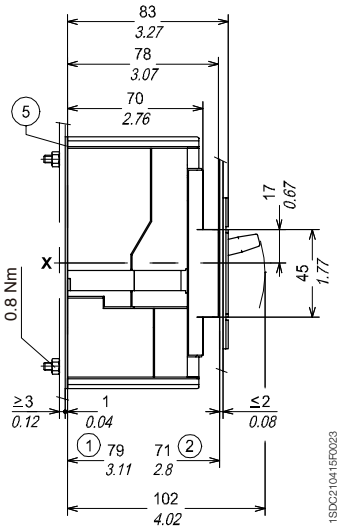
Tmax T2

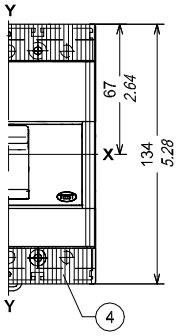
Fixed circuit breaker

[mm/*in*]

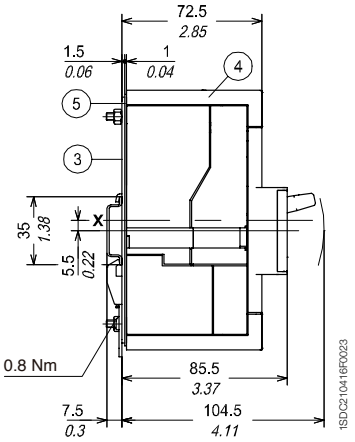
Fixing on sheet



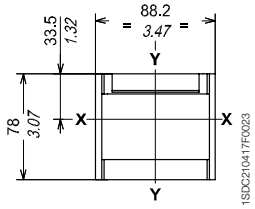




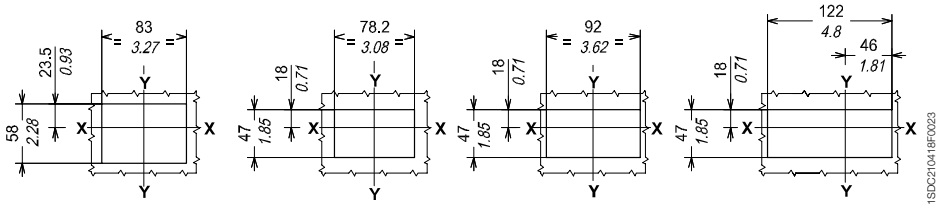
Fixing on DIN EN 50022 rail



Flange for the compartment door



Drilling templates of the compartment door



With flange and circuit breaker face flush with door (3-4 POLES)

Without flange and circuit breaker face flush with door (3-4 POLES)

Without flange and circuit breaker face extending (3 POLES)

Without flange and circuit breaker face extending (4 POLES)

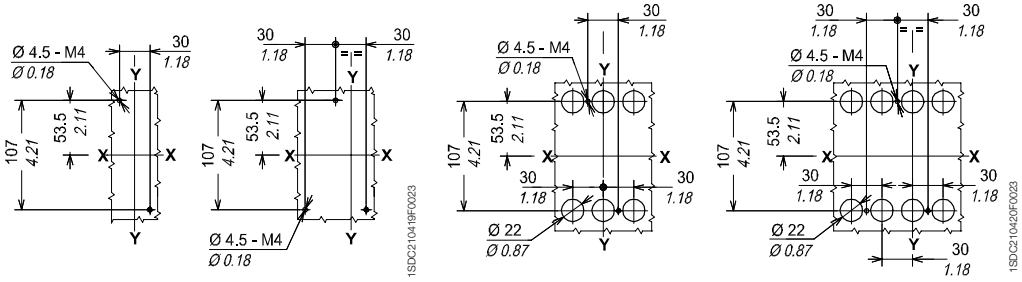
Caption

1. Depth of the switchboard in the case of circuit breaker with face not extending from the compartment door, with or without flange
2. Depth of the switchboard in the case of circuit breaker with face extending from the compartment door, without flange
3. Bracket for fixing onto rail
4. Low terminal covers with degree of protection IP40
5. Insulating plate

Drilling templates for support sheet

For front terminals

For rear terminals



3 POLES 4 POLES 3 POLES 4 POLES

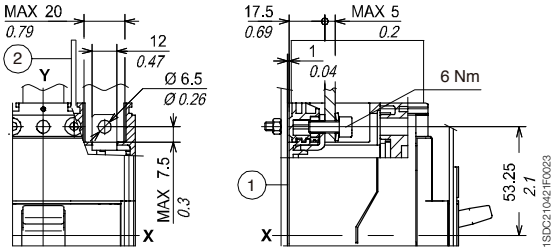
Terminals

[mm/*in*]

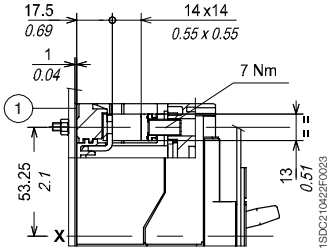
Front - F

Caption

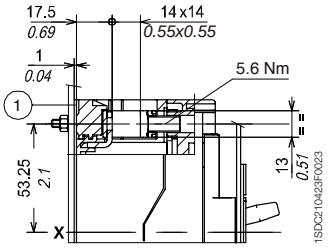
1. Insulating base plate (compulsory)
2. Insulating barriers between phases (compulsory)



Front for copper cables - FC Cu



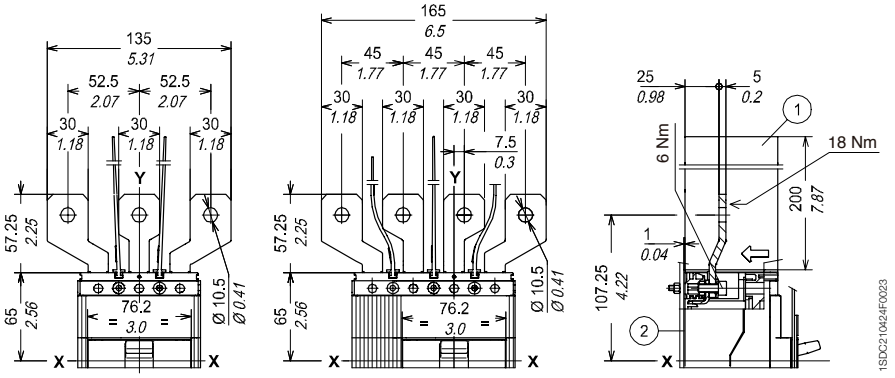
Front for copper/aluminium cables - FC CuAl 1/0 AWG/50 mm²



Caption

1. Insulating barriers between phases (compulsory)
2. Insulating plate

Front extended spread - ES



6

Overall dimensions

Tmax T2

Terminals

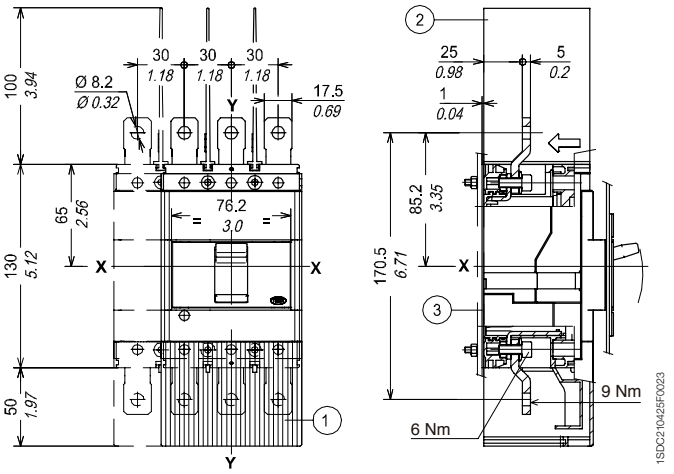
[mm/*in*]

Caption

(1) High terminal covers with degree of protection IP40

(2) Insulating barriers between phases (compulsory without 1)

Front extended - EF

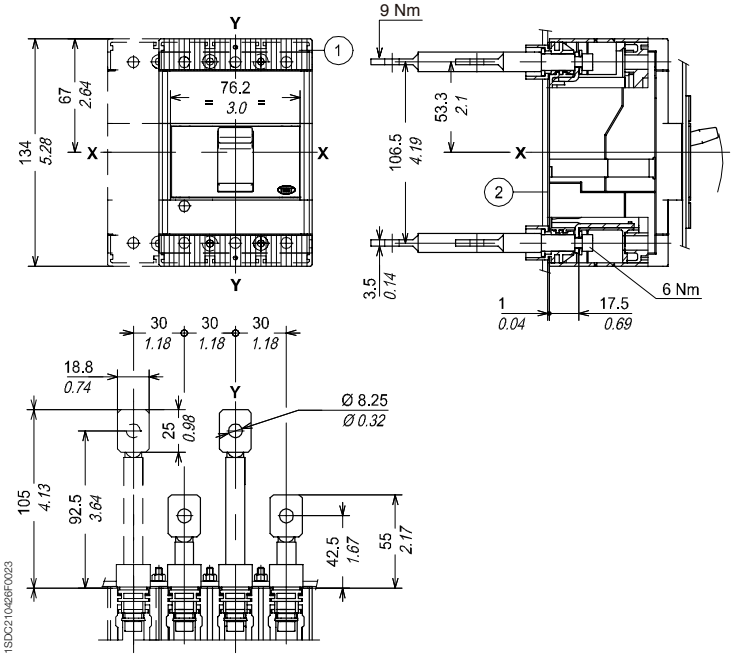


Caption

(1) Low terminal covers with degree of protection IP40

(2) Insulating barriers between phases

Rear - R



6

Plug-in

circuit breaker

[mm/*in*]

Fixing on sheet

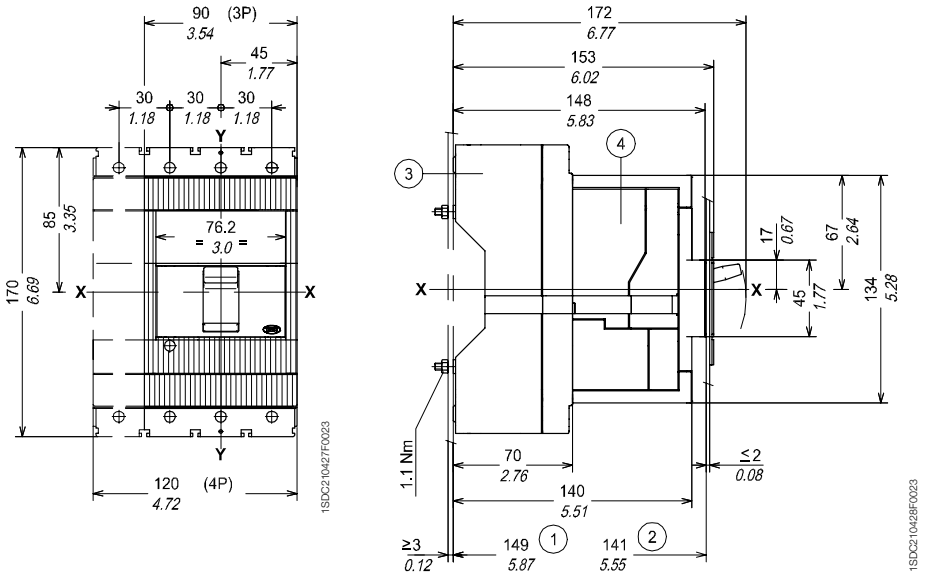
Caption

(1) Depth of the switchboard in the case of circuit breaker with face not extending from the compartment door, with or without flange

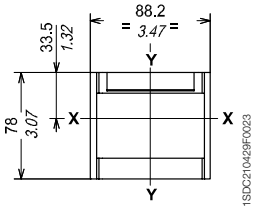
(2) Depth of the switchboard in the case of circuit breaker with face extending from the compartment door, without flange

(3) Fixed part

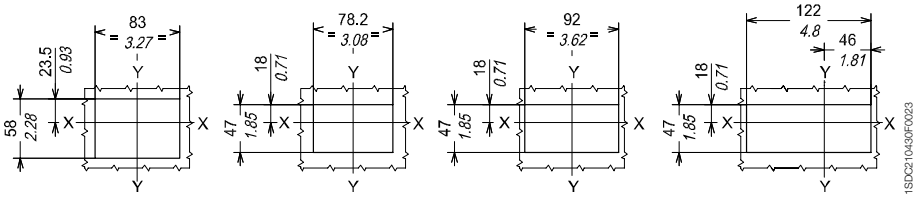
(4) Moving part with terminal covers, degree of protection IP40



Flange for compartment door



Drilling templates of the compartment door



With flange and circuit breaker face flush with door (3-4 POLES)

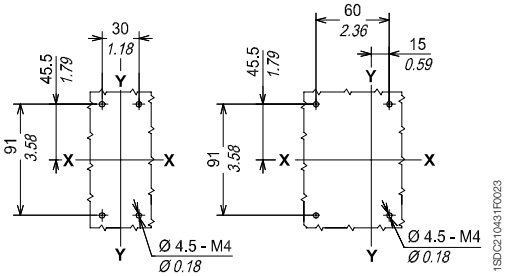
Without flange and circuit breaker face flush with door (3-4 POLES)

Without flange and circuit breaker face extending (3 POLES)

Without flange and circuit breaker face extending (4 POLES)

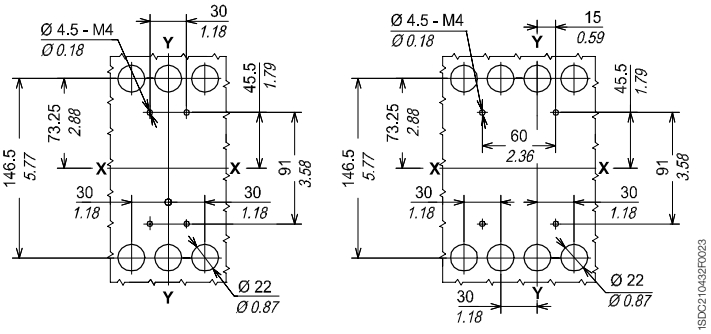
Drilling templates for support sheet

For front terminals



3 POLES 4 POLES

For rear terminals



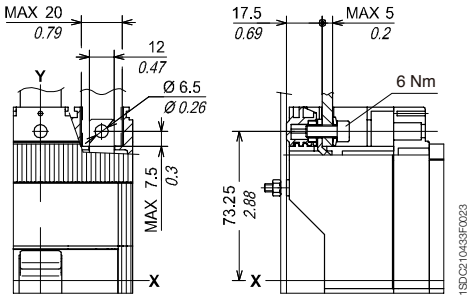
3 POLES 4 POLES

Overall dimensions
Tmax T2

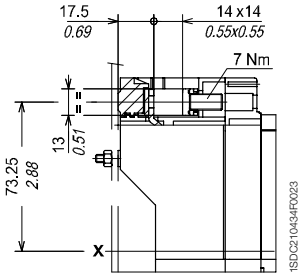
Terminals

[mm/*in*]

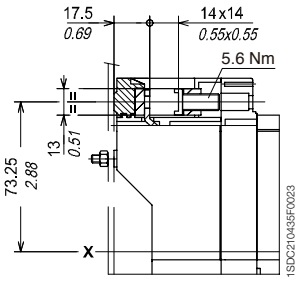
Front - F



Front for copper cables - FC Cu



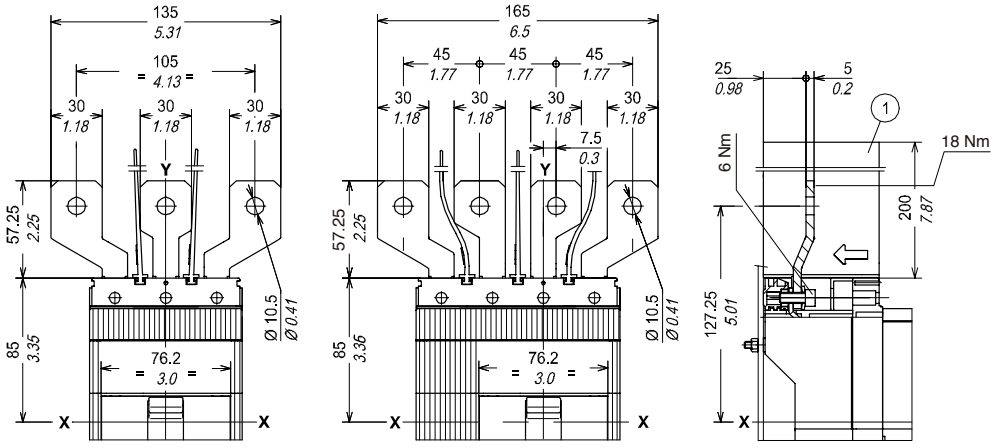
Front for copper/aluminium cables - FC CuAl 1/0 AWG/50 mm²



Caption

(1) Insulating barriers between phases (compulsory)

Front extended spread - ES



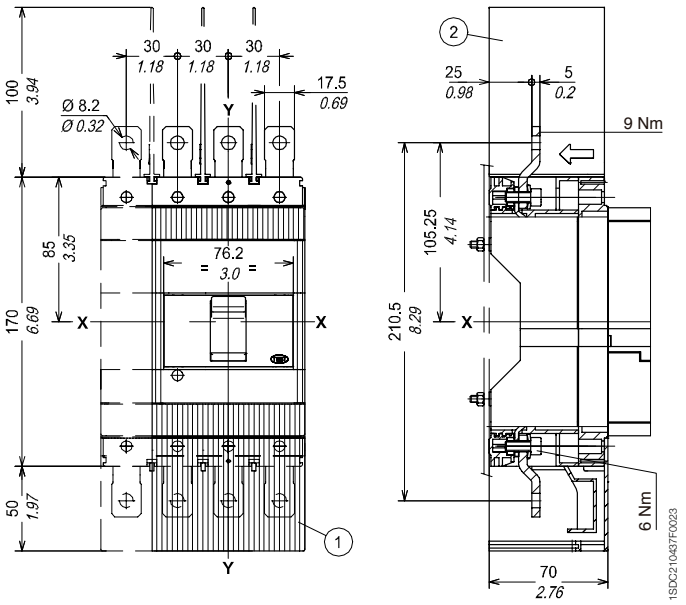
[mm/*in*]

Caption

(1) High terminal covers with degree of protection IP40

(2) Insulating barriers between phases (compulsory without 1)

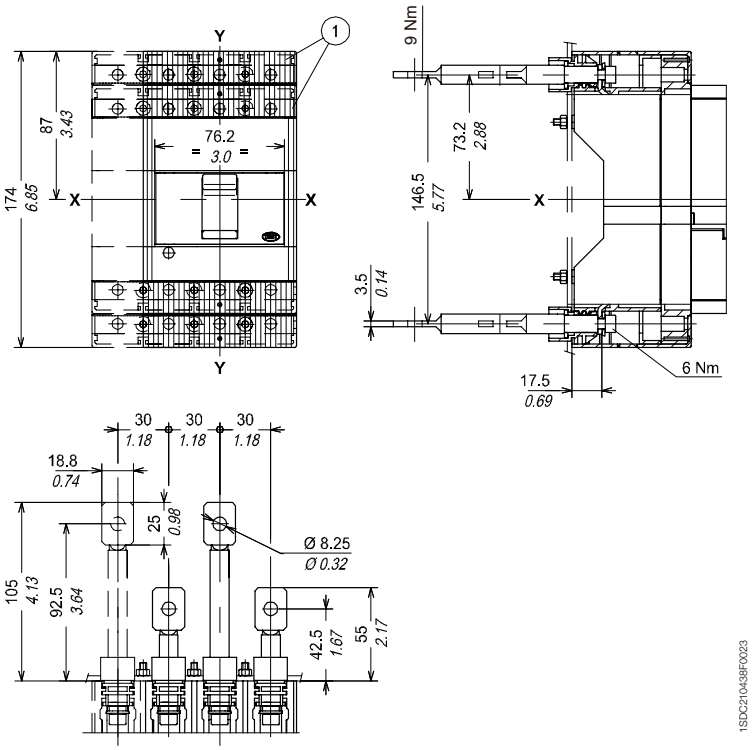
Front extended - EF



Caption

(1) Low terminal covers with degree of protection IP40

Rear - R



6

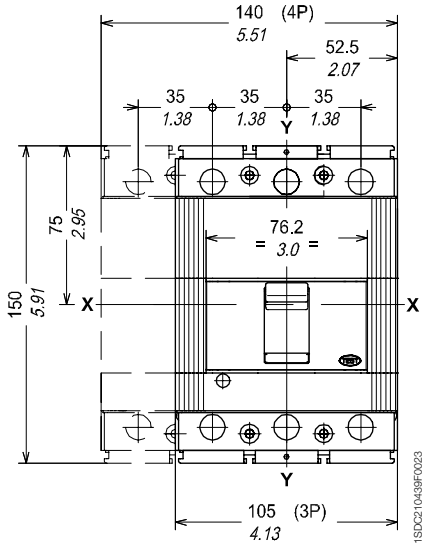
Overall dimensions

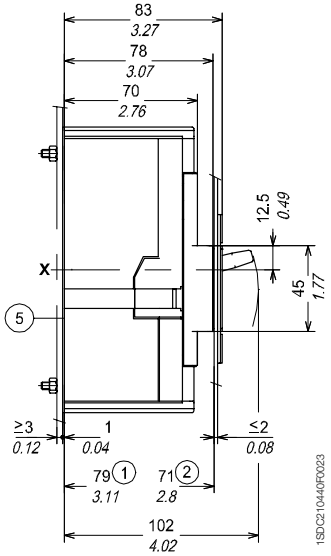
Tmax T3

Fixed circuit breaker

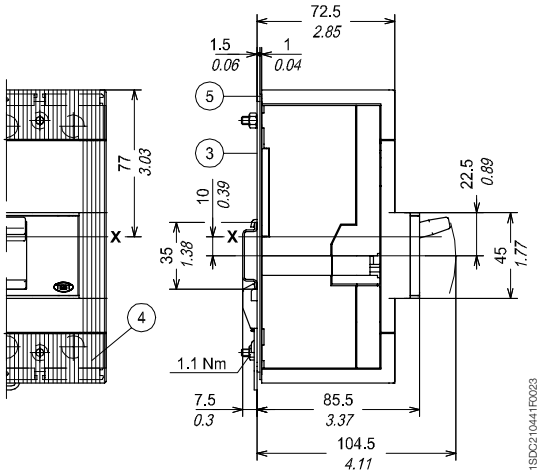
[mm/*in*]

Fixing on sheet





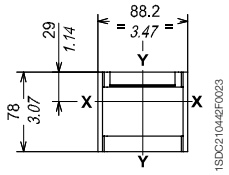
Fixing on DIN EN 50022 rail



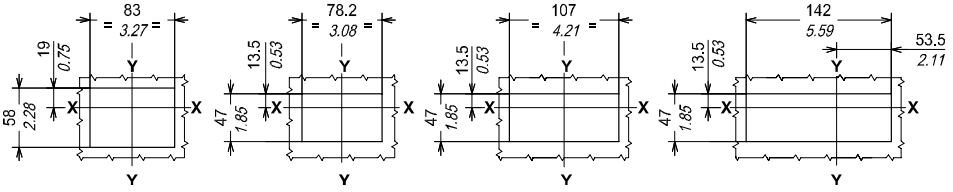
Caption

1. Depth of the switchboard in the case of circuit breaker with face not extending from the compartment door, with or without flange
2. Depth of the switchboard in the case of circuit breaker with face extending from the compartment door
3. Bracket for fixing on rail
4. Low terminal covers with degree of protection IP40
5. Insulating plate

Flange for compartment door



Drilling templates of the compartment door



With flange and circuit breaker face flush with door (3-4 POLES)

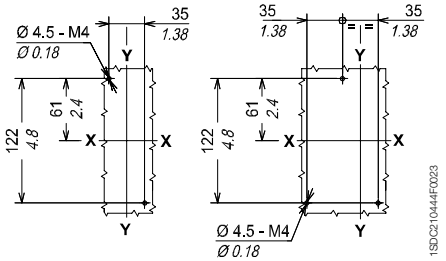
Without flange and circuit breaker face flush with door (3-4 POLES)

Without flange and circuit breaker face extending (3 POLES)

Without flange and circuit breaker face extending (4 POLES)

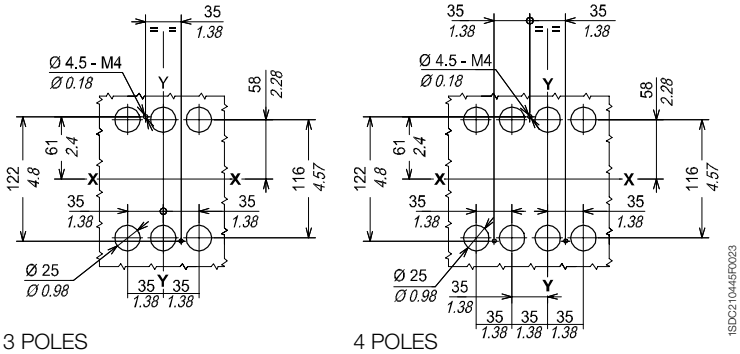
Drilling templates for support sheet

For front terminals



3 POLES 4 POLES

For rear terminals



3 POLES 4 POLES

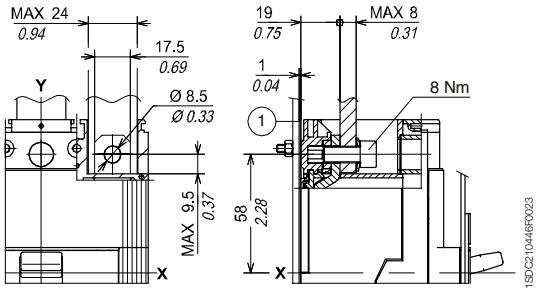
Terminals

[mm/*in*]

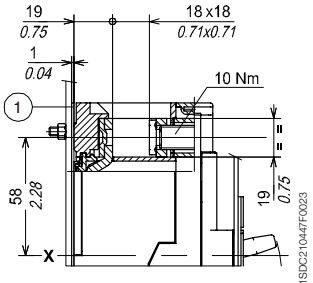
Caption

(1) Insulating base plate (compulsory)

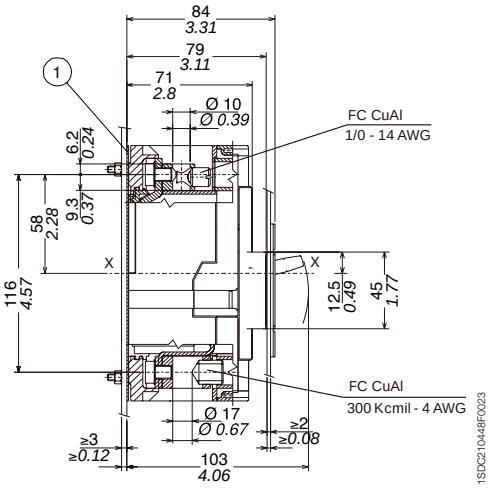
Front - F



Front for copper cables - FC Cu



Front for copper/aluminium cables - FC CuAl

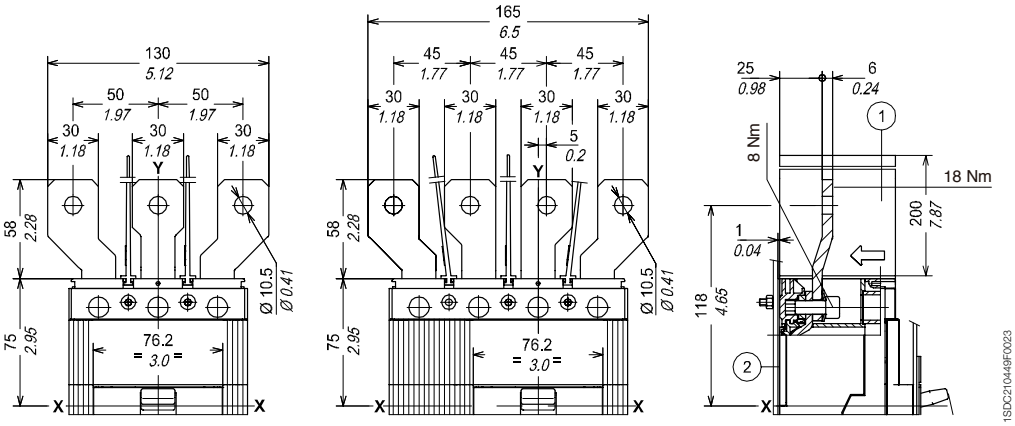


Caption

(1) Insulating barriers between phases (compulsory)

(2) Insultating plate

Front extended spread - ES



6

Overall dimensions

Tmax T3

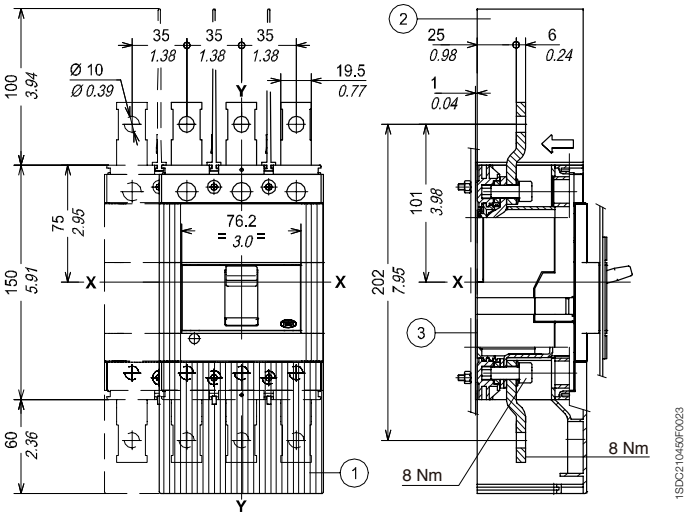
Terminals

[mm/*in*]

Caption

1. High terminal covers with degree of protection IP40
2. Insulating barriers between phases (compulsory without 1)
3. Insulating plate

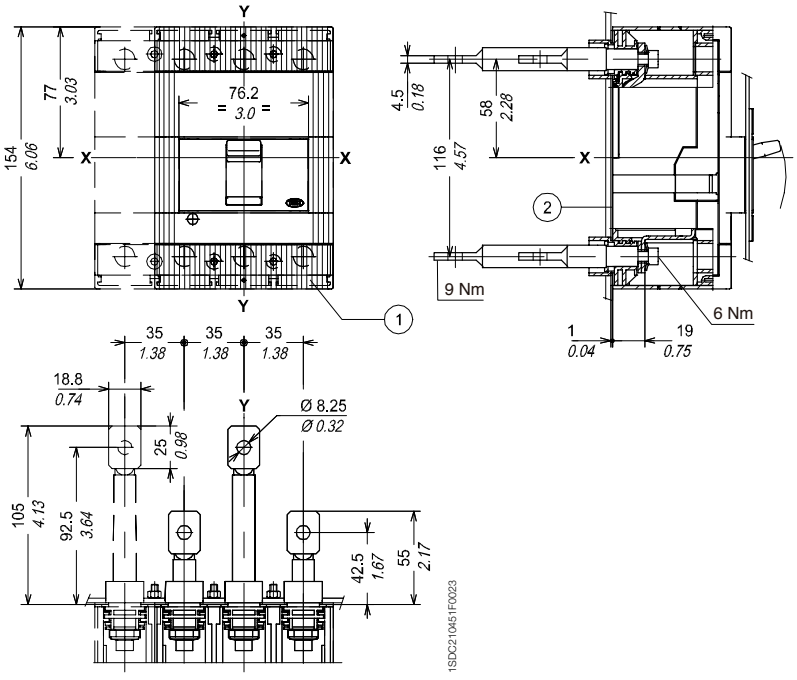
Front extended - EF



Caption

1. Low terminal covers with degree of protection IP40
2. Insulating plate

Rear - R



6

Plug-in

circuit breaker

[mm/*in*]

Caption

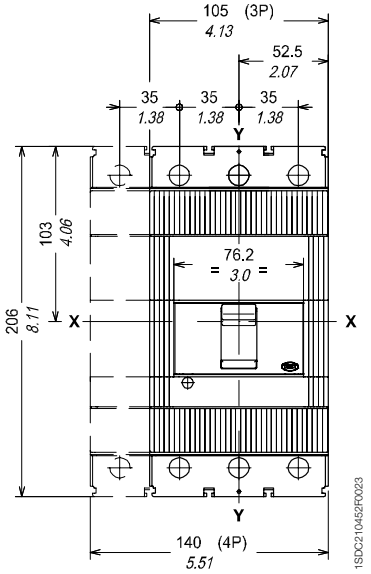
(1) Depth of the switchboard in the case of circuit breaker with face not extending from the compartment door, with or without flange

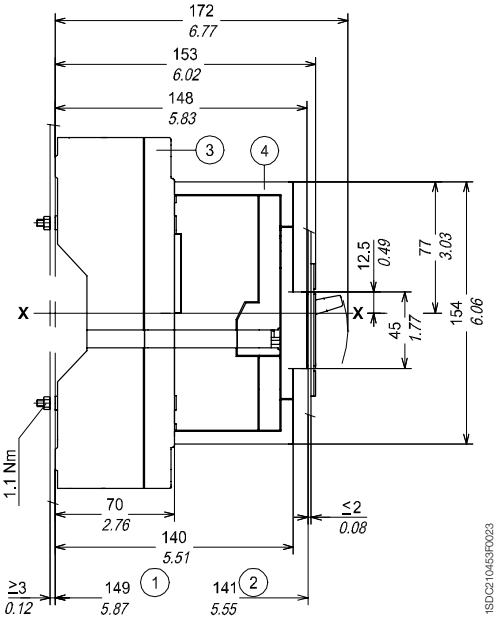
(2) Depth of the switchboard in the case of circuit breaker with face extending from the compartment door, without flange

(3) Fixed part

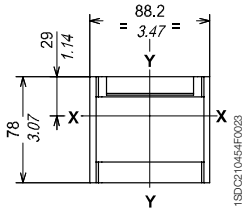
(4) Moving part with terminal covers, degree of protection IP40

Fixing on sheet

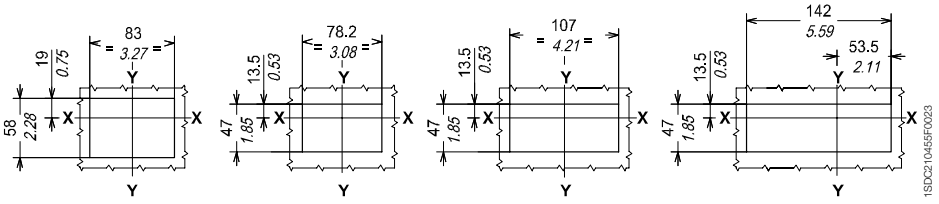




Flange for compartment door



Drilling templates of the compartment door



With flange and circuit breaker face flush with door (3-4 POLES)

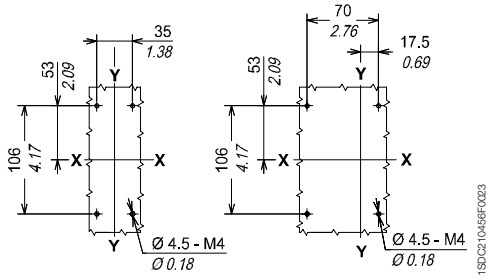
Without flange and circuit breaker face flush with door (3-4 POLES)

Without flange and circuit breaker face extending (3 POLES)

Without flange and circuit breaker face extending (4 POLES)

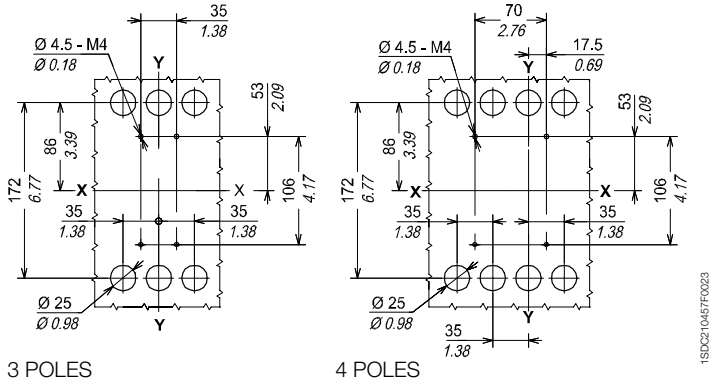
Drilling templates for support sheet

For front terminals



3 POLES 4 POLES

For rear terminals



3 POLES 4 POLES

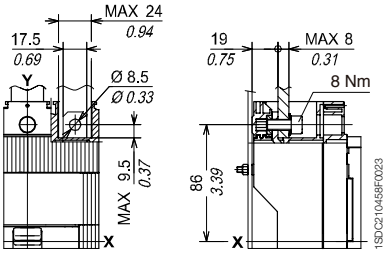
Overall dimensions

Tmax T3

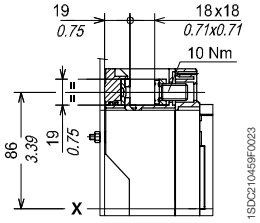
Terminals

[mm/*in*]

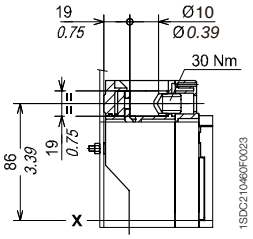
Front - F



Front for copper cables - FC Cu



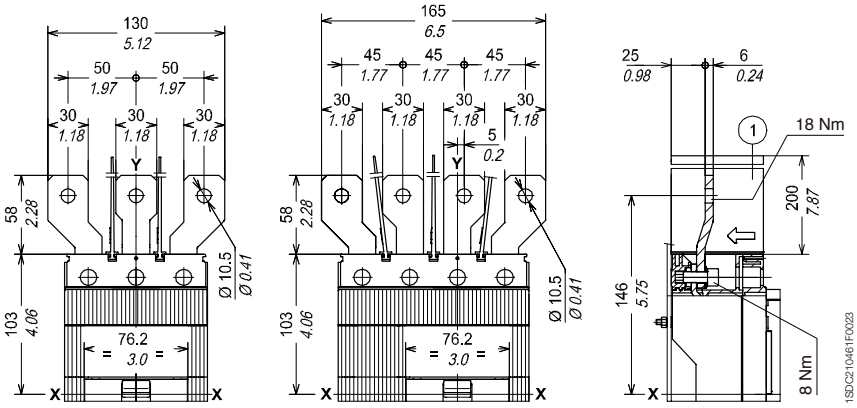
Front for copper/aluminium cables - FC CuAl 1/0 AWG/50 mm²



Caption

(1) Insulating barriers between phases (compulsory)

Front extended spread - ES



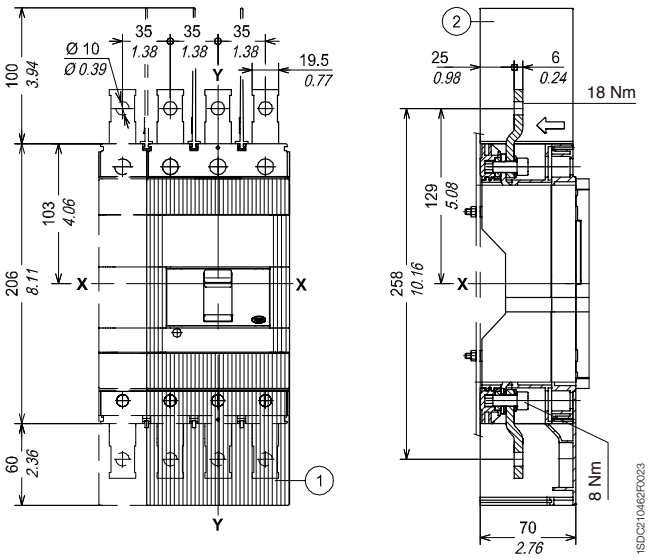
[mm/*in*]

Caption

(1) High terminal covers with degree of protection IP40

(2) Insulating barriers between phases (compulsory without 1)

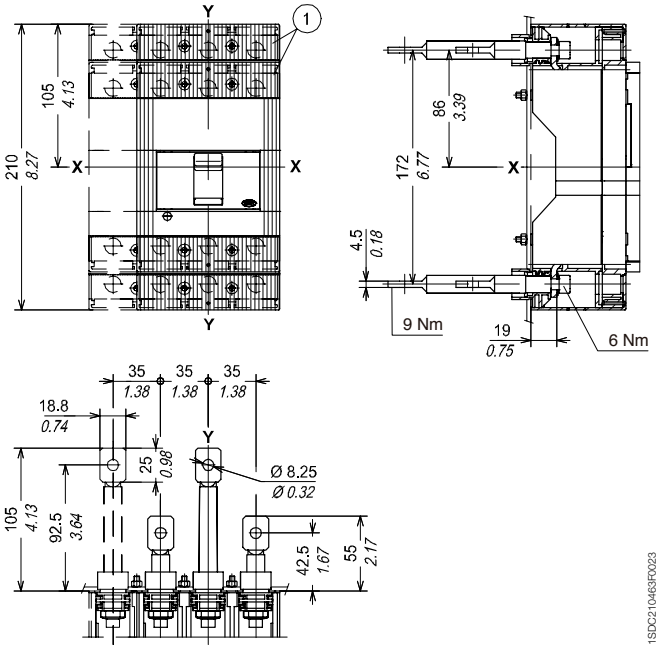
Front extended - EF



Caption

(1) Low terminal covers with degree of protection IP40

Rear - R



6

Overall dimensions

Tmax T4

Fixed circuit breaker

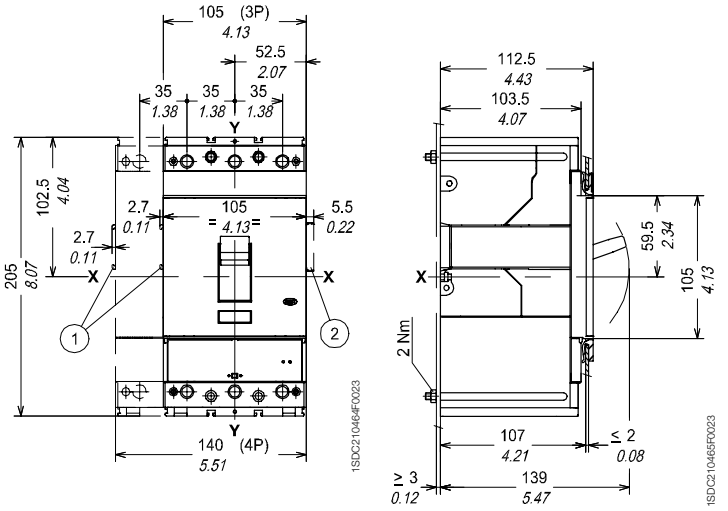
[mm/*in*]

Fixing on sheet

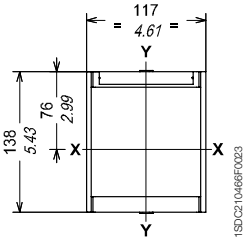
Caption

(1) Overall dimensions with cabled accessories mounted (SOR-C, UVR-C, RC221-222)

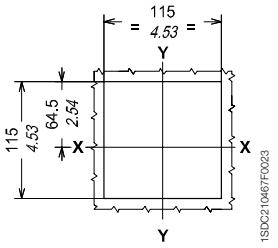
(2) Overall dimensions with cabled auxiliary contacts mounted (only 3Q 1SY)



Flange for compartment door

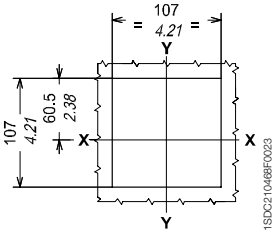


Drilling templates of the compartment door



3-4 POLES

With flange

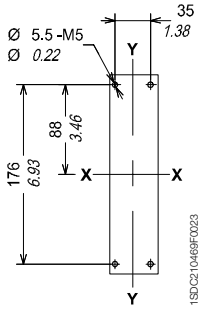


3-4 POLES

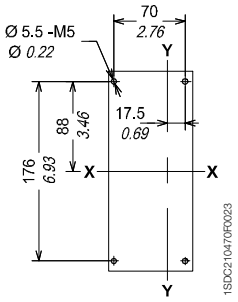
Without flange

Drilling templates for support sheet

For front terminals

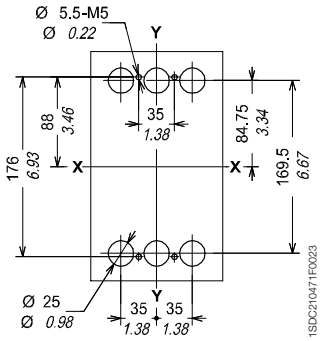


3 POLES

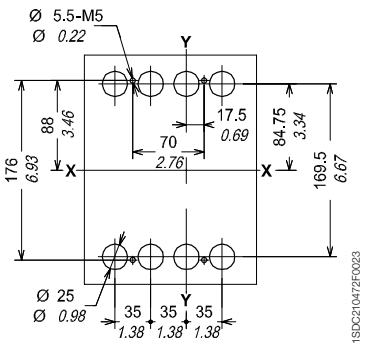


4 POLES

For rear terminals



3 POLES

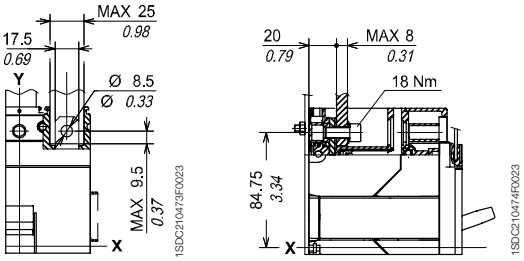


4 POLES

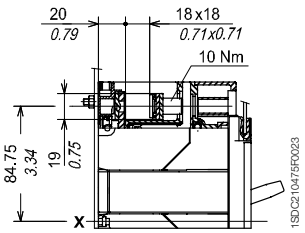
Terminals

[mm/*in*]

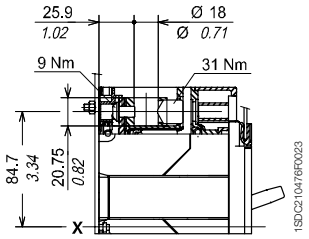
Front - F

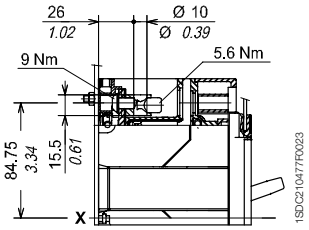


Front for copper cables - FC Cu



Front for copper/aluminium cables - FC CuAl

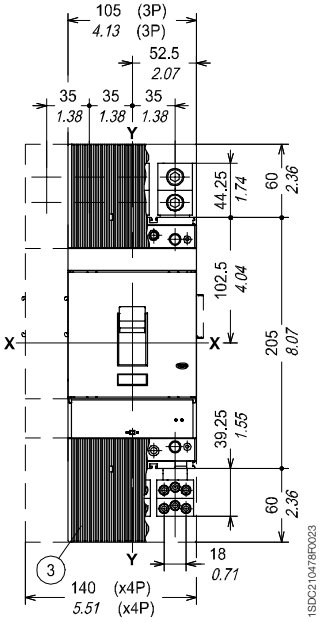


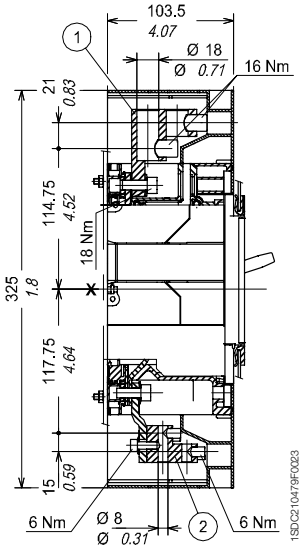


Caption

1. Front terminals for cable connection 2x150 mm²
2. Front terminals for multicable connection
3. High terminal covers with degree of protection IP40

Front multicable - MC

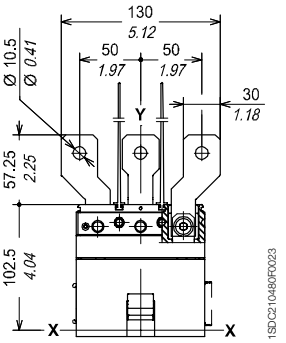


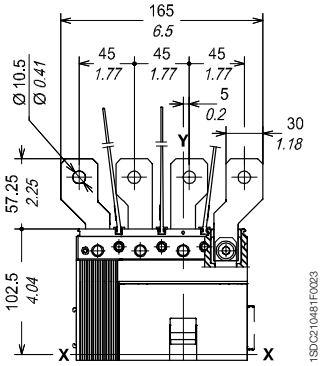


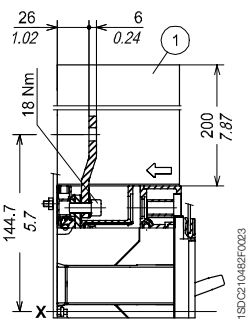
Caption

1. Insulating barriers between phases (compulsory)

Front extended spread - ES







Overall dimensions

Tmax T4

Terminals

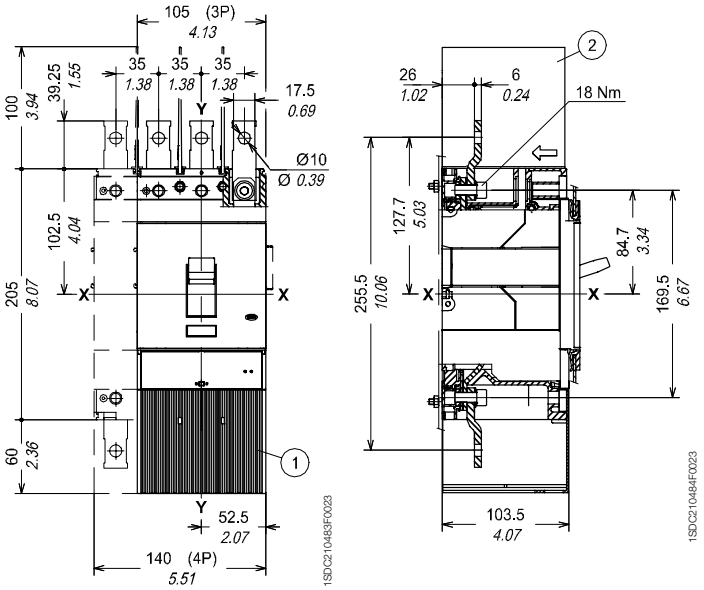
[mm/*in*]

Caption

(1) High terminal covers with degree of protection IP40

(2) Insulating barriers between phases (compulsory without 1)

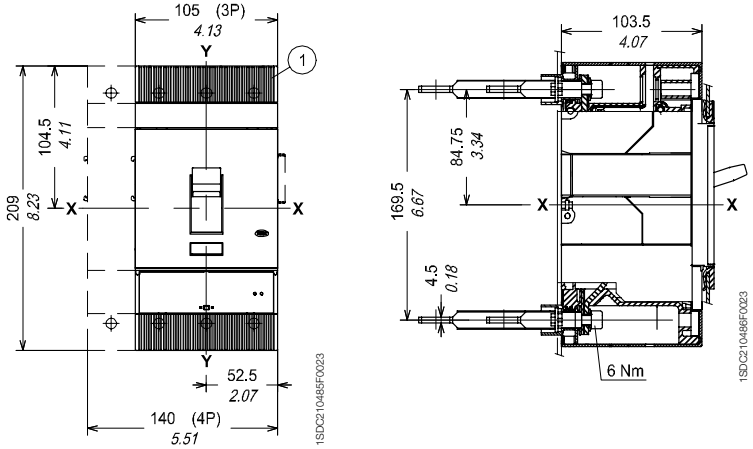
Front extended - EF

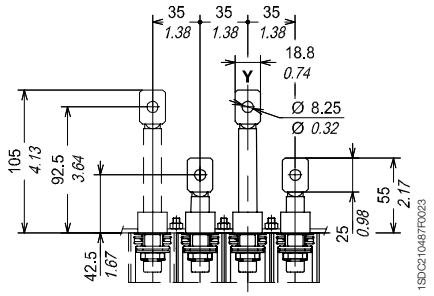


Caption

(1) Low terminal covers with degree of protection IP40

Rear - R





6

Plug-in

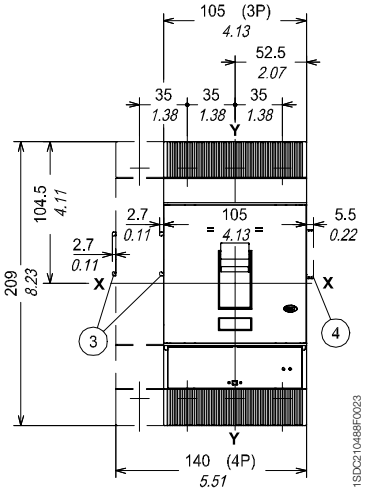
circuit breaker

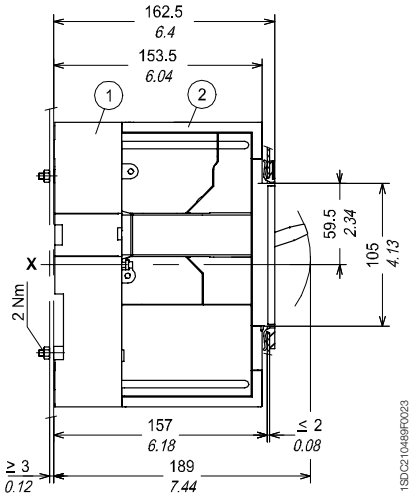
[mm/*in*]

Fixing on sheet

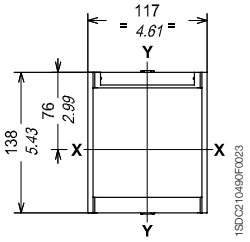
Caption

1. Fixed part
2. Moving part with terminal covers, degree of protection IP40
3. Overall dimensions with cabled accessories mounted (SOR-C, UVR-C, RC221-222)
4. Overall dimensions with cabled auxiliary contacts mounted (only 3Q 1SY)

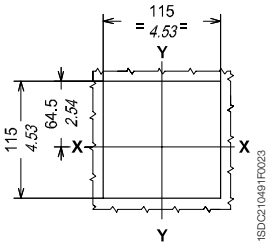




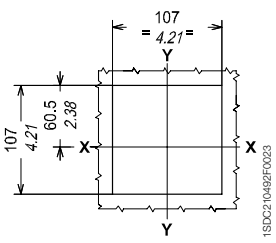
Flange for compartment door



Drilling templates of the compartment door



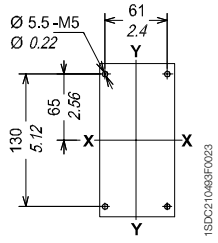
With flange



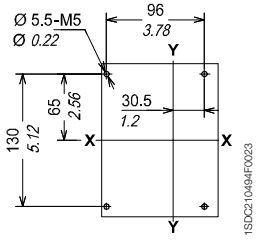
Without flange

Drilling templates for support sheet

For front terminals

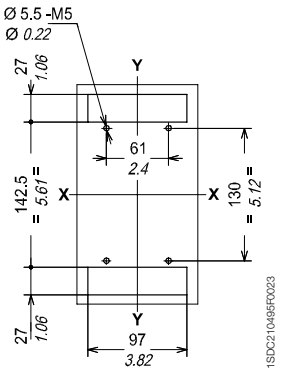


3 POLES

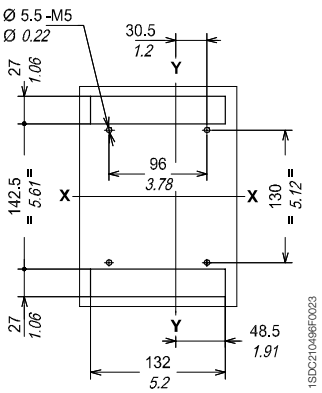


4 POLES

For rear terminals



3 POLES



4 POLES

6

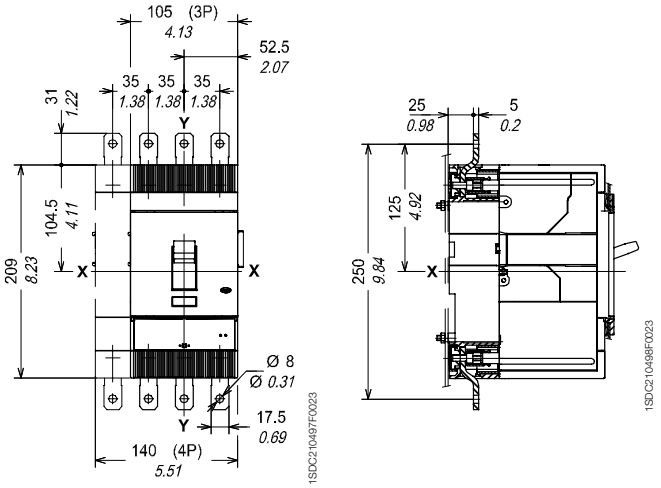
Overall dimensions

Tmax T4

Terminals

[mm/*in*]

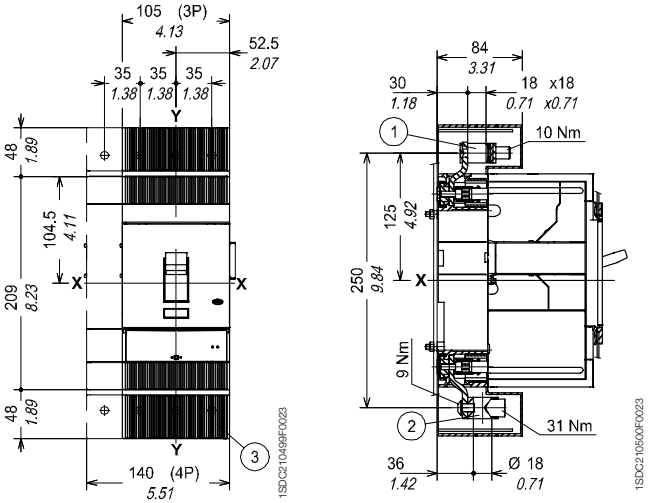
Front - EF



Caption

1. For Cu cables
2. For Cu Al cables
3. High terminal covers with degree of protection IP40

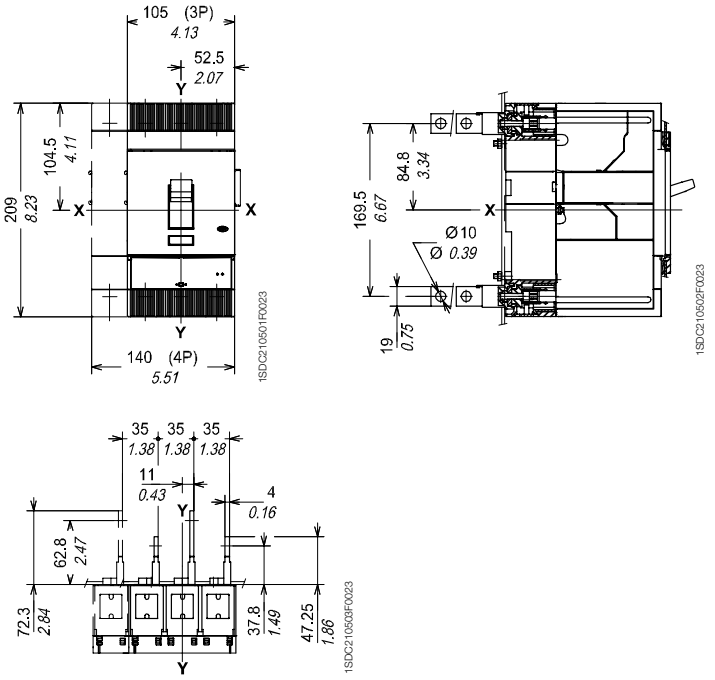
Front for copper cables - FC Cu or for copper/aluminium cables - FC CuAl



6

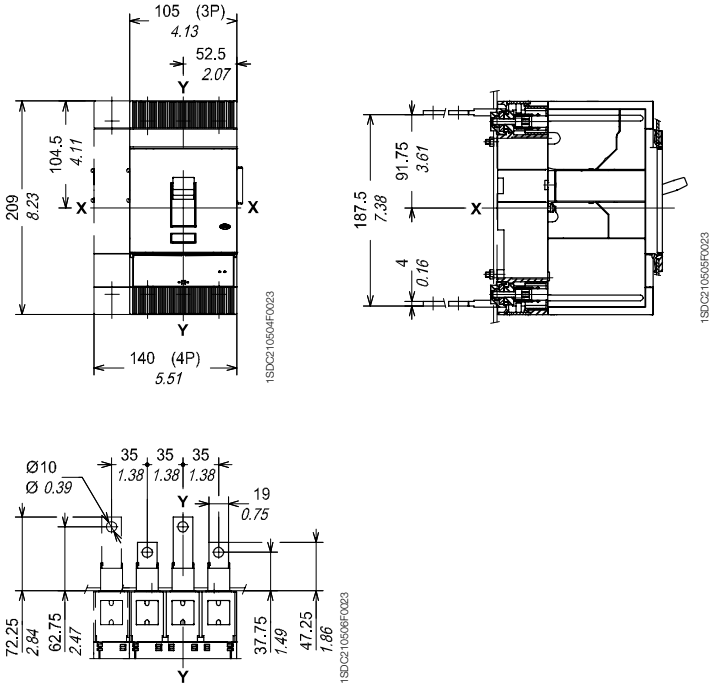
[mm/*in*]

Rear flat vertical - VR



3-4 POLES

Rear flat horizontal - HR



3-4 POLES

6

Overall dimensions

Tmax T4

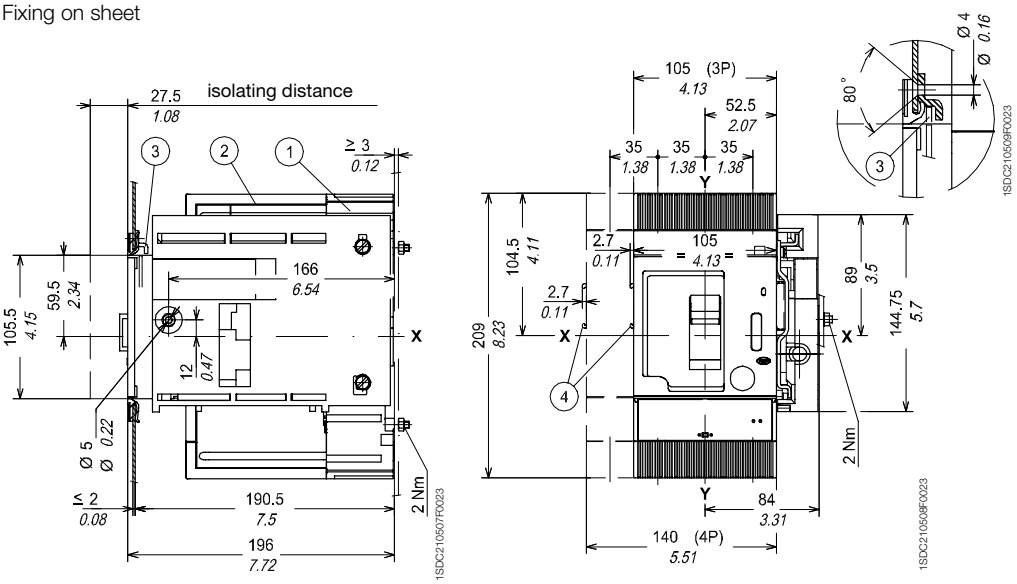
Draw out circuit breaker

[mm/*in*]

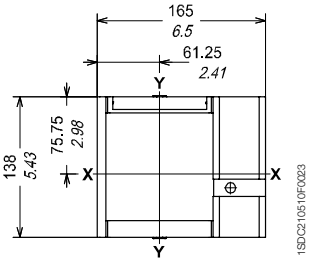
Fixing on sheet

Caption

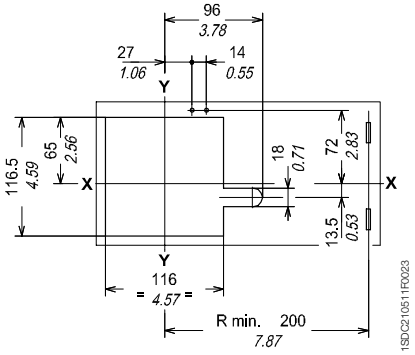
1. Fixed part
2. Moving part
3. Lock for compartment door (available on request)
4. Overall dimensions with cabled accessories mounted (SOR-C, UVR-C, RC221-222)



Flange for compartment door

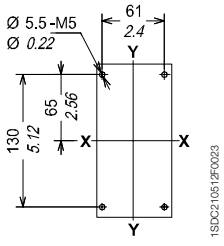


Drilling templates of the compartment door

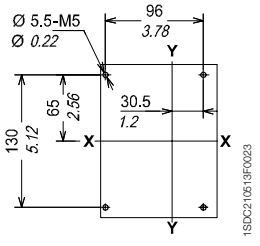


Drilling templates for support sheet

For front terminals

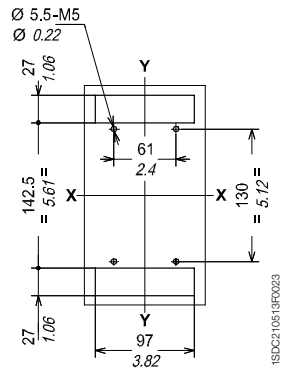


3 POLES

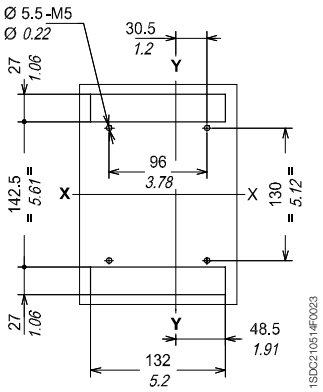


4 POLES

For rear terminals



3 POLES

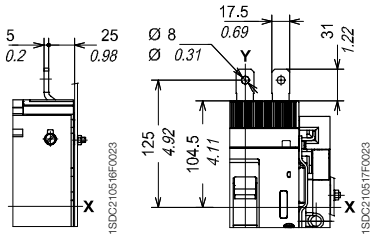


4 POLES

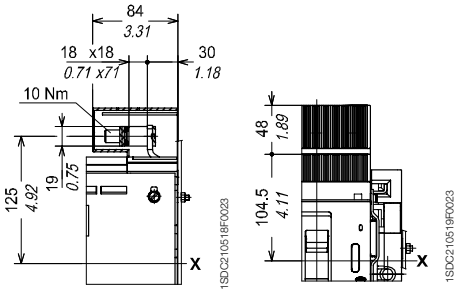
Terminals

[mm/*in*]

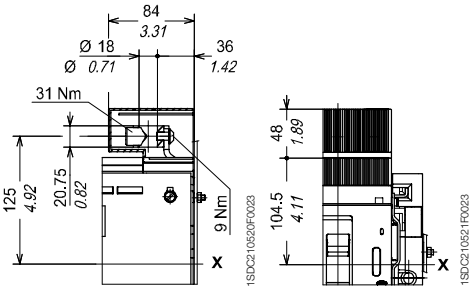
Front - EF



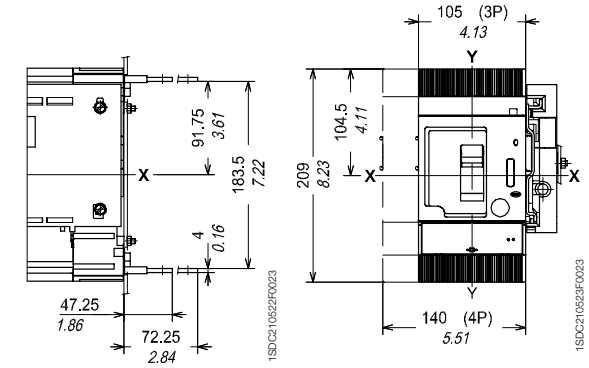
Front for copper cables - FC Cu

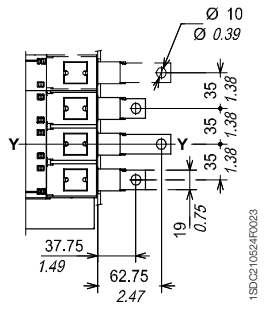


Front for copper/aluminium cables - FC CuAl



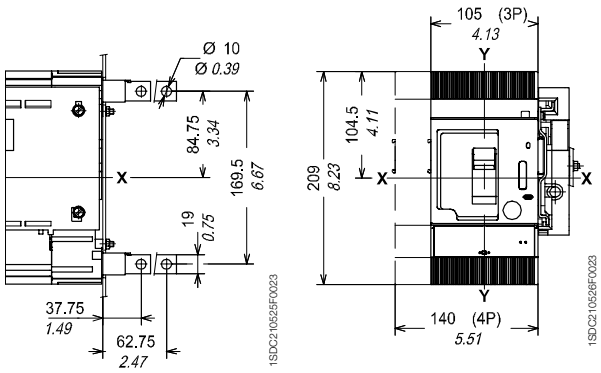
Rear flat horizontal - HR

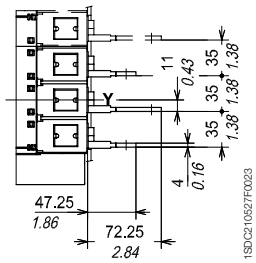




3-4 POLES

Rear flat vertical - VR





3-4 POLES

6

Overall dimensions

Tmax T5 (400 A)

Fixed circuit breaker

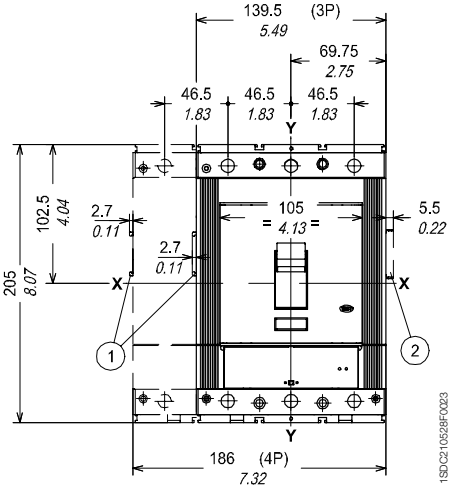
[mm/*in*]

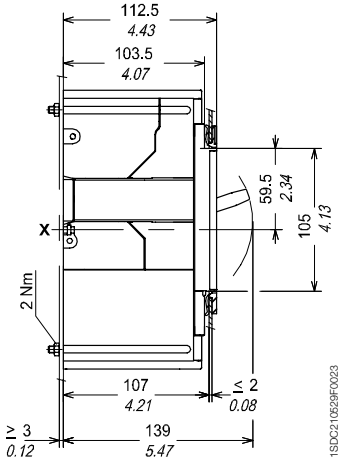
Fixing on sheet

Caption

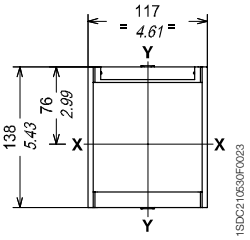
(1) Overall dimensions with cabled accessories mounted (SOR-C, UVR-C, RC221-222)

(2) Overall dimensions with cabled auxiliary contacts mounted (only 3Q 1SY)

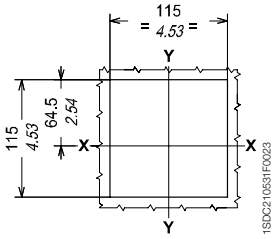




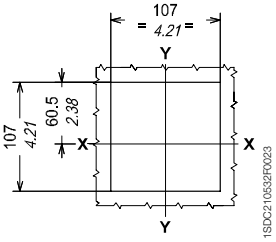
Flange for compartment door



Drilling templates of the compartment door



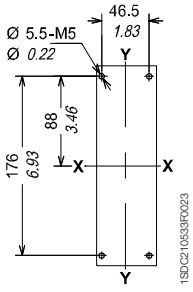
With flange (3-4 POLES)



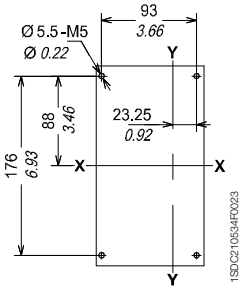
Without flange (3-4 POLES)

Drilling templates for support sheet

For front terminals

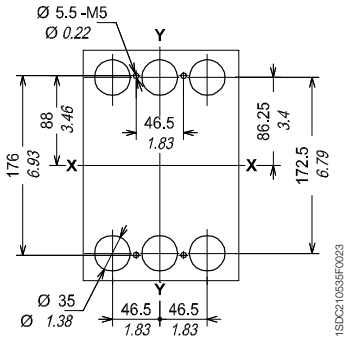


3 POLES

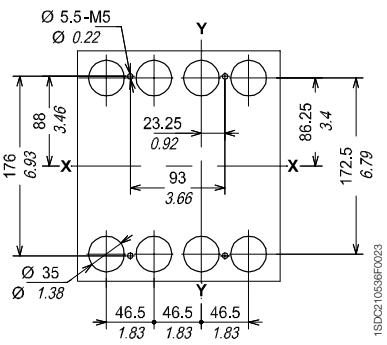


4 POLES

For rear terminals



3 POLES



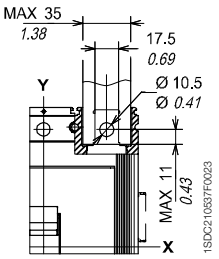
4 POLES

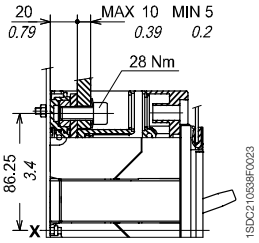
6

Terminals

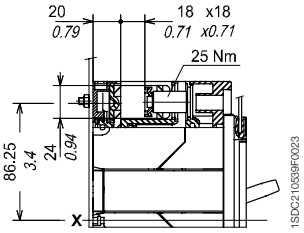
[mm/*in*]

Front - F





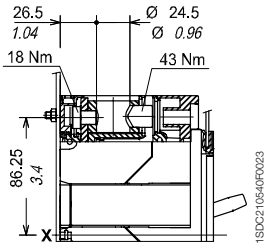
Front for copper cables - FC Cu



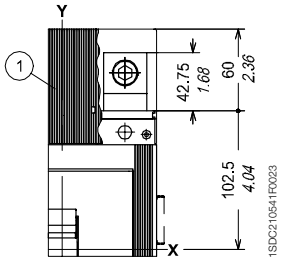
Caption

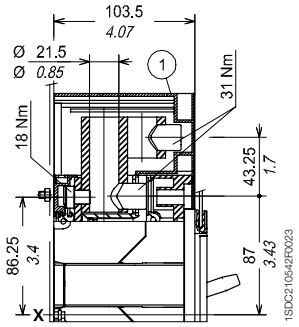
(1) High terminal covers with degree of protection IP40

Front for copper/aluminium cables Cu/Al 300 mm² FC CuAl



Front for copper/aluminium cables Cu/Al 2x240 mm² - FC CuAl

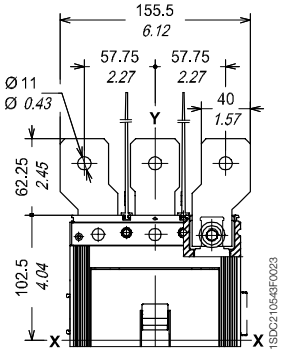


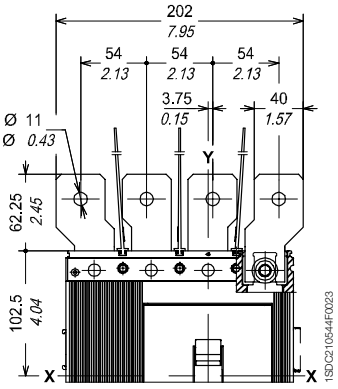


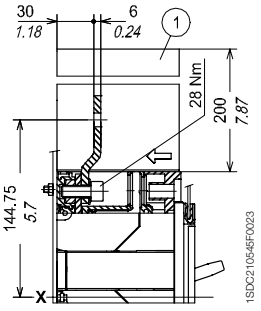
Caption

(1) Insulating barriers between phases (compulsory)

Front extended spread - ES







6

Overall dimensions

Tmax T5 (400 A)

Terminals

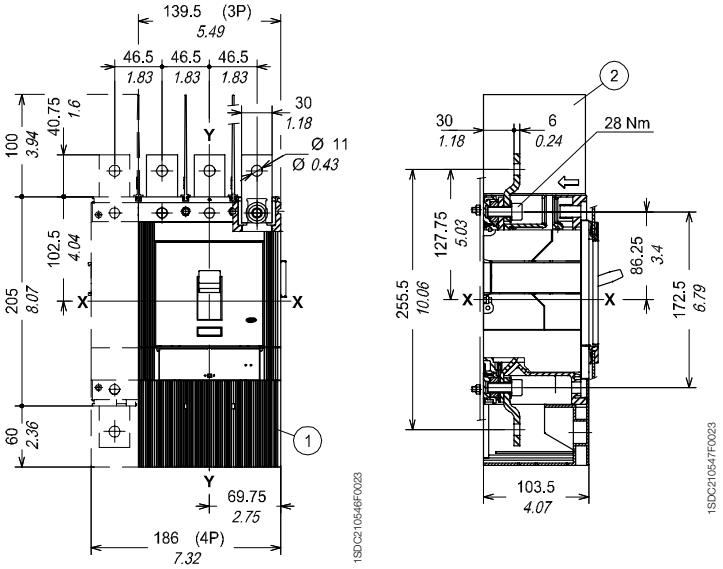
[mm/*in*]

Caption

(1) High terminal covers with degree of protection IP40

(2) Insulating barriers between phases (compulsory without 1)

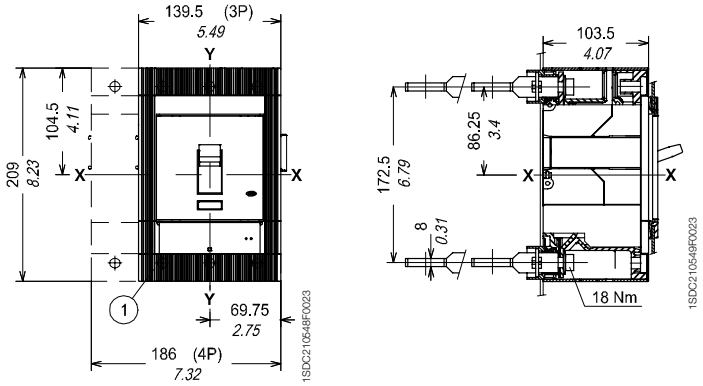
Front extended - EF

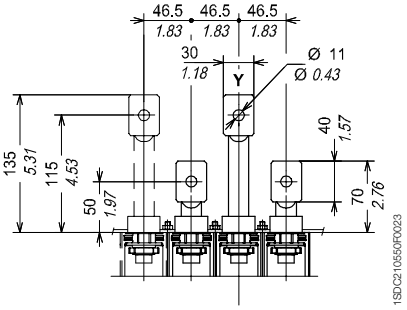


Caption

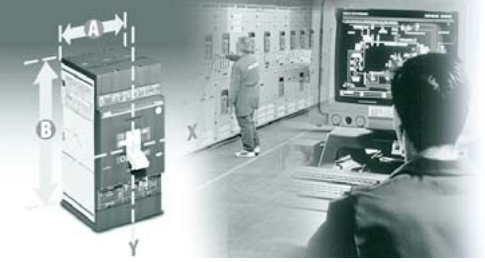
(1) Low terminal covers with degree of protection IP40

Rear - R





6



Overall dimensions

Tmax T5 (600 A)

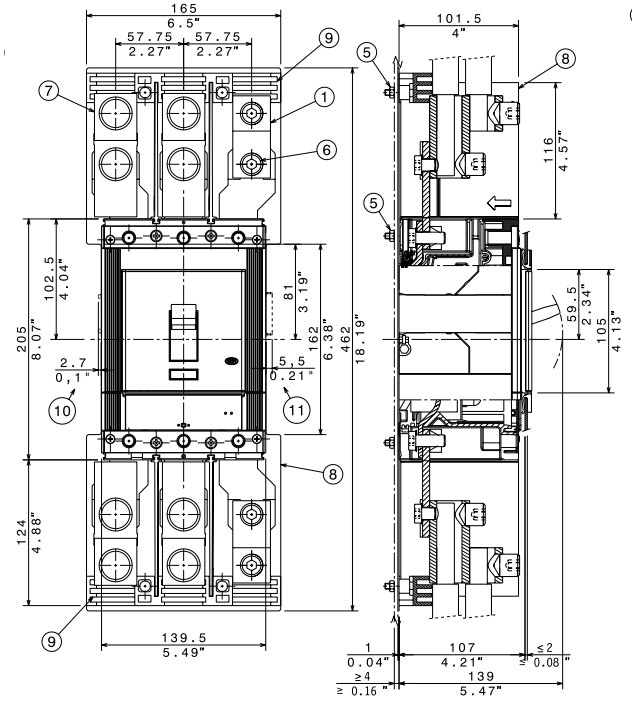
Fixed circuit breaker

[mm/*in*]

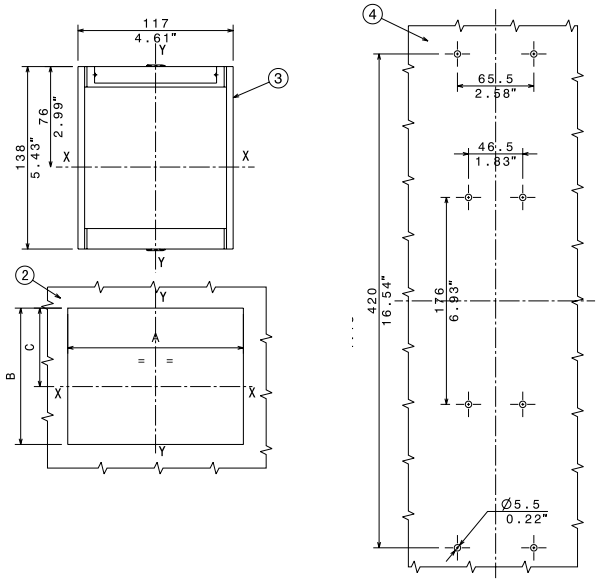
Caption

1. Front terminals for 2x240mm² cable connection
2. Compartment door sheet steel drilling
3. Flange for the compartment door
4. Fixing on sheet steel
5. Tightening torque 2 Nm
6. Tightening torque 31 Nm
7. Terminal cover
8. Insultating barrier + insulating plate
9. Terminals support
10. Spacing when equipped with SOR-C, UVR-C, RC221-222
11. Spacing when equipped with AUX-C (3Q 1SY only)

Fixing on sheet



	With flange	Without flange
A	115	107
B	115	107
C	64.5	60.5



Overall dimensions

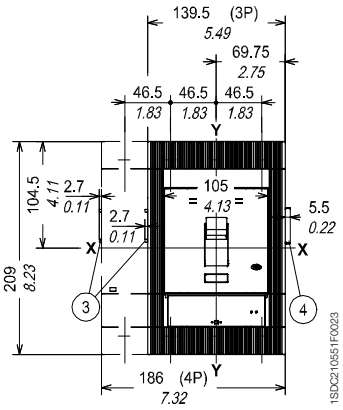
Tmax T5 (400 A)

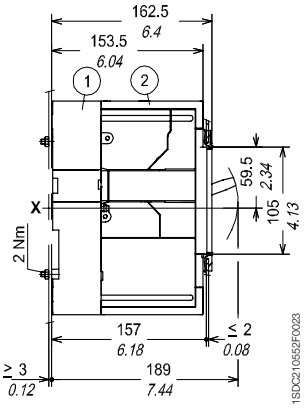
Plug-in

circuit breaker

[mm/*in*]

Fixing on sheet





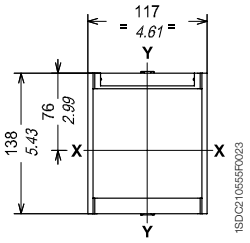
Caption

1. Fixed part
2. Moving part with terminal covers, degree of protection IP40
3. Overall dimensions with cabled accessories mounted (SOR-C, UVR-C, RC221-222)
4. Overall dimensions with cabled auxiliary contacts mounted (only 3Q 1SY)

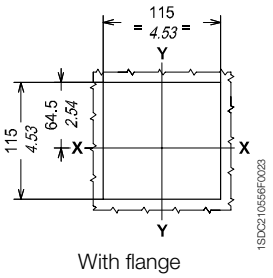
6

[mm/*in*]

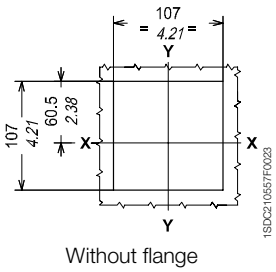
Flange for compartment door



Drilling templates of the compartment door



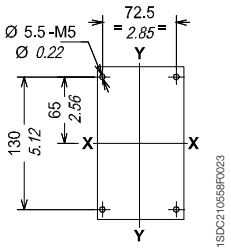
With flange



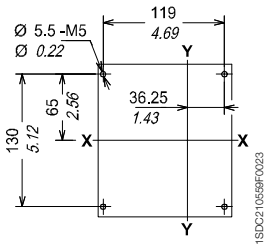
Without flange

Drilling templates for support sheet

For front terminals

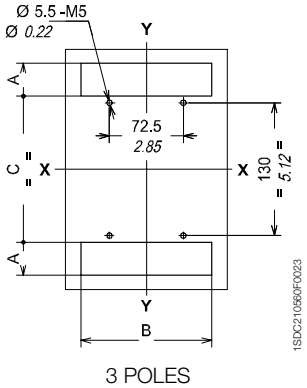


3 POLES

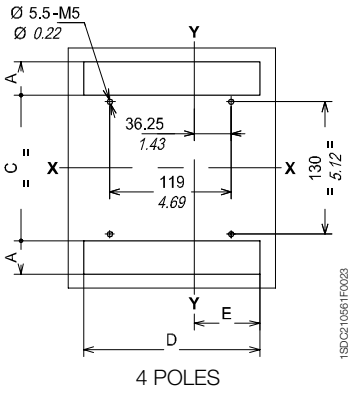


4 POLES

For rear terminals



3 POLES



4 POLES

	A	B	C	D	E
Rear 400 A	32.5 *1.28*	128.5 *5.06*	143 *5.63*	172.5 *6.79*	64.5 *2.54*

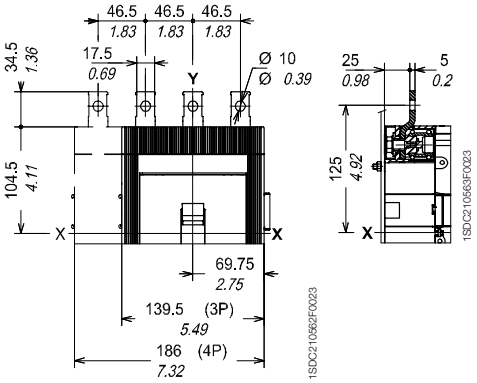
Overall dimensions

Tmax T5 (400 A)

Terminals

[mm/*in*]

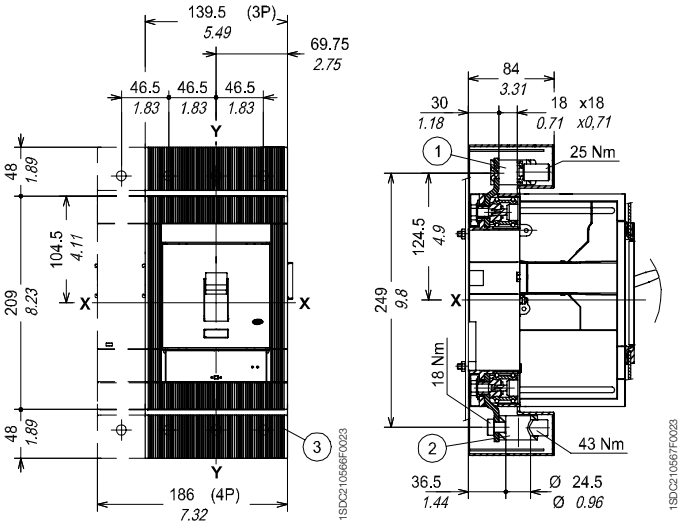
Extended front - EF



Caption

1. Front terminals for cables Cu
2. Front terminals for cables Cu/Al
3. High terminal covers with degree of protection IP40

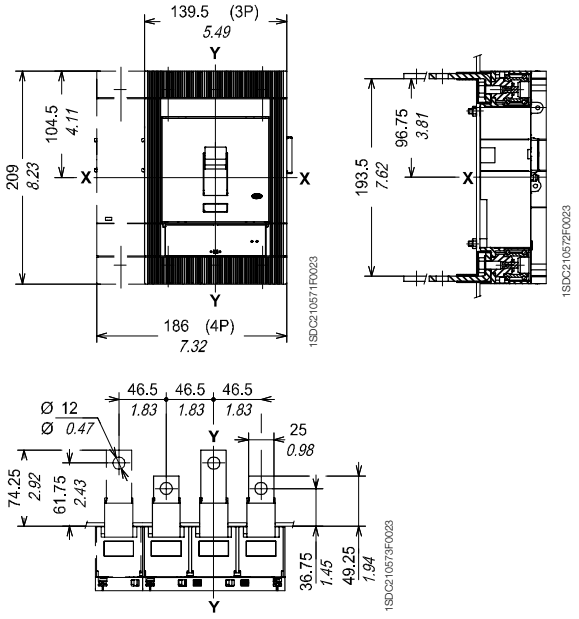
Front for cables Cu and Cu/Al - FC Cu - FC Cu/Al



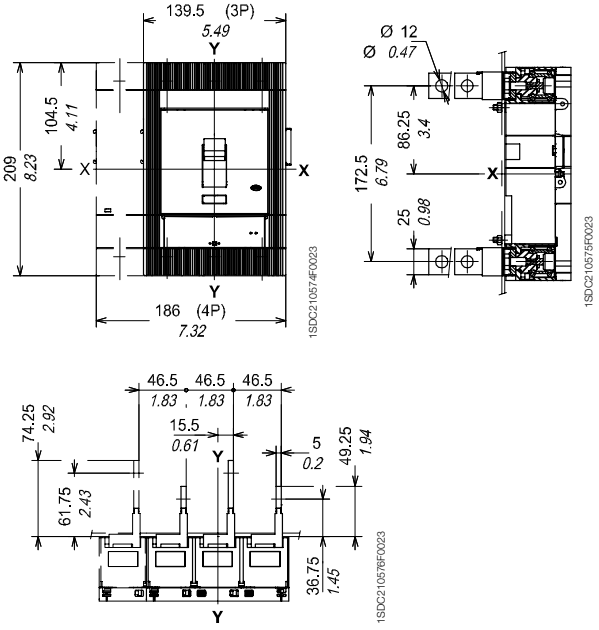
6

[mm/*in*]

Rear flat horizontal - HR



Rear vertical - VR



6

Overall dimensions

Tmax T5 (400 A)

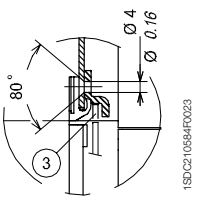
Draw out circuit breaker

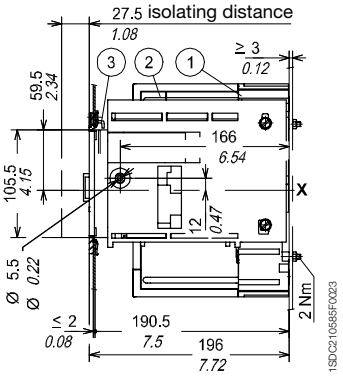
[mm/*in*]

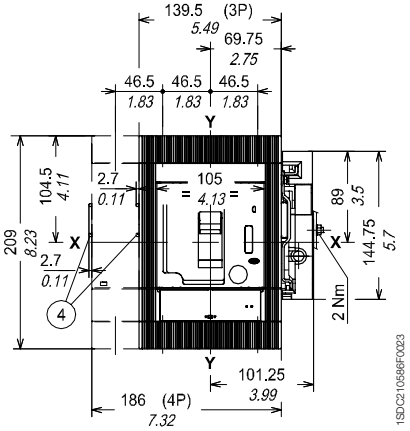
Fixing on sheet

Caption

1. Fixed part
2. Moving part with terminal covers, degree of protection IP40
3. Lock for compartment door (available on request)
4. Overall dimensions with cabled accessories mounted (SOR-C, UVR-C, RC221-222)



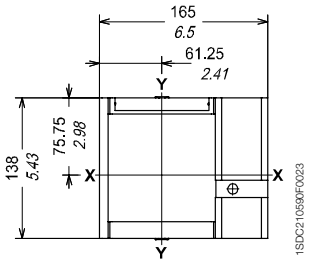




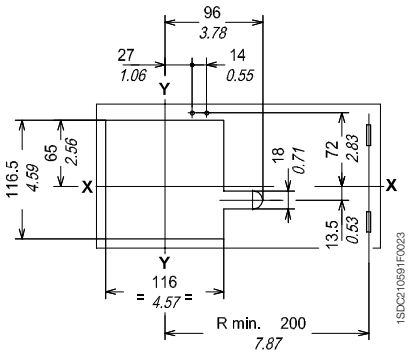
6

[mm/*in*]

Flange for compartment door

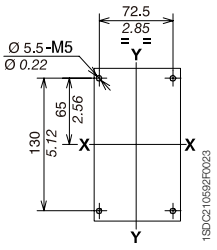


Drilling templates of the compartment door

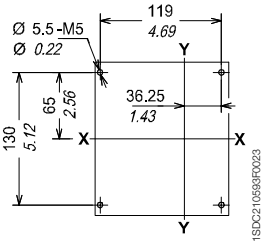


Drilling templates for support sheet

For front terminals

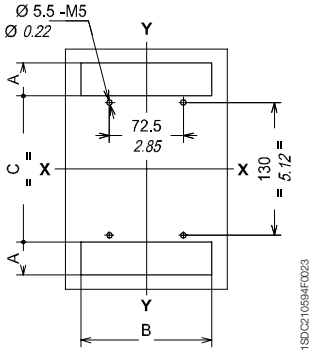


3 POLES

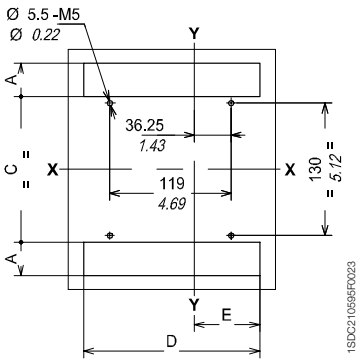


4 POLES

For rear terminals



3 POLES



4 POLES

	A	B	C	D	E
Rear 400 A	32.5 *1.28*	128.5 *5.06*	143 *5.63*	172.5 *6.79*	64.5 *2.54*

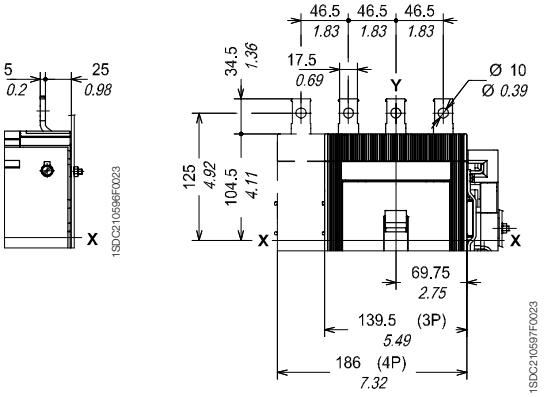
Overall dimensions

Tmax T5 (400 A)

Terminals

[mm/*in*]

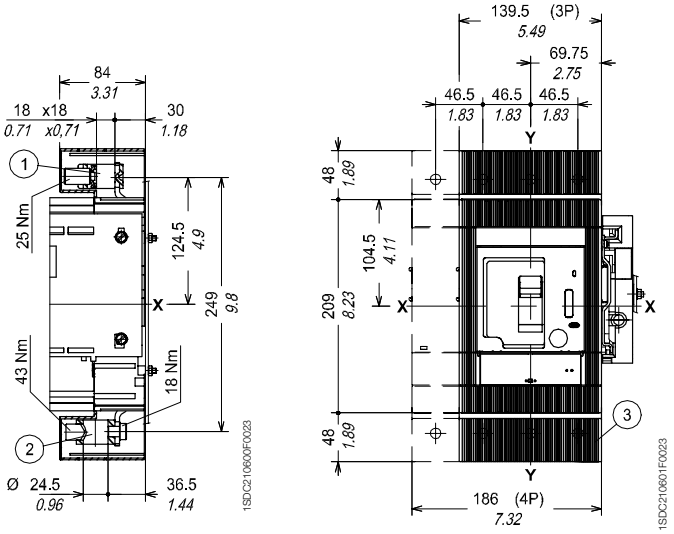
Extended front - EF



Caption

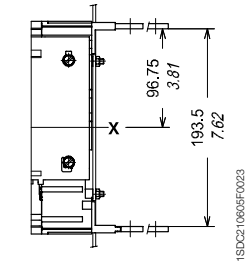
1. Front terminals for copper cables
2. Front terminals for copper/ aluminium cables
3. Terminals with degree of protection IP40

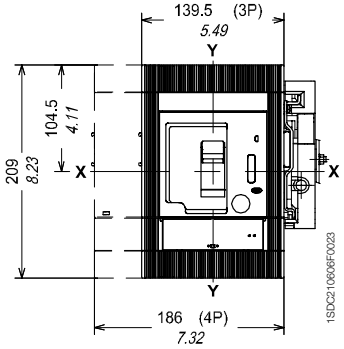
Front for cables Cu and Cu/Al 400 A- FC Cu - FC Cu/Al

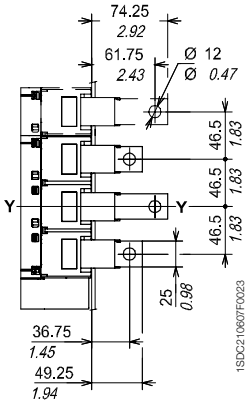


[mm/*in*]

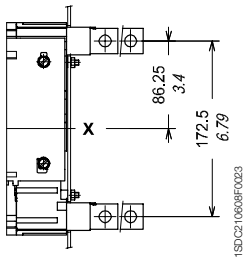
Rear flat horizontal - HR

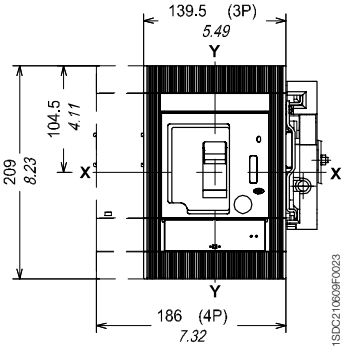


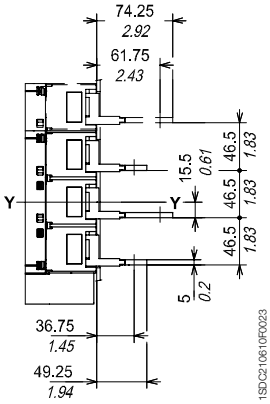




Rear flat vertical - VR







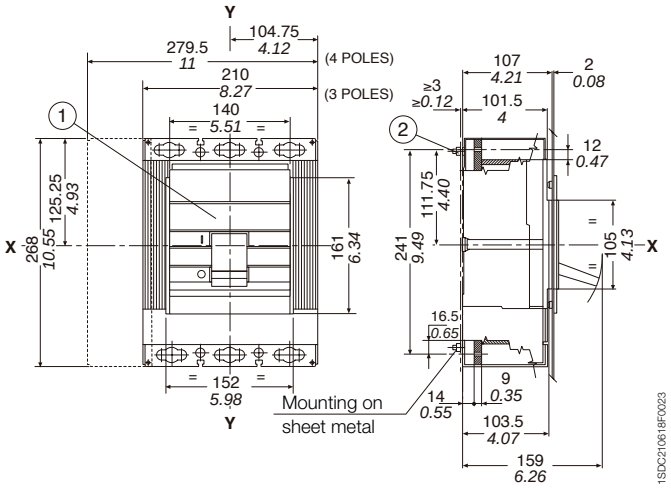
6

Overall dimensions

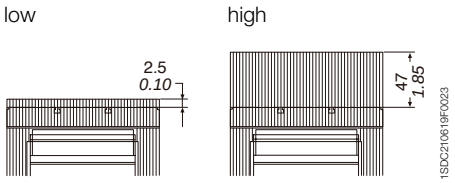
Isomax S6

Fixed circuit breaker

[mm/*in*]



Terminal covers
(to be ordered when not included in the supply)



Caption

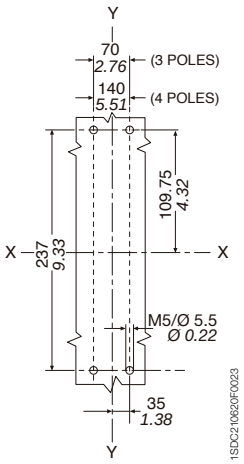
1. Flange for compartment door
2. Tightening torque 2 Nm

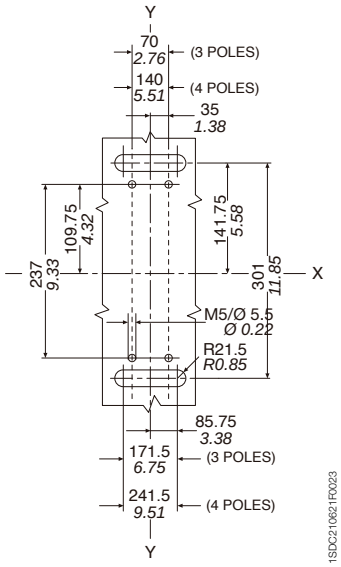
Template for drilling sheet metal support

(minimum thickness of sheet metal: 0.12”/3 mm)

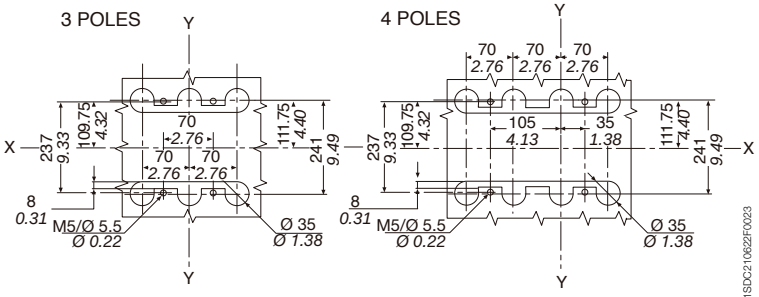
For terminals:
Front - F
Front extended - EF
Front for Cu/Al cables - FC CuAl

For rear Cu/Al cables terminals - RC



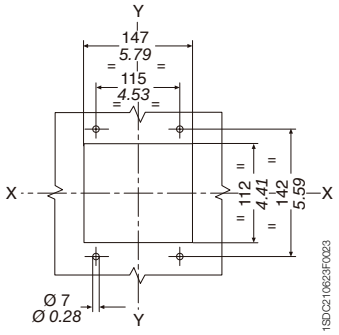


For rear threaded terminals - R



Template for drilling compartment door and fitting flange

(thickness of sheet metal: 0.08”/2 mm)

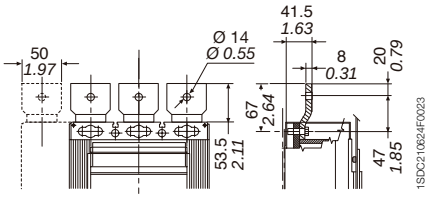


6

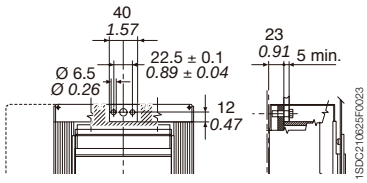
Terminals

[mm/*in*]

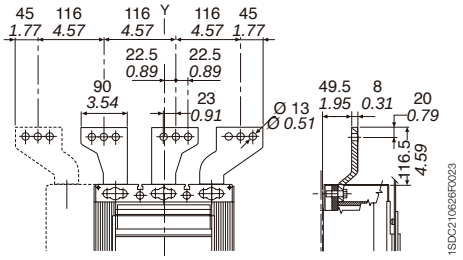
Front extended - EF



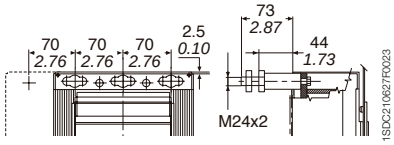
Front - F



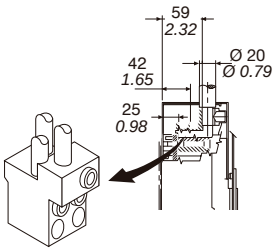
Front extended spread - ES



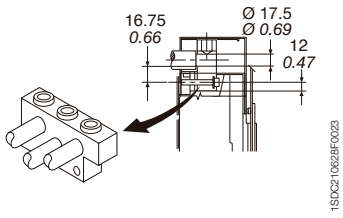
Threaded rear - R
(low terminal covers included in the supply)



Front for Cu/Al cables - FCCuAl
(IP20 high terminal covers included in the supply)



For rear Cu/Al cables - FCCuAl
(IP20 high terminal covers included in the supply)



6

Overall dimensions

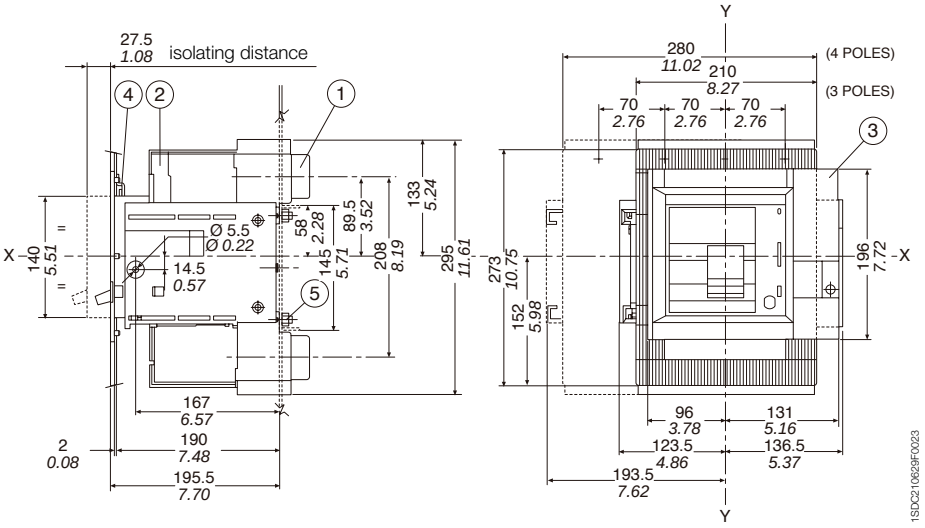
Isomax S6

Draw out circuit breaker

[mm/*in*]

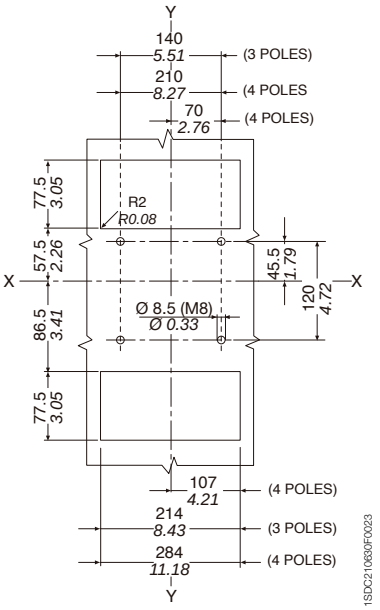
Caption

1. Fixed part
2. Moving part
3. Flange for compartment door
4. Lock for compartment door (to order)
5. Tightening torque 9 Nm



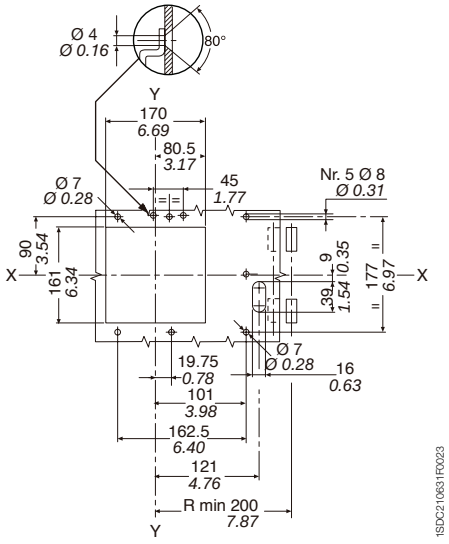
Template for drilling sheet metal support

(minimum thickness of sheet metal: 0.12”/3 mm)



Template for drilling compartment door and fitting flange

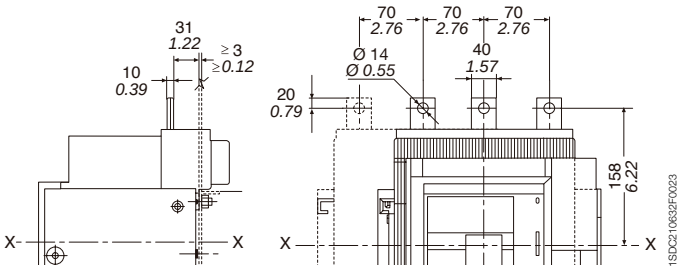
(thickness of sheet metal: 0.08”/2 mm)



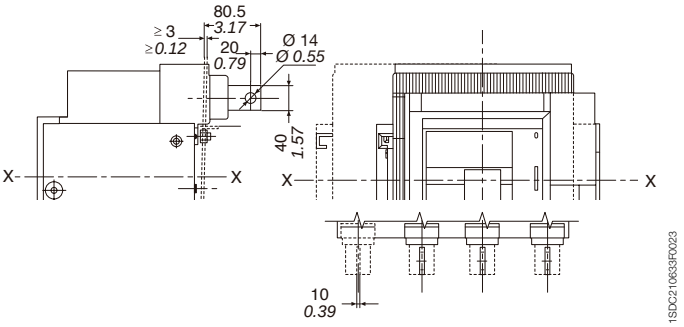
Terminals

[mm/*in*]

Front for S6 - F



Horizontal or vertical rear flat bar for S6 - HR



6

Overall dimensions

Isomax S7

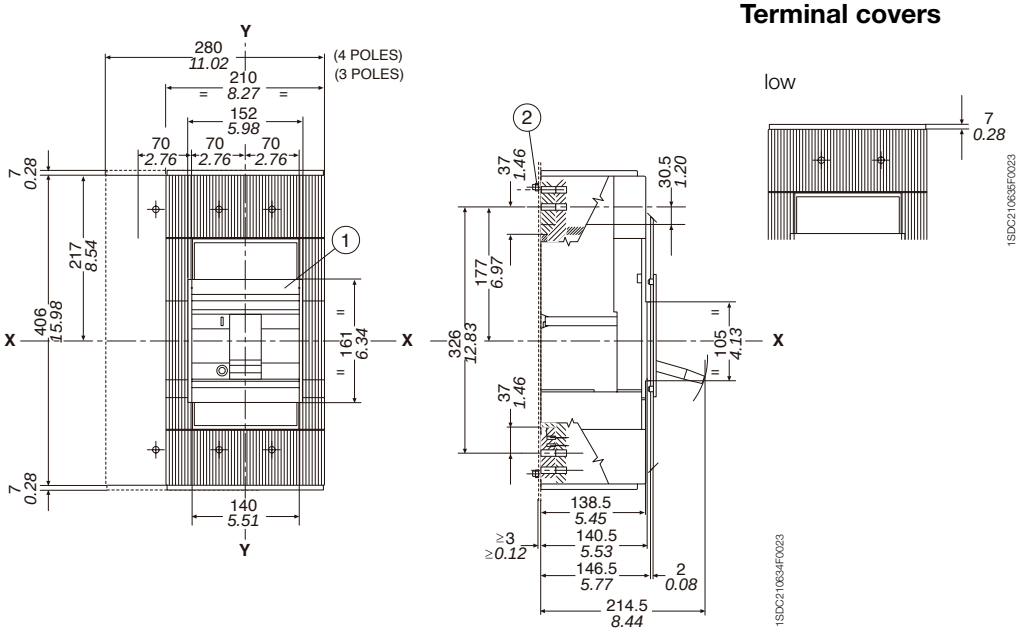
Fixed circuit breaker

[mm/*in*]

Caption

(1) Flange for compartment door

(2) Tightening torque 2 Nm



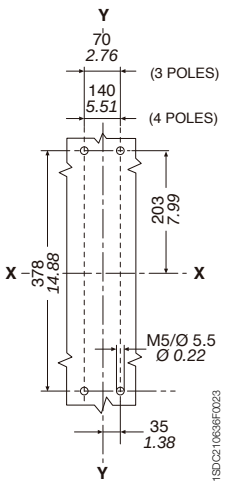
Terminal covers

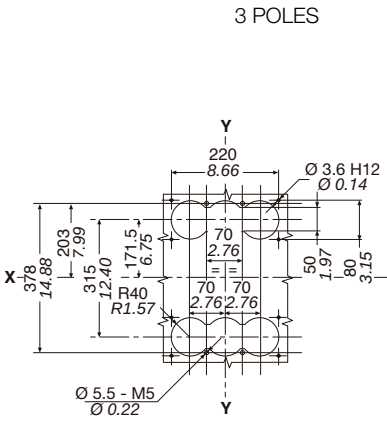
Template for drilling sheet metal support

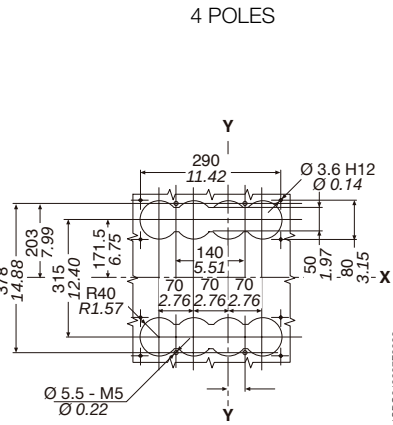
(Minimum thickness of sheet metal: 0.12”/3 mm)

For terminals:
Front - F
Front extended - EF
Front for Cu/Al cables - FC CuAl

For flat rear terminals - R

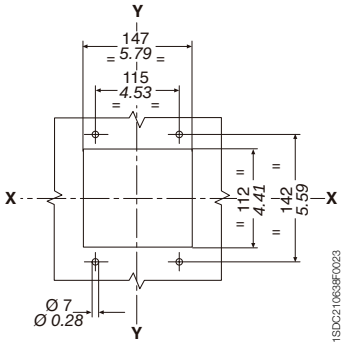






Template for drilling compartment door and fitting flange

(thickness of sheet metal: 0.08”/2 mm)

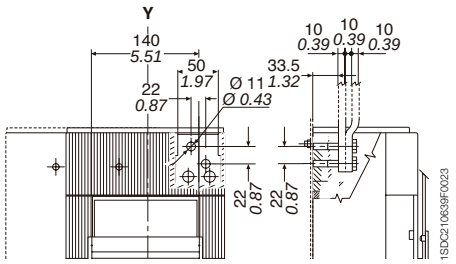


6

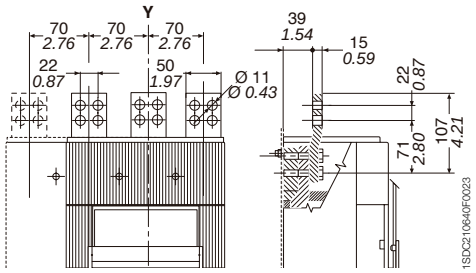
Terminals

[mm/*in*]

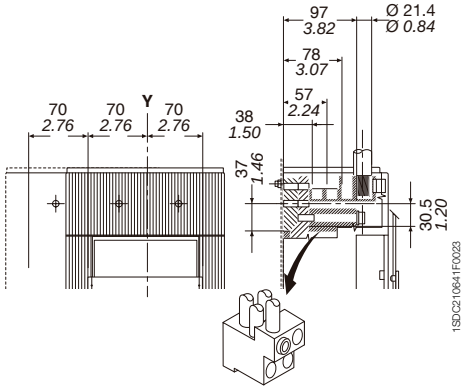
Front - F



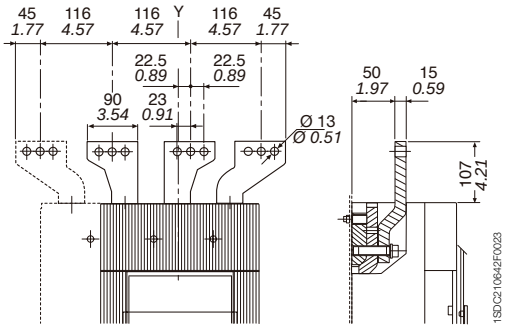
Front extended - EF



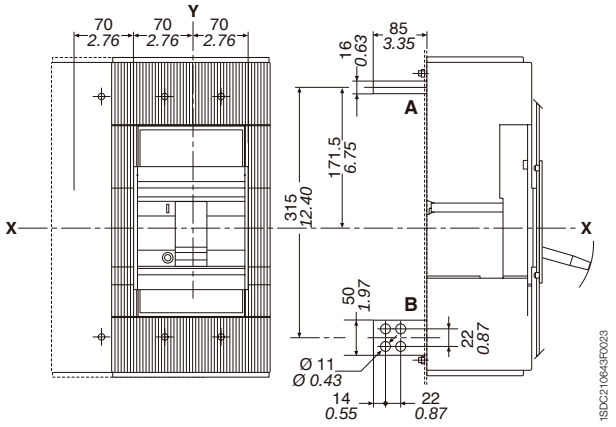
Front for Cu/Al cables for S7 1250 - FC CuAl



Front extended spreaded - ES



Raer horizontal or vertical flat terminals - HR or VR



6

Overall dimensions

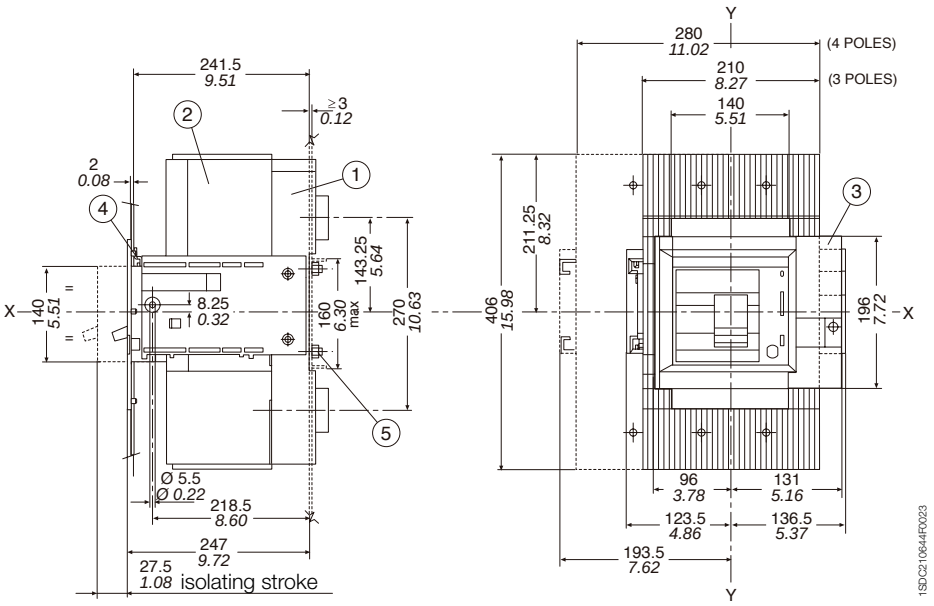
Isomax S7

Draw out circuit breaker

Caption

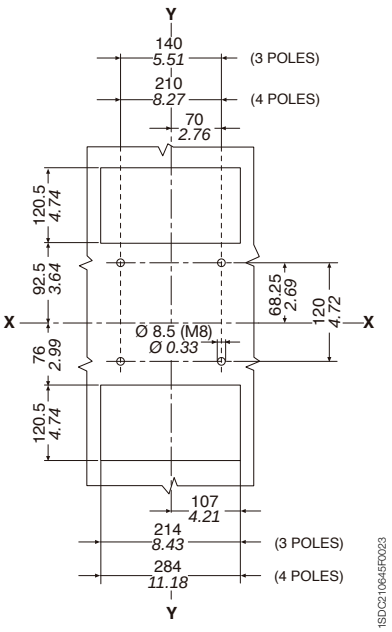
1. Fixed part
2. Moving part
3. Flange for compartment door
4. Lock for compartment door (to be ordered)
5. Tightening torque 9 Nm

[mm/*in*]



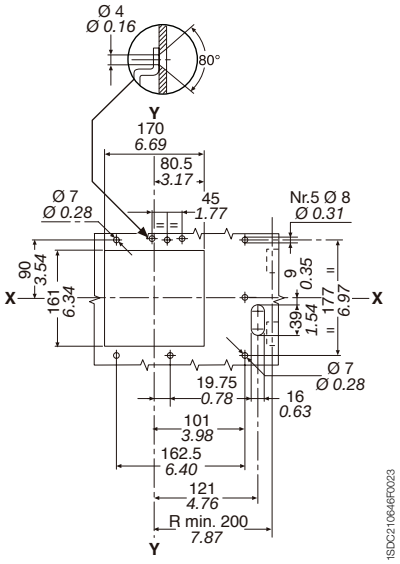
Template for drilling sheet metal support or channel

(Minimum thickness of sheet metal: 0.12”/3 mm)



Template for drilling compartment door and fitting flange

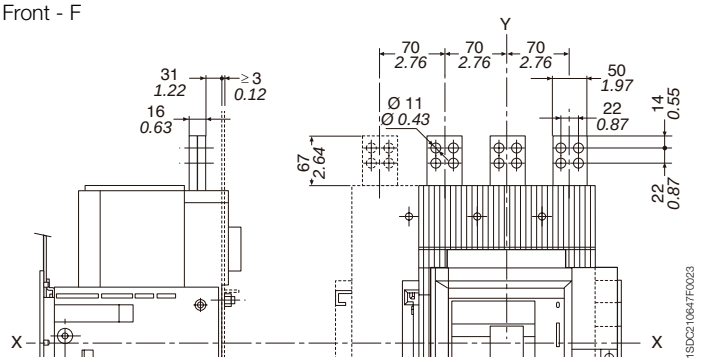
(thickness of sheet metal: 0.08”/2 mm)



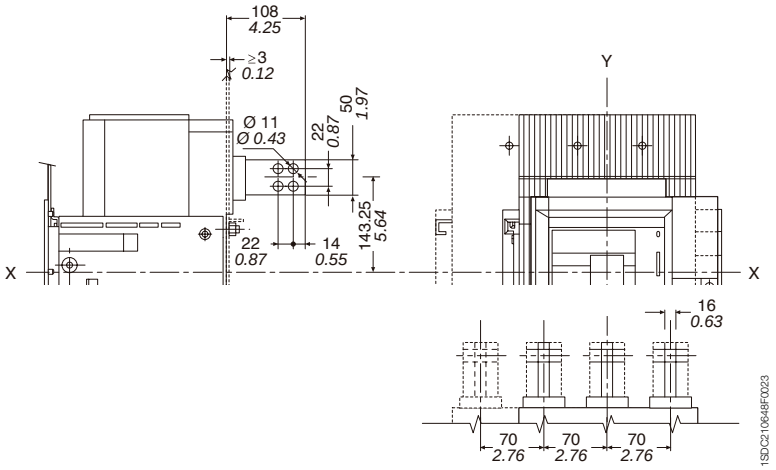
Terminals

[mm/*in*]

Front - F



Rear horizontal or vertical flat terminals - HR or VR



6

Overall dimensions

Isomax S8

Fixed circuit breaker

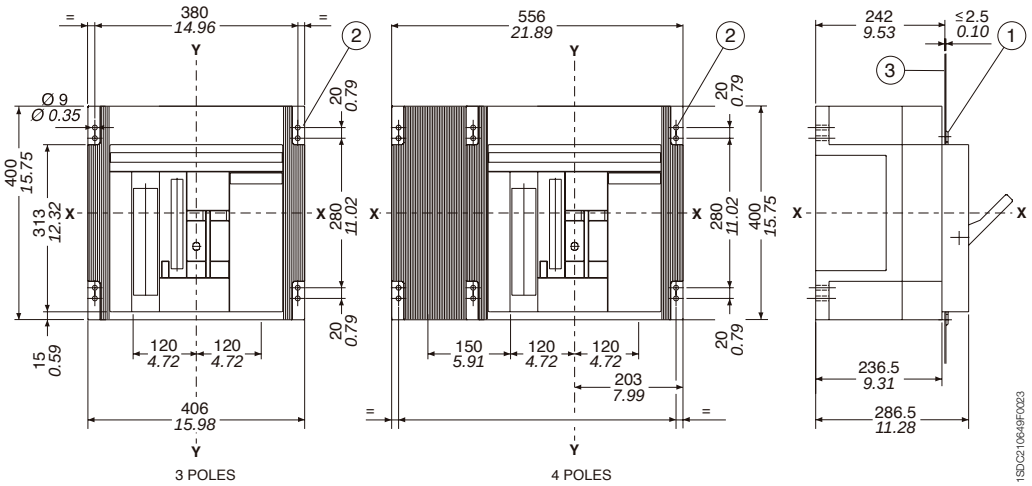
[mm/*in*]

Caption

(1) Flange for compartment door

(2) Circuit breaker mounting holes

(3) Internal side of compartment door



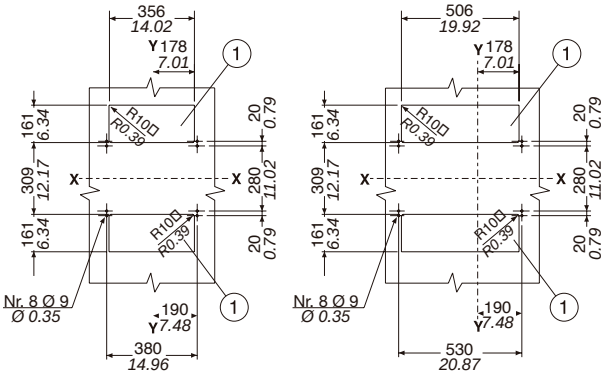
Caption

(1) Hole for rear terminals only

(2) Minimum radius of rotation of compartment door

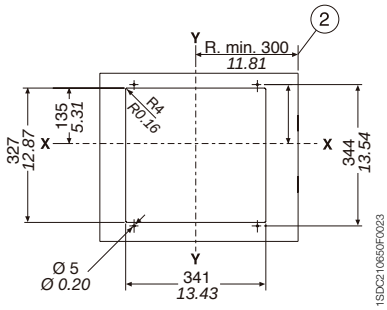
Template for drilling sheet metal support

(Minimum thickness of sheet metal: 0.12”/3 mm)



Template for drilling compartment door and fitting flange

(Minimum thickness of sheet metal: < 0.10”/2.5 mm)

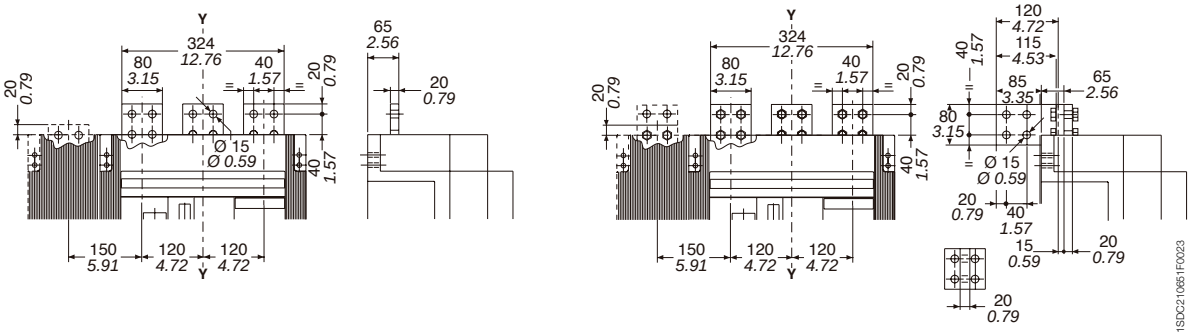


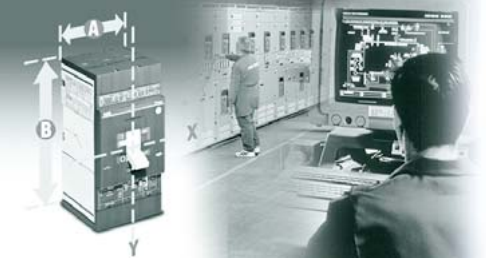
Terminals

[mm/*in*]

Front - F

Rear - R





Overall dimensions

T1, T2 and T3 with residual current release - RC221/RC222

[mm/*in*]

Caption

(1) Depth of the switchboard with circuit breaker face extending

(2) Depth of the switchboard with circuit breaker face flush with door

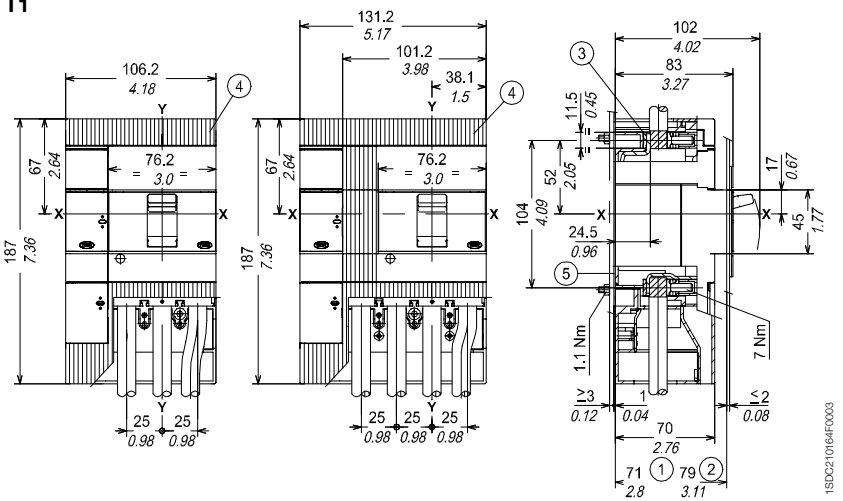
(3) Front terminals for cable connection

(4) Low terminal covers with degree of protection IP40

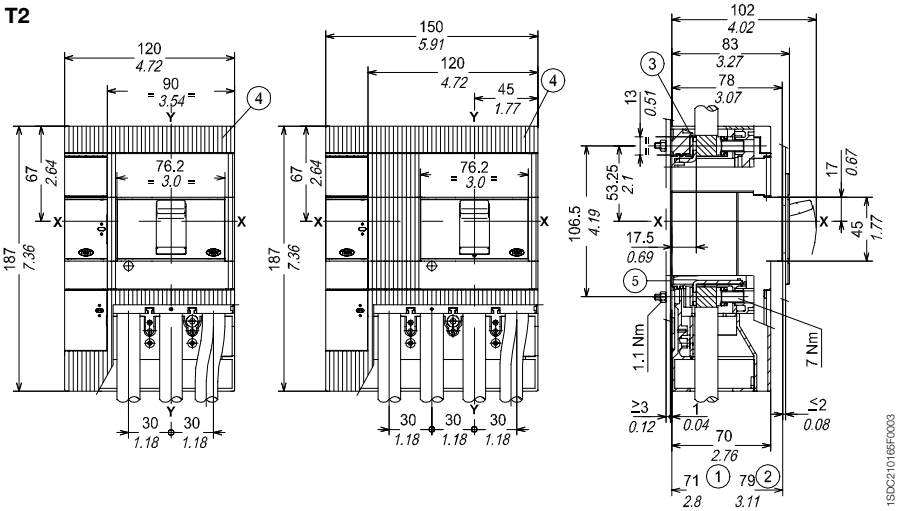
(5) Insulating plate

Front - F, fixing on sheet

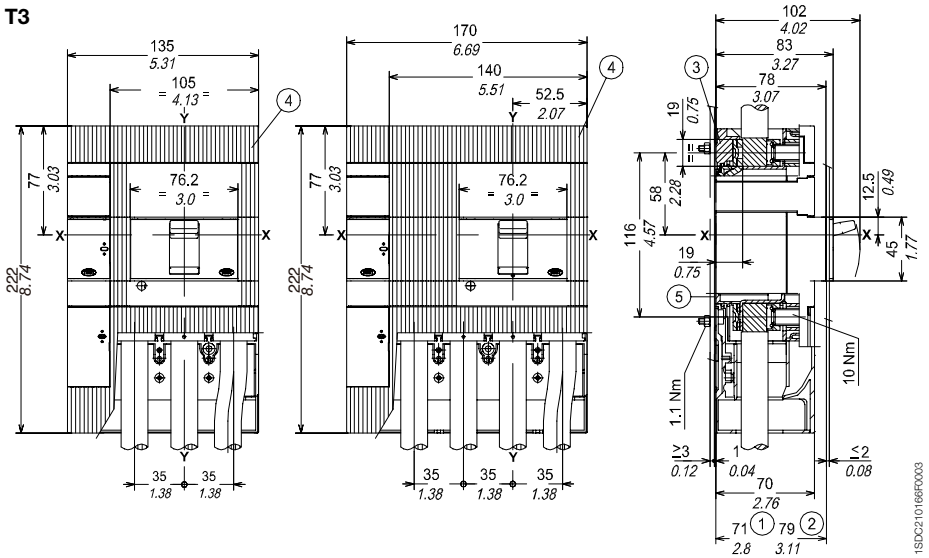
T1



T2



T3



6

Overall dimensions

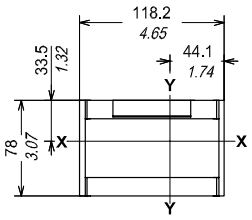
T1, T2 and T3 with residual current release - RC221/RC222

[mm/*in*]

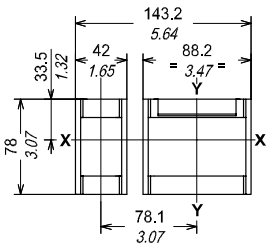
Flange for the compartment door

T1

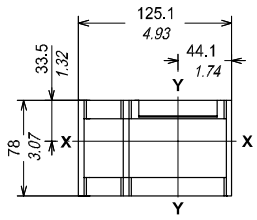
3 POLES

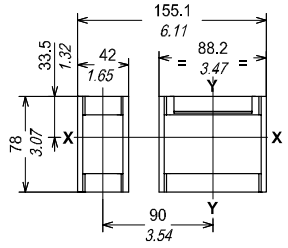


4 POLES

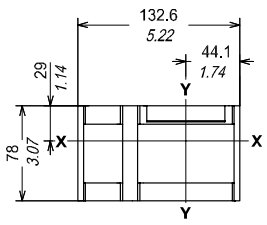


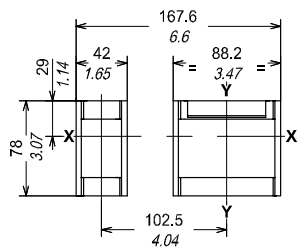
T2





T3

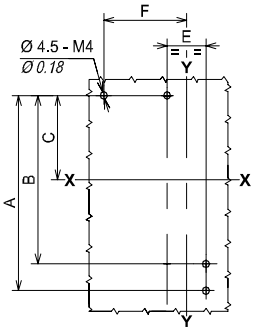




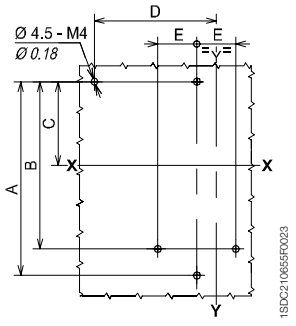
Drilling template for fixing sheet

T1 - T2 - T3

3 POLES



4 POLES



	A	B	C	D	E	F
T1	124 *4.88*	107 *4.21*	53.5 *2.11*	78.1 *3.07*	25 *0.98*	53.1 *2.09*
T2	124 *4.88*	107 *4.21*	53.5 *2.11*	90 *3.54*	30 *1.18*	60 *2.36*
T3	141.5 *5.57*	122 *4.80*	61 *2.40*	102.5 *4.04*	35 *1.38*	67.5 *2.66*

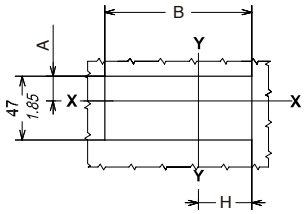
[mm/*in*]

Drilling templates of the compartment door

Without flange face extending

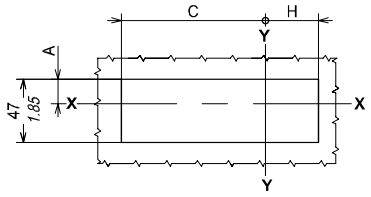
3 POLES

T1 - T2 - T3



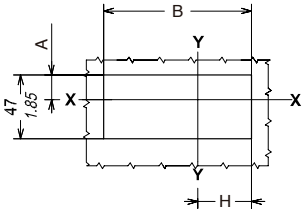
4 POLES

T1 - T2 - T3

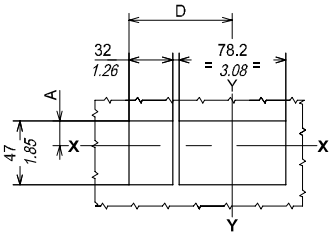


Without flange face not extending

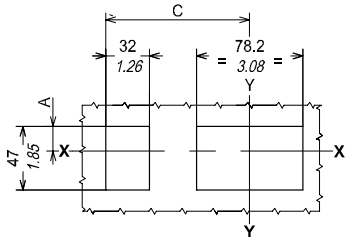
T1



T2 - T3

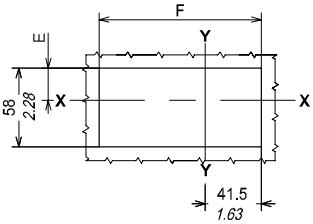


T1 - T2 - T3

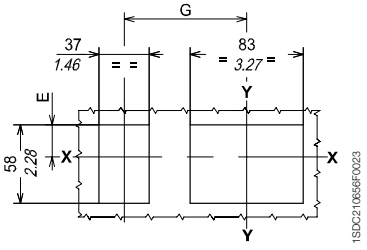


With flange face not extending

T1 - T2 - T3



T1 - T2 - T3



	A	B	C	D	E	F	G	H
T1	18 *0.71*	108.2 *4.26*	94.1 *3.70*	– –	23.5 *0.93*	113 *4.45*	78.1 *3.07*	39.1 *1.54*
T2	18 *0.71*	122 *4.80*	106 *4.17*	76 *2.99*	23.5 *0.93*	120 *4.72*	90 *3.54*	46 *1.81*
T3	13.5 *0.53*	137 *5.39*	118.5 *4.67*	83.5 *3.29*	19 *0.75*	127.4 *5.02*	102.5 *4.04*	53.5 *2.11*

Overall dimensions

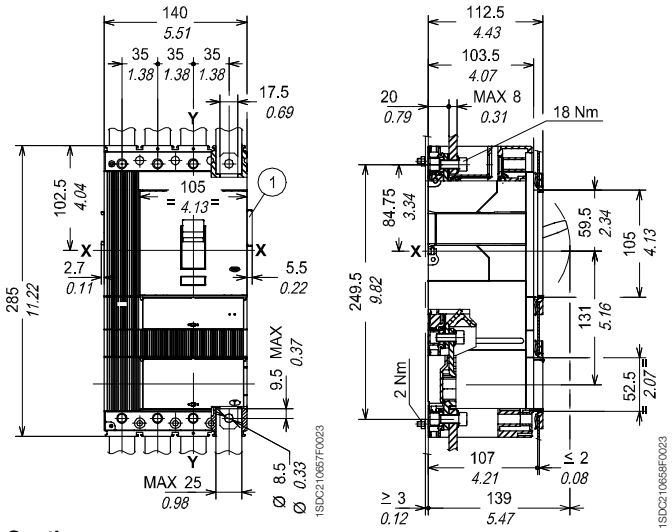
T4 and T5 with residual current release - RC221/RC222

Fixed version

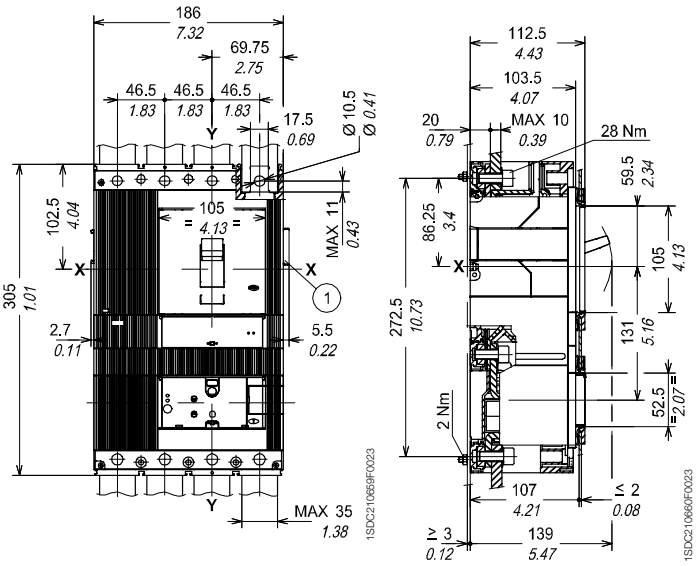
[mm/*in*]

Front - F, fixing on sheet

T4



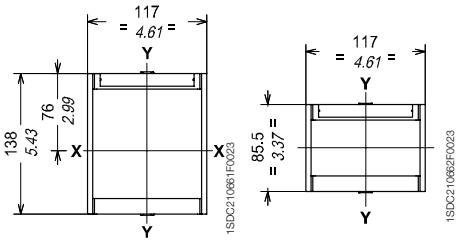
T5 (400 A)



Caption

(1) Overall dimensions with cabled auxiliary contacts mounted (only 3Q 1SY)

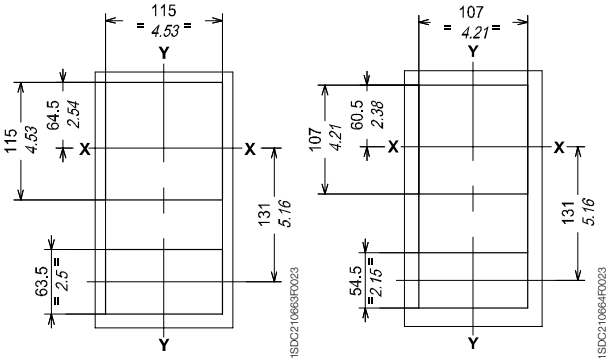
Flange for the compartment door



For circuit breakers

For residual current release

Drilling templates of compartment door and fitting flange

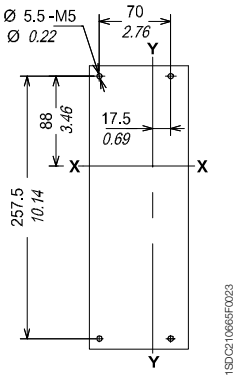


With flange

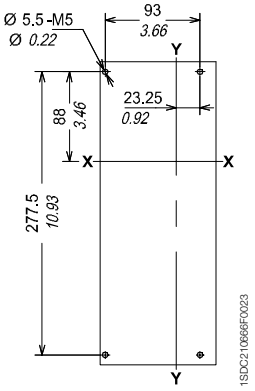
Without flange

Drilling templates for support sheet

T4



T5



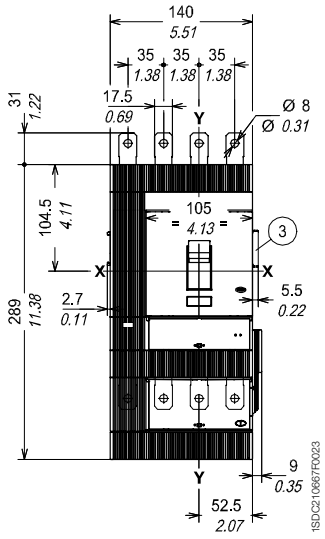
6

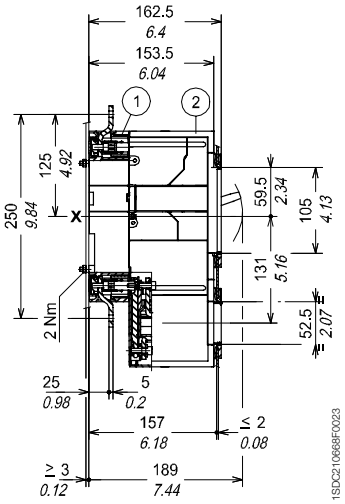
Plug-in version

[mm/*in*]

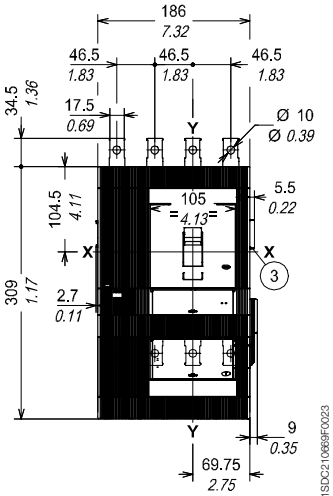
Front - F, fixing on sheet

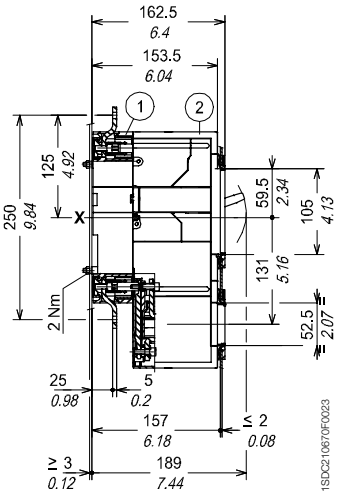
T4





T5 (400 A)





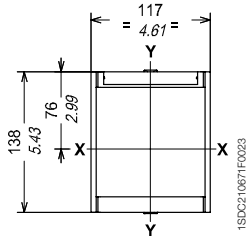
Caption

(1) Fixed part

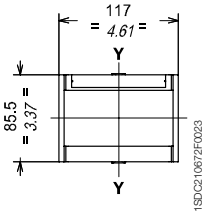
(2) Mobile part

(3) Overall dimensions with cabled auxiliary contacts mounted (only 3Q 1SY)

Flange for the compartment door

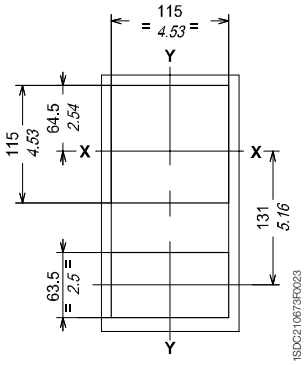


For circuit breakers

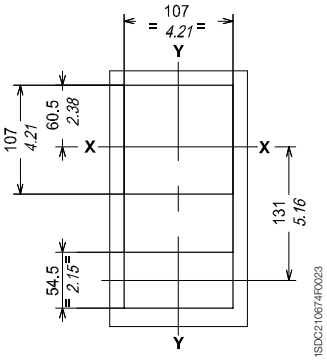


For residual current release

Drilling templates of compartment door and fitting flange



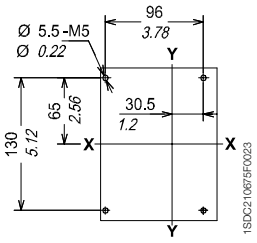
With flange



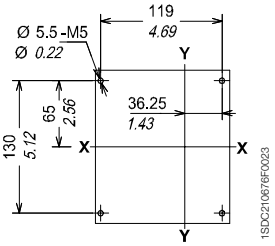
Without flange

Drilling templates for support sheet

T4



T5



6

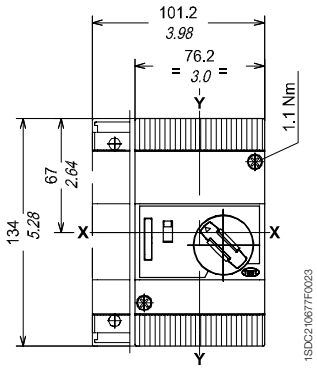
Overall dimensions

Accessories for Tmax T1 - T2 - T3

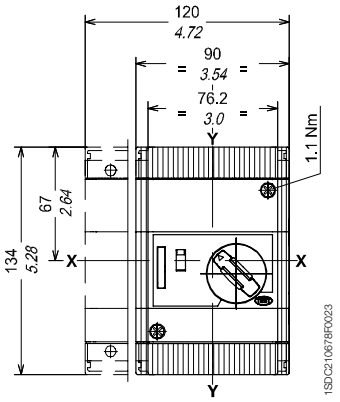
[mm/*in*]

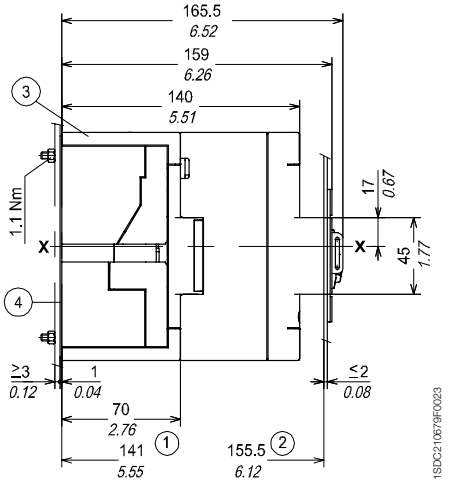
Solenoid operator superimposed

T1



T2

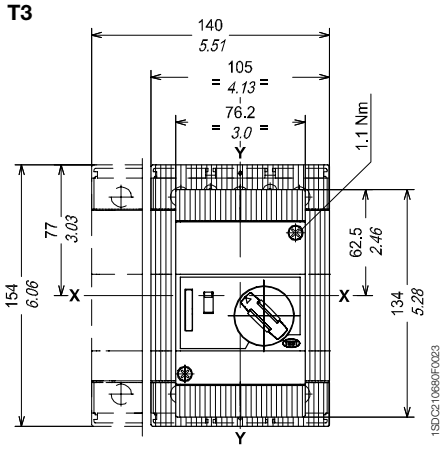


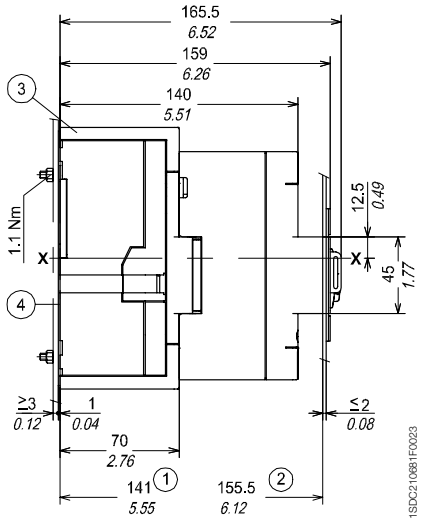


Caption

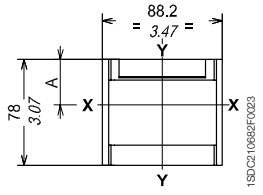
1. Depth of the switchboard with operating mechanism face extending
2. Depth of the switchboard with operating mechanism face flush with door
3. Low terminal covers with degree of protection IP40
4. Insulating plate

T3



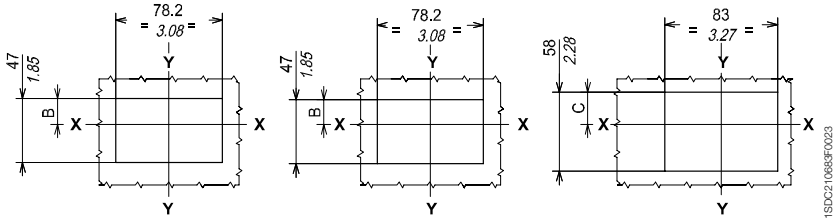


Flange for compartment door



	A	B	C
T1	33.5 *1.32*	18 *0.71*	23.5 *0.93*
T2	33.5 *1.32*	18 *0.71*	23.5 *0.93*
T3	29 *1.14*	13.5 *0.53*	19 *0.75*

Drilling templates of the compartment door

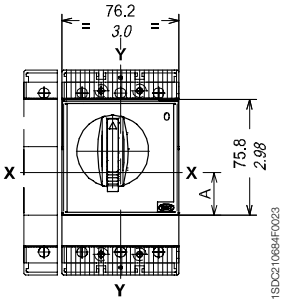


Without flange
Operating mechanism face extending

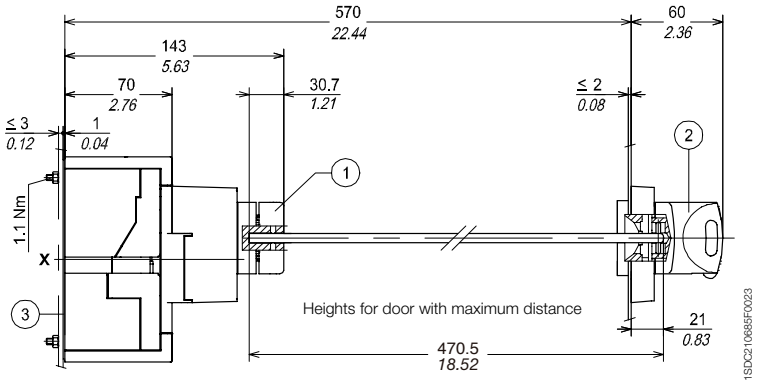
Without flange
Operating mechanism face flush with door

With flange
Operating mechanism face flush with door

[mm/*in*]



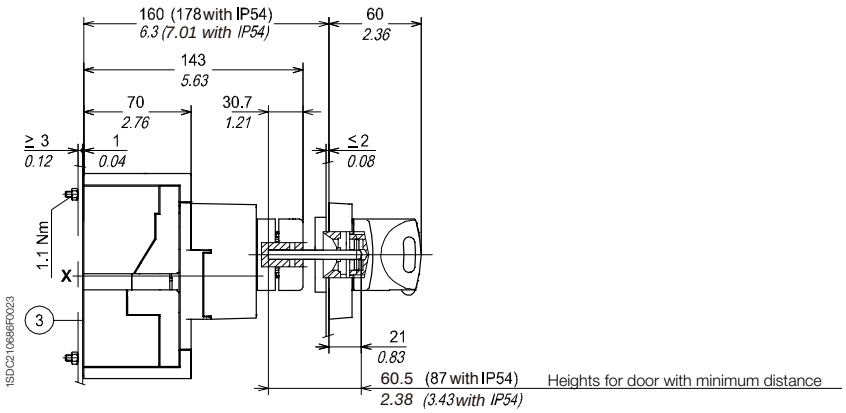
Rotary handle operating mechanism on the compartment door



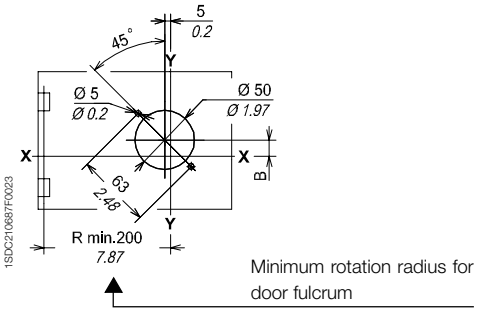
Caption

1. Transmission unit
2. Rotary handle operating mechanism on the compartment door
3. Insulating plate

	A	B
T1-T2	28 *1.10*	14 *0.55*
T3	32.5 *1.28*	9.5 *0.37*



Drilling template of the compartment door



Overall dimensions

Accessories for Tmax T1 - T2 - T3

[mm/*in*]

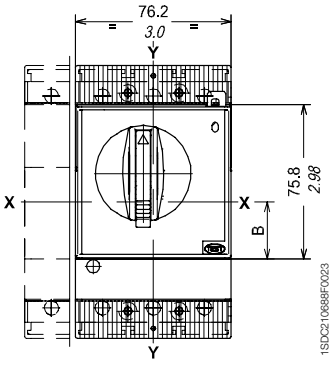
Caption

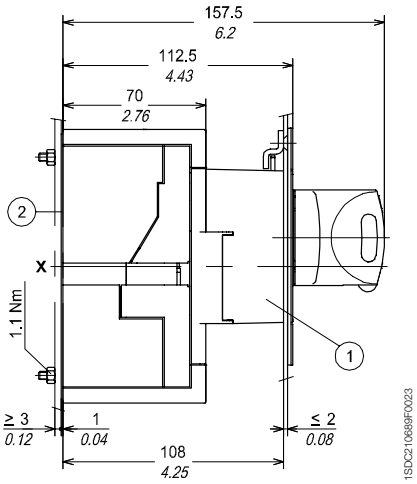
(1) Rotary handle operating mechanism on circuit breaker

(2) Insulating plate

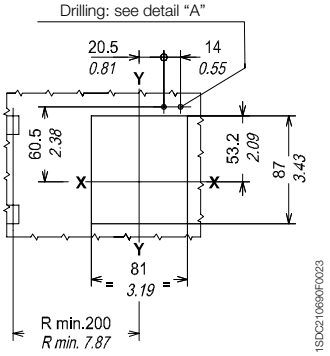
	A	B	C	D
T1-T2	67.7 *2.67*	28 *1.10*	53.2 *2.09*	60.5 *2.38*
T3	63.2 *2.49*	32.5 *1.28*	48.7 *1.92*	56 *2.20*

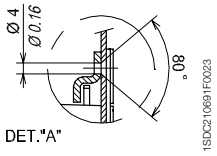
Rotary handle operating mechanism on circuit breaker



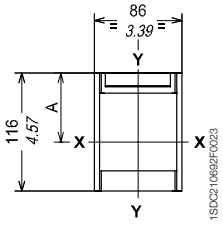


Drilling template of the compartment door





Flange for the compartment

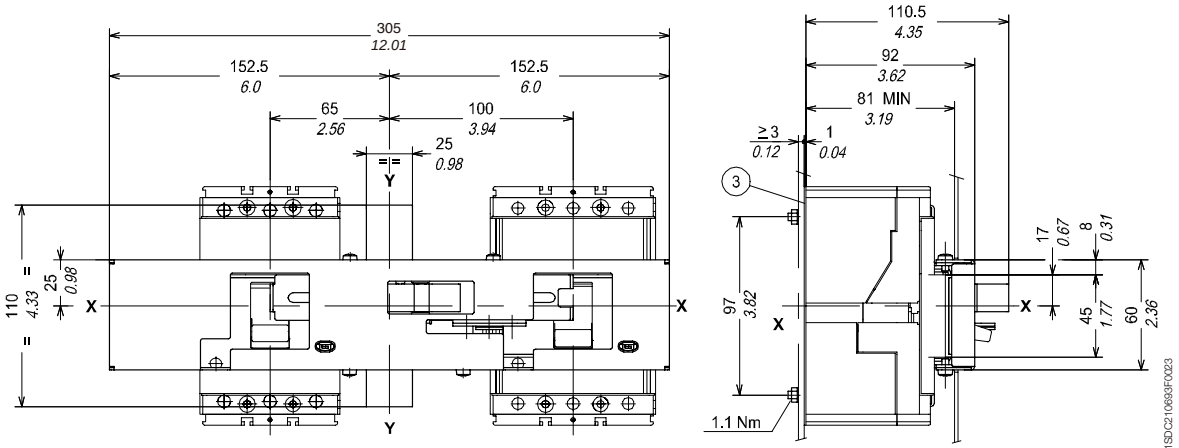


6

[mm/*in*]

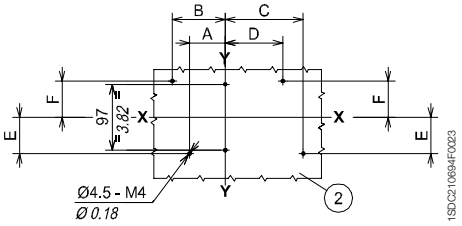
Mechanical interlock between circuit breakers

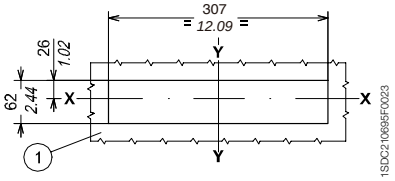
Front interlocking plate between two circuit breakers



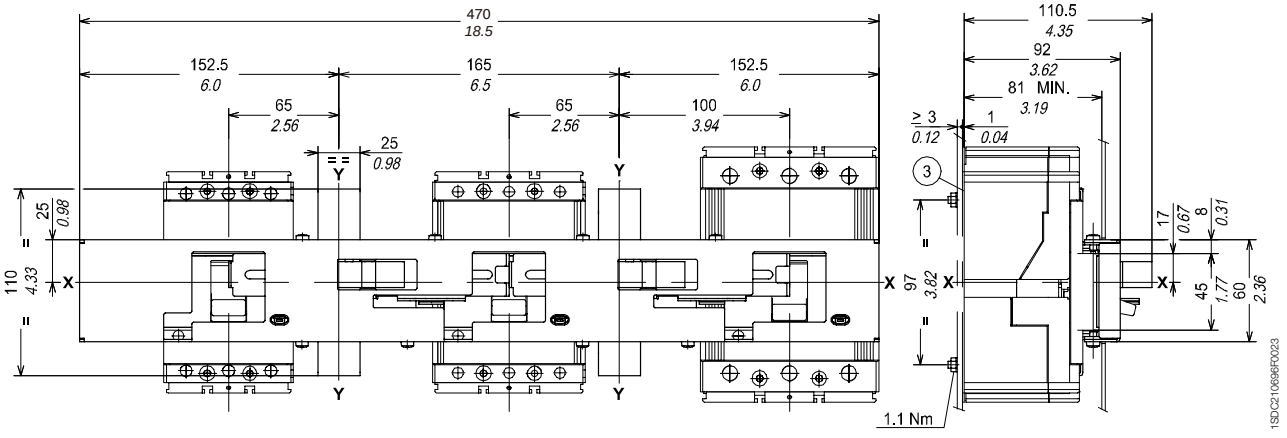
Caption

1. Drilling templates of the compartment door
2. Drilling templates for support sheet
3. Insulating plate

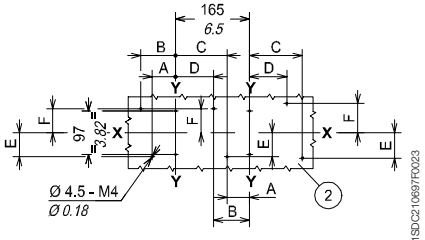


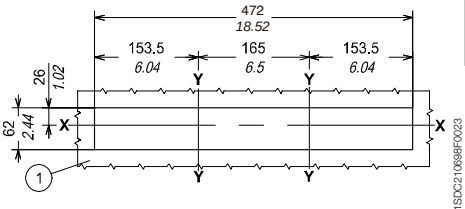


Front interlocking plate among three circuit breakers



	A	B	C	D	E	F
T1	52.5 *2.07*	77.5 *3.05*	112.5 *4.43*	87.5 *3.44*	53.5 *2.11*	53.5 *2.11*
T2	50 *1.97*	80 *3.15*	115 *4.53*	85 *3.35*	53.5 *2.11*	53.5 *2.11*
T3	47.5 *1.87*	82.5 *3.25*	117.5 *4.63*	82.5 *3.25*	56.5 *2.22*	65.5 *2.58*





6

Overall dimensions

Accessories for Tmax T4 - T5

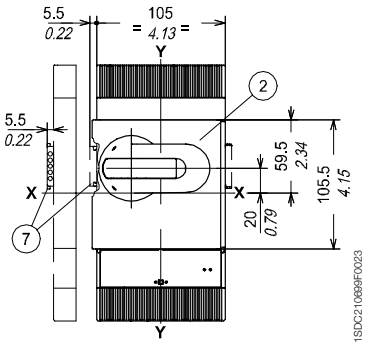
Fixed version

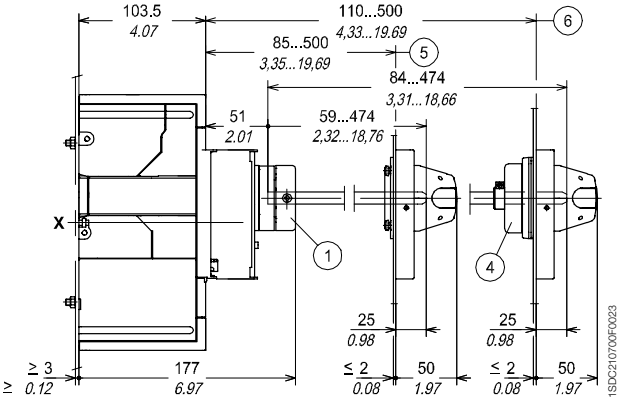
[mm/*in*]

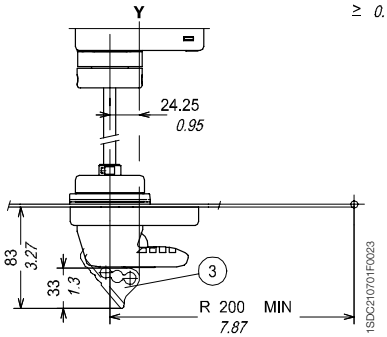
Caption

1. Transmission unit
2. Rotary handle assembly with door lock device
3. Padlock device for open position (maximum 3 padlocks to be provided by the user)
4. IP54 protection (supplied on request)
5. Min…max distance from the front of the door without accessory 4
6. Min…max distance from the front of the door with accessory 4
7. Dimension with AUE connector (early making contact)

Rotary handle operating mechanism on the compartment door

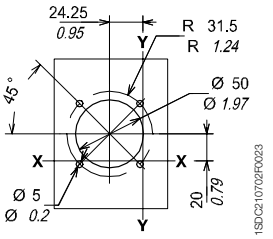






Minimum rotation radius for door fulcrum

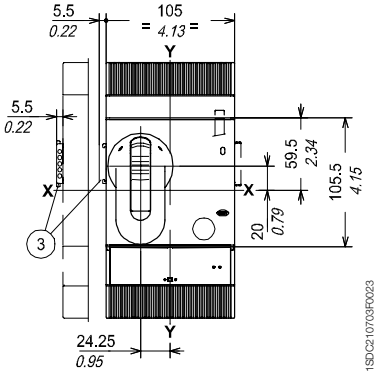
Drilling of compartment door

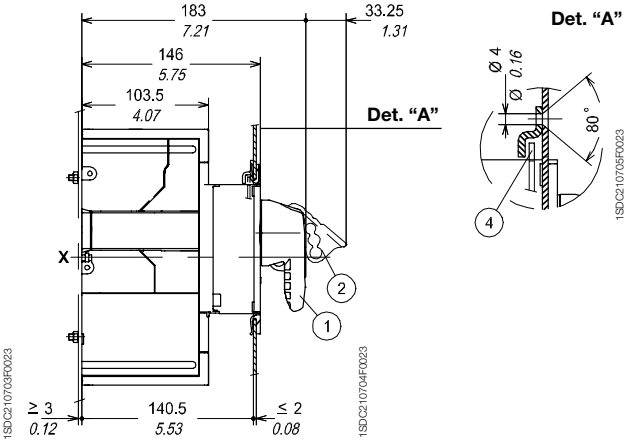


Caption

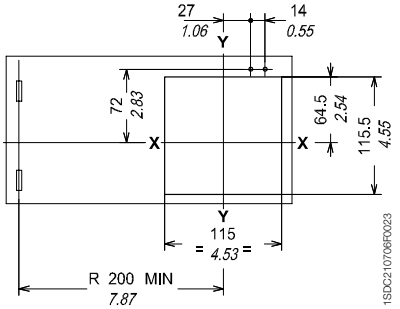
1. Rotary handle operating mechanism on circuit breaker
2. Padlock device for open position (maximum 3 padlocks to be provided by the user)
3. Dimension with AUE connector (early making contact)
4. Compartment door lock

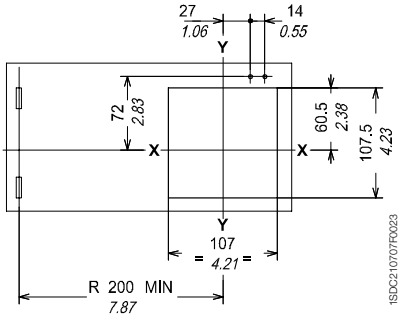
Rotary handle operating mechanism on circuit breaker



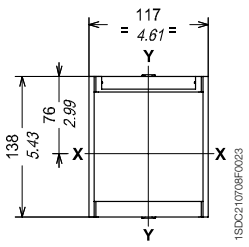


Drilling template of the compartment door





Flange for the compartment door



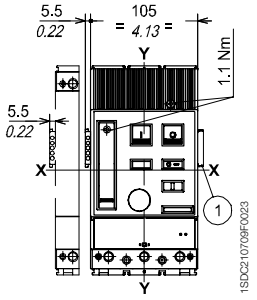
[mm/*in*]

Caption

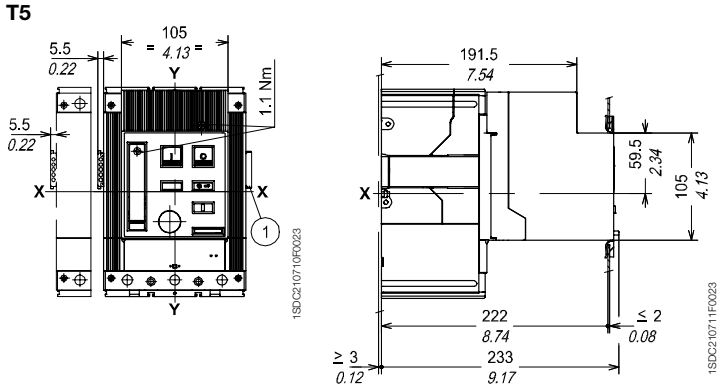
(1) Overall dimensions with cabled auxiliary contacts mounted (only 3Q 1SY)

Motor operator

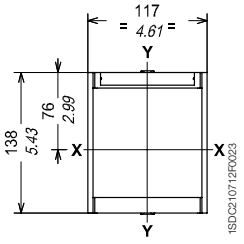
T4



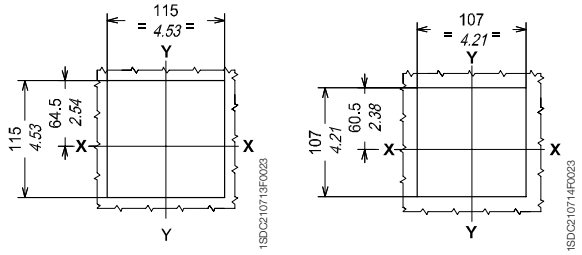
T5



Flange for the compartment door (supplied as standard)



Drilling template of the compartment door

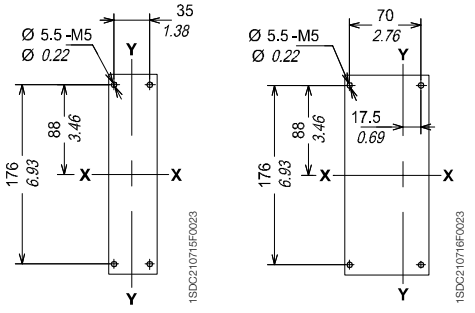


With flange

Without flange

Drilling template for support sheet

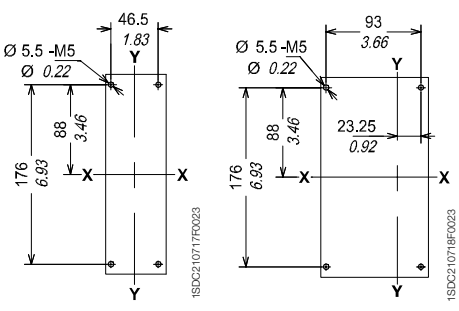
T4



3 POLES

4 POLES

T5



3 POLES

4 POLES

6

Overall dimensions

Accessories for Tmax T4 - T5

Fixed version

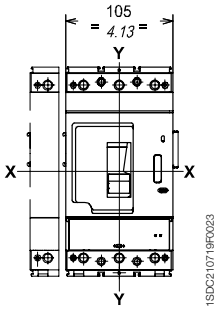
[mm/*in*]

Caption

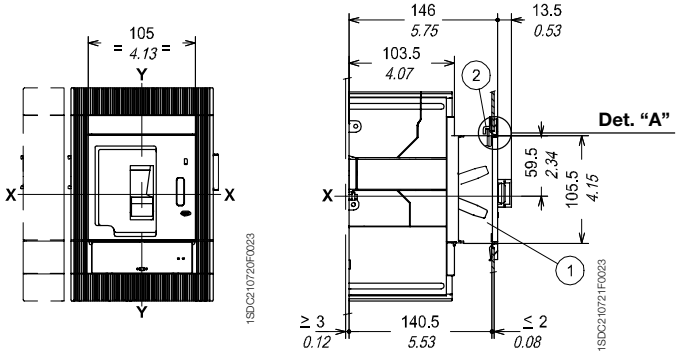
1. Front for lever operating mechanism
2. Lock for the compartment door (supplied on request)

Front for lever operating mechanism

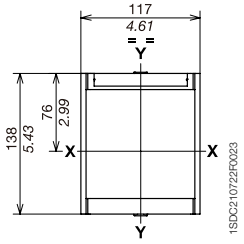
T4



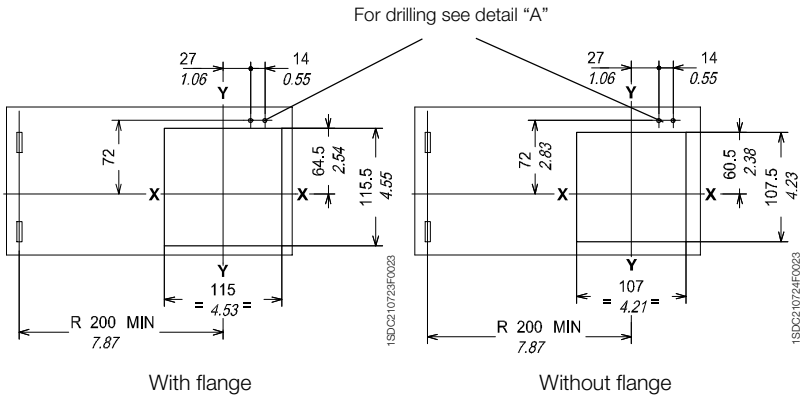
T5



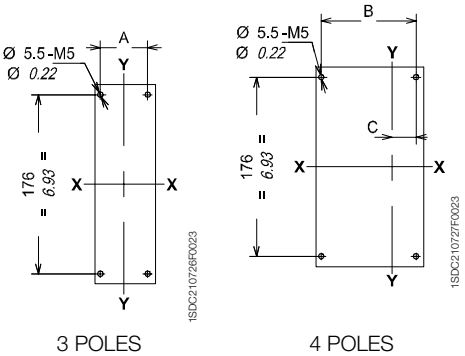
Flange for the compartment door (supplied as standard)



Drilling template for the compartment door



Drilling template for support sheet



	A	B	C
T4	35 *1.38*	70 *2.76*	17.5 *0.69*
T5	46.5 *1.83*	93 *3.66*	23.25 *0.92*

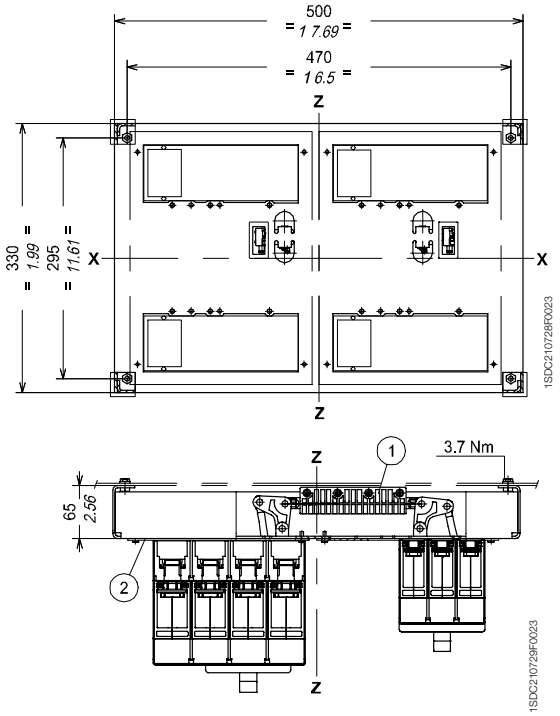
[mm/*in*]

Caption

(1) Interlocking mechanism

(2) Circuit breaker coupling plate

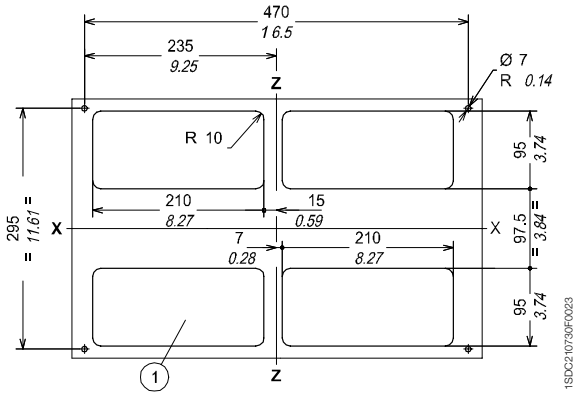
Interlock between two circuit breakers placed side by side



Caption

(1) Drilling template for all versions with rear terminals

Drilling templates for fixing the circuit breaker on the support sheet



6

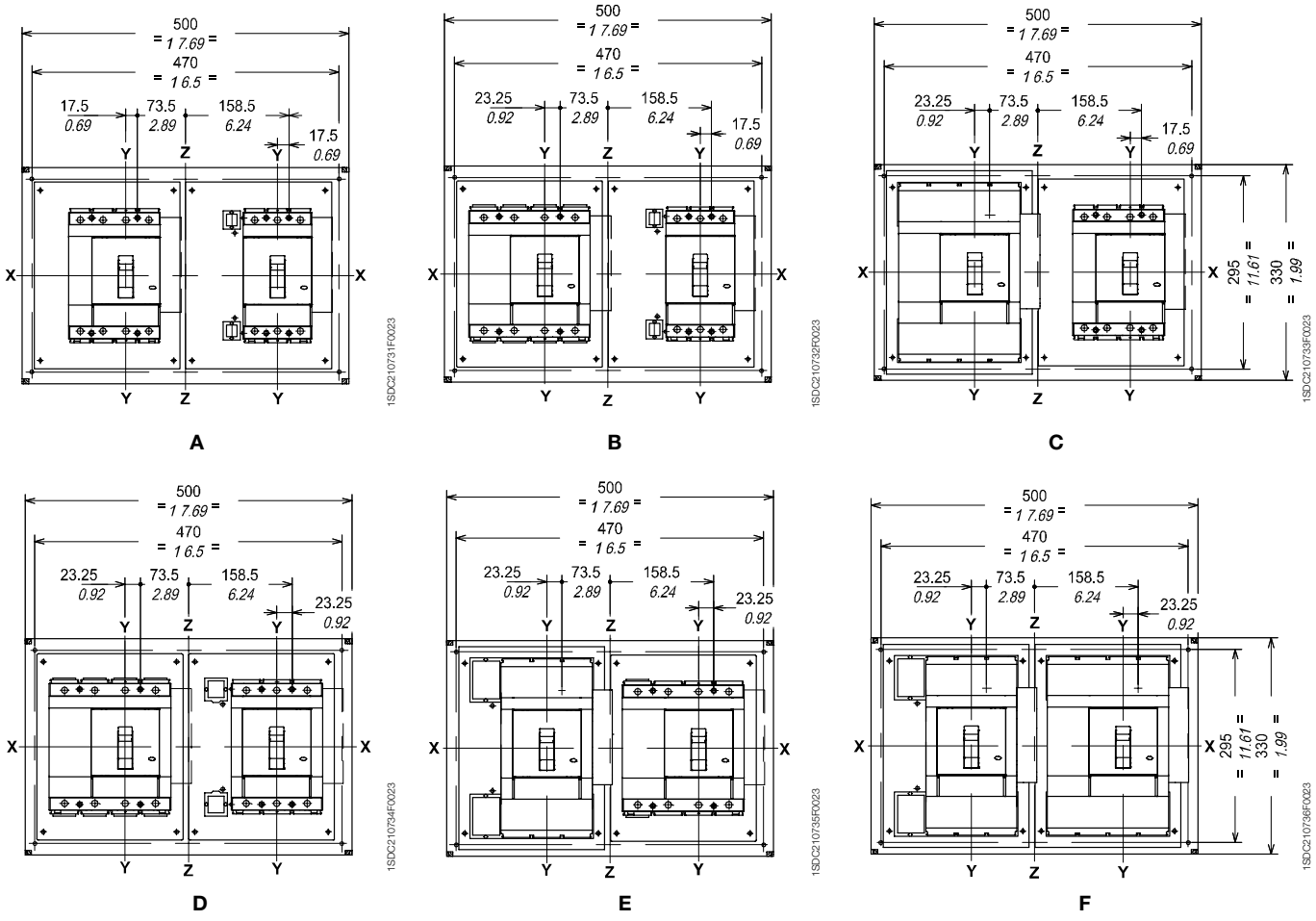
Overall dimensions

Accessories for Tmax T4 - T5

Fixed version

[mm/*in*]

Interlock between two circuit breakers placed side by side



A B C

D E F

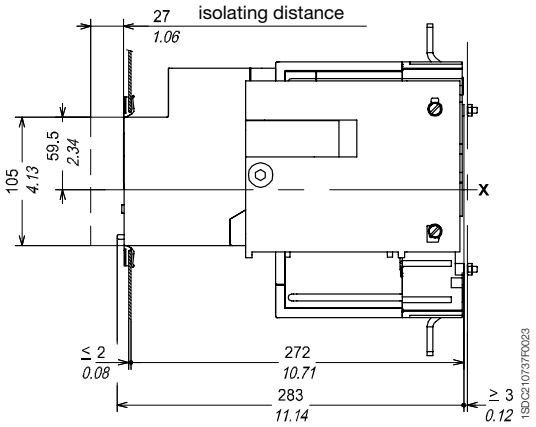
Type	Circuit breakers
A	N° 1 T4 (F-P-W) N° 1 T4 (F-P-W)
B	N° 1 T4 (F-P-W) N° 1 T5/400 (F-P-W) or T5/600* (F)
C	N° 1 T4 (F-P-W) N° 1 T5/600* (P-W)
D	N° 1 T5/400 (F-P-W) or T5/600* (F) N° 1 T5/400 (F-P-W) or T5/600* (F)
E	N° 1 T5/400 (F-P-W) or T5/600* (F) N° 1 T5/600* (P-W)
F	N° 1 T5/600* (P-W) N° 1 T5/600* (P-W)

Note:
(F) Fixed circuit breaker
(P) Plug-in circuit breaker
(W) Draw out circuit breaker
* Please ask ABB for 600 A availability

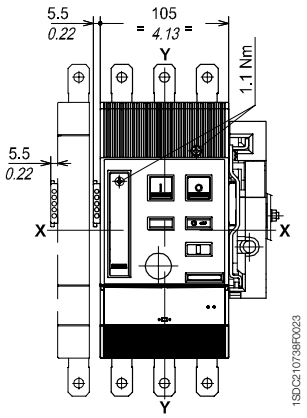
Draw out version

[mm/*in*]

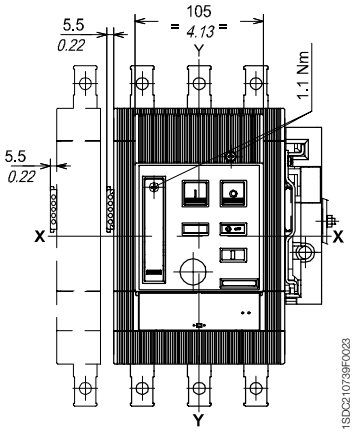
Motor operator



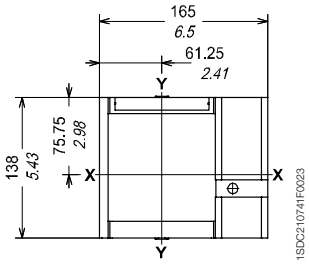
T4



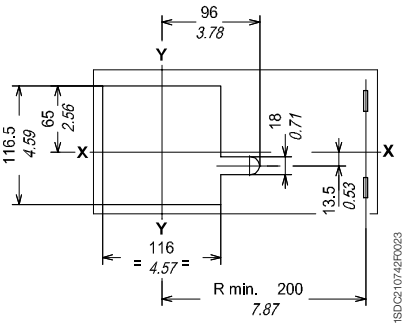
T5 (400 A)



Flange for the compartment door (supplied as standard)



Drilling templates for the compartment door and fitting flange



6

Overall dimensions

Accessories for Tmax T4 - T5

Draw out version

Caption

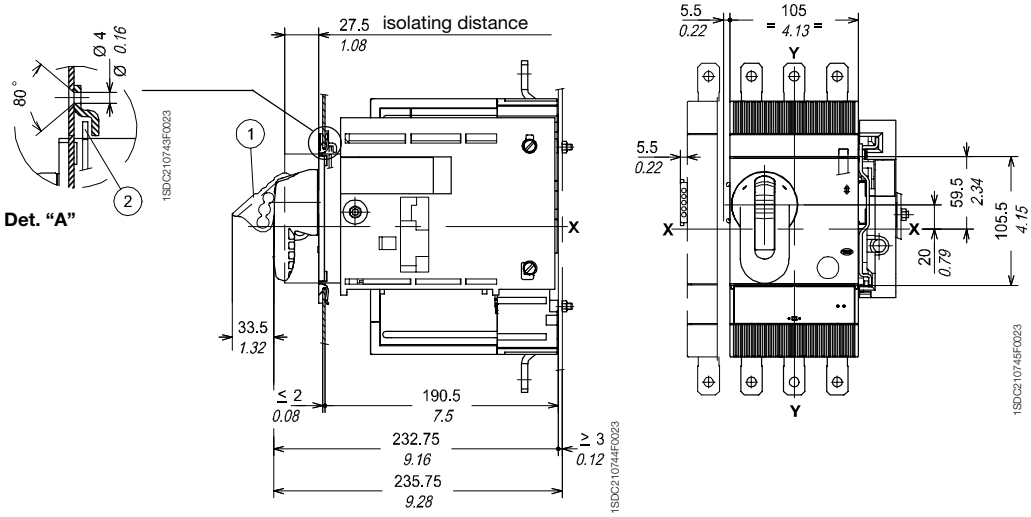
(1) Padlock device for open position (maximum 3 padlocks to be provided by the user)

(2) Lock for compartment door (supplied on request)

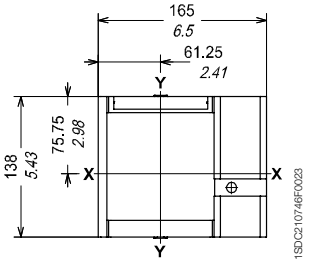
(3) Dimension with AUE connector (early making contact)

[mm/*in*]

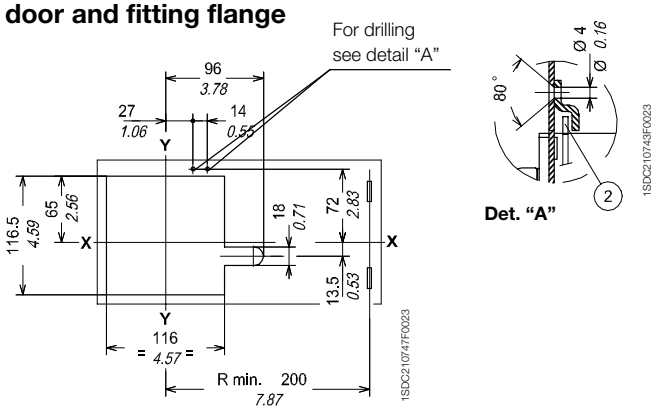
Rotary handle operating mechanism on the circuit breakers



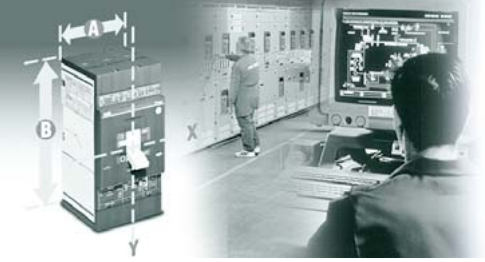
Flange for the compartment door



Drilling template for compartment door and fitting flange



6



Overall dimensions

Accessories for Isomax S6

[mm/*in*]

Caption

(1) Interlock device

(2) Drilling template for mounting circuit breaker on sheet metal

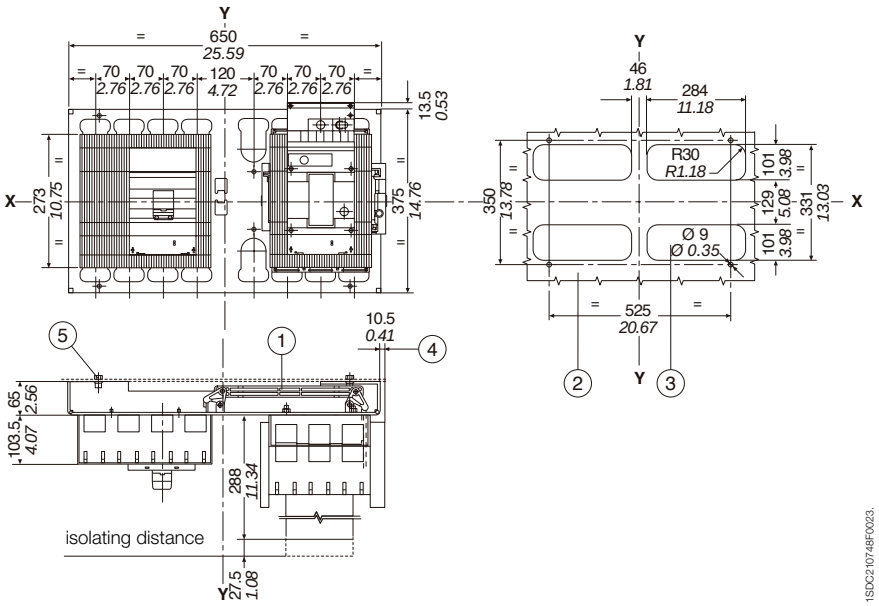
(3) Drilling template for all versions with rear terminals

(4) Dimensions with draw out version mounted on right

(5) Tightening torque 9 Nm

Note See the various different versions for the dimensions of the circuit breakers

Interlock between two horizontally-installed circuit breakers



Caption

(1) Interlock device

(2) Drilling template for mounting circuit breaker on sheet metal

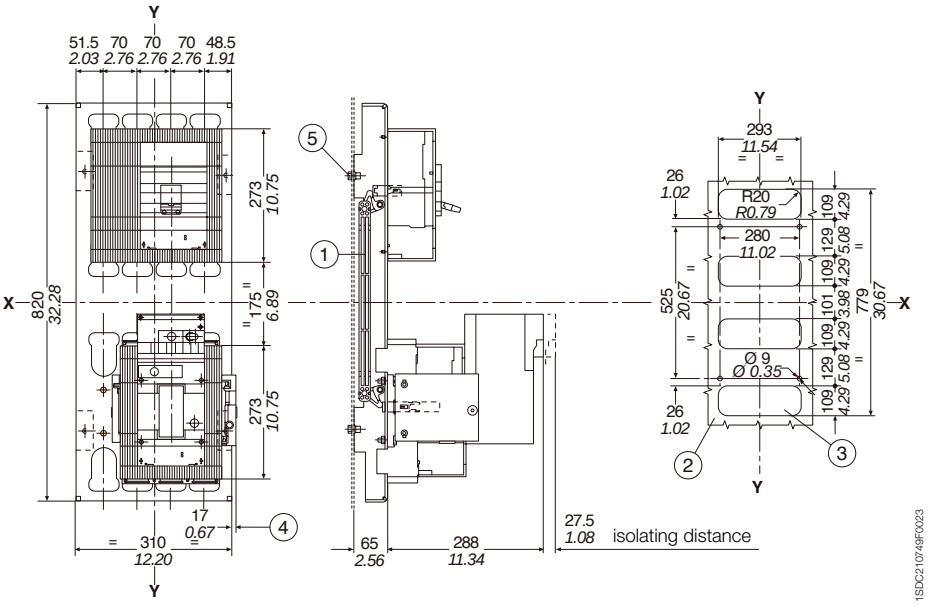
(3) Drilling template for all versions with rear terminals

(4) Dimensions with draw out version mounted on right

(5) Tightening torque 9 Nm

Note See the various different versions for the dimensions of the circuit breakers

Interlock between two vertically-installed circuit breakers

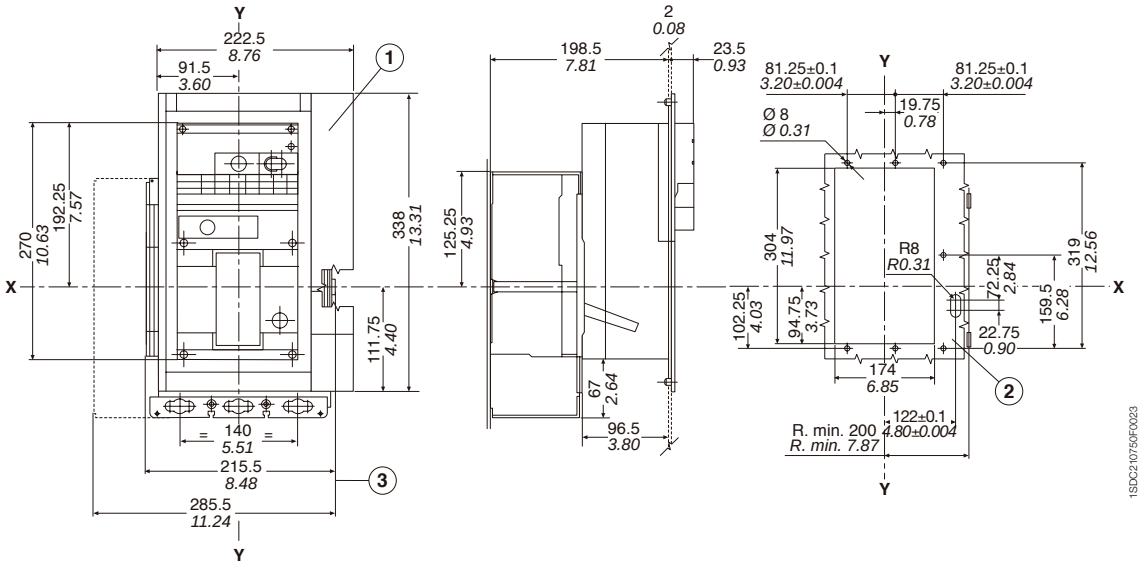


Overall dimensions

Accessories for Isomax S6

[mm/*in*]

Motor operator for fixed circuit breaker

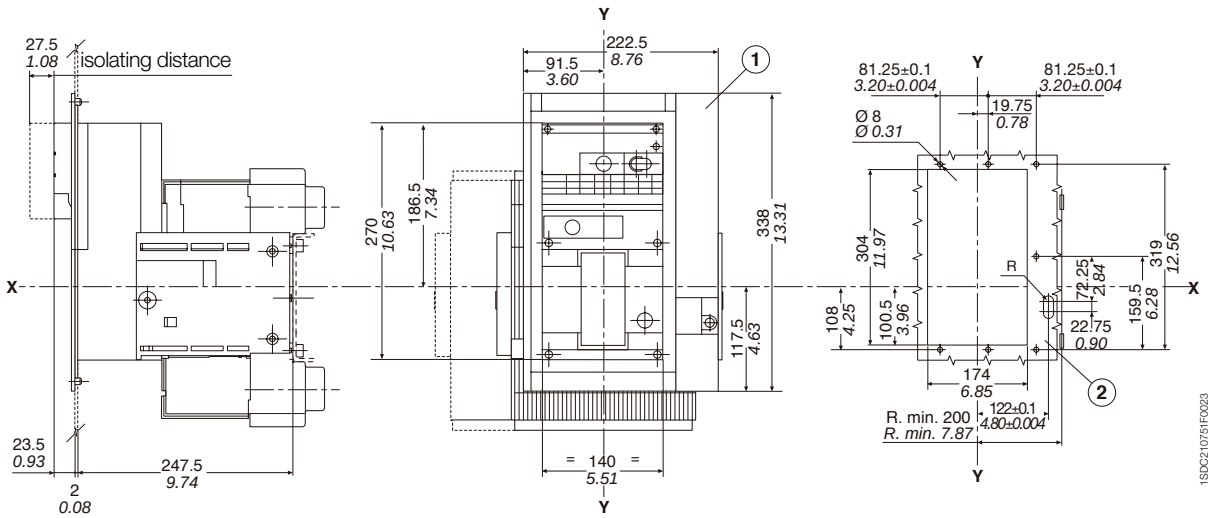


Caption

1. Flange for compartment door
2. Template for drilling compartment door
3. Dimensions with connectors

Note See the various different versions for the dimensions of the circuit breakers

Motor operator for draw out circuit breakers



Caption

1. Flange for compartment door
2. Template for drilling compartment door

Note See the various different versions for the dimensions of the circuit breakers

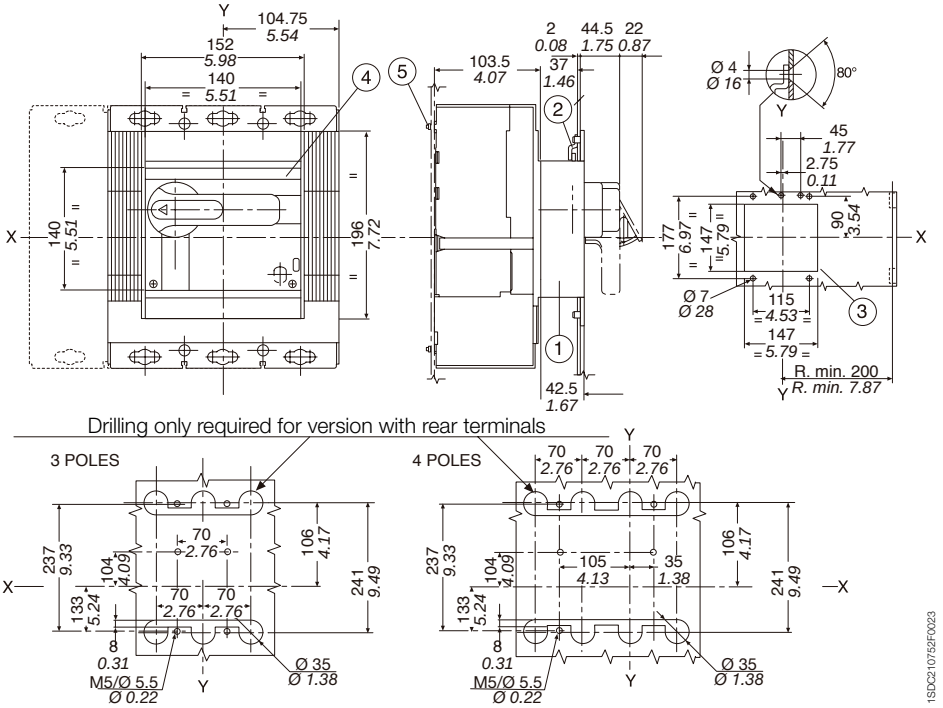
[mm/*in*]

Rotary handle operating mechanism on fixed circuit breaker

Caption

1. Rotary handle operating mechanism on circuit breaker
2. Lock for compartment door (to order)
3. Drilling of compartment door
4. Flange for compartment door
5. Tightening torque 2 Nm

Note See the various different versions for the dimensions of the circuit breakers

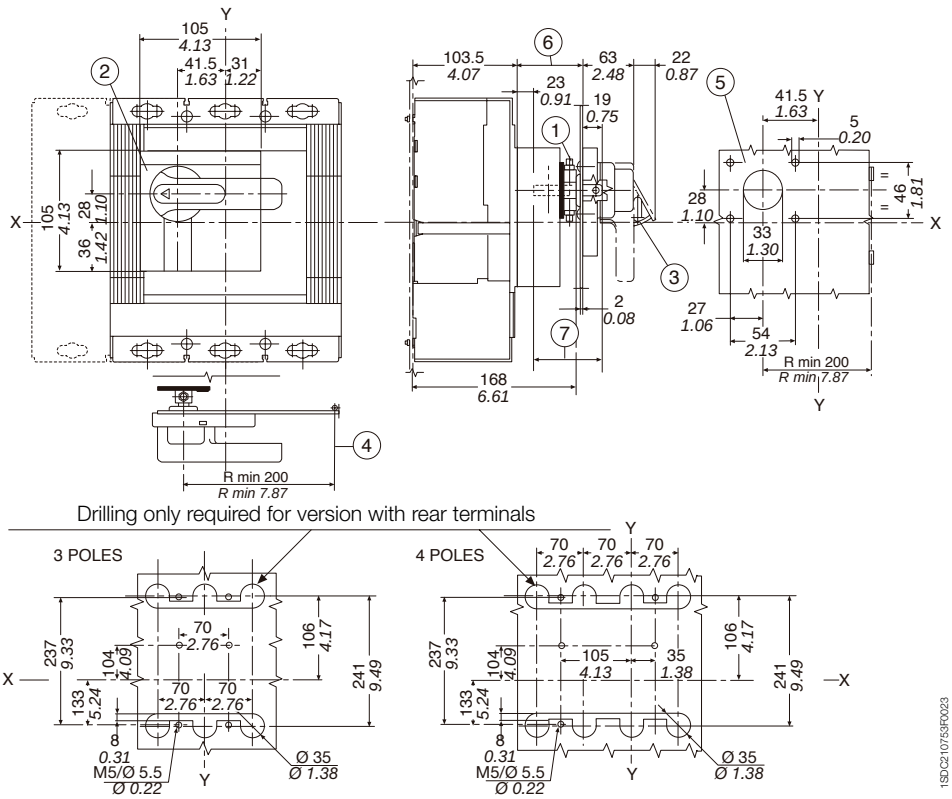


Compartment door-mounted rotary handle mechanism with adjustable depth for fixed circuit breaker

Caption

1. Transmission assembly
2. Rotary handle assembly with door lock device
3. Padlock device (maximum 3 padlocks max ø 0.24”/6 mm to be provided by customer only for circuit breaker open position)
4. Minimum radius of rotation for fulcrum of door
5. Drilling template for mounting circuit breaker on sheet metal
6. 2.83”…19.92”/72...506 mm (with IP54 protection min. 96)
7. Distance (6) -0.16”/-4 mm (shaft length)

Note See the various different versions for the dimensions of the circuit breakers



Overall dimensions

Accessories for Isomax S6

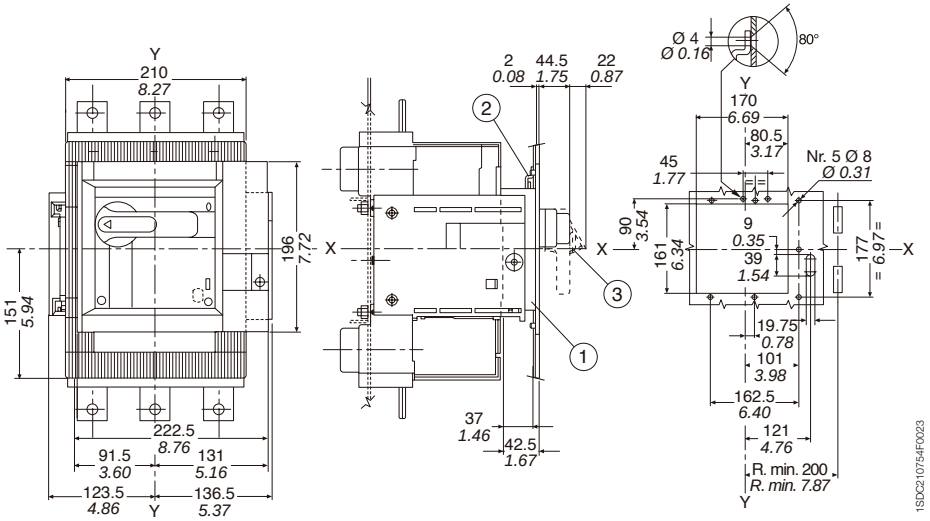
[mm/*in*]

Rotary handle operating mechanism on draw out circuit breaker

Caption

1. Rotary handle on circuit breaker
2. Lock for compartment door (to order)
3. Padlock device for open position (maximum 3 padlocks max. ø 0.24"/6 mm to be provided by user)

Note See the various different versions for the dimensions of the circuit breakers

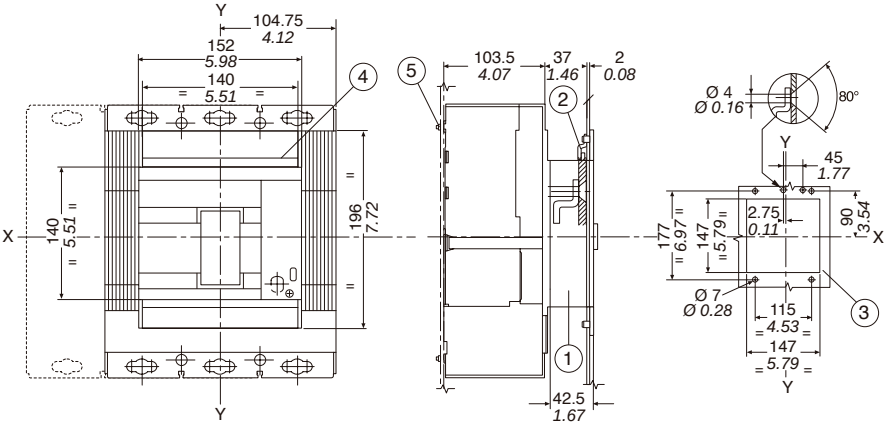


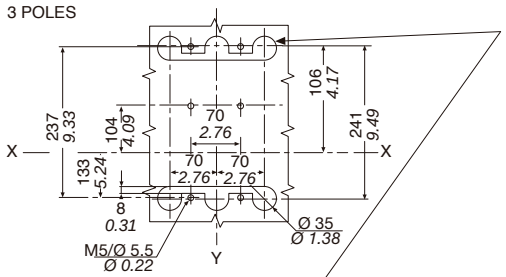
Front flange for operating lever mechanism

Caption

1. Front flange for operating lever mechanism
2. Lock for compartment door (to order)
3. Drilling of compartment door
4. Flange for compartment door
5. Tightening torque 2 Nm

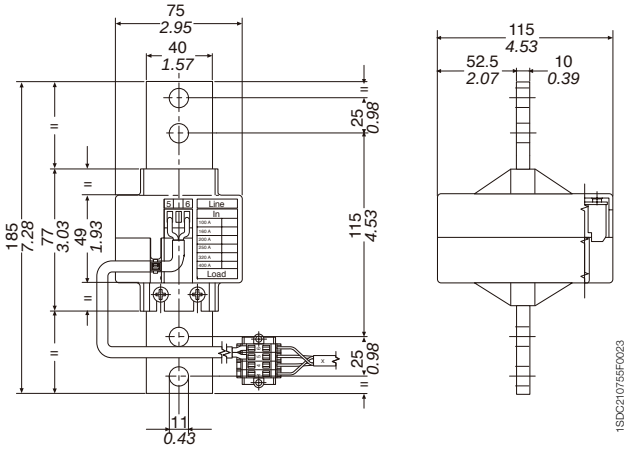
Note See the various different versions for the dimensions of the circuit breakers



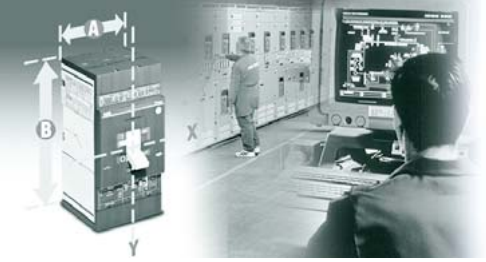


Drilling only required for version with rear terminals

External neutral



6



Overall dimensions

Accessories for Isomax S7

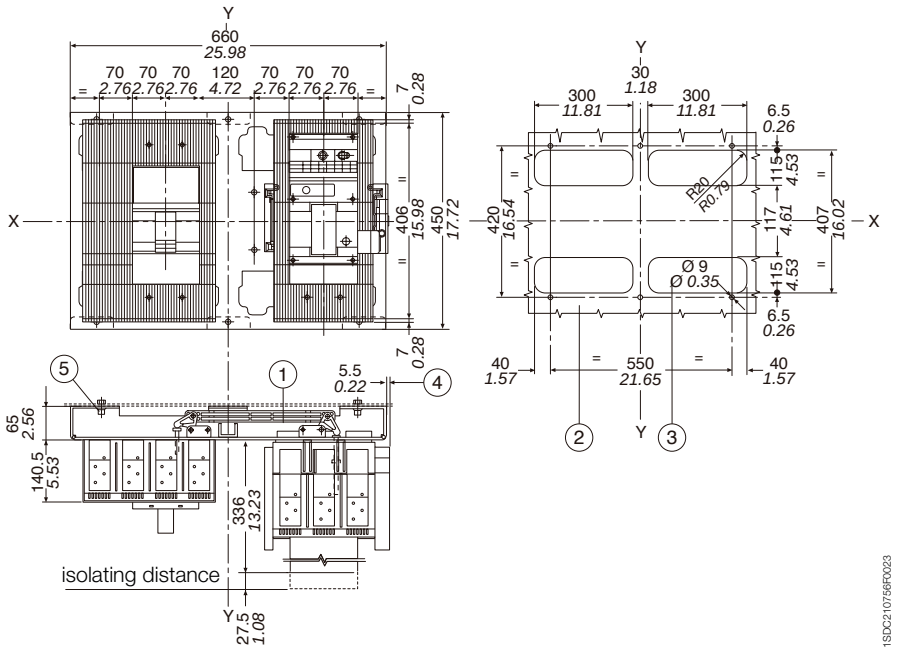
[mm/*in*]

Interlock between two horizontally-installed circuit breakers

Caption

1. Interlock device
2. Drilling template for mounting circuit breaker on sheet metal
3. Drilling template for all versions with rear terminals
4. Dimensions with draw out version mounted on right
5. Tightening torque 9 Nm

Note See the various different versions for the dimensions of the circuit breakers

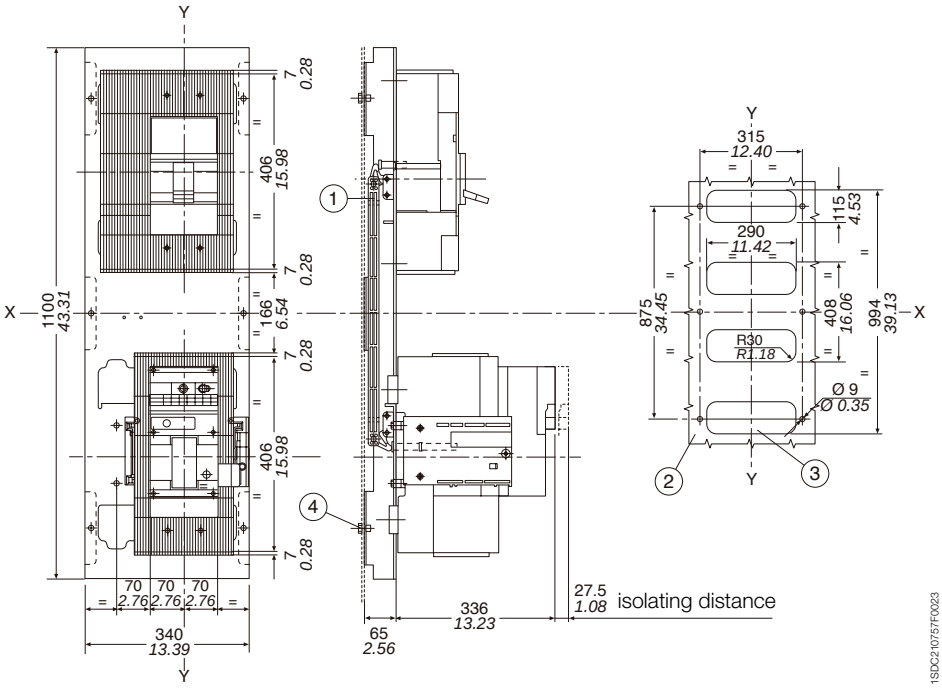


Interlock between two vertically-installed circuit breakers

Caption

1. Interlock device
2. Drilling template for mounting circuit breaker on sheet metal
3. Drilling template for all versions with rear terminals
4. Tightening torque 9 Nm

Note See the various different versions for the dimensions of the circuit breakers



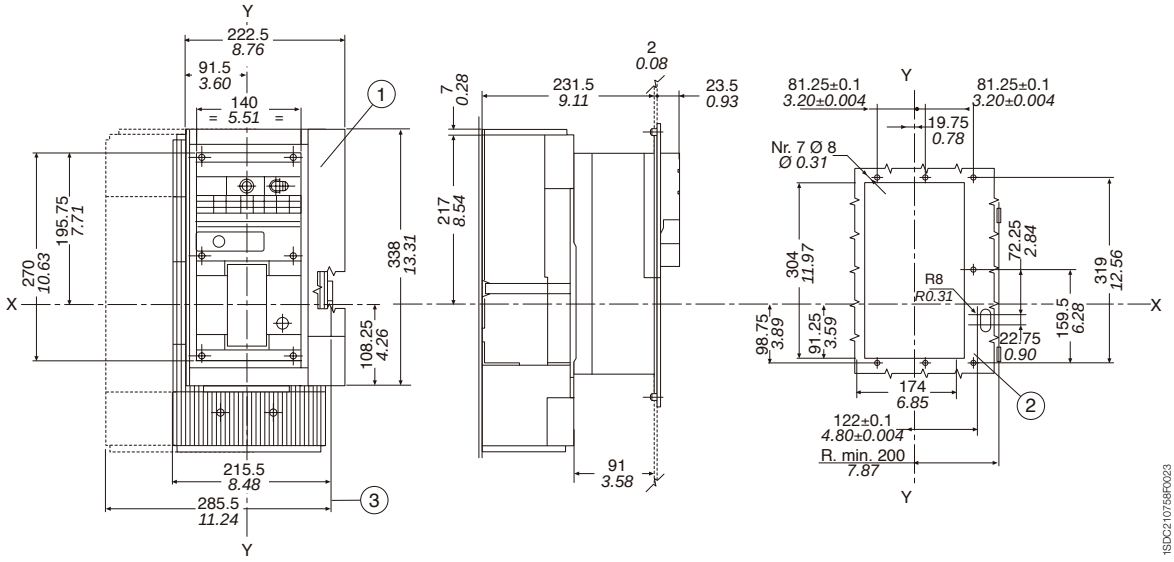
6

Overall dimensions

Accessories for Isomax S7

[mm/*in*]

Motor operator for fixed circuit breaker

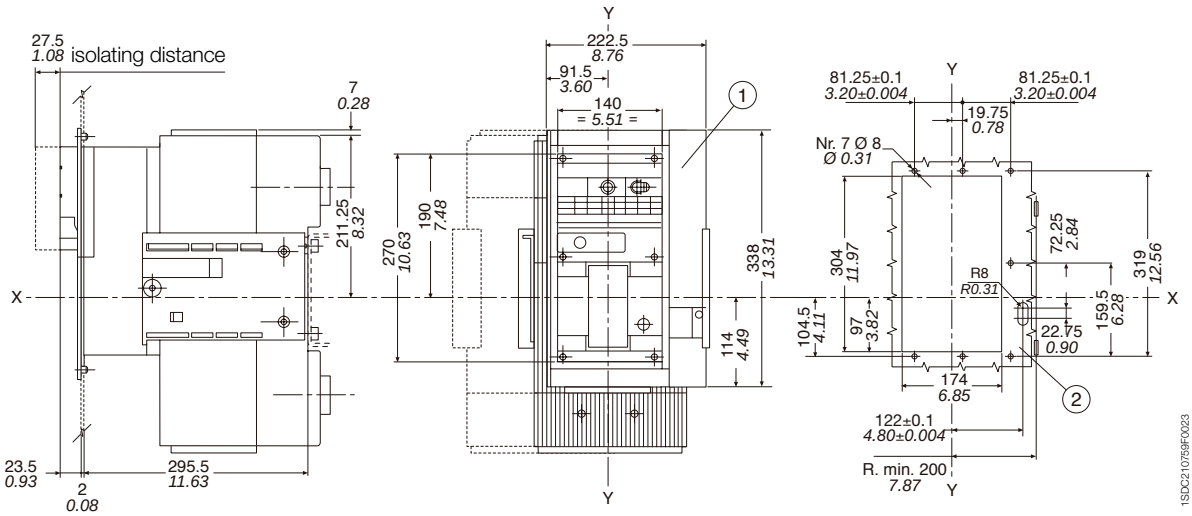


Caption

1. Flange for compartment door
2. Template for drilling compartment doorl
3. Dimensions with connectors

Note See the various different versions for the dimensions of the circuit breakers

Motor operator for draw out circuit breaker



Caption

1. Flange for compartment door
2. Template for drilling compartment door

Note See the various different versions for the dimensions of the circuit breakers

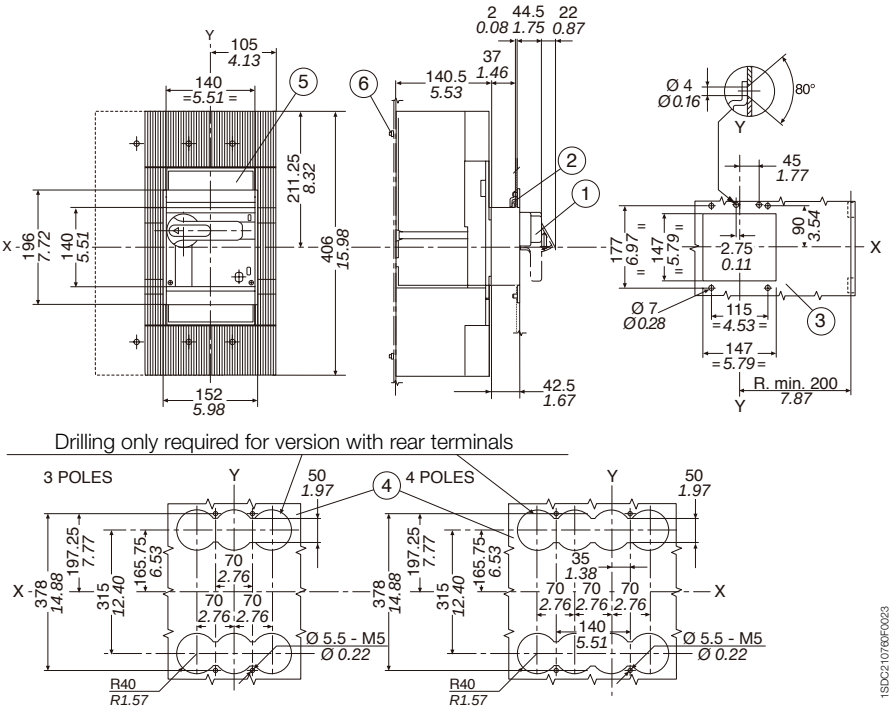
[mm/*in*]

Rotary handle operating mechanism on fixed circuit breaker

Caption

1. Rotary handle operating mechanism on circuit breaker
2. Lock for compartment door (to order)
3. Drilling of compartment door
4. Drilling template for mounting circuit breaker on sheet metal
5. Flange for compartment door
6. Tightening torque 2 Nm

Note See the various different versions for the dimensions of the circuit breakers

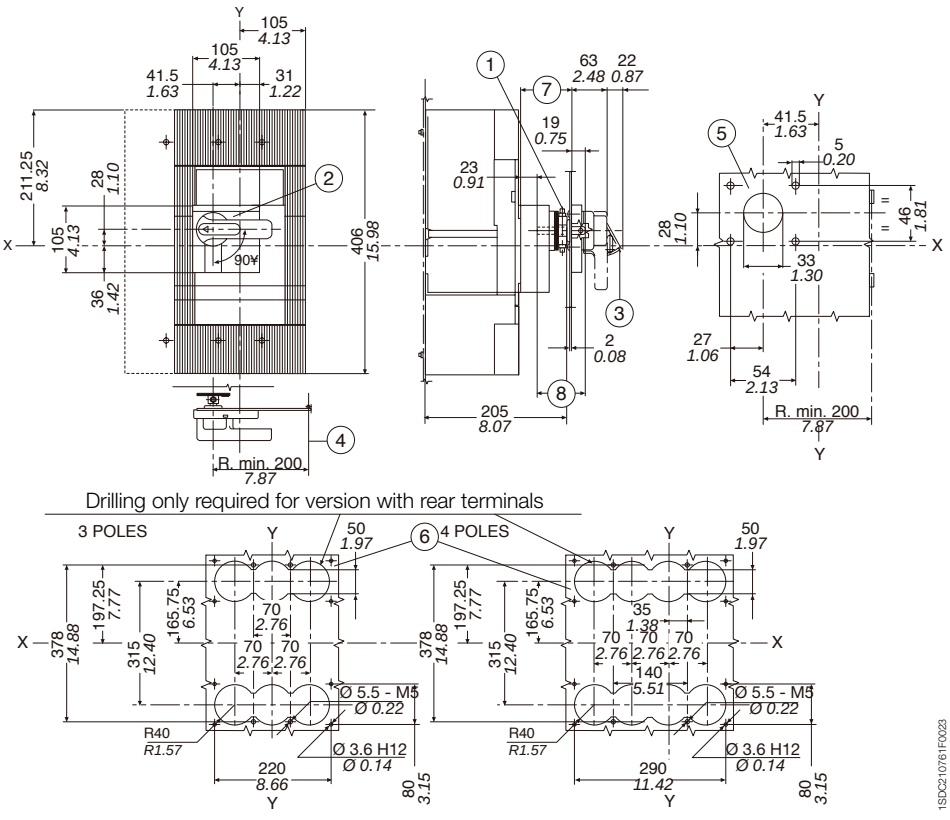


Compartment door-mounted rotary handle operating mechanism for fixed circuit breaker

Caption

1. Transmission assembly
2. Rotary handle assembly with door lock device
3. Padlock device (maximum 3 padlocks max ø 0.24”/6 mm to be provided by customer only for circuit breaker open position)
4. Minimum radius of rotation for fulcrum of door
5. Template for drilling compartment door
6. Drilling template for mounting circuit breaker on sheet metal
7. 2.83”…19.92”/72 ... 506 mm (with IP54 protection min. 96)
8. Distance (7) - 0.16”/4 mm (shaft lenght)

Note See the various different versions for the dimensions of the circuit breakers



6

Overall dimensions

Accessories for Isomax S7

[mm/*in*]

Rotary handle operating mechanism on draw out circuit breaker

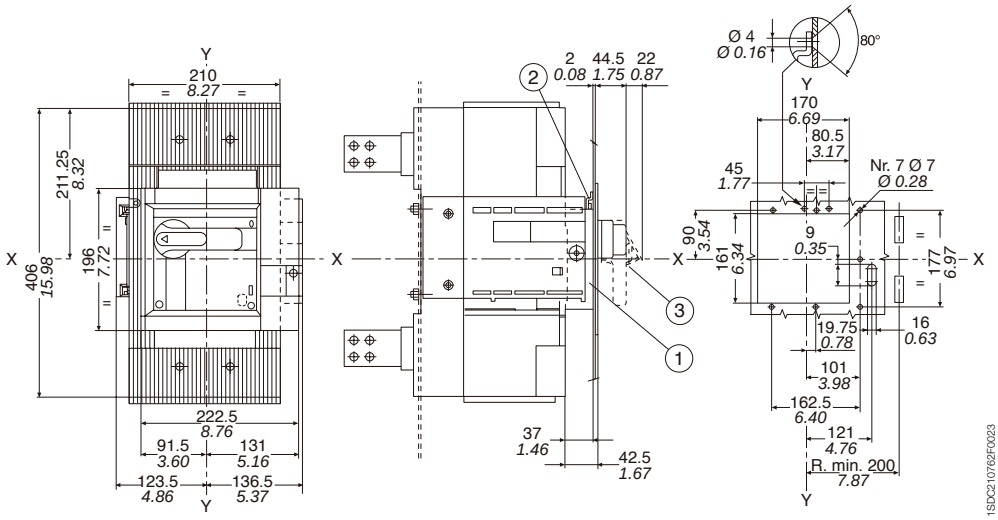
Caption

(1) Rotary handle operating mechanism on circuit breaker

(2) Lock for compartment door (to order)

(3) Padlock device for open position (maximum 3 padlocks max. ø 0.24"/6 mm to be provided by user)

Note See the various different versions for the dimensions of the circuit breakers



Front flange for operating lever mechanism

Caption

(1) Front flange for lever operating mechanism

(2) Lock for compartment door (to order)

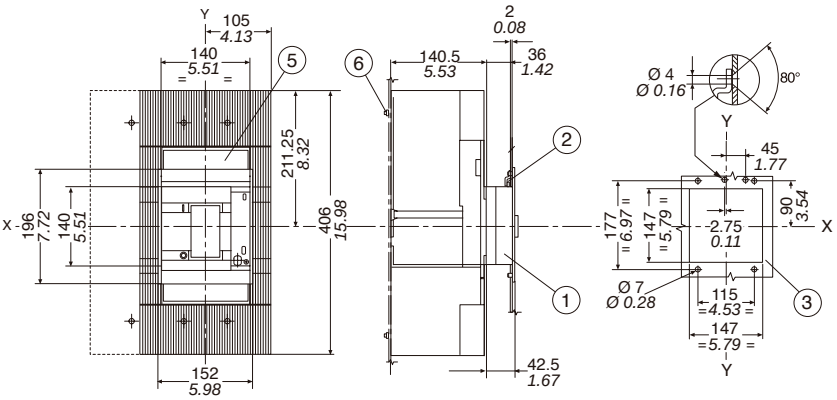
(3) Drilling of compartment door

(4) Drilling template for mounting circuit breaker on sheet metal

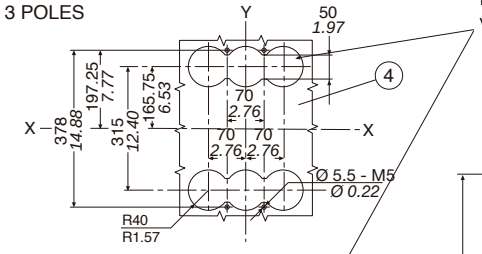
(5) Flange for compartment door

(6) Tightening torque 2 Nm

Note See the various different versions for the dimensions of the circuit breakers

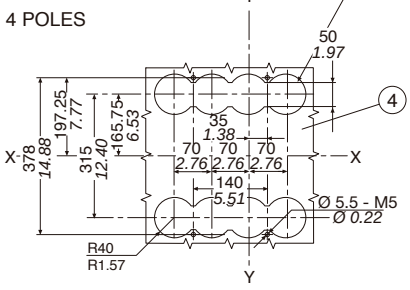


3 POLES

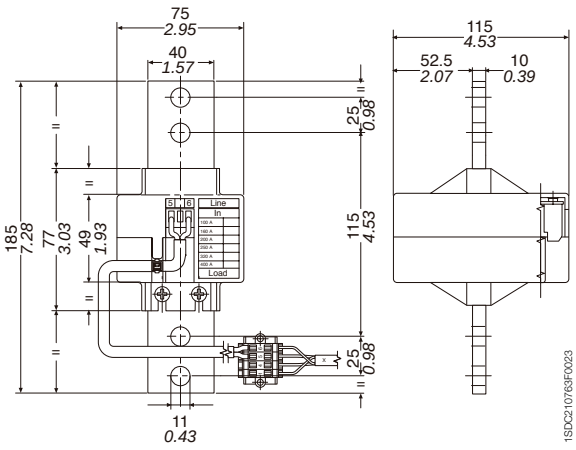


Drilling only required for version with rear terminals

4 POLES

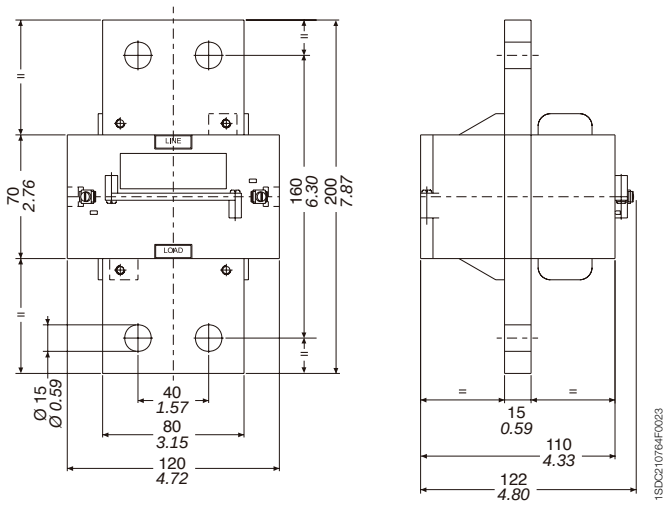


External neutral



[mm/*in*]

External neutral



Overall dimensions

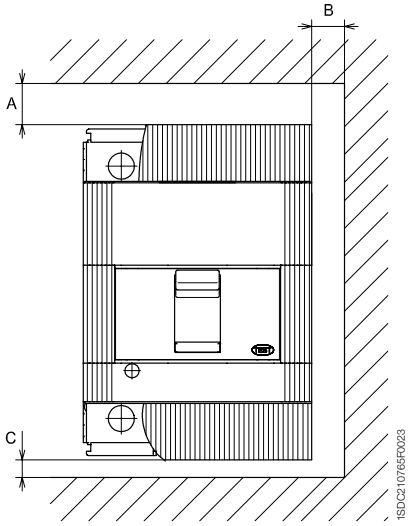
Distances to be respected - Tmax

[mm/*in*]

Insulation distances for installation in metallic cubicle

	A [mm/in]	B [mm/in]	C [mm/in]
T1	25/*0.98*	20/*0.79*	20/*0.79*
T2	25/*0.98*	20/*0.79*	20/*0.79*
T3	50/*1.97*	25/*0.98*	20/*0.79*
T4	30*/*1.18**	25/*0.98*	25*/*0.98**
T5	30*/*1.18**	25/*0.98*	25*/*0.98**

(*) For Ub ≥ 440 V: distance A ⇒ 60 mm (*2.36 inches*); distance C ⇒ 45 mm (*1.77 inches*)

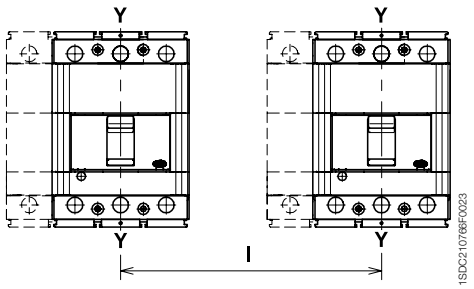


Minimum centre distance between two circuit breakers side by side or superimposed

For assembly side by side or superimposed, check that the connection busbars or cables do not reduce the air insulation distance

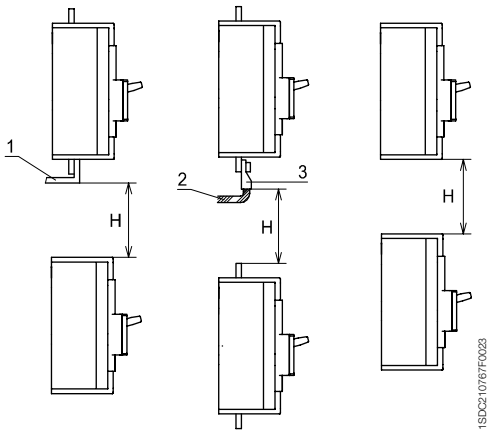
Minimum centre distance for two circuit breakers side by side

	Circuit breaker width [mm/in]		Centre distance I [mm/in]	
	3 poles	**4** poles	**3** poles	**4** poles
T1	76/*2.99*	102/*4.02*	76/*2.99*	102/*4.02*
T2	90/*3.54*	120/*4.72*	90/*3.54*	120/*4.72*
T3	105/*4.13*	140/*5.51*	105/*4.13*	140/*5.51*
T4	105/*4.13*	140/*5.51*	105/*4.13*	140/*5.51*
T5	140/*5.51*	184/*7.24*	140/*5.51*	184/*7.24*



Minimum centre distance for superimposed circuit breakers

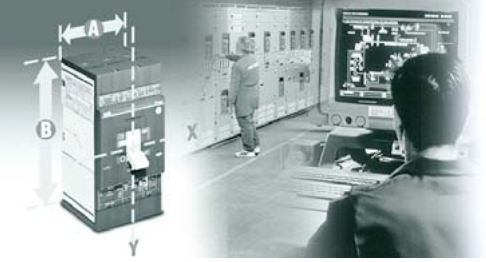
	H [mm/in]
T1	60/*2.36*
T2	90/*3.54*
T3	140/*5.51*
T4	160/*6.30*
T5	160/*6.30*



Note: The dimensions shown apply for operating voltage Ub up to 690 V. The dimensions to be respected must be added to the maximum dimensions of the various different versions of the circuit breakers, including the terminals.

Caption

1. Connection - not insulated
2. Insulated cable
3. Cable terminal



Overall dimensions

Distances to be respected - Isomax

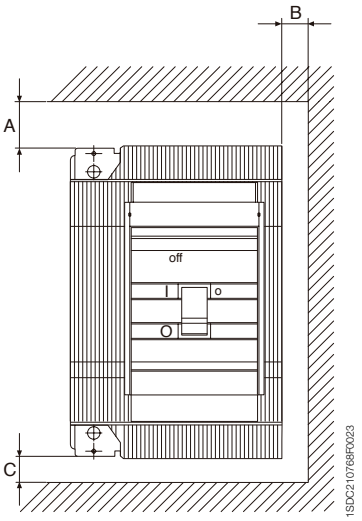
[mm/*in*]

Insulation distances for installation in metal compartment with wall to chassis ground or wall to chassis ground protected with insulating plate

Wall to chassis ground [mm/*in*]

	A ($U_b \leq$ 415 V)	A(*) ($U_b \geq$ 440 V)	B	C
S6	35 *1.38*	100 *3.94*	25 *0.98*	20 *0.79*
S7	50 *1.97*	100 *3.94*	30 *1.18*	20 *0.79*
S8	200 *7.87*	200 *7.87*	30 *1.18*	120 *4.72*

(*) These distances are valid for operating voltages of > 440 V and for circuit breakers with breaking capacity level L



Insulation distances for installation in insulated compartment

Insulated wall [mm/*in*]

	A	B	C
S6	35 *1.38*	10 *0.39*	20 *0.79*
S7	50 *1.97*	10 *0.39*	20 *0.79*
S8	120 *4.72*	15 *0.59*	120 *4.72*

The dimensions shown apply for operating voltages Ub of up to 690 V.
The dimensions to be respected must be added to the maximum dimensions of the various different versions of the circuit breakers, including the terminals.

Overall dimensions

Distances to be respected - Isomax

[mm/*in*]

Minimum distance between centres for two horizontally or vertically-installed circuit breakers

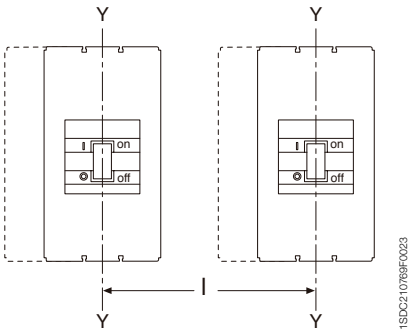
For horizontal or vertical installation, make sure that the connection busbars or cables don't reduce the air insulation distances.

Minimum distance between centres for horizontally-installed circuit breakers

	Circuit breaker width [mm/*in*]		I [mm/*in*]	
	3 poles	4 poles	3 poles	4 poles
S6	210 *8.27*	280 *11.02*	210 *8.27*	280 *11.02*
S7	210 *8.27*	280 *11.02*	210 *8.27*	280 *11.02*
S8	435 *17.13*	585 *23.03*	435 *17.13*	585 *23.03*

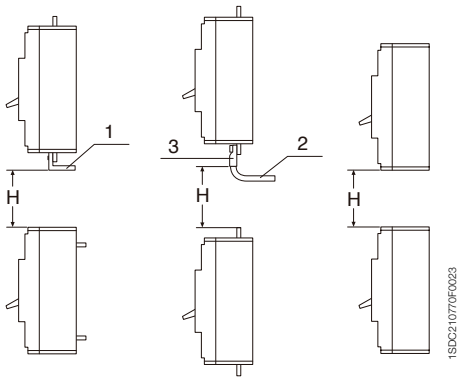
(*) these are the distances to be respected for circuit breakers fitted with a flange for the compartment door or side conductor outlets.

The distances between centres are for the installation of fixed and plug in circuit breakers. When installing draw out S6 or S7 circuit breakers you should also take into account the dimensions of the metal supporting channel that needs to be fitted between the guides of the fixed parts of two adjacent circuit breakers.



Minimum distance between centres for vertically-installed circuit breakers

	H [mm/*in*]
S6	180 *7.09*
S7	180 *7.09*
S8	300 *11.81*



1 Connection not insulated
2 Insulated cable
3 Cable terminals

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