Technical catalogue

Tmax

Low voltage moulded-case circuit-breakers up to 250 A

Preliminary - 1SDC210001D0203

Tmax SUMMARY

T GENERA

All combinations in three sizes, up to 250 A.

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

All combinations perfectly coordinated up to 250 A.

Thought up from the beginning to work together. For their electrical performances, certainly, but also to make installation incredibly simpler. The single depth (70 mm) for all three pieces of apparatus is only the most obvious feature. But you'll find you've got true "work colleagues" in the terminals and common accessories as well. Can you imagine the time and effort you'll save?

ATION

And another thing: how do you see the possibility of having a 250 A to mount on the same DIN rail as a 160 A?

All combinations without spending any more, up to 250 A.

If you've sometimes had the impression you've had to oversize a switchboard or installation because you needed performances and functions which you could only find in apparatus in the "higher range", you'll now find it's a different story altogether with Tmax. This is because technology has taken a step forward with Tmax and today you can obtain the performances you need with smaller dimensions than those you had to put up with yesterday. Doesn't that make you feel freer?

T1

Tmax T1.

THE LITTLE ONE THAT'S REALLY BIG.

Thanks to its extremely limited dimensions, Tmax T1 is a unique circuit-breaker in its category. Compared with any other circuit-breaker with the same performance (160 A - up to 36 kA at 415 V AC), the overall dimensions of the apparatus are notably smaller.
Thanks to the new arcing chambers, the arc extinction time has been reduced, thereby guaranteeing high short-circuit current limitation. Tmax T1 can therefore be used as a general switchboard circuit-breaker without having to carry out short-circuit withstand control tests (IEC 60439-1).
Simply follow the instructions given by ABB SACE to obtain a certified AS (Standard Apparatus) or ANS (Non-Standard Apparatus) switchboard.
For the first time, ABB SACE has developed a "single-pole" circuit-breaker - Tmax T1 1P - able to cover a range of currents up to 160 A, with a service voltage of 240 V AC.

FSTM9019

FSTM9020

FSTM9060

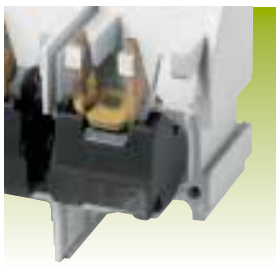
FSTM9022

Only ABB SACE manufactures small-sized moulded-case circuit-breakers with double insulation. Yet another guarantee of safety – not only for the person building the switchboard, but also for the users.
Tmax T1 is the most compact 160 A circuit-breaker with the possibility of adjusting the thermal threshold – a great advantage in terms of flexibility.

T2

Tmax T2.

INTELLIGENCE AND HIGH PERFORMANCE IN THE PALM OF YOUR HAND.



FSTM9025

Tmax T2 is the only 160 A circuit-breaker available with such high performances in such very limited overall dimensions. A breaking capacity of 85 kA at 415 V AC can be achieved. Tmax T2 uses the double breaking system with "forked" moving contacts. It's thanks to the use of this advanced breaking technique that such high current-limiting performances can be obtained with such small overall dimensions.

FSTM9023

Tmax T2 can be fitted either with the classic thermomagnetic release or with the latest generation microprocessor-based release. This is the first time that a circuit-breaker of this size can benefit from electronic protection, which adds such a wide and varied possibility of settings to the high performances, providing unequalled flexibility of use.

FSTM9010

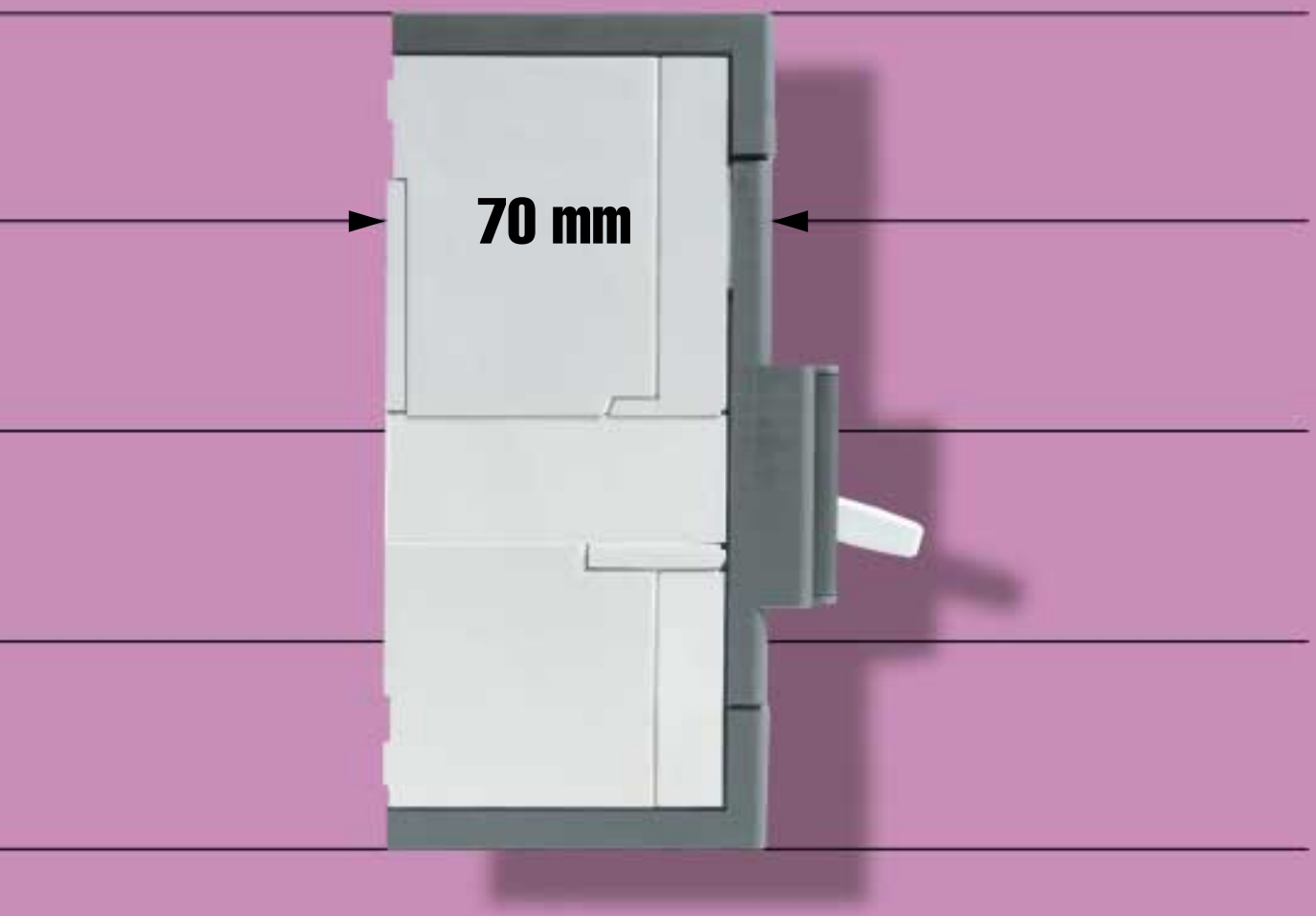
T3

Tmax T3.
250 A IN A DEPTH OF 70 MM FOR THE FIRST TIME.

250 A

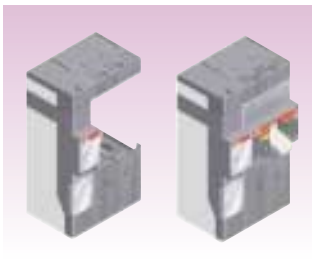
The first circuit-breaker which carries 250 A in considerably limited overall dimensions compared with any other similar apparatus comes from ABB SACE's research and design engineering capacity. This is a significant evolution for this type of apparatus because until now no-one had managed to "physically" contain such high performances whilst still guaranteeing safety and reliability. The notable reduction in the overall dimensions is immediately converted into installation advantages.

In particular, the 70 mm depth takes Tmax T3 to the same standard as the two smaller sizes, allowing standardisation of the fixing supports and selection of switchboards with smaller overall dimensions, with obvious benefits in economical as well as physical and aesthetical terms. Moreover, the Tmax range ensures flexibility and installation rapidity, thanks, too, to its integration with the rapid Unifix cabling system.



FSTM9027

FSTM9028



FSTM9029

The whole Tmax family has also had its residual current releases renewed. The new three-pole and four-pole releases have been designed and constructed to optimise space inside the switchboard and simplify coupling with the circuit-breaker.

Tmax

T1 T2 T3

Main characteristics

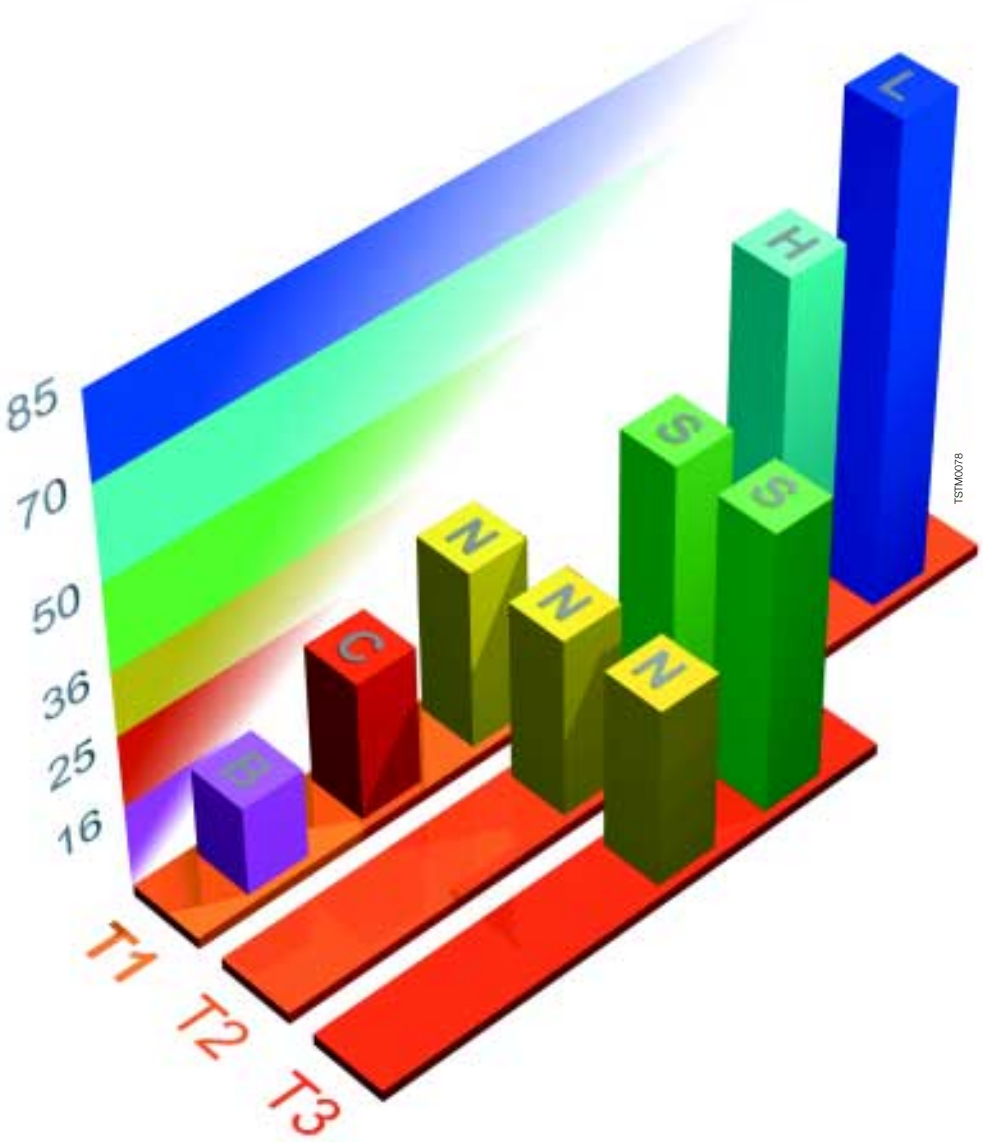
FSTM90011

Index

General information

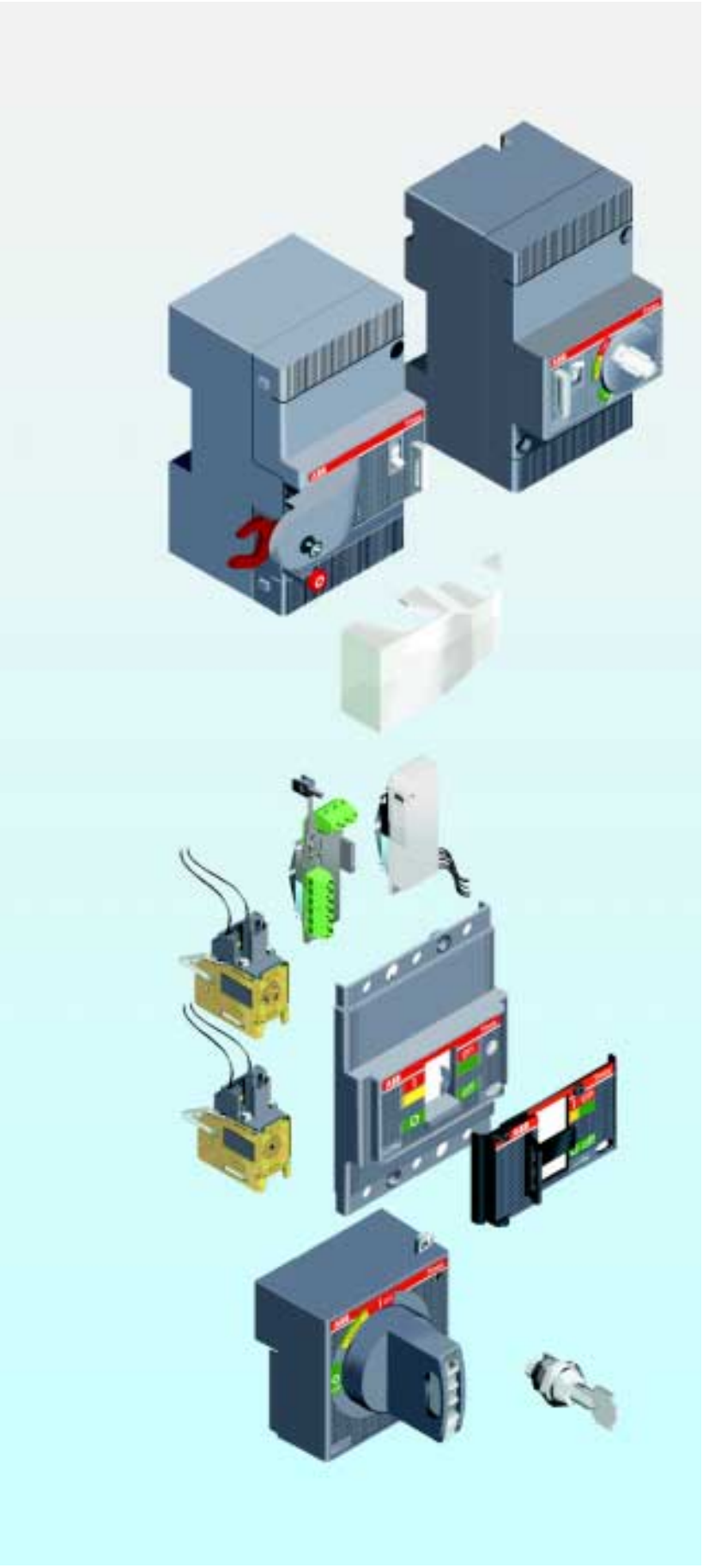
The new series of ABB SACE Tmax circuit-breakers is available in three sizes: T1, T2 and T3, able to cover a range of service currents from 1 to 250 A.
The circuit-breakers are available in the fixed, three-pole and four-pole versions and, in the T2 and T3 sizes, also in the withdrawable version. Tmax T1 is also offered in the single-pole version with breaking capacity of 25 kA (at 220/230 V).
The breaking capacities, at 380/415 V, are identified by the following letters:

B 16 kA
C 25 kA
N 36 kA
S 50 kA
H 70 kA
L 85 kA



Construction characteristics

Modularity of the series



TSTM0105

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
– circuit-breaker fixed parts for plug-in circuit-breakers
– conversion kit for the connection terminals.

Various accessories are also available:
– shunt opening releases
– undervoltage releases
– auxiliary contacts
– position contacts
– advanced contacts on rotary handle
– front and rear connection terminals
– bracket for rear fixing on DIN EN 50022 rail
– front interlocking plate
– solenoid operating mechanism
– rotary handle operating mechanism - direct on circuit-breaker and transmitted on compartment door
– three-pole and four-pole residual current releases.

Construction characteristics

Distinguishing features of the series

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.
Furthermore, the circuit-breaker has oversized insulation, both between the live internal parts and in the area of the connection terminals. In fact, the distances exceed those required by the IEC Standards and comply with what is foreseen in American usage (UL 489 Standard).

FSTM9002

Positive operation

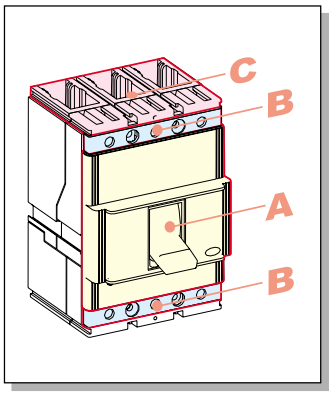
The operating lever always indicates the precise position of the moving contacts of the circuit-breaker, thereby guaranteeing safe and reliable signals, in compliance with the prescriptions of the IEC 60417-2 Standard (I = Closed; O = Open; yellow-green line = Open due to release trip). The circuit-breaker operating mechanism has free release regardless of the pressure on the lever and the speed of the operation. Release tripping 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.

FSTM9003

Isolation behaviour

In the open position, the circuit-breaker guarantees circuit isolation in compliance with the IEC 60947-2 Standard. The oversized insulation distances guarantee there are no leakage currents and dielectric resistance to any overvoltages between input and output. For the plug-in 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 sockets - plug, it is possible to carry out blank tests under these conditions, operating the circuit-breaker in complete safety.

FSTM9004



TSTM0107

Degrees of protection

The table indicates the degrees of protection guaranteed by the Tmax circuit-breakers according to the prescriptions of the IEC 60529 Standard:

	With front	Without front [2]	Without terminal covers	With high terminal covers	With low terminal covers	With IP40 protection kit on the front
A	**IP 40**	**IP 20**	-	-	-	-
B	**IP 20**	**IP 20**	**IP 20**	**IP 40**	**IP 40**	**IP 40**
C	-	-	-	**IP 40**[1]	**IP 30**[1]	-

[1] After correct installation
[2] During installation of the electrical accessories

The fixed parts are always preset with IP 20 degree of protection. IP 54 degree of protection can be obtained with the circuit-breaker installed in a switchboard fitted with a rotary handle operating mechanism transmitted on the compartment door and special kit (RHE – IP54).

Construction characteristics

Distinguishing features of the series

Operating temperature

The Tmax circuit-breakers can be used in ambient conditions where the surrounding air temperature varies between -25 °C and +70 °C, and stored in ambients with temperatures between -40 °C and +70 °C.
The circuit-breakers fitted with thermomagnetic release have their thermal element set for a reference temperature of +40 °C.
For temperatures other than +40 °C, with the same setting, there is a thermal trip threshold variation as shown in the table on page 3/19.
The electronic PR221DS microprocessor-based overcurrent release does not undergo any variations in performance as the temperature varies but, in the case of temperatures exceeding +40 °C, the maximum setting for protection against overloads L, must be reduced, as indicated in the derating graph on page 3/18, to take into account the heating phenomena which occur in the copper parts of the circuit-breaker passed through by the phase current.
For temperatures above +70 °C the circuit-breaker performances are not guaranteed.
To ensure service continuity of the installations, the way to keep the temperature within acceptable levels for operation of the various devices and not only of the circuit-breakers must be carefully assessed, such as using forced ventilation in the switchboards and in their installation room.

TSTM0002

Altitude

Up to an altitude of 2000 m the Tmax circuit-breakers 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. The circuit-breaker performances therefore undergo derating, which can basically be measured by means of the variation in significant parameters such as the maximum rated operating voltage and the rated uninterrupted current.

Altitude	[m]	2000	3000	4000	5000
Rated service voltage, Ue	[V~]	690	600	500	440
Rated uninterrupted current, Iu	%Iu	100	98	93	90


TSTM9023

Electromagnetic compatibility

Operation of the protections is guaranteed in the presence of interferences caused by electronic apparatus, atmospheric disturbances or electrical discharges by using the electronic PR221DS microprocessor-based release and the electronic RC221 and RC222 residual current releases. 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.


TSTM0104

Tropicalisation

Circuit-breakers and accessories in the Tmax series are tested in compliance with the IEC 60068-2-30 Standard, carrying out 2 cycles at 55 °C with the "variant 1" method (clause 6.3.3). The suitability of the Tmax series for use under the most severe environmental conditions is therefore ensured with the hot-humid climate defined in the climatograph 8 of the IEC 60721-2-1 Standards thanks to:

– moulded insulating cases made of synthetic resins reinforced with glass fibres;
– anti-corrosion treatment of the main metallic parts (ambient C UNI 3564-65);
– Fe/Zn 12 galvanisation (UNI ISO 2081), protected by a conversion layer mainly consisting of chromates (UNI ISO 4520).

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 organisations:

– RINA
– Det Norske Veritas
– Bureau Veritas
– Lloyd's register of shipping
– Germanischer Lloyd

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

Construction characteristics

Distinguishing features of the series

Installation

Tmax T1, T2 and T3 can be installed in the switchboards, mounted in any position on the base plate, both on the horizontal and vertical plane, without undergoing any derating of their rated characteristics.
Apart from fixing on the base plate, the Tmax series can also be installed on DIN rails, thanks to the special fixing brackets. Furthermore, the depth of 70 mm, takes Tmax T3 to the same standard as the two smaller sizes, making assembly of circuit-breakers up to 250 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.

Range of accessories

Installation rationality and flexibility of the Tmax series is also achieved thanks to two innovative solutions in development of the accessories:

– single range of accessories for all three sizes, characterised by completeness and installation simplicity;
– same possibility of equipping with accessories, in terms of connection devices (terminals, terminal covers and phase separators), between fixed circuit-breakers and fixed parts of plug-in circuit-breakers.

Compliance with Standards and company quality system

Tmax circuit-breakers and their accessories comply with the international IEC 60947-2 Standards and the EC directive:

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

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

The Test Room at ABB SACE is accredited by SINAL (certificate No. 062/1997).

The Tmax series also has a range which has undergone certification according to the severe American UL 489 and CSA C22.2 Standards.

The pieces of apparatus comply with the prescriptions for on-board shipping installations and approvals are in the process of being obtained from the major Naval Registers (please ask ABB SACE for confirmation).

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

The third certifying Organisation is RINA-QUACER. ABB SACE obtained its first certification in 1990 with three-year validity, and has now reached its third confirmation of renewal.

The new Tmax series has a hologram on the front, obtained using special anti-imitation techniques - a guarantee of the quality and genuineness of the circuit-breaker as an ABB SACE product.

Attention to protection of the environment is another priority commitment for ABB SACE, and, as confirmation of this, the environmental management system has been certified by RINA. ABB SACE - the first industry in the electromechanical sector 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 SACE's commitment to safeguarding the environment is also shown in concrete way by Life Cycle Assessments (LCA) of the products, carried out directly by ABB SACE's Research and Development in collaboration with the ABB Research Centre. Selection of materials, processes and packing materials is made optimising the true environmental impact of the product, even foreseeing the possibility of recycling it.

FSTM8007

Electrical characteristics

Power distribution circuit-breakers

				Tmax T1 1P	Tmax T1		
Rated uninterrupted current, **Iu**			[A]	160	160		
Poles			No.	1	3/4		
Rated service voltage, **Ue**		(AC) 50-60 Hz	[V]	240	690		
		(DC)	[V]	125	500		
Rated impulse withstand voltage, **Uimp**			[kV]	8	8		
Rated insulation voltage, **Ui**			[V]	500	800		
Voltage test at industrial frequency for 1 min.			[V]	3000	3000		
Rated ultimate short-circuit breaking capacity, **Icu**				**B**	**B**	**C**	**N**
(AC) 50-60 Hz 220 / 230 V			[kA]	25 (3)	25	40	50
(AC) 50-60 Hz 380 / 415 V			**[kA]**	**-**	**16**	**25**	**36**
(AC) 50-60 Hz 440 V			[kA]	-	10	15	22
(AC) 50-60 Hz 500 V			[kA]	-	8	10	15
(AC) 50-60 Hz 690 V			[kA]	-	3	4	6
(DC) 250 V - 2 poles in series			[kA]	25 (at 125 V)	16	25	36
(DC) 250 V - 3 poles in series			[kA]	-	20	30	40
(DC) 500 V - 3 poles in series			[kA]	-	16	25	36
Rated short-circuit service breaking capacity, **Ics**							
(AC) 50-60 Hz 220 / 230 V			[%Icu]	75%	100%	75%	75%
(AC) 50-60 Hz 380 / 415 V (1)			[%Icu]	-	100%	75%	50% (19 kA)
(AC) 50-60 Hz 440 V			[%Icu]	-	100%	75%	50%
(AC) 50-60 Hz 500 V			[%Icu]	-	100%	75%	50%
(AC) 50-60 Hz 690 V			[%Icu]	-	100%	75%	50%
Rated short-circuit making capacity, **Icm**							
(AC) 50-60 Hz 220 / 230 V			[kA]	52.5	52,5	84	105
(AC) 50-60 Hz 380 / 415 V			[kA]	-	32	52.5	75.6
(AC) 50-60 Hz 440 V			[kA]	-	17	30	46.2
(AC) 50-60 Hz 500 V			[kA]	-	13.6	17	30
(AC) 50-60 Hz 690 V			[kA]	-	4.3	5.9	9.2
Breaking time			[ms]	7	7	6	5
Utilisation category				A	A		
Isolation behaviour				■	■		
Reference Standards				IEC 60947-2	IEC 60947-2		
Releases:	thermomagnetic	TMD (adj)		-	■		
		TMF (fixed)		■	-		
	magnetic only	MA		-	-		
	microprocessor-based	PR221DS-LS		-	-		
		PR221DS-I		-	-		
Versions				F	F		
Terminals F - P				FC Cu	FC Cu - EF - FC CuAl 95 mm^2		
Fixing on DIN rail				-	DIN EN 50022		
Mechanical life			[No. Operations]	25000	25000		
			[No. Hourly operations]	240	240		
Electrical life at 415 V			[No. Operations]	8000	8000		
			[No. Hourly operations]	120	120		
Basic dimensions, fixed version		3 poles	L [mm]	25.4 (1 pole)	76		
		4 poles	L [mm]	-	102		
			H [mm]	130	130		
			P [mm]	70	70		
Weight	fixed version	3/4 poles	[kg]	0.4 (1 pole)	0.9 / 1.2		
	plug-in version	3/4 poles	[kg]	-	-		

(1) The data in brackets indicates the absolute value [kA] of the rated short-circuit breaking capacity, Ics.
(2) In the plug-in version, the maximum setting is derated by 10% at 40 °C.
(3) The breaking capacity for settings In= 16 A and In= 20 A is 16 kA.

FSTM9008

Tmax T2				Tmax T3	
160				250	
3/4				3/4	
690				690	
500				500	
8				8	
800				800	
3000				3000	
N	**S**	**H**	**L**	**N**	**S**
65	85	100	120	50	85
36	**50**	**70**	**85**	**36**	**50**
30	45	55	75	25	40
25	30	36	50	20	30
6	7	8	10	5	8
36	50	70	85	36	50
40	55	85	100	40	55
36	50	70	85	36	50
100%	100%	100%	100%	75%	50%
100%	100%	100%	75% (70 kA)	75%	50% (27 kA)
100%	100%	100%	75%	75%	50%
100%	100%	100%	75%	75%	50%
100%	100%	100%	75%	75%	50%
143	187	220	264	105	187
75.6	105	154	187	75.6	105
63	94.5	121	165	52.5	84
52.5	63	75.6	105	40	63
9.2	11.9	13.6	17	7.7	13.6
3	3	3	3	7	6
A				A	
■				■	
IEC 60947-2				IEC 60947-2	
■				■	
-				-	
■ (MF up to R12.5 A)				■	
■				-	
■				-	
F - P (2)				F - P (2)	
F - FC Cu - FC CuAl - EF - ES - R - FC CuAl 185 mm²				F-FC Cu-FC CuAl-EF-ES-R - FC CuAl 240 mm²	
DIN EN 50022				DIN EN 50022	
25000				25000	
240				120	
8000				8000	
120				120	
90				105	
120				140	
130				150	
70				70	
1.1 / 1.5				2.1 / 3	
1.5 / 1.9				2.7 / 3.7	

Electrical characteristics

Power distribution circuit-breakers

General characteristics

The new series of Tmax moulded-case circuit-breakers - complying with the IEC 60947-2 Standard - is divided into three basic sizes, with an application range from 1 A to 250 A and breaking capacities from 16 kA to 85 kA (at 380/415 V).
Selection of the size allows the basic electrical characteristics to be identified simply and immediately, whereas selection of the overcurrent release is made according to the type of application required.
The Tmax T1, T2 and T3 circuit-breakers fitted with thermomagnetic TMD releases with adjustable thermal threshold (I_1 = 0.7...1 x In) are available for protection of networks in alternating current. Tmax T2 is also available fitted with the electronic PR221DS microprocessor-based release.
The range of use in alternating current of the Tmax series varies from 1 A to 250 A with voltages up to 690 V.
The Tmax T1, T2 and T3 circuit-breakers fitted with TMD can also be used in direct current installations, with an application range from 1 A to 250 A and a minimum operating voltage of 24 V DC. With 2 poles in series, the circuit-breakers can be used with rated voltages of 250 V and breaking capacities up to 85 kA; whereas with 3 poles in series, 500 V can be reached with breaking capacities still up to 85 kA.
The T2 and T3 three-pole circuit-breakers can also be fitted with MA adjustable magnetic only releases, for applications in both alternating and direct current, particulary for motor protection functions (see page 1/18).

Field of application of the alternating and direct current circuit-breakers

	Release	Range [A]
AC		
T1 160	TMD	16...160
T2 160	TMD	1...160
	MA	2.5...100
	PR221DS	10...160
T3 250	TMD	63...250
	MA	100...200
DC		
T1 160	TMD	16...160
T2 160	TMD	1...160
	MA	2.5...100
T3 250	TMD	63...250
	MA	100...200

Thermomagnetic releases

T1 e T3

I_1=0.7...1 x In	L1 - L2 - L3
	neutral
	T1 160
	T3 250
I_3	L1 - L2 - L3
	neutral

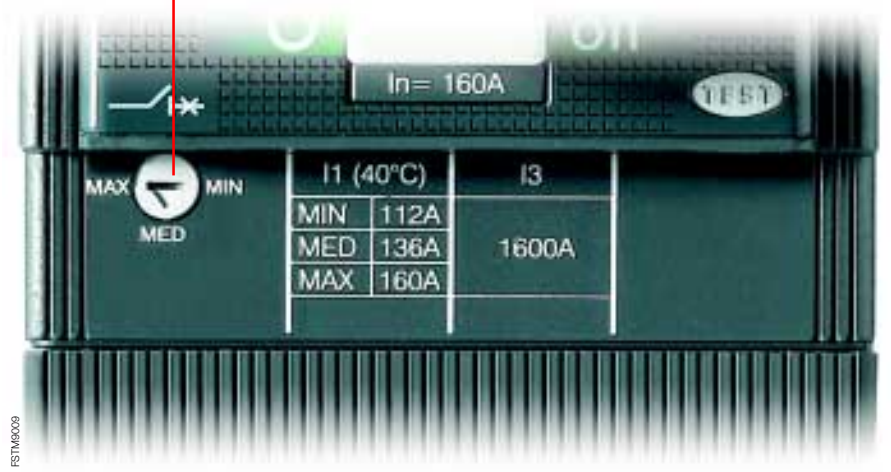
T2

I_1=0.7...1 x In	L1 - L2 - L3
	neutral
	T2 160
I_3	L1 - L2 - L3
	neutral

Thermomagnetic releases

The Tmax T1, T2 and T3 circuit-breakers can be fitted with thermomagnetic releases and are used to protect alternating and direct current networks with an application range from 1A to 250A. They allow protection against overloads with a thermal device (with adjustable threshold) made using the bimetal technique, and protection against short-circuit with a magnetic device (with fixed threshold).
The four-pole circuit-breakers are always supplied with the neutral protected by the release and protection of the neutral at 100% of the phase setting for settings up to 100 A. For higher settings, the version with protection of the neutral at 50% of the phase setting is available.

Thermal threshold
Adjustable from 0.7 to 1 x In

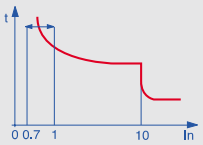


TMD

R16	R20	R25	R32	R40	R50	R63	R80	R100	R125	R125	R160	R160	R200	R200	R250	R250
R16	R20	R25	R32	R40	R50	R63	R80	R100	R125	R80	R160	R100	R200	R125	R250	R160
■	■	■	■	■	■	■	■	■	■		■	■				
						■	■	■	■	■	■	■	■	■	■	■
500	500	500	500	500	500	630	800	1000	1250	1250	1600	1600	2000	2000	2500	2500
500	500	500	500	500	500	630	800	1000	1250	800	1600	1000	2000	1250	2500	1600

R1.6	R2	R2.5	R3.2	R4	R5	R6.3	R8	R10	R12.5	R16	R20	R25	R32	R40	R50	R63	R80	R100	R125	R125	R160	R160
R1.6	R2	R2.5	R3.2	R4	R5	R6.3	R8	R10	R12.5	R16	R20	R25	R32	R40	R50	R63	R80	R100	R125	R80	R160	R100
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
16	20	25	32	40	50	63	80	100	125	500	500	500	500	500	500	630	800	1000	1250	1250	1600	1600
16	20	25	32	40	50	63	80	100	125	500	500	500	500	500	500	630	800	1000	1250	800	1600	1000

Notes
- Indication R identifies the setting current for phase (L1-L2-L3) and neutral protection (second line of both tables).
- The thermomagnetic releases which equip the Tmax T1, T2 and T3 circuit-breakers have the thermal element with adjustable threshold I_1 = 0.7...1 x In. The adjusted current value is obtained by using the special selector and is intended to be at 40 °C. The magnetic element has a fixed trip threshold with a tolerance of ± 20% according to the indications in the IEC 60947-2 (pos. 8.3.3.1.2) Standards.
  The trip thresholds of the I_3 magnetic protection are a function of the setting used for protection of both the phases and neutral.



Electrical characteristics

Power distribution circuit-breakers

Electronic PR221DS release

For uses in alternating current, the Tmax T2 circuit-breaker can be fitted with the PR221DS overcurrent release using microprocessor-based electronic technology. This allows protection functions which guarantee a high level of reliability, trip precision and insensitivity to the electromagnetic components in compliance with the standards in force on the matter. The power supply required for correct operation is supplied directly by the current transformers of the release and tripping is always guaranteed, even in conditions of single-phase load, and in correspondence with the minimum setting.

The PR221DS release, available on T2, provides protection functions against overload L and short-circuit S/I (PR221DS-LS version), and, alternatively, it is also available in the version with the sole function of protection against instantaneous short-circuit I (PR221DS-I version, see page 1/19).

The wide range of adjustments makes this release particularly suitable in all distribution applications where reliability and trip precision is needed anwhere only protection against short-circuit is required (I_3= 1...10 x In), using the SACE PR221DS release in the I version.

The SACE PR221 DS-LS release provides protection functions against overload L and delayed short-circuit S or, alternatively, instantaneous short-circuit I. The protection function against delayed short-circuit, which can be set to 100 ms or 250 ms in correspondence with a current of 8 x In, also makes this release suitable in applications where selective coordination is required.

There is a single adjustment for the phases and neutral, for which, however, the protection threshold of the functions can be requested at 50 - 100% that of the phases.

The protection release consists of current transformers (three or four according to the number of poles of the circuit-breaker), the SACE PR221DS protection unit and an opening solenoid, with demagnetisation (SA) which acts directly on the circuit-breaker operating mechanism unit and is mounted in the right-hand slot of the circuit-breaker.

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

When the protection trips, the circuit-breaker opens by means of the opening solenoid (SA), which changes over a contact to signal release tripped. Resetting the signal is mechanical and takes place when the circuit-breaker operating lever is reset. The SA opening solenoid is always supplied and is housed in the right slot. On request, an auxiliary circuit kit is available, specifically for electronic T2, which includes:

- 1 electronic release trip signalling contact
- 1 open/closed signalling contact
- 1 release trip signalling contact.

It is possible to test the opening solenoid (SA) by means of the SACE TT1 test device.

A positive outcome of the test coincides with circuit-breaker opening.

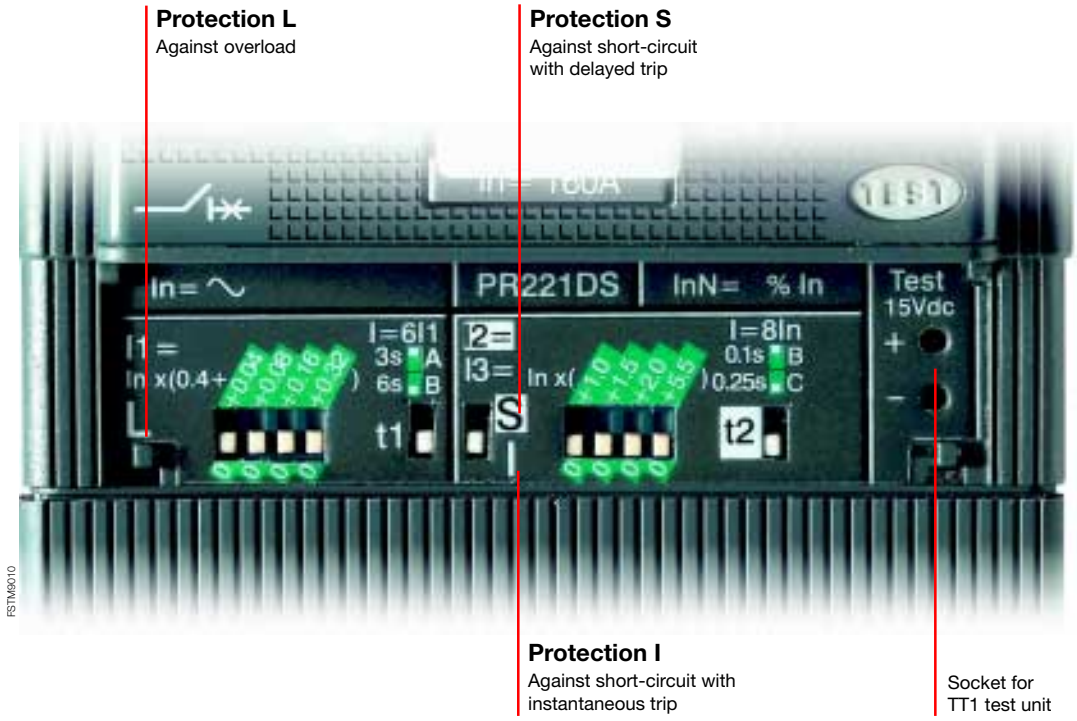
Setting the adjustment parameters of the protection functions is carried out directly from the front of the PR221DS release by means of the special dip-switches.

Current transformers

In	10 A	25 A	63 A	100 A	160 A
T2 160	■	■	■	■	■
L	4…10	10…25	25…63	40…100	64…160
S	10…100	25…250	63…630	100…1000	160…1600
I	10…100	25…250	63…630	100…1000	160…1600
neutral (50%)	-	-	-	-	■
neutral (100%)	■	■	■	■	■

Characteristics of the electronic PR221DS release

Operating temperature	- 25 °C ÷ + 70 °C
Relative humidity	90%
Operating frequency	45…66 Hz
Electromagnetic compatibility (LF and HF)	IEC 60947-2 Annex F
Electrostatic discharges	IEC 61000-4-2
Radiated electromagnetic field	IEC 61000-4-3
Short-time transients	IEC 61000-4-4
Mean time before failure (MTBF)	15 years (at 45 °C)



Protection functions and parametrisation of the PR221DS-LS release

Protection function			Trip threshold	Trip curves A	B	C
L CANNOT BE EXCLUDED	Against overload with inverse long delay trip and trip characteristic according to a definite time curve (I^2t = constant)		**I1** = 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 1.05...1.30 x I1 (IEC 60947-2)	at 6 x I1 t1 = 3s (tolerance:	at 6 x I1 t1 = 6s ± 10% up to 2 x In; ± 20% over 2 x In)	
S CAN BE EXCLUDED	Against short-circuit with inverse short delay and trip characteristic with definite time (I^2t = constant)	I²t=cost ON	**I2** = 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% up to 2 x In ± 20% over 2 x In		at 8 x In t2 = 0.1s	at 8 x In t2 = 0.25s (tolerance: ± 20%)
I CAN BE EXCLUDED	Against short-circuit with instantaneous adjustable trip (can be selected as an alternative to protection function S)	I²t=cost OFF	**I3** = 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%			

Electrical characteristics

Circuit-breakers for motor protection

Magnetic and electronic overcurrent releases

Starting, operating and protection of three-phase asynchronous motors are basic operations for their correct use. The traditional system used for this purpose foresees three different devices: a circuit-breaker for protection against short-circuit, a thermal relay for protection against overload and missing or unbalanced phase and a contactor for motor switching. All this has to take the problems which arise at the moment of starting into account.
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.

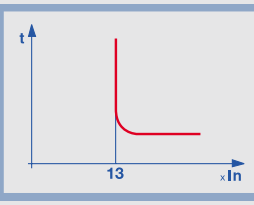
Magnetic only fixed releases - MF

T2

In [A]		1	1.6	2	2.5	3.2	4	5	6.5	8.5	11	12.5
	T2 160	■	■	■	■	■	■	■	■	■	■	■
	L1 - L2 - L3	13	21	26	33	42	52	65	84	110	145	163

I_3= 13 x In

Notes
The magnetic only releases which equip the Tmax T2 circuit-breaker in the three-pole version have a trip threshold (I_3) fixed at 13xIn, according to what is indicated in the table.



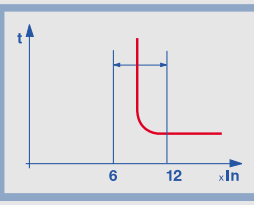
Adjustable magnetic only releases - MA

T2 e T3

In [A]		20	32	52	80	100	125	160	200
	T2 160	■	■	■	■	■			
	T3 250					■	■	■	■
	L1 - L2 - L3	120...240	192...384	314...624	480...960	600...1200	750...1500	960...1920	1200...2400

I_3=6...12 x In

Notes
The magnetic only releases which equip the Tmax T2 and T3 three-pole version circuit-breakers have a trip threshold (I_3) which can be adjusted from 6 to 12 x In, according to the indications in the table.



Electronic PR221DS-I microprocessor-based overcurrent release

T2N T2S T2H T2L	Rated current release	Trip current function I
	In [A]	**I3 [A]**
■	10	10...100
■	25	25...250
■	63	63...630
■	100	100...1000
■	160	160...1600

With its new Tmax series of moulded-case circuit-breakers, ABB SACE proposes a range up to 250 A which, by only implementing protection against short-circuit, is suitable for use inside the traditional type of protected starters.
The Tmax T2 and T3 circuit-breakers, in the version with magnetic only release adjustable between 6 and 12 times the rated service current, stand out for their compactness and excellent performances in terms of breaking capacity and specific let-through energy limitation. Moreover, thanks to their great flexibility due to the wide setting range of the magnetic threshold, motor protection is optimised. They can be used in a very wide range of start-ups, from 0.37 kW to 45 kW for T2 and up to 90 kW for T3 (at 415 V). Finally, thanks to adjustment of the protection against short-circuit from 1 to 10 times the rated current, T2 160, with different levels of breaking capacity (N-S-H-L) and fitted with the electronic PR221DS-I microprocessor-based release, allows the most suitable trip value for any type of motor to be selected.

Protection functions and parametrisation of the PR221DS-I release

Protection function		Trip threshold
Against short-circuit with instantaneous adjustable trip	I^2t=cost OFF	**I3** = 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%

Electrical characteristics

Switch-disconnectors

The Tmax switch-disconnectors derive from the corresponding circuit-breakers, of which they keep the overall dimensions, versions, fixing systems and the possibility of mounting accessories unchanged.
They are characterised by a rated voltage of 690 V in alternating current and 500 V in direct current.

Coordination with the circuit-breakers (380/415 V AC)

		Icc_{max} [kA_{rms}]		Icm [kA_{pic}]	
Type		**T1D 160**	**T3D 250**	**T1D 160**	**T3D 250**
T1	**B**	16		32	
	C	25		52.5	
	N	36		75.6	
T2	**N**	36		75.6	
	S	50		105	
	H	70		154	
	L	85		187	
T3	**N**		36		75.6
	S		50		105

Conventional thermal current, **Ith**			[A]
Rated service current in AC23A category, **Ie**			[A]
Poles			No.
Rated service voltage, **Ue**		(AC) 50-60 Hz	[V]
		(DC)	[V]
Rated impulse withstand voltage, **Uimp**			[kV]
Rated insulation voltage, **Ui**			[V]
Test voltage at industrial frequency for 1 minute			[V]
Rated short-circuit making capacity, **Icm**		(min) only switch-disconnector	[kA]
		(max) with circuit-breaker on supply side	[kA]
Rated short-time withstand current for 1s, **Icw**			[kA]
Isolation behaviour			
Reference standards			
Versions			
Terminals			
Mechanical life			[No. Operations]
			[No. Hourly operations]
Basic dimensions, fixed		3 poles	L [mm]
		4 poles	L [mm]
			H [mm]
			P [mm]
Weight	fixed	3/4 poles	[kg]
	plug-in	3/4 poles	[kg]

Applications

They 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.

Isolation

The main function carried out by this apparatus consists of isolation of the circuit they are inserted in.
Once the contacts are open they are at a distance which prevents an arc from striking, in accordance with the prescriptions in the standards regarding isolation behaviour. The position of the operating lever corresponds definitely with that of the contacts (positive operation).

Tmax T1D	Tmax T3D
160	250
125	200
3/4	3/4
690	690
500	500
8	8
800	800
3000	3000
2.8	5.3
187	105
2	3.6
■	■
IEC 60947-3	IEC 60947-3
F	F - P
FC Cu - EF - FC CuAl 95 mm²	F - FC Cu - FC CuAl - EF - ES - R - FC CuAl 240 mm²
20000	25000
120	120
76	105
102	140
130	150
70	70
0.9 / 1.2	2.1 / 3
-	2.7 / 3.7

Protection

Each switch-disconnector must be protected on the supply side by a coordinated device which safeguards it against short-circuits. The coordination table given at the side indicates the Tmax circuit-breaker which can carry out the protection function for each switch-disconnector. These are always pieces of apparatus of a size corresponding to or smaller than that of the switch disconnector.

Making capacity

The making capacity Icm is a performance of notable importance since a switch-disconnector must be able to withstand the dynamic, thermal and current stresses which can occur during closure without being destroyed, up to the short-circuit closing conditions.

Withstand capacity in closed position

Identifies the capacity to maintain the closed position for short-time overcurrents. It is a significant parameter which qualifies the performances of this apparatus.

Electrical characteristics

Tmax T1 1P single-pole moulded-case circuit-breaker

For the first time, ABB SACE has developed a moulded-case circuit-breaker with a single pole construction characteristic. This is a circuit-breaker with 160 A rated uninterrupted current able to operate at service voltages up to 240 V AC, in compliance with the IEC 60947-2 Standard. From the dimensional viewpoint, the new T1 1P is identical to the Tmax T1 size (same height H = 130 mm and same depth D = 70 mm), except for its width, which is typical of a single pole type (W = 25.4 mm).
It can therefore be installed in distribution switchboards using a base plate, even side by side with other circuit-breakers in the series.

Thermomagnetic release - TMF

Tmax T1 1P is fitted with a TMF thermomagnetic release, with fixed magnetic thermal threshold which means it can be used in networks both with alternating and direct current, with a range of currents from 16A to 160A. Protection against overload is guaranteed thanks to the thermal element with fixed threshold, whereas protection against short-circuit is guaranteed by the magnetic element, again with fixed threshold.

Thermomagnetic release - TMF

T1 1P

I_1= In [A]	R16	R20	R25	R32	R40	R50	R63	R80	R100	R125	R160
I_3 [A]	500	500	500	500	500	500	630	800	1000	1250	1600

Field of application of the T1 1P in alternating and direct current

	Release	Range [A]
AC - T1 1P 160	TMF	16...160
DC - T1 1P 160	TMF	16...160

Accessories

Index

Accessories

There is a single range of accessories for all three sizes of the Tmax series and this is characterised by the completeness of the solutions proposed, together with flexibility and simplicity of use.

FSTM9012

Accessories

Versions and types

Fixed

The Tmax T1, T2 and T3 FIXED version three-pole or four-pole circuit-breakers, foresee:
- a single 70 mm depth
- 45 mm standardised front
- single flange for compartment door for the 3 sizes
- possibility of assembly on base plate or DIN rail
- thermomagnetic or electronic release (on T2)
- standard FC Cu type terminals (front for copper cables) for T1 and F type (front) for T2 and T3.

Plug-in

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

The circuit-breaker is removed 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.

Starting from the fixed version with front terminals, the Tmax T2 and T3 circuit-breakers can be converted into the various versions using the conversion Kits. This makes managing the product, its versions and warehouse stocks in general very flexible. It is, however, always possible to ask for the circuit-breaker in the required version fully prepared in the factory. To carry out isolation of the electrical accessories, combined with plug-in circuit-breakers, the socket-plug connectors in the version with 3, 6 and 12 poles can be ordered.

Versions available

	F Fixed	P Plug-in
T1	■	–
T2	■	■
T3	■	■

Accessories

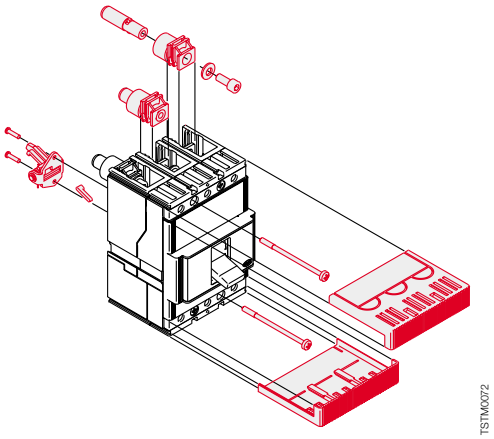
Versions and types

Kit for conversion into moving part of plug-in for T2 - T3

Allows the fixed circuit-breaker with front terminals to be converted into the moving part of a plug-in circuit-breaker. The kit consists of:

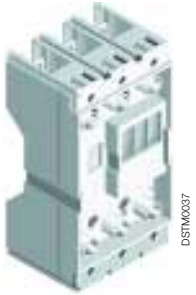
– tulip isolating contacts
– anti-racking out safety device- assembly screws and nuts.

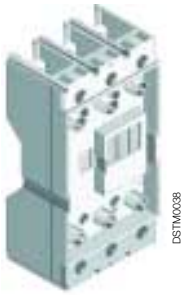
The fixed part is necessary to complete the circuit-breaker.
In the case where the circuit-breaker has some electrical accessories mounted (SOR, UVR, MOS, RC22_, AUX, AUE), the plug-socket connectors for isolation of the relative auxiliary circuits can also be ordered.



Fixed part for T2 - T3

The fixed part allows the circuit-breaker to be made in the plug-in version. The racked-in and racked-out positions are possible for plug-in version circuit-breakers. The fixed parts are available, in the standard version, with front terminals (F): a distinguishing characteristic is the possibility of equipping the fixed parts with the same terminal, terminal cover and phase separator kits used for the fixed circuit-breakers.





Accessories

Connection terminals

The basic version circuit-breaker is supplied with:
– front terminals for copper cables (FC Cu), for the Tmax T1 circuit-breakers
– front terminals (F), for the Tmax T2 and T3 circuit-breakers.
Different types of terminals which can be combined together in different ways are also available (top of one type, bottom of a different type), thereby allowing the circuit-breakers to be connected to the plant in the most suitable way in relation to installation requirements.
The following can be distinguished:
– **front terminals** which allow connection of cables or busbars working directly from the front of the circuit-breaker
– **orientated rear terminals** which allow installation of the circuit-breakers in switchboards with rear access to both the cable and busbar connections.
Terminals are available for direct connection of bare copper or aluminium cables and terminals for connection of busbars or cables with cable terminals.
A notable characteristic is that all the different types of terminals available can be mounted either on the fixed version circuit-breaker or on the corresponding fixed part of the plug-in circuit-breaker.

The information needed to make the connections is summarised on page 2/7 for each type of terminal. The minimum and maximum cross-sections of the cables which can be clamped in the terminals and the diameter of the terminal are indicated for connection to bare cables. For connections with busbars, flat terminals of different sizes and composition are recommended. Furthermore, the minimum depth the flat terminal to be connected must have is also indicated, if it is of a different composition compared to the one recommended.
The torque values to be applied to the tightening screws of the terminals for cables and to the screws used to connect the busbars to the flat terminals are indicated.

The circuit-breakers can be ordered complete with the terminals required (mounted directly in the factory), by associating the terminal kit codes with the code of the standard version circuit-breaker, or the terminals can be ordered individually in packs of 3 - 4 - 6 or 8 pieces.
To receive the circuit-breaker with mixed terminals, the two terminal half-kits must be specified, loading the one to be mounted on top as the fist half-kit and then the one to be loaded below.

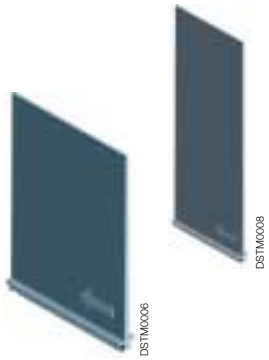
Insulating terminal covers

The terminal covers are applied to the circuit-breaker to prevent accidental contact with live parts and thereby guarantee protection against direct contacts. The following are available:
– low terminal covers. These guarantee IP40 degree of protection for fixed circuit-breakers with rear terminals and for moving parts of plug-in circuit-breakers
– high terminal covers for fixed circuit-breakers with front, front extended, front for cables and rear terminals. These guarantee IP40 degree of protection.
The fixed parts of plug-in circuit-breakers can use the same terminal covers as the corresponding fixed circuit-breakers. The degrees of protection indicated are valid for the circuit-breaker installed in a switchboard.

Accessories

Connection terminals

Phase separating partitions



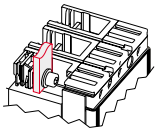
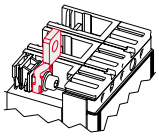
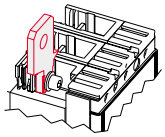
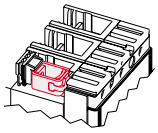
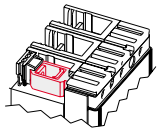
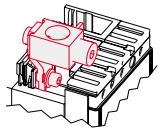
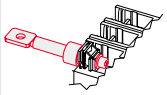
These allow the insulation characteristics between the phases at the connections to be increased. They are mounted from the front, even with the circuit-breaker already installed, inserting them into the corresponding slots and they are available in two versions:
– 100 mm high
– 200 mm high.
The H=100 mm phase separators are supplied as compulsory with front extended type terminals (EF), whereas the ones with height H=200 mm are compulsory with front extended spread type terminals (ES).
They are incompatible with both the high and low insulating terminal covers.The fixed parts of plug-in circuit-breakers can use the same separating partitions as the corresponding fixed circuit-breakers. With the phase separating partitions mounted, a special kit is available 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.

Screws for sealing the terminal covers

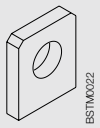
These are applied to the terminal covers of fixed circuit-breakers or to the moving parts of plug-in circuit-breakers. They prevent removal of both the high and low terminal covers and can be locked with a wire and lead seal.

Kit for taking up the auxiliary power supply

Special kits are available with the Tmax T2 and T3 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).

	F	EF	ES	FC Cu	FC CuAl	FC CuAl	R
	 Front terminals	 Front extended terminals	 Front extended spread terminals	 Front terminals for copper cables	 Front terminals for CuAl cables	 Front terminals for CuAl cables (housed externally)	 Rear terminals
T1	–	F	–	F (*)	–	F	–
T2	F - P (*)	F - P	F - P	F - P	F - P	F - P	F - P
T3	F - P (*)	F - P	F - P	F - P	F - P	F - P	F - P

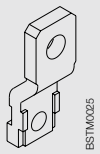
(*) Standard supply F = Fixed P = Plug-in



Front terminals - F

Allow connection of busbars or cables with cable terminals

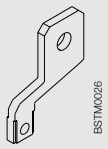
Type	Version	Pieces	Busbars/cable terminal [mm]				Tightening [Nm]	Terminal covers		Phase separators
			L	H	D	hole	B	high	low	H=100 mm
T2	F - P	1	20	7.5	5	6.5	6	R	R	R
T3	F - P	1	24	9.5	8	8.5	8	R	R	R



Front extended terminals - EF

Allow connection of busbars or cables with cable terminals

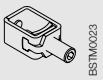
Type	Version	Pieces	Busbars [mm]			Tightening [Nm]		Terminal covers		Phase separators
			L	D	hole	A	B	high	low	H=100 mm
T1	F	1	15	5	8.5	7	9	R	-	S
T2	F - P	1	20	4	8.5	6	9	R	-	S
T3	F - P	1	20	6	10	8	18	R	-	S



Front extended spread terminals - ES

Allow connection of busbars or cables with cable terminals

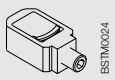
Type	Version	Pieces	Busbars [mm]			Tightening [Nm]		Terminal covers		Phase separators
			L	D	hole	A	B	high	low	H=200 mm
T2	F - P	1	30	4	10.5	6	18	-	-	S
T3	F - P	1	30	4	10.5	8	18	-	-	S

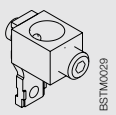


Front terminals for copper cables - FC Cu

Allow connection of bare copper cables directly to the circuit-breaker. They are not suitable for tube cable terminals.

Type	Version	Pieces	Cable [mm²]		Busbars	Cable terminal	Tightening	Terminal diameter	Terminal covers		Phase separators
			rigid	flexible	L [mm]	L [mm]	B [Nm]	[mm]	high	low	H=100 mm
T1/T1 1P	F	1	2.5-70	2.5-50	12	12	7	12	R	R	R
T2	F - P	1	1-95	1-70			7	14	R	R	R
T3	F - P	1	6-185	6-150			10	18	R	R	R

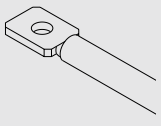




Front terminals for copper/aluminium cables - FC CuAl

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

Type	Assembly	Version	Pieces	Cable [mm²]	Tightening [Nm]		Terminal diameter	Terminal covers		Phase separators
				rigid	A	B	[mm]	high	low	H=100 mm
T1	external	F	1	35-95	7	13.5	14	S	-	-
T2	standard	F - P	1	1-95		7	14	R	R	R
	external	F - P	1	70-185	6	25	18	S	-	-
T3	standard	F - P	1	70-185		16	18	R	R	R
	external	F - P	1	150-240	8	31	24	S	-	-



Rear orientated terminals - R

Allow connection of busbars or cable terminals at the rear. They can be installed in 4 different positions to facilitate connection to the cables/busbars.

Type	Version	Pieces	Busbars [mm]			Tightening [Nm]		Terminal covers		Phase separators
			L	D	hole	A	B	high	low	H=100 mm
T2	F - P	1	20	4	8.5	6	9	-	S	-
T3	F - P	1	20	6	8.5	6	9	-	S	-

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

Accessories

Service releases

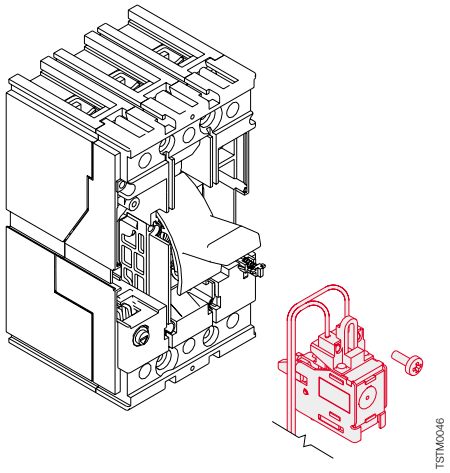
The service releases, shunt opening release and undervoltage release, housed and fixed in a slot on the left-hand side of the circuit-breaker are always alternative to each other. They can be supplied in the pre-cabled version with 1 m long free cables or in the version with cabling carried out by the customer by means of connection to the terminals integrated in the release. Assembly is carried out by pressing into the appropriate seat on the left-hand part of the circuit-breaker and fixing with the screw provided.

Shunt opening release - SOR

Allows circuit-breaker opening by means of an electric command. Operation of the release is guaranteed for a voltage between 80% and 110% of the rated power supply voltage Un, both in alternating current and in direct current. It is always fitted with an auxiliary limit contact.

SOR - Electrical characteristics

Version	Absorbed power on inrush AC [VA]	DC [W]
12 V DC		50
24…30 V AC/DC	50	
48…60 V AC/DC	60	60
110…127 V AC - 110…125 V DC	50	50
220…240 V AC - 220…250 V DC	50	50
380…440 V AC	55	
480…500 V AC	55	
Circuit-breaker opening times [ms]	15	

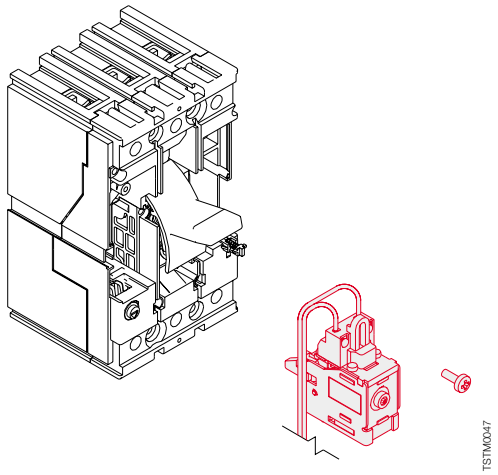


Undervoltage release - UVR

Opens the circuit-breaker due to lack of release power supply voltage or to drops to values under 0.7 x Un with a trip range from 0.7 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-energised, it is not possible to close the circuit-breaker or the main contacts.

UVR - Electrical characteristics

Version	Absorbed power during continuos service AC [VA]	DC [W]
24…30 V AC/DC	1.5	1.5
48 V AC/DC	1	1
60 V AC/DC	1	1
110…127 V AC - 110…125 V DC	2	2
220…240 V AC - 220…250 V DC	2.5	2.5
380…440 V AC	3	
480…500 V AC	4	
Circuit-breaker opening times [ms]	15	



Time delay device for undervoltage release - UVD

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.

Accessories

Electric signals

These allow information on the operating state of the circuit-breaker to be taken outside.
Installation of these accessories is carried out directly from the front of the circuit-breaker in special slots placed on the right-hand side of the circuit-breaker, completely segregated from the live parts - all to the benefit of user safety.


TSTM0032


BSTM0059

Auxiliary contacts for external signalling - AUX

These carry out electrical signalling of the operating state of the circuit-breaker:
- open/closed: indicates the position of the circuit-breaker contacts
- release trip: signals circuit-breaker opening due to overcurrent release trip (for overload or short-circuit), trip of the residual current release, of the opening coil or of the undervoltage release, of the emergency opening pushbutton of the motor operator or due to operation of the test pushbutton
- alarm signalling (only for Tmax T2 with electronic release): signals intervention of one of the protection functions of the electronic release.
  Signalling is reset when the circuit-breaker is re-armed (reset).

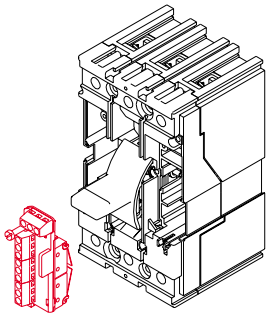
As an alternative, the following are available:
- an open/closed signalling contact (on change-over) plus a release trip signalling contact (on change-over)
- three open/closed signalling contacts (on change-over) plus one contact signalling release trip (on change-over).

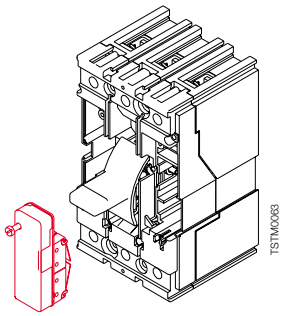
They can be supplied either in the pre-cabled version with 1 m long free cables, or in the version with cabling carried out by the customer by means of connection to the terminals integrated on the release.
With the T2 circuit-breaker, fitted with electronic PR221DS release, the alarm signalling contact can be supplied (on request), plus one contact signalling open/closed (on change-over) plus one contact signalling release trip (on change-over), in the pre-cabled version.
A change-over contact signalling residual current protection trip is always supplied for the Tmax circuit-breakers combined with the residual current RC221 and RC222 releases.
2 change-over contacts for signalling pre-alarm and alarm are also available with RC222.

AUX - Electrical characteristics

Power supply voltage	Service current	
	Category of utilisation (IEC 60947-5-1)	
	AC 14	DC 13
125 V	6 A	0.3 A
250 V	5 A	0.5 A

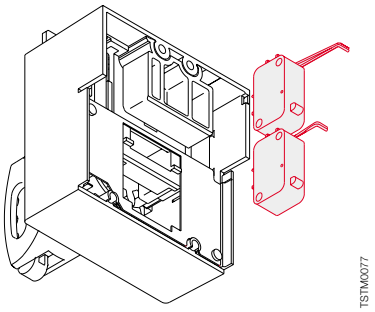
Protection with gG 10 x 38 type fuse (I_{max} 6A)




TSTM0063

Early auxiliary contacts - AUE

Two normally open contacts, advanced in relation to closing. They 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. The early contacts are only supplied in the cabled version with 1 metre long cables, complete with socket-plug with 6 poles.

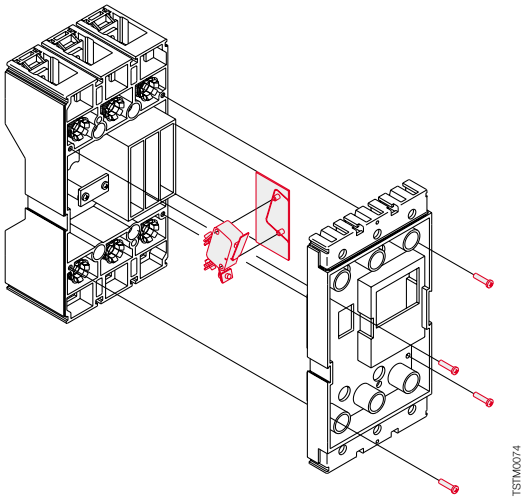


Auxiliary position contacts for T2 and T3 - AUP

For the fixed part of circuit-breakers, Tmax T2 and T3 provide electrical signalling of the circuit-breaker position in relation to the fixed part. They can only be connected by means of free wires and are available in the following versions:

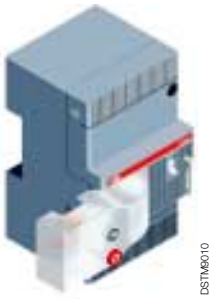
– contacts signalling circuit-breaker racked-in.

A maximum of three contacts in any combination can be installed on the fixed part of T2 and T3.



Accessories

Remote control



Solenoid operator - MOS

Allows remote circuit-breaker opening and closing control and is particularly recommended for use in electric network supervision and control systems. A selector allows passage from automatic to manual operation. It is always provided with a padlock in the open position.

It operates both circuit-breaker opening and closing, working directly on the circuit-breaker lever.

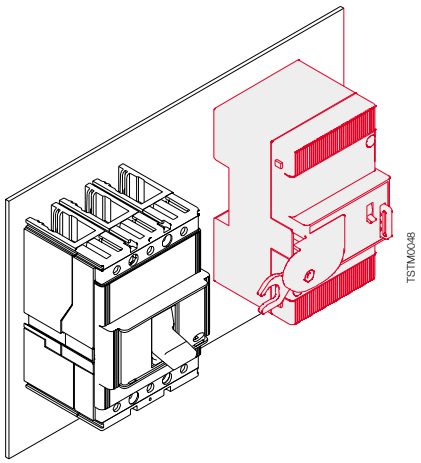
It is offered in two versions, one "beside" the circuit-breaker, with T1 and T2, for installation on a panel or DIN EN 50022 rail, the other on the "front", with T1, T2 and T3, suitable for installation directly on the front of the circuit-breaker. The latter is complete with operating handle. The front version can also be used with plug-in circuit-breakers.

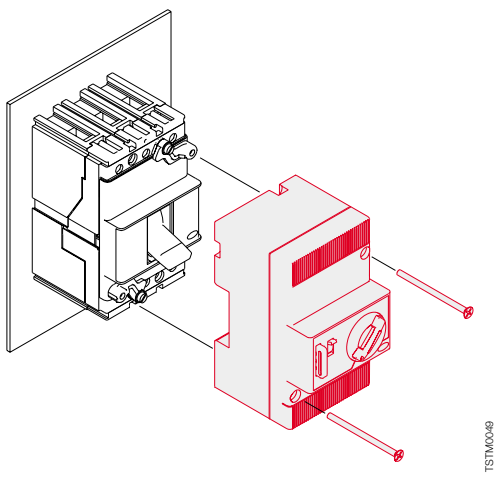
Both types can be used either in the three-pole or four-pole versions.

The solenoid motor operator is supplied complete with 1 metre long free cables, and for the superimposed version only, with a 3 pole socket-plug connector.

Both the opening and closing control is operated by the motor, which works directly on the circuit-breaker lever. The table shows the power supply voltage values Un [V].

Rated voltage, Un		
AC	[V]	110…250
DC	[V]	48…60 / 110…250
Service voltage		85…110% Un
Absorbed power on inrush		2500 [VA] / 1000 [W]
Time	opening [s]	< 0.1
	closing [s]	< 0.1
Mechanical life	[no. Operations]	25000
Degree of protection, on the front		IP30
Minimum control impulse time on opening and closing	[ms]	>100





Rotary handle operating mechanism - RHD/RHE

Thanks to its ergonomic grip, the rotary handle facilitates operation. It is fitted with a padlock in the open position which prevents circuit-breaker closing. The opening in the padlock can take up to 3 padlocks - 7 mm stem Ø (not supplied). It is always fitted with a compartment door lock and on request it can be supplied with a 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. The rotary handle operating mechanism is available in either the direct version or in the transmitted version on the compartment door. The release settings and nameplate data remain accessible to the user.

The rotary handle operating mechanism in the emergency version is also available, complete with yellow-red handle and yellow plate, suitable for controlling machine tools.

The transmitted rotary handle operating mechanisms can be ordered by building up the following three devices:

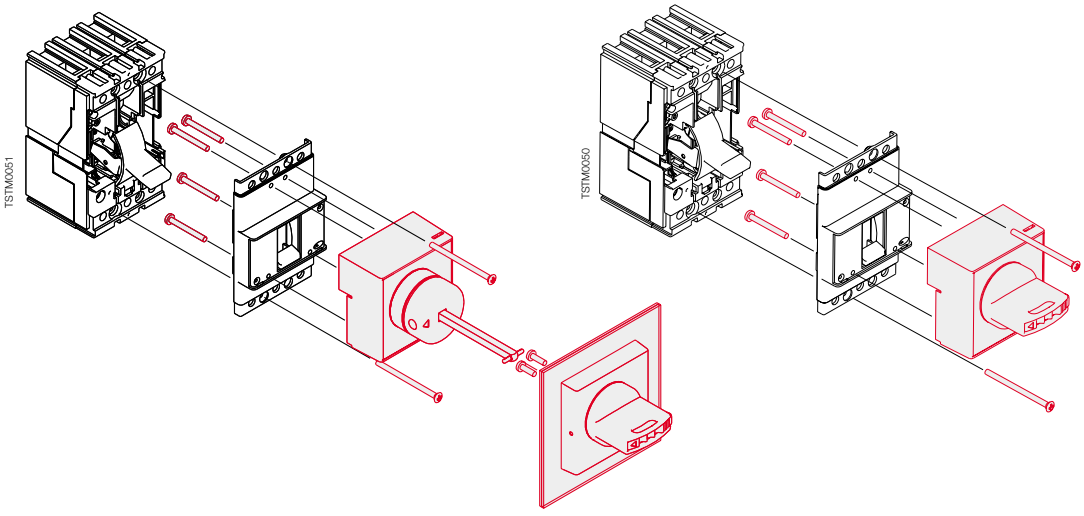
– rotary handle on the compartment door
– transmission rod (500 mm)
– base for circuit-breaker,

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

Type of operating mechanism (RH_)

		F / P [1]
RHD	Direct	■
RHD_EM	Direct emergency	■
RHE	Transmitted with adjustable distance	■
RHE_EM	Emergency transmitted with adjustable distance	■
RHE_B	Base for circuit-breaker	■
RHE_S	Rod for adjustable transmitted handle	500 mm
RHE_H	Handle for transmitted with adjustable distance RH	■
RHE_H_EM	Emergency handle for transmitted with adjustable distance RH	■

[1] for T1, only the F version is available



Accessories

Operating mechanisms and locks

Operating mechanisms and locks

Allows the mechanical circuit-breaker closing operation to be locked.
The following versions are available:
– lock with different key for each circuit-breaker
– lock with same key for groups of circuit-breakers.
The circuit-breaker lock in the open position ensures isolation of the circuit in accordance with the IEC 60947-2 Standard. It is also available in the version which allows locking both in the open and closed position. The lock in the closed position does not prevent release of the mechanism following a fault or remote control command.

Key lock on the circuit-breaker - KLC

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
– special type, with key removable in both positions.

Sealable thermal adjustment lock

This is applied to the circuit-breaker covers near the thermal element regulator of the TMD thermomagnetic release and prevents it being tampered with.

IP54 protection for rotary handle

Allows IP54 degree of protection to be obtained. It is available for rotary handle operating mechanism on the compartment door (RHE) for the T1, T2 and T3 circuit-breakers.

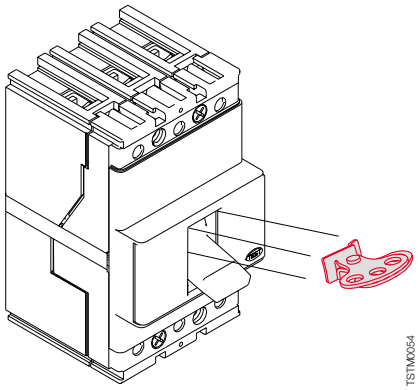
Padlock for operating lever - PLL


DSTM0014

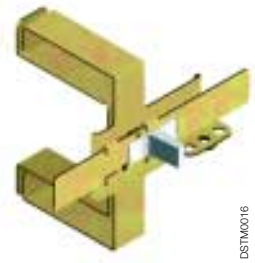

DSTM0013

This is applied to the T1 - T2 - T3 circuit-breaker covers to prevent the lever closing or opening operation. It allows installation up to a maximum of three padlocks - stem 7 mm Ø (not supplied). It is available in the following versions:

– locking device only of the closing operation (it is applied with circuit-breaker on O/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.


TSTM0054

Front interlock - MIF


DSTM0016

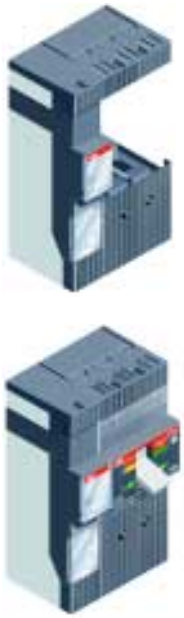
This can be applied on the front of two T1, T2 or T3 circuit-breakers mounted side by side, in either the three-pole or four-pole fixed version and prevents simultaneous closing of the two circuit-breakers. Fixing is carried out directly on the base plate of the switchboard. The front interlocking plate allows installation of a padlock in order to fix the position (possibility of locking in the O-O position as well). It is also possible to interlock three circuit-breakers side by side, using the proper plate, thereby making the following interlock combinations: IOO-OIO-OOI-OOO.
It is incompatible with the front accessories (solenoid operator, rotary handle operating mechanism).

Accessories

Residual current releases

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.
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 earth contacts, indirect contacts and fire hazards. The residual current releases can also be mounted on the Tmax T1D and T3D 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 automatic 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 IEC 61000: for protection against unwarranted trips
– IEC 60755 (SACE RCQ): for insensitivity to direct current components.

Electronic RC221 and RC222 residual current releases



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 an opening solenoid, supplied with the residual current release, and are 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 tests 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.

The residual current releases are supplied complete with:
– an opening solenoid 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.
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 as a loose article, the FC Cu terminal semi-kit must also be included in the order (consult the code section on page 5/15).

Residual current releases		**RC221**	**RC222**
Technology		electronic with microprocessor	
Action		with solenoid	
Primary service voltage [1]	[V]	85...500	
Operating frequency	[Hz]	50-60 ± 10%	
Test operation range [1]	[V]	85...500	
Rated service current	[A]	up to 250	
Rated residual current trip, $I_{\Delta n}$	[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
Non-trip residual current		65% $I_{\Delta n}$	
Time limit for non-trip (at 2 x $I_{\Delta n}$)	[s]	instantaneous	inst.-0.1-0.2-0.3-0.5-1-2-3
Tolerance over trip times	%		± 20
Local trip signalling		■	■
SA with change-over contact for trip signalling		■	■
Self-supply		■	■
Input for remote opening			■
NO contact for signalling pre-alarm			■
NO contact for signalling alarm			■
Indication of 25% pre-alarm of $I_{\Delta n}$ (tolerance ± 3%)			■
Alarm timing indication			■
Automatic reset of the residual current release on resetting the associated circuit-breaker		■	■
Type A for pulsating, alternating current		■	■
Selective type			■
Power supply from above and from below		■	■
Assembly with three-pole circuit-breakers		■	■
Assembly with four-pole circuit-breakers		■	■
Emergency stop device			■

[1] Operation up to 50 V Phase - Neutral

Accessories

Residual current releases

GSIS9046

SACE RCQ switchboard residual current relay

The Tmax T1, T2 and T3 circuit-breakers can also be combined with the SACE RCQ switchboard relay with separate toroid (to be installed externally on the line conductors) and these fulfil 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 SACE RCQ switchboard relay is suitable for applications where a system of residual current protection coordinated with the various distribution levels, from the main switchboard to the end user is required. 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) to provide protection of people against direct contacts.

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

The SACE RCQ relay is of the type with indirect action and acts on the circuit-breaker release mechanism by means of the shunt opening release 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		**SACE 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 60 [mm]	[A]	0.03 ... 30
Toroidal transformer Ø 110 [mm]	[A]	0.03 ... 30
Toroidal transformer Ø 185 [mm]	[A]	0.1 ... 30
Range of use of transformers which can be opened		
Toroidal transformer Ø 110 [mm]	[A]	0.3 ... 30
Toroidal transformer Ø 180 [mm]	[A]	0.3 ... 30
Toroidal transformer Ø 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 flashing LED 2 N.O. 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: 5 m
Dimensions L x H x D	[mm]	96 x 96 x 131.5
Drilling for assembly on door	[mm]	92 x 92

Accessories

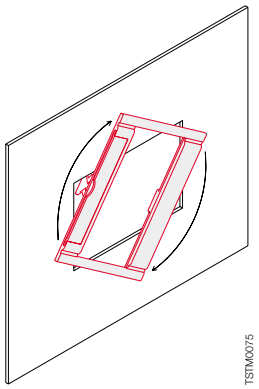
Installation and testing accessories, and spare parts

Bracket for fixing onto DIN rail

This is applied to the fixed circuit-breaker and allows installation on a standardised DIN EN 50022 rail. It simplifies assembly of the T1 - T2 and T3 circuit-breakers in standard switchboards.
The bracket for fixing onto a DIN rail is also available for the Tmax circuit-breakers combined with the RC221 and RC222 residual current releases or with the solenoid operator of the type placed at the side.

Flange for compartment door

This is always supplied with the Tmax T1 - T2 and T3 circuit-breakers.
All the flanges in the Tmax series are of new design and do not require the use of screws for installation: fixing is highly simplified by just a simple coupling operation.
When a rotary handle operating mechanism, solenoid operator or residual current releases is used, a dedicated flange is supplied to be used instead of the one supplied with the circuit-breaker.



Accessories

Installation and testing accessories, and spare parts

SACE TT1 test unit

Allows the PR221DS electronic release trip and the trip test of the opening solenoid (SA). The device, supplied by a replaceable 9 V battery, is provided with a connector-tracer point with two polarised poles housed on the bottom of the box which allows connection of the device to the test input bushings on the front of the electronic PR221DS-I or PR221DS-LS release.
The limited dimensions of the accessory make it practically pocket-type.

2

Spare parts

The following spare parts are available:

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

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

Characteristic curves and technical information

Index

Characteristic curves

Technical information

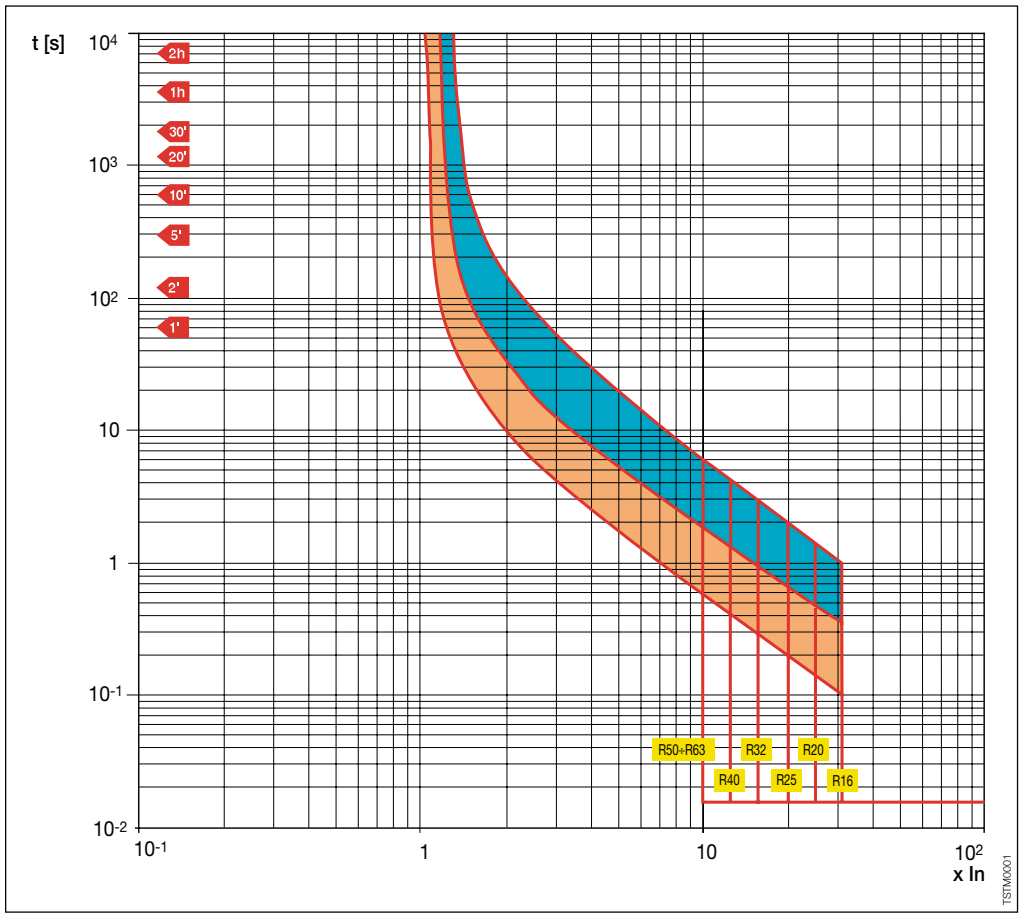
(*) For the T1 1P characteristic curves, please ask ABB SACE directly.

Trip curves for distribution

Circuit-breakers with thermomagnetic releases

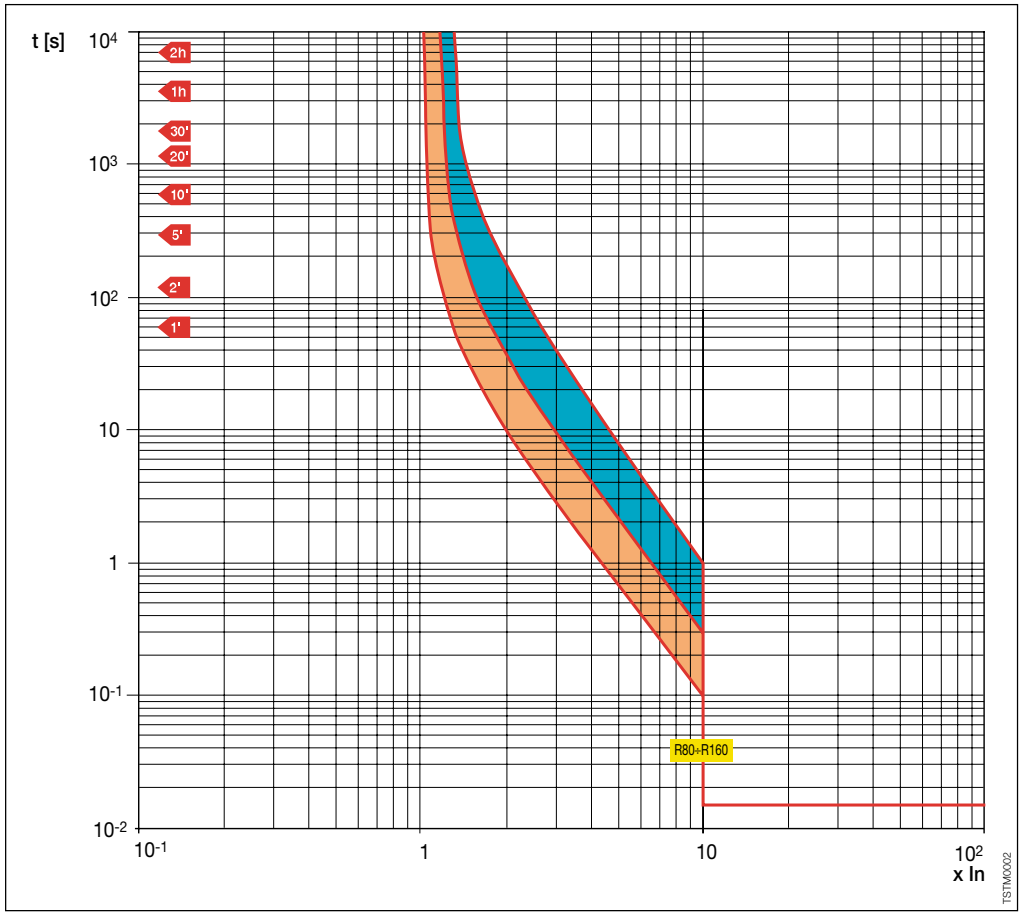
T1 160 TMD

R16-R63



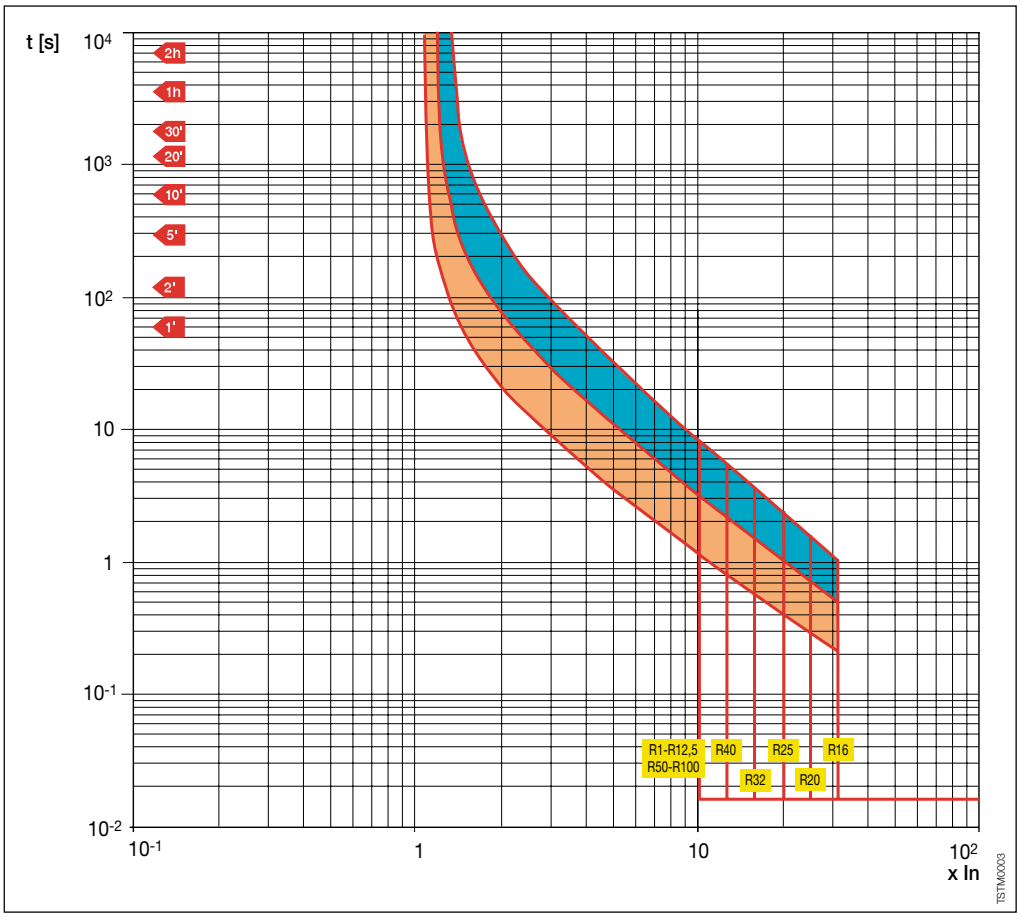
T1 160 TMD

R80-R160

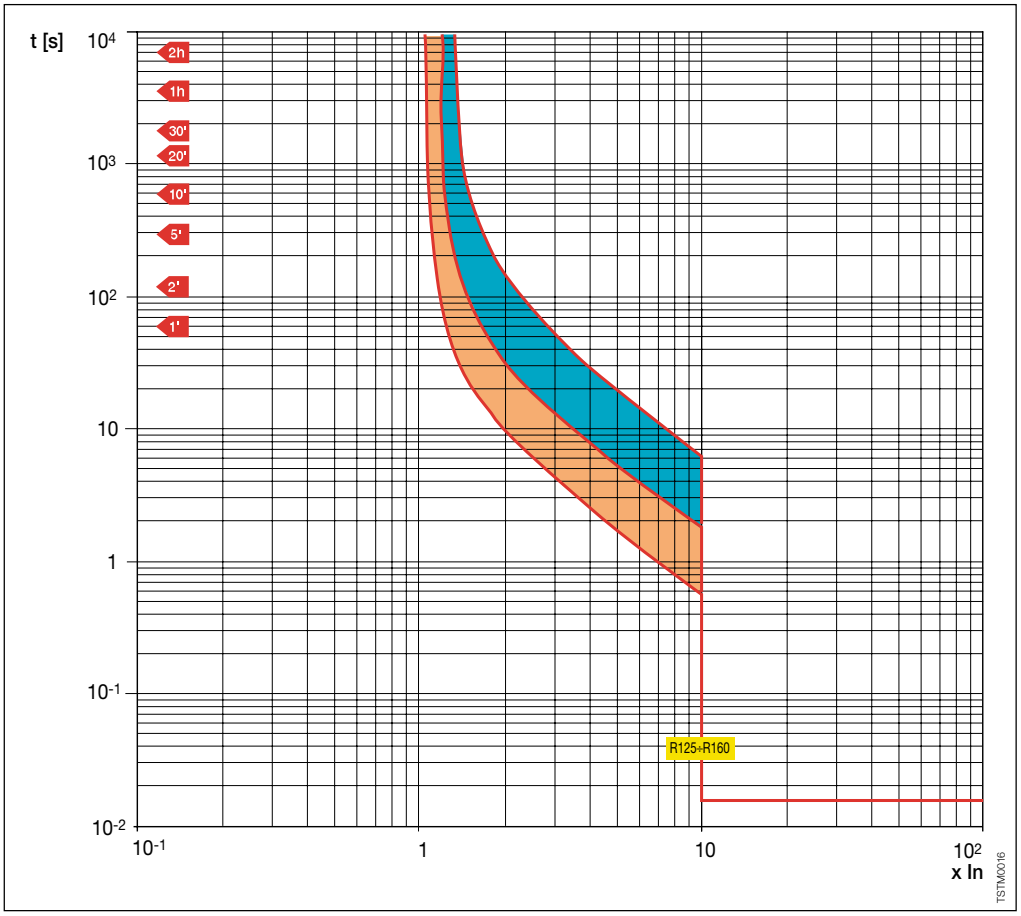


3

T2 160 TMD
R1-R100



T2 160 TMD
R125-R160



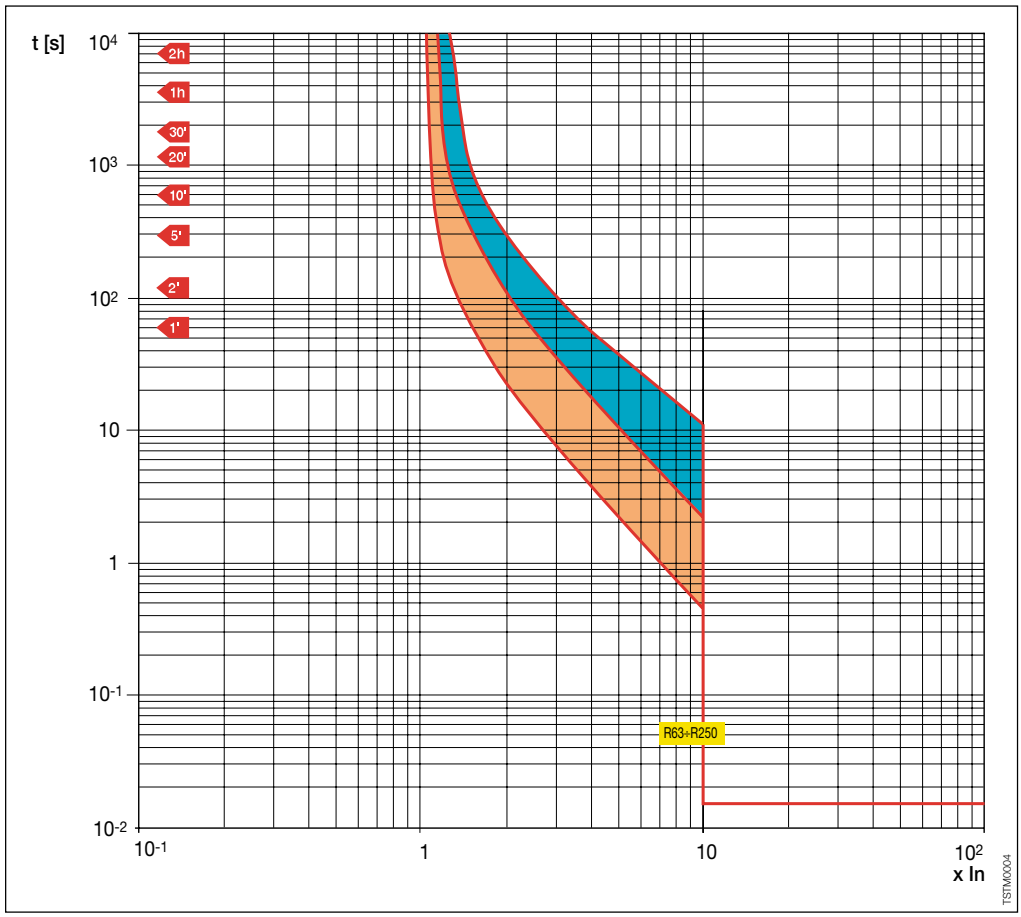
3

Trip curves for distribution

Circuit-breakers with thermomagnetic releases

T3 250 TMD

R63-R250



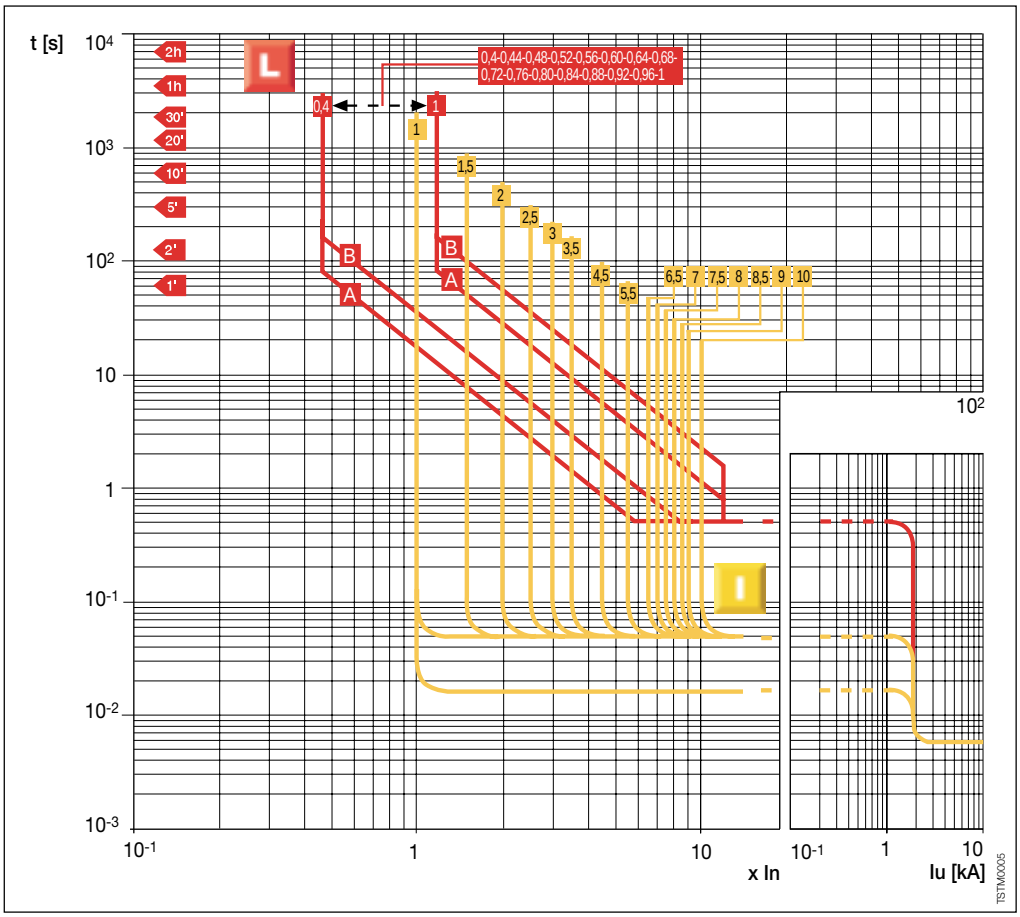
3

Trip curves for distribution

Circuit-breakers with electronic PR221DS-LS releases

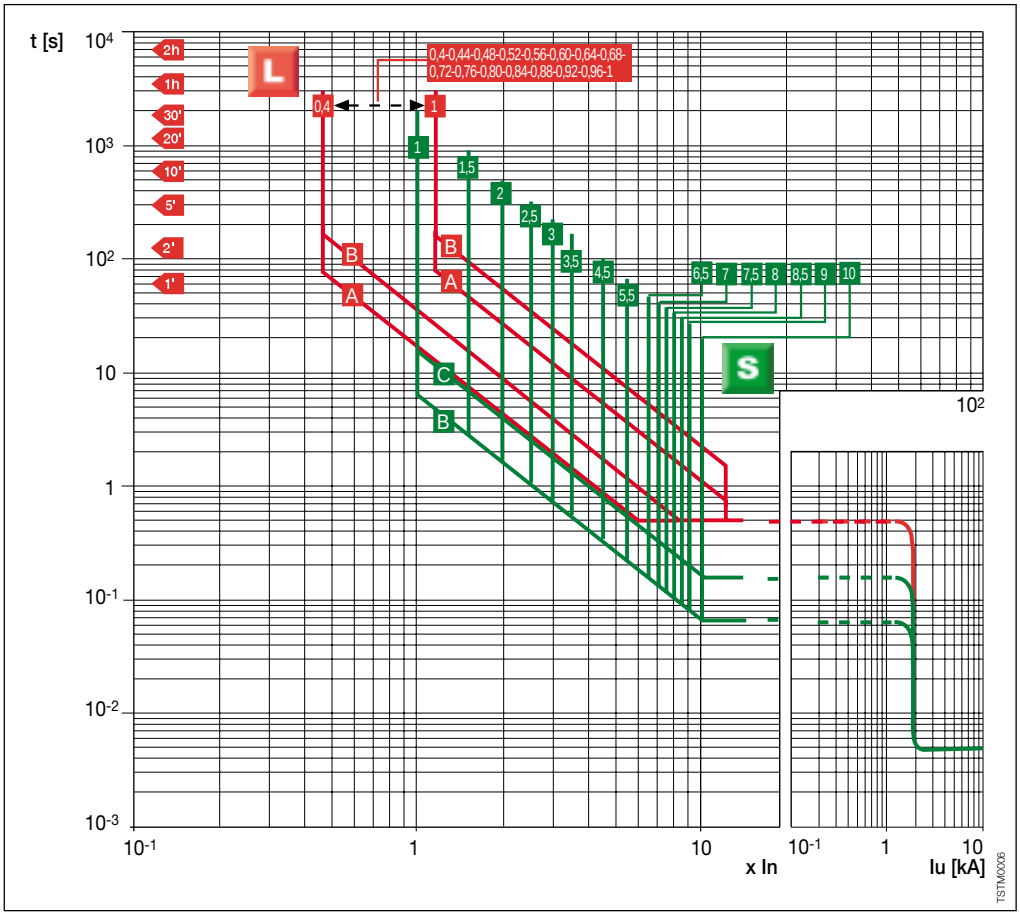
T2 160 PR221DS-LS

Functions L-I



T2 160 PR221DS-LS

Functions L-S



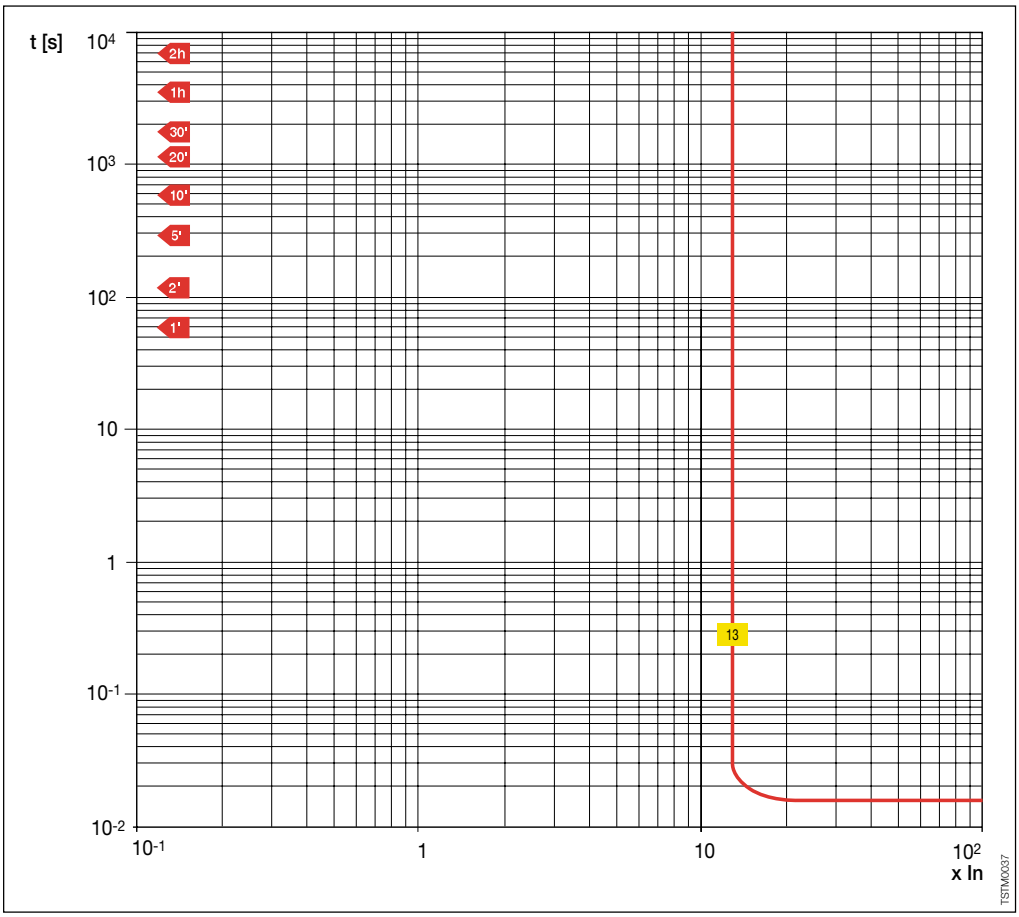
3

Trip curves for motor protection

Circuit-breakers with magnetic only releases

T2 160 MA

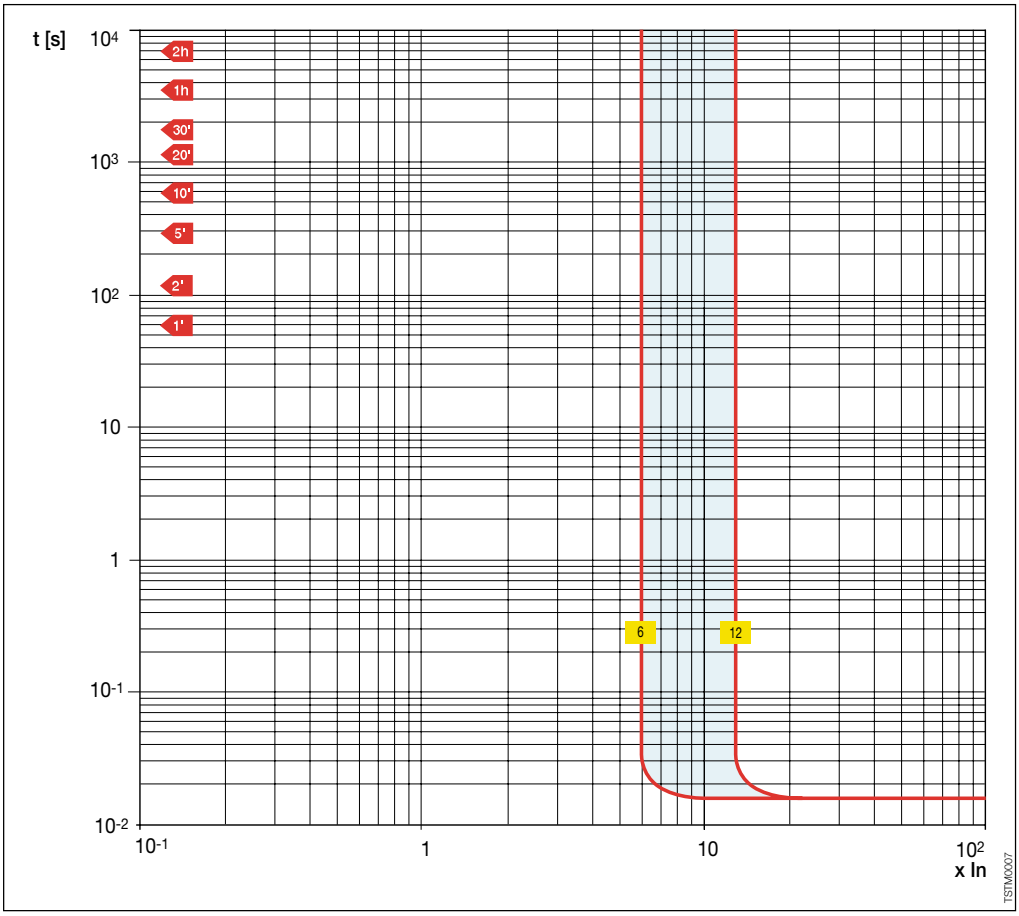
Fixed magnetic only release
I_3 = 13 x In



3

T2 160 MA
T3 250 MA

Adjustable magnetic only release
I_3 = 6…12 x In

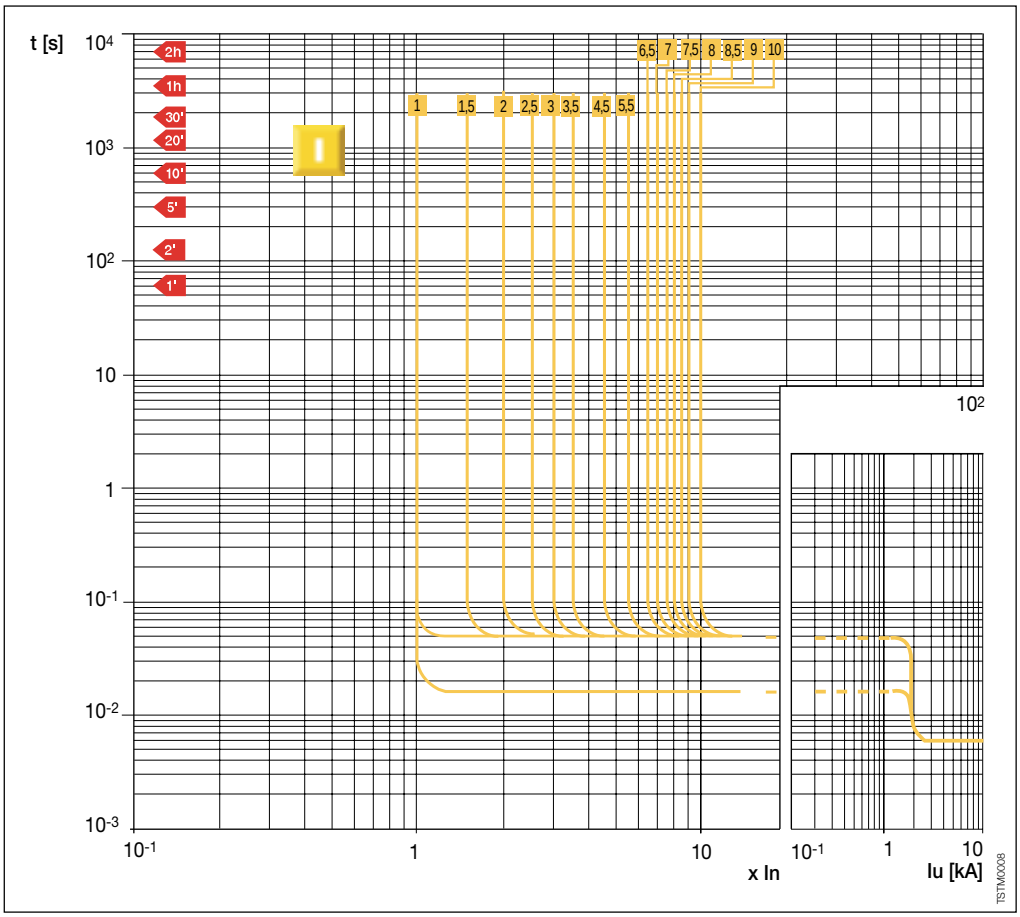


Trip curves for motor protection

Circuit-breakers with electronic PR221DS-I releases

T2 160 PR221DS-I

Function I

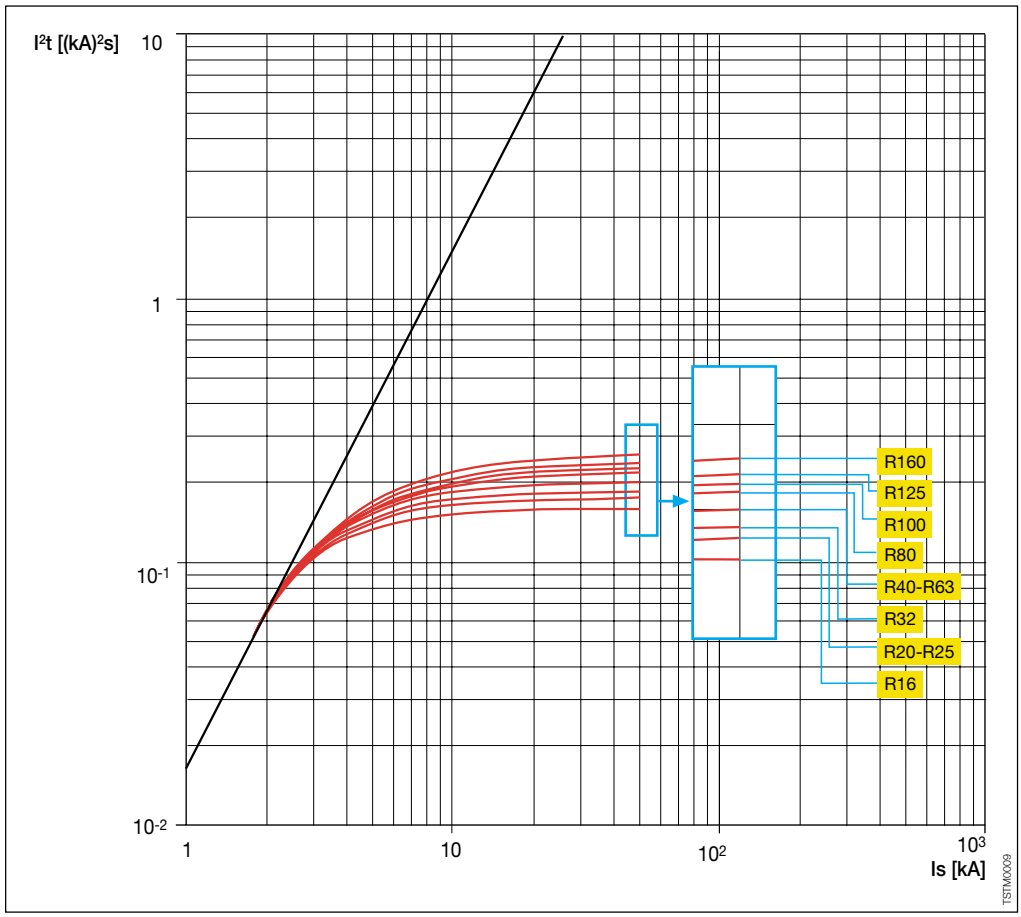


3

Specific let-through energy curves

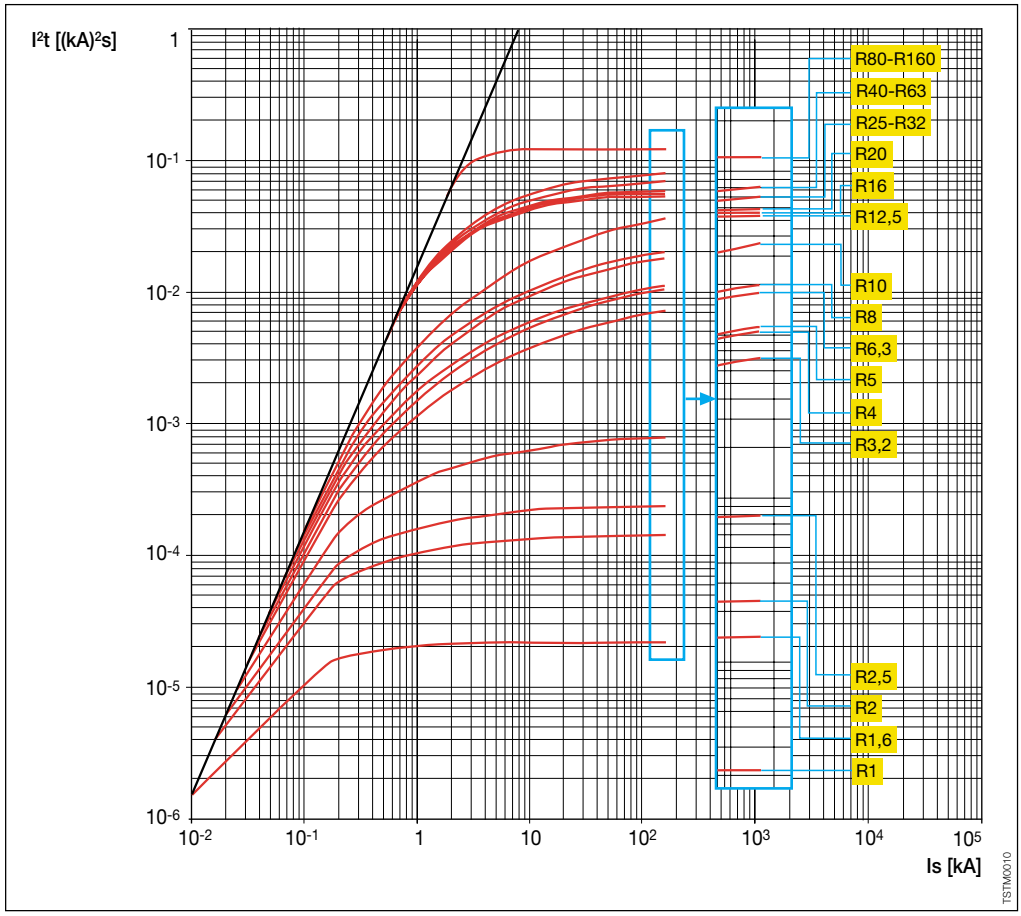
T1 160

230 V



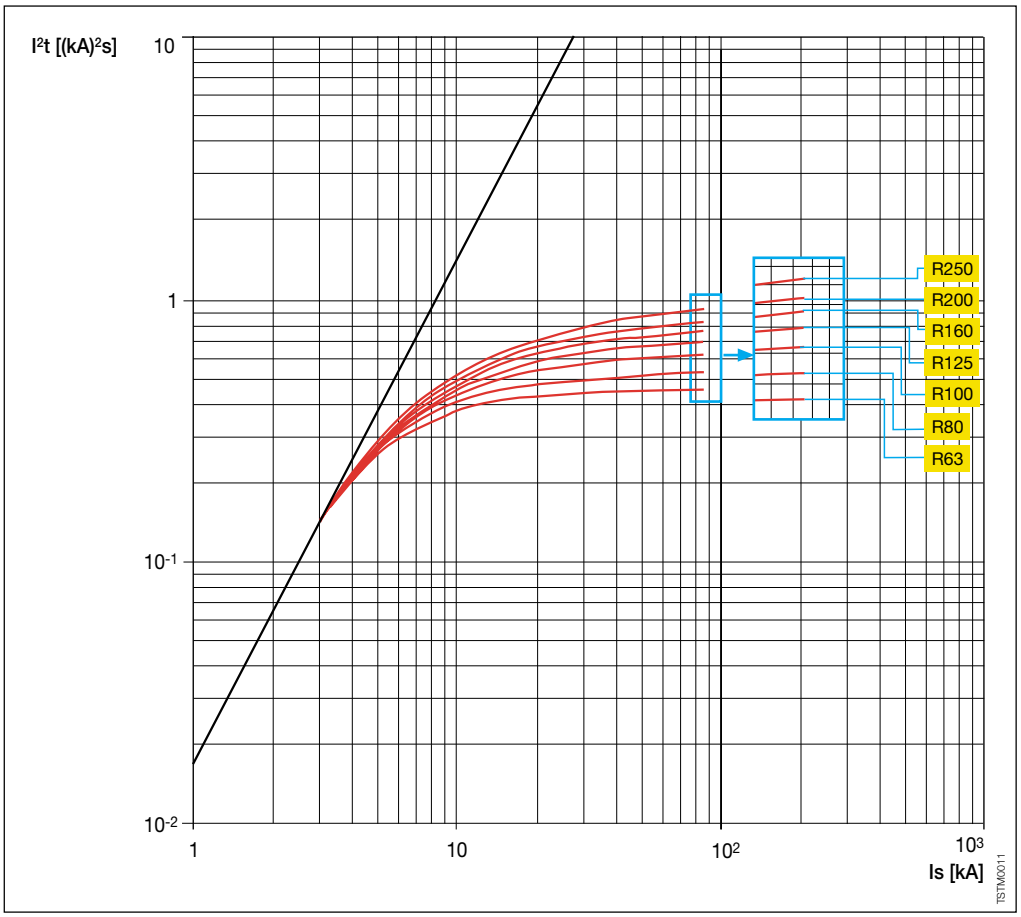
T2 160

230 V



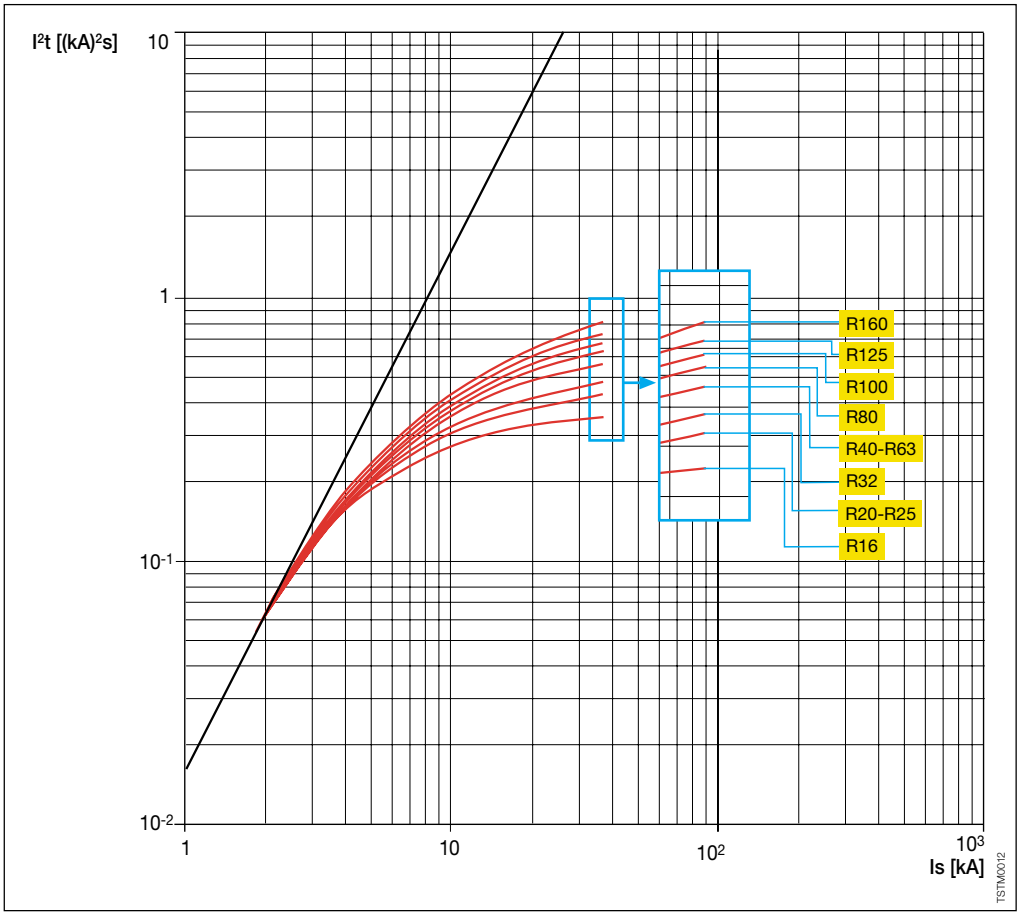
T3 250

230 V



T1 160

400-440 V

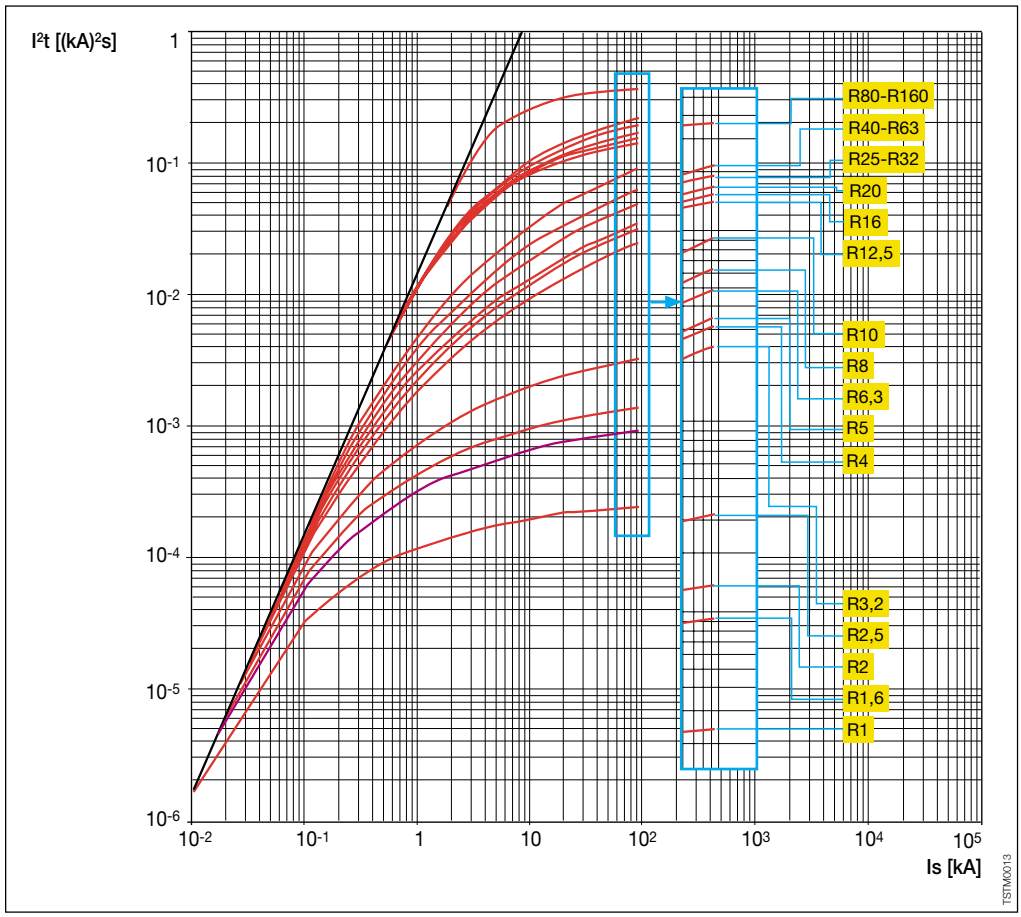


3

Specific let-through energy curves

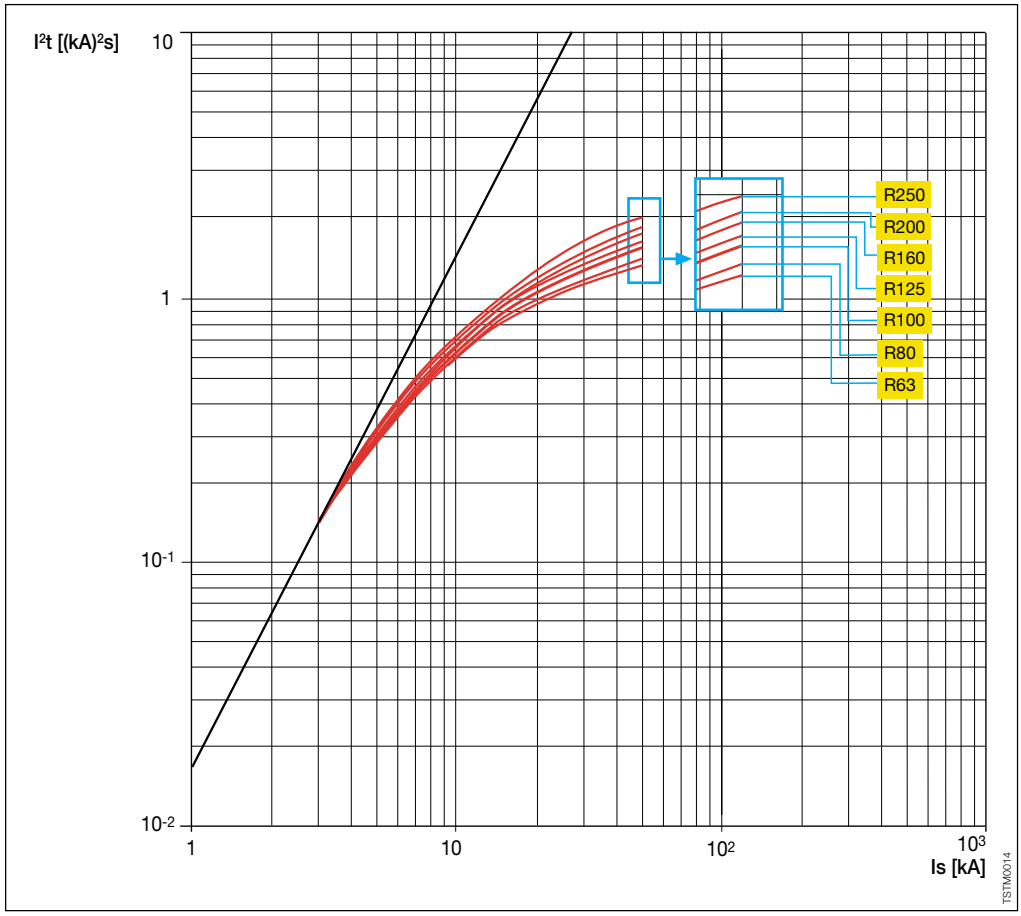
T2 160

400-440 V



T3 250

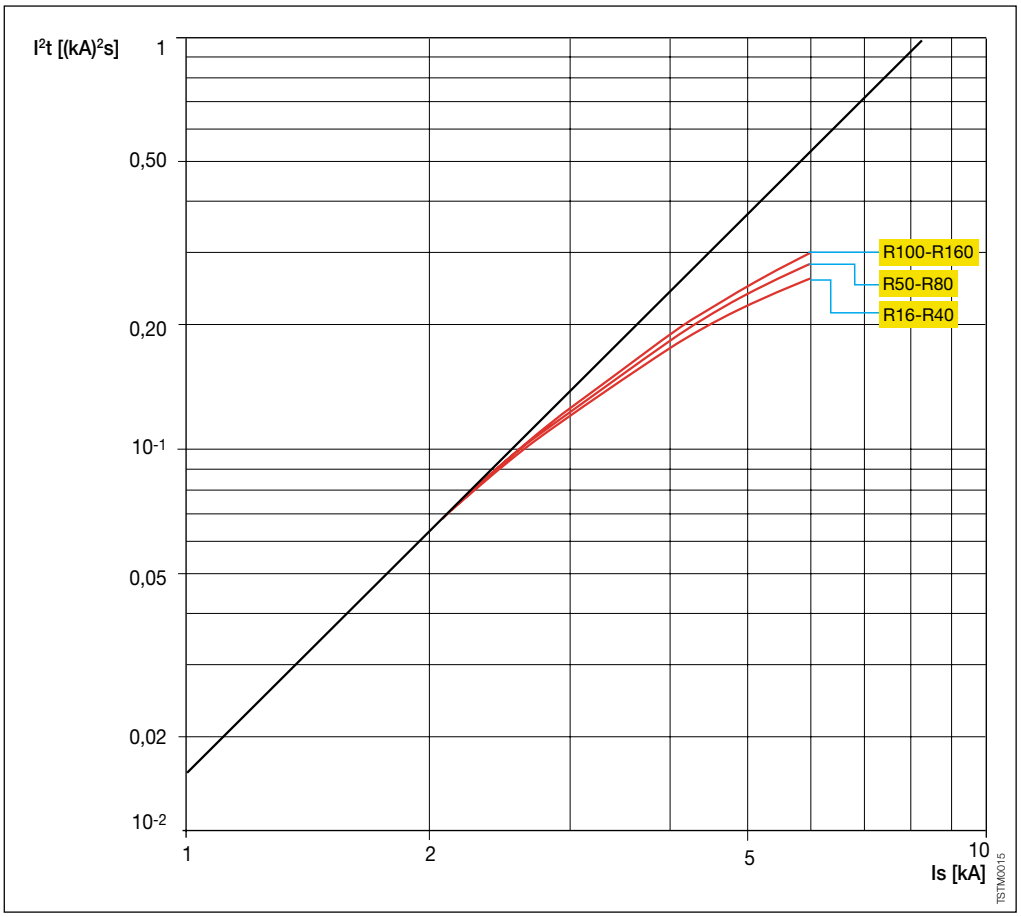
400-440 V



3

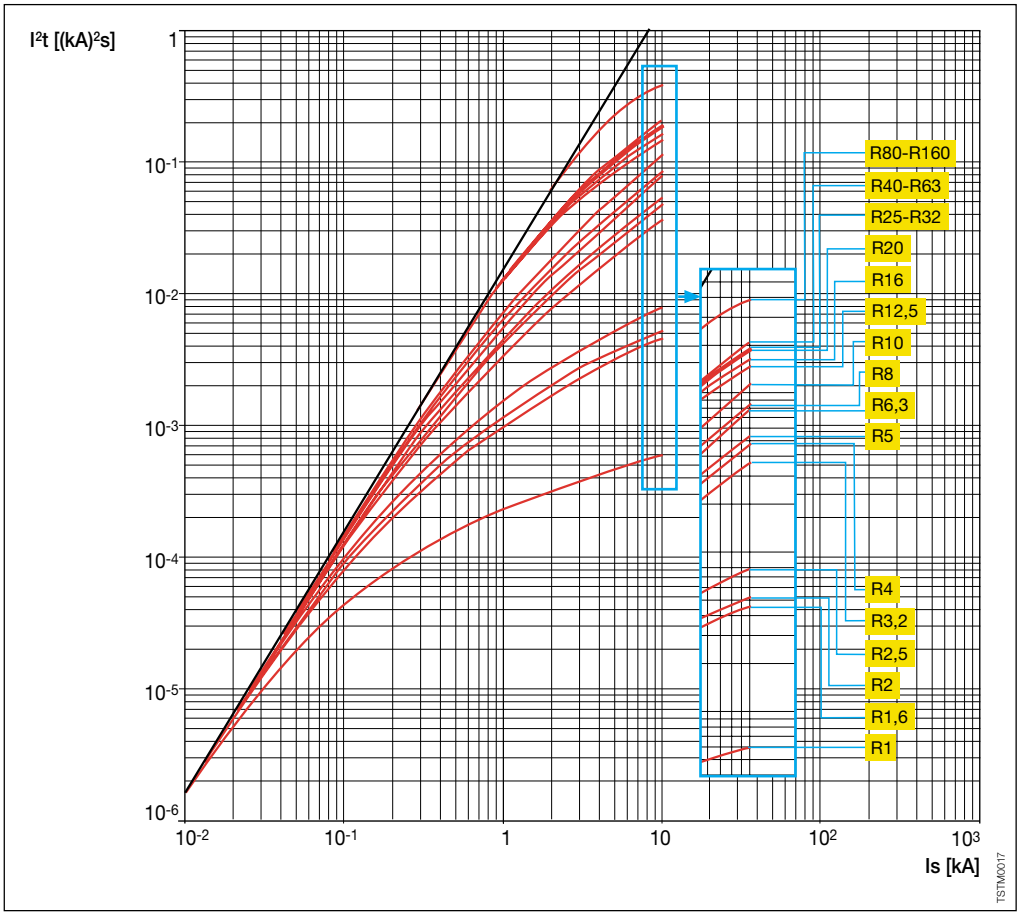
T1 160

690 V



T2 160

690 V

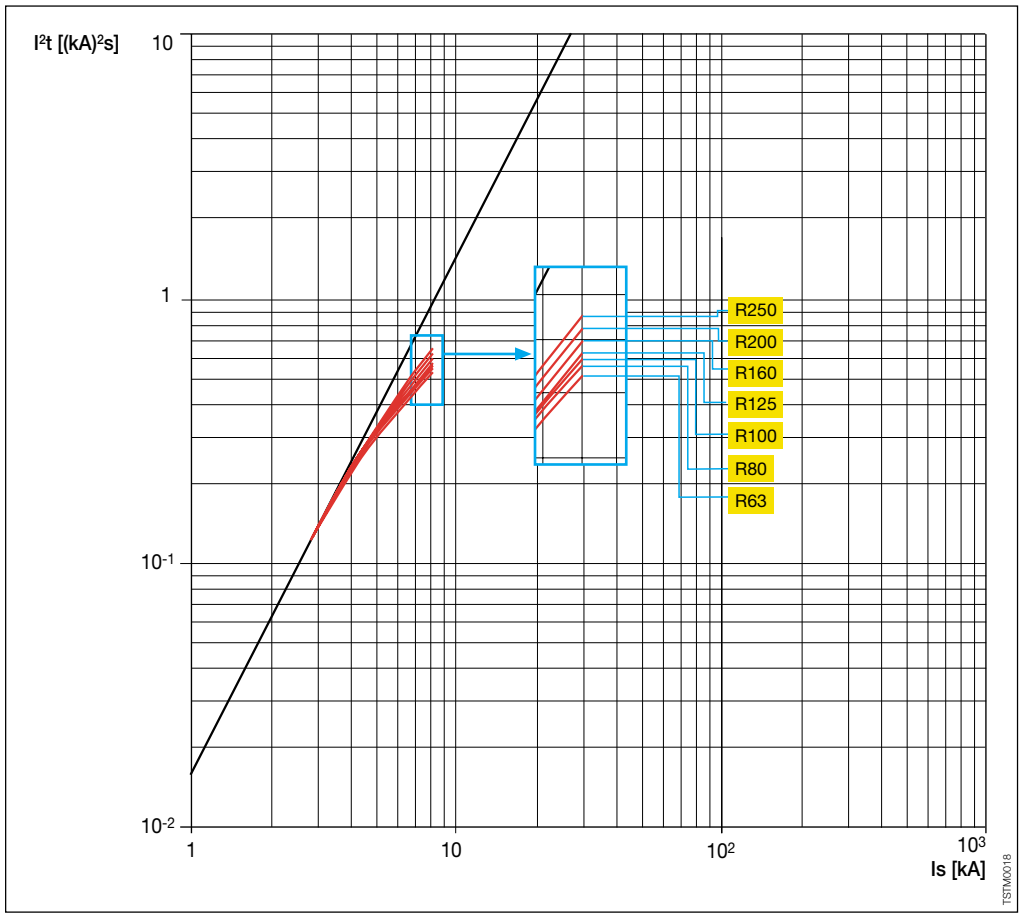


3

Specific let-through energy curves

T3 250

690 V

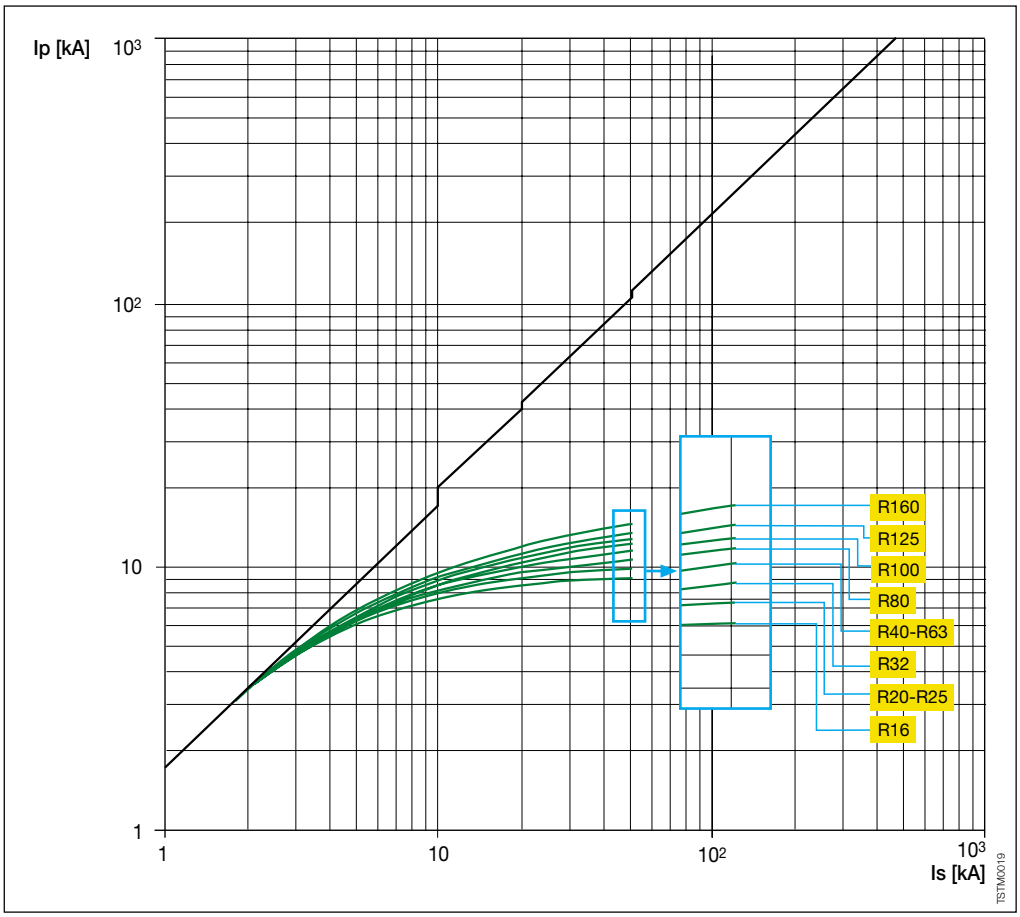


3

Limitation curves

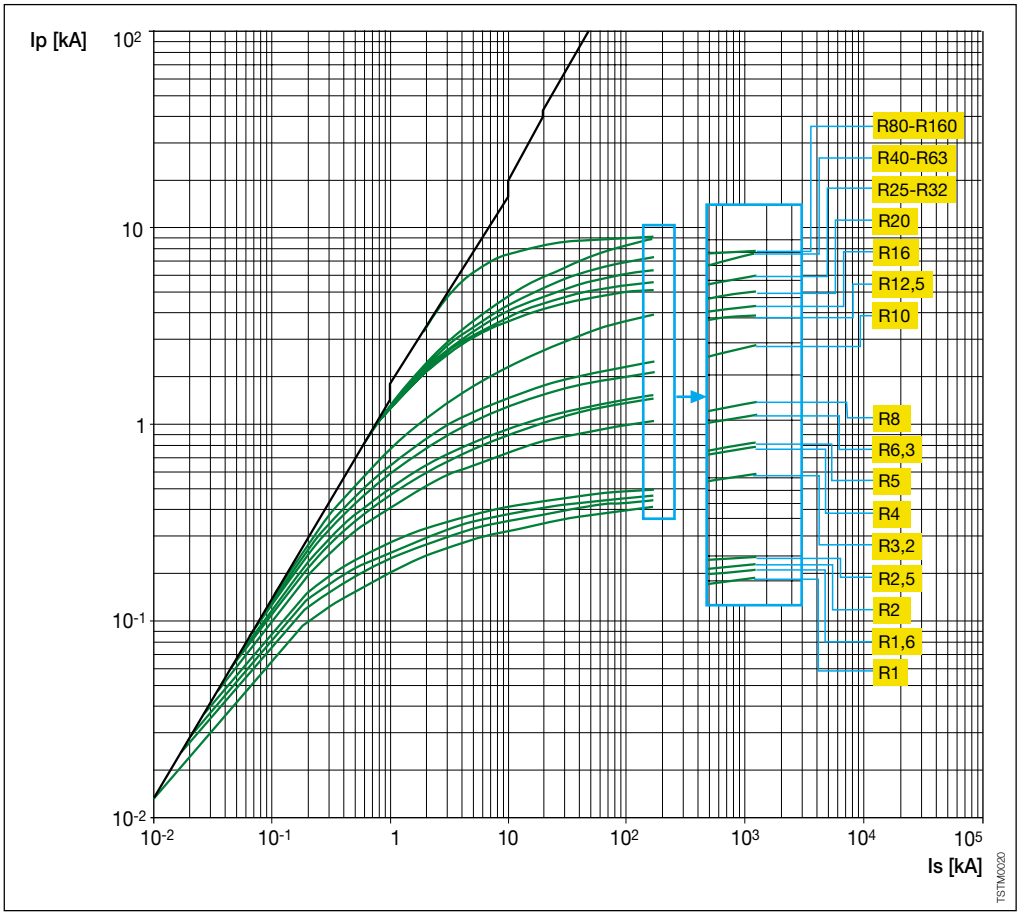
T1 160

230 V



T2 160

230 V

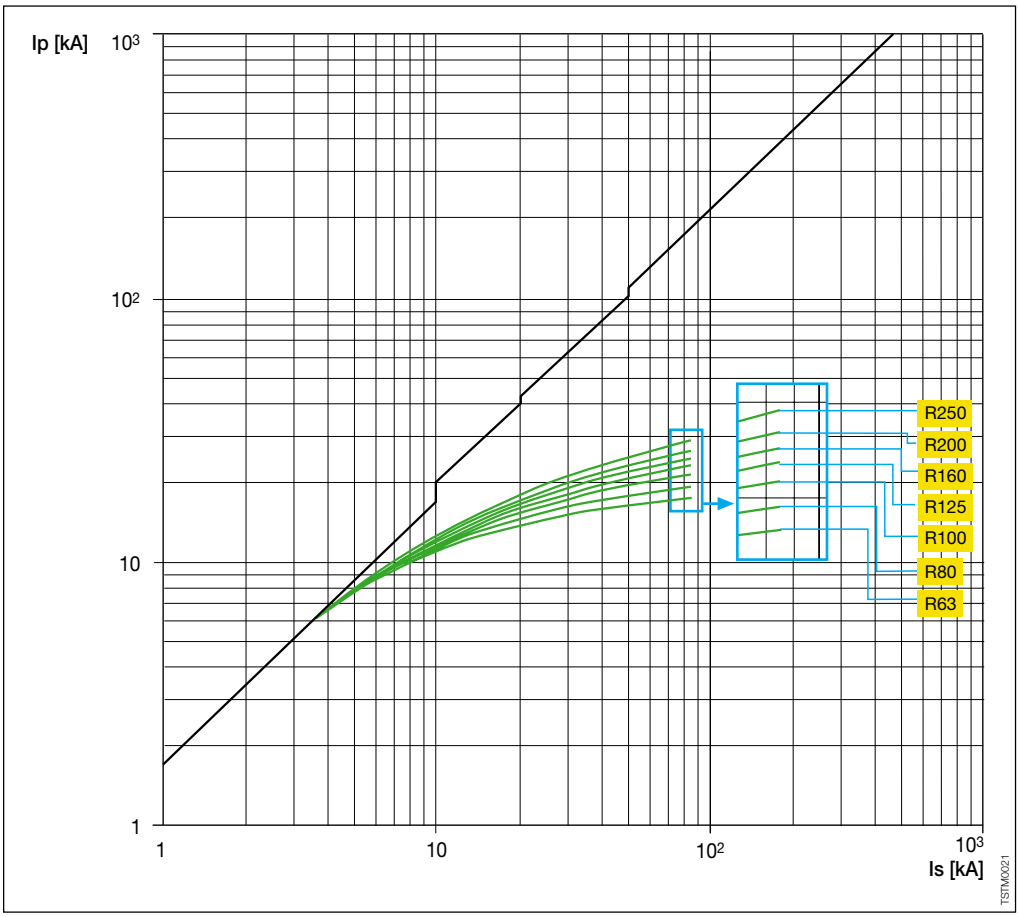


3

Limitation curves

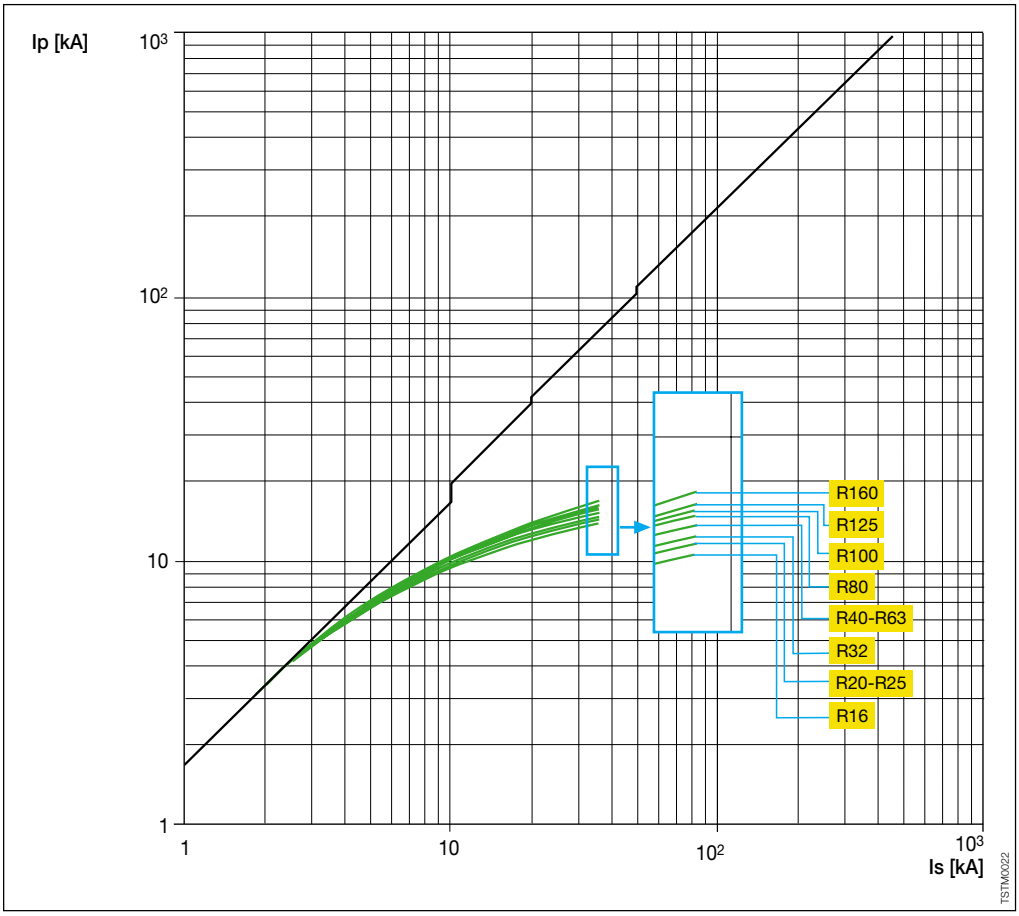
T3 250

230 V



T1 160

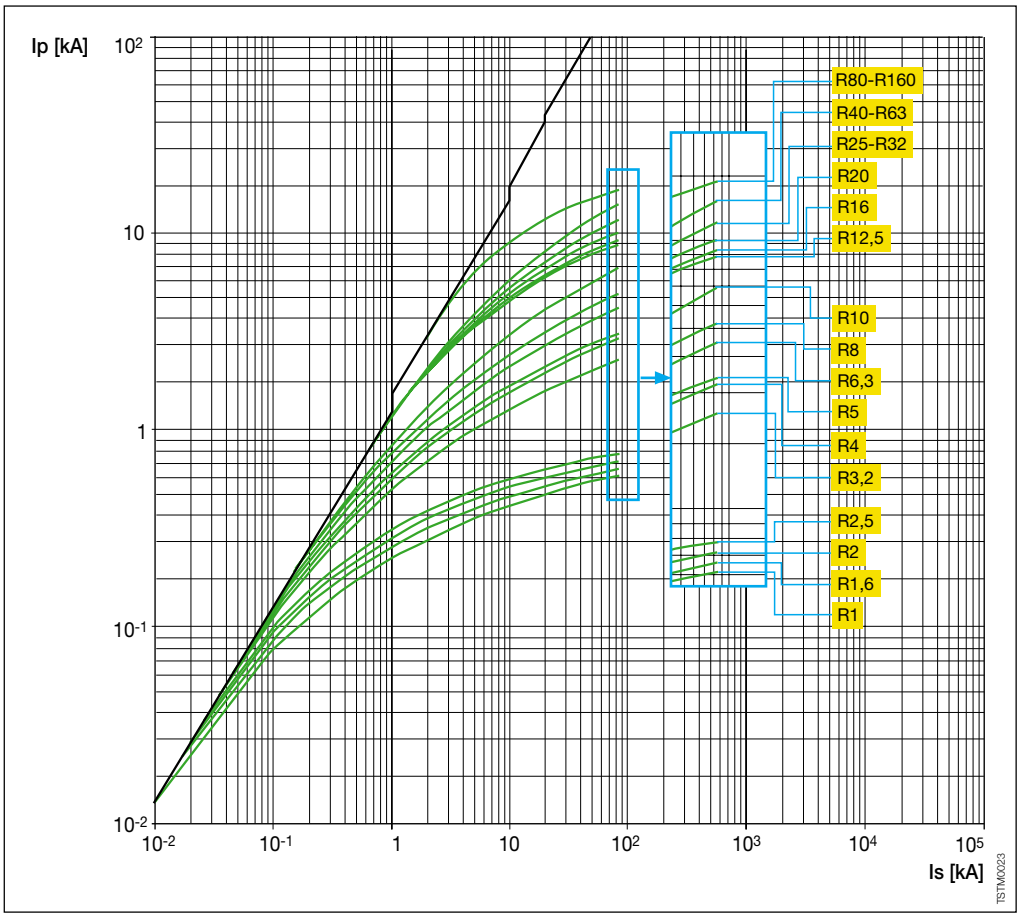
400-440 V



3

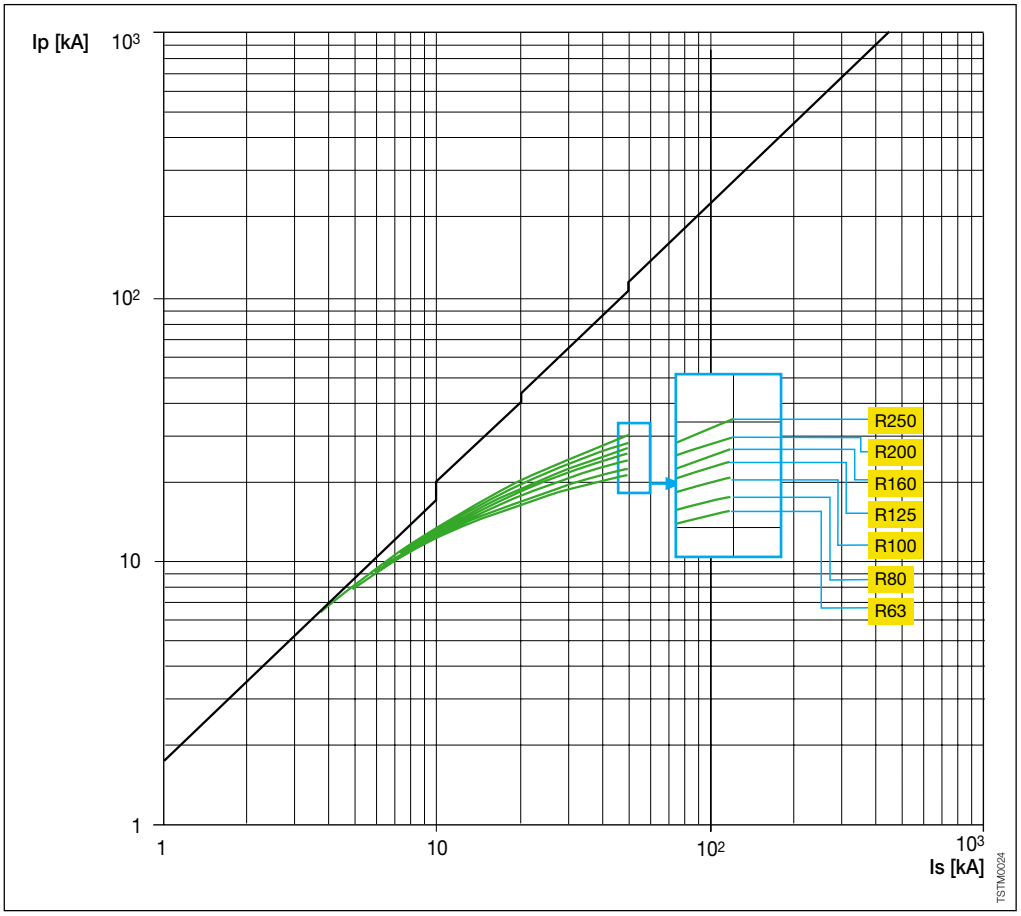
T2 160

400-440 V



T3 250

400-440 V

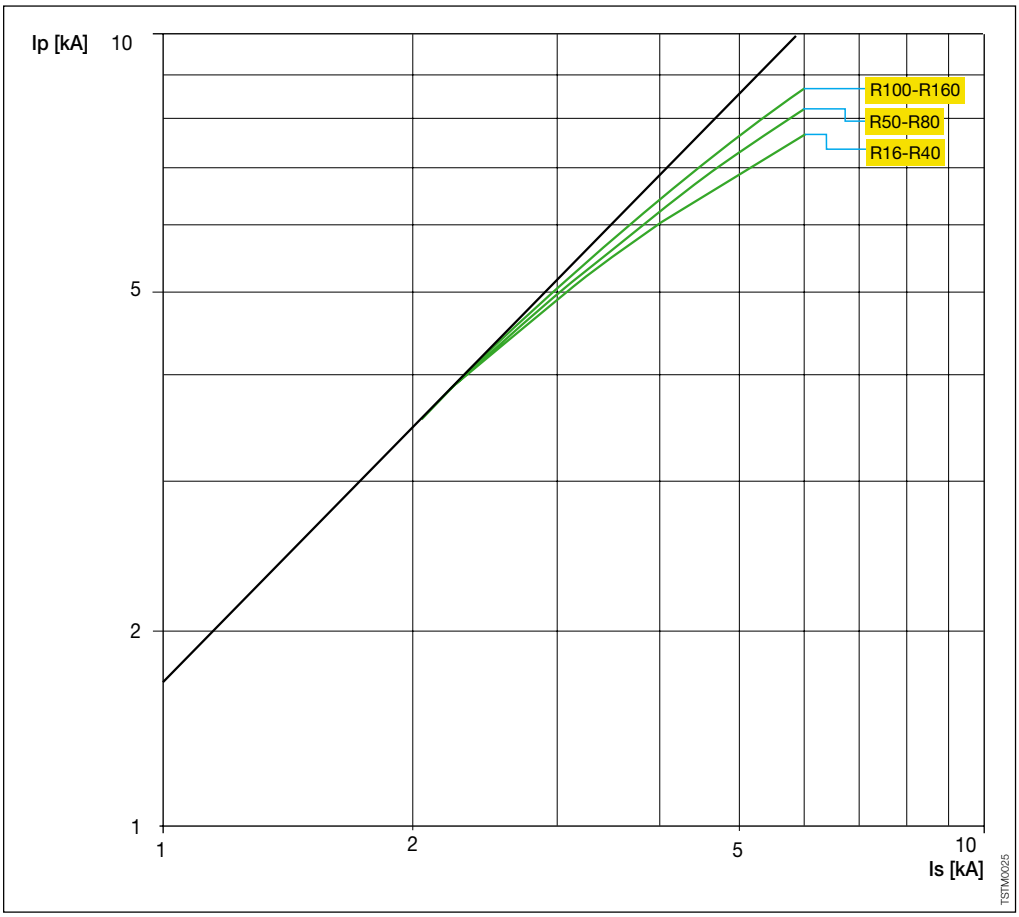


3

Limitation curves

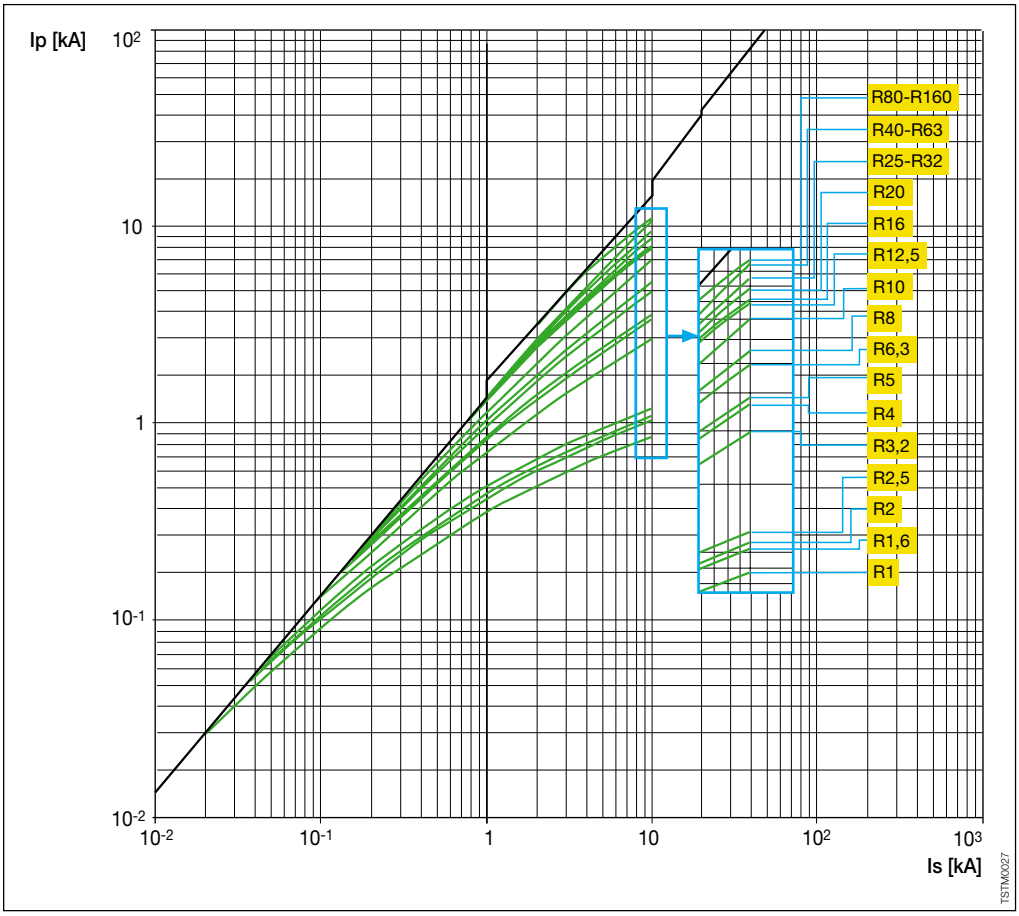
T1 160

690 V



T2 160

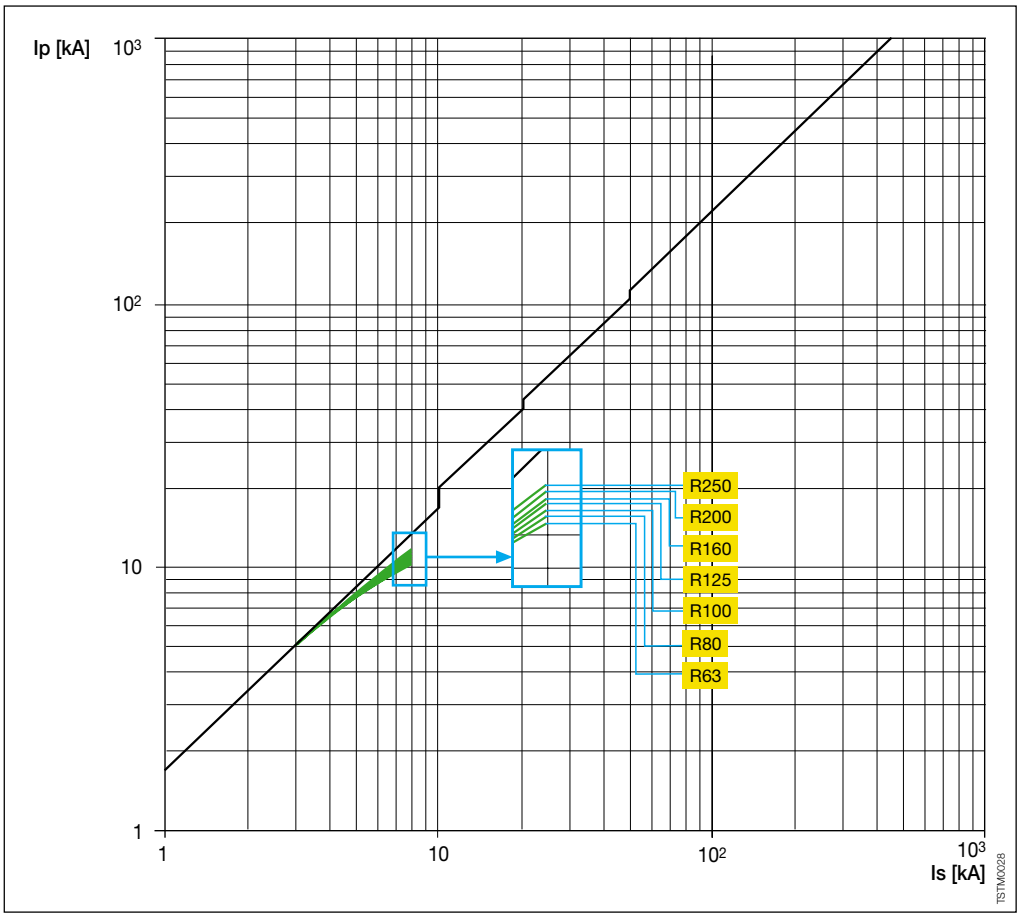
690 V



3

T3 250

690 V

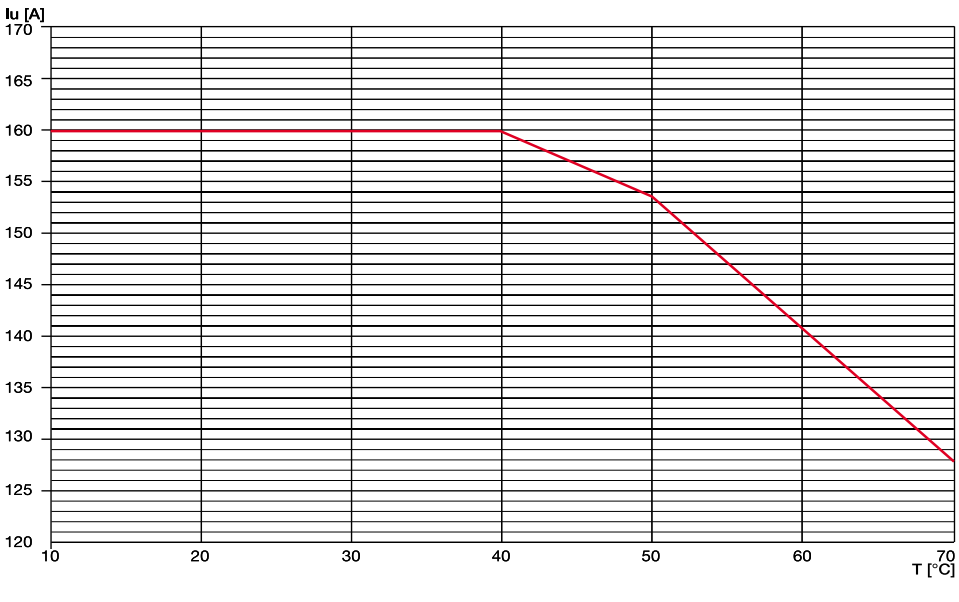

Ip [kA]
10³
10²
10
1
1
10
10²
10³
Is [kA]
R250
R200
R160
R125
R100
R80
R63
TSTM0028

Temperature performances

Circuit-breakers with electronic release

T2 160 PR221DS

	up to 40 °C		50 °C		60 °C		70 °C	
Terminals	I_{max} [A]	I_1	I_{max} [A]	I_1	I_{max} [A]	I_1	I_{max} [A]	I_1
F	160	1	153,6	0,96	140,8	0,88	128	0,8
EF	160	1	153,6	0,96	140,8	0,88	128	0,8
ES	160	1	153,6	0,96	140,8	0,88	128	0,8
FC Cu	160	1	153,6	0,96	140,8	0,88	128	0,8
FC Cu	160	1	153,6	0,96	140,8	0,88	128	0,8
R	160	1	153,6	0,96	140,8	0,88	128	0,8



3

Temperature performances

Circuit-breakers with thermomagnetic release

Tmax T1 and T1 1P (*)

	10 °C		20 °C		30 °C		40 °C		50 °C		60 °C		70 °C	
TMD	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
R16	13	18	12	18	12	17	11	16	11	15	10	14	9	13
R20	16	23	15	22	15	21	14	20	13	19	12	18	11	16
R25	20	29	19	28	18	26	18	25	16	23	15	22	14	20
R32	26	37	25	35	24	34	22	32	21	30	20	28	18	26
R40	32	46	31	44	29	42	28	40	26	38	25	35	23	33
R50	40	58	39	55	37	53	35	50	33	47	31	44	28	41
R63	51	72	49	69	46	66	44	63	41	59	39	55	36	51
R80	64	92	62	88	59	84	56	80	53	75	49	70	46	65
R100	81	115	77	110	74	105	70	100	66	94	61	88	57	81
R125	101	144	96	138	92	131	88	125	82	117	77	109	71	102
R160	129	184	123	176	118	168	112	160	105	150	98	140	91	130

Tmax T2

	10 °C		20 °C		30 °C		40 °C		50 °C		60 °C		70 °C	
TMD	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
R1	0.8	1.1	0.8	1.1	0.7	1.1	0.7	1.0	0.7	0.9	0.6	0.9	0.6	0.8
R1.6	1.3	1.8	1.2	1.8	1.2	1.7	1.1	1.6	1.0	1.5	1.0	1.4	0.9	1.3
R2	1.6	2.3	1.5	2.2	1.5	2.1	1.4	2.0	1.3	1.9	1.2	1.7	1.1	1.6
R2.5	2.0	2.9	1.9	2.8	1.8	2.6	1.8	2.5	1.6	2.3	1.5	2.2	1.4	2.0
R3.2	2.6	3.7	2.5	3.5	2.4	3.4	2.2	3.2	2.1	3.0	1.9	2.8	1.8	2.6
R4	3.2	4.6	3.1	4.4	2.9	4.2	2.8	4.0	2.6	3.7	2.4	3.5	2.3	3.2
R5	4.0	5.7	3.9	5.5	3.7	5.3	3.5	5.0	3.3	4.7	3.0	4.3	2.8	4.0
R6.3	5.1	7.2	4.9	6.9	4.6	6.6	4.4	6.3	4.1	5.9	3.8	5.5	3.6	5.1
R8	6.4	9.2	6.2	8.8	5.9	8.4	5.6	8.0	5.2	7.5	4.9	7.0	4.5	6.5
R10	8.0	11.5	7.7	11.0	7.4	10.5	7.0	10.0	6.5	9.3	6.1	8.7	5.6	8.1
R12.5	10.1	14.4	9.6	13.8	9.2	13.2	8.8	12.5	8.2	11.7	7.6	10.9	7.1	10.1
R16	13	18	12	18	12	17	11	16	10	15	10	14	9	13
R20	16	23	15	22	15	21	14	20	13	19	12	17	11	16
R25	20	29	19	28	18	26	18	25	16	23	15	22	14	20
R32	26	37	25	35	24	34	22	32	21	30	19	28	18	26
R40	32	46	31	44	29	42	28	40	26	37	24	35	23	32
R50	40	57	39	55	37	53	35	50	33	47	30	43	28	40
R63	51	72	49	69	46	66	44	63	41	59	38	55	36	51
R80	64	92	62	88	59	84	56	80	52	75	49	70	45	65
R100	80	115	77	110	74	105	70	100	65	93	61	87	56	81
R125	101	144	96	138	92	132	88	125	82	117	76	109	71	101
R160	129	184	123	178	118	168	112	160	105	150	97	139	90	129

Tmax T3

	10 °C		20 °C		30 °C		40 °C		50 °C		60 °C		70 °C	
TMD	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
R63	51	72	49	69	46	66	44	63	41	59	38	55	35	51
R80	64	92	62	88	59	84	56	80	52	75	48	69	45	64
R100	80	115	77	110	74	105	70	100	65	93	61	87	56	80
R125	101	144	96	138	92	132	88	125	82	116	76	108	70	100
R160	129	184	123	176	118	168	112	160	104	149	97	139	90	129
R200	161	230	154	220	147	211	140	200	130	186	121	173	112	161
R250	201	287	193	278	184	263	175	250	163	233	152	216	141	201

(*) For the T1 1P circuit-breaker (fitted with TMF fixed thermomagnetic release), only consider the column corresponding to the maximum adjustment of the TMD releases.

Power losses

Power [W/pole]		T1/T1 1P	T2		T3	
Setting	Iu [A]	F	F	P	F	P
R1	1		1.5	1.7		
R1.6	1.6		2.1	2.5		
R2	2		2.5	2.9		
R2.5	2.5		2.6	3.0		
R3.2	3.2		2.9	3.4		
R4	4		2.6	3.0		
R5	5		2.9	3.5		
R6.3	6.3		3.5	4.1		
R8	8		2.7	3.2		
R10	10		3.1	3.6		
R12.5	12.5		1.1	1.3		
R16	16	1.5	1.4	1.6		
R20	20	1.8	1.7	2.0		
R25	25	2.0	2.3	2.8		
R32	32	2.1	2.7	3.2		
R40	40	2.6	3.9	4.6		
R50	50	3.7	4.3	5.0		
R63	63	4.3	5.1	6.0	4.3	5.1
R80	80	4.8	6.1	7.2	4.8	5.8
R100	100	7.0	8.5	10.0	5.6	6.8
R125	125	10.7	12.0	14.7	6.6	7.9
R160	160	15.0	17.0	20.0	7.9	9.5
R200	200				13.2	15.8
R250	250				17.8	21.4
In=10	10		0.5	0.6		
In=25	25		1.0	1.2		
In=63	63		3.5	4.0		
In=100	100		8.0	9.2		
In=160	160		17.0	20.0		

Wiring diagrams and overall dimensions

Index

Wiring diagrams

Overall dimensions

Wiring diagrams

Information for reading

State of operation represented

The diagram is shown under the following conditions:
- circuit-breaker in fixed or plug-in version (according to the type of circuit-breaker), open and racked-in
- circuits without power
- releases not tripped.

Version

The diagram shows a plug-in version circuit-breaker or switch-disconnector (only T2 and T3), but is also valid for the fixed version circuit-breakers or switch-disconnectors. With the fixed version circuit-breakers or switch-disconnectors, the applications indicated in figures 21-22-23-31-32 and 33 cannot be provided.

Caption

□	=	Figure number of the diagram
*	=	See note indicated by the letter
A1	=	Circuit-breaker applications
A2	=	Solenoid operator applications
A3	=	RC221 or RC222 type residual current release applications
A4	=	Indicative apparatus and connections for control and signalling, outside the circuit-breaker
D	=	Electronic time-delay device of the undervoltage release (outside the circuit-breaker)
K51	=	PR221DS microprocessor-based type of overcurrent release
K87	=	RC221 or RC222 type residual current release
Q	=	Main circuit-breaker
Q/0…3	=	Auxiliary contacts of the circuit-breaker
S3	=	Safety contact operated by the padlock
S4/1-2	=	Contacts operated by the rotary handle of the circuit-breaker (see note C)
S51	=	Contact for electrical signalling of circuit-breaker open due to trip of the PR221DS type electronic release
S75I/1…3	=	Contacts for electrical signalling of circuit-breaker in racked-in position (only provided with plug-in version circuit-breakers. See note D)
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 circuit-breaker closing
SD	=	Power supply switch-disconnector of the RC221 or RC222 type residual current release
SO	=	Pushbutton or contact for circuit-breaker opening
SY	=	Contact for electrical signalling of circuit-breaker open due to YO, YO1, YO2, YU thermomagnetic release trip (tripped position)
TI	=	Toroidal current transformer
TI/L1…L3	=	Current transformers place on phases L1-L2-L3
X1	=	3-way connector for YO/YU (see note E)
X2	=	12-way connector for auxiliary contacts (see note E)
X3	=	3-way connector for solenoid operator
X4	=	6-way connector for contacts operated by the rotary handle
X5	=	3-way connector for contact for electrical signalling of circuit-breaker open due to RC221 or RC222 type residual current release trip (see note E)
X6	=	3-way connector for contact for electrical signalling of circuit-breaker open due to electronic PR221DS release trip (see note E)
XV	=	Terminal boxes of the applications
YC	=	Shunt closing release of the solenoid operator
YO	=	Shunt opening releaseT2 three-pole or four-pole circuit-breaker with PR221 microprocessor-based release
YO1	=	Opening solenoid of the PR221 type overcurrent release
YO2	=	Opening solenoid of the RC221 or RC222 type residual current release
YO3	=	Shunt opening release of the solenoid operator
YU	=	Undervoltage release (see note B).

Description of figures

Fig. 1 = Shunt opening release.
Fig. 2 = Opening solenoid of the RC221 type residual current release.
Fig. 3 = Opening solenoid of the RC222 type residual current release.
Fig. 4 = One change-over contact for electrical signalling of circuit-breaker open due to trip of the RC221 or RC222 type residual current release.
Fig. 5 = Instantaneous undervoltage release (see note B).
Fig. 6 = Instantaneous undervoltage release in version for machine tools with one contact in series (see notes B and C).
Fig. 7 = Instantaneous undervoltage release in version for machine tools with two contacts in series (see notes B and C).
Fig. 8 = Undervoltage release with electronic delay device outside the circuit-breaker (see note B).
Fig. 10 = Two contacts for electrical signalling of pre-alarm of the RC222 type residual current release.
Fig. 12 = Solenoid operator
Fig. 14 = Three change-over contacts for electrical signalling of circuit-breaker open or closed and one change-over contact for electrical signalling of circuit-breaker open due to trip of the thermomagnetic releases, YO, YO1, YO2, YU (tripped position).
Fig. 15 = One change-over contact for electrical signalling of circuit-breaker open or closed and one change-over contact for electrical signalling of circuit-breaker open due to trip of the thermomagnetic releases, YO, YO1, YO2, YU (tripped position).
Fig. 16 = One change-over contact for electrical signalling of circuit-breaker open or closed and one change-over contact for electrical signalling of circuit-breaker open due to trip of the thermomagnetic releases, YO, YO1, YO2, YU (tripped position) and one change-over contact for electrical signalling of circuit-breaker open due to trip of the PR221 overcurrent release.
Fig. 21 = First change-over position contact of the circuit-breaker, for electrical signalling of racked-in (see note D).
Fig. 22 = Second change-over position contact of the circuit-breaker, for electrical signalling of racked-in (see note D).
Fig. 23 = Third change-over position contact of the circuit-breaker, for electrical signalling of racked-in (see note D).

Incompatibility

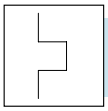
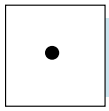
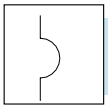
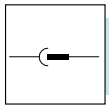
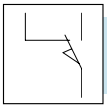
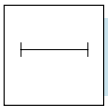
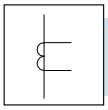
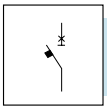
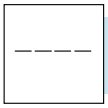
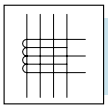
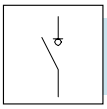
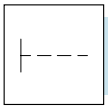
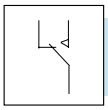
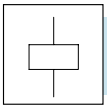
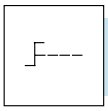
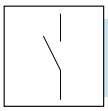
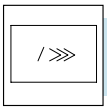
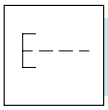
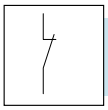
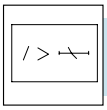
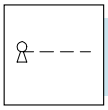
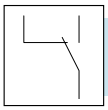
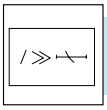
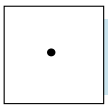
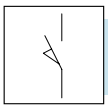
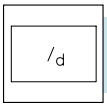
The circuits indicated by the following figures cannot be supplied at the same time on the same circuit-breaker:
2 - 3
1 - 4 - 5 - 6 - 7 - 8 (for three-pole circuit-breakers)
1 - 5 - 6 - 7 - 8 (for four-pole circuit-breakers)
14 - 15 - 16

Notes

A) The circuit-breaker is only fitted with the applications specified in the order confirmation from ABB SACE. To make out the order, please consult this catalogue.
B) The undervoltage release is supplied for power supply derived on the supply side of the circuit-breaker or from and 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 6-7 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) The circuit-breaker can be fitted with a total of 3 position contacts S751I.
E) Connectors X1 and X2, X5 and X6 are supplied on request for circuit-breakers in the fixed version, whilst they are always supplied with circuit-breakers in the plug-in version.

Wiring diagrams

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

 Thermal effect	 Terminal or clamp	 Opening position contact (limit switch)
 Electromagnetic effect	 Socket and plug (female and male)	 Change-over break before make contact (limit switch)
 Timer	 Current transformer	 Power circuit-breaker - switch-disconnector with automatic opening
 Mechanical connection	 Current transformer with primary consisting of 4 through conductors and with secondary wound with socket	 Switch-disconnector
 Mechanical manual operating mechanism (general case)	 Change-over break before make contact and automatic return	 Control coil (general symbol)
 Rotary handle operating mechanism	 Make contact	 Instantaneous overcurrent relay
 Pushbutton control	 Break contact	 Overcurrent relay with inverse long time delay characteristic
 Key control	 Change-over break before make contact	 Overcurrent relay with inverse short time delay characteristic
 Conductor connection	 Closing position contact (limit switch)	 Residual current relay

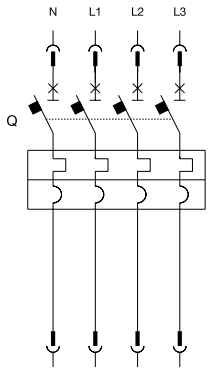
4

Wiring diagrams

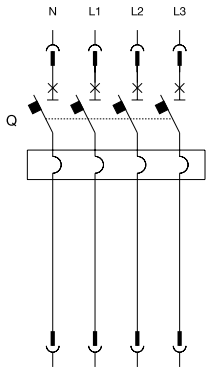
Circuit diagram of the T1, T2 and T3 circuit-breakers

Tmax T1-T2-T3

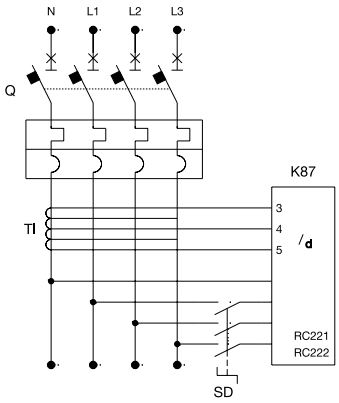
State of operation



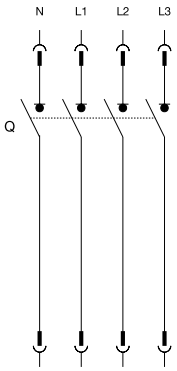
T1-T2-T3 three-pole or four-pole circuit-breaker with thermomagnetic release



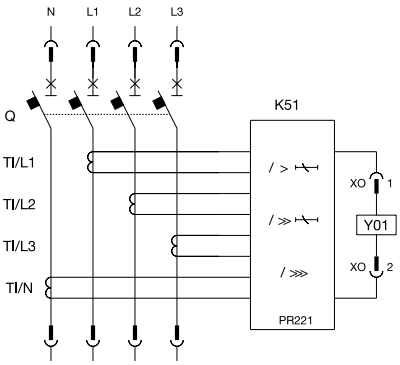
T2-T3 three-pole or four-pole circuit-breaker with magnetic release



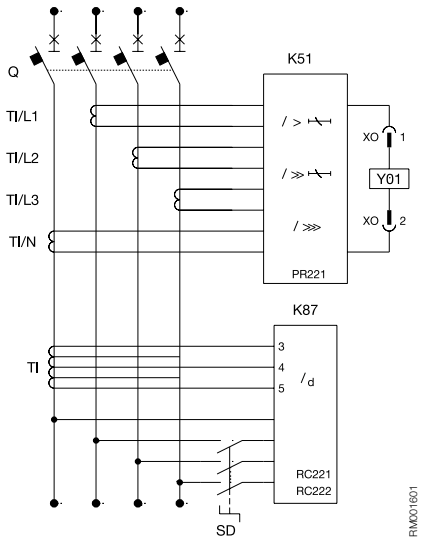
Three-pole or four-pole circuit-breaker in fixed version with RC221 or RC222 residual current release



T1D-T3D three-pole or four-pole switch-disconnector



T2 three-pole or four-pole circuit-breaker with PR221 microprocessor-based release



T2 three-pole or four-pole circuit-breaker in fixed version with PR221 microprocessor-based release and RC221 or RC222 residual current release

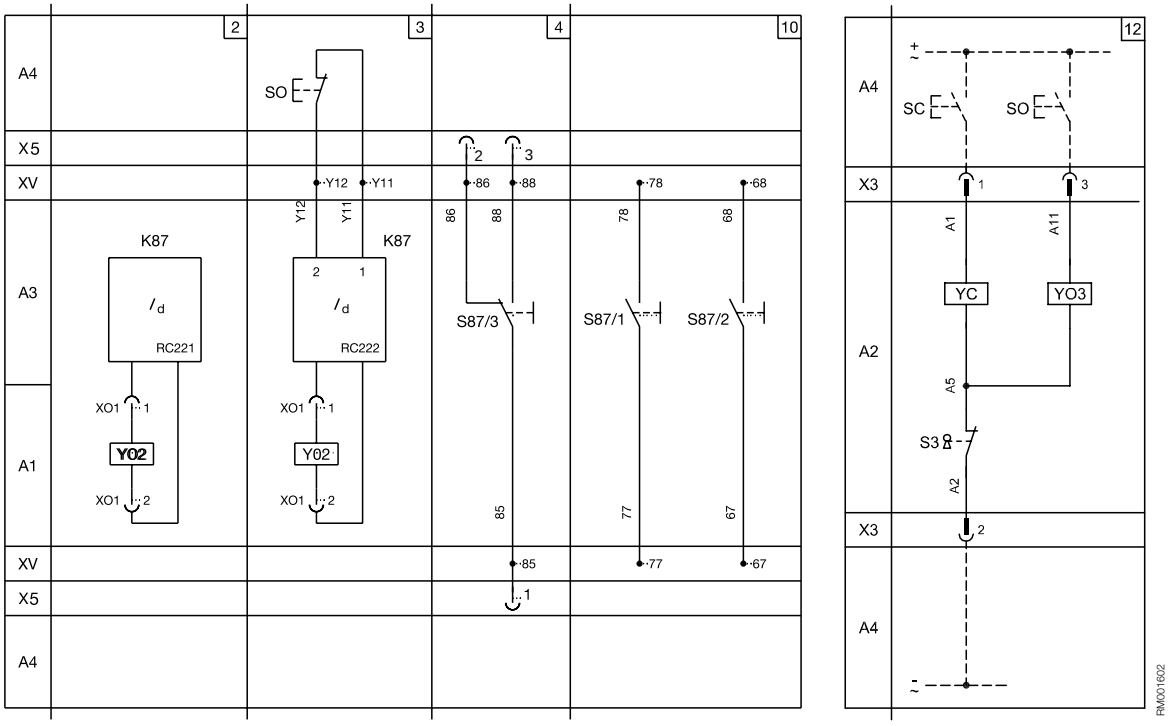
4

Wiring diagrams

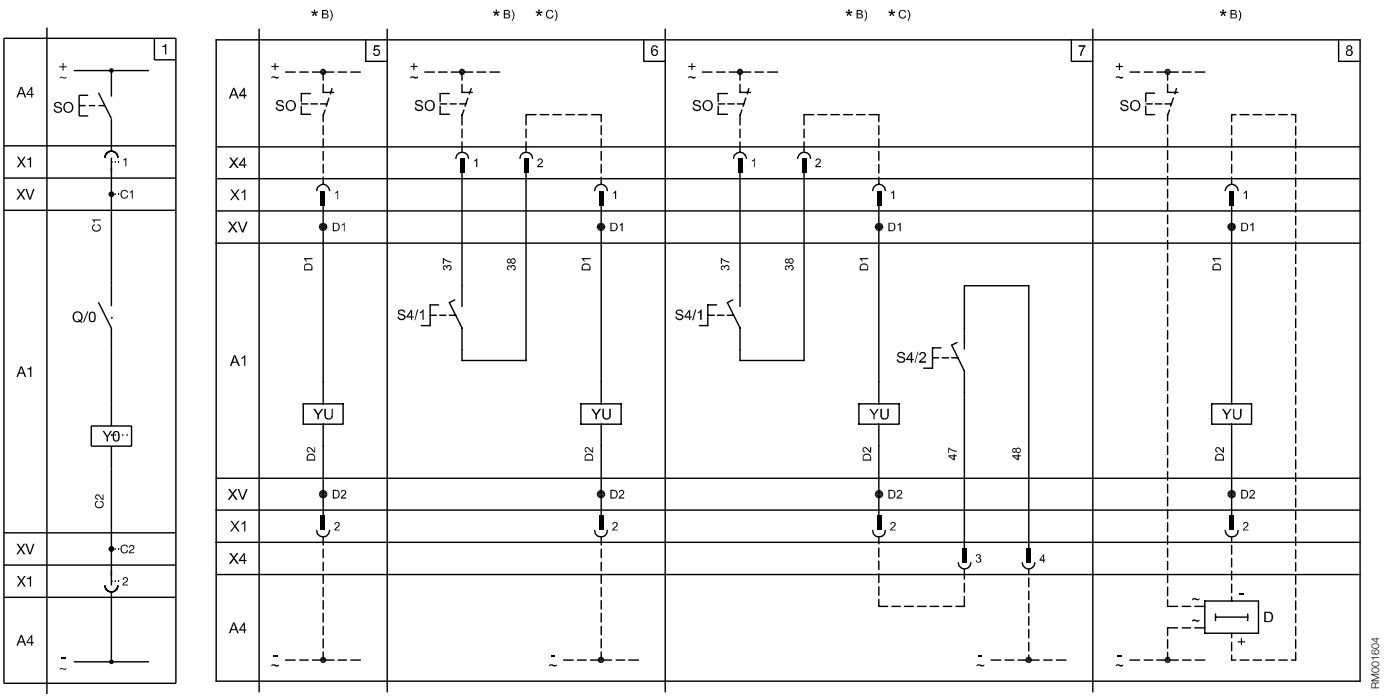
Electrical accessories for T1, T2 and T3

Tmax T1-T2-T3

Residual current releases with solenoid operator

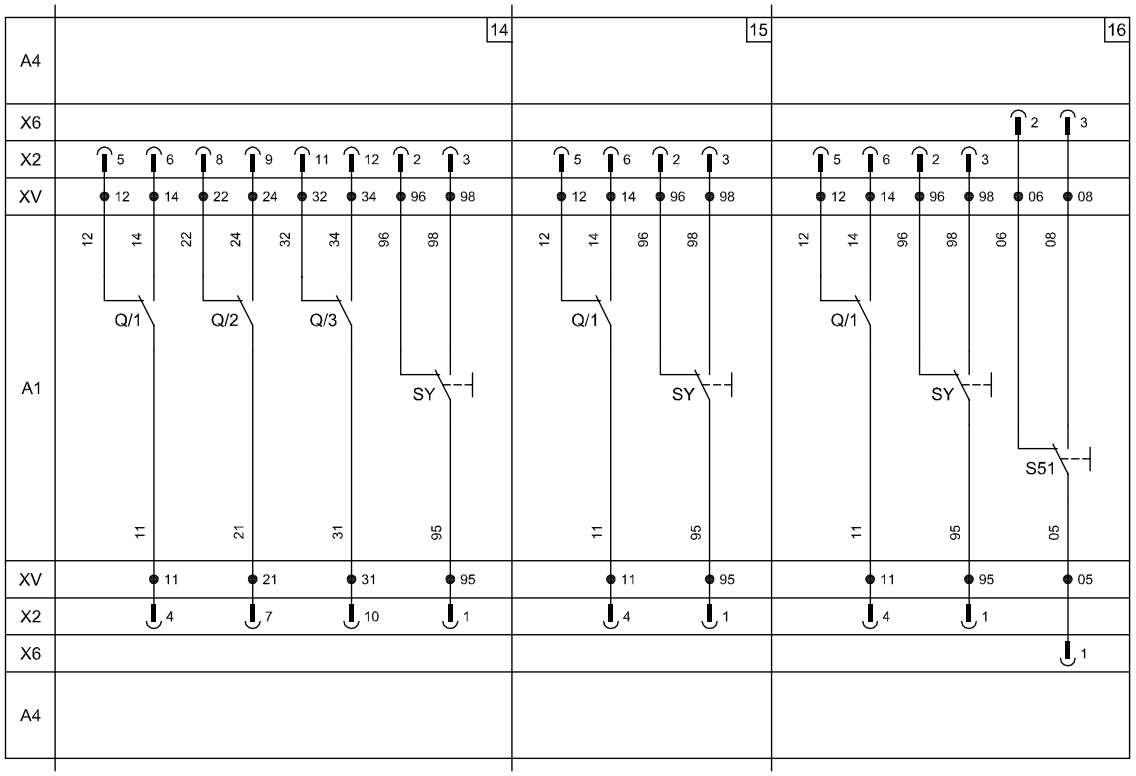


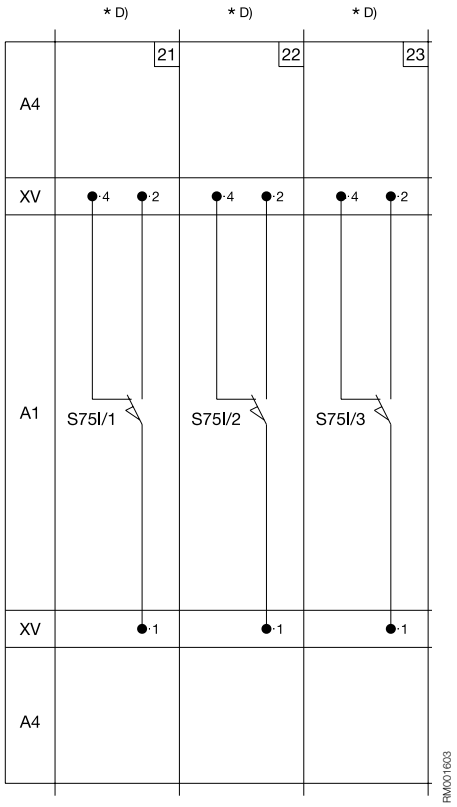
Shunt opening releases and undervoltage releases



4

Auxiliary contacts



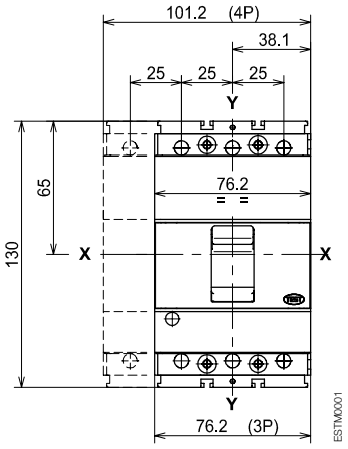


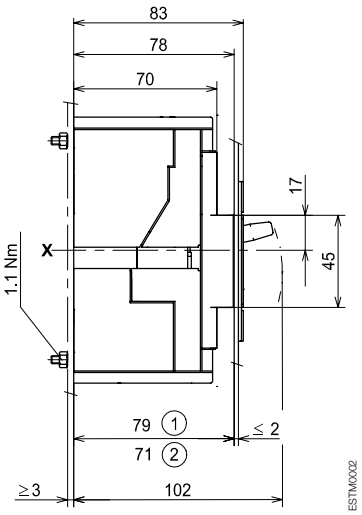
Overall dimensions

Tmax T1 and single-pole Tmax T1

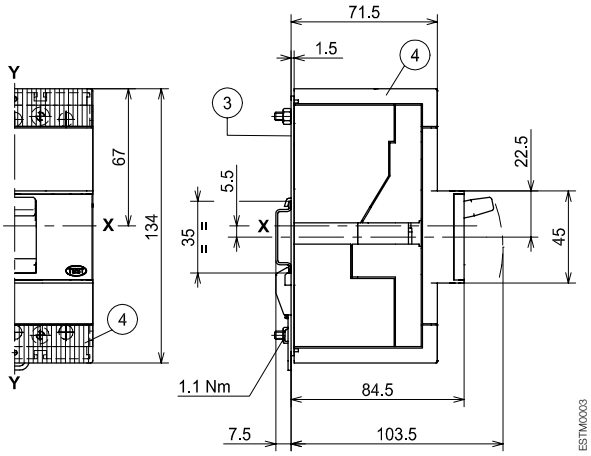
Fixed circuit-breaker

Fixing on sheet

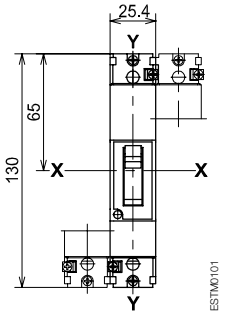




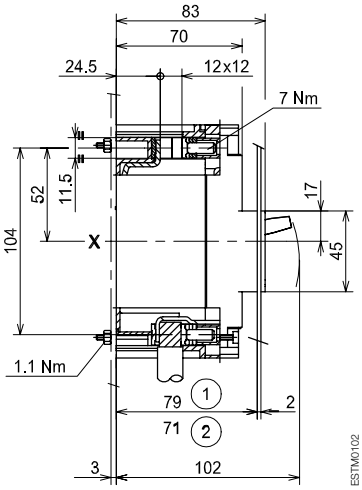
Fixing on DIN EN 50022 rail



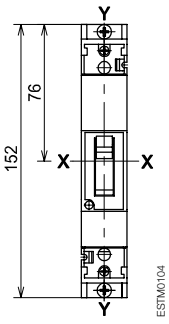
Without inserts



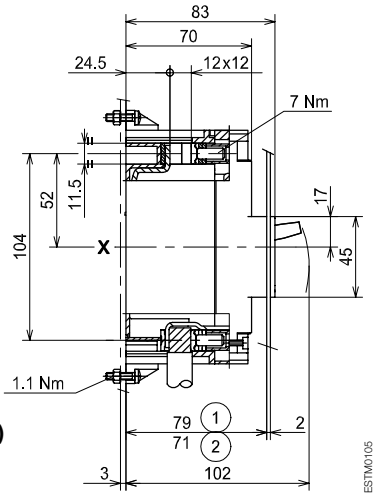
T1 1P (SINGLE-POLE)



With inserts



T1 1P (SINGLE-POLE)

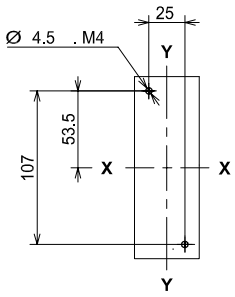


Caption

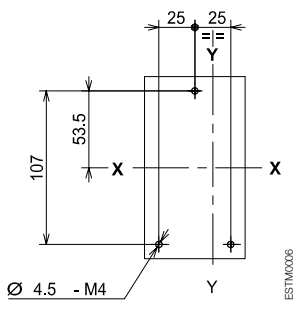
1. Depth of the switchboard in the case of circuit-breaker with face not extending from the compartment door, with or without flange
2. Depth of the switchboard in the case of circuit-breaker with face extending from the compartment door, without flange
3. Bracket for fixing onto rail
4. Bottom terminal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

Drilling templates for support sheet

For front terminals

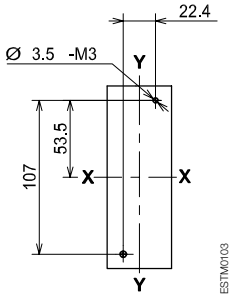


3 POLES

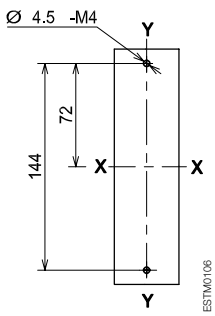


4 POLES

Without inserts



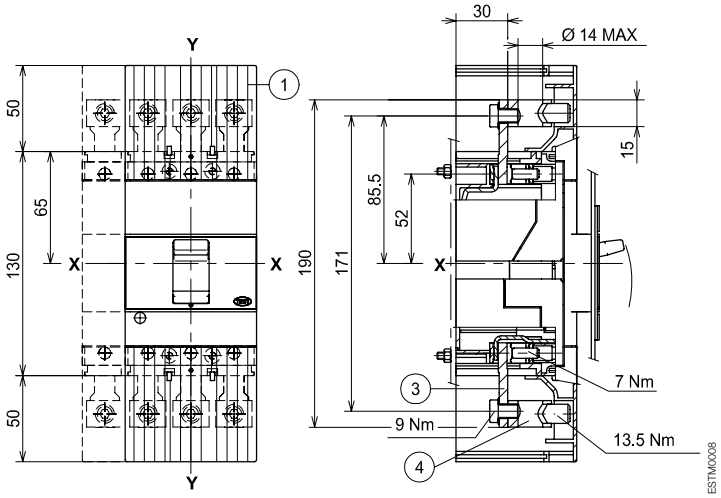
With inserts



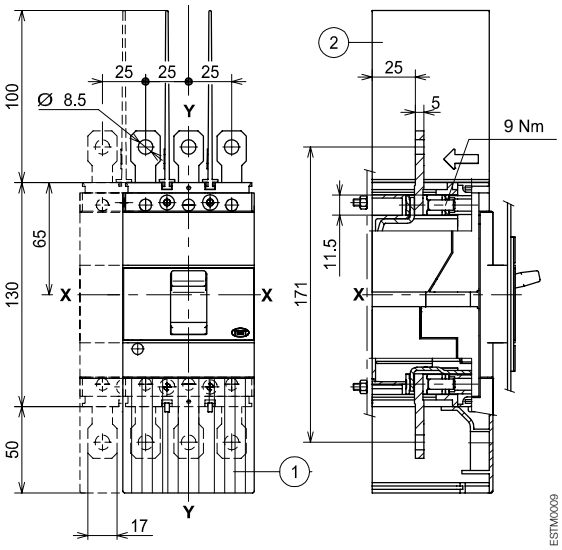
T1 1P (SINGLE-POLE)

Terminals

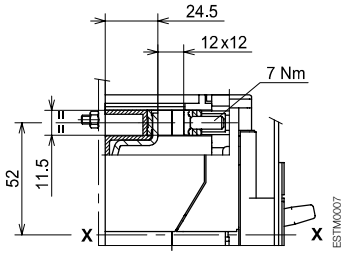
Front for copper/aluminium cables - FC CuAl



Front extended - EF



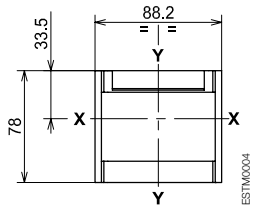
Front for copper cables - FC Cu



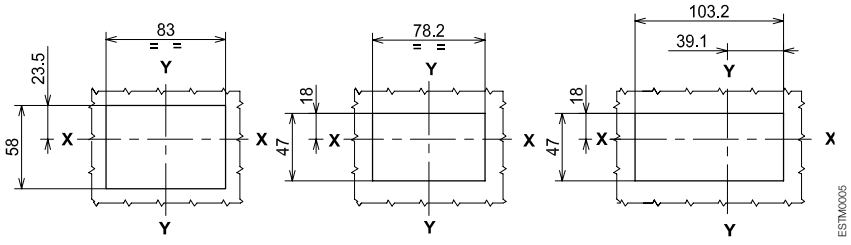
Caption

1. High terminal covers with IP40 degree of protection (compulsory)
2. Insulating barriers between phases (compulsory in the absence of top terminal covers)
3. Front extended terminals
4. Terminals for CuAl cables 95 mm²

Flange for the compartment door



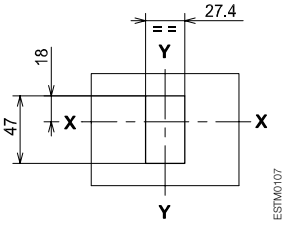
Drilling templates of the compartment door



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)

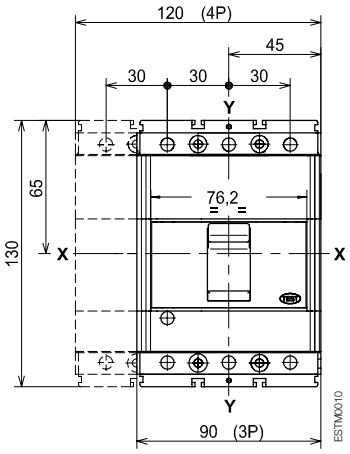


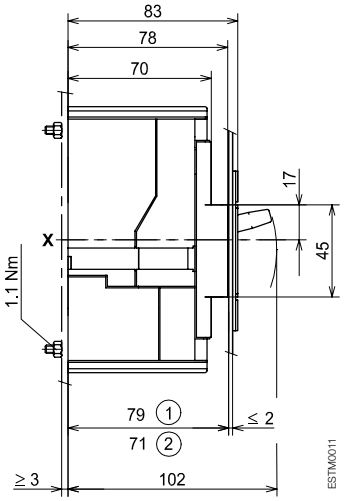
(SINGLE-POLE)

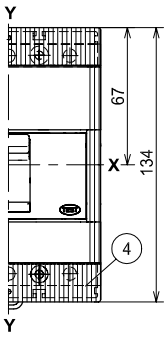
Overall dimensions
Tmax T2

Fixed circuit-breaker

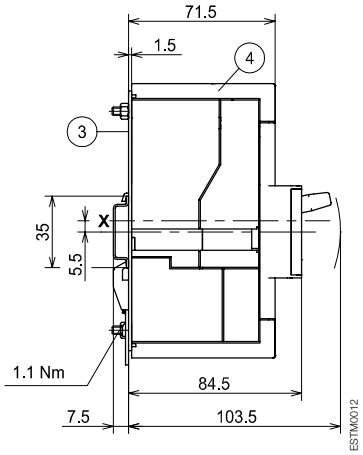
Fixing on sheet



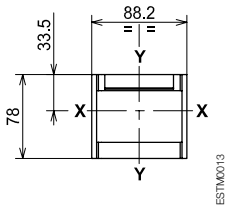




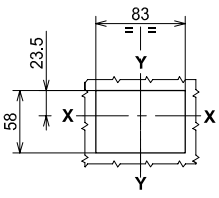
Fixing on DIN EN 50022 rail



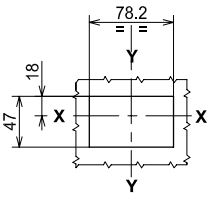
Flange for the compartment door



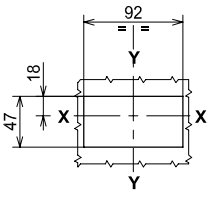
Drilling templates of the compartment door



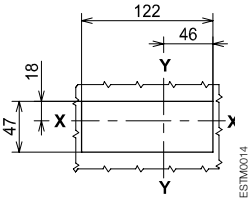
With flange and circuit-breaker face flush with door (3-4 POLES)



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

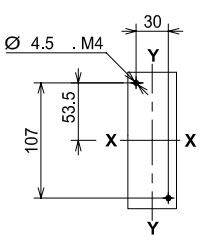
(2) Depth of the switchboard in the case of circuit-breaker with face extending from the compartment door, without flange

(3) Bracket for fixing onto rail

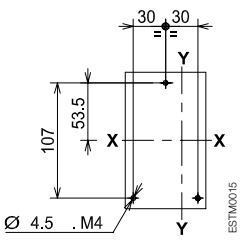
(4) Low terminal covers with degree of protection IP40

Drilling templates for support sheet

For front terminals

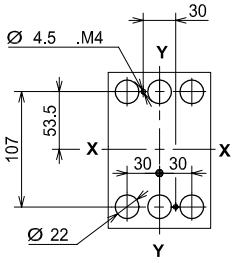


3 POLES

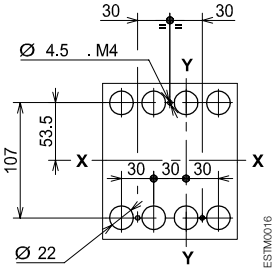


4 POLES

For rear terminals



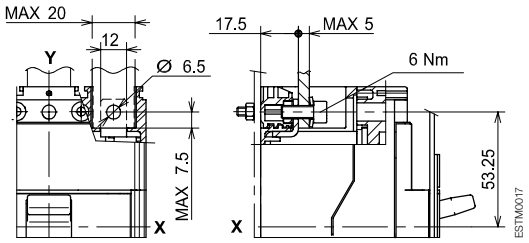
3 POLES



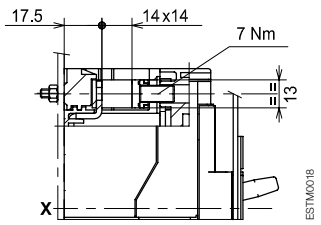
4 POLES

Terminals

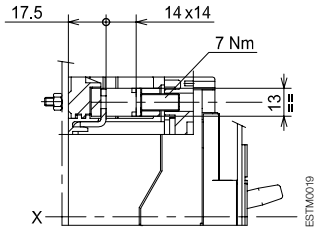
Front F



Front for copper cables - FC Cu



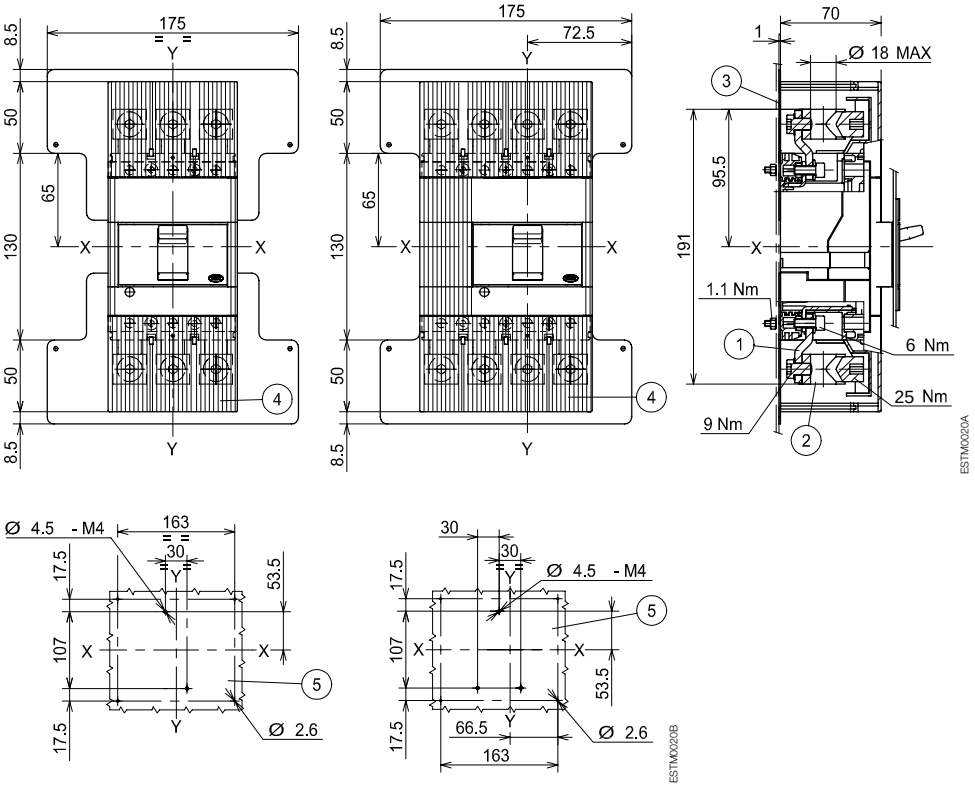
Front for copper/aluminium cables - FC CuAl 95 mm²



Caption

1. Front extended terminals
2. Front terminals for cables 185 mm² CuAl
3. Insulating base plate (compulsory)
4. High terminal covers with degree of protection IP40 (compulsory)
5. Drilling templates for support sheet

Front for copper/aluminium cables - FC CuAl 185 mm²



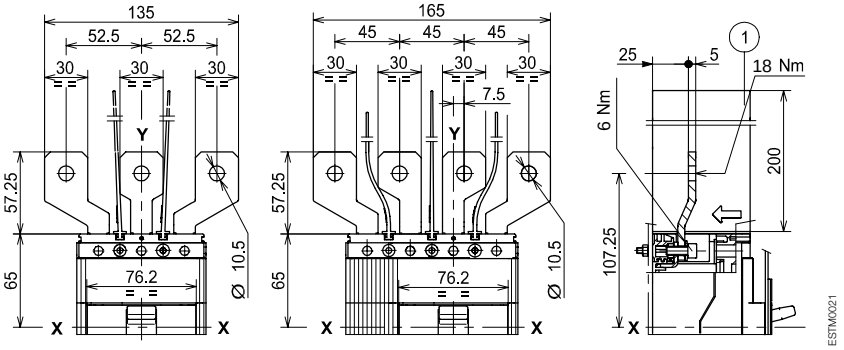
3 POLES

4 POLES

Caption

1. Insulating barriers between phases (compulsory)

Front extended spread - ES



4

Overall dimensions
Tmax T2

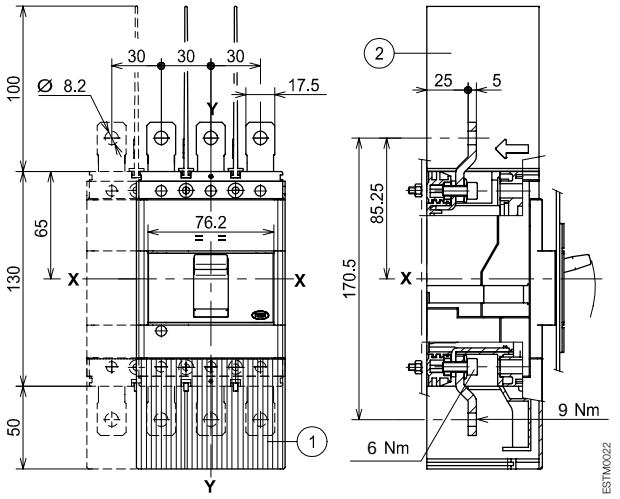
Terminals

Caption

(1) High terminal covers with degree of protection IP40

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

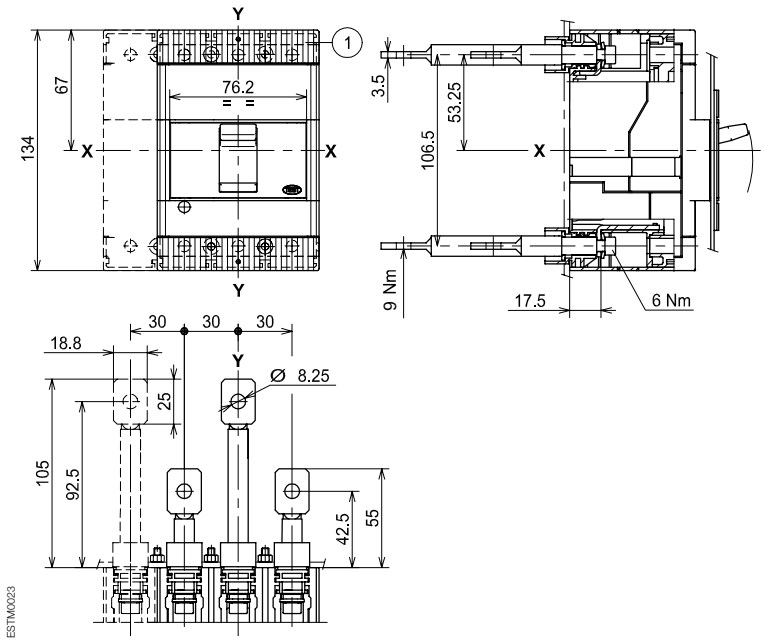
Front extended - EF



Caption

(1) Low terminal covers with degree of protection IP40

Rear - R

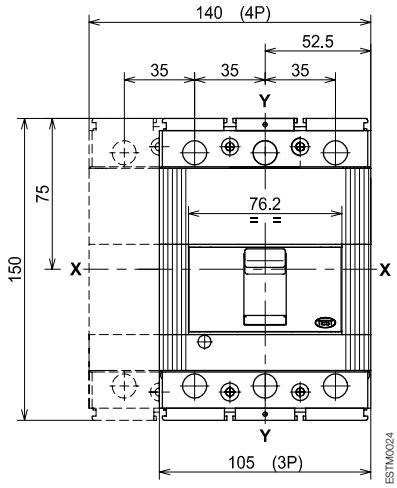


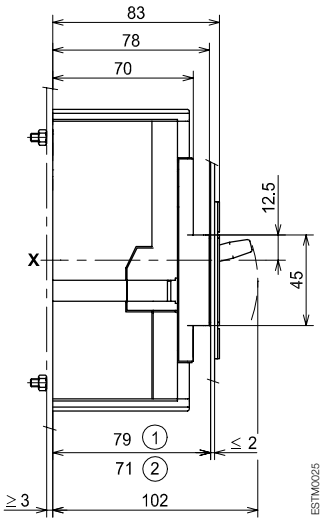
4

Overall dimensions
Tmax T3

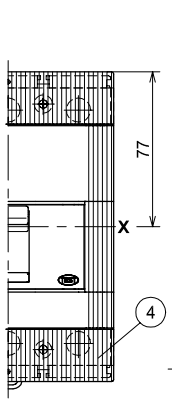
Fixed circuit-breaker

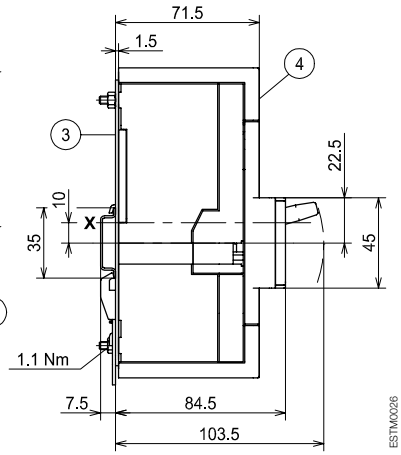
Fixing on sheet





Fixing on DIN EN 50022 rail





Caption

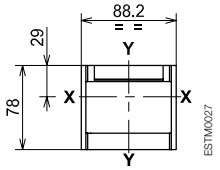
(1) Depth of the switchboard in the case of circuit-breaker with face not extending from the compartment door, with or without flange

(2) Depth of the switchboard in the case of circuit-breaker with face extending from the compartment door

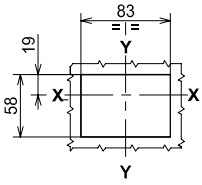
(3) Bracket for fixing on rail

(4) Low terminal covers with degree of protection IP40

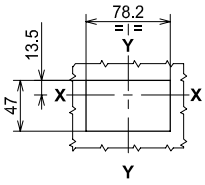
Flange for compartment door



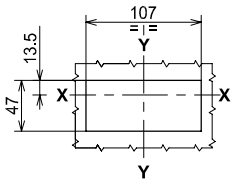
Drilling templates of the compartment door



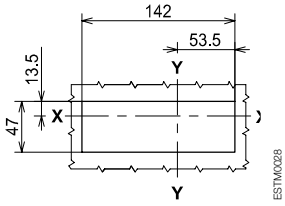
With flange and circuit-breaker face flush with door (3-4 POLES)



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



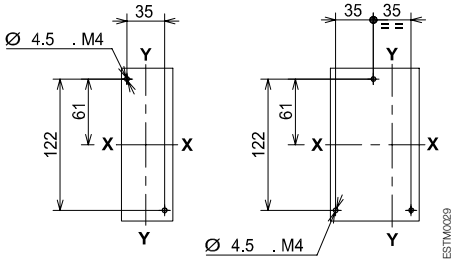
Without flange and circuit-breaker face extending (3 POLES)



Without flange and circuit-breaker face extending (4 POLES)

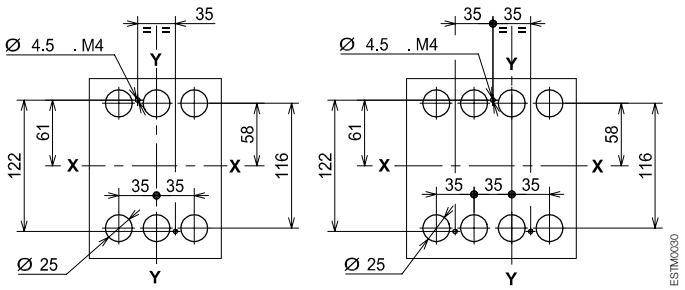
Drilling templates for support sheet

For front terminals



3 POLES 4 POLES

For rear terminals

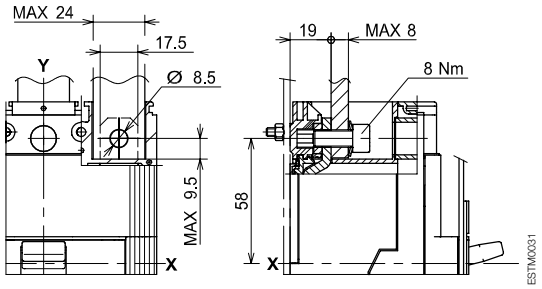


3 POLES 4 POLES

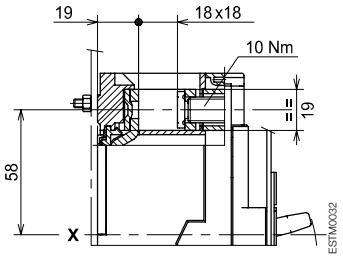
Overall dimensions
Tmax T3

Terminals

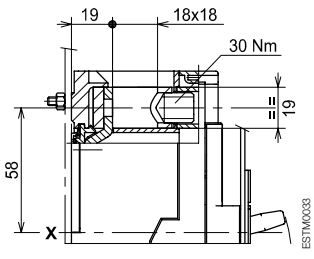
Front - F



Front for copper cables - FC Cu



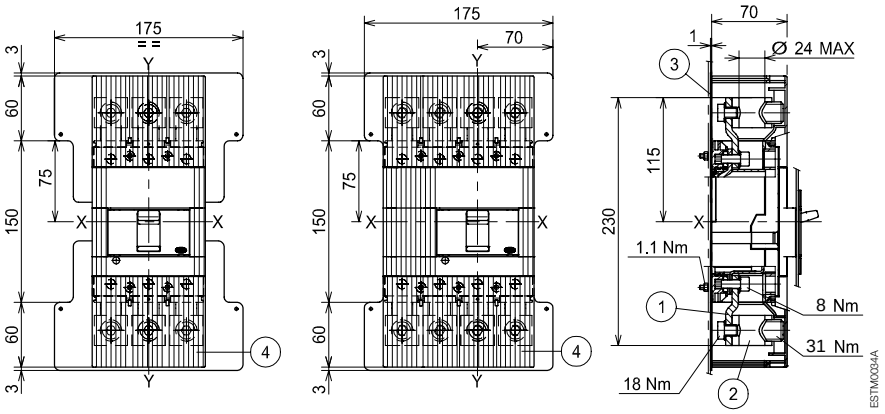
Front for copper/aluminium cables - FC CuAl 185 mm²

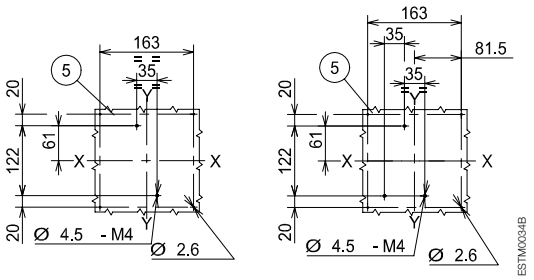


Caption

1. Front extended terminals
2. Front terminals for cables 240 mm² CuAl
3. Insulating base plate (compulsory)
4. High terminal covers with degree of protection IP40 (compulsory)
5. Drilling templates for support sheet

Front for copper/aluminium 240 mm² cables - FC CuAl 240 mm²





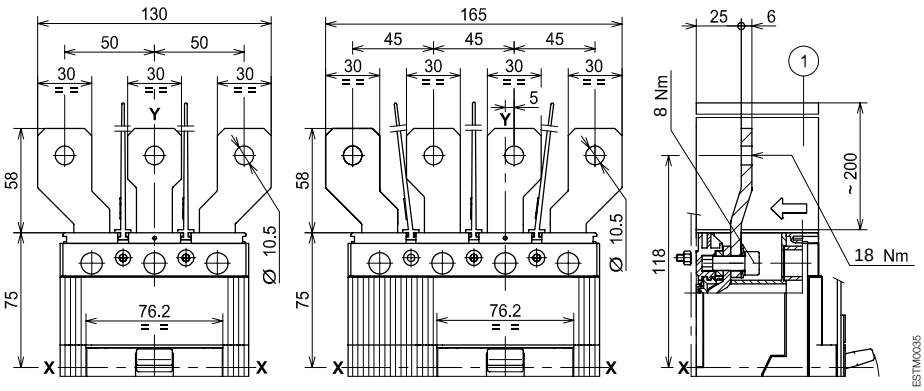
3 POLES

4 POLES

Caption

1. Insulating barriers between phases (compulsory)

Front extended spread - ES

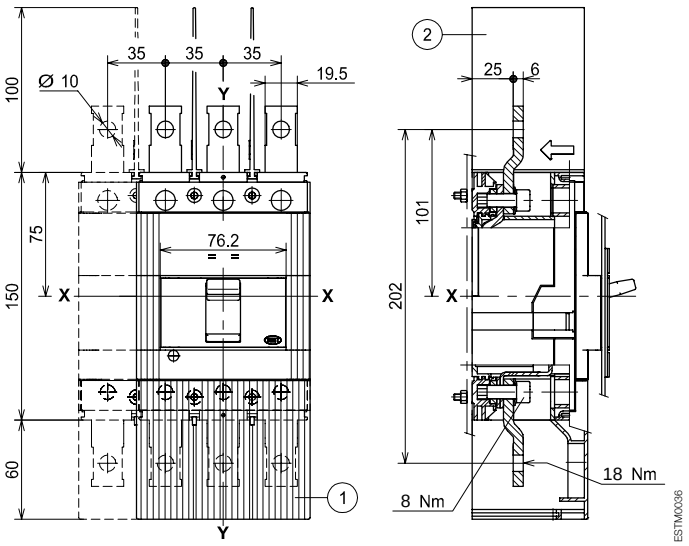


Caption

(1) High terminal covers with degree of protection IP40

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

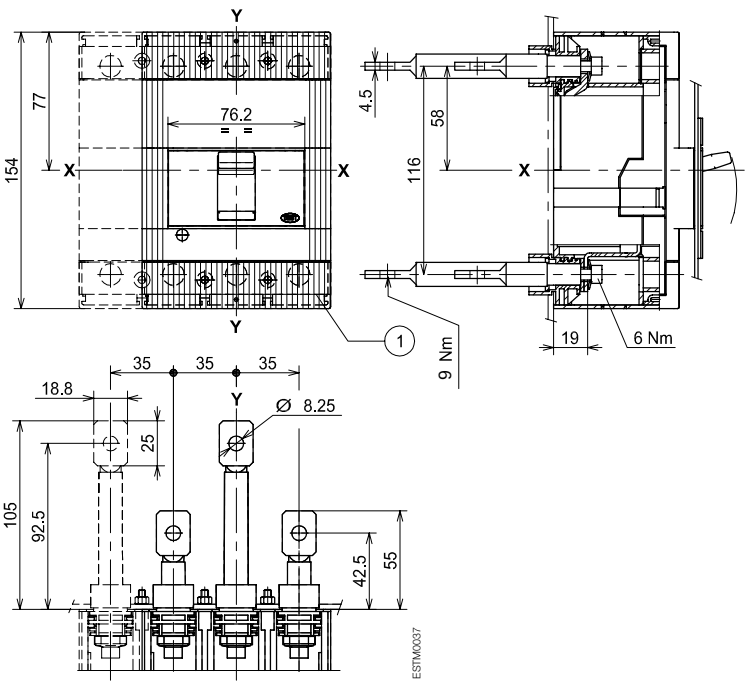
Front extended - EF



Caption

(1) Low terminal covers with degree of protection IP40

Rear - R



4

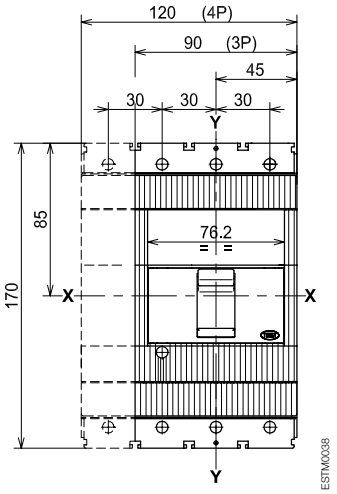
Overall dimensions
Tmax T2

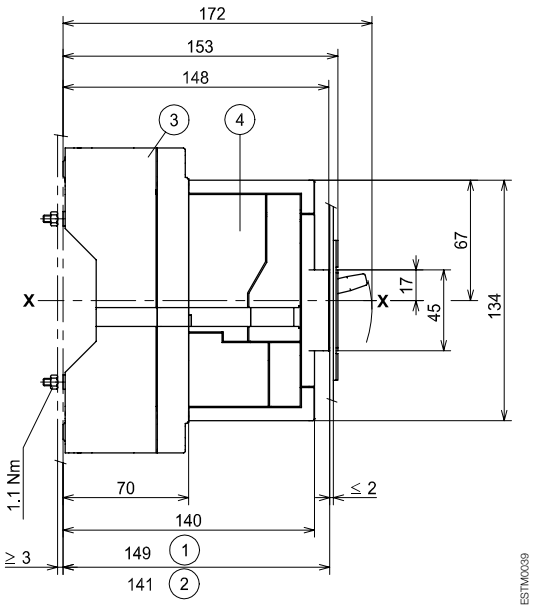
Plug-in circuit-breaker

Caption

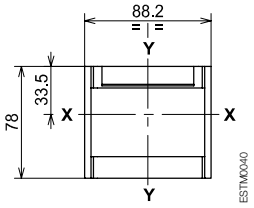
1. Depth of the switchboard in the case of circuit-breaker with face not extending from the compartment door, with or without flange
2. Depth of the switchboard in the case of circuit-breaker with face extending from the compartment door, without flange
3. Fixed part
4. Moving part with terminal covers, degree of protection IP40

Fixing on sheet

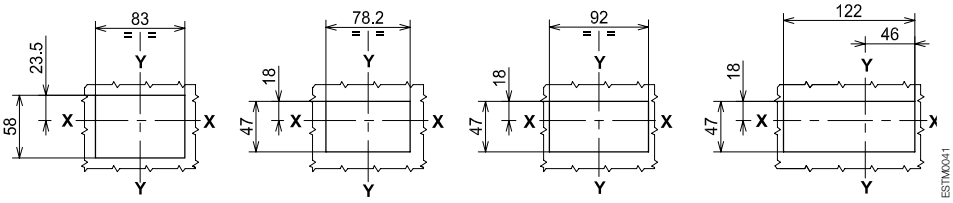




Flange for compartment door



Drilling templates of the compartment door



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

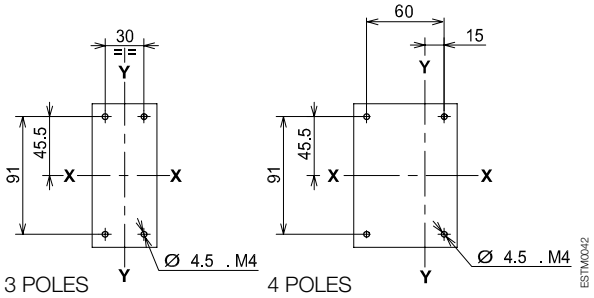
Without flange and circuit-breaker face flush with door (3-4 POLES)

Without flange and circuit-breaker face extending (3 POLES)

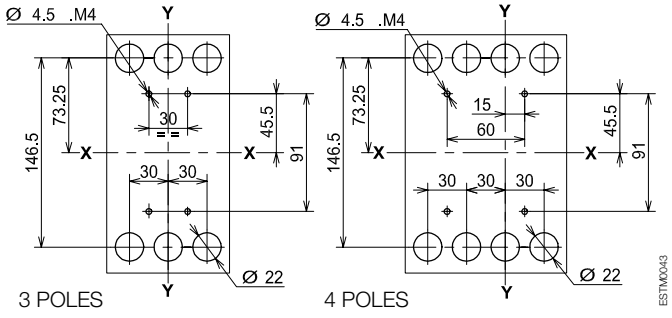
Without flange and circuit-breaker face extending (4 POLES)

Drilling templates for support sheet

For front terminals

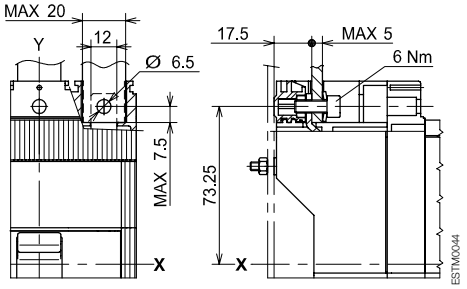


For rear terminals

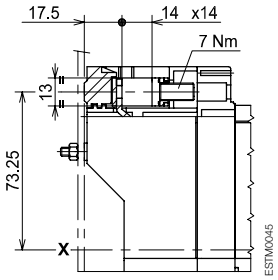


Terminals

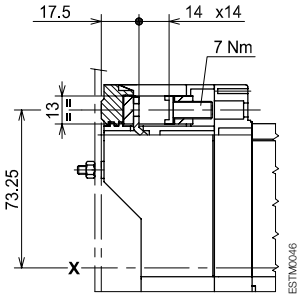
Front - F



Front for copper cables - FC Cu



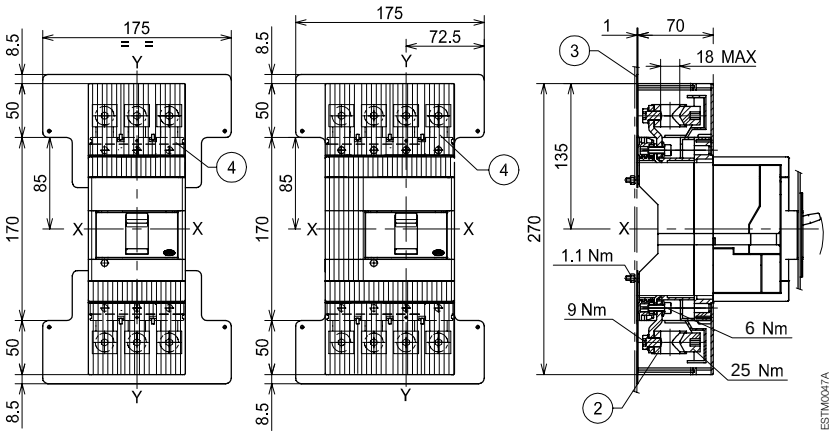
Front for copper/aluminium cables - FC CuAl 95 mm²

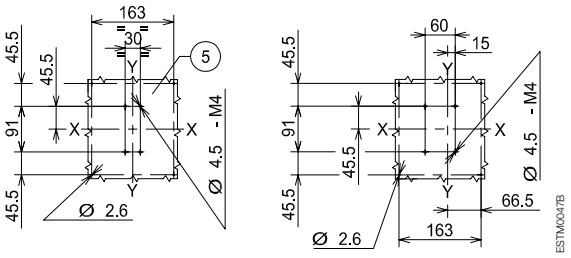


Caption

1. Front extended terminals
2. Front terminals for cables 185 mm² CuAl
3. Insulating base plate (compulsory)
4. High terminal covers with degree of protection IP40
5. Drilling templates for support sheet

Front for copper/aluminium 185 mm² cables - FC CuAl 185 mm²





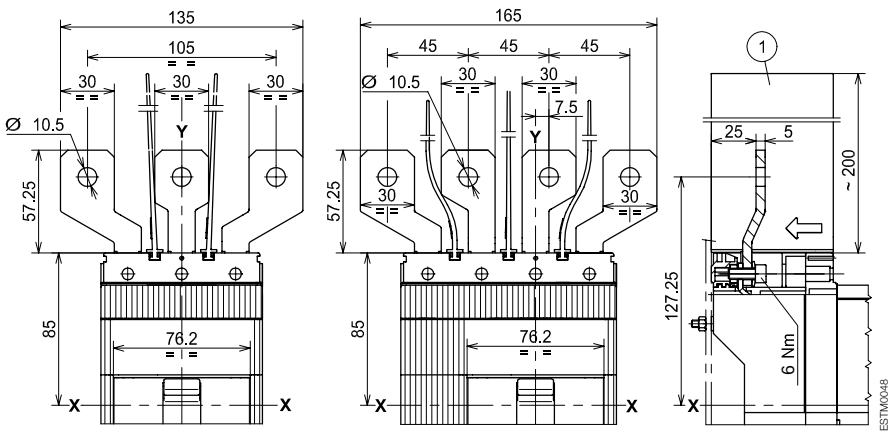
3 POLES

4 POLES

Caption

1. Insulating barriers between phases (compulsory)

Front extended spread - ES



Overall dimensions
Tmax T2

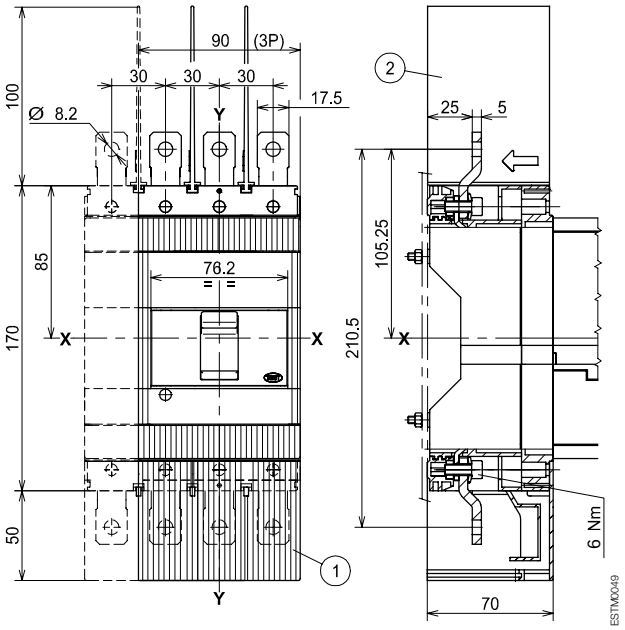
Terminals

Caption

(1) High terminal covers with degree of protection IP40

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

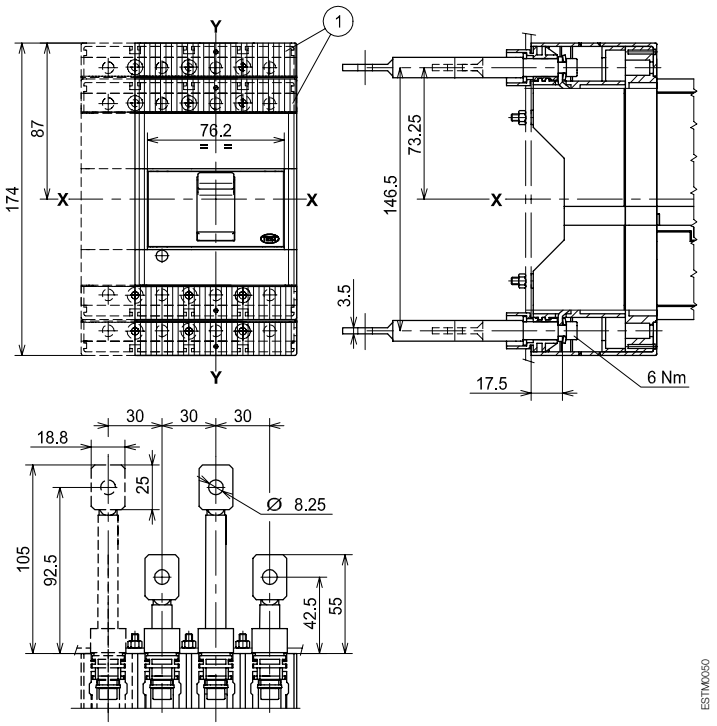
Front extended - EF



Caption

(1) Low terminal covers with degree of protection IP40

Rear - R



4

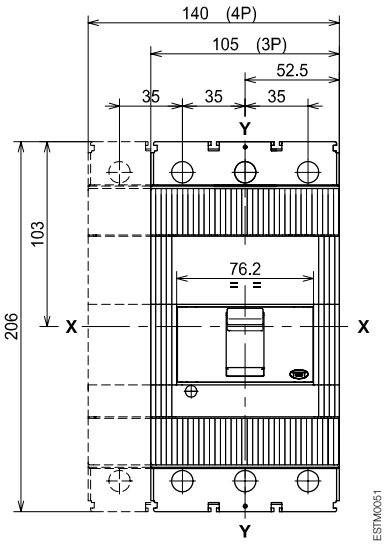
Overall dimensions
Tmax T3

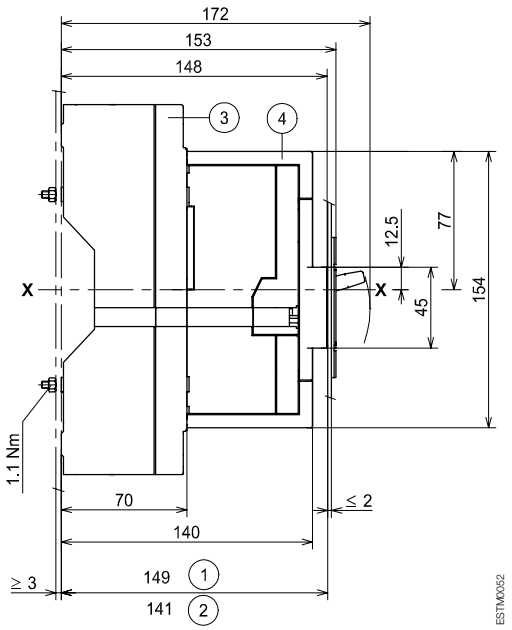
Plug-in circuit-breaker

Caption

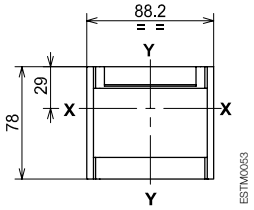
1. Depth of the switchboard in the case of circuit-breaker with face not extending from the compartment door, with or without flange
2. Depth of the switchboard in the case of circuit-breaker with face extending from the compartment door, without flange
3. Fixed part
4. Moving part with terminal covers, degree of protection IP40

Fixing on sheet

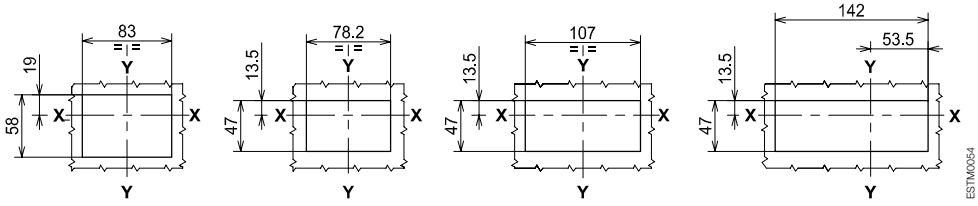




Flange for compartment door



Drilling templates of the compartment door



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

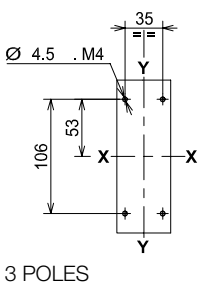
Without flange and circuit-breaker face flush with door (3-4 POLES)

Without flange and circuit-breaker face extending (3 POLES)

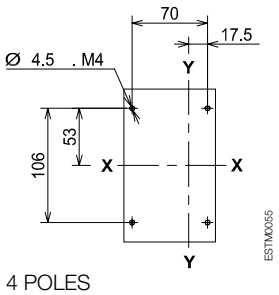
Without flange and circuit-breaker face extending (4 POLES)

Drilling templates for support sheet

For front terminals

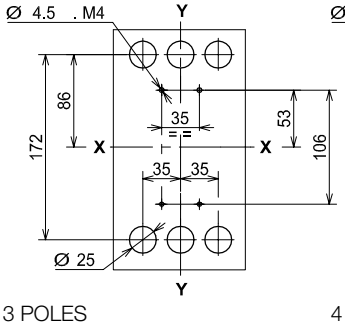


3 POLES

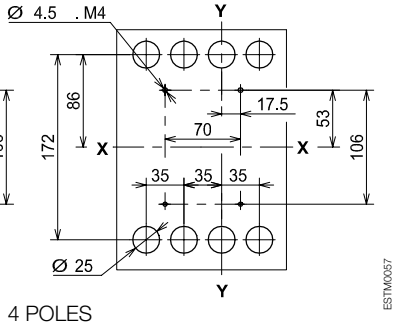


4 POLES

For rear terminals



3 POLES



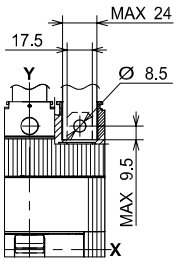
4 POLES

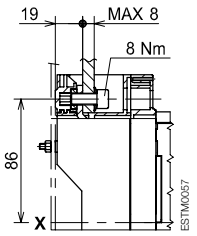
4

Overall dimensions
Tmax T3

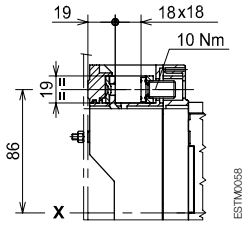
Terminals

Front - F

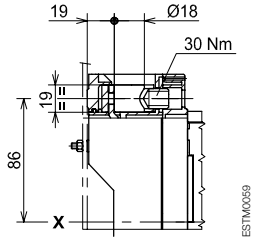




Front for copper cables - FC Cu



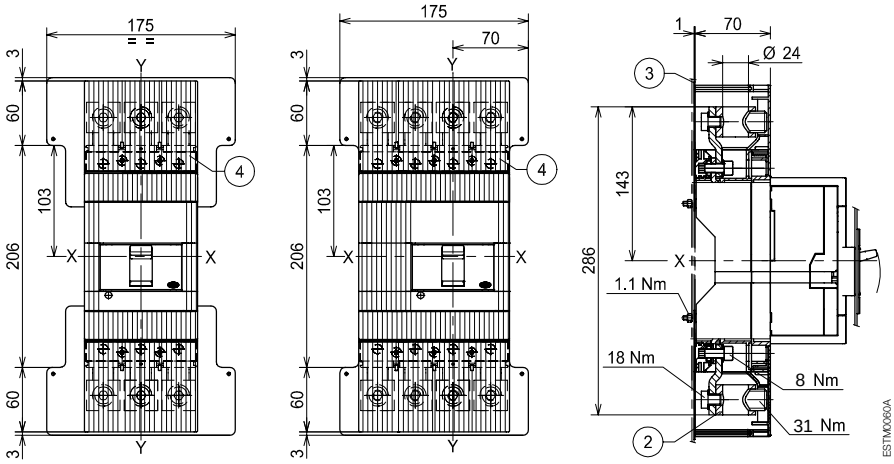
Front for copper/aluminium cables - FC CuAl 185 mm²

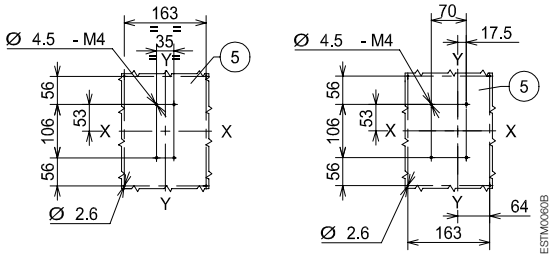


Caption

1. Front extended terminals
2. Front terminals for cables 240 mm² CuAl
3. Insulating base plate (compulsory)
4. High terminal covers with degree of protection IP40
5. Drilling templates for support sheet

Front for copper/aluminium 240 mm² cables - FC CuAl 240 mm²





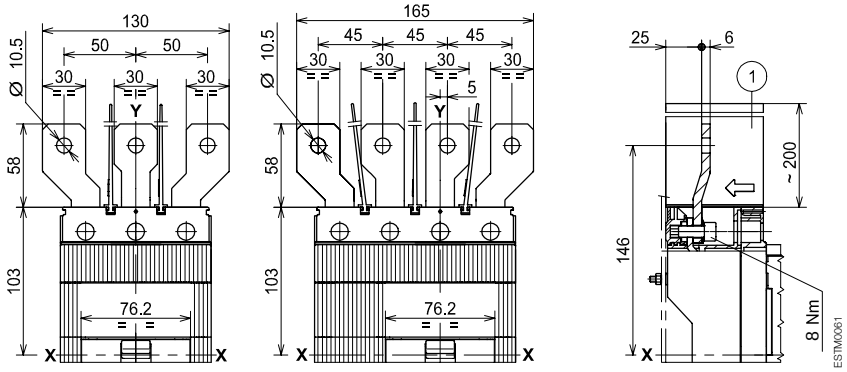
3 POLES

4 POLES

Caption

1. Insulating barriers between phases (compulsory)

Front extended spread - ES

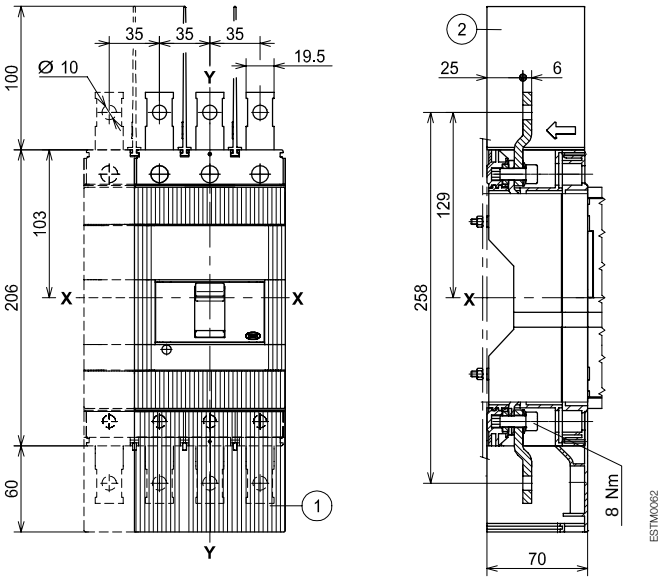


Caption

(1) High terminal covers with degree of protection IP40

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

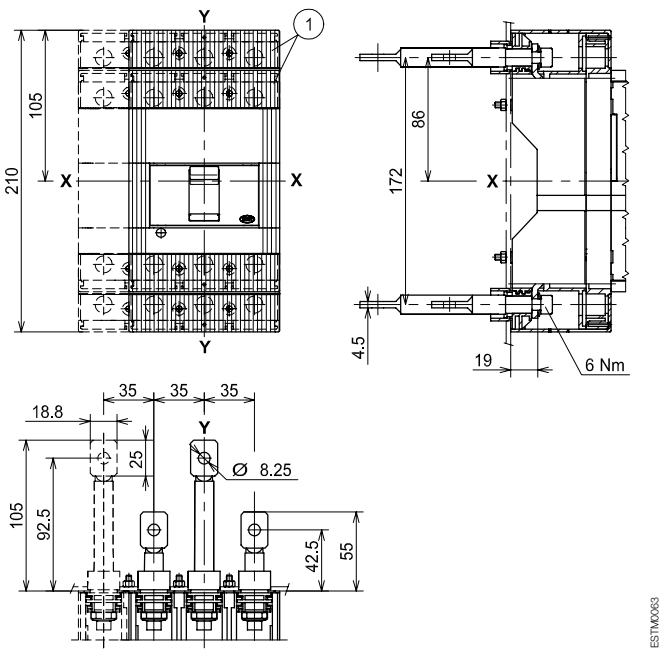
Front extended - EF



Caption

(1) Low terminal covers with degree of protection IP40

Rear - R



4

Overall dimensions

Circuit-breaker with RC221/RC222 residual current release

Fixed version

Caption

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

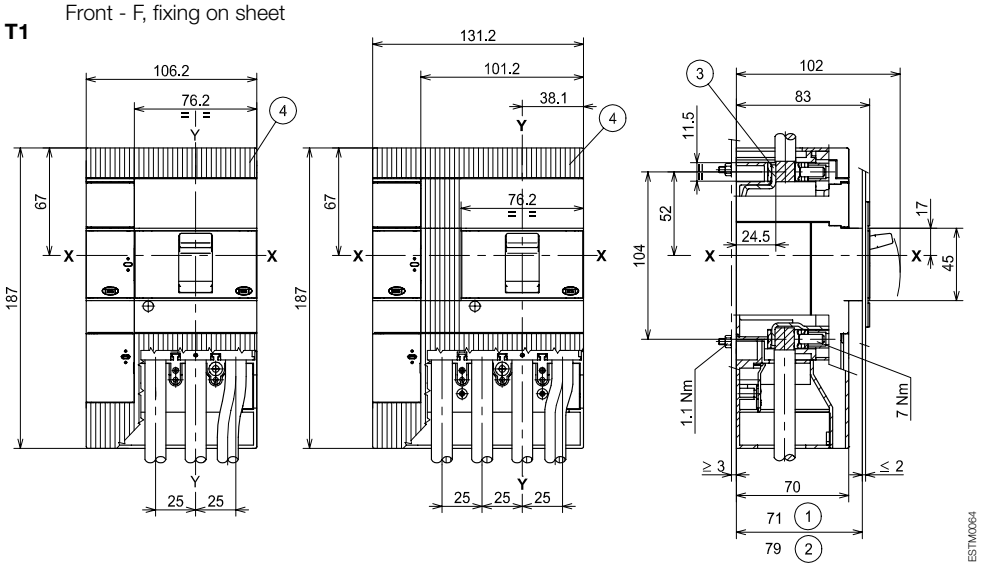
(2) Depth of the switchboard with circuit-breaker face flush with door

(3) Front terminals for cable connection

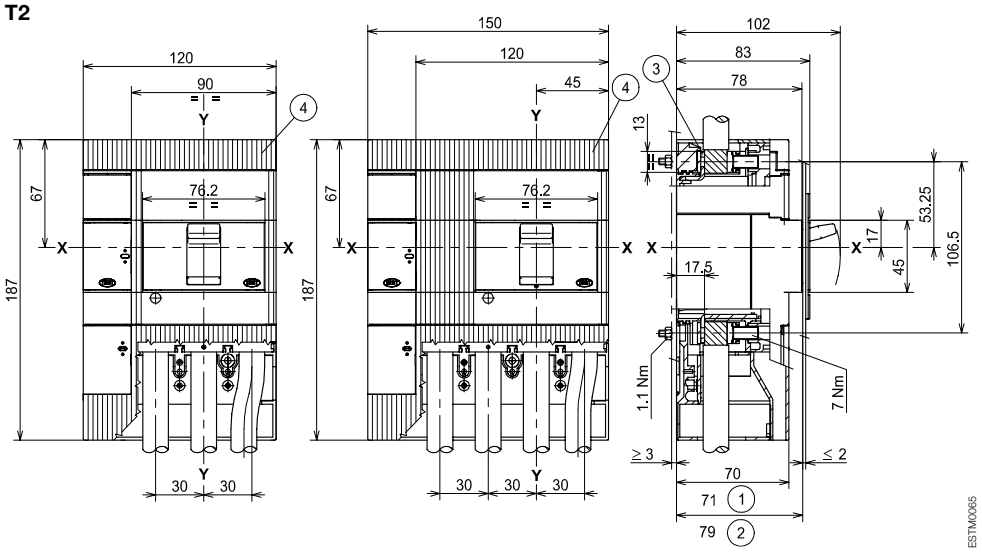
(4) Low terminal covers with degree of protection IP40

Front - F, fixing on sheet

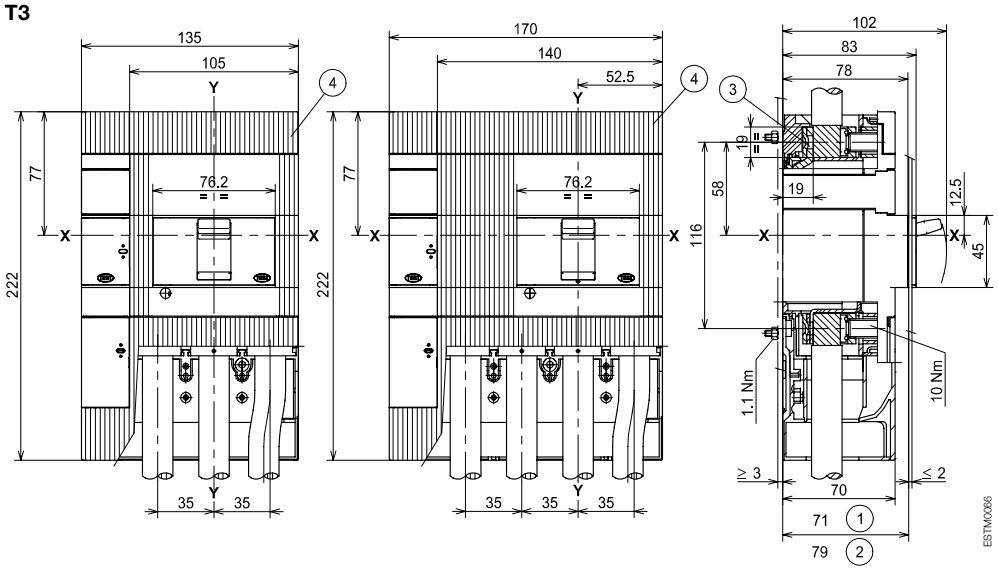
T1



T2



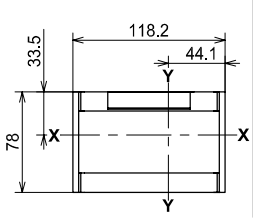
T3



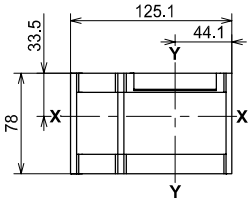
Flange for the compartment door

T1

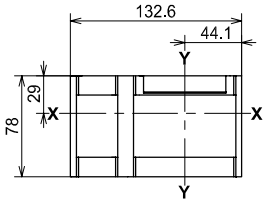
3 POLES



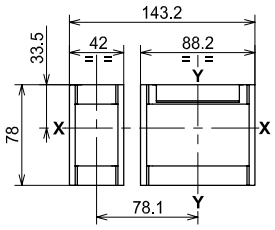
T2

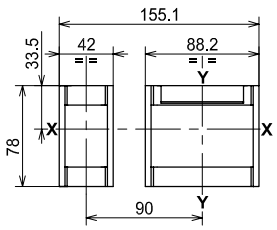


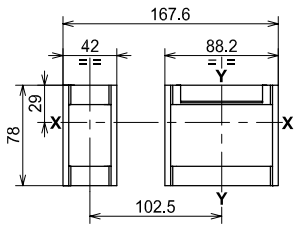
T3



4 POLES



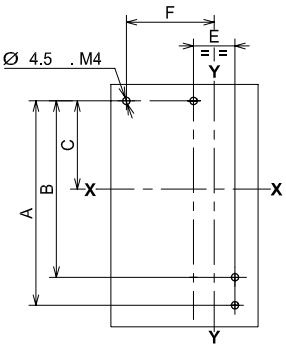




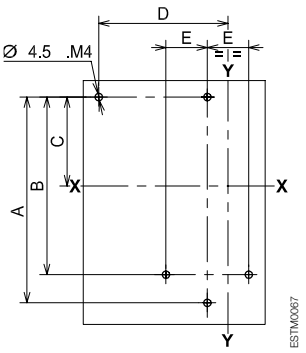
Drilling template for fixing sheet

T1 - T2 - T3

3 POLES



4 POLES



	A	B	C	D	E	F
T1	124	107	53,5	78,1	25	53,1
T2	124	107	53,5	90	30	60
T3	141,5	122	61	102,5	35	67,5

Overall dimensions

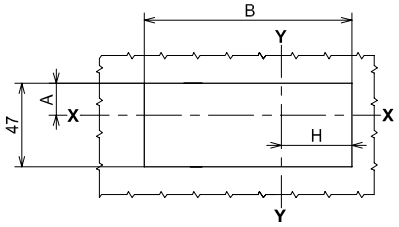
Circuit-breaker with RC221/RC222 residual current release

Drilling templates of the compartment door

Without flange face extending

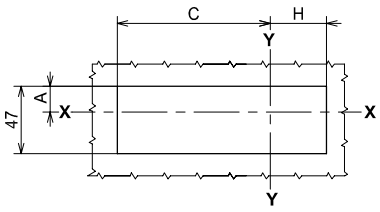
3 POLES

T1 - T2 - T3



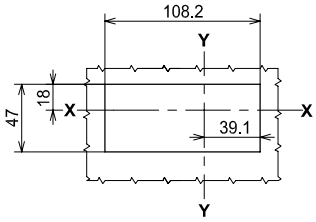
4 POLES

T1 - T2 - T3

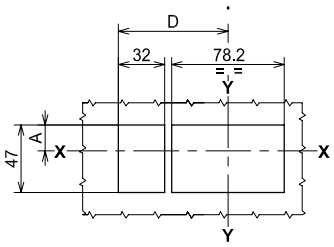


Without flange face not extending

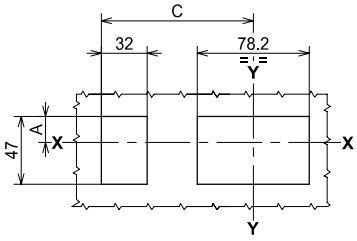
T1



T2 - T3

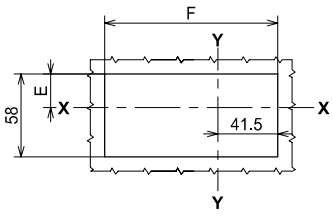


T1 - T2 - T3

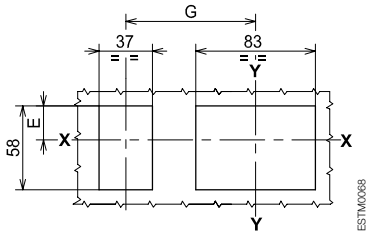


With flange face not extending

T1 - T2 - T3



T1 - T2 - T3



	A	B	C	D	E	F	G	H
T1	18	108,2	94,1	–	23,5	113	78,1	39,1
T2	18	122	106	76	23,5	120	90	46
T3	13,5	137	118,5	83,5	19	127,4	102,5	53,5

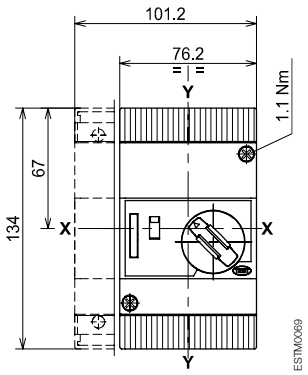
Overall dimensions

Accessories for Tmax T1 - T2 - T3

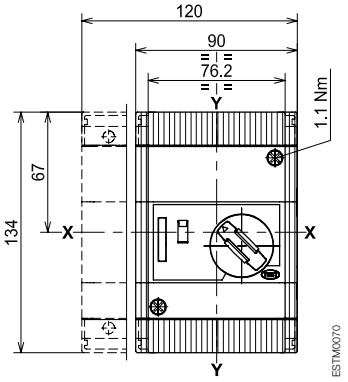
Fixed version

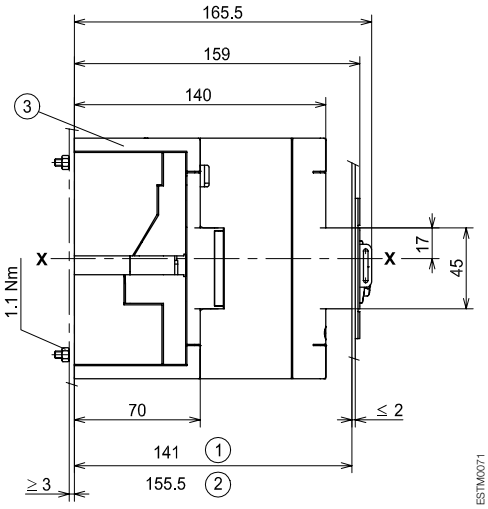
Solenoid operator superimposed

T1



T2

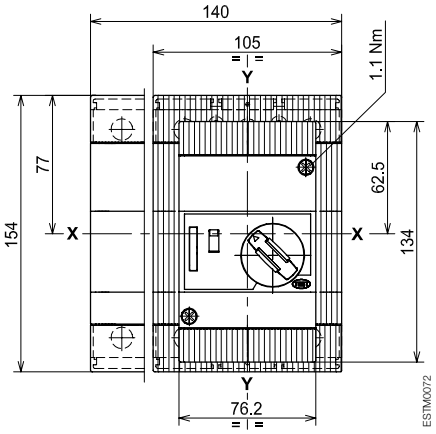


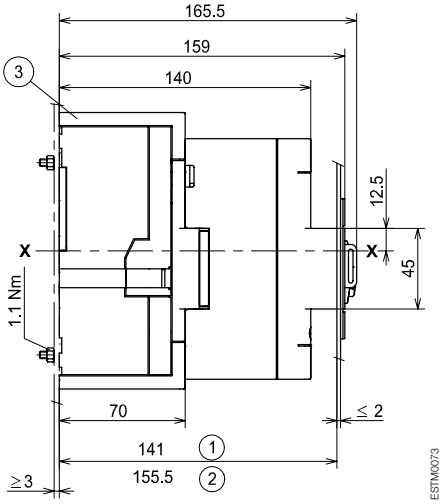


Caption

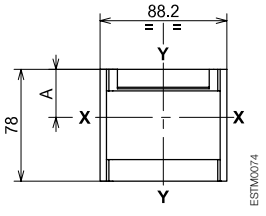
1. Depth of the switchboard with operating mechanism face extending
2. Depth of the switchboard with operating mechanism face flush with door
3. Low terminal covers with degree of protection IP40

T3



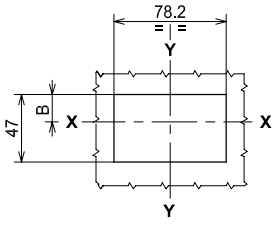


Flange for compartment door

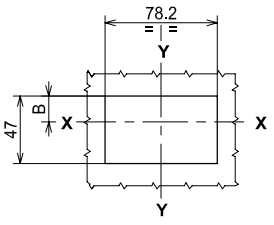


	A	B	C
T1	33,5	18	23,5
T2	33,5	18	23,5
T3	29	13,5	19

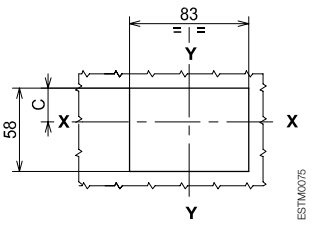
Drilling templates of the compartment door



Without flange
Operating mechanism face extending



Without flange
Operating mechanism face flush with door



With flange
Operating mechanism face flush with door

Overall dimensions
Accessories for Tmax T1 - T2

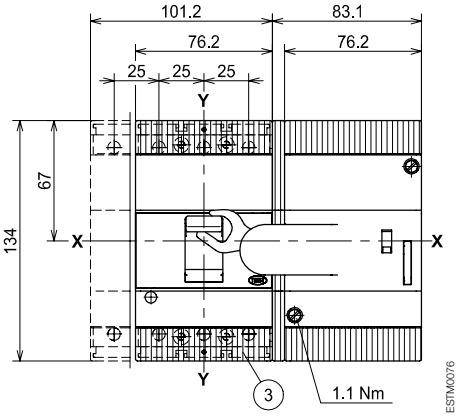
Fixed version

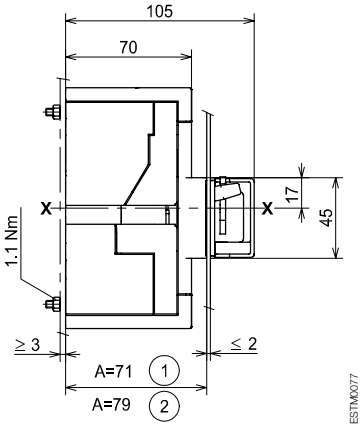
Caption

1. Circuit-breaker face extending
2. Circuit-breaker face flush with door
3. Low terminal covers with degree of protection IP40

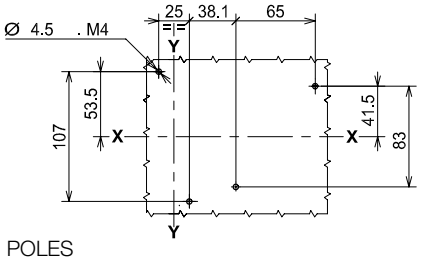
Solenoid operator side by side

T1

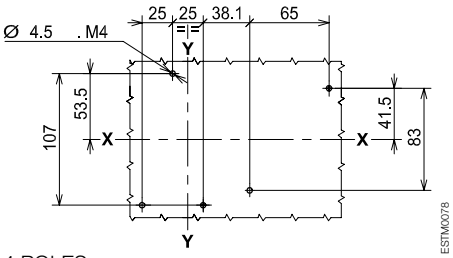




Drilling templates for fixing sheet

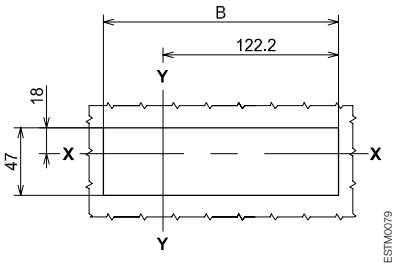


3 POLES



4 POLES

Drilling templates of the compartment door



	A	B
3P	79	161,3
	71	161,3
4P	79	161,3
	71	186,3

Fixed version

Caption

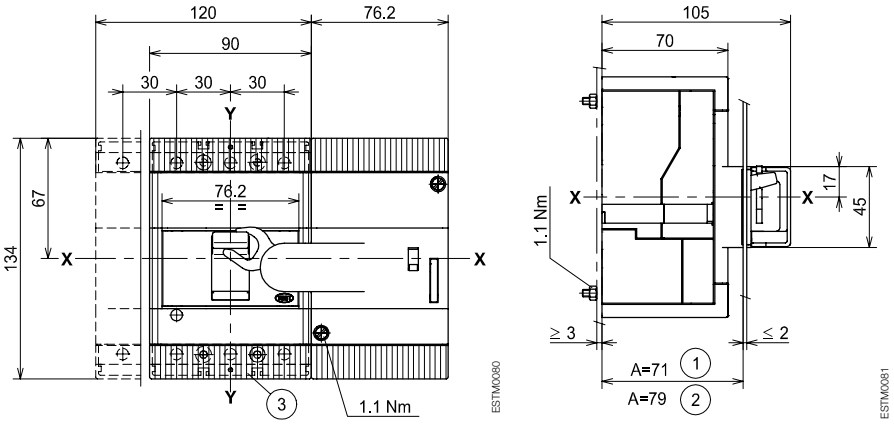
(1) Circuit-breaker face extending

(2) Circuit-breaker face flush with door

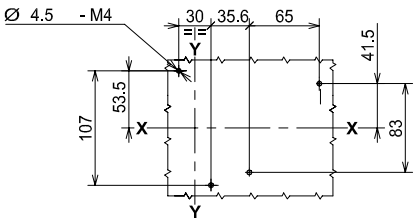
(3) Low terminal covers with degree of protection IP40

Solenoid operator side by side

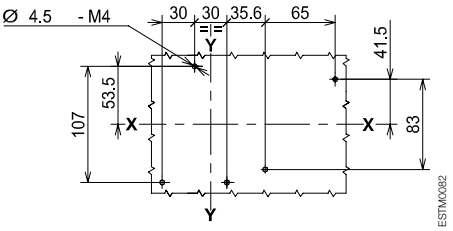
T2



Drilling templates for fixing sheet

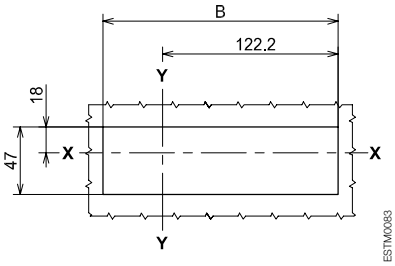


3 POLES



4 POLES

Drilling templates of the compartment door



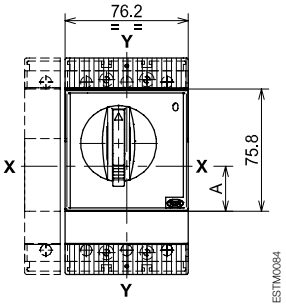
	A	B
3P	79	161,3
	71	161,3
4P	79	161,3
	71	198,2

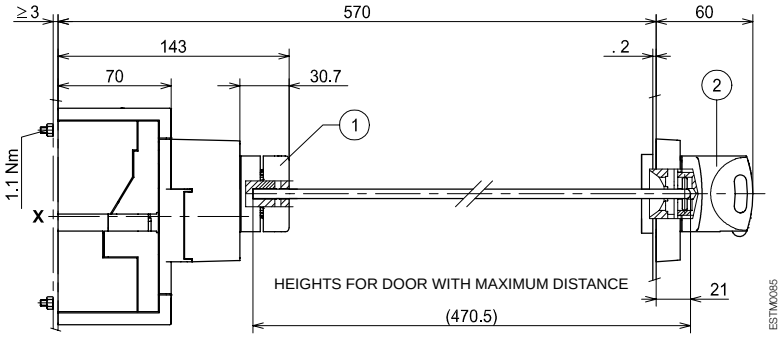
Overall dimensions

Accessories for Tmax T1 - T2 - T3

Fixed version

Rotary handle operating mechanism on the compartment door

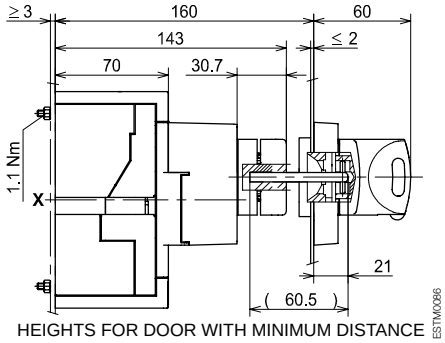




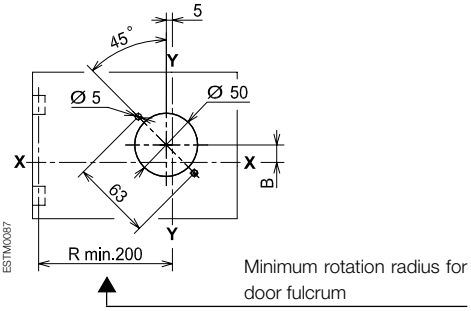
Caption

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

	A	B
T1-T2	28	14
T3	32,5	9,5



Drilling template of the compartment door

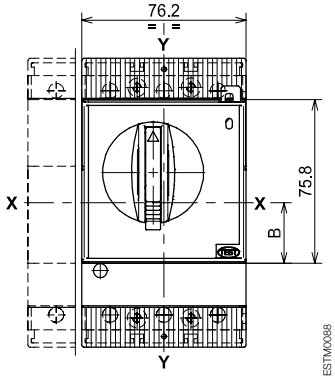


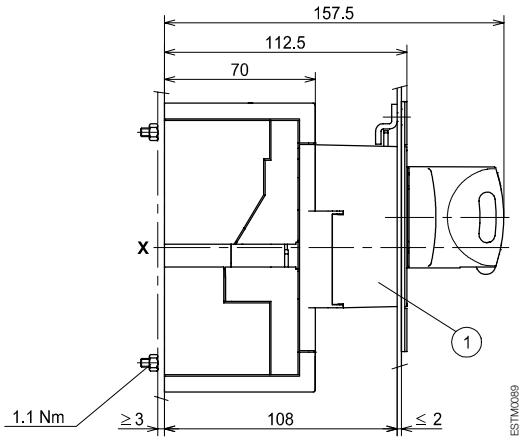
Rotary handle operating mechanism on circuit-breaker

Caption

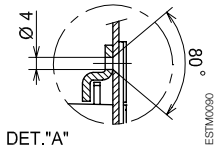
1. Rotary handle operating mechanism on circuit-breaker

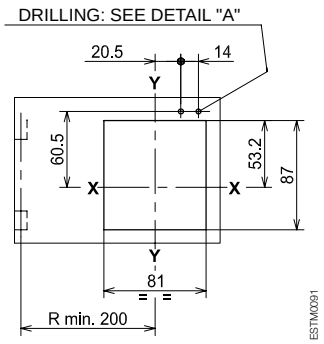
	A	B	C	D
T1-T2	67,7	28	53,2	60,5
T3	63,2	32,5	48,7	56



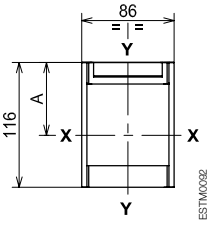


Drilling template of the compartment door



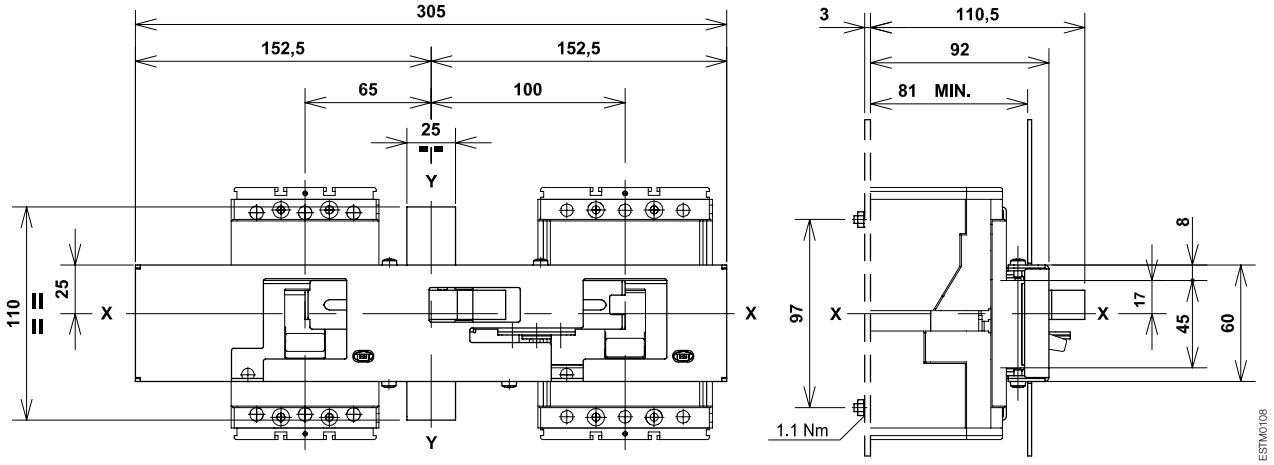


Flange for the compartment



Mechanical interlock between circuit-breakers

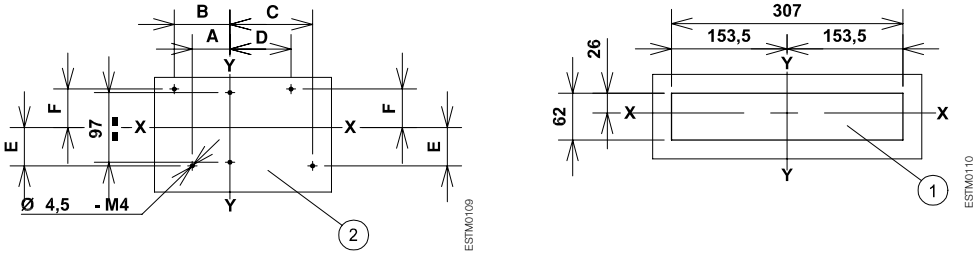
Front interlocking plate between two circuit-breakers



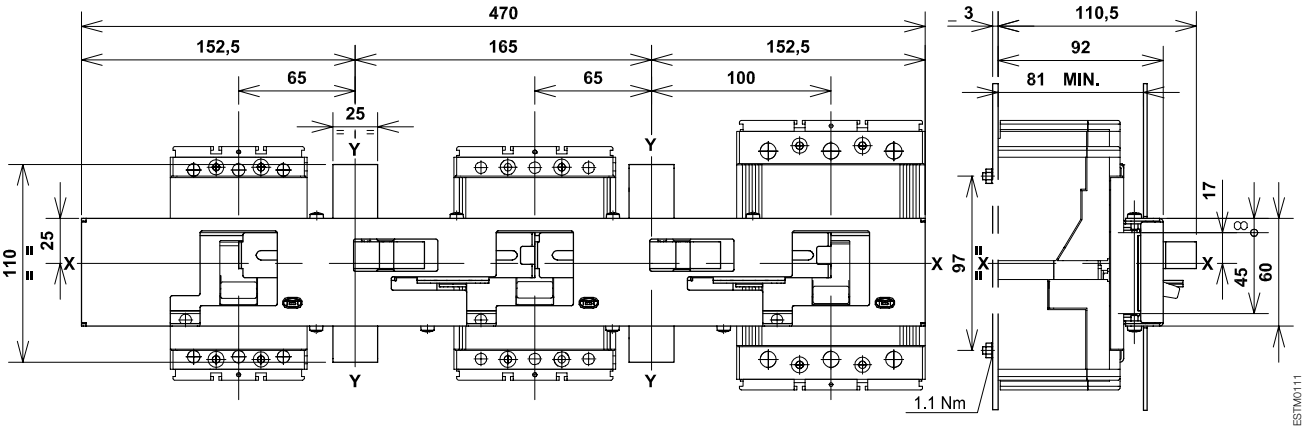
Caption

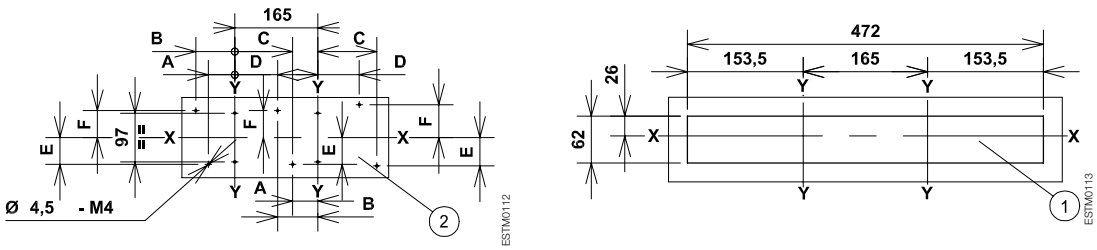
(1) Drilling templates of the compartment door

(2) Drilling templates for support sheet



Front interlocking plate between three circuit-breakers



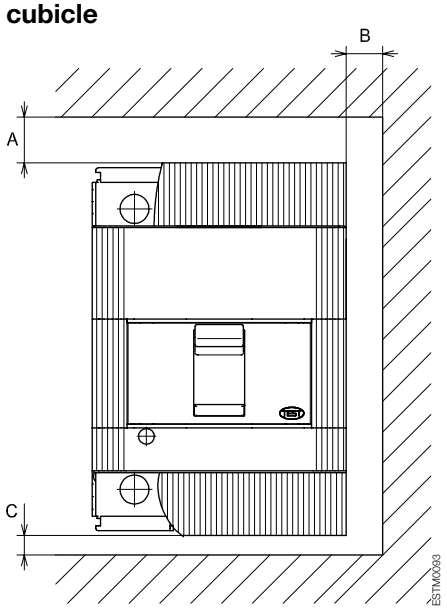


	A	B	C	D	E	F
T1	52,5	77,5	112,5	87,5	53,5	53,5
T2	50	80	115	85	53,5	53,5
T3	47,5	82,5	117,5	82,5	56,5	65,5

Overall dimensions
Distances to be respected

Insulation distances for installation in metallic cubicle

	A [mm]	B [mm]	C [mm]
T1	25	20	20
T2	25	20	20
T3	50	25	20

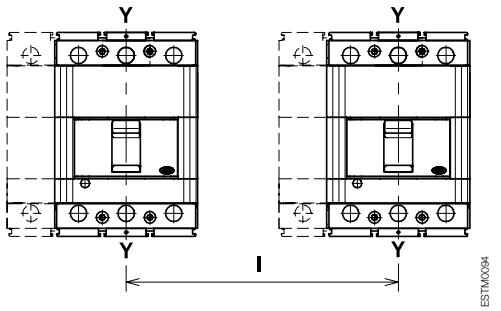


Minimum centre distance between two circuit-breakers side by side or superimposed

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

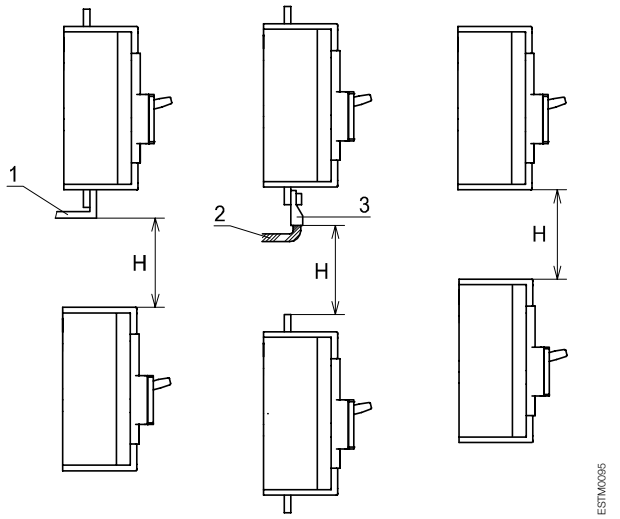
Minimum centre distance for two circuit-breakers side by side

	Circuit-breaker width [mm]		Centre distance I [mm]	
	3 poles	4 poles	3 poles	4 poles
T1	76	102	76	102
T2	90	120	90	120
T3	105	140	105	140



Minimum centre distance for superimposed circuit-breakers

	H [mm]
T1	60
T2	90
T3	140



Caption

(1) Connection - not insulated

(2) Insulated cable

(3) Cable terminal

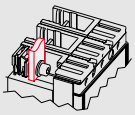
Ordering codes

Index

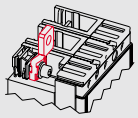
Ordering codes

General information

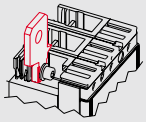
Abbreviations used to describe the apparatus



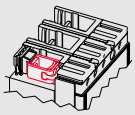
F = Front terminals



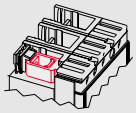
EF = Front extended terminals



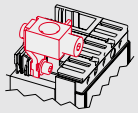
ES = Front extended spread terminals



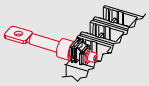
FC Cu = Front terminals for copper cables



FC CuAl = Front terminals for Cu/Al cables



FC CuAl = Front terminals for Cu/Al cables (housed externally)



R = Rear terminals

I_3 Magnetic trip current

In Rated current of the thermomagnetic release

PR221 In Rated current of the PR221 microprocessor-based release current transformers

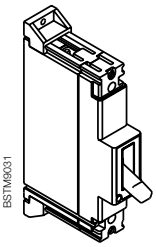
Iu Rated uninterrupted current of the circuit-breaker

Icu Rated ultimate short-circuit breaking capacity

N= 50%
N= 100% Protection of the neutral at 50% or at 100% of that of the phases

T1B 1P 160

Fixed (F)



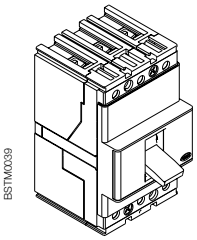
Iu (40 °C) = 160 A - Icu (230 V) = 25 kA

FC Cu = Front terminals for copper cables	In	I_3	1SDA0.....R1 1 pole
Thermomagnetic release with fixed thresholds			
T1B 1P 160 F FC Cu (1x70mm²)	R16	500	52616
T1B 1P 160 F FC Cu (1x70mm²)	R20	500	52617
T1B 1P 160 F FC Cu (1x70mm²)	R25	500	52618
T1B 1P 160 F FC Cu (1x70mm²)	R32	500	52619
T1B 1P 160 F FC Cu (1x70mm²)	R40	500	52620
T1B 1P 160 F FC Cu (1x70mm²)	R50	500	52621
T1B 1P 160 F FC Cu (1x70mm²)	R63	630	52622
T1B 1P 160 F FC Cu (1x70mm²)	R80	800	52623
T1B 1P 160 F FC Cu (1x70mm²)	R100	1000	52624
T1B 1P 160 F FC Cu (1x70mm²)	R125	1250	52625
T1B 1P 160 F FC Cu (1x70mm²)	R160	1600	52626

Ordering codes

Power distribution circuit-breakers

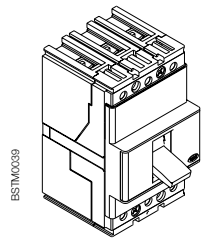
T1B 160
Fixed (F)



Iu (40 °C) = 160 A - Icu (415 V) = 16 kA

FC Cu = Front terminals for copper cables	In	I_3	1SDA0.....R1 3 poles	4 poles N= 50%	4 poles N= 100%
Thermomagnetic release					
T1B 160 F FC Cu (1x70mm²)	R16	500	50870		50881
T1B 160 F FC Cu (1x70mm²)	R20	500	50871		50882
T1B 160 F FC Cu (1x70mm²)	R25	500	50872		50883
T1B 160 F FC Cu (1x70mm²)	R32	500	50873		50884
T1B 160 F FC Cu (1x70mm²)	R40	500	50874		50885
T1B 160 F FC Cu (1x70mm²)	R50	500	50875		50886
T1B 160 F FC Cu (1x70mm²)	R63	630	50876		50887
T1B 160 F FC Cu (1x70mm²)	R80	800	50877		50888
T1B 160 F FC Cu (1x70mm²)	R100	1000	50878		50889
T1B 160 F FC Cu (1x70mm²)	R125	1250	50879		50890
T1B 160 F FC Cu (1x70mm²)	R160	1600	50880	50891	50936

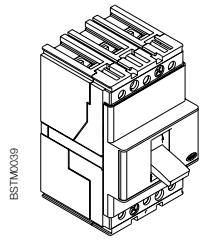
T1C 160
Fixed (F)



Iu (40 °C) = 160 A - Icu (415 V) = 25 kA

FC Cu = Front terminals for copper cables	In	I_3	1SDA0.....R1 3 poles	4 poles N= 50%	4 poles N= 100%
Thermomagnetic release					
T1C 160 F FC Cu (1x70mm²)	R25	500	50894		50905
T1C 160 F FC Cu (1x70mm²)	R32	500	50895		50906
T1C 160 F FC Cu (1x70mm²)	R40	500	50896		50907
T1C 160 F FC Cu (1x70mm²)	R50	500	50897		50908
T1C 160 F FC Cu (1x70mm²)	R63	630	50898		50909
T1C 160 F FC Cu (1x70mm²)	R80	800	50899		50910
T1C 160 F FC Cu (1x70mm²)	R100	1000	50900		50911
T1C 160 F FC Cu (1x70mm²)	R125	1250	50901		50912
T1C 160 F FC Cu (1x70mm²)	R160	1600	50902	50913	50937

T1N 160
Fixed (F)



Iu (40 °C) = 160 A - Icu (415 V) = 36 kA

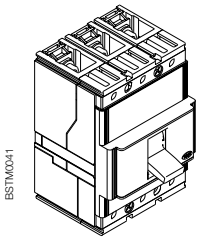
FC Cu = Front terminals for copper cables	In	I_3	1SDA0.....R1 3 poles	4 poles N= 50%	4 poles N= 100%
Thermomagnetic release					
T1N 160 F FC Cu (1x70mm²)	R32	500	50917		50928
T1N 160 F FC Cu (1x70mm²)	R40	500	50918		50929
T1N 160 F FC Cu (1x70mm²)	R50	500	50919		50930
T1N 160 F FC Cu (1x70mm²)	R63	630	50920		50931
T1N 160 F FC Cu (1x70mm²)	R80	800	50921		50932
T1N 160 F FC Cu (1x70mm²)	R100	1000	50922		50933
T1N 160 F FC Cu (1x70mm²)	R125	1250	50923		50934
T1N 160 F FC Cu (1x70mm²)	R160	1600	50924	50935	50938

Ordering codes

Power distribution circuit-breakers

T2N 160

Fixed (F)



Iu (40 °C) = 160 A - Icu (415 V) = 36 kA

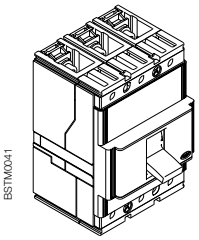
F = Front terminals		PR221 In	1SDA0.....R1 3 poles	1SDA0.....R1 4 poles	
Electronic release				N= 50%	N= 100%
T2N 160 F F	PR221DS-LS	10	51123		51128
T2N 160 F F	PR221DS-LS	25	51124		51129
T2N 160 F F	PR221DS-LS	63	51125		51130
T2N 160 F F	PR221DS-LS	100	51126		51131
T2N 160 F F	PR221DS-LS	160	51127	51132	51613
T2N 160 F F	PR221DS-I	10	51163		51169
T2N 160 F F	PR221DS-I	25	51164		51170
T2N 160 F F	PR221DS-I	63	51165		51171
T2N 160 F F	PR221DS-I	100	51166		51172
T2N 160 F F	PR221DS-I	160	51168	51173	51617

Note: The opening solenoid (SA) of the T2 circuit-breaker with PR221DS electronic release is housed in the right slot. When ordered, the set of auxiliary contacts for electronic T2 (1SDA0…R1) is available, consisting of:
1 open/closed contact for signalling electronic release trip
1 open/closed contact for signalling release trip
1 open/closed contact for signalling state of the circuit-breaker

F = Front terminals	In	I_3	1SDA0.....R1 3 poles	1SDA0.....R1 4 poles	
Thermomagnetic release				N= 50%	N= 100%
T2N 160 F F	R1.6	16	50940		50962
T2N 160 F F	R2	20	50941		50963
T2N 160 F F	R2.5	25	50942		50964
T2N 160 F F	R3.2	32	50943		50965
T2N 160 F F	R4	40	50944		50966
T2N 160 F F	R5	50	50945		50967
T2N 160 F F	R6.3	63	50946		50968
T2N 160 F F	R8	80	50947		50969
T2N 160 F F	R10	100	50948		50970
T2N 160 F F	R12.5	125	50949		50971
T2N 160 F F	R16	500	50950		50972
T2N 160 F F	R20	500	50951		50973
T2N 160 F F	R25	500	50952		50974
T2N 160 F F	R32	500	50953		50975
T2N 160 F F	R40	500	50954		50976
T2N 160 F F	R50	500	50955		50977
T2N 160 F F	R63	630	50956		50978
T2N 160 F F	R80	800	50957		50979
T2N 160 F F	R100	1000	50958		50980
T2N 160 F F	R125	1250	50959	50981	51115
T2N 160 F F	R160	1600	50960	50982	51116

T2S 160

Fixed (F)



Iu (40 °C) = 160 A - Icu (415 V) = 50 kA

F = Front terminals		PR221 In	1SDA0.....R1		
			3 poles	4 poles	
Electronic release				N= 50%	N= 100%
T2S 160 F F	PR221DS-LS	10	51133		51138
T2S 160 F F	PR221DS-LS	25	51134		51139
T2S 160 F F	PR221DS-LS	63	51135		51140
T2S 160 F F	PR221DS-LS	100	51136		51141
T2S 160 F F	PR221DS-LS	160	51137	51142	51614
T2S 160 F F	PR221DS-I	10	51174		51179
T2S 160 F F	PR221DS-I	25	51175		51180
T2S 160 F F	PR221DS-I	63	51176		51181
T2S 160 F F	PR221DS-I	100	51177		51182
T2S 160 F F	PR221DS-I	160	51178	51183	51618

Note: The opening solenoid (SA) of the T2 circuit-breaker with PR221DS electronic release is housed in the right slot. When ordered, the set of auxiliary contacts for electronic T2 (1SDA0…R1) is available, consisting of:
1 open/closed contact for signalling electronic release trip
1 open/closed contact for signalling release trip
1 open/closed contact for signalling state of the circuit-breaker

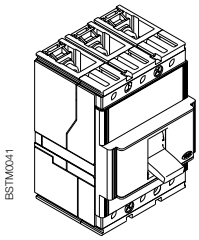
F = Front terminals	In	I_3	1SDA0.....R1		
			3 poles	4 poles	
Thermomagnetic release				N= 50%	N= 100%
T2S 160 F F	R1.6	16	50984		51006
T2S 160 F F	R2	20	50985		51007
T2S 160 F F	R2.5	25	50986		51008
T2S 160 F F	R3.2	32	50987		51009
T2S 160 F F	R4	40	50988		51010
T2S 160 F F	R5	50	50989		51011
T2S 160 F F	R6.3	63	50990		51012
T2S 160 F F	R8	80	50991		51013
T2S 160 F F	R10	100	50992		51014
T2S 160 F F	R12.5	125	50993		51015
T2S 160 F F	R16	500	50994		51016
T2S 160 F F	R20	500	50995		51017
T2S 160 F F	R25	500	50996		51018
T2S 160 F F	R32	500	50997		51019
T2S 160 F F	R40	500	50998		51020
T2S 160 F F	R50	500	50999		51021
T2S 160 F F	R63	630	51000		51022
T2S 160 F F	R80	800	51001		51023
T2S 160 F F	R100	1000	51002		51024
T2S 160 F F	R125	1250	51003	51025	51117
T2S 160 F F	R160	1600	51004	51026	51118

Ordering codes

Power distribution circuit-breakers

T2H 160

Fixed (F)



Iu (40 °C) = 160 A - Icu (415 V) = 70 kA

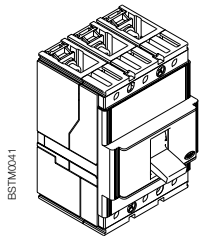
F = Front terminals		PR221 In	1SDA0.....R1		
			3 poles	4 poles	
Electronic release				N= 50%	N= 100%
T2H 160 F F	PR221DS-LS	10	51143		51148
T2H 160 F F	PR221DS-LS	25	51144		51149
T2H 160 F F	PR221DS-LS	63	51145		51150
T2H 160 F F	PR221DS-LS	100	51146		51151
T2H 160 F F	PR221DS-LS	160	51147	51152	51615
T2H 160 F F	PR221DS-I	10	51184		51189
T2H 160 F F	PR221DS-I	25	51185		51190
T2H 160 F F	PR221DS-I	63	51186		51191
T2H 160 F F	PR221DS-I	100	51187		51192
T2H 160 F F	PR221DS-I	160	51188	51193	51619

Note: The opening solenoid (SA) of the T2 circuit-breaker with PR221DS electronic release is housed in the right slot. When ordered, the set of auxiliary contacts for electronic T2 (1SDA0…R1) is available, consisting of:
1 open/closed contact for signalling electronic release trip
1 open/closed contact for signalling release trip
1 open/closed contact for signalling state of the circuit-breaker

F = Front terminals	In	I_3	1SDA0.....R1		
			3 poles	4 poles	
Thermomagnetic release				N= 50%	N= 100%
T2H 160 F F	R1.6	16	51028		51050
T2H 160 F F	R2	20	51029		51051
T2H 160 F F	R2.5	25	51030		51052
T2H 160 F F	R3.2	32	51031		51053
T2H 160 F F	R4	40	51032		51054
T2H 160 F F	R5	50	51033		51055
T2H 160 F F	R6.3	63	51034		51056
T2H 160 F F	R8	80	51035		51057
T2H 160 F F	R10	100	51036		51058
T2H 160 F F	R12.5	125	51037		51059
T2H 160 F F	R16	500	51038		51060
T2H 160 F F	R20	500	51039		51061
T2H 160 F F	R25	500	51040		51062
T2H 160 F F	R32	500	51041		51063
T2H 160 F F	R40	500	51042		51064
T2H 160 F F	R50	500	51043		51065
T2H 160 F F	R63	630	51044		51066
T2H 160 F F	R80	800	51045		51067
T2H 160 F F	R100	1000	51046		51068
T2H 160 F F	R125	1250	51047	51069	51119
T2H 160 F F	R160	1600	51048	51070	51120

T2L 160

Fixed (F)



Iu (40 °C) = 160 A - Icu (415 V) = 85 kA

F = Front terminals		PR221 In	1SDA0.....R1 3 poles	1SDA0.....R1 4 poles	
Electronic release				N= 50%	N= 100%
T2L 160 F F	PR221DS-LS	10	51153		51158
T2L 160 F F	PR221DS-LS	25	51154		51159
T2L 160 F F	PR221DS-LS	63	51155		51160
T2L 160 F F	PR221DS-LS	100	51156		51161
T2L 160 F F	PR221DS-LS	160	51157	51162	51162
T2L 160 F F	PR221DS-I	10	51194		51199
T2L 160 F F	PR221DS-I	25	51195		51200
T2L 160 F F	PR221DS-I	63	51196		51201
T2L 160 F F	PR221DS-I	100	51197		51202
T2L 160 F F	PR221DS-I	160	51198	51203	51620

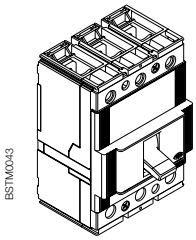
Note: The opening solenoid (SA) of the T2 circuit-breaker with PR221DS electronic release is housed in the right slot. When ordered, the set of auxiliary contacts for electronic T2 (1SDA0…R1) is available, consisting of:
1 open/closed contact for signalling electronic release trip
1 open/closed contact for signalling release trip
1 open/closed contact for signalling state of the circuit-breaker

F = Front terminals	In	I_3	1SDA0.....R1 3 poles	1SDA0.....R1 4 poles	
Thermomagnetic release				N= 50%	N= 100%
T2L 160 F F	R1.6	16	51072		51094
T2L 160 F F	R2	20	51073		51095
T2L 160 F F	R2.5	25	51074		51096
T2L 160 F F	R3.2	32	51075		51097
T2L 160 F F	R4	40	51076		51098
T2L 160 F F	R5	50	51077		51099
T2L 160 F F	R6.3	63	51078		51100
T2L 160 F F	R8	80	51079		51101
T2L 160 F F	R10	100	51080		51102
T2L 160 F F	R12.5	125	51081		51103
T2L 160 F F	R16	500	51082		51104
T2L 160 F F	R20	500	51083		51105
T2L 160 F F	R25	500	51084		51106
T2L 160 F F	R32	500	51085		51107
T2L 160 F F	R40	500	51086		51108
T2L 160 F F	R50	500	51087		51109
T2L 160 F F	R63	630	51088		51110
T2L 160 F F	R80	800	51089		51111
T2L 160 F F	R100	1000	51090		51112
T2L 160 F F	R125	1250	51091	51113	51121
T2L 160 F F	R160	1600	51092	51114	51122

Ordering codes

Power distribution circuit-breakers

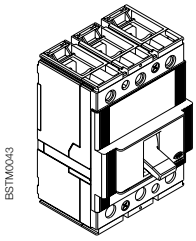
T3N 250
Fixed (F)



Iu (40 °C) = 250 A - Icu (415 V) = 36 kA

F = Front terminals	In	I_3	1SDA0.....R1		
			3 poles	4 poles	
Thermomagnetic release				N= 50%	N= 100%
T3N 250 F F	R63	630	51241		51252
T3N 250 F F	R80	800	51242		51253
T3N 250 F F	R100	1000	51243		51254
T3N 250 F F	R125	1250	51244	51255	51303
T3N 250 F F	R160	1600	51245	51256	51304
T3N 250 F F	R200	2000	51246	51257	51305
T3N 250 F F	R250	2500	51247	51258	51306

T3S 250
Fixed (F)



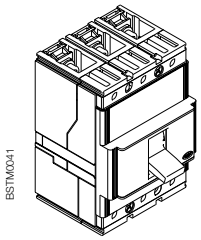
Iu (40 °C) = 250 A - Icu (415 V) = 50 kA

F = Front terminals	In	I_3	1SDA0.....R1		
			3 poles	4 poles	
Thermomagnetic release				N= 50%	N= 100%
T3S 250 F F	R63	630	51263		51274
T3S 250 F F	R80	800	51264		51275
T3S 250 F F	R100	1000	51265		51276
T3S 250 F F	R125	1250	51266	51277	51307
T3S 250 F F	R160	1600	51267	51278	51308
T3S 250 F F	R200	2000	51268	51279	51309
T3S 250 F F	R250	2500	51269	51280	51310

Ordering codes

Motor protection circuit-breakers

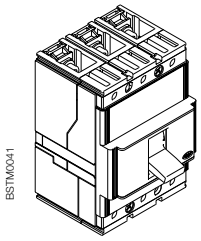
T2N 160
Fixed (F)



Iu (40 °C) = 160 A - Icu (415 V) = 36 kA

F = Front terminals		I_3	1SDA0.....R1 3 poles
Magnetic release			
T2N 160 F F	R1	13	53110
T2N 160 F F	R1.6	21	53111
T2N 160 F F	R2	26	53112
T2N 160 F F	R2.5	33	53113
T2N 160 F F	R3.2	42	53114
T2N 160 F F	R4	52	53115
T2N 160 F F	R5	65	53116
T2N 160 F F	R6.5	84	53117
T2N 160 F F	R8.5	110	53118
T2N 160 F F	R11	145	53119
T2N 160 F F	R12.5	163	53120
T2N 160 F F	R20	120...240	51207
T2N 160 F F	R32	92...384	51208
T2N 160 F F	R52	14...624	51209
T2N 160 F F	R80	480...960	51210
T2N 160 F F	R100	600...1200	51211

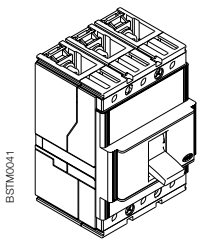
T2S 160
Fixed (F)



Iu (40 °C) = 160 A - Icu (415 V) = 50 kA

F = Front terminals		I_3	1SDA0.....R1 3 poles
Magnetic release			
T2S 160 F F	R1	13	53121
T2S 160 F F	R1.6	21	53122
T2S 160 F F	R2	26	53123
T2S 160 F F	R2.5	33	53124
T2S 160 F F	R3.2	42	53125
T2S 160 F F	R4	52	53126
T2S 160 F F	R5	65	53127
T2S 160 F F	R6.5	84	53128
T2S 160 F F	R8.5	110	53129
T2S 160 F F	R11	145	53130
T2S 160 F F	R12.5	163	53131
T2S 160 F F	R20	120...240	51216
T2S 160 F F	R32	192...384	51217
T2S 160 F F	R52	314...624	51218
T2S 160 F F	R80	480...960	51219
T2S 160 F F	R100	600...1200	51220

T2H 160
Fixed (F)



Iu (40 °C) = 160 A - Icu (415 V) = 70 kA

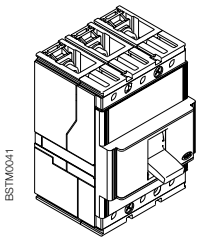
F = Front terminals		I_3	1SDA0.....R1 3 poles
Magnetic release			
T2H 160 F F	R1	13	53132
T2H 160 F F	R1.6	21	53133
T2H 160 F F	R2	26	53134
T2H 160 F F	R2.5	33	53135
T2H 160 F F	R3.2	42	53136
T2H 160 F F	R4	52	53137
T2H 160 F F	R5	65	53138
T2H 160 F F	R6.5	84	53139
T2H 160 F F	R8.5	110	53140
T2H 160 F F	R11	145	53141
T2H 160 F F	R12.5	163	53142
T2H 160 F F	R20	120...240	51224
T2H 160 F F	R32	192...384	51225
T2H 160 F F	R52	314...624	51226
T2H 160 F F	R80	480...960	51227
T2H 160 F F	R100	600...1200	51228

Ordering codes

Motor protection circuit-breakers

T2L 160

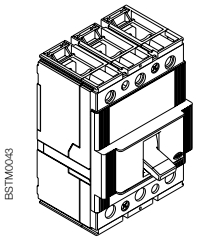
Fixed (F)



Iu (40 °C) = 160 A - Icu (415V) = 85 kA

F = Front terminals		I_3	1SDA0.....R1 3 poles
Magnetic release			
T2L 160 F F	R1	13	53143
T2L 160 F F	R1.6	21	53144
T2L 160 F F	R2	26	53145
T2L 160 F F	R2.5	33	53146
T2L 160 F F	R3.2	42	53147
T2L 160 F F	R4	52	53148
T2L 160 F F	R5	65	53149
T2L 160 F F	R6.5	84	53150
T2L 160 F F	R8.5	110	53151
T2L 160 F F	R11	145	53152
T2L 160 F F	R12.5	163	53153
T2L 160 F F	R20	120...240	51232
T2L 160 F F	R32	192...384	51233
T2L 160 F F	R52	314...624	51234
T2L 160 F F	R80	480...960	51235
T2L 160 F F	R100	600...1200	51236

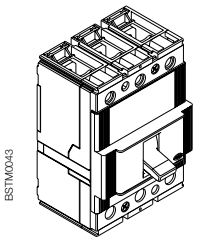
T3N 250
Fixed (F)



Iu (40 °C) = 250 A - Icu (415 V) = 36 kA

F = Front terminals			1SDA0.....R1 3 poles
Magnetic release			
T3N 250 F F	R100	600...1200	51315
T3N 250 F F	R125	750...1500	51316
T3N 250 F F	R160	960...1920	51317
T3N 250 F F	R200	1200...2400	51318

T3S 250
Fixed (F)



Iu (40 °C) = 250 A - Icu (415 V) = 50 kA

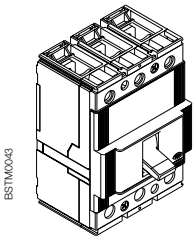
F = Front terminals			1SDA0.....R1 3 poles
Magnetic release			
T3S 250 F F	R100	600...1200	51320
T3S 250 F F	R125	750...1500	51321
T3S 250 F F	R160	960...1920	51322
T3S 250 F F	R200	1200...2400	51323

Ordering codes

Switch-disconnectors

T1D 160

Fixed (F)

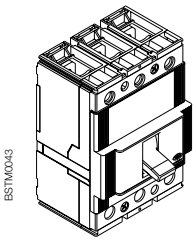


Iu (40 °C) = 160 A - Icw = 2 kA

FC Cu = Front terminals for copper cables	1SDA0.....R1	
	3 poles	4 poles
T1D 160 F FC Cu (1x70mm²)	51325	51326

T3D 250

Fixed (F)



Iu (40 °C) = 250 A - Icw = 3.6 kA

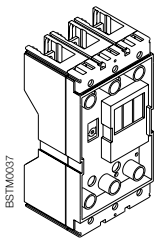
F = Front terminals	1SDA0.....R1	
	3 poles	4 poles
T3D 250 F F	51327	51328

Ordering codes

Fixed parts

T2

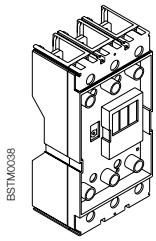
Plug-in (P) Fixed part



FC = Front terminals	1SDA0.....R1	
	3 poles	4 poles
T2 P FP F	51329	51330

T3

Plug-in (P) Fixed part



FC = Front terminals	1SDA0.....R1	
	3 poles	4 poles
T3 P FP F	51331	51332

Conversion of the version

Conversion kit from fixed into moving part of plug-in

Type	1SDA0.....R1
Kit MP T2 3p	51411
Kit MP T2 4p	51412
Kit MP T3 3p	51413
Kit MP T3 4p	51414

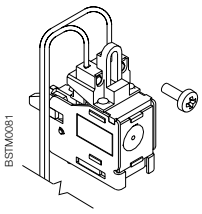
Note: The plug-in version must be composed as follows:

1) Fixed circuit-breaker
2) Conversion kit from fixed into moving part of plug-in
3) Fixed part of plug-in

Ordering codes

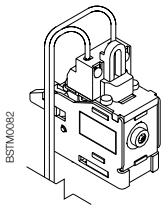
Accessories

Services releases



Shunt opening release - SOR

Type	1SDA0.....R1
uncabled version	
SOR 12 V DC	53000
SOR 24…30 V AC / DC	51333
SOR 48...60 V AC / DC	51334
SOR 110...127 V AC - 110...125 V DC	51335
SOR 220...240 V AC - 220...250 V DC	51336
SOR 380...440 V AC	51337
SOR 480...500 V AC	51338
cabled version	
SOR-C 12 V DC	53001
SOR-C 24…30 V AC / DC	51339
SOR-C 48...60 V AC / DC	51340
SOR-C 110...127 V AC - 110...125 V DC	51341
SOR-C 220...240 V AC - 220...250 V DC	51342
SOR-C 380...440 V AC	51343
SOR-C 480...500 V AC	51344
SOR-C 480...500 V AC	51344



Undervoltage release - UVR

Type	1SDA0.....R1
uncabled version	
UVR 24…30 V AC / DC	51345
UVR 48 V AC / DC	51346
UVR 60 V AC/DC	52333
UVR 110...127 V AC - 110...125 V DC	51347
UVR 220...240 V AC - 220…250 V DC	51348
UVR 380...440 V AC	51349
UVR 480...500 V AC	51350
cabled version	
UVR-C 24…30 V AC / DC	51351
UVR-C 48 V AC / DC	51352
UVR-C 60 V AC/DC	52335
UVR-C 110...127 V AC - 110...125 V DC	51353
UVR-C 220...240 V AC - 220…250 V DC	51354
UVR-C 380...440 V AC	51355
UVR-C 480...500 V AC	51356

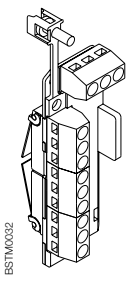
Time delay device for undervoltage release - UVD

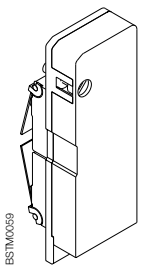
Type	1SDA0.....R1
UVD 24 V AC / DC	51357
UVD 48 V AC / DC	51358
UVD 60 V AC / DC	51359
UVD 110...125 V AC / DC	51360
UVD 220...250 V AC / DC	51361

Connectors for service releases

Type	1SDA0.....R1
Socket-plug connectors 12 poles	51362
Socket-plug connectors 6 poles	51363
Socket-plug connectors 3 poles	51364
Kit 12 cables L=2m for AUX	51365
Kit 6 cables L=2m for AUX	51366
Kit 2 cables L=2m for SOR-UVR	51367

Electrical signals

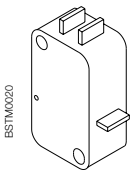




Auxiliary contacts - AUX

Type	1SDA0.....R1
uncabled version [1]	
AUX 1Q 1SY - 1 open/closed change-over and 1 release tripped change-over	51368
AUX 3Q 1SY - 3 open/closed change-over and 1 release tripped change-over	51369
cabled version [1]	
AUX-C 1Q 1SY - 1 open/closed change-over and 1 release tripped change-over	51370
AUX-C 3Q 1SY - 3 open/closed change-over and 1 release tripped change-over	51371
cabled version for T2 with PR221DS release	
AUX-C 1S51 1Q SY – 1 change-over device for electronic release tripped, 1 change-over device for release tripped and 1 open/closed change-over device	53704

[1] These cannot be combined with the circuit-breakers fitted with PR221DS electronic releases.



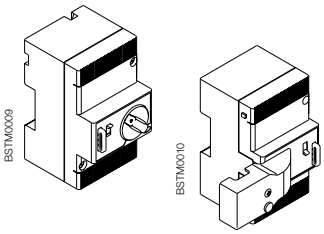
Position contacts for fixed part - AUP

Type	1SDA0.....R1
AUP T2-T3 - 1 contact signalling circuit-breaker racked-in	51372

Accept contacts and connectors - AUE

Type	1SDA0.....R1
AUE - 2 early contacts	51374

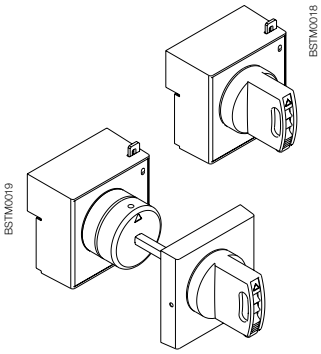
Motor operator



Solenoid operator - MOS

Type	1SDA0.....R1
Superimposed MOS 48...60 V DC	51376
Superimposed MOS 110...250 V DC	51377
Note: it is always fitted with plug-socket	
Side-by-side MOS T1-T2 48...60 V DC	51379
Side-by-side MOS T1-T2 110...250 V AC / DC	51380
Note: it is always fitted with crimped cables	

Rotary handle operating mechanism



Direct - RHD

Type	1SDA0.....R1
normal RHD	51381
emergency RHD_EM	51382

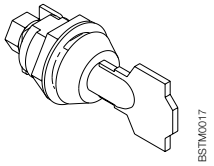
Transmitted - RHE

Type	1SDA0.....R1
Normal RHE	51383
Emergency RHE_EM	51384
Single components	
RHE_B base only for RHE	51385
RHE_S 500mm rod only for RHE	51386
RHE_H handle only for RHE	51387
RHE_H_EM emergency handle only for RHE	51388

IP54 protection for rotary handle

Type	1SDA0.....R1
RHE-IP54 protection kit IP54	51392

Operating mechanism and locks

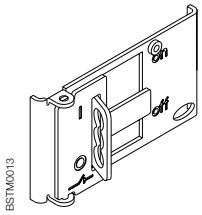


Key lock for rotary handle - RHL

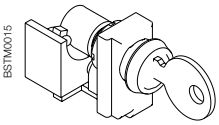
Type	1SDA0.....R1
RHL - different keys for each circuit-breaker/in open position	51389
RHL - same keys for groups of circuit-breakers/in open position	51390
RHL - different keys for each circuit-breaker/in open-closed position	52021

Ordering codes

Accessories



BSTM0013



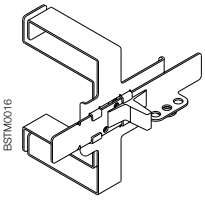
BSTM0015

Padlock lever lock - PLL

Type	1SDA0.....R1
PLL - in open position	51393
PLL - in open/closed position	51394

"Ronis" key lock in open position on the circuit-breaker - KLC [1]

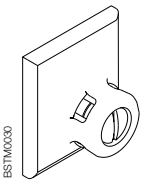
Type	1SDA0.....R1
standard version	
KLC keys – the same key for sets of circuit-breakers – T1	53528
KLC keys – the same key for sets of circuit-breakers – T2	53529
KLC keys – the same key for sets of circuit-breakers – T3	53530
version with key removable in both positions	
KLC-S keys – the same key for sets of circuit-breakers – T1	51395
KLC-S keys – the same key for sets of circuit-breakers – T2	52015
KLC-S keys – the same key for sets of circuit-breakers – T3	52016



BSTM0016

Mechanical interlock between two circuit-breakers - MIF

Type	1SDA0.....R1
MIF front interlocking plate between 2 circuit-breakers	51396
MIF front interlocking plate between 3 circuit-breakers	52165

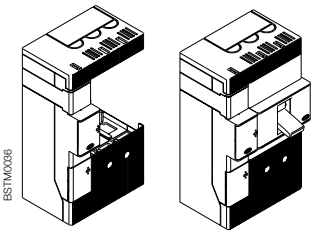


BSTM0030

Sealable lock of thermal adjustment

Type	1SDA0.....R1
TMD release anti-adjustment seal	51397

Residual current releases



BSTM0036

SACE RC221, SACE RC222

Type	1SDA0.....R1
RC221/1 for T1 3p fixed	51398
RC222/1 for T1 3p fixed	51400
RC221/1 for T1 4p fixed	51401
RC222/1 for T1 4p fixed	51402
RC221/2 for T2 3p fixed	51403
RC222/2 for T2 3p fixed	51404
RC221/2 for T2 4p fixed	51405
RC222/2 for T2 4p fixed	51406
RC221/3 for T3 3p fixed	51407
RC222/3 for T3 3p fixed	51408
RC221/3 for T3 4p fixed	51409
RC222/3 for T3 4p fixed	51410

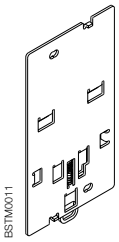
Note: The TMax circuit-breakers, combined with the RC221 or RC222 residual current releases, must, as compulsory, have the FC Cu terminal 1/2 kit mounted underneath. The residual current releases for T2 and T3 circuit-breakers are always supplied complete the with FCCu terminal kit.

SACE RCQ

Type	1SDA0.....R1
relay and closed toroid - diameter 60 mm	37388
relay and closed toroid - diameter 110 mm	37389
relay and toroid which can be opened - diameter 110 mm	37390
relay and toroid which can be opened - diameter 180 mm	37391
relay and toroid which can be opened - diameter 230 mm	37392
relay only	37393
closed toroid only - diameter 60 mm	37394
closed toroid only - diameter 110 mm	37395
toroid which can be opened only - diameter 110 mm	37396
toroid which can be opened only - diameter 180 mm	37397
toroid which can be opened only - diameter 230 mm	37398

[1] It cannot be mounted when there is a front operating mechanism, a rotary handle operating mechanism, motor operator, or RC221/RC222 residual current releases and, only in the case of three-pole circuit-breakers, with the service releases (UVR, SOR).

Installation accessories



Bracket for fixing onto DIN rail

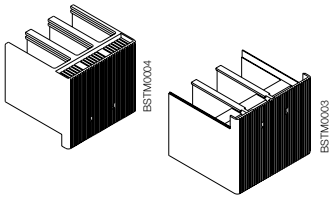
Type	1SDA0.....R1
DIN50022 T1-T2	51437
DIN50022 T3	51439
DIN50022 T1 - T2 for RC221/RC222	51937
DIN50022 T3 for RC221/RC222	51938
DIN50022 T1 -T2 for MOS side-by-side	51939

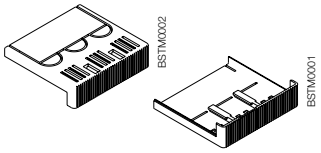
Accessories for electronic over-current releases

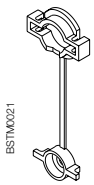
TT1 test unit

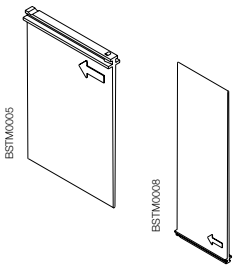
Type	1SDA0.....R1
TT1 - Test unit for T2 with PR221DS	37121

Connection terminals









High insulating terminal covers - HTC

Type	1SDA0.....R1
HTC T1 3p	51415
HTC T1 4p	51416
HTC T2 3p	51417
HTC T2 4p	51418
HTC T3 3p	51419
HTC T3 4p	51420

Low insulating terminal covers - LTC

Type	1SDA0.....R1
LTC T1 3p	51421
LTC T1 4p	51422
LTC T2 3p	51423
LTC T2 4p	51424
LTC T3 3p	51425
LTC T3 4p	51426

IP40 front protections for screw terminals - STC

Type	1SDA0.....R1
STC T1 3p	51431
STC T1 4p	51432
STC T2 3p	51433
STC T2 4p	51434
STC T3 3p	51435
STC T3 4p	51436

Sealable screws for terminal covers

Type	1SDA0.....R1
Sealable screws	51504

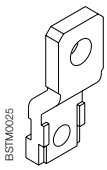
Separating partitions - PB

Type	1SDA0.....R1
PB100 low (H=100mm) - 4 pieces	51427
PB100 low (H=100mm) - 6 pieces	51428
PB200 high (H=200mm) - 4 pieces	51429
PB200 high (H=200mm) - 6 pieces	51430

Ordering codes

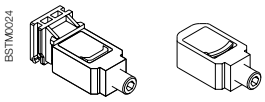
Accessories

Front extended terminals - EF



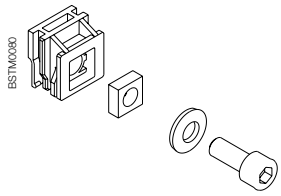
Type	1SDA0.....R1
EF T1 - 6 pieces	51440
EF T1 - 8 pieces	51441
EF T1 - 3 pieces	51442
EF T1 - 4 pieces	51443
EF T2 - 6 pieces	51464
EF T2 - 8 pieces	51465
EF T2 - 3 pieces	51466
EF T2 - 4 pieces	51467
EF T3 - 6 pieces	51488
EF T3 - 8 pieces	51489
EF T3 - 3 pieces	51490
EF T3 - 4 pieces	51491

Front terminals for copper-aluminium cables - FC CuAl



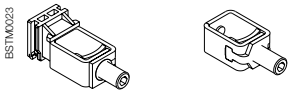
Type	1SDA0.....R1
FC CuAl 95mm² T1 - 6 pieces - external terminal	51444
FC CuAl 95mm² T1 - 8 pieces - external terminal	51445
FC CuAl 95mm² T1 - 3 pieces - external terminal	51446
FC CuAl 95mm² T1 - 4 pieces - external terminal	51447
FC CuAl T2 95mm² - 6 pieces	51456
FC CuAl T2 95mm² - 8 pieces	51457
FC CuAl T2 95mm² - 3 pieces	51458
FC CuAl T2 95mm² - 4 pieces	51459
FC CuAl T2 185mm² - 6 pieces - external terminal	51460
FC CuAl T2 185mm² - 8 pieces - external terminal	51461
FC CuAl T2 185mm² - 3 pieces - external terminal	51462
FC CuAl T2 185mm² - 4 pieces - external terminal	51463
FC CuAl 185mm² T3 - 6 pieces	51484
FC CuAl 185mm² T3 - 8 pieces	51485
FC CuAl 185mm² T3 - 3 pieces	51486
FC CuAl 185mm² T3 - 4 pieces	51487
FC CuAl 140…240mm² T3 - 3 pieces - external terminal	51940
FC CuAl 140…240mm² T3 - 4 pieces - external terminal	51941
FC CuAl 140…240mm² T3 - 6 pieces - external terminal	51942
FC CuAl 140…240mm² T3 - 8 pieces - external terminal	51943

Front terminals - F [1]



Type	1SDA0.....R1
F T2 - 6 pieces - Plugs with screws	51448
F T2 - 8 pieces - Plugs with screws	51449
F T2 - 3 pieces - Plugs with screws	51450
F T2 - 4 pieces - Plugs with screws	51451
F T3 - 6 pieces - Plugs with screws	51476
F T3 - 8 pieces - Plugs with screws	51477
F T3 - 3 pieces - Plugs with screws	51478
F T3 - 4 pieces - Plugs with screws	51479

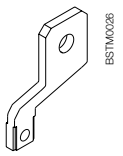
Front terminals for copper cables - FC Cu



Type	1SDA0.....R1
FC Cu T2 - 6 pieces	51452
FC Cu T2 - 8 pieces	51453
FC Cu T2 - 3 pieces	51454
FC Cu T2 - 4 pieces	51455
FC Cu T3 - 6 pieces	51480
FC Cu T3 - 8 pieces	51481
FC Cu T3 - 3 pieces	51482
FC Cu T3 - 4 pieces	51483

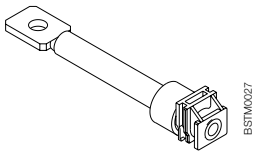
[1] To be requested as loose kit.

Front extended spread terminals - ES



Type	1SDA0.....R1
ES T2 - 6 pieces	51468
ES T2 - 8 pieces	51469
ES T2 - 3 pieces	51470
ES T2 - 4 pieces	51471
ES T3 - 6 pieces	51492
ES T3 - 8 pieces	51493
ES T3 - 3 pieces	51494
ES T3 - 4 pieces	51495

Rear orientated terminals - R



Type	1SDA0.....R1
R T2 - 6 pieces	51472
R T2 - 8 pieces	51473
R T2 - 3 pieces	51474
R T2 - 4 pieces	51475
R T3 - 6 pieces	51496
R T3 - 8 pieces	51497
R T3 - 3 pieces	51498
R T3 - 4 pieces	51499

Kit for taking up voltage for auxiliaries

Type	1SDA0.....R1
AuxV T2 - 3 pieces	51500
AuxV T2 - 4 pieces	51501
AuxV T3 - 3 pieces	51502
AuxV T3 - 4 pieces	51503

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

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