ABB SACE molded case circuit breakers

UL 489 and CSA C22.2 Standard

Preliminary - 1SDC210003D0201





ABB



molded case circ

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off

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COMPLETE AND PERFECTLY INTEGRATED

In the range of molded case circuit breakers conforming with the UL 489 and CSA C22.2 Standard, ABB SACE proposes an entire range which covers continuous current ratings between 15 A and 2500 A and interrupting ratings, at 480 V AC, which can reach 100 kA.

The ranges available are as follows:

- circuit breakers for power distribution (fitted with thermomagnetic or electronic trip units starting from 100 A)
- circuit breakers with adjustable magnetic only trip units for motor protection (MCP: Motor Control Protection)
- molded case switches for use as isolators or switching devices for lines, busbars or parts of a plant (MCS: Molded Case Switch)

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

uit breakers

ABB





480 V

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

COMPACT DIMENSIONS

4

0 ...

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

4

SACE S8

1SDC210589F

DOUBLE INSULATION*

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

* Exception for the SACE Isomax S8.



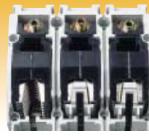
TMAX T1. THE LITTLE ONE THAT'S

SMALLER OVERALL DIMENSIONS AND HIGH PERFORMANCES

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 (100 A - up to 22 kA at 480 V AC), the overall dimensions of the apparatus are notably smaller. Moreover, 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 100 A, with a service voltage of 277 V AC.





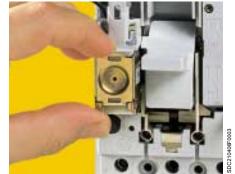
NEW ARCING CHAMBERS

Like the other two Tmax circuit breakers, the arcing chambers are manufactured using a gasifying material and an innovative construction system. The new chambers mean the arc extinction

time can be reduced, thereby guaranteeing high short-circuit current limitation.

DOUBLE INSULATION

Only ABB SACE manufactures small-sized molded case circuit breakers with double insulation. Yet another guarantee of safety, not only for the person building the switchboard, but also for the users.



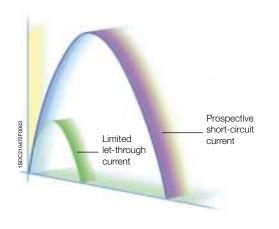
EVERY TYPE OF DISTRIBUTION SYSTEM

Tmax T1 is the smallest circuit breaker with high performances (22 kA) at 480 V AC. Thanks to its electrical characteristics, this circuit breaker can be used with Y or Delta distribution systems. This is a great advantage in terms of flexibility for its various installation applications.

REALLY BIG.

HIGH LIMITATION

Thanks to its high performances, Tmax T1, as well as T2 and T3, is used with great advantages in all the applications where a high limitation of the value of the specific let-through energy and the peak of the short circuit-current allows a smaller size of cables, busbars and all the devices on the loadside of the circuit breaker.



ACCESSORIES

The same accessories as the other two circuit breakers in the family can be mounted on Tmax T1, with great benefits in terms of reduced stock and simple selection. Even the details have not been overlooked, such as the new flange (ABB SACE patent) which avoids securing with screws on the door and compensates any defects in sheet punching.



TMAX T2. INTELLIGENCE AND HIGH PERFOR

INTERRUPTING RATING

SDC210414F0003



Tmax T2 is the only 100 A circuit breaker available with such high performances in such very limited overall dimensions. An interrupting rating of 65 kA at 480 V AC can be achieved.

DOUBLE BREAKING

Tmax T2 uses the double breaking system with "forked" moving contacts. It is thanks to the use of this advanced breaking tech-

nique that such high currentlimiting performances can be obtained with such small overall dimensions. Apart from guaranteeing a high degree of protection, these performances mean better (and therefore more economical) sizing of the devices and cables installed on the load side.



SDC210408F0003



MANCE IN THE PALM OF YOUR HAND.

TRIP UNITS

Tmax T2 can be fitted with a trip unit of the latest technology. This is the first time that a circuit breaker of this size can be equipped with an electronic protection, which adds such a wide and varied possibility of



(BOCS10408-LOODS)

settings to the high performances, providing unequalled flexibility of use. Moreover, Tmax T2 is available with the thermomagnetic trip unit.



SELECTIVITY

The performances and large selection of curves with the electronic release considerably widen the selectivity functions of the Tmax T2 circuit breaker towards the load side of the system.

MCP: MOTOR CONTROL Protection

Tmax T2-MCP allows particularly advantageous coordinations for motor protection.





TMAX T3. 225 A IN A DEPTH OF 2.76

AN ABB SACE ACHIEVEMENT

The first circuit breaker which carries 225 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 product because until now no one had managed to "physically" contain such high performances while still guaranteeing safety and reliability.

SIMPLIFIED INSTALLATION



The notable reduction in the overall dimensions is immediately converted into installation advantages. In particular, the 2.76 inches (70 mm) depth takes Tmax T3 to the same standard as the two smaller

sizes, allowing standardization of the mounting supports. This means that, from now on, even a 225 A circuit breaker can be installed on a 35 mm DIN rail.



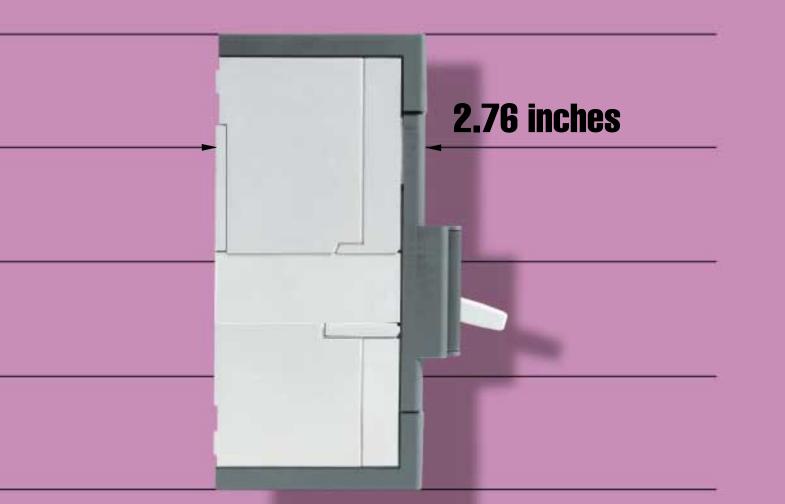
SWITCHBOARDS WITH REDUCED DEPTH

With Tmax T3, the reduced depth of the apparatus means being able to select switchboards with smaller overall dimensions, with obvious benefits in costs as well as size and aesthetics.

MCP: MOTOR Control Protection

Tmax T3-MCP also allows coordination for motor protection.





INCHES FOR THE FIRST TIME.

FEWER STOCK CODES, Standardisation of slots

Standardization of the front of the Tmax T3 circuit breaker with that of the other two circuit breakers in the family means the doors cut out can be highly standardized, with components of switchboards commonly used on the market.

TERMINALS

Even more standardization in the terminals and even greater uniformity, for easier stock management and simplified selection. From this viewpoint, ABB SACE offers for the first

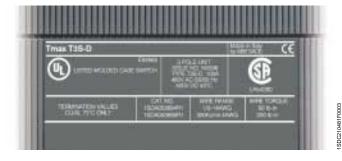
time the same terminals for both the versions, fixed and plug-in.

Moreover, the terminals of the three sizes are comparable with those of the higher-sized circuit breakers with regard to their connection capacity.



MCS: MOLDED CASE SWITCH

The T1N-D and T3S-D molded case switches are available for use as isolators or switching devices for lines, busbars or circuit breakers in parts of a plant.





100% UL RATED CIRCUIT BREAKERS



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

FROM 150 A TO 2500 A

SACE ISOMAX S3 UP TO 600 V

For applications at 600 V, ABB SACE offers a wide choice of circuit breakers with Icu interrupting ratings from 14 kA to 85 kA at 600 V AC.

The SACE Isomax S3 circuit breaker, in the 150 A frame, can already be used at 600 V AC providing excellent performances in terms of interrupting rating.

The possibility of having circuit breakers certified for use at this voltage, allows perfect standardization of the apparatus both on the US and the Canadian market, where 600 V is most widely used.

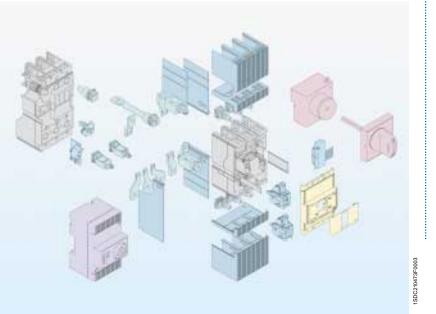




WITH SACE ISOMAX S

MAXIMUM VERSATILITY

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



COMPLETE RANGE OF ACCESSORIES

SACE Isomax S circuit breakers are complemented by a complete range of accessories to satisfy the widely differing operational and automation requirements.

Accessories are standardized for groups of circuit breakers to streamline storage logistics and simplify installation. SACE Isomax S can be customized as required under conditions of absolute safety. All the accessories can be mounted with simple operations without exposing the main contacts (except for the SACE Isomax S8).

UL 489 CSA C22.2

Circuit breakers				T1 1P	T1	T2	T3	
Continuous current rating	J		[A]	100	100	100	225	
Number of poles			[Nr]	1	3/4	3/4	3/4	
Rated voltage	AC ((50-60Hz)	[V]	277	480	480	480	
	DC		[V]		500		500	
Interrupting ratings				В	Ν	S H	N S	
	AC	240 V	[kA]		50 ⁽²⁾	65 100	50 65	
		277 V	[kA]	18(1)				
		480 V	[kA]		22 ⁽²⁾	35 65	25 35	
	1	600 V	[kA]					
	DC	250 V 2 poles in series	[kA]		25		25 35	
		500 V 3 poles in series	[kA]		25		25 35	
		500 V 2 poles in series	[kA]					
		600 V 3 poles in series	[kA]					
Trip units		TMF/TMD						
		ELT						
		MA						
Versions		MCCB						
		MCS						
		MCP						

IEC 60947-2

Circuit breakers				T1 1P		T1			Т	2		Т	3	
Rated uninterrupted current,	lu		[A]	160		160			10	60		2	50	
Number of poles			[Nr]	1		3/4			3	/4		3	/4	
Rated service voltage, Ue A	C (50-60Hz)		[V]	240		690			6	90		6	90	
Γ	C		[V]	125		500			5	00		5	00	
Rated ultimate short circuit b	preaking capac	city, Icu		В	В	С	Ν	Ν	S	н	L	Ν	S	
A	C (50-60 Hz)	220/230 V	[kA]	25	25	40	50	65	85	100	120	50	85	
		380/415 V	[kA]		16	25	36	36	50	70	85	36	50	
		440 V	[kA]		10	15	22	30	45	55	75	25	40	
		500 V	[kA]		8	10	15	25	30	36	50	20	30	
		690 V	[kA]		3	4	6	6	7	8	10	5	8	
[C 250 V 2 po	les in series	[kA]		16	25	36	36	50	70	85	36	50	
	250 V 3 po	les in series	[kA]		20	30	40	40	55	85	100	40	55	
	500 V 2 po	les in series	[kA]											
	500 V 3 po	les in series	[kA]		16	25	36	36	50	70	85	36	50	
	750 V 3 po	les in series	[kA]											
Releases		TMF		•										
		TMD												
		ELT												
		MF												
		MA												
Dimensions		H [i	n/mm]	5.12/130	5	.12/13	0		5.12	/130		5.9	/150	
		W 1p or 3p [i	n/mm]	1/25.4		3/76			3.54	/90		4.13	/105	
		W 4p [i	n/mm]			4/102			4.72	/120		5.51	/140	
		D [i	n/mm]	2.76/70	2	.76/70)		2.76	6/70		2.7	6/70	
Mechanical life		[No.oper	ations]	25000	:	25000			250	000		25	000	
	[N	o. Hourly oper	ations]	240		240			24	10		1	20	
Electrical life @415V AC		[No.oper	ations]	8000		8000			80	00		80	000	
	[N	o. Hourly oper	ations]	120		120			12	20		1	20	

TMF = Thermomagnetic fixed TMD = Thermomagnetic adjustable

MF = Magnetic fixed MA = Magnetic adjustable

ELT= Electronic microprocessor-based

 $^{(1)}$ In 15 A = 10 kA @ 277 V AC $^{(2)}$ In 15 A = 35 kA @ 240 V AC, 14 kA @ 277/480 V AC $^{(3)}$ In 15 A and 30 A = 65 kA @ 480 V AC

	S3 15	50		S 3	225			S4			S 5			S 6		S 7	S 8
	150			22	25			250			400			800		1200	1600,2000,2500
	2/3/4	1		2/3	3/4			2/3/4			2/3/4			2/3/4		2/3/4	3
	600		240		480			600			600			600		600	600
	600			50	00						600			600			
N	н	L	В	Ν	н	L	Ν	н	L	Ν	н	L	Ν	н	L	Н	V
65	100	150	150	65	100	150	65	150	200	65	150	200	65	150	200	100	125
25	50	85 ⁽³⁾		25	50	65	25	65	100	35	65	100	50	65	100	65	100
14	14	25					18	22	35	22	22	35	25	35	42	50	85
35	50	65	50	20	35	50				35	50	65	35	50	65		
20	35	50								20	35	50	20	35	50		
																	•

	S 3			S 4			S 5			S	6			S 7			S 8	
1	160/250)		160/25	0	4	100/63	0		630	/800		12	250/16	00	2000/2	2500/320	00
	3/4			3/4			3/4			3	/4			3/4			3/4	
	690			690			690			69	90			690			690	
	750						750			7	50							
N	н	L	N	н	L	Ν	н	L	Ν	S	н	L	S	н	L	Н	v	
65	100	170	65	100	200	65	100	200	65	85	100	200	85	100	200	85	120	
35	65	85	35	65	100	35	65	100	35	50	65	100	50	65	100	85	120	
30	50	65	30	50	80	30	50	80	30	45	50	80	40	55	80	70	100	
25	40	50	25	40	65	25	40	65	25	35	40	65	35	45	70	50	70	
14	18	20	18	22	30	20	25	30	20	22	25	30	20	25	35	40	50	
35	65	85				35	65	100	35	50	65	100						
35	50	65				35	50	65	20	35	50	65						
20	35	50				20	35	50	16	20	35	50						
16	6.69/17	'0		10/254	1		10/25	4		10.5	5/268		1:	5.98/4	106	15.	75/400	
4	.13/10	5		4.13/10	5	5	.51/14	40		8.27	/210		6	3.27/2	10	15.	98/406	
5	.51/14	0	:	5.51/14	0	7	.24/18	34		11.02	2/280		1	1.02/2	280	21.	89/556	
4.0	07/103	.5	4	.07/103	3.5	4.	07/10	3.5		4.07/	103.5		5.	45/13	8.5	9.9	53/242	
	25000			20000			20000)		20	000			1000	0	1	0000	
	120			120			120			1:	20			120			20	
100	000(160)A)-	10	000 (16	0A)-	700	00 (40	0A)-		7000 (630A)	-	700	0 (12	50A)-	2500	(2500A)	-
80	00(250	A)	80)00 (25	0A)	50	00 (63	(A0		5000	(800A))	500	00 (16	00A)	1500	(3200A)
	120			120			60			6	0			20			2500A) - (3200A)	

Molded case circuit breakers for specific applications in accordance with IEC 60947-2 Standard







		Tmax T1	Tmax T2	Tmax T3
	Current-limiting circuit breakers		T2L	
	Poles		3/4	
	lu [A]		160	
	Ue [V]		690	
11	Icu @ 380/415 V [kA]		85	
	Icu @ 440 V [kA]		75	
at all	Icu @ 690 V [kA]		10	
	Ics/Icu %		75%	
	lcs/lcu % @ 500/600 V		75%	
	Dimensions L [mm]		90 / 120	
	H [mm]		130	
	D [mm]		70	



	Motor protection		T2	Т3	
	Poles		3	3	
11	lu	[A]	160	250	
- î	In	[A]	100	200	
TP	Ue	[V]	690	690	
11	Release magnetic only, M fixed		(up to R12.5)	-	
	Release magnetic only, M adjustable		(from R20)		
2	Microprocessor-based release PR 212/P	1	-	-	
100	Microprocessor-based release PR 212/N	IP, IEC 60947-4-1	_	_	



Range at 1000 V AC-DC

	Poles		
	lu	[A]	
100	Ue	[V]	
100	Icu @ 1000 V AC	[kA]	
11	lcu @ 1000 V DC	4 poles in series [kA]	
1.00			



	Switch-disconnectors according to IEC 60947-3 Standard	I T1D	T3D
44	Poles	3/4	3/4
65	Ith [A]	160	250
16	lu [A]	160	250
	Ue [V]	690	690
	Uimp [kV]	8	8
	Ui [V]	800	800
-	Icm [kA]	2.8	5.3
Post.	Icw [kA]	2	3.6











Isomax S3 S3X	Isomax S4 S4X	Isomax S5	Isomax S6 S6X	Isomax S7	Isomax S8
3/4	3/4		3/4		
125-200	250		400-630		
690	690		690		
200	200		200		
180	180		180		
75	75		75		
100%	100%		100%		
75%	75%		75%		
105 / 140	105 / 140		210 / 280		
255	339		406		
103.5	103.5		103.5		

S3 / S3X	S4 / S4X	S5	S6 / S6X	S 7	
3	3	3	3	3	
160-250 / 125-200	160-250 / 250	400-630	630-800 / 400-630	1250-1600	
3200	100250	320630	320800	10001600	
690	690	690	690	690	
-	-	-	-	-	
	-	-	-	-	
-					
-					

S3L / S3X	S4L / S4X	S5L	S6L / S6X	
3 (AC) - 4 (DC)	3	4	3 (AC) - 4 (DC)	
160 / 125	160-250 / 250	400	630-800 (DC) / 630	
1000	1000	1000	1000	
6 / 30	8 / 30	8	12 / 30	
40	-	40	40 - 50	

S3D	S6D	S7D	S8D
3/4	3/4	3/4	3/4
100 - 160 - 250 - 320	400 - 630 - 800	1000 - 1250 - 1600	2000 - 2500 - 3200
100 - 160 - 250 - 320	400 - 630 - 800	1000 - 1250 - 1600	2000 - 2500 - 3200
690	690	690	690
8	8	8	8
800	800	800	800
10	30	52.5	85
6.5	15	25	40





Main characteristics



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Construction characteristics

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General information

The ABB SACE family of molded case circuit breakers in conformity with UL 489 and CSA C22.2 No. 5.1 Standard - Tmax and Isomax - is divided into different, perfectly integrated, sizes (T1B 1p, T1, T2, T3, S3 150, S3 225, S4, S5, S6, S7 and S8), able to cover a range of service currents from 15 to 2500 A.

The power distribution circuit breakers are available, with UL 489 and CSA C22.2 approval, in the fixed, two-pole, three-pole and four-pole versions.

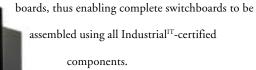
The Tmax T1 circuit breaker is also available in the single pole Tmax T1B 1p version, with an interrupting rating of 18 kA at 277 V AC. The circuit breakers can be selected among different interrupting rating levels from 22 kA to 100 kA at 480 V AC.

Tmax, Isomax, Emax: Industrial^{IT} enabled!

Industrial^{IT} is the solution developed by ABB for the all-round integration of a company's activities, where each product is seen as part of a complete solution. Products and technologies are grouped into functional categories (Suites), each of which

measures, controls, optimizes and supports

a specific "block" of activities, and they can ensure coordinated interaction thanks to the platform created by ABB (AIP: Aspect Integrator Platform). In addition to interactivity between certified products, every certified product also guarantees the ready molded-case and **Emax** power circuit breakers has obtained certification and is fully entitled to join the Protect^{IT} suite of products. These circuit breakers combine with about 700 products in the ArTu M and ArTu K ranges of distribution



Tmax, Isomax and Emax operation can be integrated with the configurable ABB products in a system: this compatibility has always been a fundamental premise of the ABB SACE design process. Mass customization, i.e. the mass production of components customized to meet a given

Industrial

buyer's specific needs is already feasible, as Industrial^{IT} certification demonstrates.

Yet again, ABB SACE is ahead of the field in offering a better and better customer service!

* All product technical data and related documentation can be found in Internet and is accessible to the customer. The standard documentation is in English, but there are local language versions for each country where a given product is marketed.

availability of all the information needed for it to function technical characteristics, installation instructions, use and maintenance instructions, environmental certificates and declarations, all updated to the latest version ... a considerable advantage for the user*.

After **Tmax**, which was the first Industrial^{IT}-certified ABB SACE product, now the whole range of **Tmax** and **Isomax**

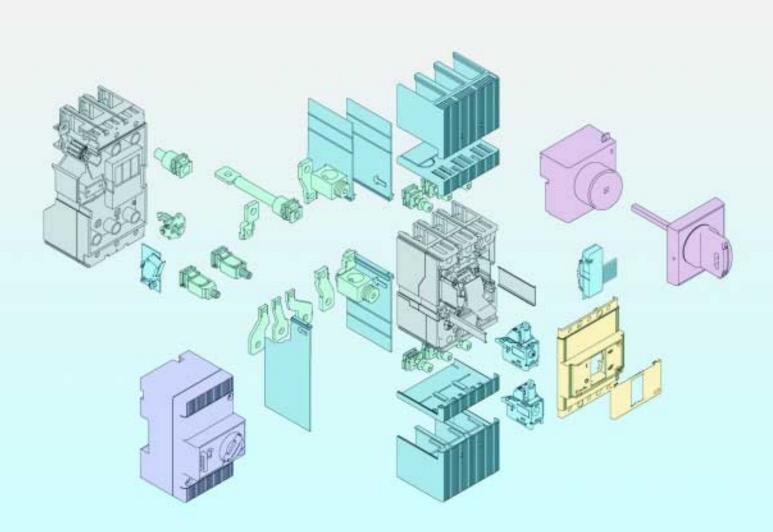
For further information, go to the *Products and services/Industrial*^{1T} section on our web site: http://www.abb.com



Modularity of the series

Starting from the fixed⁽¹⁾ circuit breaker, all the other versions are obtained by mounting the conversion kit. The following are available:

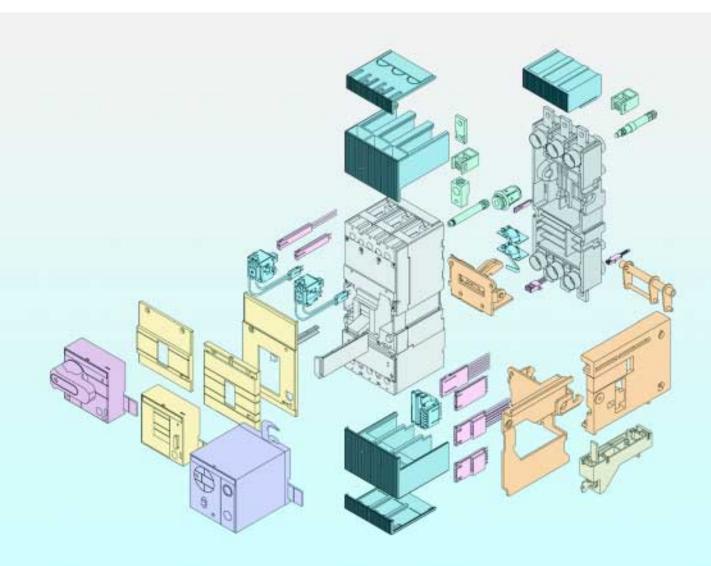
- conversion kit from fixed circuit breaker to moving part of plugin circuit breaker (for T2, T3, S3, S4 and S5)
- conversion kit from fixed circuit breaker to moving part of drawout circuit breaker (for S3, S4, S5, S6 and S7)
- fixed parts for plug-in circuit breakers
- fixed parts for draw-out circuit breakers
- conversion kit for the connection terminals.



Various accessories are also available (except for T1B 1p which cannot be fitted with accessories):

- shunt trips⁽²⁾
- undervoltage releases(2)
- auxiliary contacts⁽²⁾
- position contacts
- early auxiliary contacts on rotary handle
- front and rear connection terminals
- rear assembly bracket for mounting on 35 mm DIN rail
- mechanical interlock⁽²⁾
- solenoid operating mechanism⁽²⁾
- motor operator⁽²⁾
- rotary handle operating mechanisms, direct on the circuit breaker and transmitted on the compartment door⁽²⁾
- three-pole and four-pole residual current releases.

(1) File UL: E93565 (2) File UL: E116596





Distinguishing features of the series

Compliance with Standards and company quality system

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

"Low Voltage Directives" (LVD) no. 73/23 EEC

"Electromagnetic Compatibility Directive" (EMC) no.89/336 EEC.
 Certification of conformity with the above-mentioned product
 Standards is carried out, in respect of the European EN 45011
 Standard, by the Italian certification body ACAE (Association for
 Certification of Electrical Apparatus), a member of the European
 LOVAG organization (Low Voltage Agreement Group).



The ABB SACE test laboratory is accredited by SINAL (certificate no. 062/1997).

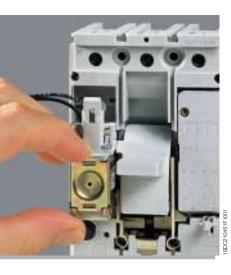
The ABB SACE Quality System complies with the international ISO 9001 Standard (model for quality assurance in design, development, construction, installation and service) and with the equivalent European EN ISO 9001 and Italian UNI EN ISO 9001 Standards.

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

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

Attention to protection of the environment is another priority commitment for ABB SACE and, as confirmation of this, the company environmental management system has been certified by RINA. ABB SACE - the first industry in the electromechanical section in Italy to obtain this recognition - thanks to a revision of the production process with an eye to ecology, has been able to reduce the consumption of raw materials and waste from processing by 20%.

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



Double insulation

This construction characteristic consists of the presence of double insulation between the live power parts (excluding the terminals) and the front parts of the apparatus where the operator works during normal operation of the installation. The seat of each electrical accessory is completely segregated from the power circuit, thereby preventing any risk of contact with live parts, and, in particular, the operating mechanism unit is completely insulated in relation to the powered circuits. As a consequence most accessories are field installable.

Furthermore, the insulation distances, both between the live internal parts and in the terminal connection area, comply with what is foreseen by the UL 489 Standard and are higher than those required by the international IEC Standards.



Characteristics which distinguish the series

Positive operation

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



Isolation behavior

In the open position, the circuit breaker guarantees circuit isolation in compliance with the IEC 60947-2 Standard. The oversized insulating distances guarantee there are no leakage currents and dielectric resistance to any overvoltages between input and output. For plug in and draw-out version circuit breakers, in the racked-out position, the power and auxiliary circuits are insulated,



guaranteeing that no part is live. By means of special socket-plugs, it is possible to carry out blank tests under these conditions, operating the circuit breaker in complete safety.

Operating temperature

The Tmax and Isomax circuit breakers can be used in ambient conditions where the surrounding air temperature varies between -13 °F and +158 °F (-25 °C and +70 °C) and stored in ambients with temperatures between -40 °F and +158 °F (-40 °C and +70 °C). The circuit breakers fitted with



thermomagnetic release have their thermal element set for a reference temperature of 104 $^{\circ}$ F (40 $^{\circ}$ C).

For temperatures other than 104 °F (40 °C), with the same setting, there is a variation of the thermal threshold as shown in the tables on page 3/29 and 3/30.

The electronic PR211/P, PR212/P and PR221DS microprocessor-based overcurrent releases do not undergo any variations in performance as the temperature varies but, in the case of tempera-

tures exceeding 104 °F (40 °C), the maximum setting for protection against overloads, L, must be reduced, as indicated in the derating graphs on page 3/28, to take into account the heating phenomena which occur in the copper parts of the circuit breaker passed through by the phase current. For temperature above 158 °F (70 °C) the circuit breaker performances are not guaranteed.



Distinguishing features of the series

Altitude

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

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



Electromagnetic compatibility

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

Tropicalization

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

- insulating cases made of synthetic resins reinforced with glass fibers:
- anti-corrosion treatment of the main metallic parts (ambient C UNI 3564-65):
- Fe/Zn 12 galvanization (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 organizations:

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

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

Installation

The molded case circuit breakers can be mounted, in the switchboards, directly on the base plate, horizontally or vertically, without any derating of their rated characteristics⁽¹⁾. All the circuit breakers can be supplied throught either top or bottom terminals⁽²⁾. The circuit breakers up to 400 A (except Tmax T1B 1p) can also be installed on DIN rails, thanks to the special mounting brackets. Furthermore, the depth of 2.76" (70 mm) up to 225 A allows even more simplified assembly of the circuit breakers in standard switchboards. In fact, it is possible to prepare standardized support structures, facilitating the design stage and construction of the switchboard.



(1) The SACE Isomax S8 can be mounted just in vertical position. (2) The SACE Isomax S8 can be supplied only from the top.



Electrical characteristics

Power distribution circuit breakers









			T1 1P	T1	T2	Т3	
Continuous current rating		[A]	100	100	100	225	
Numbers of poles		Nr	1	3/4	2/3/4(3)	2/3/4(3)	
Rated voltage	(AC) 50/60Hz	[V]	277	480	480	480	
	(DC)	[V]		500	500	500	
Test voltage (1min) 50/60 Hz		[V]	3000	3000	3000	3000	
Interrupting ratings		[kA rms]	В	Ν	SH	N S	
240 V AC		[kA rms]		50 ⁽²⁾	65 150	50 65	
277 V AC		[kA rms]	18(1)				
480 V AC		[kA rms]		22 ⁽²⁾	35 65	25 35	
600 V AC		[kA rms]					
500 V DC (2 poles ir	n series)	[kA rms]		25		25 35	
600 V DC (3 poles ir	n series)	[kA rms]		25		25 35	
Overcurrent trip units	Thermal magnetic						
	Microprocessor based						
Dimensions fixed version	Н	[in-mm]	5.12/130	5.12/130	5.12/130	5.9/150	
	W 2P-3P	[in-mm]	1/25.4	3/76	3.54/90	4.13/105	
	W 4P	[in-mm]		4/102	4.72/120	5.51/140	
	D	[in-mm]	2.76/70	2.76/70	2.76/70	2.76/70	
Mechanical life	[No. op. / No. h	ourly op.]	25000/240	25000/240	25000/240	25000/120	
Weights (fixed 3p)		[lbs]	1.06	2.34	2.86	5.45	

 Note: for S3...S6 4 poles only for the N versions.

 ⁽¹⁾
 In 15 A = 10 kA @ 277 V AC

 ⁽²⁾
 In 15 A = 35 kA @ 240 V AC, 14 kA @ 277/480 V AC

 ⁽³⁾
 Ask ABB for two-pole version availability



Sa	3 15	50	S	S3 2	225		ļ	S 4			S 5			S 6		S 7	S 8
	150			22	5			250			400			800		1200	1600/2000/2500
2	2/3/4			2/3	/4		2	2/3/4			2/3/4	1	:	2/3/4		2/3/4	3
	600		240	480	480	480		600			600			600		600	600
	600			50	0						600			600			
:	3000			300	00		3	3000			3000)		3000		3000	3000
N	Н	L	в	Ν	Н	L	Ν	Н	L	Ν	н	L	Ν	н	L	Н	V
65	100	150	150	65	100	150	65	150	200	65	150	200	65	150	200	100	125
25	50	85		25	50	65	25	65	100	35	65	100	50	65	100	65	100
14	14	25					18	22	35	22	22	35	25	35	42	50	85
35	50	65	50	20	35	50				35	50	65	35	50	65		
20	35	50								20	35	50	20	35	50		
6.	70/17	0		6.70/	170		10.	00/2	54	10	0.00/2	254	14	.25/2	68	16/406	15.75/400
4.	13/10	5		4.13/	105		4.1	13/10)5	5	.51/1	40	8.	27/2	10	8.27/210	15.98/406
5.	51/14	0		5.51/	140		5.5	51/14	10	7	.24/1	84	11	.02/2	80	11.02/280	21.89/556
4.0	7/103	3.5	4	1.07/1	03.5		4.0	7/103	3.5	4.	07/10	3.5	4.0	7/10	3.5	5.45/138.5	9.25/235
250	000/1	20	2	25000	/120		200	00/1	20	20	000/	120	200	000/1	20	10000/120	10000/20
	6.75			6.7	'5			8.8			11			22		37.5	135



Electrical characteristics

Power distribution circuit breakers

General characteristics

The ABB SACE family of molded case circuit breakers, complying with the UL 489 and CSA C22.2 No. 5.1 Standards, is divided into different sizes, with an application range from 15 to 2500 A and interrupting ratings up to 100 kA at 480 V AC.

Selection of the size allows the basic electrical characteristics to be identified simply and immediately, whereas selection of the overcurrent trip unit is made according to the type of application required.

The Tmax T1, T3 and Isomax S3 150, S3 225 with fixed thermal and magnetic threshold, S5 and S6 thermomagnetic with adjustable thermal and magnetic threshold are available for protection of both AC and DC circuits.

Apart from the circuit breakers indicated above, for alternating current networks, the Tmax T2, Isomax S4, S5, S6, S7 and S8 circuit breakers with electronic microprocessor-based trip unit are also available.

	Release	Range [A]
AC		
Т1В 1р	TMF	15100
T1	TMF	15100
Т2	TMF ELT	15100 10100
ТЗ	TMF	60225
S3 150	TMF	15150
S3 225	TMF	175225
S4	ELT	100250
S5	TMD ELT	300, 400 300, 400
S6	TMD ELT	600, 800 400800
S7	ELT	1000, 1200
S8	ELT	16002500
DC		
T1	TMF	15100
Т3	TMF	60225
S3 150	TMF	15150
S3 225	TMF	175225
S5	TMD	300, 400
S6	TMD	600, 800

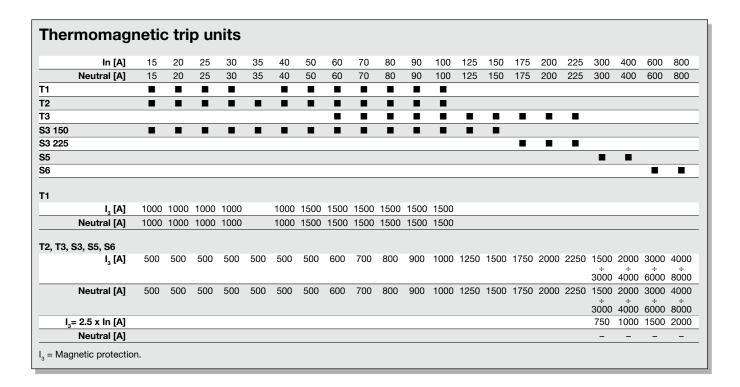
Range of application of the alternating and direct current circuit breakers

1/12

Thermomagnetic trip units

The Tmax T1B 1p, T1, T2, T3, Isomax S3 150, S3 225, S5 and S6 circuit breakers can be fitted with thermomagnetic trip unit and are used in protection of alternating current networks or direct current networks with a range of application from 15 A to 800 A. They allow protection against overloads with a thermal device (fixed threshold for T1B 1P, T1, T2, T3, S3 and adjustable threshold between $0.7 \div 1 \times In$ for S5 and S6), made using the bimetal technique, and protection against short-circuit with a magnetic device (fixed threshold for T1 1P, T1, T2, T3, S3 and adjustable threshold between $5 \div 10 \times In$ or fixed at $2.5 \times In$ for S5 and S6).

The four-pole circuit breakers are always supplied with the neutral protected by the trip unit and protection of the neutral at 100% of the phase setting⁽¹⁾.



⁽¹⁾ S3N 150 ln = 100 A, 150 A and S3N 225 ln = 225 A are available with no thermal protection for the neutral.



Electrical characteristics

Power distribution circuit breakers

Electronic microprocessor-based trip units

For uses in alternating current, the Tmax T2, Isomax S4, S5, S6, S7 and S8 circuit breakers can be fitted with SACE PR221DS, PR211/P and PR212/P overcurrent trip units using microprocessorbased technology. This allows protection functions which guarantee a high level of reliability, trip precision and insensitivity to the electromagnetic components in compliance with the applicable standards. The power supply required for correct operation is supplied directly by the current transformers of the trip unit, and is always guaranteed, even in conditions of single-phase load, and in correspondence with the minimum setting.

Curre	nt tra	nsformers							
In [A]		10	25	63	100	100	150	250	
T2									
S4									
S5									
S6									
S7									
S8									
L	[A]	410	1025	2563	40100	40100	60150	100250	
s	[A]	10100	25250	63630	1001000	1001000	1501500	2502500	
I	[A]	10100	25250	63630	1001000	1501200	2251800	3753000	
G	[A]					20100	30150	50250	

The SACE PR221DS trip unit, available on Tmax T2, provides protection functions against overload L and short-circuit S/I (PR221DS-LS version) and, alternatively, it is also available with instantaneous protection only, against short circuit I (PR221DS-I version, see page 1/23).

The SACE PR211/P trip unit, available from S4 to S7, provides protection functions against overload L and instantaneous short-circuit I (PR211/P-LI version) and, alternatively, only with protection against instantaneous short-circuit I (PR211/P-I version, see page 1/23).

The SACE PR212/P trip unit, available from S4 to S8, provides protection functions against overload L, delayed short-circuit S, instantaneous short-circuit I and against ground fault G. It is available in versions PR212/P-LSI or PR212/P-LSIG.

For four-pole Tmax T2 with PR221DS trip unit, the protection of the neutral is set to 100% of the phase protection setting.

For four-pole SACE Isomax S circuit breakers with PR211/P trip unit, the protection of the neutral is set to 50% of the phase protection setting. Ask ABB for the 100% version.

For four-pole SACE Isomax S circuit breakers with PR212/P trip unit, the protection of the neutral can be set to 100% or 50% of the phase protection setting (by means of dip-switches on the front of the trip unit).

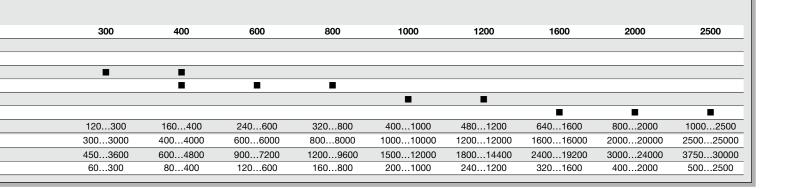
These protection trip units consist of the current transformers, the SACE PR221DS or PR211/P or PR212/P protection unit and an opening solenoid, with demagnetization which acts directly on the operating mechanism unit and is mounted in the right-hand slot for T2 or in the trip unit case for Isomax.

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

When the protection trips, the circuit breaker opens by means of the opening solenoid, which changes over a bell alarm contact to signal trip unit tripped. Resetting the signal is mechanical and takes place when the circuit breaker operating lever is reset.

It is possible to test the opening solenoid by means of the SACE TT1 device. A positive test will trip the breaker.

Setting the adjustment parameters of the protection functions is carried out directly from the front of the releases by means of dip-switches and, for PR212/P, remotely, too, thanks to the use of the SACE PR212/D⁽¹⁾ dialogue units, available with Modbus or LON communication protocols.

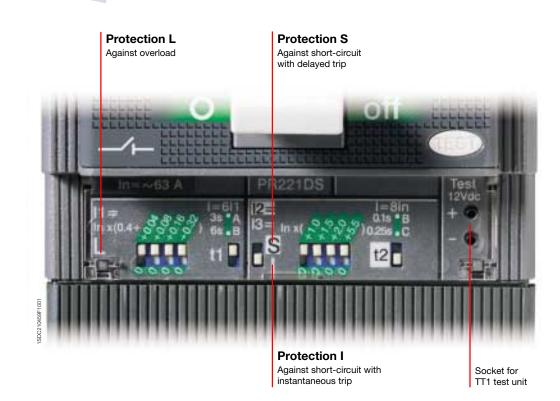


Operating temperature	–13 °F…+158 °F (–25 °C…+70 °C)
Relative humidity	90%
Service frequency	4566 Hz able to measure harmonics up to 550 Hz
Electromagnetic compatibility (LF and HF)	IEC 60947-2 Annex F
Electrostatic discharges	IEC 61000-4-2
Radiated electromagnetic field	IEC 61000-4-3
Short-time transients	IEC 61000-4-4
Mean time between failure (MTBF)	15 years (at 113 °F/45 °C)
Characteristics of the signalling contact	(for SACE PR211/P and PR212/P only)
Maximum interrupted current	0.5 A
Maximum interrupted voltage	24 V DC/AC
Breaking capacity	3 W/VA
Contact/contact insulation	500 V AC
Contact/coil insulation	1000 V AC

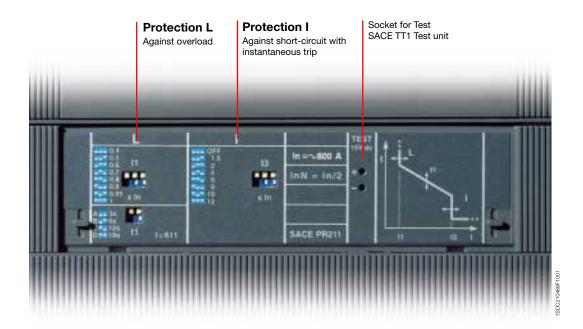


Electrical characteristics

Power distribution circuit breakers



Protection functions and parametrisation of the PR221DS-LS trip unit (for Tmax T2)										
Protection	function		Trip threshold	Trip curve A	es B	с				
CANNOT BE EXCLUDED	Against overload with inverse long delay trip and trip character- istic according to a definite time curve (l^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 ln Release between 1.051.30 x l1 (IEC 60947-2 and UL 489)	at 6 x l1 t1 = 3s (tolerance:	at 6 x l1 t1 = 6s ± 10% up ± 20% ove					
CAN BE EXCLUDED	Against short-circuit with inverse short delay and trip characteristic with definite time (I ² t = constant)	I ² t=cost ON	12 = 1 - 1.5 - 2 - 2.5 - 3 - 3.5 - 4.5 - 5.5 - 6.5 - 7 - 7.5 - 8 - 8.5 - 9 - 10 x ln Tolerance ± 10% up to 2 x ln ± 20% over 2 x ln		at 8 x In t2 = 0.1s (tolerance:	t2 = 0.25s				
CAN BE EXCLUDED	Against short-circuit with instan- taneous adjustable trip (can be selected as an alternative to pro- tection function S)	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 ln Tolerance ± 20%							

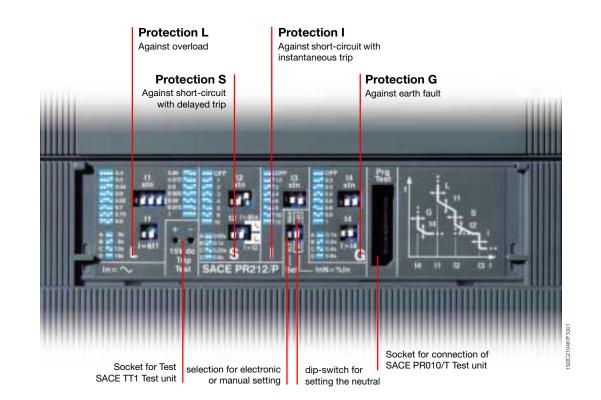


Protectio	on functions and p	baram	netrisation of the SACE PF	R211/P t	rip unit (for Isom	ax S4S7)
Protection	function		Trip threshold	Trip curv A	es B	С	D
CANNOT BE EXCLUDED	Against overload with in- verse long time delay and trip characteristic accord- ing to a time dependent curve (l ² t = constant)		I1 = 0.4 - 0.5 - 0.6 - 0.7 - 0.8 - 0.95 - 1 x ln Release between 1.051.30 x I1 (IEC 60947-2 and UL 489)	t1 = 3s		at 6 x l1 t1 = 12s o 2 x ln; <u>+</u> 209	at 6 x l1 t1 = 18s % above 2 x ln)
CAN BE EXCLUDED	Against short-circuit with adjustable instantaneous trip	L	I3 = 1.5 - 2 - 4 - 6 - 8 - 10 - 12 x ln (* Tolerance ± 20%)			



Electrical characteristics

Power distribution circuit breakers



Protection	function		Trip threshold	Trip curve A	Trip curves A B C D					
CANNOT BE EXCLUDED	Against overload with inverse long time delay and trip characteristic according to a time dependent curve ($l^2t = constant$)		$\begin{array}{ll} \textbf{I1} &=& 0.4 - 0.5 - 0.55 - 0.6 - 0.65 - \\ && 0.7 - 0.75 - 0.8 - 0.85 - 0.875 - \\ && 0.9 - 0.925 - 0.95 - 0.975 - \\ && 1 \times \ln \end{array}$ Release between 1.051.30 x l1 (IEC 60947-2 and UL 489)	t1 = 3s	at 6 x l1 t1 = 6s 10% up to 2	at 6 x l1 t1 = 12s 2 x ln; <u>+</u> 20%	at 6 x l1 t1 = 18s above 2 x ln)			
CAN BE EXCLUDED	Against short-circuit with inverse short time delay and trip characteristic with dependent time (l ² t = constant) or inde- pendent time	Pt=cost ON Pt=cost OFF	$l2 = 1 - 2 - 3 - 4 - 6 - 8 - 10 \times ln$ Tolerance ± 10% $l2 = 1 - 2 - 3 - 4 - 6 - 8 - 10 \times ln$ Tolerance ± 10%	at 8 x ln t2 = 0.05s (tolerance: <u>+</u> t2 = 0.05s (tolerance: <u>+</u>	20%) t2 = 0.1s		at 8 x ln t2 = 0.5s t2 = 0.5s			
CAN BE EXCLUDED	Against short-circuit with adjustable instantaneous trip	L	I3 = 1.5 - 2 - 4 - 6 - 8 - 10 - 12 x ln (* Tolerance ± 20%)						
CAN BE EXCLUDED	Against earth fault with short inverse time delay and trip characteristic ac- cording to a dependent time curve (l^2t = constant)		$\mathbf{I4} = \begin{array}{l} 0.2 - 0.3 - 0.4 - 0.6 - 0.8 - 0.9 - \\ 1 \text{xln} \end{array}$ Tolerance ± 20%	3.25 x 14		up to 1.6 x l4 t4 = 400ms	up to 1.25 x l4 t4 = 800ms			



Electrical characteristics

Motor control protection circuit breakers: MCP

Magnetic and electronic overcurrent trip units

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

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

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



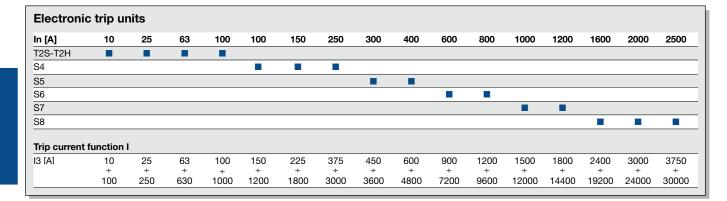


МСР		Т	2	T3		S3			S4			S 5			S6		S 7	S 8
Continuous curre	ent ratings	1(00	225		150-225	5		250			400	I		800		1200	1600 2000 2500
Poles		3	3	3		3			3			3			3		3	3
Ratings		3	100	100200	325	50150	175250		100 150 250			300 400			600 800		1000 1200	1600 2000 2500
Interrupting rati	ngs	S	н	S	L	L	L	Ν	н	L	Ν	н	L	Ν	н	L	Н	v
	240 V AC	65	150	65	50	150	150	65	150	200	65	150	200	65	150	200	100	125
	480 V AC	35	65	35	25	85	65	35	65	100	25	65	100	50	65	100	65	100
	600 V AC				10	25		18	22	35	22	22	35	25	35	42	50	85
	500 V DC			35	65*	65	50											
	600 V DC				50*	50												
Trip unit																		
Adjustable																		
magnetic only	(412 x ln)																	
	(612 x ln)			•														
Electronic	PR221DS-I																	
	PR211/P-I																	
*= performance a	available only for	25 A	rating	version														



Electrical characteristics

Motor control protection circuit breakers: MCP



Protect	ion functions and parar	netrisa	ation of the PR221DS-I trip unit (for Tmax T2)
Protectio	on function		Trip threshold
	Against short-circuit with adjust- able instantaneous trip	I ² t=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%

rotection functions and parametrisation of the SACE PR211/P trip unit (for Isomax S4S8)										
Protection function	Trip threshold									
Against short-circuit with adjust- able instantaneous trip	I3 = 1.5 - 2 - 4 - 6 - 8 - 10 - 12 x ln (*) Tolerance ± 20%									



Electrical characteristics

Molded case switches: MCS

The MCS can be used as general circuit breakers in sub-switchboards, as switching and isolation parts for lines, busbars or groups of apparatus, or as bus-ties. They can be part of general isolation devices of groups of machines or of complexes for motor operation and protection.

The MCS are derived from the corresponding circuit breakers, of which they keep the overall dimensions, versions, fixing systems and the possibility of mounting accessories.

The MCS up to 1200 A are available in three-pole and four-pole versions, whereas the 2500 A calibration is only available in the three-pole version.

All the molded case switches in accordance with UL 489 and CSA C22.2 Standards are self protected.



MCS		T1N-D	T3S-D 150	T3S-D 225	S3H-D 150	S3H-D 225	S4H-D	S5H-D	S6H-D	S7H-D	S8V-D
Rating	[A]	100	150	225	150	225	250	400	600 800	1200	2500
Poles	[No]	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Magnetic override	[A]	1000	1500	2250	1500	2250	3000	5000	8000 10000	20000	35000
Rated Voltage											
AC (50-60 Hz) [V]	480	480	480	600	480	600	600	600	600	600
D	C [V]	500	500	500	600	500		600	600	600	600



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1SDC210500F1001



Versions and types

1000	A.		
		1	
-	-		2
2	No.	2	01F1001
縣	a	1	1SDC210501F1001
-	En la	1	10

Fixed

FIXED version ABB SACE molded case circuit breakers in accordance with UL/CSA standards up to 2500 A, are available in the two-pole, three-pole and four-pole version up to 1200 A and only in the three-pole version from 1600 A up to 2500 A. The circuit breakers have:

- single depth of 2.76" (70 mm) up to 225 A and 4.07"
- (103.5 mm) from 150 to 800 A - standardized front 1.77" (45 mm) up to 225 A
- possibility of assembly on back plate or on DIN rail up to 400 A (except T1B 1p)
- thermomagnetic or electronic trip units
- UL file: E93565 for circuit breakers and MCP. CSA file: LR54280
- UL file: E116595 for MCS. CSA file: LR54280.



Plug-in

The PLUG-IN version⁽¹⁾ circuit breaker consists of:

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

Circuit breaker removal is carried out by unscrewing the top and bottom fixing screws. A special lock prevents circuit breaker racking in and racking out with the contacts in the closed position. Tmax T2 and T3 and SACE Isomax S3, S4, S5 circuit breakers,

starting from the fixed version, can be changed into the various types using the conversion kits.



Versions and types

Draw-out

The draw-out version circuit breaker consists of:

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

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

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

	Fixed	Plug-in	Draw-out
T1 B 1P		-	-
T1		-	-
T2			-
Т3			_
S3 150			
S3 225			
S4			
S5			
S6		-	
S7		-	
S8		-	_



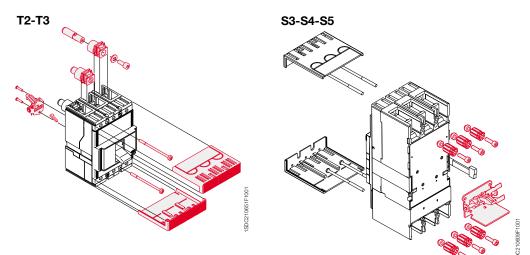


Conversion kit into moving part of plug-in for T2, T3, S3, S4 and S5

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

- isolating contacts
- anti-removal safety device
- assembly nuts and screws
- terminals covers.
- The circuit breaker is completed with the fixed part.

When the circuit breaker has electrical accessories mounted (SOR, UVR, MOS, AUX, AUE), the socket-plug connectors can also be ordered for isolation of the relative auxiliary circuits.



Fixed part

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

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

The fixed part for draw-out version is fitted with a guide for supporting the moving part during the isolation or withdrawal operations. For SACE Isomax S6 and S7 circuit breakers, there are two guides.

For Tmax T2 and T3 circuit breakers, the fixed parts are available, in the standard version, with front terminals (F): a distinguishing characteristic of these two sizes of circuit breakers is the possibility of equipping the fixed parts with the same kit of terminals, terminal covers and phase separators, used for the fixed circuit breakers.



Versions and types

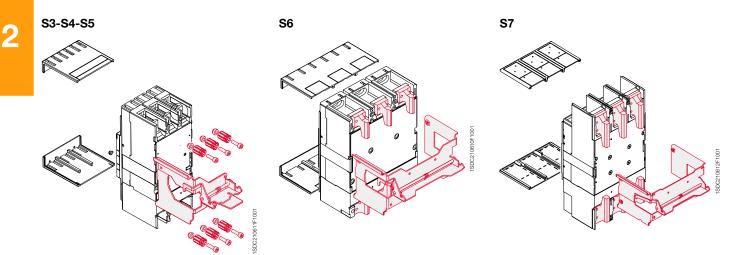


Conversion kit into moving part of draw-out circuit breaker for S3...S7

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

- front for lever operating mechanism
- rotary handle operating mechanism
- motor operator

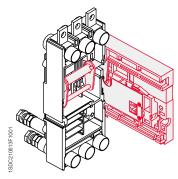
in order to prevent the racking-out operation with the circuit breaker closed. The circuit breaker is completed with the fixed part.





Conversion kit for fixed part of plug-in into fixed part of draw-out for S3, S4, S5

A guide for converting the fixed part of a plug-in version circuit breaker into the fixed part of a draw-out version circuit breaker is available for SACE Isomax S3, S4, S5 circuit breakers.





Racking out crank

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



Connection terminals

The basic version of the circuit breakers is supplied with:

- lugs for copper and aluminium cables (FC CuAl) for the Tmax T1 circuit breaker

- front terminals (F) for Tmax T2, T3, SACE Isomax S3, S4, S5, S6, S7 and S8 circuit breakers. Different types of terminals are also available and these can be combined in various ways (top of one type, bottom of a different type), allowing the circuit breaker to be connected to the plant in the most suitable way for the installation requirements.

The following distinctions can be made between:

- front terminals which allow connection of cables or busbars by acting directly from the front of the circuit breaker
- rear terminals which allow installation in switchboards with rear access to both cable and busbar connections. For Tmax T2 and T3 the operation of the rear terminals can be adjusted in the field.

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

An important feature of the Tmax T2 and T3 circuit breakers is that all the different types of terminals can be mounted either on the fixed version circuit breaker or on the fixed part of the plug-in circuit breaker.

The information needed to make the connections is given for each type of terminal on page 2/10. The minimum and maximum cross-section of the cables which can be tightened in the terminals and the diameter of the terminal are indicated for connection with bare cables. Flat bars of different size and composition are recommended for connections with busbars. The required minimum depth is also indicated, if it is different to the one recommended.

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





Insulating terminal covers

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

- low terminal covers, which guarantee IP40 degree of protection for fixed circuit breakers with rear terminals and for moving parts of plug-in or draw-out circuit breakers
- high terminal covers, for fixed circuit breakers with front, front extended, front for cables and rear terminals; guarantee IP40 degree of protection
- terminal covers for fixed parts, of plug-in or draw-out circuit breakers for S3, S4, S5, S6 and S7 circuit breakers, guarantee IP40 degree of protection on the front with moving part connected. They are available in a single version. The fixed parts of plug-in T2 and T3 circuit breakers can use the same terminal covers as the corresponding fixed circuit breakers.

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



Connection terminals





Phase separating partitions

These allow the insulation characteristics between the phases at the connections to be increased. They are mounted from the front, even with the circuit breaker already installed.

Two versions are available for Tmax T1, T2 and T3 circuit breakers:

- 3.94" (100 mm) high
- 7.87" (200 mm) high.

The H = 3.94" (100 mm) phase separators are supplied as standard with front extended type terminals (EF), whereas those with H = 7.87" (200 mm) are standard with the front extended spread type of terminals (ES).

They are incompatible with both the high and low insulating terminal covers.

The fixed parts of plug-in Tmax circuit breakers can use the same phase separating partitions as the corresponding fixed circuit breakers. With the phase separating partitions mounted, a special kit is available on request to reach IP40 degree of protection from the front of the circuit breaker.

Moreover, it is possible to mount the phase separating partitions between two circuit breakers or fixed parts side by side.

For SACE Isomax S3, S4 and S5 circuit breakers, phase separating partitions with low terminal covers are always supplied. With the high terminal covers, the separators are not needed since they are already incorporated.

They must always be requested for SACE Isomax S6 and S7 circuit breakers. They are always an alternative to the high or low terminal covers.



Screws for sealing the terminal covers

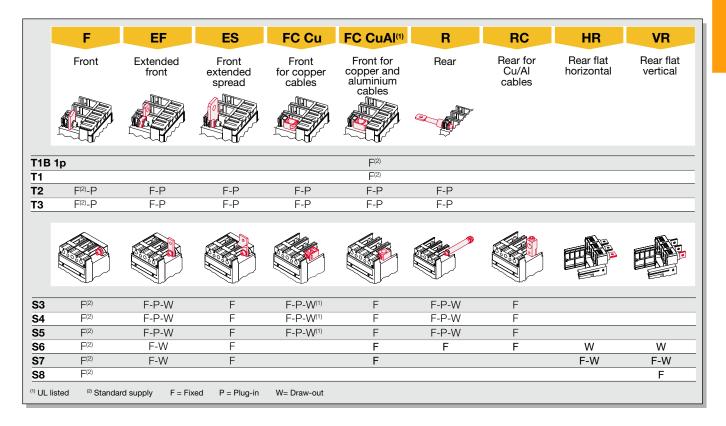
These are applied to the terminal covers of fixed circuit breakers or to the moving parts of plug-in or draw-out circuit breakers. They prevent removal of both the high and low terminal covers and can be locked with a wire and lead seal.

Direct connection for 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).

Connection terminals





Connection terminals

Front terminals - F

Allow connection of busbars or cables terminated with cable terminals

Туре	Version	Pieces	Busbars/cable terminals [in-mm]			ninals	Tightening [Ibin-Nm]	٦	Ferminal	Phase partitions	
			W	Н	D	Ø	В	high	low	fixed part	
T2	F - P	1	0.79-20	0.3-7.5	0.2-5	0.26-6.5	54-6	R	R		R
Т3	F - P	1	0.94-24	0.37-9.5	0.31-8	0.33-8.5	71-8	R	R		R
S3 150	F	1	0.79-20	0.39-10	0.16-4	0.35-9	80-9	R	R		R*
S3 225	F	1	0.79-20	0.39-10	0.24-6	0.35-9	80-9	R	R		R*
S4	F	1	0.79-20	0.39-10	0.24-6	0.35-9	80-9	R	R		R*
S5	F	2	0.98-25	0.47-12	0.20-5	0.43-11	161-18	R	R		R
S6	F	2	1.97-50	0.47-12	0.20-5	2 x 0.27-7	80-9	R	R		R
S7	F	2	1.97-50	0.79-20	0.31-8	2 x 0.43-11	161-18		R		R
S8 2000	F	3	3.94-100		0.20-5	4 x 0.59-15	625-70		R		
S8 2500	F	4	3.94-100		0.20-5	4 x 0.59-15	625-70		R		

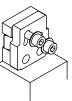


T2-T3



S6





Front extended terminals - EF

Allow connection of busbars or cables terminated with cable terminals

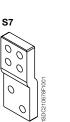
Туре	Version	Pieces		Busba [in-mr			terminals -mm]	J	Tightening [lbin-Nm]		ninal co	overs	Phase partitions
			W	D	Ø	W	Ø	А	В	high	low fi	xed part	
T2	F-P	1	0.79-20	0.16-4	0.33-8.5	0.79-20	0.33-8.5	54-6	80-9	R			S
тз	F-P	1	0.79-20	0.24-6	0.39-10	0.79-20	0.39-10	71-8	161-18	R			S
S3 150	F	1	0.79-20	0.16-4	0.33-8.5	0.79-20	0.31-8	80-9	80-9	R	R	R	R*
S3 225	F-P-W	1	0.79-20	0.24-6	0.33-8.5	0.79-20	0.33-8.5	80-9	80-9	R	R	R	R*
S4	F-P-W	1	0.79-20	0.24-6	0.33-8.5	0.79-20	0.33-8.5	80-9	80-9	R	R	R	R*
S5	F-P-W	2	0.98-25	0.20-5	0.43-11	0.98-25	0.43-11	161-18	161-18	R	R	R	R*
S6	F-W	2	1.97-50	0.20-5	0.55-14	1.97-50	0.55-14	80-9	268-30	R	R		R
S7 ⁽¹⁾	F-W	2	1.97-50	0.31-8	4 x 0.43-11	1.97-50	4 x 0.43-11	402-45	161-18		R		R

⁽¹⁾ Fix the busbars on 2 holes on the diagonal.

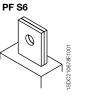


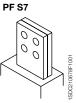












R*= Are supplied with low terminal covers (which are, in turn, on request)

S*= Are supplied as standard with the low terminal covers

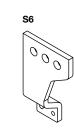
 $\label{eq:alpha} \begin{array}{l} \mathsf{A} = \text{Tightening of the terminal onto the circuit breaker} \\ \mathsf{B} = \text{Tightening of the cable/busbar onto the terminal} \end{array}$

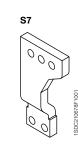
Туре	Version	Pieces	Busbars [in-mm]						Tightening [lbin-Nm]		ninal covers	Phase partitions
			W	D	Ø	W	Ø	А	В	high	low fixed part	
T2	F-P	1	1.18-30	0.16-4	0.41-10.5	1.18-30	0.41-10.5	54-6	161-18			S
Т3	F-P	1	1.18-30	0.16-4	0.41-10.5	1.18-30	0.41-10.5	71-8	161-18			S
S3	F	1	1.18-30	0.16-4	0.33-8.5	1.18-30	0.33-8.5	80-9	80-9		S	S*
S4	F	1	1.18-30	0.16-4	0.33-8.5	1.18-30	0.33-8.5	80-9	80-9		S	S*
S5	F	2	1.57-40	0.20-5	0.43-11	1.57-40	0.43-11	161-18	161-18		S	S*
S6	F	2	2.04-50	0.20-5	3 x 0.51-13	4 x 1.77-45	0.51-13	80-9	268-30			
S7	F	2	2.04-50	0.31-8	3 x 0.51-13	4 x 1.77-45	0.51-13	402-45	179-30			











Front	terminal	s for copp	er cables - FC Cu							
Allow of	connection	of bare cop	per cables directly to the	circuit breaker						
Туре	Version	Pieces		able (cmil-mm²]	Tightening [Ibin-Nm]	Terminal diam. [in-mm]	Tei	rminal	covers	Phase partitions
			rigid	flexible	В		high	low	fixed part	
T2	F-P	1	183/0-195	182/0-170	62-7	0.55-14	R	R	R	R
Т3	F-P	1	10350-6185	10300-6150	89-10	0.71-18	R	R	R	R
S3	F-P-W	1	10350-6185		142-16	161-18	R	R	S	R*
S4	F-P-W	1	10350-6185		142-16	161-18	R	R	S	R*
S5	F-P-W	1	6500-16240		222-25	0.95-24	R	R	S	R*
-										









 $\begin{array}{l} \mathsf{A} = \text{Tightening of the terminal onto the circuit breaker} \\ \mathsf{B} = \text{Tightening of the cable/busbar onto the terminal} \\ \mathsf{R} = \mathsf{On request} \end{array}$

S = Standard R^* = Are supplied with low terminal covers (which are, in turn, on request) S^* = Are supplied as standard with the low terminal covers

ABB SACE

2

Connection terminals

Front terminals for copper/aluminium cables - FC CuAI

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

Туре	Version	Pieces		ble cmil-mm²]	•	tening 1-Nm]	Terminal diam. [in-mm]	Ter	minal	covers	Phase partitions
					A	В		high	low	fixed part	
T1 1p / T1	F	1	1410	2.56	20-2.5		0.37-9.5	R	R	R	R
			8	10	40-4.5						
			61/0	1650	45-5						
T2	F-P	1	141/0	2.550	80-9	50-5.6		R	R	R	R
Т3	F-P	1	141/0	2.550	80-9	50-5.6	0.39-10	R	R	R	R
	F-P	1	4300	25150	80-9	200-22.6	0.67-17	R	R	R	R
S3 150 (In 100)	F	1	141/0	2.550	80-9	50-5.6		R			
S3 150	F	1	24/0	3595	80-9	120-13.5	0.56-14.2	R			
S3 225	F	1	4300	25150	80-9	276-31		R			
S4 (up to In 225)	F	1	4300	25150	80-9	276-31	0.67-17	R			
S4 250	F	1	6300	16185	80-9	276-31	0.7- 18	R			
S5 (In 300)	F	1	250500	120240	161-18	383-43	0.87-22	R			
S5	F	2	3/0250	95120	161-18	276-31	0.61-15.5	S			
S6	F	3	2/0400	70185	80-9	383-43	0.75-9	S			
S6	F	2	250500	120240	44-5	276-31	0.87-22	S			
S7	F	4	4/0500	95240	311-35	383-43	0.85-21.5	S			

т2-т3









Rear	terminal	s - R											
Allow o	onnection	of busba	rs at the re	ar									
Туре	Version	Pieces		Busbar [in-mr			terminals -mm]		tening n-Nm]	Te	erminal	covers	Phase partitions
			W	D	Ø	W	Ø	А	В	high	low	fixed part	
T2	F - P	1	0.79-20	0.16-4	0.33-8.5			54-6	80-9		S		
Т3	F - P	1	0.79-20	0.24-6	0.33-8.5			54-6	80-9		S		
S3 150	F	1	0.79-20	0.16-4	0.49-12.5	0.79-20	0.49-12.5	89-10	179-20		S		S*
	P-W	1	0.79-20	0.16-4	0.49-12.5	0.79-20	0.49-12.5	89-10	179-20				
S3 225	F	1	0.79-20	0.24-6	0.49-12.5	0.79-20	0.49-12.5	89-10	179-20		S		S*
	P-W	1	0.79-20	0.24-6	0.49-12.5	0.79-20	0.49-12.5	89-10	179-20				
S4	F	1	0.79-20	0.24-6	0.49-12.5	0.79-20	0.49-12.5	89-10	179-20		S		S*
	P-W	1	0.79-20	0.24-6	0.49-12.5	0.79-20	0.49-12.5	89-10	179-20				
S5	F	2	0.98-25	0.20-5	0.65-16.5	0.98-25	0.65-16.5	161-18	356-40		S		S*
	P-W	2	0.98-25	0.20-5	0.65-16.5	0.98-25	0.65-16.5	161-18	356-40				
S6	F	2	1.97-50	0.20-5	0.98-25	1.97-50	0.98-25	161-18	890-100		S		

т2-т3







PF S3-S4-S5



 $\begin{array}{l} \mathsf{A} = \text{Tightening of the terminal onto the circuit breaker} \\ \mathsf{B} = \text{Tightening of the cable/busbar onto the terminal} \\ \mathsf{R} = \text{On request} \end{array}$

- S = Standard

1SDC210676F1001

R*= Are supplied with low terminal covers (which are, in turn, on request) S*= Are supplied as standard with the low terminal covers

Rear terminals for copper/aluminium cables - RC

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

Version	Pieces	Cables [AWG or Kcmil-mm ²]	•	•	Terminal diam. [in/mm]	Те	rminal	covers	Phase partitions
			A	В		high	low	fixed part	
F	1	4250-25120	80-9	276-31	0.63-16	S			
F	1	4250-25120	80-9	276-31	0.63-16	S			
F	1	250500-120240	161-18	383-43	0.827-21	S			
F	3	2/0300-70150	80-9	276-31	0.689-17.5	S			
	F F F F F	VersionPiecesF1F1F1F3	[AWG or Kcmil-mm²] F 1 4250-25120 F 1 4250-25120 F 1 250500-120240	[AWG or Kcmil-mm²] [bin/ [bin/ A F 1 4250-25120 80-9 F 1 4250-25120 80-9 F 1 250500-120240 161-18	[AWG or Kcmil-mm²] [[bin-Nm] A B F 1 4250-25120 80-9 276-31 F 1 4250-25120 80-9 276-31 F 1 250500-120240 161-18 383-43	[AWG or Kcmil-mm²] [lbin-Nm] [in/mm] A B F 1 4250-25120 80-9 276-31 0.63-16 F 1 4250-25120 80-9 276-31 0.63-16 F 1 4250-25120 80-9 276-31 0.63-16 F 1 250500-120240 161-18 383-43 0.827-21	[AWG or Kcmil-mm²] [[bin-Nm] [in/mm] A B high F 1 4250-25120 80-9 276-31 0.63-16 S F 1 4250-25120 80-9 276-31 0.63-16 S F 1 250500-120240 161-18 383-43 0.827-21 S	[AWG or Kcmil-mm²] [lbin-Nm] [in/mm] A B high low F 1 4250-25120 80-9 276-31 0.63-16 S F 1 4250-25120 80-9 276-31 0.63-16 S F 1 4250-25120 80-9 276-31 0.63-16 S F 1 250500-120240 161-18 383-43 0.827-21 S	Image: Constraint of the system of

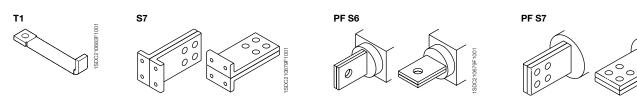
S3-S4-S5



5		1SDC210679F1001

S6 800

	at horizor			rminals	- HR and VR							
Туре	Version	Pieces		Busbars [in-mm]	-	Cable te [in-r		Tightening [lbin-Nm]		Therm cove		Phase partitions
			W	D	Ø	W	Ø	В	high	low	fixed part	
T1	F	1	0.55-14	0.20-5	0.24-6.2			44.5-5		S		
S6	W	2	1.97-50	0.20-5	0.55-14	1.97-50	0.55-14	267-30				
S7	F-W	2	1.97-50	0.31-8	4 x 0.43-11			179-20		S		
S8 2000	F	3	3.94-100	0.20-5	4 x 0.59-15			625-70				
S8 2500	F	4	3.94-100	0.20-5	4 x 0.59-15			625-70				



	•		e in copper/aluminium aluminium distribution cable of	directly to the circui	t breaker				
Туре	Version	Pieces	Cables [AWG or Kcmil-mm ²]	Ø [in-mm]	Tightening [Ibin-Nm]	T High	erminal co Low	overs Fixed part	Phase barriers
S3	F	6	146-2.516	0.218-5.5	35-4	S		-	
S4	F	6	146-2.516	0.218-5.5	35-4	S			
S5	F	6	141/0-2.550	0.39-9.9	50-5.6		S		R

* Ask ABB Inc.



A = Tightening of the terminal onto the circuit breaker B = Tightening of the cable/busbar onto the terminal

R = On request

S = Standard $\mathsf{R}^*{=}$ Are supplied with low terminal covers (which are, in turn, on request) $\mathsf{S}^*{=}$ Are supplied as standard with the low terminal covers

2



Service releases

The shunt trip 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 are supplied in the pre-cabled version with 39.4" (1 m) long cables for the T1, T2 and T3 circuit breakers; whereas for S3, S4, S5, S6 and S7, the power supply is made by means of special connectors.

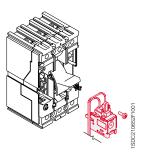
Assembly is carried out by pressure into the appropriate seat located in the left-hand part of the circuit breaker and fixing with the screw provided.

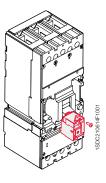
SOR - Shunt trip (UL file: E116596)

This allows circuit breaker opening by means of an electrical command. Operation of the release is guaranteed for a voltage between 75% and 110% of the value of the rated power supply voltage Un, both in AC and DC. It is always fitted with an auxiliary limit contact.

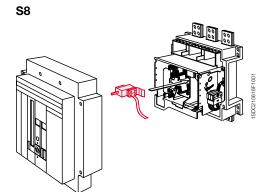
T1-T2-T3

S3-S4-S5





S6-S7



SOR - Electrical characteristics						
Tmax T1, T2	, ТЗ					
	Absorbe on in	•				
Version	AC [VA]	DC [W]				
12 V DC		50				
2430 V AC	50					
4860 V AC/DC	60	60				
110127 V AC-110125 V DC	50	50				
220240 V AC-220250 V DC	50	50				
380440 V AC	55					
480500 V AC	55					
Opening times [ms]	1	5				

SACE Isomax S3,	S4 and S5	
	Absorbe	d power
	on in	rush
Version	AC [VA]	DC [W]
12 V DC		120
24 V AC/DC	100	120
24 V DC*		4
48 V DC		120
110120 V AC-110125 V DC	100	120
110120 V AC*	4	
220240 V AC-220250 V DC	100	120
480 V AC	100	
Opening times [ms]	≤	15

SACE Isomax	S6, S7		SACE Ison	nax S8	
	Absorbe on in	•		Absorbe on in	•
Version	AC [VA]	DC [W]	Version	AC [VA]	DC [W]
12 V DC		150	24 V DC		150
24 V AC/DC	150	150	24 V AC-30 V DC	200	150
48 V DC		150	48 V AC/DC	200	150
110120 V AC-110125 V DC	150	150	60 V DC		150
220240 V AC-220250 V DC	150	150	100127 V AC/DC	200	150
480 V AC	150		127150 V AC	200	
Opening times [ms]	≤1	5	160 V DC-150180 V AC	200	150
			200250 V AC/DC	200	150
			380500 V AC	200	
			Opening times [ms]	≤2	20

* Shunt trip for permanent supply



Service releases



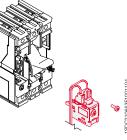
UVR - Undervoltage release (UL file: E116596)

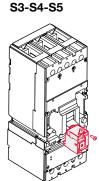
This opens the circuit breaker due to a power supply failure of the release or to voltage drops to values of less than 0.7 x Un with a trip range from 0.69 to 0.35 x Un.

After tripping, the circuit breaker can be closed again starting from a voltage higher than 0.85 x Un. With the undervoltage release de-energized, it is not possible to close the circuit breaker.

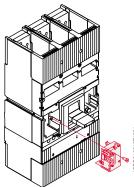




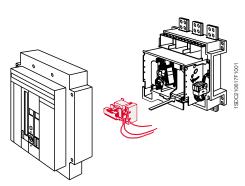




S6-S7



S8



2

Tmax T1, T2	, ТЗ	
	Absorbe	d power
	on in	rush
Version	AC [VA]	DC [W]
2430 V AC/DC	1.05	1.05
48 V AC/DC	1	1
60 V AC/DC	1	1
110127 V AC-110125 V DC	2	2
220240 V AC-220250 V DC	2.05	2.05
380440 V AC	3	
480500 V AC	4	
Opening times [ms]	1	5

SACE Isom	ax S3, S4 and S5	
<u></u>	Absorbe on in	•
Version	AC [VA]	DC [W]
24 V AC	6	
24 V DC		3
48 V AC	6	
48 V DC		3
110127 V AC	6	
220250 V AC	6	
220250 V DC		3
480 V AC	6	
Opening times [ms]	≤18 f ≤25 for	

SACE Iso	max S6, S7	
	Absorbe	d power
	on in	rush
Version	AC [VA]	DC [W]
24 V DC		4
24 V AC	10	
48 V AC	10	
48 V DC		4
110127 V AC	10	
110125 VDC		4
220250 V AC	10	
220250 V DC		4
480 V AC	10	
Opening times [ms]	≤2	25

SACE Iso	max S8	
	Absorbe on in	•
Version	AC [VA]	DC [W]
24 V DC		15
24 V AC (50Hz)	30	
30 V DC		15
30 V AC (50Hz)	30	
48 V DC		15
48 V AC (50Hz)	30	
60 V DC		15
60 V AC (50Hz)	30	
100 V AC (50Hz)- 110…115 V AC (60Hz)	30	
110115 V AC (50Hz)-		
125…127 V AC (60Hz)	30	
110125 V DC		15
120 V AC	30	
127130 V AC (50Hz)	30	
208…220 V AC (60Hz)	30	
220 V AC (50Hz)	30	
220250 V DC		15
230240 V AC (50Hz)- 277 V AC (60Hz)	30	
240 V AC	30	
380 V AC (60Hz)	30	
380400 V AC (50Hz)-		
440 V AC (60Hz)	30	
480 V AC	30	
500 V AC (50Hz)	30	
Opening times [ms]	≤	25

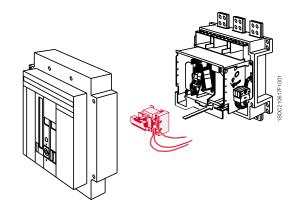


Service releases



Closing coil

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



SACE Isomax S8		
	Absorbed po	wer on inrusl
Version	AC [VA]	DC [W]
24 V DC		220
24 V AC (50Hz)	200	
24 V AC (60Hz)	200	
30 V DC		220
30 V AC (50Hz)	200	
48 V DC		220
48 V AC (50Hz)	200	
60 V DC		220
60 V AC (50Hz)	200	
100 V AC (50Hz)-110115 V AC (60Hz)	200	
110115 V AC (50Hz)-125127 V AC (60Hz)	200	
110125 V DC		220
120 V AC (60Hz)	200	
127130 V AC (50Hz)	200	
208220 V AC (60Hz)	200	
220 V AC (50Hz)	200	
220250 V DC		220
230240 V AC (50Hz)-277 V AC (60Hz)	200	
240 V AC (60Hz)	200	
310 V DC		220
380 V AC (60Hz)	200	
380400 V AC (50Hz)-440 V AC (60Hz)	200	
415440 V AC-480 V AC (60Hz)	200	
500 V AC (50Hz)	200	
Opening times [ms]	≥	25



UVD - Time delay device for undervoltage release

The undervoltage release can be combined with an external electronic power supply time delay device, which allows circuit breaker opening in the case of a drop or failure in the power supply voltage of the release itself, according to fixed delays from 0.25 to 3 sec., thereby preventing nuisance trips caused by temporary fluctuations in the voltage. The delay device must be combined with the undervoltage release of corresponding voltage.

Connectors for service releases



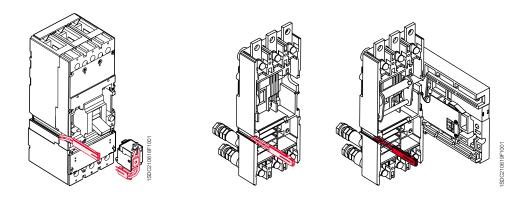
These allow the shunt trip or undervoltage release to be connected to the power supply circuit. They are available in the following versions:

- for SACE Isomax S3...S7 fixed circuit breakers

for SACE Isomax S3...S7 plug-in/draw-out circuit breakers.
 Assembly is by means of pressure into special slots in the left side of the circuit breaker.

Cables of different lengths (UL/CSA) are available.

Socket-plugs with 3, 6 or 12 poles and cable kit (UL/CSA) with a length of 78.8' (2 meters) are available for Tmax: the socket-plugs are necessary only for plug-in version.



Extension for testing releases



Available for SACE Isomax S3, S4, S5, S6 and S7 circuit breakers, this allows supply to the service releases with the circuit breaker in the withdrawn position. It is therefore possible to carry out blank operating tests of the circuit breaker in safe conditions, i.e. isolated in relation to the power circuits.



Electrical signals

These allow information relative to the circuit breaker status to be taken outside the circuit breaker. Installation of these accessories takes place directly from the front of the circuit breaker, in special slots on the right-hand side of the circuit breaker, completely segregated from the live parts, with increased operator safety.

AUX - Auxiliary contacts and bell alarm (UL file: E116596)

These carry out electrical signaling of the operating state of the circuit breaker:

- open/closed: indicates the position of the main contacts
- bell alarm: signals the circuit breaker open due to one of the following reasons:
 - overload or short circuit
 - shunt trip
 - UVR
 - trip push button on the breaker on the motor operator or due to operation of the test pushbutton alarm signalling (only for Tmax T2 with electronic release); signals intervention of the protection functions of the electronic release.

Electrical characteristics							
T1, T2, T3							
Power supply vo	Itage	Breaking capacity					
AC (50 - 60Hz) [V]	DC [V]	Resistive load [A] Inductive load					
24		10	4				
48		1.2	0.7				
110		0.45	0.3				
220		0.35	0.2				
	250	6	3				
	S3, S	4, S5, S6, S7					
Power supply voltage Breaking capacity							
AC (50 - 60Hz) [V]	DC [V]	Ohmic load [A]					
	125	0.3					
	250	0.	15				
250		e	6				
400		3	3				
S8							
Power supply vo	Power supply voltage		capacity				
AC (50 - 60Hz) [V]	DC [V]	Ohmic I	oad [A]				
	220	1					
380		e	3				
500		3	3				



2

Signaling is reset when the circuit breaker is re-armed (reset). The signals indicated in the table are available:

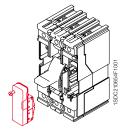
T1, T2, T3			
11, 12, 10	S3, S4, S5	S6, S7	S8

For the SACE Isomax S3, S4, S5, S6 and S7 circuit breakers, the auxiliary contacts of the circuit breaker are available, in accordance with IEC 60947-2 Standard, also in the gold-plated version for digital signals, also suitable for use for Un<24 V voltages with the same type of signaling and versions.

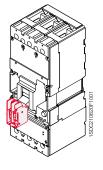
With Tmax T2 circuit breaker, fitted with electronic PR221DS release, the alarm signalling contact can be supplied (on request) plus one contact signalling open/closed (on change-over) plus one contact signalling release trip (on change-over), in the pre-wired version.

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

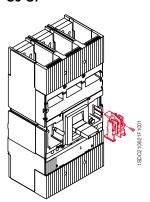
T1-T2-T3







S6-S7





Electrical signals



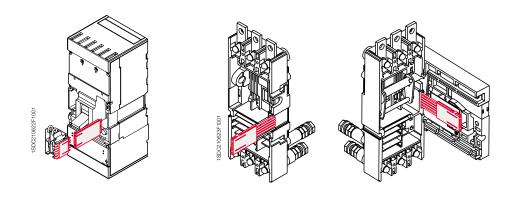
Connectors for auxiliary contacts

These allow the auxiliary contacts to be connected to the relative power supply circuit.

For SACE Isomax S3, S4, S5, S6, S7 circuit breakers, the auxiliary contacts (fitted with plug connector) can only be supplied by means of the specific connectors to be ordered specifying the size and version of the circuit breaker (fixed or plug-in/draw-out).

Assembly is carried out by mounting into special slots on the right side of the circuit breaker.

Socket-plugs with 3, 6 or 12 poles and cable kit (UL/CSA) with a length of 78.8" (2 m) are available. For Tmax: the socket-plugs are necessary only for plug-in version.





Extension for testing auxiliary contacts

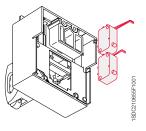
Available for SACE Isomax S3, S4, S5, S6 and S7 circuit breakers, this allows the auxiliary contacts to be connected to the relative power supply circuit with the circuit breaker in the withdrawn position. With the circuit breaker in safe conditions, i.e. isolated in relation to the power circuits, blank tests of circuit breaker operation can be carried out.



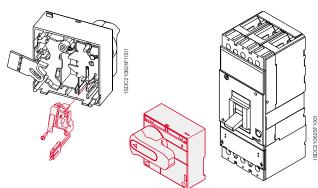
AUE - Early auxiliary contacts

An auxiliary contact for S3...S7 and two contacts for T1, T2 and T3, allow the undervoltage release or a control device to be supplied in advance, in relation to closing of the main contacts, in compliance with the IEC 60204-1, and VDE 0113 Standards. They are mounted inside the direct rotary handle operating mechanism. For SACE Isomax S3, S4, S5, S6 and S7, the contact is supplied complete with socket connector of the type with double slide for simultaneous connection of the undervoltage release and of the consent contact itself; with T1, T2 and T3, the early contacts are supplied in the cabled version with cables 39.4" (1 m) long, complete with socket-plug with 6 poles.





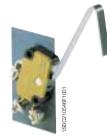




2



Electrical signals





2

AUP - Auxiliary position contacts

For the fixed part of circuit breakers Tmax T2 and T3, SACE Isomax S3, S4, S5, S6 and S7 provide electrical signaling of the circuit breaker position in relation to the fixed part: racked-in, withdrawn and racked-out. They can only be connected by means of free wires and are available in the following versions:

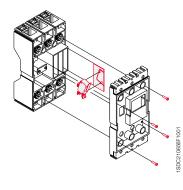
- contacts signaling circuit breaker racked-in for Tmax and Isomax circuit breakers
- contacts signaling circuit breaker drawn-out for Isomax circuit breakers.

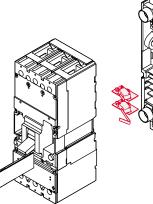
A maximum of three contacts for T2, T3, S4 and S5, a maximum of two contacts for S3 and five contacts for S6 and S7, in any combination can be installed on the fixed part.

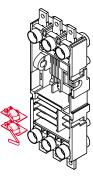
The circuit breaker position contacts are also available in the goldplated version for digital signals, also suitable for use for Un<24 V voltages with the same type of signaling and versions (for Isomax).

T2-T3









2/24



Remote controls

These allow remote control of circuit breaker opening and closing and are particularly suitable for use in electrical network supervision and control systems.

A selector allows changeover from automatic to manual operation. They are always fitted with a padlock.

MOS - Solenoid operating mechanism for Tmax T1, T2 and T3 (UL file: E116596)

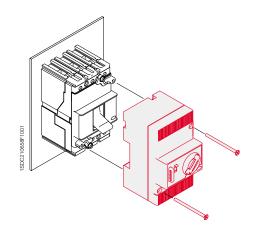
This operates both opening and closing of the circuit breaker, acting directly on its lever. It is proposed in the front version suitable for being installed directly on the front of the circuit breaker and is complete with handle for operation.

The operating mechanism can be used either in the three-pole or four-pole version.

It is supplied complete with free cables 39.4" (1 m) long and socket-plug connector with 3 poles.

The table gives the power supply voltage values Un [V].

AC	[V]	110250		
DC	[V]	4860 / 110250		
Service voltage		85110% 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	n, on the front	IP30		
Minimum control im	ipulse			
time on opening and	d closing [ms]	>100		





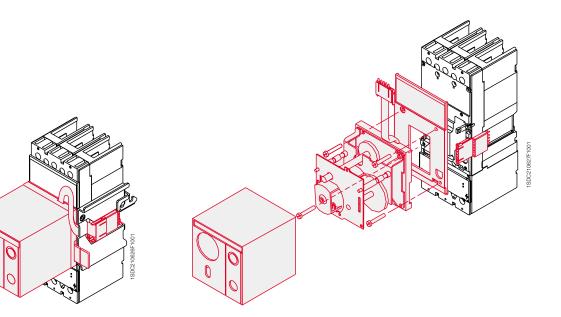
2/25

Remote controls

Direct action motor operator for SACE Isomax S3, S4, S5 (UL file: E116596)

Both the opening and closing command is controlled by the motor, which acts directly on the circuit breaker lever. The table shows the power supply voltage values Un [V].

Motor operator S3, S4, S5						
			AC	DC		
Rated voltage, Un		[V]		24		
		[V]		4860		
		[V]	120	125		
		[V]	240	250		
		[V]	440			
Operating voltage			85110% Un			
Inrush power absorption F	⊃ _S		500 [VA]	500 [W]		
Service power absorption	Pc		350 [VA]	350 [W]		
Operating frequency	[Hz]		50-60			
Time constant		[ms]	18			
Duration	openi	ng [s]	0.1			
	closi	ng [s]	0.1			
Mechanical life [no. opera	tions]	15000 (S3-S4)-10000 (S5)			
Degree of protection, on the front		IP30				
Minimum duration of the opening and closing command impulse [ms]		2	150			





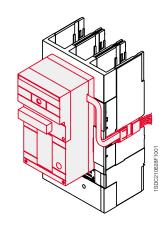


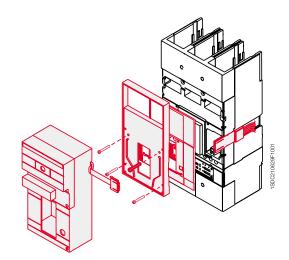
Stored energy motor operator for SACE Isomax S6, S7 circuit breakers (UL file: E116596)

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

In the case of interlocked circuit breakers, the key lock against manual operation is necessary.

Motor operator S6, S7	,				
			AC	DC	
Rated voltage, Un [V]			24		
		[V]		48	
		[V]	120	125	
		[V]	240	250	
Operating voltage			85110% Un		
Inrush power absorption Ps		660 [VA]	600 [W]		
Service power absorpti	on Pc		180 [VA]	180 [W]	
Operating frequency	[Hz]		50-60		
Time constant	[ms]		22		
Duration	opening [s]		1.	2	
	closing [s]		0.0)9	
Mechanical life	[no. operations]		10000 (S6)	-5000 (S7)	
Degree of protection, on the front		IP30			
Minimum duration of th	e opening				
and closing command impulse [ms]			≥ 100		







Remote controls



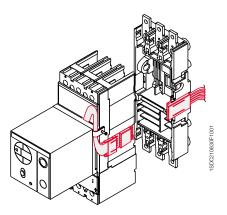
Geared motor for SACE Isomax S8 circuit breaker

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



Connectors for motor operators

The motor operators, from S3 to S7, can only be supplied by means of the specific connectors. They are of the slide type and allow simultaneous connection of both the motor operator and the auxiliary contacts to the relative power supply circuit. They are an alternative to the corresponding connectors for the auxiliary contacts only since they are housed in the same seat. They must be ordered specifying the size and version of the circuit breaker (fixed or plug-in/draw-out).



Extension for testing motor operators



For the SACE S3, S4, S5, S6, and S7 circuit breakers, this allows both motor operators and the auxiliary contacts to be connected to the relative power supply circuit with the circuit breaker in the racked-out position. With the circuit breaker in safe conditions, i.e. isolated in relation to the power circuits, blank operating tests of the circuit breaker can be carried out. It must be ordered specifying the size and version of the circuit breaker (fixed or plug-in/ draw-out) and automatically excludes the corresponding extension for testing the auxiliary contacts.



Operating mechanisms with locks







Rotary handle operating mechanism (UL file: E116596 for Tmax)

The rotary handle operating mechanism facilitates operation thanks to its ergonomic handle. It is always fitted with a padlock in the open position which prevents the circuit breaker being closed. The padlock slot can take up to three padlocks – stem Ø 0.27" (7 mm) for T1, T2, T3 and 0.24" (6 mm) for S3, S4, S5, S6, S7 (not supplied).

The rotary handle operating mechanism for T1, T2 and T3 is always fitted with a compartment door lock and, on request, can be supplied with a key lock in the open position; for S3, S4, S5, S6 and S7, on request, it can be supplied with a compartment door lock or key lock in the open position.

Application of the rotary handle operating mechanism is an alternative to the motor operator and to the front interlocking plate for Tmax and to the front flange for the lever operating mechanism for Isomax.

The rotary handle operating mechanism is available in either the direct version and in the transmitted version on the compartment door.

The position of the rotary handle indicates with certainty the position of the contacts: open, closed and relay tripped. The trip unit settings and the nameplate data remain accessible to the user. For SACE Isomax S6 and S7 circuit breakers, the direct rotary handle operating mechanism on the circuit breaker is always sup-

plied complete with flange for the compartment door.

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

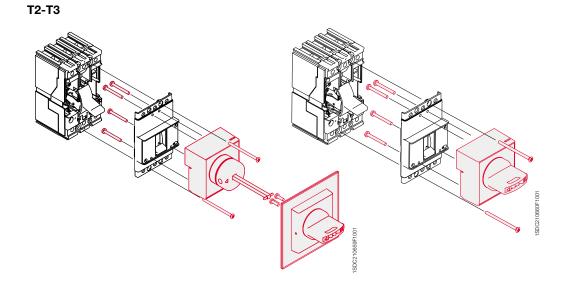
- rotary handle on the compartment door
- transmission rod (19.68" / 500 mm)
- base for circuit breaker

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

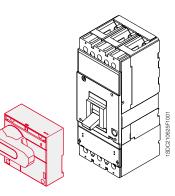
T1, T2, T3	S3, S4, S5		S6, S7	
F/P	F/P	w	F	w
19.68" - 500 mm	18.81" - 300 mm	18.81" - 300 mm	19.68" - 500 mm	19.68" - 500 mm
19.68" - 500 mm	18.81" - 300 mm		19.68" - 500 mm	
19.68" - 500 mm	19.68" - 500 mm			
	F/P 19.68" - 500 mm 19.68" - 500 mm	F/P F/P Image: state	F/P F/P W Image: state stat	F/P F/P W F Image:



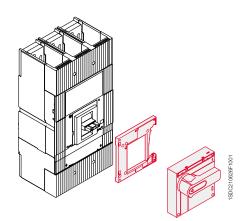
Operating mechanisms with locks



S3-S4-S5



S6-S7





Front flange for lever operating mechanism

This can be installed on SACE Isomax S3, S4, S5, S6, and S7 fixed, plug-in or draw-out circuit breakers. In the case of draw-out circuit breakers installed in compartments, it allows higher protection degree of protection to be kept for the whole isolation run of the circuit breaker.

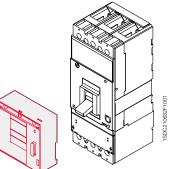
It is always fitted with a padlock in the open position (stem \emptyset 0.24" - 6 mm up to three padlocks - not supplied) which prevents closing of the circuit breaker.

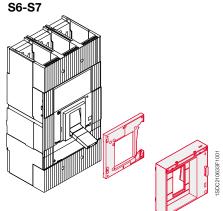
On request, it can be fitted with a key lock in the open position for one or more circuit breakers and with the compartment door lock. It is available in the following versions:

- for fixed or plug-in circuit breaker
- for draw-out circuit breaker.

For the SACE Isomax S6, S7 circuit breakers, it is always supplied complete with flange for the compartment door, whereas for the S3, S4, and S5 circuit breakers the flange supplied with the circuit breaker can be used, to be ordered separately.

S3-S4-S5



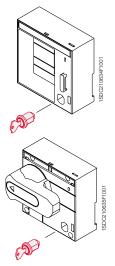


Key lock in open position

This allows the mechanical closing operation of the circuit breaker to be locked.

- The following versions are available:
- lock with different key for each circuit breaker
- lock with the same key for groups of circuit breakers.

For SACE Isomax S3...S7 circuit breakers, different locks are supplied for the direct action motor operator, for stored energy motor operator, for rotary handle or front for lever operating mechanism. For Tmax, the key lock is available for the rotary handle operating mechanism (RHL). Furthermore, for Tmax, it is also available in the version which allows the lock both in the open and in the closed position: the lock in the closed position does not prevent tripping of the mechanism following a fault or a remote control command.









Operating mechanisms with locks

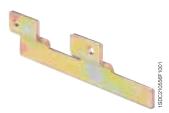


KLC - Key lock on the circuit breaker

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

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

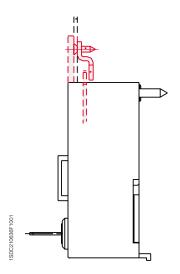
- standard type, with key only removable with the circuit breaker locked
- special type, with key removable in both positions.



Compartment door lock

This prevents the compartment door being opened with the circuit breaker closed. It can be used with the SACE Isomax S3, S4, S5, S6, and S7 circuit breakers in the fixed, plug-in or draw-out version and fitted with rotary handle operating mechanism or front for lever operating mechanism. It consists of two elements: one applied to the rotary handle operating mechanism or to the front for the lever operating mechanism, the other, consisting of a metal striker, to be applied onto the compartment door.

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



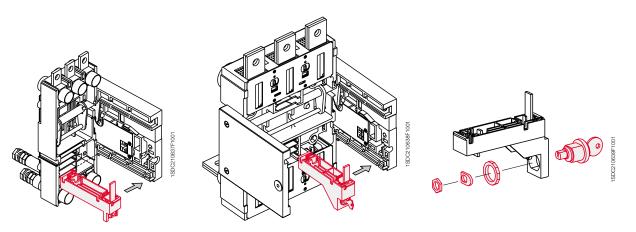
2



Lock for fixed part of draw-out circuit breakers S3...S7

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

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



Sealable thermal adjustment lock



This is applied to the circuit breaker covers near the thermal element regulator of the TMD thermomagnetic trip unit 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 Tmax and Isomax circuit breakers.



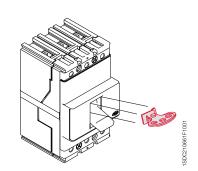
Operating mechanisms with locks



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

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

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



T1							
	T2	тз	S3	S4	S 5	S 6	S 7
			•				•
•	•	•					
	•	• •	• • •				

T1-T2-T3



S3...S7



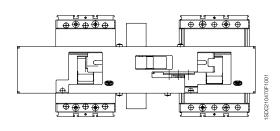
T1-T2-T3

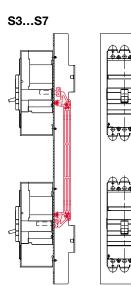
Mechanical interlock between circuit breakers

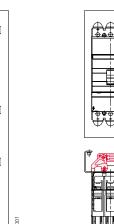
For Tmax T1, T2 and T3 circuit breakers a front mechanical interlock (MIF) is available which can be applied on the front of two both three-pole and four-pole fixed version circuit breakers, which prevents simultaneous closing of the two circuit breakers. Fixing is carried out directly on the back plate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

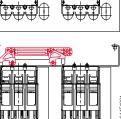
For SACE Isomax S3, S4, S5, S6 and S7 circuit breakers, the (rear) mechanical interlock allows installation of two circuit breakers on a single support and, by means of a walking beam mechanism, makes them mechanically inter-dependent. It prevents operation in parallel of two power supply sources (e.g.: normal - emergency). It consists of a kit with levers and assembly accessories and a metallic support.

The mechanical interlock is available in the version for side-byside circuit breakers and for superimposed circuit breakers. Only circuit breakers of the same size and in the same version can be interlocked.









Mechanical interlocks								
	T1	T2	тз	S 3	S4	S 5	S 6	S7
Front interlock between two fixed circuit breakers								
Front interlock between three fixed circuit breakers								
Rear interlock between two fixed or plug-in or								
draw-out circuit breakers side by side								
Rear interlock between two fixed or plug-in or								
draw-out circuit breakers superimposed								



Residual current releases - IEC only

All the Tmax and SACE Isomax S3 series of circuit breakers are preset for assembly combined with residual current releases. In particular, the Tmax circuit breakers can be combined with SACE RC221 or RC222 residual current releases, whereas SACE Isomax S3 can be combined with SACE RC211 or RC212 residual current releases.

Apart from the protection against overloads and short-circuits typical of circuit breakers, the residual current circuit breakers which are derived from them also guarantee protection of people and against earth fault currents, thereby ensuring protection against direct earth contacts, indirect contacts and the risk of fire.

The use of residual current circuit breakers allows continual monitoring of the state of insulation of the plant, ensuring efficient protection against the risks of fire and explosion and, in the case of devices with $Idn \leq 30$ mA, ensuring the protection required by the Standards and by the accident prevention 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 the direct current components.





SACE RC221 and RC222 electronic residual current releases

The SACE RC221 and RC222 residual current releases can be installed on the Tmax T1, T2 and T3 circuit breakers. The versions available make their use possible both with three-pole and four-pole fixed version circuit breakers.

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, to be housed in the special slot made in the area of the left pole.

They do not require an auxiliary power supply since they are supplied directly from the network and their operation is guaranteed even with only a single phase plus neutral or just two phases supplied with voltage and in the presence of one-direction pulsating currents with continuous components.

All the possible connections are allowed as long as the connection of the neutral to the first pole on the left is guaranteed in the four-pole version.

The RC221 and RC222 releases can be fed either from the load or the line side.





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 signaling residual current release trip
- a 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 rationalization of the installation procedure. Only front terminals for copper cables (FC Cu) at the bottom are mounted on the residual current releases.

Residual current releases		RC221	RC222	
Technology		electronic with	microprocessor	
Action		with solenoid		
Primary service voltage (1)	[V]	85500		
Operating frequency	[Hz]	50-60 ± 10%		
Test operation range (1)	[V]	85500		
Rated service current	[A]	up	to 250	
Rated residual current trip, l∆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	% l∆n	
Time limit for non-trip (at 2 x l∆n)	[s]	instantaneous	inst0.1-0.2-0.3- 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	า			
NO contact for signalling alarm				
Indication of 25% pre-alarm of $l \Delta n$ (tolerance \pm 3%)			-	
Alarm timing indication				
Automatic reset of the residual curre on resetting the associated circuit b	0	e I		
Type A for pulsating, alternating cu	rrent			
Selective type				
Power supply from above and from	1 below			
Assembly with three-pole circuit br	eakers			
Assembly with four-pole circuit bre	akers			
Emergency stop device				
⁽¹⁾ Operation up to 50 V Phase - Neutral				



Residual current releases - IEC only

SACE RC211 and RC212 electronic residual current releases

The SACE RC211 or RC212 residual current releases can be installed on the SACE Isomax S3 circuit breaker, in the fixed, four-pole version and can be supplied in two versions as follows:

- for assembly in position beside the circuit breaker
- for assembly in position under the circuit breaker.

They are constructed using analogue technology and act directly on the circuit breaker by means of an opening solenoid, supplied with the release, to be housed in the special slot made in the area of the third pole.

They do not require an auxiliary power supply since they are supplied directly from the network and their operation is guaranteed even with only a single phase supplied with voltage and in the presence of one-direction pulsating currents with continuous components.

The operating conditions of the apparatus can be controlled constantly by means of the test pushbutton of the electronic circuit and the residual current trip magnetic indicator.

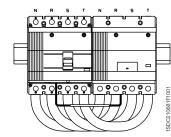
The circuit breaker complete with residual current release can be fitted with the electrical accessories normally available for the circuit breaker. The opening and undervoltage releases are housed in the special slot made in the fourth pole.

Residual current release beside the four-pole version circuit breaker

This is supplied complete with:

- power cables for connection to the lower terminals of the circuit breaker (respect correspondence with the neutral and phases)
- an opening solenoid to be housed in the area of the third pole, complete with plug-socket connector for connection to the residual current release
- 2 brackets for fixing on DIN rail (one for the circuit breaker and one for the residual current release)
- plug connector to make the connection of the remote opening pushbutton (to be provided by the customer).

For the SACE Isomax S3 circuit breaker, the residual current release is fitted with front terminals and is also supplied with a front flange H = 1.77" - 45 mm for the circuit breaker. On request, the front terminals for cables can be mounted, using the standard circuit breaker kit.



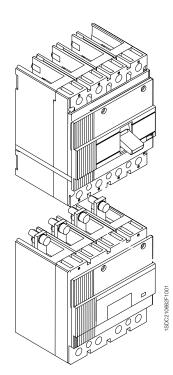
beside

Residual current release under the four-pole version circuit breaker

This is supplied complete with:

- an opening solenoid to be housed in the area of the third pole, complete with plug-socket connector for connection to the residual current release
- plug connector to make the connection of the remote opening pushbutton (to be provided by the customer) with the SACE RC212 residual current release
- two flanges for the compartment door
- protection for assembly in the area between the circuit breaker and the residual current release.

The residual current release is supplied with front terminals for cables. On request, the rear threaded terminals can be mounted, using the standard kit of the circuit breaker. For SACE S3 circuit breakers, the residual current release is supplied with front terminals (together with a front H = 1.77" - 45 mm for circuit breaker). On request, using the standard kit of the circuit breaker, front terminals for cables, extended front terminals, or rear terminals for cables can be mounted or the rear terminals using the kit with 4 pieces for the circuit breaker can be mounted and the kit for residual current release.





Residual current releases



SACE RCQ residual current relay - IEC only

The Tmax T1, T2, T3 and SACE Isomax S3, S4, S5, S6, S7 circuit breakers can be combined with the SACE RCQ relay with separate toroid (to be installed externally on the line conductors) and these fulfill requirements with thresholds up to 30 A trips and times up to 5 s or when the installation conditions are particularly restrictive, such as with circuit breakers already installed, or limited space in the circuit breaker compartment.

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

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 currents only (Type AC), for alternating and/or pulsating current with direct components (Type A) and allows residual current selectivity to be set up.

The 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 A	AC [V]	3.15 19.69
	DC [V]	1.89 4.92
Operating frequency	[Hz]	1.97 ÷ 2.36 Hz ± 10%
Trip threshold adjustment l∆n		
1st range of adjustments	[A]	0.001-0.002-0.004-0.001-0.002
2nd range of adjustments	[A]	0.04-0.12-0.20-0.39-1.18
Trip time adjustment	[s]	0-0.004-0.001-0.002-0.02-0.03-0.04-0.08-0.12-0.20
Pre-alarm threshold adjustment [%] x l∆n	0.98 2.95% x l∆n
Range of use of closed transformers		
Toroidal transformer Ø 2.36" [60 mm]	[A]	0.001 1.18
Toroidal transformer Ø 4.33" [110 mm]	[A]	0.001 1.18
Toroidal transformer Ø 7.28" [185 mm]	[A]	0.004 1.18
Range of use of transformers which can be	opened	
Toroidal transformer Ø 4.33" [110 mm]	[A]	0.01 1.18
Toroidal transformer Ø 7.09" [180 mm]	[A]	0.01 1.18
Toroidal transformer Ø 9.06" [230 mm]	[A]	0.04 1.18
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	Ň	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: 7.87 in
Dimensions L x H x D	[in]	3.78 x 3.78 x 5.18
Drilling for assembly on door	[in]	3.62 x 3.62



Accessories for electronic releases

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

The dialogue unit is a device which allows two-way communication from the circuit breaker to the outside and vice versa. ABB SACE has built two distinct dialogue units able to support two different communication protocols: SACE PR212/D-M (Modbus RTU protocol) and SACE PR212/D-L (LonTalk protocol by Echelon). Both units are housed in external modules, which can be installed on DIN rails, and can be used with the S4, S5, S6, and S7 circuit breakers fitted with SACE PR212/P electronic release, both in the LSI and LSIG versions. They must be supplied with a stabilized voltage of 24 V DC (\pm 20% with maximum ripple \pm 5%) and be earthed. Communication towards the outside is generally addressed to a supervision and control unit, which has the task of collecting and storing the information regarding the part of the plant controlled.

In the case of an error in the serial communication due to a fault in the dialogue unit or lack of auxiliary power supply, the SACE PR212/P protection unit works according to the last parameters set and, in any case, in accordance with what has been set manually. The SACE PR212/D-M and SACE PR212/D-L dialogue units are always fitted in combination with the SACE PR212/T actuator unit, which allows remote closing or opening operation of the circuit breaker (Remote Control) by means of two digital outputs which can be disabled thanks to the dip-switch (LOC/REM) positioned on LOC.

Information available

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



Accessories for electronic releases



SACE PR212/T actuator unit

The SACE PR212/T actuator unit allows circuit breaker opening and closing by means of the motor operator mounted on the circuit breaker. It is always supplied in combination with the SACE PR212/D dialogue unit. An auxiliary power supply with a stabilized voltage of 24 V DC (\pm 20%, with maximum ripple - \pm 5%) and earthed is required for operation of the unit.

The PR212/D dialogue unit sends the digital opening and closing commands, received from the supervision and control system, to the inputs of the SACE PR212/T actuator unit, which carries out circuit breaker closing and opening by means of a power relay. The motor operator of the circuit breaker (use the versions with power supply voltage at 110 V AC/DC or 220 V AC) must be connected to these relays.



SACE TT1 Test unit

This allows control of tripping of the SACE PR211/P, SACE PR212/P, and SACE PR221DS electronic releases and the trip test of the opening solenoid. The device is supplied by means of a 12 V replaceable battery and is fitted with a two-pole polarized connector-tracer point housed on the bottom of the box, which allows connection of the device to the test input bushings located on the bottom of the electronic release.

The limited dimensions of the accessory make it practically pockettype.



SACE PR212/K signaling unit

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

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



SACE PR020/K signaling unit

The SACE PR020/K signaling unit can convert the signals received via the bus from the SACE PR212/P (LSI or LSIG) protection units into electric signals by means of normally open electrical power contacts.

An auxiliary power supply with a voltage stabilized at 24 V DC ($\pm 20\%$ with maximum ripple $\pm 5\%$) and earthed is needed to operate the unit.

It is connected to the Internal Bus of the protection unit by means of a dedicated serial line over which the information regarding the state of activation of the protection functions passes, on the basis of which the relative power contacts are closed.

In particular, the following signals are available:

PR21	2/P (LSI-LSIG)
K51	PR212/P (LSI-LSIG)
1	Protection L alarm
2	Protection S alarm
3	Protection I alarm
4	Protection G alarm
5	Bus K.O.
6	Release trip
7	Release trip
8	Protection L pre-alarm

PR020/K	
Maximum switching capacity	100 W / 1250 VA (resistive load)
Maximum switching voltage	130 V DC / 250 V AC
Maximum switching current	5A
Breaking power (UL/CSA) @ 30 V DC (resistive load)	3.3 A
Breaking power (UL/CSA) @ 250 V DC (resistive load)	5 A
Contact/coil insulation	2000 V efficient (1 min. @ 50 Hz)

Alarm signaling remains active for the whole duration of the overload up to any release trip.

The protection trip signals remain active during the timing phase and remain that way even after release trip.

A Reset pushbutton on the front of the unit allows the state of all signals to be reset.

There are also two LEDs available on the unit for visually signaling the following information:

- "Power ON": auxiliary power supply present
- "TX (Int Bus)": flashing synchronized with the communication activity with the Internal Bus, and eight LEDs dedicated to internal power releases status.

The table shows the characteristics of the signaling relays available in the SACE PR020/K unit.



Accessories for electronic releases



SACE PR010/T Test and Configuration Unit

The SACE PR010/T unit is an instrument able to carry out the Test, programming and parameter readout functions for the protection units which equip the SACE Isomax S molded case circuit breakers and the SACE Emax air circuit breakers.

In particular, for circuit breakers fitted with SACE PR212/P release, the test, programming and readout parameter functions are available.

All the functions mentioned can be carried out ON BOARD by connection of the SACE PR010/T unit to the multipin front flange connector on the protection unit; connection is guaranteed by means of special interfacing cables supplied as standard with the unit.

The man-machine interface is guaranteed by using a membrane keyboard and a multi-line alphanumerical display.

There are also two LEDs on the unit which signal the following respectively:

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

Two different types of Test are provided: automatic and manual. By means of connection to the PC (with software diskette provided by ABB SACE), it is also possible to upgrade the SW of the SACE PR010/T unit to allow adaptation of the Test unit to evolution of new products.

The results of most importance regarding the test can also be stored in the unit itself and sent to the Personal Computer on explicit request for "issue of report".

Both in automatic and manual mode, the SACE PR010/T unit is able to test the following:

- protection functions L, S, I, G

- monitoring of correct operation of the microprocessor.

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

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



CT for external neutral

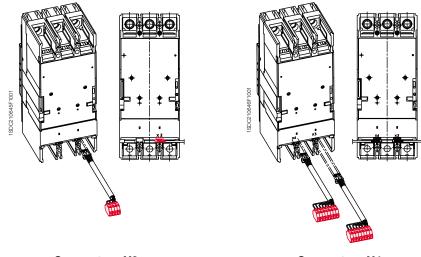
This is mounted on to the neutral conductor and allows protection against earth faults with three-pole circuit breakers. The circuit breaker must be fitted with SACE PR212/P – LSIG trip unit. The transformer must be connected to the trip unit by means of the specific X3-X4 connectors, selected according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

Connectors



These allow connection of the microprocessor-based trip unit to units or components of external plants. They are, in fact, used to make the relay tripped signal available outside and to connect the protection transformer of the neutral conductor outside the circuit breaker or to the actuator, dialogue and signaling units, if these are provided.

- connector X3 for circuit breaker fixed fitted with trip unit SACE PR211/P
- connector X3 for plug-in/draw-out circuit breaker (to be applied in the fixed part) fitted with SACE PR211/P trip unit
- connectors X3-X4 for fixed circuit breaker fitted with SACE PR212/P trip unit
- connectors X3-X4 for plug-in/draw-out circuit breaker fitted with SACE PR212/P trip unit.



Connectors X3

Connectors X4



Installation and testing accessories and spare parts



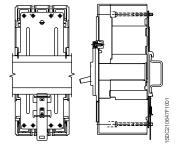
Bracket for fixing on DIN rail

This is applied to the fixed circuit breaker and allows installation on standardized DIN rails.

It simplifies assembly of circuit breakers up to 400 A (except for T1B 1p) in standard switchboards.

- bracket for fixing on DIN EN 50022 rail for Tmax T1, T2 and T3 circuit breakers
- bracket for fixing on DIN EN 50023 rail for SACE S3-S4-S5 circuit breakers.

The bracket for fixing onto DIN rails is also available for the Tmax circuit breakers combined with RC221 and RC222 residual current releases or with the solenoid operating mechanism of the sideby-side type. The fixing bracket kit for SACE S3-S4-S5 circuit breakers also includes the front H = 1.77" - 45 mm.



Flange for compartment door For the SACE Isomax S3, S4, S5, S6 and S7 circuit breakers it is possible to use the same flange (to be ordered), which can be

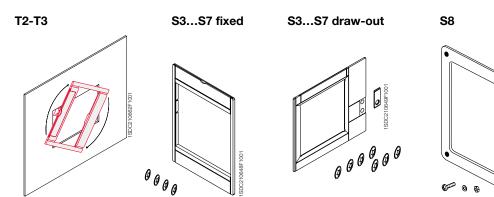
dedicated flange is supplied.

possible to use the same flange (to be ordered), which can be used with the circuit breaker (to be ordered separately), with the rotary handle operating mechanism, front for lever operating mechanism and motor operator. In case of use of these accessories with SACE Isomax S6 and S7 circuit breakers, a special flange is supplied for the purpose.

All the flanges of the Tmax series (to be ordered) are of new conception and do not require the use of screws for their installation: fixing is greatly simplified by means of a simple dove-tailing operation.

In the case of use of a rotary handle operating mechanism, solenoid operating mechanism or residual current releases, a special

21 0666F 1001





Automatic transfer switch - ATS010 (IEC only)

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

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

In case of an error in the normal line voltage, in accordance with the delays set, the normal line circuit breaker is opened, the generator started and the emergency line circuit breaker closed. Similarly, when the normal line returns to range, the reverse switching procedure is automatically controlled. It is especially suited for use in all emergency power supply systems requiring a solution that is ready to install, easy to use and reliable.

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

The switching system consists of the ATS010 unit connected to two motor-driven and mechanically interlocked circuit breakers. SACE Isomax S3, S4, S5, S6 and S7 circuit breakers can be used. The built-in mains sensor of the SACE ATS010 device makes it possible to detect errors in the mains voltage. The three inputs may be directly connected to the three phases of the normal power supply line for networks with rated voltage up to 500V AC. Networks with a higher voltage require the insertion of voltage transformers (TV), setting a rated voltage for the device that matches their secondary voltage (typically 100V).

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

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

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

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

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

For software safety, a special logic prevents unwarranted operations, while a constantly operative watchdog system points out any microprocessor malfunctions via a LED on the front of the device. Hardware safety allows integration of an electrical interlock via power relay, so that there is no need to use an external electrical interlock system. The manual selector on the front of the device can also control the entire switching procedure, even in the event of a microprocessor fault, by working electromechanically on the control relays.



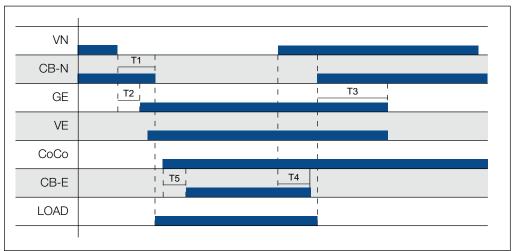
Installation and testing accessories and spare parts

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

Maximum voltage Un Max +5%+30% Ur			
Maximum voltage Un Max +5%+30% Ur Fixed frequency thresholds 10%+10% fn T1: opening delay of the normal line circuit breaker 032 s T2: generator start-up delay due to network error 032 s T3: stopping delay of the generator 0254 s T4: switching delay due to network stop 0254 s T5: closing delay of the emergency line circuit breaker	Setting range for th	resholds and times	
Fixed frequency thresholds 10%+10% fn T1: opening delay of the normal line circuit breaker 032 s due to network error (CB-N) 032 s T2: generator start-up delay due to network error 032 s T3: stopping delay of the generator 0254 s T4: switching delay due to network stop 0254 s T5: closing delay of the emergency line circuit breaker	Minimum voltage	Un Min	-5%30% Un
T1: opening delay of the normal line circuit breaker due to network error (CB-N) 032 s T2: generator start-up delay due to network error 032 s T3: stopping delay of the generator 0254 s T4: switching delay due to network stop 0254 s T5: closing delay of the emergency line circuit breaker	Maximum voltage	Un Max	+5%+30% Un
due to network error (CB-N)032 sT2: generator start-up delay due to network error032 sT3: stopping delay of the generator0254 sT4: switching delay due to network stop0254 sT5: closing delay of the emergency line circuit breaker	Fixed frequency thres	holds	10%+10% fn
T3: stopping delay of the generator 0254 s T4: switching delay due to network stop 0254 s T5: closing delay of the emergency line circuit breaker 0254 s		032 s	
T4: switching delay due to network stop 0254 s T5: closing delay of the emergency line circuit breaker	T2: generator start-up delay due to network error		032 s
T5: closing delay of the emergency line circuit breaker	T3: stopping delay of	the generator	0254 s
	T4: switching delay due to network stop		0254 s
			032 s

Rated voltages settings available	100, 115, 120, 208, 220, 230, 240, 277,
	347, 380, 400, 415, 440, 480, 500 V

Operating sequence



Caption

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

Front panel



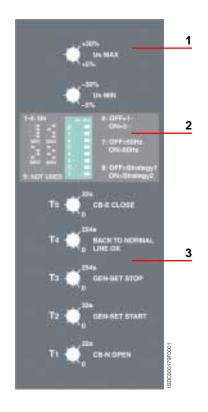
Caption

Status of the ATS010 unit and logic
 Operating mode selector

2

- 3 Normal line check 4 Normal line circuit breaker status
- 5 Voltage on the emergency line
 6 Emergency line circuit breaker status
 7 Generator status

Side panel settings



Caption

- 1 Selectors to set the under- and overvoltage thresholds2 Dip-switches to set:
- rated voltage
 - normal single-phase or three-phase line
 - mains frequency
- switching strategy
 3 Switching delay time settings for T1...T5



Characteristic curves and technical information

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Circuit breakers with thermomagnetic releases

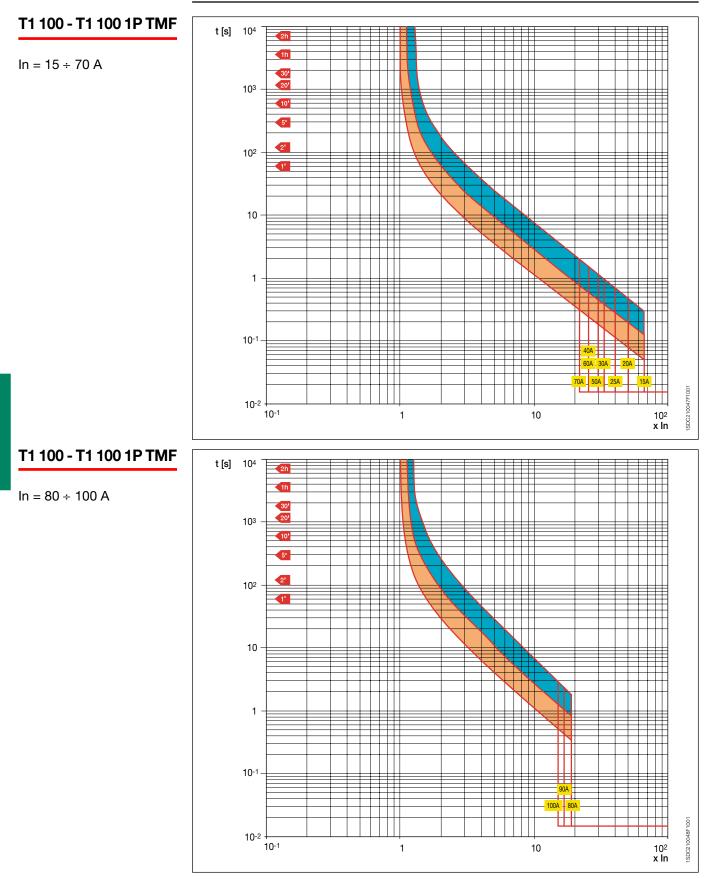
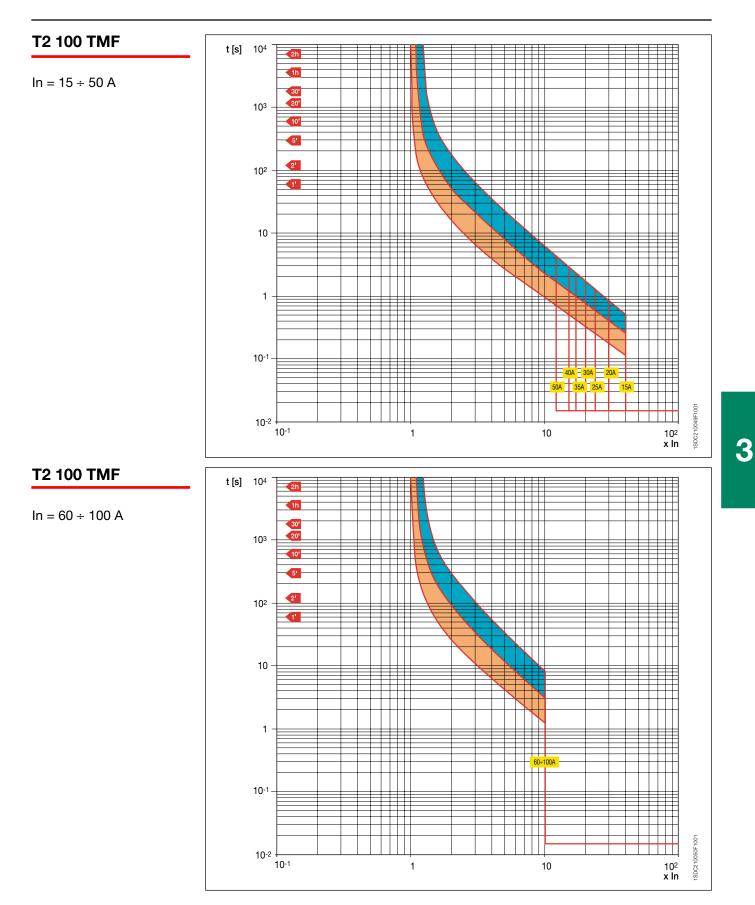


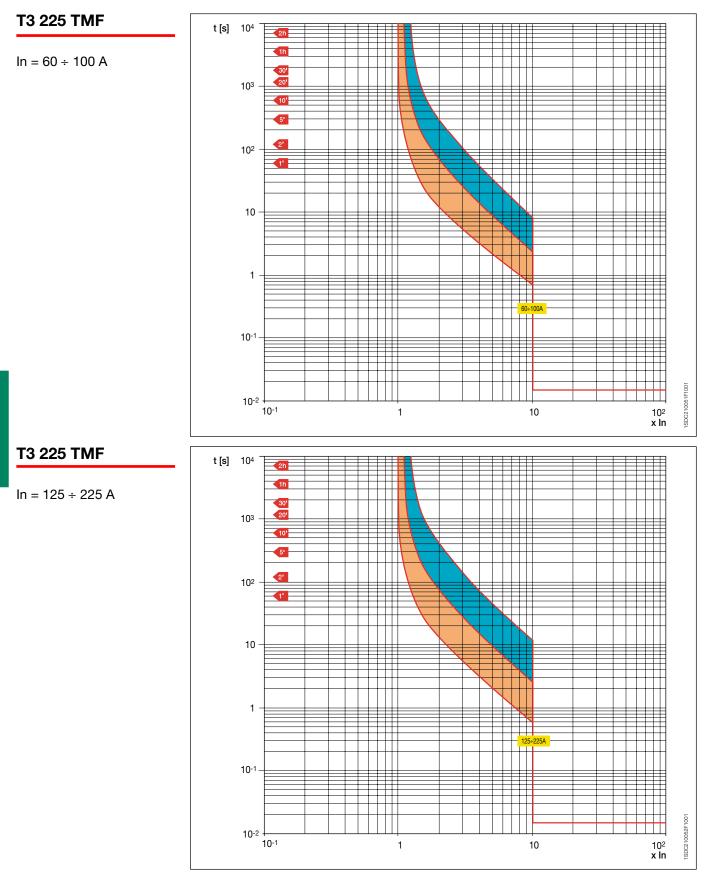
ABB SACE

3

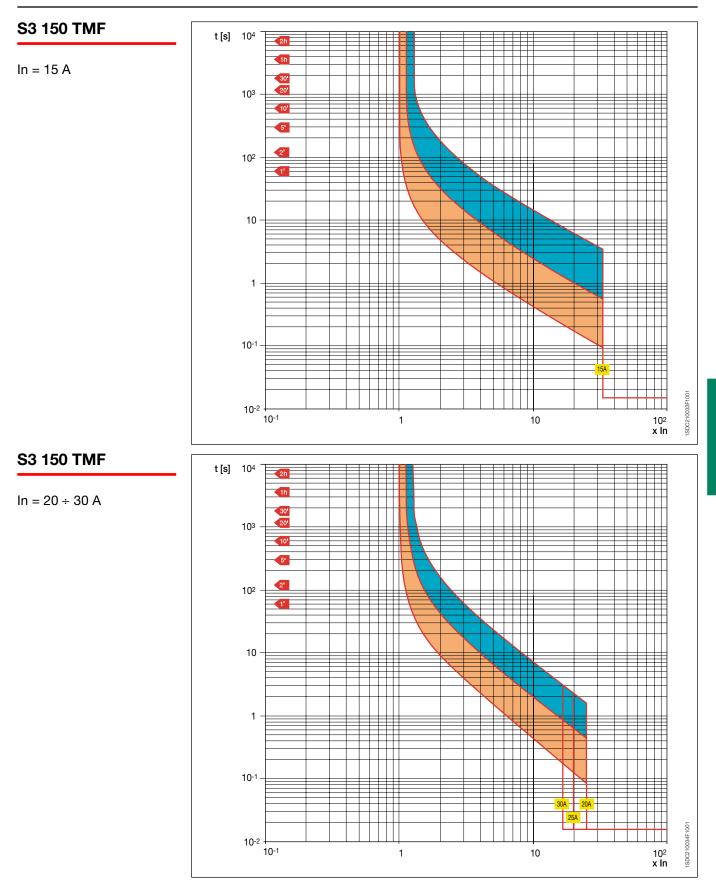




Circuit breakers with thermomagnetic releases

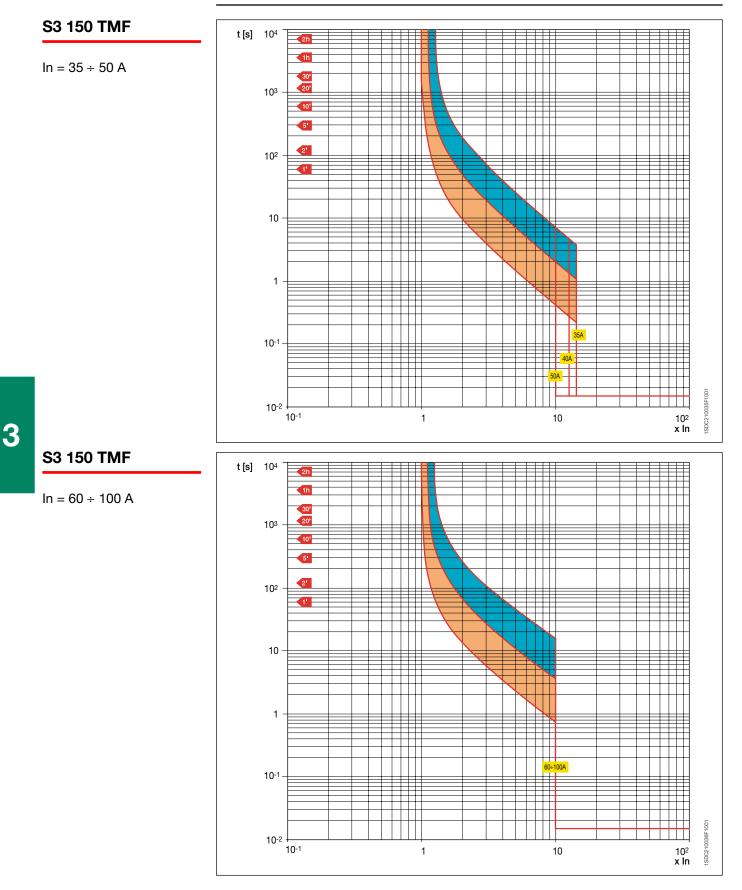


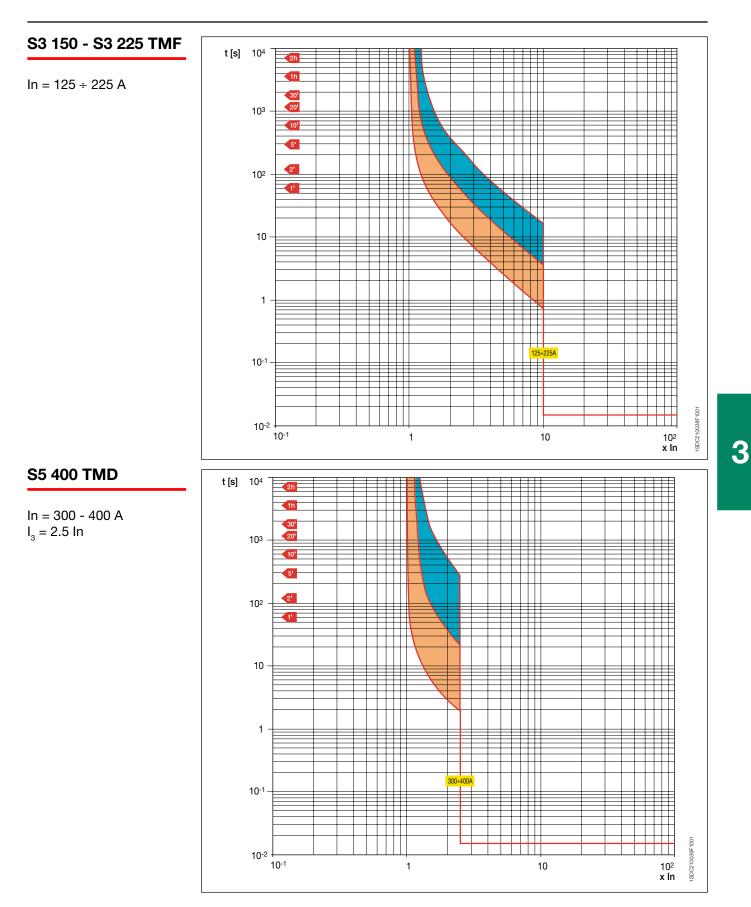
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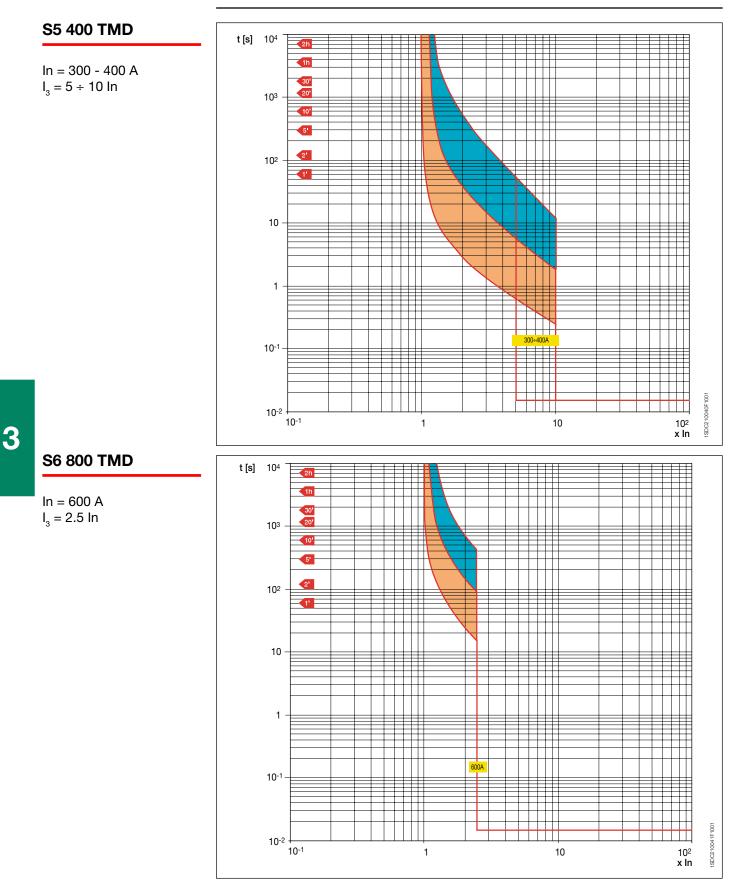
Circuit breakers with thermomagnetic releases

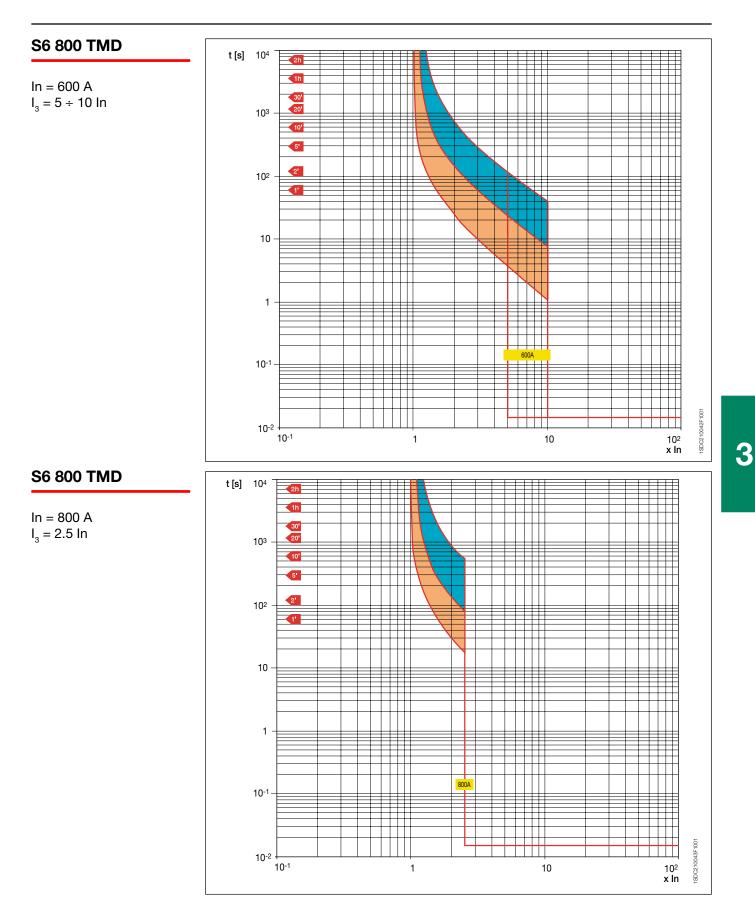






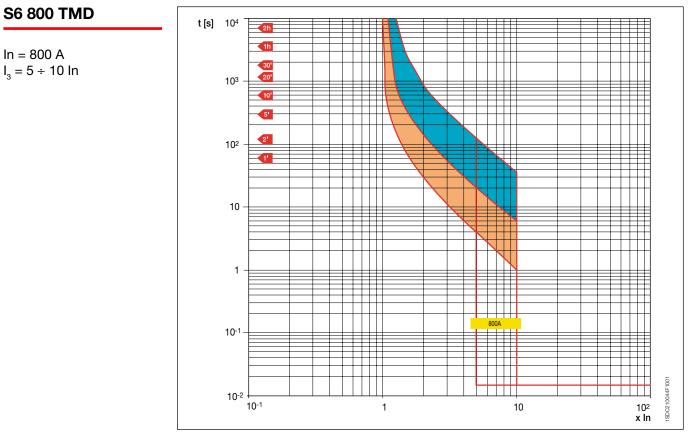
Circuit breakers with thermomagnetic releases





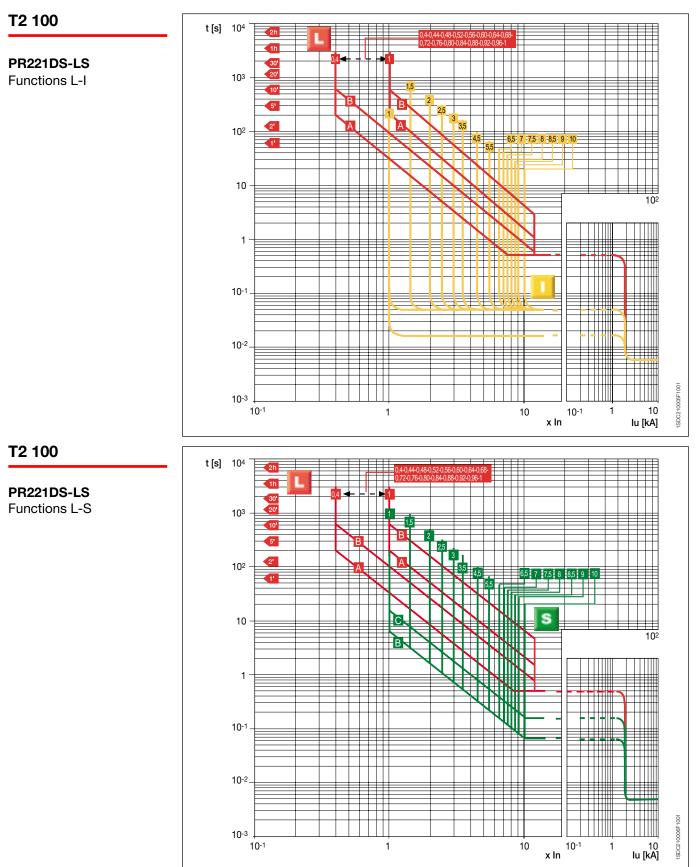


Circuit breakers with thermomagnetic releases



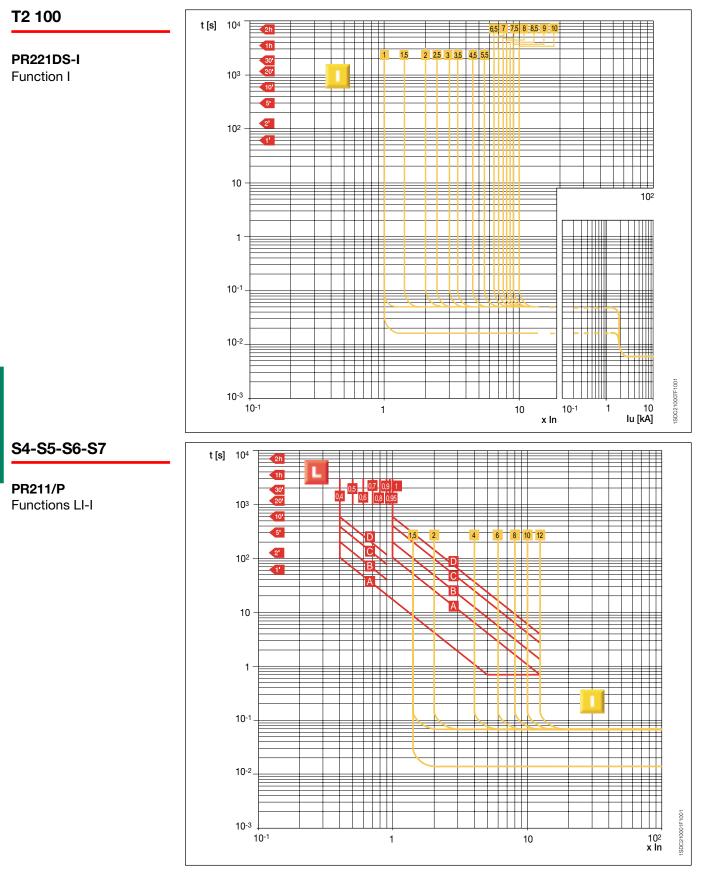
3

Circuit breakers with SACE PR221DS, SACE PR211/P, SACE PR212/P electronic releases

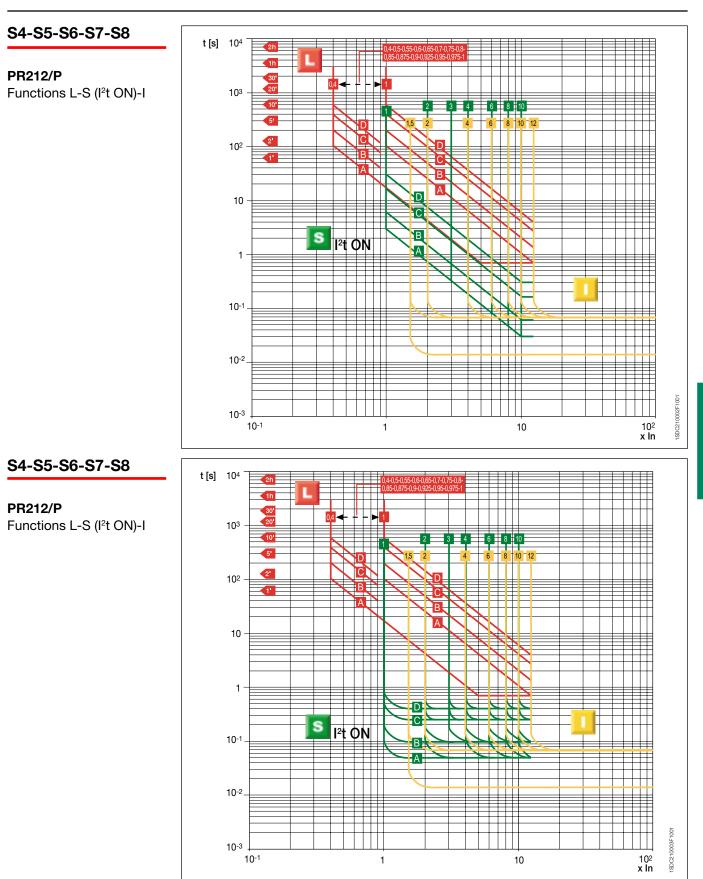




Circuit breakers with SACE PR221DS, SACE PR211/P, SACE PR212/P electronic releases

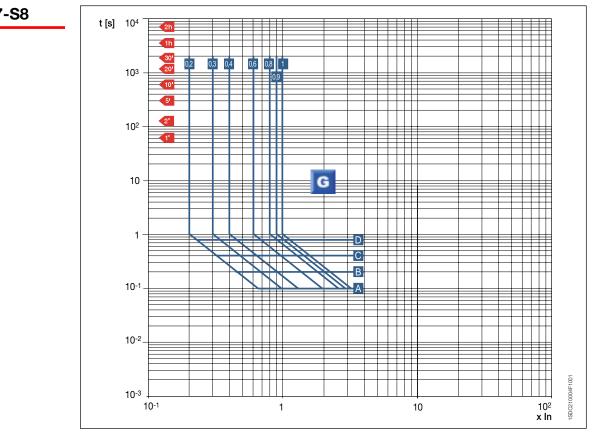


3





Circuit breakers with SACE PR221DS, SACE PR211/P, SACE PR212/P electronic releases

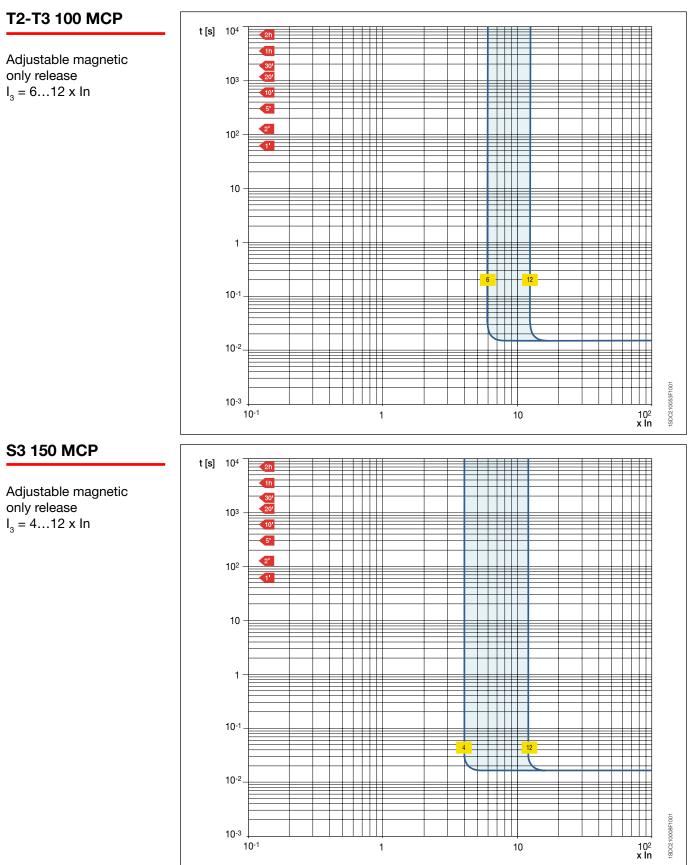


S4-S5-S6-S7-S8

PR212/P Function G

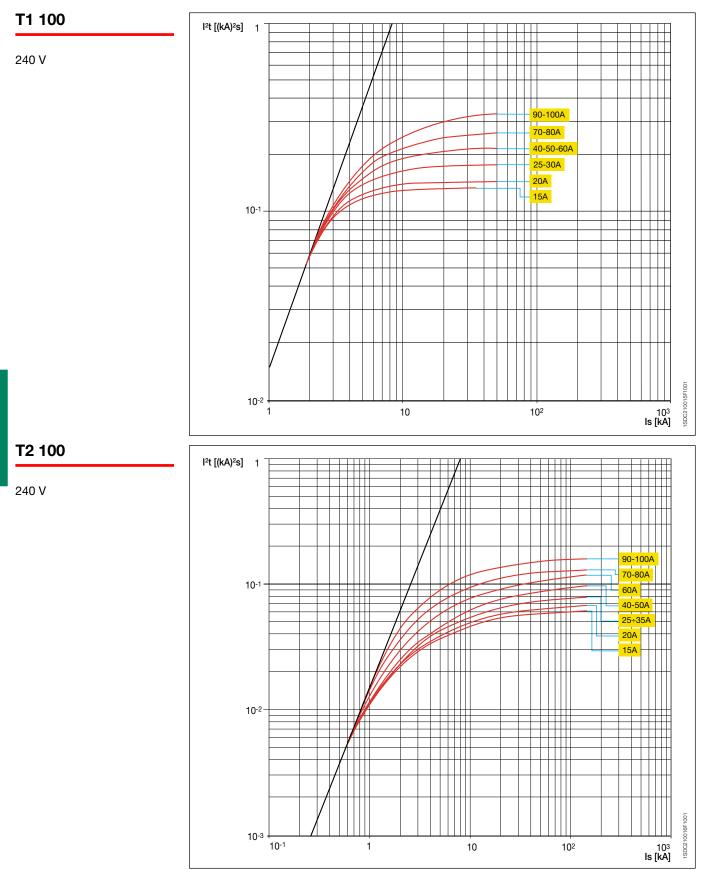
Trip curves for MCP

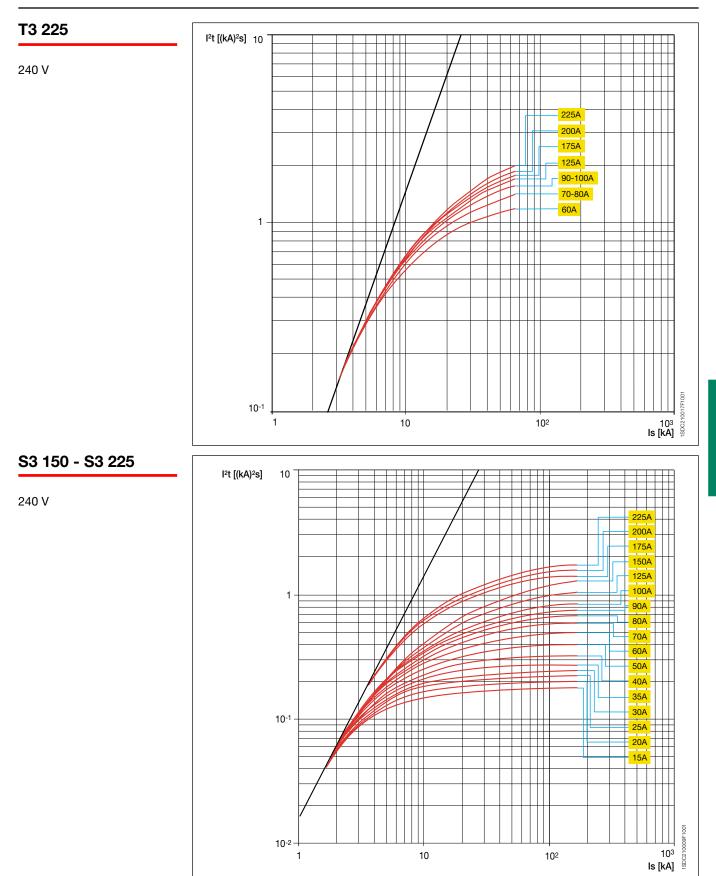
Circuit breaker with magnetic only releases





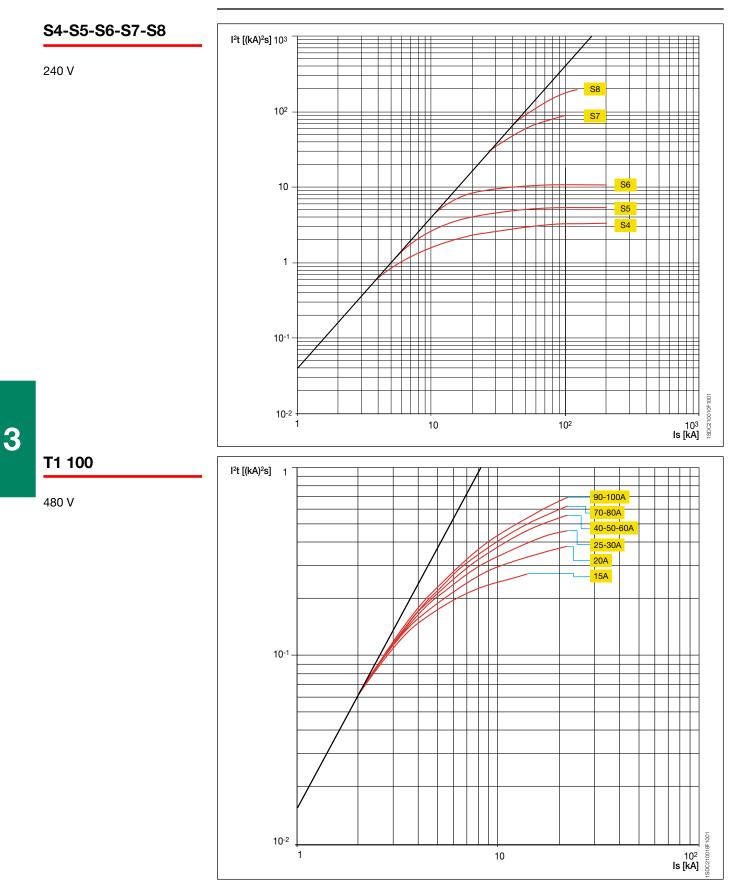
Specific let-through energy curves

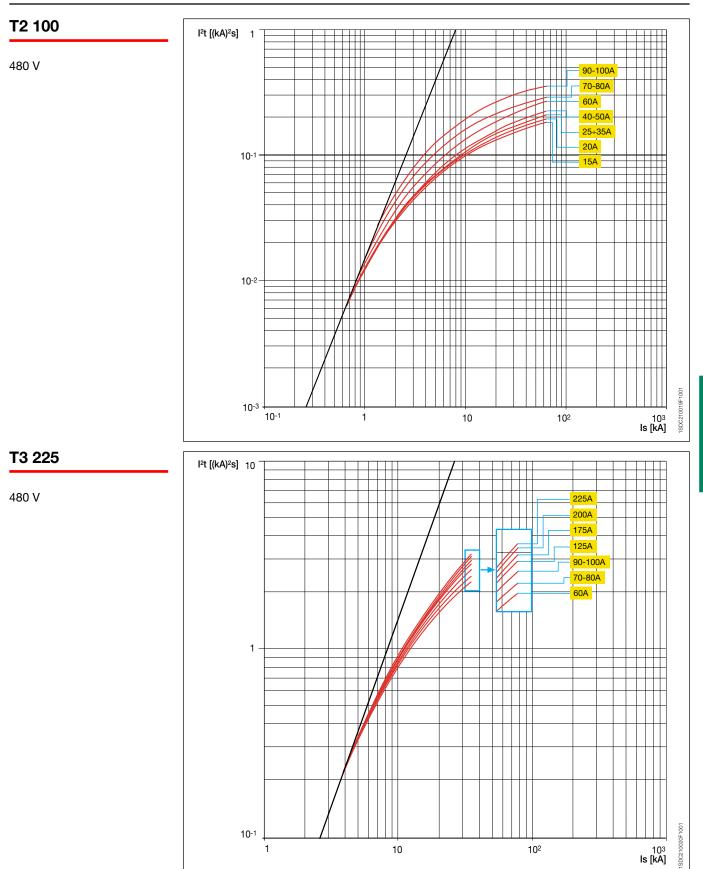






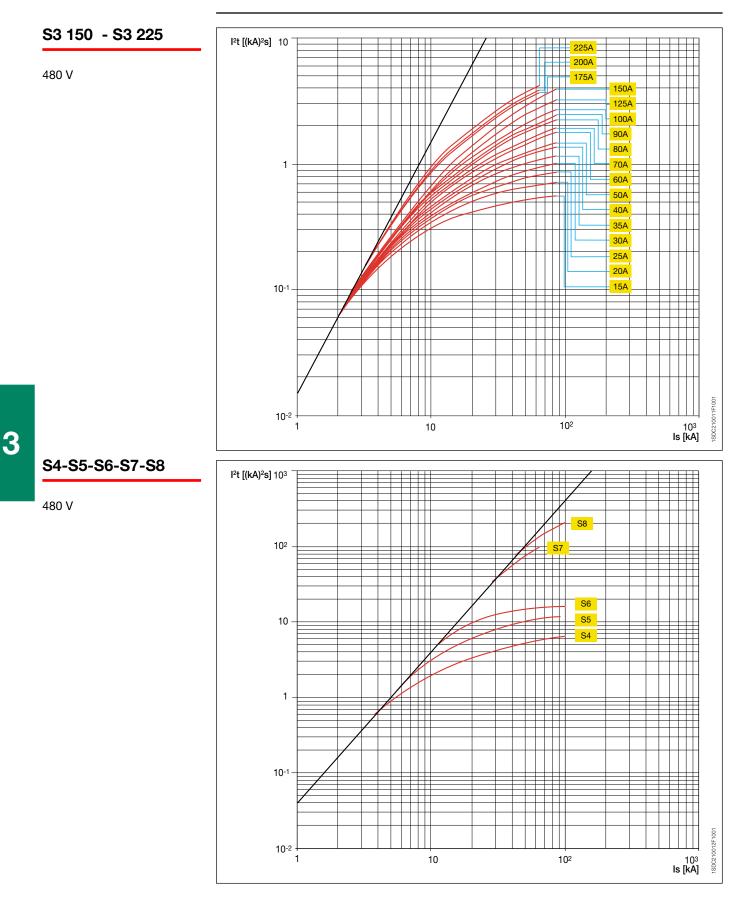
Specific let-through energy curves

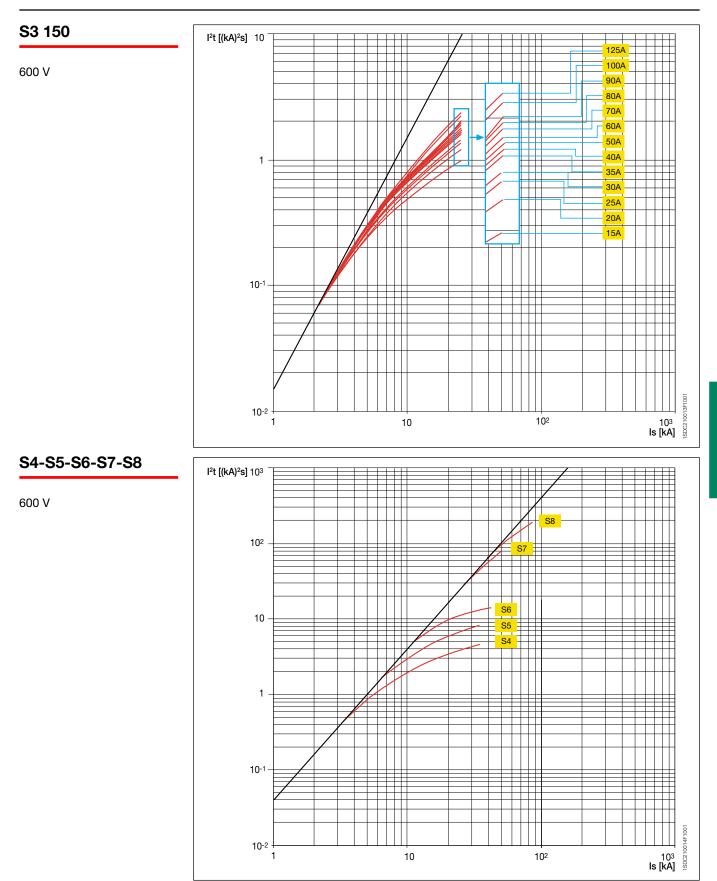






Specific let-through energy curves







Limitation curves

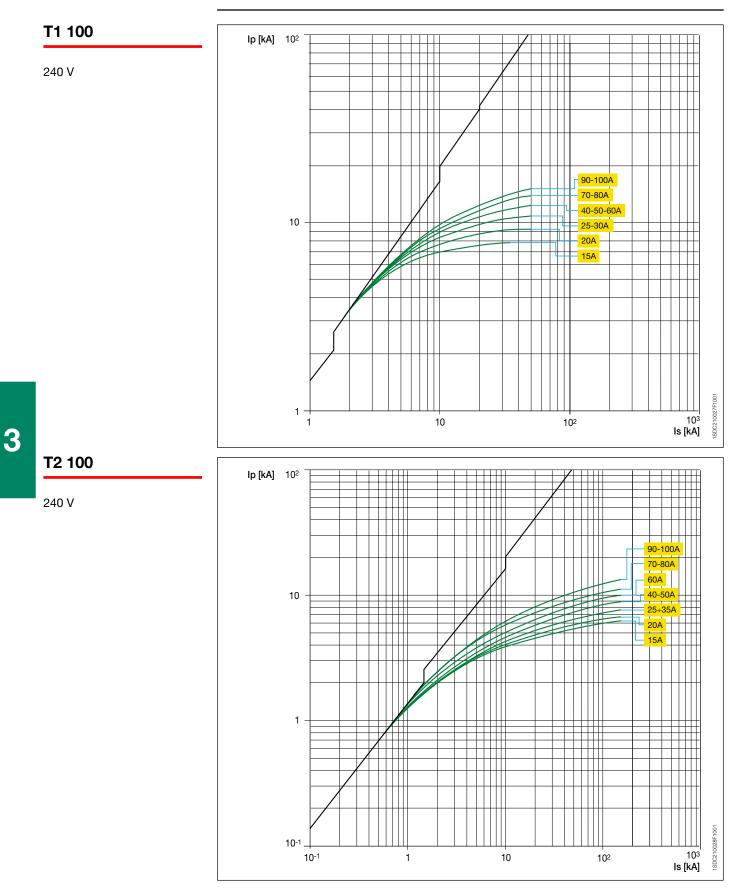
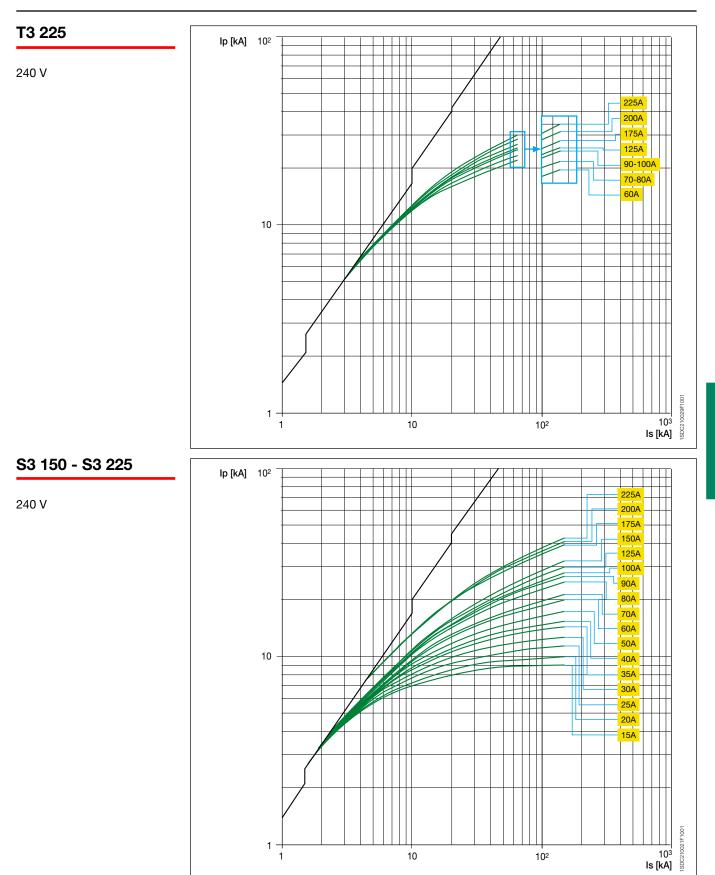
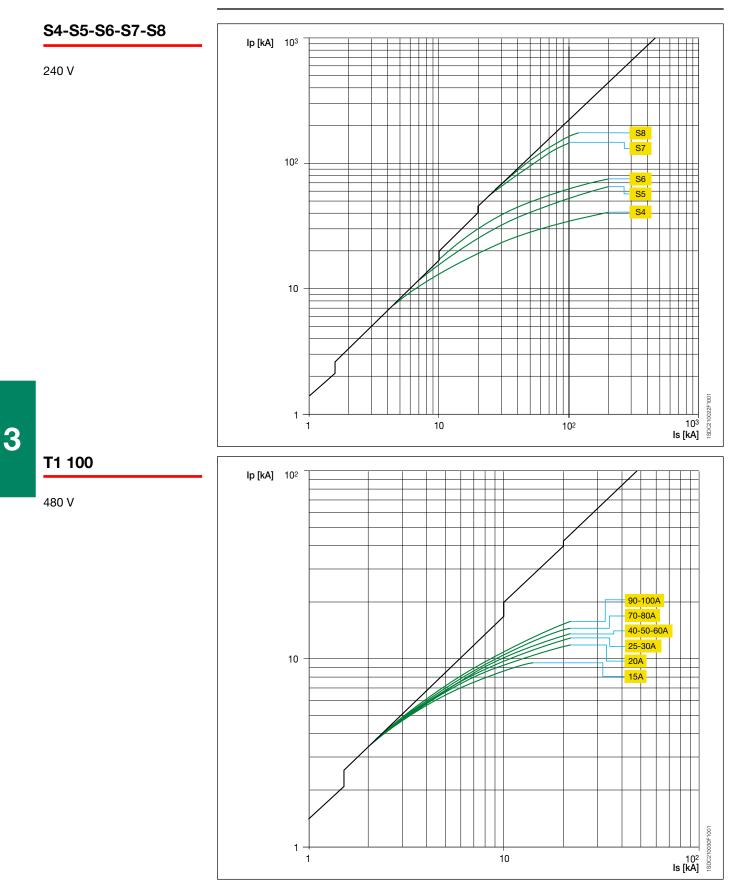


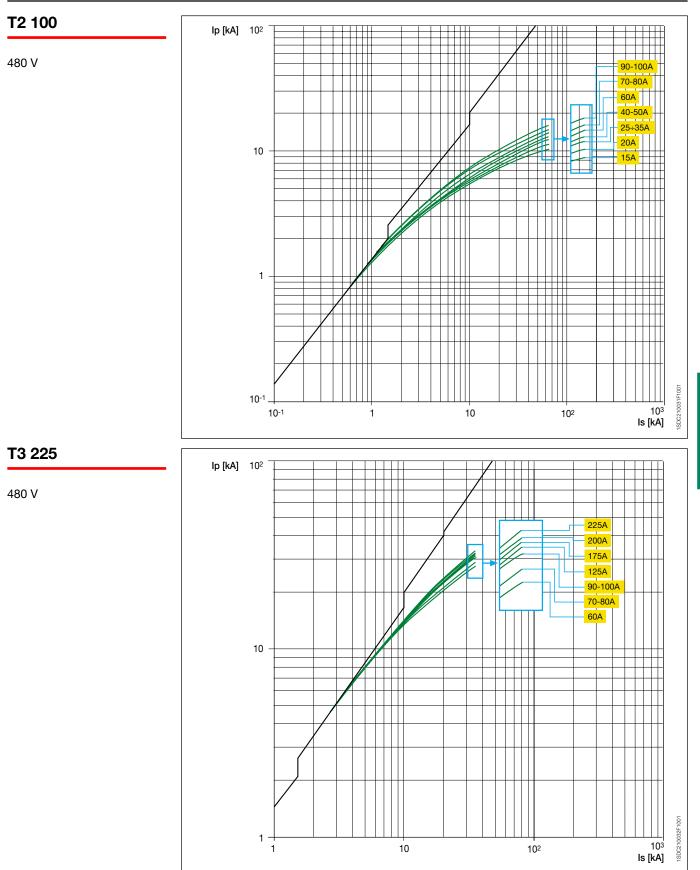
ABB SACE





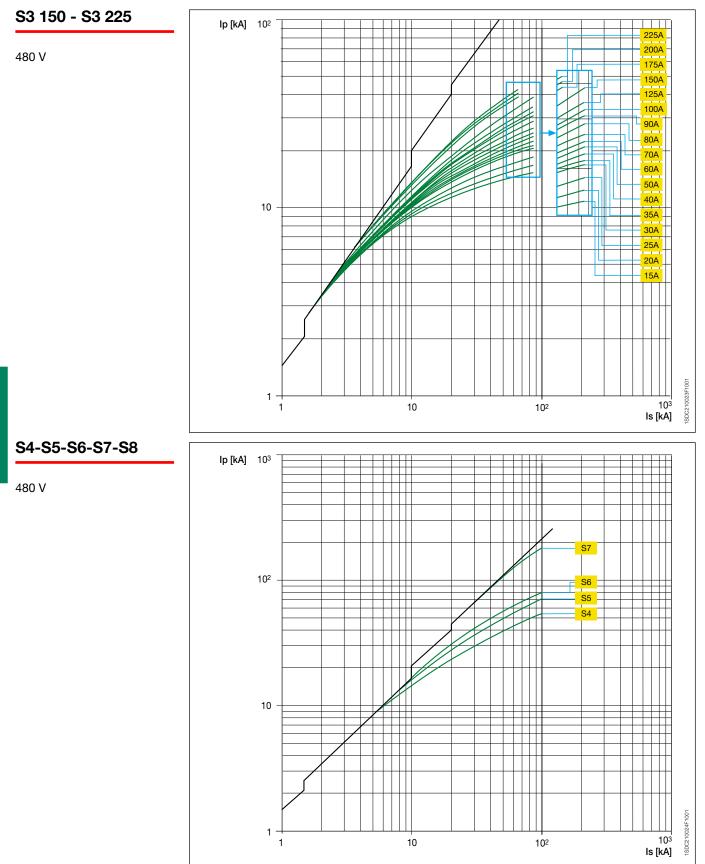
Limitation curves



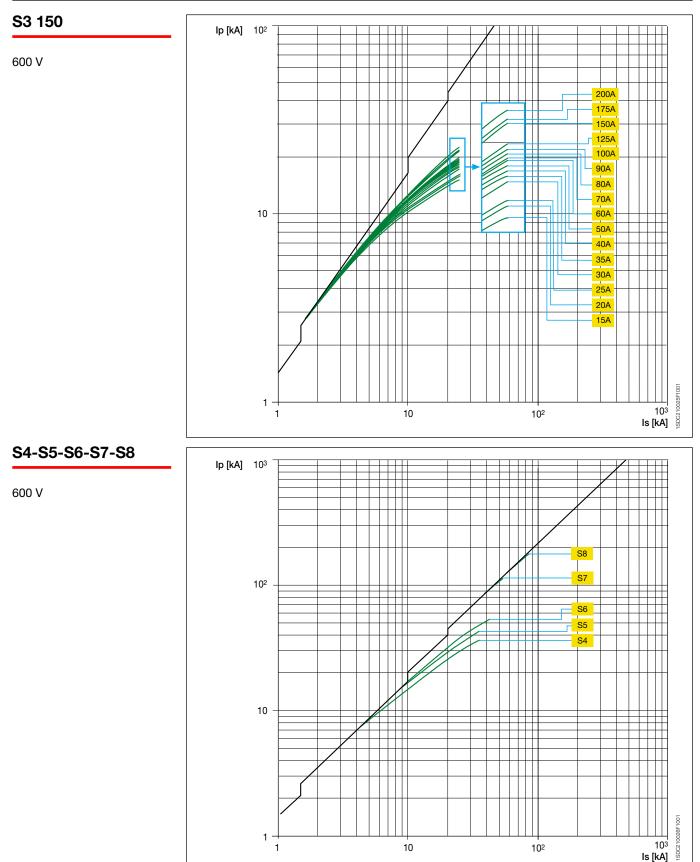




Limitation curves



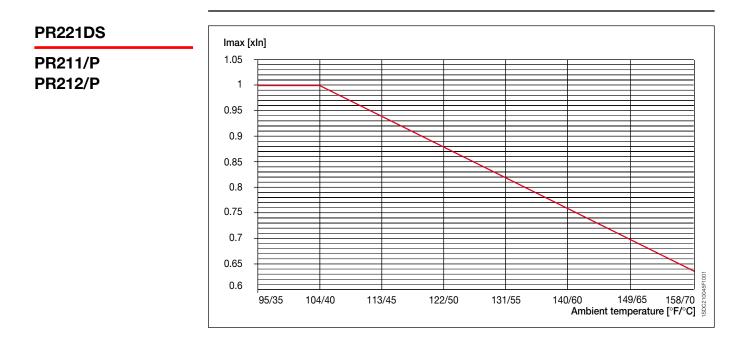
3





Temperature performances

Circuit breakers with electronic release





Temperature performances

Circuit breakers with thermomagnetic release

In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 °F / 60
15	18	17	16	15	14	13
20	24	22	21	20	19	17
25	29	28	27	25	23	22
30	35	34	32	30	28	26
40	47	45	43	40	37	34
50	60	57	53	50	46	42
60	71	68	64	60	56	51
70	83	79	75	70	65	60
80	94	90	85	80	75	69
90	106	101	96	90	84	78
100	121	114	107	100	92	84
Tmax T2						
In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 °F / 60
15	18	17	16	15	14	12
20	24	23	21	20	18	17
25	30	28	27	25	23	21
30	35	33	32	30	28	26
35	40	39	37	35	33	31
40	46	44	42	40	38	35
50	56	54	52	50	48	45
60	71	68	64	60	56	51
70	83	79	75	70	65	60
80	96	91	86	80	74	67
90	109	103	97	90	83	75
100	115	110	105	100	95	89
Tmax T3						
In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 °F / 60
60	70	67	64	60	56	52
70	82	78	74	70	66	61
80	92	88	84	80	75	71
90	104	100	95	90	85	79
100	117	112	106	100	94	87
125	145	139	132	125	118	110
150	175	167	159	150	141	131
175	205	195	185	175	164	152
200	236	224	213	200	187	172
225	264	251	239	225	211	195



Temperature performances

Circuit breakers with thermomagnetic release

In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 °F / 60 °C
15	18	17	16	104 F / 40 C	14	140 F / 60 V
20	24	22	21	20	14	13
25 30	30	28	27	25	23	21 26
35	41 47	<u> </u>	<u> </u>	<u> </u>	33	30
40						
50	59	56	53	50	47	43
60	71	67	64	60	56	51
70	83	78	74	70	66	60
80	94	90	85	80	75	68
90	106	101	95	90	85	77
100	118	112	106	100	95	85
125	148	140	133	125	119	106
150	177	168	159	150	143	127
Isomax S3		CO 05 / OO 00		104 05 / 40 00	100 %5 / 50 %0	
In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 °F / 60 °C
175	207	196	186	175	166	149
200	236	224	212	200	190	170
225	266	252	239	225	214	191
Isomax S5						140 °F / 60 °C
Isomax S5 In [A]	50 °F / 10 °C	68 °F / 20 °C	86 °F / 30 °C	104 °F / 40 °C	122 °F / 50 °C	140 1 / 00 0
	50 °F / 10 °C 241345	68 °F / 20 °C 230328	86 °F / 30 °C 220314	104 ° F / 40 ° C 210300	122 °F / 50 °C 200286	187267
In [A]						
In [A] 300	241345	230328	220314	210300	200286	187267
In [A] 300 400	241345	230328	220314	210300	200286	187267 250355
In [A] 300 400 Isomax S6	241345 325465	230328 310442	220314 295420	210300 280400	200286 265380	187267



Power losses

Туре	Release	In [A]	P [W/pole]
T1 - T1B 1p	TMF	15	1.3
T1 - T1B 1p	TMF	20	1.3
T1 - T1B 1p	TMF	25	2.0
T1 - T1B 1p	TMF	30	1.8
T1 - T1B 1p	TMF	40	2.6
T1 - T1B 1p	TMF	50	3.7
T1 - T1B 1p	TMF	60	3.9
T1 - T1B 1p	TMF	70	5.3
T1 - T1B 1p	TMF	80	4.8
T1 - T1B 1p	TMF	90	6.1
T1 - T1B 1p	TMF	100	6.8
T2	TMF	15	1.0
T2	TMF	20	1.7
T2	TMF	25	1.6
T2	TMF	30	2.4
T2	TMF	35	3.0
T2	TMF	40	2.8
T2	TMF	50	3.2
T2	TMF	60	4.6
T2	TMF	70	4.7
T2	TMF	80	5.4
T2	TMF	90	6.9
T2	TMF	100	7.7
T2	Electronic	10	0.5
T2	Electronic	25	1.0
T2	Electronic	63	3.5
T2	Electronic	100	8.0
Т3	TMF	60	3.9
Т3	TMF	70	4.2
Т3	TMF	80	4.8
Т3	TMF	90	5.0
Т3	TMF	100	5.3
Т3	TMF	125	6.6
Т3	TMF	150	7.4
Т3	TMF	175	11.6
Т3	TMF	200	13.2
Т3	TMF	225	15.0



Power losses

-	<u>.</u> .		5.84/ 1.1
Туре	Release	In [A]	P [W/pole]
S3	TMF	15	3.2
S3	TMF	20	3.2
S3	TMF	25	3.3
S 3	TMF	30	3.5
S3	TMF	35	4.8
S3	TMF	40	6.3
S3	TMF	50	5.3
S3	TMF	60	7.7
S 3	TMF	70	4.6
S3	TMF	80	6.0
S3	TMF	90	7.6
S3	TMF	100	7.0
S3	TMF	125	6.7
S3	TMF	150	8.8
S 3	TMF	175	9.2
S3	TMF	200	12.0
S3	TMF	225	13.5
S4	Electronic	100	1.7
S4	Electronic	150	4.4
S4	Electronic	250	13.3
S5	TMD	300	17.6
S5	TMD	400	21.7
S5	Electronic	300	13.2
\$5 \$5	Electronic	400	20.0
S6	TMD	600	27.8
S6	TMD	800	31.0
S6	Electronic	600	27.2
S6	Electronic	800	32.0
\$7	Electronic	1200	49.2
	Electronic	1200	42.7
S8	Electronic	2000	67.2
	Electronic	2500	101.7
30		2300	101.7



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and prine by moore			·····

Tmax

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SACE Isomax S

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SACE Isomax S4-S5

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SACE Isomax S6-S7

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

	contact with position
	position contact contact)
	ing position contact contact)
connection	ge-over position ct with temporary uption (limit contact)
Manual mechanical control (general case) Resistor (general symbol) Switch	h-disconnector
Pushbutton actuator Induction motor, threephase, squirrel cage Contactor	actor (closing ct)
	t breaker with natic release
Cam control	ol coil (general ol)
	ntaneous urrent
	current relay with table short time- trip
	current relay with inverse time-delay
	current relay with se long time delay
cables (example: two 4 relay)	fault overcurrent with inverse short delay trip
Connection of conductors Connection of conductors Change-over contact with temporary interruption Change-over contact with temporary interruption	ual current relay
F Operated by turning Change-over break before make contact and with spring return function	ABB SACE



Information for reading - Tmax

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 MCS (only T2 and T3), but is also valid for the fixed version circuit breakers or MCS. With the fixed version circuit breakers or MCS, the applications indicated in figures 21-22-23 cannot be provided.

Caption

 ↓ A1 A2 A3 A4 D K51 K87 Q Q/03 R S3 S4/1-2 S51 S751/13 S87/1 S87/2 S87/3 SC SD SO SY 	 Figure number of the diagram See note indicated by the letter Circuit breaker applications Solenoid operator applications RC221 or RC222 type residual current release applications Indicative apparatus and connections for control and signalling, outside the circuit breaker Electronic time-delay device of the undervoltage release (outside the circuit breaker) PR221DS microprocessor-based trip unit RC221 or RC222 type residual current release Main circuit breaker Auxiliary contacts of the circuit breaker Safety contact operated by the padlock Contact for electrical signalling of circuit breaker in racked-in position (only provided with plug-in version circuit breakers. See note D) Contact for electrical signalling of RC222 type residual current release alarm Contact for electrical signalling of RC222 type residual current release alarm Path circuit breaker in racked-in position (only provided with plug-in version circuit breakers. See note D) Contact for electrical signalling of RC222 type residual current release alarm Contact for electrical signalling of circuit breaker open due to RC221 or RC222 type residual current release alarm Pushbutton or contact for circuit breaker closing Power supply switch-disconnector of the RC221 or RC222 type residual current release Pushbutton or contact for circuit breaker closing Power supply switch-disconnector of the RC221 or RC222 type residual current release
TI	 Contact for electrical signalling of circuit breaker open due to YO, YO1, YO2, YU thermomagnetic release trip (bell alarm) Toroidal current transformer
TI/L1L3	= 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 trip unit (see note E)
XV	= Terminal boxes of the applications
YC	= Closing coil of the solenoid operator
YO	= Shunt trip T2 three-pole or four-pole circuit breaker with PR221 trip unit
YO1	= Opening solenoid of the PR221 trip unit
YO2	= Opening solenoid of the RC221 or RC222 type residual current release
YO3	= Shunt trip of the solenoid operator
YU	= Undervoltage release (see note B).

Information for reading – Tmax

Description of figures

- Fig. 1 = Shunt trip.
- 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 changeover contact for electrical signalling of circuit breaker open due to trip of the thermomagnetic releases, YO, YO1, YO2, YU (bell alarm).
- Fig. 15 = One change-over contact for electrical signalling of circuit breaker open or closed and one changeover contact for electrical signalling of circuit breaker open due to trip of the thermomagnetic re leases, YO, YO1, YO2, YU (bell alarm).
- Fig. 16 = One change-over contact for electrical signalling of circuit breaker open or closed and one changeover contact for electrical signalling of circuit breaker open due to trip of the thermomagnetic releases, YO, YO1, YO2, YU (bell alarm) and one change-over contact for electrical signalling of circuit breaker open due to trip of the PR221 trip unit.
- 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

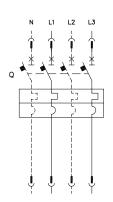
Notes

- A) The circuit breaker is only fitted with the applications specified in the order confirmation from ABB.
- 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.
- F) Extra external minimum-voltage resistor powered on 250 V DC, 380-440 V AC and 480-500 V AC.

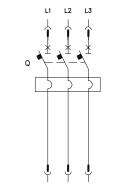


Circuit diagrams - T1, T2 and T3

Tmax T1-T2-T3

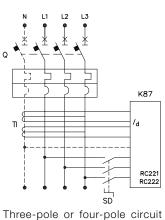


T1-T2-T3 three-pole or four-pole, or two-pole T2-T3 circuit breaker with thermomagnetic trip unit

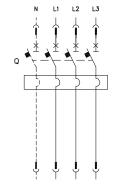


State of operation

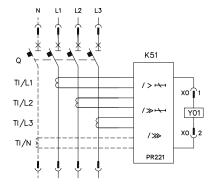
T2-T3 MCP three-pole with magnetic trip unit



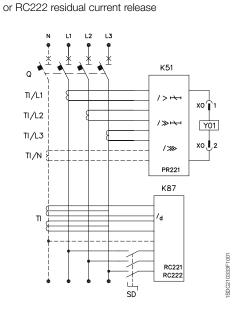
breaker in fixed version with RC221



T1, T3 MCS three-pole or four-pole



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

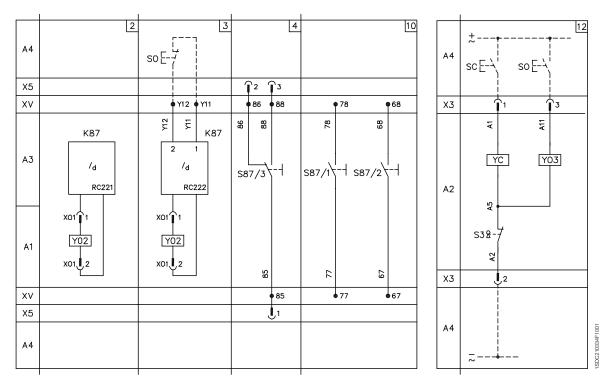


T2 three-pole or four-pole circuit breaker in fixed version with PR221 microprocessor-based trip unit and RC221 or RC222 residual current release

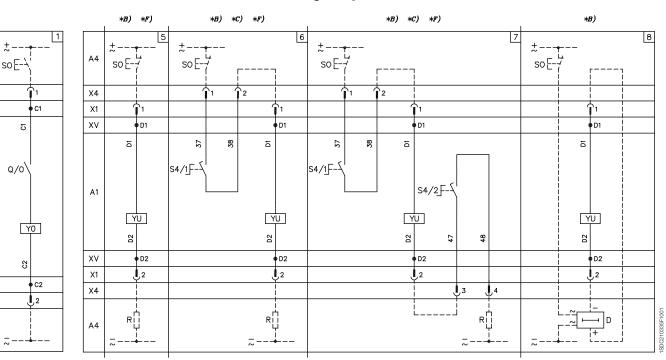
Electrical accessories - T1, T2 and T3

Tmax T1-T2-T3

Residual current releases with solenoid operator



Shunt and undervoltage trip units



+~

A4

X1

хv

A1

xv

X1

Α4

A4									14					15					
X7										(5 (6	2 (3		〕 ₅ ′	6 (2 (3
X6																			
X2	Í	5	6 (Î ° (9	11	12	2	3										
XV	•	12	9 14	• 22	24	32	3 4 (96	98		12	1 4 (96	98		1 2 (14	96	98
A1	12	₽ Q/1	5	77 Q/2	32	Q/3	8	sr t	 	12	2 Q/1	8	sr t	 	12	₽ Q/1	96	sr t	œ
		ŧ		21		31		95			£		95			Ŧ		95	

• 95

J1

9 31

10

11

95

1

Auxiliary contacts

XV

X2 X6

X7

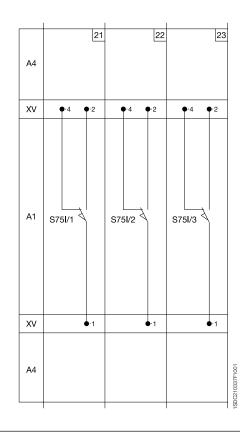
A4

• 11

___4

• 21

17



4

16

• 11

__4

95

U1

1² **1**³

• 08 • 06 98 90 80

> -+ S51

> > • 05

J1

0336F1001

05

Information for reading – SACE Isomax S

State of the operation represented

The circuit is shown in the following conditions:

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

Instructions for resetting the circuit breaker after the releases have tripped

The circuit breaker can open both through the action of the motor

operator and due to the following releases tripping:

- overcurrent
- undervoltage
- opening

with consequent opening of contact SY (if fitted) in series with relay KO.

A reset operation involving manual or electric opening will have to be carried out in order to close the circuit breaker again after tripping.

Contact SY closes again at the end of the operation. The type of resetting should be chosen to suit the design requirements and duty conditions. A number of possible solutions are suggested below:

1) Manual resetting only

The electrical opening control (contact SO1) must be connected in series with contact SY. Opening (for S3 - S4 - S5 using the auxiliary relay KO) is therefore prevented until the circuit breaker is in its tripped position. To reset the circuit breaker one needs to operate the related lever until the circuit breaker is in its open position and the closing springs are fully loaded.

2) Electrical resetting, responsibility of the operator

The normal electric opening control (contact SO1) must be connected in series with contact SY. Another opening control is provided (contact SO2), connected in series directly to relay KO for S3 - S4 - S5 or connected directly to pole A3 of connector X2 for S6 - S7.

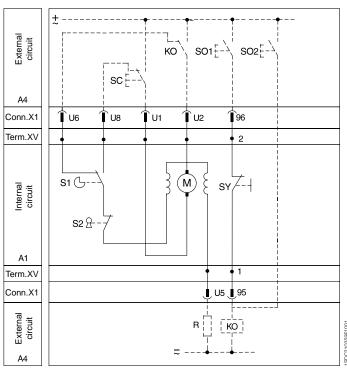
This control must be protected by, for example, a pushbutton keyswitch. It should only be used if the information relayed to the control sta-

tion manager allows one to rule out the possibility of the tripping having been caused by a short circuit, or if the causes of the short circuit have been removed.

3) Electrical resetting always enabled

The electrical opening control (contact SO2) is connected in series directly to relay KO for S3 - S4 - S5 or connected directly to pole A3 of connector X2 (for S6 - S7) and is therefore always enabled.

Example of use: automatic resetting of the circuit breaker immediately after the releases have been tripped N.B. If an overcurrent release is fitted, it will be necessary to identify the causes that brought it to its tripped position in order to prevent it from closing again in short-circuit conditions. Manual resetting is always allowed in each of these examples.





Information for reading – SACE Isomax S3

Versions

The diagram indicates a circuit breaker or an isolating-switch in draw out or plug-in version but it may be applied to circuit breaker or an isolating-switch in fixed version too.

Circuit given in figures 21-22-31-32 cannot be supplied with circuit breakers or isolating-switches in fixed version.

Caption

☐ A1 A2 A4 D K87 K0 M Q	 Reference number of diagram figure See note indicated by the letter Circuit breaker accessories Motor operator accessories Indicative devices and connections for control and signalling, external to the circuit breaker Solid-state time-delaying device for undervoltage release (external to the circuit breaker) Residual current release type RC211 or RC212 Auxiliary opening relay Motor with series energization for the circuit breaker opening and closing Main circuit breaker
Q/D2	= Circuit breaker auxiliary contacts
R	= Resistance external to the circuit breaker, supplied for motor supply voltage higher than 220 V
S1	= Position contact operated by a cam of the circuit breaker
S2	= Safety contact operated by:
	 key lock (if provided)
	 padlock device
S4	 Contact operated by the circuit breaker rotary handle (see note C)
S75I/12	= Contacts signalling circuit breaker in the connected position (provided with circuit breaker in draw out or plug-in version only. See note D)
S75S/12	 Contacts signalling circuit breaker in the isolated or plugged-out position (provided with circuit breaker in draw out or plug-in version only. See note D)
SC	= Pushbutton or contact for circuit breaker closing, the operation shall last for 100 ms at least
SO	= Pushbutton or contact for circuit breaker opening
SO1,SO2	= Pushbutton or contact for circuit breaker opening, the operation shall last for 100 ms at least (see Instruction for resetting the circuit breaker after the releases have tripped, page 4/8)
SY	 Contact signalling circuit breaker tripped through thermomagnetic, YO, YO1, YO2, YU releases operation (bell alarm)
TI	= Ring current transformer
X1, X2	= Connectors for the circuit breaker auxiliary circuits
XV	= Terminal boards of the accessories
YO	= Shunt trip
YO1	= Opening solenoid of the RC211 or RC212 type current residual release
YO2	= Shunt trip for permanent supply
YU	= Undervoltage release (see note B).

Information for reading – SACE Isomax S3

Description of figures

- Fig. 1 = Shunt trip
- Fig. 2 = Opening solenoid of the RC211 type residual current release
- Fig. 3 = Opening solenoid of the RC212 type residual current release
- Fig. 4 = Instantaneous undervoltage release (see note B)
- Fig. 5 = Instantaneous undervoltage release in version for machine tools (see notes B and C)
- Fig. 6 = Undervoltage release with solid-state time-delaying device external to the circuit breaker (see note B)
- Fig. 7 = Direct-acting motor operator
- Fig. 8 = Shunt trip for permanent supply
- Fig. 11 = Two change-over contacts signalling circuit breaker on/off
- Fig. 12 = One change-over contact signalling circuit breaker on/off and one change-over contact signalling circuit breaker tripped through thermomagnetic YO, YO1, YO2, YU releases operation (bell alarm)
- Fig. 21 = First circuit breaker position contact, signalling the connected position (see note D)
- Fig. 22 = Second circuit breaker position contact, signalling the connected position (see note D)
- Fig. 31 = First circuit breaker position contact, signalling the isolated or plugged-out position (see note D)
- Fig. 32 = Second circuit breaker position contact, signalling the isolated or plugged-out position (see note D).

Incompatibility

The combinations of circuits given in the figures below are not possible on the same circuit breaker: 2 - 3

1 - 4 - 5 - 6 - 7 - 8 11 - 12 21 - 31

22 - 32

Notes

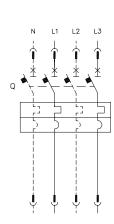
- A) Circuit breaker is delivered complete with the accessories listed in the ABB order acknowledgement only.
- B) Undervoltage release is suitable for circuit breaker supply side feeding or for feeding from an independent source: circuit breaker closes only if the undervoltage release is energized (lock on closing is achieved mechanically)
- C) Contact S4 given in fig. 5 opens the circuit when the circuit breaker is open and it closes when a manual closing control is carried out through rotary handle, in compliance with the Standards relevant to the machine tools (the closing does not occur indeed if the undervoltage release is not energized)
- D) Circuit breaker can be equipped with S75I and S75S position contacts, in whatever combination, with a maximum of 2 total contacts.

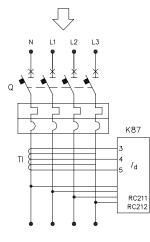


Circuit diagrams – SACE Isomax S3

SACE Isomax S3

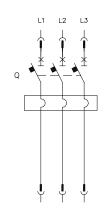
State of operation



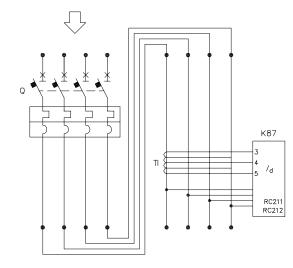


Two-pole, three-pole or four-pole S3Fcircuit breaker with thermomagneticbtrip unitb

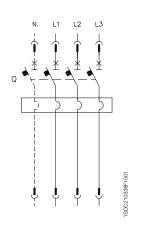
Fixed version four-pole S3 circuit breaker with RC211 or RC212 residual current release (vertical installation)



S3 MCP three-pole with magnetic trip unit



Fixed version four-pole S3 circuit breaker with RC211 or RC212 residual current release (side by side installation)

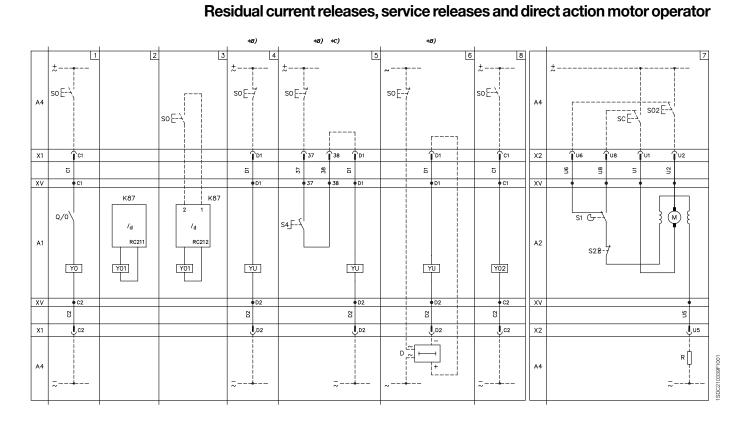


S3 MCS three-pole or four-pole

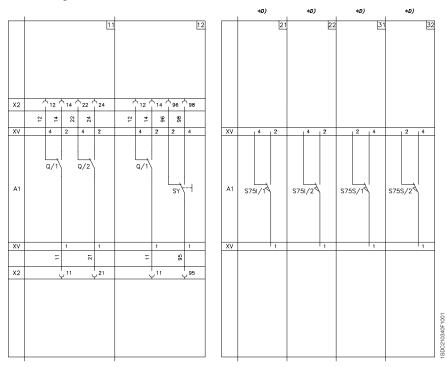
Δ

Electrical accessories – SACE Isomax S3

SACE Isomax S3



Auxiliary contacts





Information for reading – SACE Isomax S4 and S5

Versions

The diagram indicates a circuit breaker in draw out or plug-in version but it may be applied to circuit breaker in fixed version too.

Circuits given in figures 21-22-23-31-32-33 cannot be supplied with circuit breaker in fixed version.

Caption

 See note indicated by the letter A1 = Circuit breaker accessories A2 Motor operator accessories A4 = Indicative devices and connections for control and signalling, external to the circuit breaker A1 = Dialogue unit type PR212/D-L or PR212/D-M, for connection with a central control system A12 AC = Actuating unit type PR212/D-L or PR212/D-M, for connection of dialogue unit controls A12/KC = Opening control of the actuating unit A13 = Signalling unit type PR220/K, with auxiliary relays for electrical indication of the overcurrent microprocessor based protective functions D = Solid-state time-delaying device for undervoltage release (external to the circuit breaker) H = Signalling lamp KS1 = Microprocessor based trip units: PR211/P trip unit, with the following protective functions: L against overload with inverse long time-delay trip I against short-circuit with inverse of definite short time-delay trip		= Reference number of diagram figure
A4 = Matter operator accessories A4 = Indicative devices and connections for control and signalling, external to the circuit breaker A11 = Dialogue unit type PR212/L-L or PR212/L-M, for connection with a central control system A12 = Actuating unit type PR212/L, with auxiliary relays for the execution of dialogue unit controls A12/KC = Opening control of the actuating unit A13 = Signalling control of the actuating unit A14 = Solid-state time-delaying device for undervoltage release (external to the circuit breaker) H1 = Signalling lamp K51 = Microprocessor based trip units: - PR211/P trip unit, with the following protective functions: - L against overload with inverse long time-delay trip - 1 against short-circuit with instantaneous trip - Regainst short-circuit with instantaneous trip - Signalling unit type PR21/P trip unit, with the following protective functions: - L against short-circuit with inverse or definite short time-delay trip - 1 against short-circuit with instantaneous trip - S against short-circuit with inverse or definite short time-delay trip - 1 against short-circuit with instantaneous trip - G against short-circuit with averse or definite short time-delay trip - 1 against short-circuit with inverse short time-delay trip - G against alawit and the cincuit breaker	*	5 5
A4 = Indicative devices and connections for control and signalling, external to the circuit breaker A11 = Dialogue unit type PR212/D-L or PR212/D-M, for connection with a central control system A12 = Actuating unit type PR212/T, with auxiliary relays for the execution of dialogue unit controls A12/KC = Cosing control of the actuating unit A13 = Signalling unit type PR020/K, with auxiliary relays for electrical indication of the overcurrent microprocessor based protective functions D = Solid-state time-delaying device for undervoltage release (external to the circuit breaker) H1 = Signalling lamp K51 = Microprocessor based trip units: - PR211/P trip unit, with the following protective functions: - L against short-circuit with instananeous trip - B PR212/P trip unit, with the following protective functions: - L against short-circuit with instantaneous trip - B PR212/P trip unit, with the following protective functions: - L against short-circuit with instantaneous trip - S against short-circuit with instantaneous trip - S against short-circuit with instantaneous trip - S against short-circuit with instantaneous trip - S against aerh fault with inverse short time-delay trip - L against short-circuit with instantaneous trip - Actualiary opening relay M = Motor with serises energization for the circ	A1	= Circuit breaker accessories
A11 = Dialogue unit type PR212/D-L or PR212/D-M, for connection with a central control system A12 = Actuating unit type PR212/T, with auxiliary relays for the execution of dialogue unit controls A12/KC = Opening control of the actuating unit A13 = Signalling unit type PR020/K, with auxiliary relays for electrical indication of the overcurrent microprocessor based protective functions: D = Solid-state time-delaying device for undervoltage release (external to the circuit breaker) H1 = Signalling lamp K51 = Microprocessor based trip units: - PR211/P trip unit, with the following protective functions: - L against overload with inverse long time-delay trip - L against overload with inverse long time-delay trip - L against short-circuit with instantaneous trip - PR211/P trip unit, with the following protective functions: - L against short-circuit with instantaneous trip - Chatats for electrical indication of the overcurrent microprocessor based protective functions K51/VD K51/NB = Contacts for electrical indication of the circuit breaker opening and closing M1 = Induction motor Q = Main circuit breaker K51/VD = Alarm indication of VD1 release tripped (bell alarm) for overcurrent and for "trip test" K0/O = Contacts preakera ustilary contacts	A2	= Motor operator accessories
A12 = Actuating unit type PR212/T, with auxiliary relays for the execution of dialogue unit controls A12/KC = Closing control of the actuating unit A12/KC = Opening control of the actuating unit A12/KC = Signalling unit type PR020/K, with auxiliary relays for electrical indication of the overcurrent microprocessor based protective functions D = Solid-state time-delaying device for undervoltage release (external to the circuit breaker) H1 = Signaling lamp K51 = Microprocessor based trip units: - PR211/P trip unit, with the following protective functions: - L against short-circuit with instantaneous trip - PR212/P trip unit, with the following protective functions: - L against short-circuit with inverse or definite short time-delay trip - L against short-circuit with inverse short time-delay trip - L against short-circuit with inverse short time-delay trip - L against short-circuit with inverse short time-delay trip - L against short-circuit with inverse short time-delay trip - K51/VC = Auxminication of VD release tripped (bell alarm) for overcurrent and for "trip test" K61/VC = Auxminication of VD release tripped (bell alarm) for overcurrent and for "trip test" K0 = Auxminication of VD release tripped (bell alarm) for overcurrent and for "trip test" K0 = Auxminication for the circuit breaker op	A4	
 A12/KC = Closing control of the actuating unit A12/KO = Opening control of the actuating unit A13 = Signalling unit type PR020/K, with auxiliary relays for electrical indication of the overcurrent microprocessor based protective functions D = Solid-state time-delaying device for undervoltage release (external to the circuit breaker) H1 = Signalling lamp K51 = Microprocessor based trip units: PR211/P trip unit, with the following protective functions: Lagainst overload with inverse long time-delay trip I against short-circuit with inverse long time-delay trip I against short-circuit with inverse long time-delay trip S against short-circuit with inverse or definite short time-delay trip G against short-circuit with inverse short time-delay trip G against against short-circuit breaker opening and closing M1 = Induction motor M = Motor with series energization for the circuit breaker opening and closing M1 = Induction motor M = Position contact operated by a cam of the circuit breaker S2 = Safety contact operated by a cam of the circuit breaker S2 = Safety contact operated by a cam of the circuit breaker S2 = Safety contact operated by: padlock device S4 = Contact signalling circuit breaker rotary	A11	 Dialogue unit type PR212/D-L or PR212/D-M, for connection with a central control system
 A12/KO = Opening control of the actuating unit A13 = Signalling unit type PR02/K, with auxiliary relays for electrical indication of the overcurrent microprocessor based protective functions D = Solid-state time-delaying device for undervoltage release (external to the circuit breaker) H1 = Signalling lamp K51 = Microprocessor based trip units: PR211/P trip unit, with the following protective functions: L against short-circuit with instantaneous trip PR212/P trip unit, with the following protective functions: L against short-circuit with instantaneous trip S against short-circuit with instantaneous trip G against earth fault with inverse long time-delay trip I against short-circuit with instantaneous trip G against earth fault with inverse short time-delay trip I against short-circuit with instantaneous trip G against earth fault with inverse short time-delay trip I against short-circuit with instantaneous trip G against earth fault with inverse short time-delay trip I adainst work on the circuit breaker opening and closing M1 = Induction motor Q = Main circuit breaker auxiliary contacts R = Resistance external to the circuit breaker, supplied for motor supply voltage higher than 220 V R = Resistance external to the circuit breaker rotary handle (see note C) S75V13 = Contacts signalling circuit breaker in the isolated or plugged-out position (provided with circuit breaker in draw out or plug-in version only. See note D) S75V13 = Contacts signalling circuit breaker in the isolated or plugged-out position (provided with circuit breaker in draw out or plug-in version o		
A13 = Signalling unit type PR020/K, with auxiliary relays for electrical indication of the overcurrent microprocessor based protective functions D = Solid-state time-cleaying device for undervoltage release (external to the circuit breaker) H1 = Signalling lamp K51 = Microprocessor based trip units: - PR211/P trip unit, with the following protective functions: - L against overload with inverse long time-delay trip Imaginst short-circuit with instantaneous trip = PR212/P trip unit, with the following protective functions: - L against short-circuit with instantaneous trip K51/1B = Contacts for electrical indication of the overcurrent microprocessor based protective functions K51/1B = Contacts for electrical indication of the overcurrent microprocessor based protective functions K51/1B = Contacts for electrical indication of the overcurrent microprocessor based protective functions K51/1B = Contacts for electrical indication of the overcurrent microprocessor based protective functions K51/1B = Contacts or electrical indication for the circuit breaker opening and closing M1 = Induction motor Q = Auxiliary contacts R = Resistance external to the circuit breaker, supplied for motor supply voltage higher than 220 V R1 = Thermistor S1 = Position contact operated by a cam of the circuit		о о
microprocessor based protective functions D = Solid-state time-delaying device for undervoltage release (external to the circuit breaker) H1 = Signalling lamp K51 = Microprocessor based trip units: - PR211/P trip unit, with the following protective functions: - L against short-circuit with inverse long time-delay trip - PR212/P trip unit, with the following protective functions: - L against short-circuit with inverse long time-delay trip - S against short-circuit with inverse or definite short time-delay trip - G against short-circuit with inverse short time-delay trip - G against short-circuit with inverse short time-delay trip - G against as thort-circuit with inverse short time-delay trip - G against earth fault with inverse short time-delay trip - G against earth fault with inverse short time-delay trip - G against earth fault with inverse short time-delay trip - G against earth fault with inverse short time-delay trip - G against earth fault with inverse short time-delay trip - G against earth fault with inverse short time-delay trip - G against earth fault with inverse log time dollarm) for overcurrent and for "trip test" K51/1B = Contacts for electrical indication of the overcurrent microprocessor based protective functions K51/V1 = Alarm indication of V01 release tripped (bell alarm) for overcurrent and for "trip test" K0 = Auxiliary opening relay M1 = Induction motor Q/O2 = Circuit breaker = Cortact operated by: - key lock (fi provided) P = Position contact operated by: - key lock device </td <td></td> <td></td>		
H1 = Signalling lamp K51 = Microprocessor based trip units: - PR211/P trip unit, with the following protective functions: - Lagainst overload with inverse long time-delay trip - Lagainst short-circuit with instantaneous trip - R212/P trip unit, with the following protective functions: - Lagainst short-circuit with inverse long time-delay trip - Sagainst short-circuit with inverse or definite short time-delay trip - Lagainst solut-circuit with inverse short time-delay trip - Gagainst earth fault with inverse short time-delay trip - Gadainst earth fault with inverse short time-delay trip - Adamin dication of YO1 release tripped (bell alarm) for overcurrent and for "trip test" K51/03 For time contact operated by: - Induction motor Q - Main circuit breaker auxiliary contacts R = Resistance external to the circuit breaker, supplied for motor supply voltage higher than 220 V R1 = Thermistor Safety contact operated by: - key lock (if provided) - padiock device S4 = Contact signalling circuit breaker in the connected position (provided with circuit breaker in draw out or plug-in version only. See note D) S	A13	
K51 = Microprocessor based trip units: - PR211/P trip unit, with the following protective functions: - Lagainst overload with inverse long time-delay trip - Iagainst short-circuit with instantaneous trip - PR212/P trip unit, with the following protective functions: - Lagainst overload with inverse long time-delay trip - S against short-circuit with inverse long time-delay trip - G against earth fault with inverse long time-delay trip - G against earth fault with inverse short time-delay trip - Alarm indication of YO1 release tripped (bell alarm) for overcurrent and for "trip test" K0 = Auxiliary opening relay M = Motrop roteker Q/O2 = Circuit breaker Q/O2 = Circuit breaker auxiliary contacts R = Resistance external to the circuit breaker, supplied for motor supply voltage higher than 220 V R1 = Thermistor S2 = Safety contact operated by: - key lock (if provided) - padlock device S4 = Contact signalling circuit breaker in the connected position (provided with circuit breaker in draw out or plug-in version only. See note D) S751/13 = Contacts for elecuit breaker in the isolated or plugged-out position (provided with circuit breaker in draw out or plug-in version only. See note D) S755/13 <td>D</td> <td> Solid-state time-delaying device for undervoltage release (external to the circuit breaker) </td>	D	 Solid-state time-delaying device for undervoltage release (external to the circuit breaker)
 PR211/P trip unit, with the following protective functions: Lagainst overload with inverse long time-delay trip Lagainst short-circuit with instantaneous trip PR212/P trip unit, with the following protective functions: 	H1	= Signalling lamp
 L against overload with inverse long time-delay trip I against short-circuit with instantaneous trip PR212/P trip unit, with the following protective functions: 	K51	
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TI/L2 = Current transformer located on the phase L2	SY	
		= Current transformer located on the phase L1
TI/L3 = Current transformer located on the phase L3		
	TI/L3	= Current transformer located on the phase L3

Information for reading – SACE Isomax S4 and S5

TI/N	= Current transformer located on neutral
W1	= Serial interface with the remote supervision and control system (see note E)
X1, X2	= Connectors for the circuit breaker auxiliary circuits
X3, X4	= Connectors for the overcurrent microprocessor based release circuits (in case of circuit breaker
	in draw out or plug-in version the racking-out of the connectors occur simultaneousty with the one of the circuit breaker)
X5, X6	= Delivery terminal boards for the overcurrent microprocessor based trip units circuits
XO	= Connector for opening solenoid YO1
XV	= Terminal boards of the accessories
YO	= Shunt trip
YO1	 Opening solenoid of overcurrent trip unit
YU	= Undervoltage release (see note B).

Description of figures

Fig. 1	= Shunt t	tri
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- Fig. 4 = Instantaneous undervoltage release (see note B)
- Fig. 5 = Instantaneous undervoltage release in version for machine tool (see notes B and C).
- Fig. 6 = Undervoltage release with solid-state time-delaying device external to the circuit breaker (see note B)
- Fig. 7 = Direct-acting motor operator
- Fig. 11 = Two change-over contacts signalling circuit breaker on/off
- Fig. 12 = One change-over contact signalling circuit breaker on/off and one change-over contact signalling circuit breaker tripped through thermomagnetic YO, YO1, YU releases operation (bell alarm)
- Fig. 21 = First circuit breaker position contact, signalling the connected position (see note D)
- Fig. 22 = Second circuit breaker position contact, signalling the connected position (see note D)
- Fig. 23 = Third circuit breaker position contact, signalling the connected position (see note D)
- Fig. 31 = First circuit breaker position contact, signalling the isolated or plugged-out position (see note D)
- Fig. 32 = Second circuit breaker position contact, signalling the isolated or plugged-out position (see note D)
- Fig. 33 = Third circuit breaker position contact, signalling the isolated or plugged-out position (see note D)
- Fig. 41 = Contact signalling YO1 releases operated (for electrical characteristics of the contact see note G). It is available with PR211/P trip unit only
- Fig. 48 = Auxiliary circuits of the microprocessor based trip unit PR212/P connected to the dialogue unit type PR212/D-L or PR212/D-M and to the actuating unit type PR212/T
- Fig. 49 = Auxiliary circuits of the microprocessor based trip unit PR212/P connected to the dialogue unit type PR212/D-L or PR212/D-M, to signalling unit type PR020/K and to the actuating unit type PR212/T
- Fig. 50 = Auxiliary circuits of the microprocessor based trip unit PR212/P connected to signalling unit type PR020/K.

Incompatibility

The combinations of circuits given in the figures below are not possible on the same circuit breaker:

- 1 4 5 6
- 11 12 21 - 31
- 22 32
- 23 33
- 48 49 50

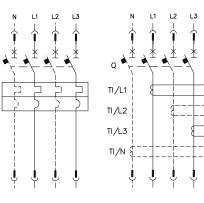
Notes

- A) Circuit breaker is delivered complete with the accessories listed in the ABB order acknowledgement only.
- B) Undervoltage release is suitable for circuit breaker supply side feeding or for feeding from an independent source: circuit breaker closes only if the undervoltage release is energized (lock on closing is achieved mechanically)
- C) Contact S4 given in fig. 5 opens the circuit when the circuit breaker is open and it closes when a manual closing control is carried out through rotary handle, in compliance with the Standards relevant to the machine tools (the closing does not occur indeed if the undervoltage release is not energized)
- D) Circuit breaker can be equipped with S75I and S75S position contacts, in whatever combination, with a maximum of 3 total contacts
- E) To connect the serial communication line to the remote supervision and control system, see following documents:
 - RH0298.001 for Modbus
 - RH0297.001 for Lon
- F) In case of circuit breaker in fixed version with current transformer on external neutral conductor, in order to remove the circuit breaker it is necessary to short-circuit the terminals of TI/N current transformer
- G) Contact signalling overcurrent microprocessor based trip unit operated (see fig. 41) has the following electrical characteristics:
 - rated voltage = 24 V
 - breaking capacity (resistive load) = 3 W/VA
 - maximum current interrupted = 0.5 A.



Circuit diagrams – SACE Isomax S4 and S5

SACE Isomax S4-S5



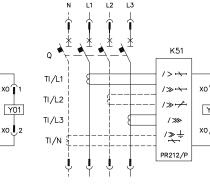
State of operation

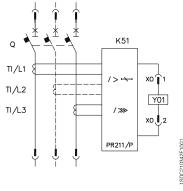
K51

/> +

/≫

PR211/P





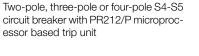
L3

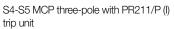
Two-pole, three-pole or four-pole S5 circuit breaker with thermomagnetic trip unit

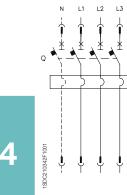
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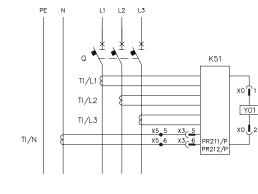
Two-pole, three-pole or four-pole S4-S5 circuit breaker with PR211/P microprocessor based trip unit

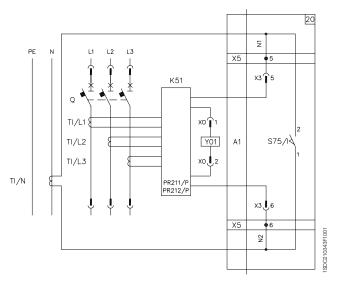
*F)











S4-S5 MCS threepole and four-pole

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

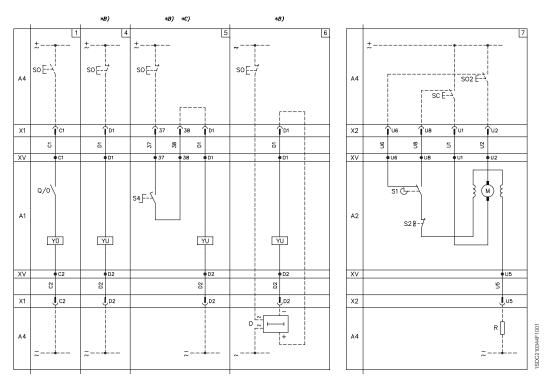
Plug-in or draw-out version three-pole circuit breaker with current transformer on neutral conductor, external to circuit breaker



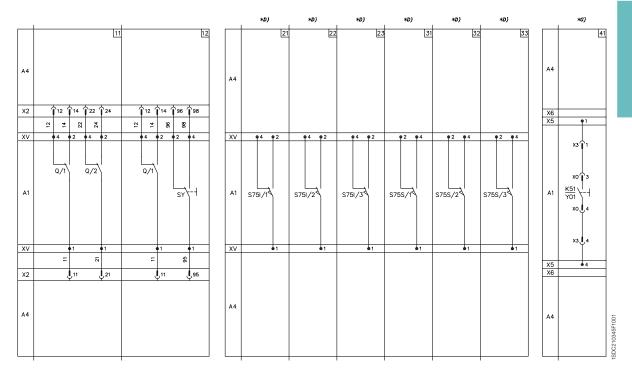
Electrical accessories – SACE Isomax S4 and S5

SACE Isomax S4-S5

Service releases and direct action motor operator



Auxiliary contacts

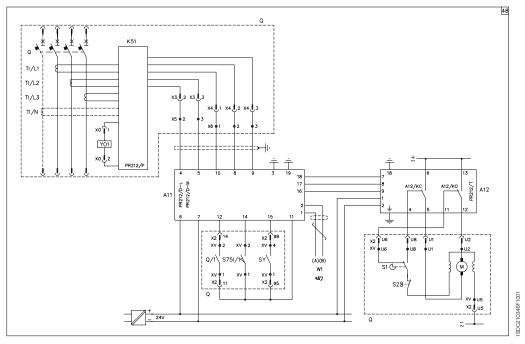




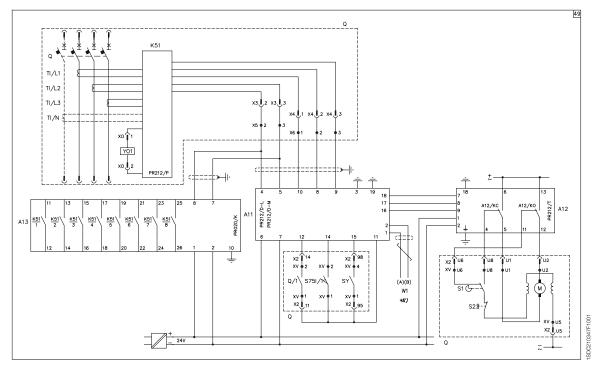
Electrical accessories – SACE Isomax S4 and S5

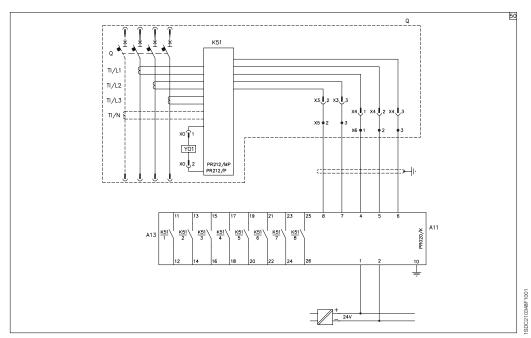
SACE Isomax S4-S5

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



SACE PR212/P trip unit connected to the dialogue unit PR212/D, signalling unit SACE PR020/K and actuator unit SACE PR212/T





SACE PR212/P trip unit connected to signalling unit SACE PR020/K

Information for reading – SACE Isomax S6 and S7

Versions

The diagram indicates a circuit breaker or an isolating-switch in draw out version but it may be applied to circuit breaker or an isolating-switch fixed version too.

Circuits given in figures 21-22-23-24-25-31-32-33-34-35 cannot be supplied with circuit breaker or isolating-switches in fixed version.

Caption

	= Reference number of diagram figure
*	= See note indicated by the letter
A1	= Circuit breaker accessories
A2	= Motor operator accessories
A4 A11 A12	 Indicative devices and connections for control and signallings, external to the circuit breaker Dialogue unit type PR212/D-L or PR212/D-M, for connection with a central control system Actuating unit type PR212/T, with auxiliary relays for the execution of dialogue unit controls
A12/KC	 Closing control of the actuating unit
A12/KO	 Opening control of the actuating unit
A13	 Signalling unit type PR020/K, with auxiliary relays for electrical indication of the overcurrent microprocessor based protective functions
D H1	 Solid-state time-delaying device for undervoltage release (external to the circuit breaker) Signalling lamp
K51	= Microprocessor based trip unit:
	 PR211/P trip unit, with the following protective functions:
	 L against overload with inverse long time-delay trip
	- I against short-circuit with instantaneous trip
	 PR212/P trip unit, with the following protective functions:
	 L against overload with inverse long time-delay trip
	 S against short-circuit with inverse or definite short time-delay trip
	 I against short-circuit with instantaneous trip
	- G against earth fault with inverse short time-delay trip
K51/1B	= Contacts for electrical indication of the overcurrent microprocessor based protective functions
K51/YO1	= Alarm indication of YO1 release tripped (bell alarm) for overcurrent and for "trip test"
KO	= Opening relay and spring charging device with a slay put make contact disengaged by a cam of the motor operating mechanism when the circuit breaker reaches the open position and the closing springs are charged
М	 Motor for the circuit breaker opening and for the closing springs charging
M1	= Induction motor
Q	= Main circuit breaker
Q/O2	= Circuit breaker auxiliary contacts
R1	= Thermistor
S1	= Contact operated by the cam of the motor operating mechanism: it closes when the circuit
	breaker is in closed position and it opens when the circuit breaker is in open position (it does not switch when the circuit breaker is in tripped position)
S2	= Contact operated by the cam of the motor operating mechanism: it opens when the circuit
	breaker is in closed position and it closes when the circuit breaker is in open position (it does not switch when the circuit breaker is in tripped position). The contact is also operated by the key
00	lock device (if provided)
S3	= Contact operated by the com of the motor operating mechanism: it opens after closing of contact KO and it closes when the circuit breaker is in open position (it does not switch when the circuit breaker is in open position).
S75l/15	circuit breaker is in tripped position = Contacts signalling circuit breaker in the connected position (provided with circuit breaker in
0750//	withdrawable version only. See note D)
S75S/15	= Contacts signalling circuit breaker in the isolated position (provided with circuit breaker in draw out version only. See note D)
SC	= Pushbutton or contact for circuit breaker closing
SC3	= Pushbutton for motor start
SO	= Pushbutton or contact for circuit breaker opening
SO1,SO2	 Pushbutton or contact for circuit breaker opening (see Instructions for resetting the circuit breaker after the releases have tripped, page 4/8)
SO3	= Pushbutton for motor stop

SY	= Contact signalling circuit breaker tripped through thermomagnetic, Y0, Y01, YU releases
	operation (bell alarm)
TI/L1	 Current transformer located on the phase L1
TI/L2	= Current transformer located on the phase L2
TI/L3	= Current transformer located on the phase L3
TI/N	= Current transformer located on neutral
W1	 Serial interface with the remote supervision and control system (see note E)
X1, X2	= Connectors for the circuit breaker auxiliary circuits
X3, X4	= Connectors for the overcurrent microprocessor based release circuits (in case of circuit breaker
	in draw out plug-in version the racking-out of the connectors occur simultaneoustly with the one
	of the circuit breaker)
X5, X6	 Delivery terminal boards for the overcurrent microprocessor based circuits
XO	= Connector for opening solenoid YO1
XV	 Terminal boards of the accessories
YC	= Closing coil
YO	= Shunt trip
YO1	= Opening solenoid of overcurrent microprocessor based trip unit
YU	= Undervoltage release (see note B).

Description of figures

Fig. 1	= Shunt opening release

- Fig. 4 = Instantaneous undervoltage release (see note B)
- Fig. 6 = Undervoltage release with solid-state time-delaying device external to the circuit breaker (see note B)
- Fig. 8 = Stored energy motor operator
- Fig. 11 = Two change-over contacts signalling circuit breaker on/off
- Fig. 12 = One change-over contact signalling circuit breaker on/off and one change-over contact signalling circuit breaker tripped through thermomagnetic YO, YO1, YU releases operation (bell alarm)
- Fig. 13 = One contact for electrical signalling of circuit breaker on, one contact for electrical signalling of circuit breaker off and one contact for electrical signalling of circuit breaker not tripped through thermomagnetic, YO, YO1, YU releases operation (not tripped position) to be used for example, for the accept contact reported in fig. 8
- Fig. 21 = First circuit breaker position contact, signalling the connected position (see note D)
- Fig. 22 = Second circuit breaker position contact, signalling the connected position (see note D)
- Fig. 23 = Third circuit breaker position contact, signalling the connected position (see note D)
- Fig. 24 = Fourth circuit breaker position contact, signalling the connected position (see note D)
- Fig. 25 = Fifth circuit breaker position contact, signalling the connected position (see note D)
- Fig. 31 = First circuit breaker position contact, signalling the isolated position (see note D)
- Fig. 32 = Second circuit breaker position contact, signalling the isolated position (see note D)
- Fig. 33 = Third circuit breaker position contact, signalling the isolated position (see note D)
- Fig. 34 = Fourth circuit breaker position contact, signalling the isolated position (see note D)
- Fig. 35 = Fifth circuit breaker position contact, signalling the isolated position (see note D)
- Fig. 41 = Contact signalling YO1 releases operated (for electrical characteristics of the contact see note G)
- Fig. 48 = Auxiliary circuits of the microprocessor based trip unit PR212/P connected to the dialogue unit type PR212/D-L or PR212/D-M and to the actuating unit type PR212/T
- Fig. 49 = Auxiliary circuits of the microprocessor based trip unit PR212/P connected to the dialogue unit type PR212/D-L or PR212/D-M, to signalling unit type PR020/K and to the actuating unit type PR212/T
- Fig. 50 = Auxiliary circuits of the microprocessor based trip unit PR212/P connected to signalling unit type PR020/K.



Information for reading – SACE Isomax S6 and S7

Incompatibility

The combinations of circuits given in the figures below are not possible on the same circuit breaker:

- 1 4 6
- 11 12 13 21 - 31
- 22 32
- 23 33
- 24 34
- 25 35
- 48 49 50

Notes

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



Wiring diagrams

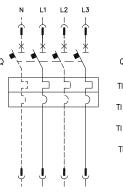
State of operation

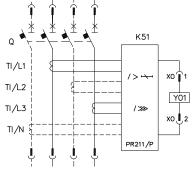
Circuit diagrams - SACE Isomax S6 and S7

11

N

SACE Isomax S6-S7

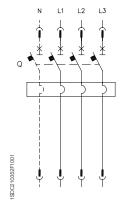


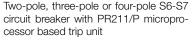


L2 L3

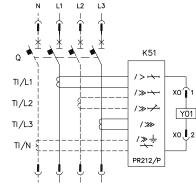
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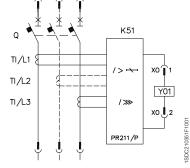
Two-pole, three-pole or four-pole S6-S7 circuit breaker with thermomagnetic trip unit





*F)

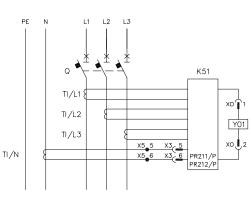


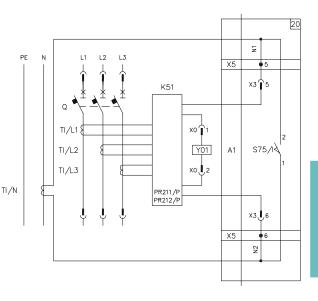


12 L3

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

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





S6-S7 MCS threepole and four-pole

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

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

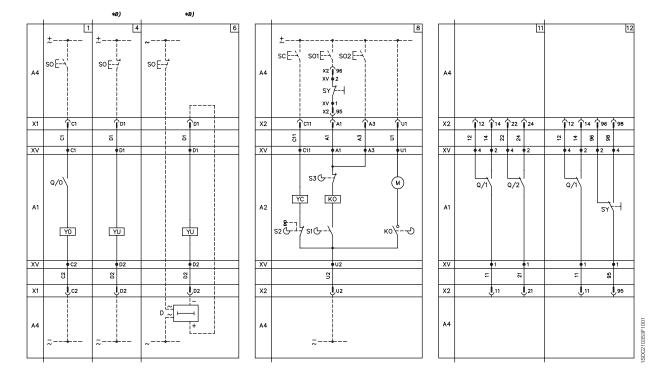
Δ



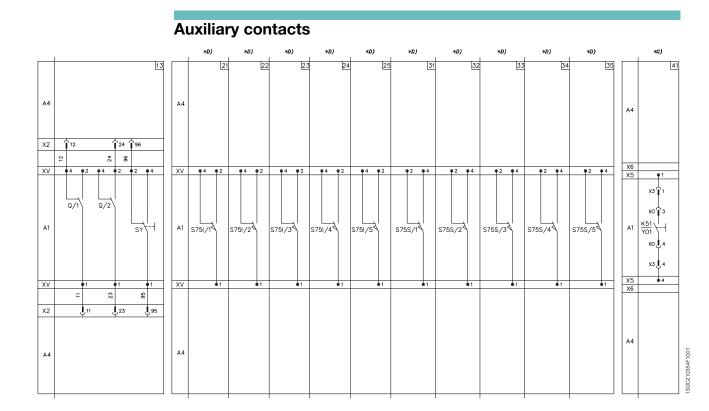
Wiring diagrams

Electrical accessories - SACE Isomax S6-S7

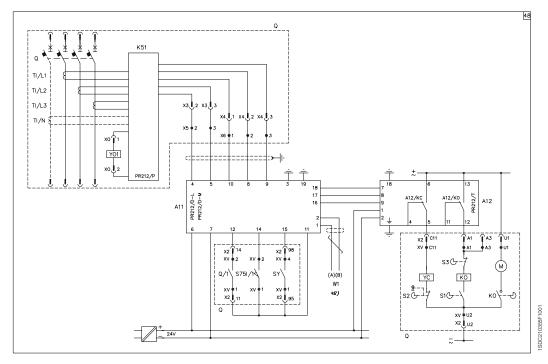
SACE Isomax S6-S7



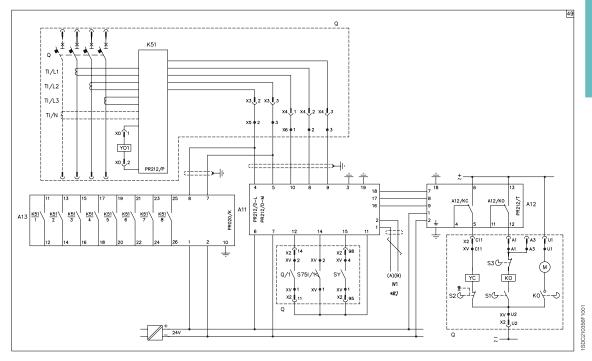
Service releases, stored energy motor operator and auxiliary contacts



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

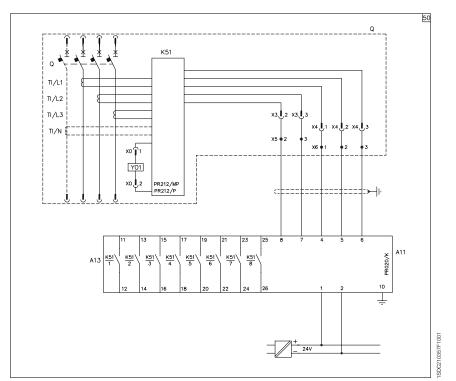


SACE PR212/P trip unit connected to the dialogue unit SACE PR212/D signalling unit SACE PR020/K and actuator unit SACE PR212/T



Wiring diagrams

Electrical accessories – SACE Isomax S6-S7



SACE PR212/P trip unit connected to the signalling unit PR020/K



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Fixed circuit breaker/terminals
Plug-in circuit breaker/terminals
SACE Isomax S3-S4-S5
Fixed circuit breaker/terminals
Plug-in and draw out circuit breaker/terminals
SACE Isomax S6
Fixed circuit breaker/terminals
Plug-in and draw out circuit breaker/terminals
SACE Isomax S7
Fixed circuit breaker/terminals
Plug-in and draw out circuit breaker/terminals
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Fixed circuit breaker/terminals
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Tmax T1 - T2 - T3
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5/1



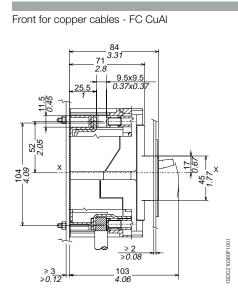
Tmax T1 and single-pole Tmax T1

Fixed circuit breaker [mm/in] Fixing on sheet Fixing on DIN EN 50022 rail 101.2 (4P) 83 3.27 3.98 72.5 *2.85* 38.1 79 1.5 3.11 1.5 0.06 25 25 25 (5) 70 0.04 0.98 0.98 (5) 0.98 2.76 3 . 🕀 đ 22.5 0.89 65______ 67 76.2 2 0.67 --3.0 130 5.12 134 5.28 ⊥×x X ! 1.1 Nm X \$ 2 45 $\oplus \oplus \oplus \oplus \oplus$ Ð SDC210101F1001 6 1.1 Nm <u>>3</u> 0.12 1 85.5 76.2 (3P) SDC210103F 3.37 0.04 3.0 79(1) 712 <u>7.5</u> 0.3 104.5 3.11 2.8 SDC210102F 4.11 102 4.02 Without inserts With inserts 83 83 3.27 3.27 70 70 2.76 2.76 12 x12 0.47x0.47 _12 x12 0.47x0.47 24.5 24.5 0.96 0.96 7 Nm 1.0 5 Nm J 76 2.99 17 65 2.56 11.5 52 2.05 52 11.5 ₽ 5.98 - X 5.12 104 4.09 ١. -X 45 (5) (5) 8 0.8 Nm 1.4 Nm T1 1P (SINGLE-POLE) <u>≥3</u> 0.12 T1 1P (SINGLE-POLE) <u>≥ 3</u> 0.12 2 0.04 0.08 0.04 SDC210202F100 71(2) <u>71</u>(2) 79(1) 79(1) SDC210205F100 3.11 2.8 3.11 2.8 102 102 4.02 4.02 Caption Drilling templates for support sheet With inserts For front terminals Without inserts (1) Depth of the switchboard in the case of circuit breaker with 22.4 25 25 25 Ø 4.5 - M4 0.98 Ø 3.5 - M3 Ø4.5 - M4 face not extending from the 0.98 0.98 Ø 0.18 Ø 0.18 Ø 0.14 compartment door, with or without flange 72 53.5 2.11 53.5 2.11 53.5 2.11 (2) Depth of the switchboard in the 4.21 107 4.21 4.27 £ 29 2.67 ★ case of circuit breaker with + > +× \star face extending from the compartment door, without flange SDC210106F100 SDC210206F1001 (3) Bracket for fixing onto rail Ø4.5 - M4 Ø 0.18 Y (4)Bottom terminal covers with IP40 degree of protection 4 POLES T1 1P (SINGLE-POLE) 3 POLES (5) Insulating plate

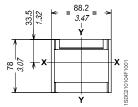
5/2

Terminals

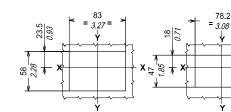
[mm/in]



Flange for the compartment door



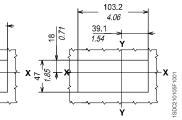
Drilling templates of the compartment door



27.4 1.08

Υ

1207F



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

<u>18</u> 0.71

(SINGLE-POLE)

¢ '8 **+**x

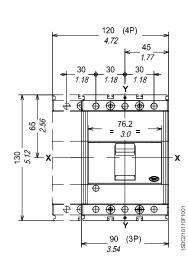
Without flange and h circuit breaker face flush with door (3-4 POLES) or extending (3 POLES)

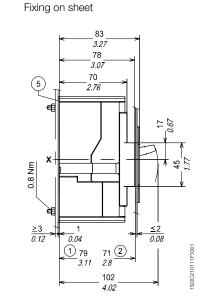
Without flange and circuit breaker face extending (4 POLES)

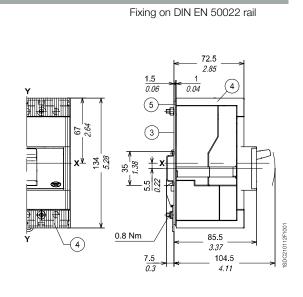


Tmax T2

Fixed circuit breaker

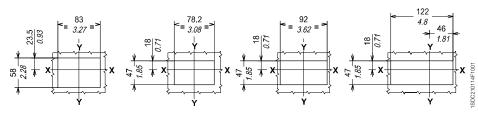






[mm/in]

Drilling templates of the compartment door



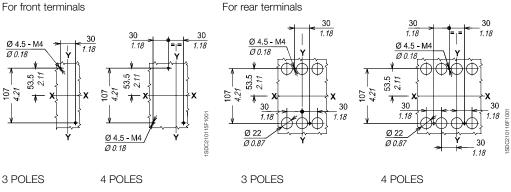
With flange and circuit breaker face flush with door (3-4 POLES)

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





32

3.07

Flange for the

compartment door

88.2

3.47

1001

C210113F

Caption

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



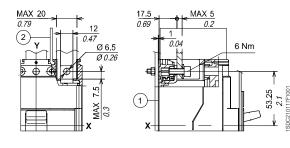
Terminals

Front F

Caption

1 Insulating base plate (compulsory)

(2) Insulating barriers between phases (compulsory)



Front for copper cables - FC Cu

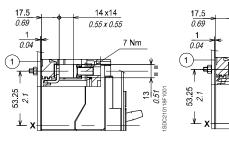
Front for copper/aluminium cables - FC CuAl 1/0 AWG/50 $\rm mm^2$

сł

<u>14 x14</u> 0.55x0.55

5.6 Nm

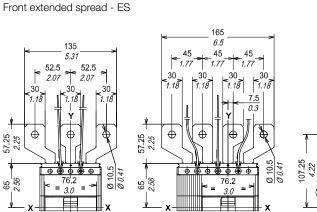
33

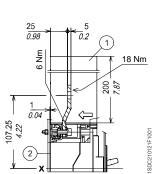


Caption

1 Insulating barriers between phases (compulsory)

(2) Insulating plate







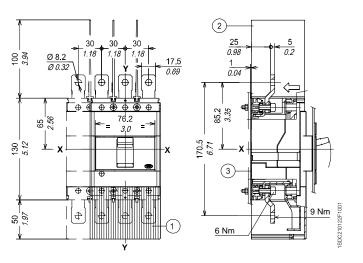
Terminals

Caption

- (1) High terminal covers with degree of protection IP40
- Insulating barriers between phases (compulsory without 1)

Overall dimensions Tmax T2

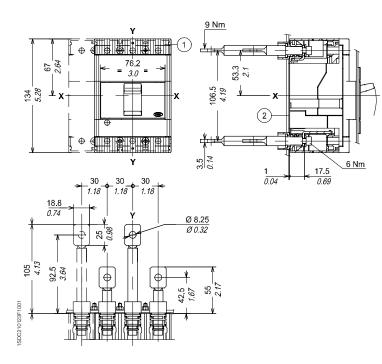
Front extended - EF



Caption

Rear - R

- (1) Low terminal covers with degree of protection IP40
- (2) Insulating barriers between phases

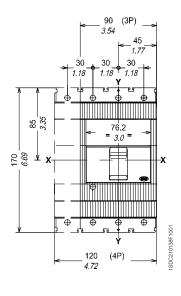


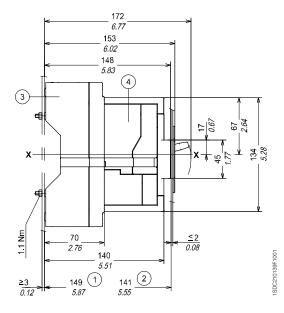
Plug-in

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

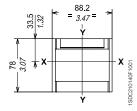


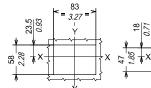


Fixing on sheet

Drilling templates of the compartment door

Flange for compartment door

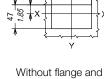




With flange and

(3-4 POLES)

circuit breaker face flush with door



circuit breaker face

flush with door

(3-4 POLES)

78.2

3.08

Without flange and circuit breaker face extending (3 POLES)

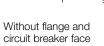
92

3.62

18

×¥ 1.85

4



122

4.8

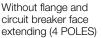
<u>18</u> 0.71

8. 1 ×

47

46

1.8



15 *0.59*

15.5

¥.

30

1.18

Ø 22

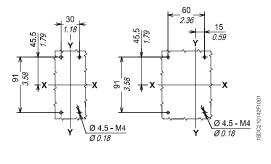
Ø 0.87

91 3.58

ISDC210143F1001

Drilling templates for support sheet

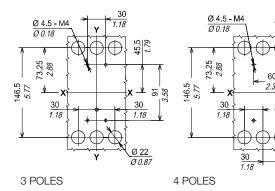
For front terminals



3 POLES



For rear terminals

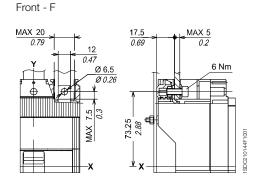




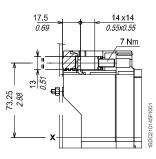
Overall dimensions Tmax T2

Terminals

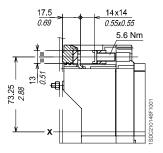
[mm/in]



Front for copper cables - FC Cu



Front for copper/aluminium cables - FC CuAl 1/0 AWG/50 $\rm mm^2$

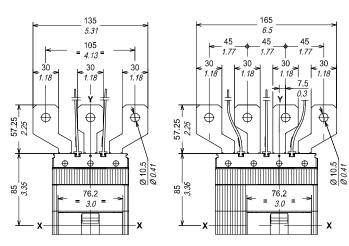


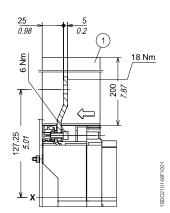
Caption

5

1 Insulating barriers between phases (compulsory)

Front extended spread - ES



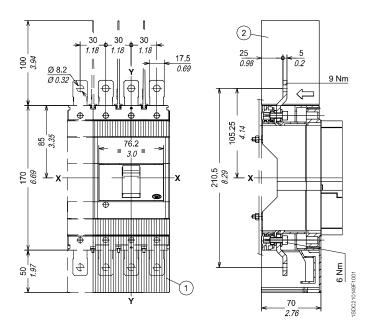


Terminals

Caption

- (1) High terminal covers with degree of protection IP40
- Insulating barriers between phases (compulsory without 1)

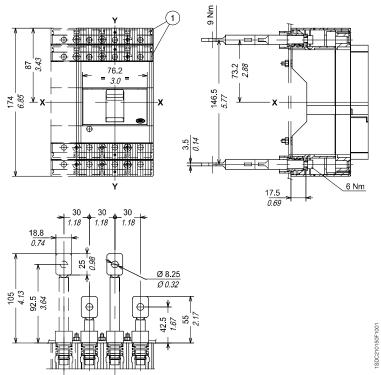
Front extended - EF



Caption

(1) Low terminal covers with degree of protection IP40

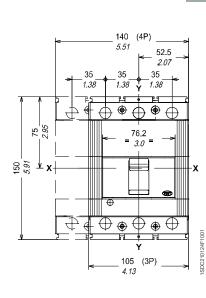
Rear - R

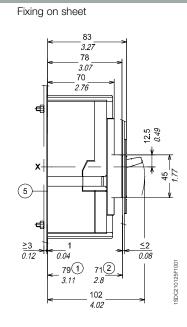


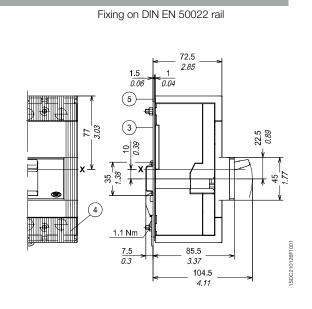


Tmax T3

Fixed circuit breaker







[mm/in]

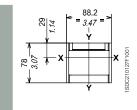
Caption

- (1) Depth of the switchboard in the case of circuit breaker with face not extending from the compartment door, with or without flange
- (2) Depth of the switchboard in the case of circuit breaker with face extending from the compartment door
- (3) Bracket for fixing on rail

(4) Low terminal covers with degree of protection IP40

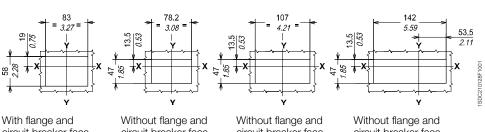
(5) Insulating plate

Flange for compartment door



5

Drilling templates of the compartment door



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)

35 1.38

58

-х

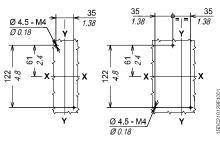
1.38

<u>35 35</u> 1.38 1.38 35

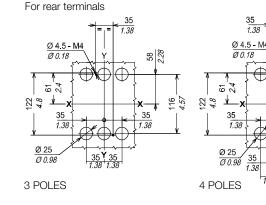
116

Drilling templates for support sheet

For front terminals



3 POLES 4 POLES



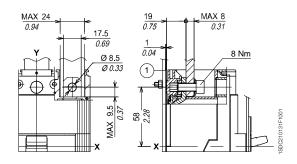


ISDC210130F100

Terminals

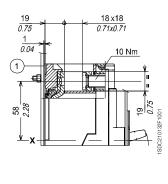
[mm/*in*]

Front - F

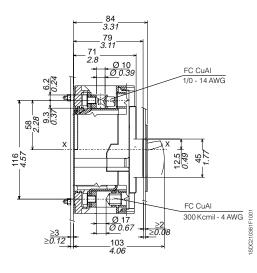


Caption

1 Insulating base plate (compulsory) Front for copper cables - FC Cu



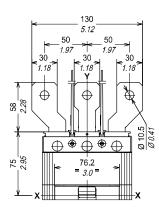
Front for copper/aluminium cables - FC CuAl 1/0 AWG/50 mm²



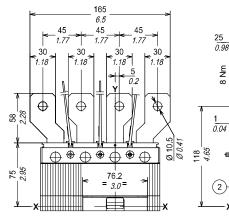
Caption

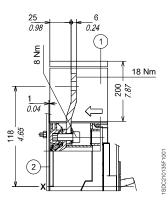
1 Insulating barriers between phases (compulsory)

(2) Insultating plate



Front extended spread - ES





5



Overall dimensions Tmax T3

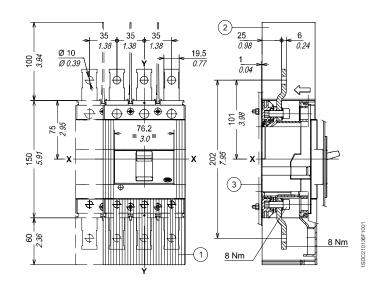
Terminals

Caption

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

(3) Insulating plate

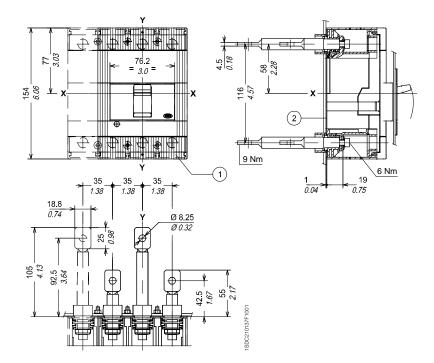
Front extended - EF



Caption

- 1 Low terminal covers with degree of protection IP40
- (2) Insulating plate

Rear - R

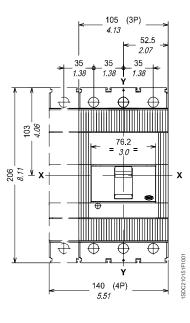


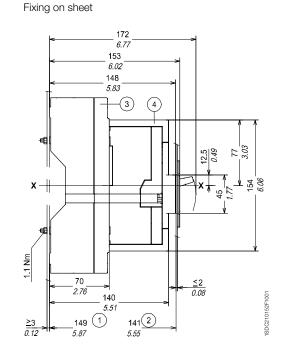
Plug-in

circuit breaker

Caption

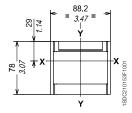
- (1) Depth of the switchboard in the case of circuit breaker with face not extending from the compartment door, with or without flange
- (2) Depth of the switchboard in the case of circuit breaker with face extending from the compartment door, without flange
- (3) Fixed part
- (4) Moving part with terminal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

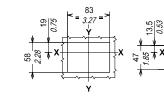




Drilling templates of the compartment door

Flange for 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)

78.2

3.08

Υ

Without flange and circuit breaker face extending (3 POLES)

107

42

<u>13.5</u> 0.53

85

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

<u>53</u>

106

SDC210156F1001

142

5.59

→ <u>2.11</u>

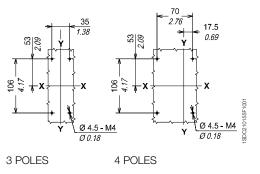
13.5 0.53

85

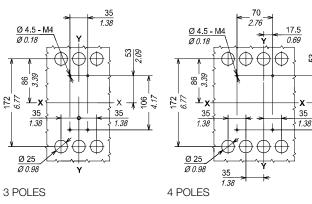
53.5

Drilling templates for support sheet

For front terminals







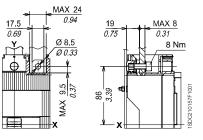


Tmax T3

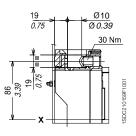
Terminals

[mm/in]

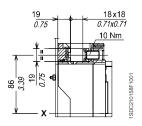




Front for copper/aluminium cables - FC CuAl 1/0 AWG/50 mm²



Front for copper cables - FC Cu

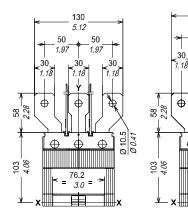


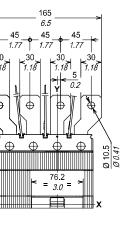
Caption

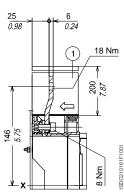
5

(1) Insulating barriers between phases (compulsory)

Front extended spread - ES



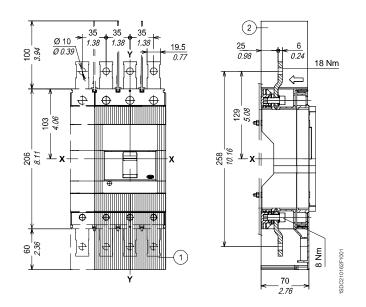




Caption

- (1) High terminal covers with degree of protection IP40
- Insulating barriers between phases (compulsory without 1)

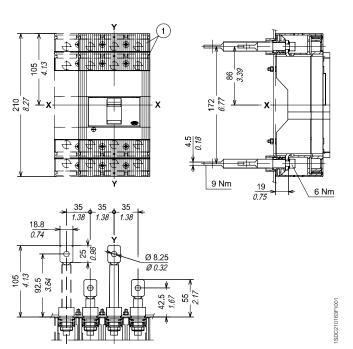
Front extended - EF



Caption

(1) Low terminal covers with degree of protection IP40

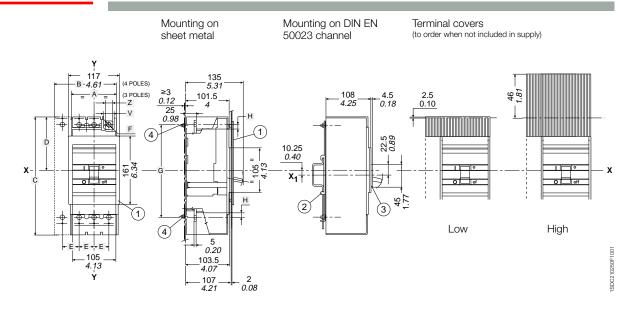
Rear - R





SACE Isomax S3-S4-S5

Fixed circuit breaker

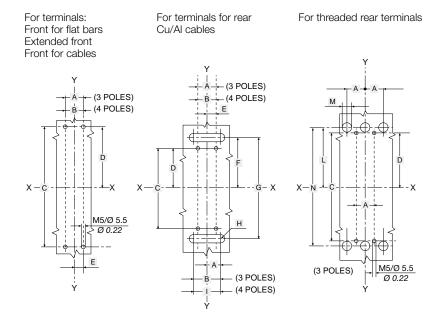


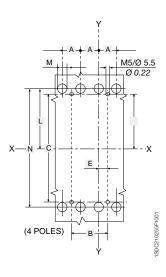
Caption

- (1) Flange for compartment door
- (2) Bracket for mounting on DIN EN 50023 channel
- (3) 1.77" (45 mm) front flange
- (4) Tightening torque 2 Nm

Template for drilling sheet metal support

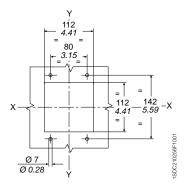
(minimum thickness of sheet metal: 0.12"/3 mm)





Template for drilling compartment door and fitting flange

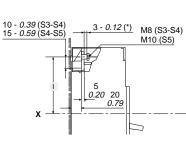
(thickness of sheet metal: 0.08"/2 mm)



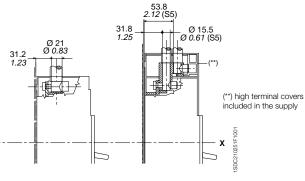
	Α	В	С	D	Е	F	G	н	I	L	М	Ν
S 3	35	70	139	71.75	17.5	94.75	185	R15	105	73.75	Ø 24	143
	1.38	2.76	5.47	<i>2.82</i>	0.69	<i>3.73</i>	<i>7.28</i>	<i>R0.59</i>	<i>4.13</i>	2.90	Ø 0.94	5.63
S4	35	70	214	105.25	17.5	128.25	260	R15	105	107.25	Ø 24	218
	1.38	2.76	8.43	<i>4.14</i>	<i>0.6</i> 9	<i>5.0</i> 5	10.24	<i>R0.59</i>	<i>4.13</i>	<i>4.22</i>	Ø 0.94	8.58
S 5	43.75	87.5	214	105.25	22	134.25	272	R20	131.25	107.25	Ø 30	218
	1.72	<i>3.44</i>	8.43	<i>4.14</i>	0.87	<i>5.29</i>	10.71	<i>R0.79</i>	<i>5.17</i>	<i>4.22</i>	Ø 1.18	8.58

Terminals

Front for flat bars



Front for cables



(*) 0.12" (3 mm) = minimum admissible thickness for S5 400

For SACE S3 - S4 - S5

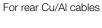
1x500 Kcmil (1 x 240 mm²) (S5 400) 2x250 Kcmil (2 x 120 mm²) For SACE S5

	Α	в	С	D	Е	F	G	н	I	L	v	z
S 3	105	140	170	87.25	35	Ø 8	143	10	73.75	18x18	24	17.5
	<i>4.13</i>	5.51	6.69	3.44	1.38	Ø 0.31	5.63	<i>0.3</i> 9	2.90	0.71x0.71	0.94	<i>0.6</i> 9
S 4	105	140	254	125.25	35	Ø 8	218	11	107.25	18x18	24	17.5
	<i>4.13</i>	5.51	10	<i>4.93</i>	1.38	Ø 0.31	8.58	<i>0.43</i>	<i>4.22</i>	0.71x0.71	0.94	<i>0.6</i> 9
S 5	140	183.75	254	125.25	43.75	Ø 10	218	12	107.25	24x24	31	19.5
	5.51	<i>7.23</i>	10	<i>4.93</i>	1.72	0.39	8.58	0.47	<i>4.22</i>	0.94x0.94	1.22	<i>0.77</i>



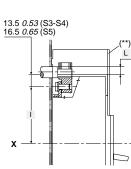
Overall dimensions SACE Isomax S3-S4-S5

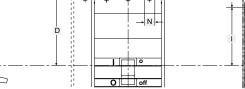
Terminals



Extended front

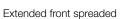
0





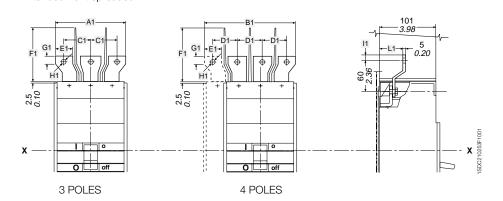
 $\oplus \| \oplus \| \oplus$

(**) high terminal covers included in supply

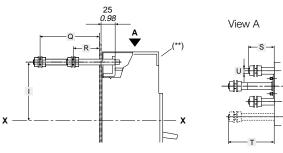


 $(^{\star\star\star})$ Separator plates between the phases to order

ISDC210254F1001







(**) low terminal covers included in supply

	D	I	L	Ν	0	Ρ	Q	R	S	т	U	A1	B1	C1	D1	E1	F1	G1	H1	11	L1
S 3	87.25 <i>3.44</i>	73.75 <i>2.90</i>	Ø 16 Ø 0.63	20 <i>0.7</i> 9	Ø 8.5 Ø 0.33	100 3.94	81.5 <i>3.21</i>	36.5 1.44	55 2.17	100 <i>3.94</i>	M 12	130 5. <i>12</i>	165 6.50	50 1.97	45 1.77	30 1.18	155 6.10	 	Ø 8.5 Ø 0.33	12.5 <i>0.4</i> 9	45 1.77
S4	125.25 <i>4.93</i>	107.25 <i>4.22</i>	Ø 16 Ø 0.63	20 <i>0.7</i> 9	Ø 8.5 Ø 0.33	100 3.94	81.5 <i>3.21</i>	36.5 1.44	55 2.17	100 3.94	M 12	130 5.12	165 6.50	50 1.97	45 1.77	30 1.18	155 6.10	 	Ø 8.5 Ø 0.33	12.5 <i>0.4</i> 9	45 1.77
S5	125.25 <i>4.</i> 93	107.25 <i>4.22</i>	Ø 21 Ø 0.83	25 0.98	Ø 11 Ø 0.43	100 3.94	86.5 3.41	39.5 1.56	62 2.44	108 4.25	M 16										

[mm/in]

12.5

1SDC210252F1001

33.5

25 0.98

946

Plug-in and

(2)

(4)

[mm/in]

draw out circuit breaker Plug-in SACE S3-S4-S5 Draw out SACE S3-S4-S5 Y 117 4.61 27.5 1.08 isolating travel Caption (4 POLES) 4 POLES) ВĻ $\frac{\geq 3}{0.12}$ (3 POLES) _≥3 *∎0.12* (3 POLES) (2) (1) Fixed part (4 _ (1)(1)3 **e** e e e e o • -(3) Moving part complete with IP20 protection class ۲ (5) (5) 105 4.13 terminal covers 161 34 05 Ø 5.5 1.75 Ø 0.22 0.07 5.0 (Φ¦ (3) Flange for compartment (5) 1 ۲ door (5) **e e e** • • o Lock for compartment Φ + E + + E + | → E door (to order) ++ E ++ E + 153 167 6.02 6.57 ٠F - F -00 105 4.13 190 7.48 156.5 2 0.08 2 0.08 (5) Tightening torque 1.1 Nm 105 ISDC210257F 6.16 4.13 н (S3-S4) - 2 Nm (S5) 184.5 195.5 96 *3.78* 7/ Ý 7.26 7.70 2.91 Ϋ́ Note The draw out circuit В С D F н Α Е G I L М Ν breaker must be completed with one of the following 70 105 100 52.25 25 M4-Ø5 73.75 143 35 70 105 R14 **S**3 accessories: 2.76 4.13 3.94 2.06 0.98 M4-Ø0.20 2.90 5.63 1.38 2.76 4.13 R0.55 - front flange for operating 82 117 135 65.75 41 M4-Ø5 107.25 218 35 70 105 R14 **S**4

- lever mechanism - rotary handle operating mechanism
- motor operator

Template for drilling sheet metal support

M4-Ø0.20

M5-Ø6 *M5-Ø0,24*

1.61

58

2.28

4.22

107.25 *4.22*

8.58

218

8.58

1.38

43.75

1.72

2.76

87.5 3.44

4.13

131.25 *5.17*

R0.55

R18

R0.71

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

SACE S3-S4-S5

2.59

65.75 2.59

3.23

115

4.53

S5

4.61

160

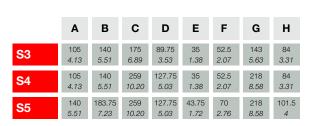
6.30

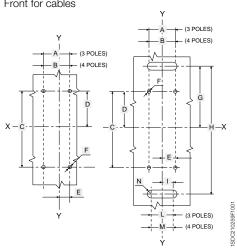
5.31

135 5.31

For terminals: Front for flat bars Front for cables

For terminals Threaded rear



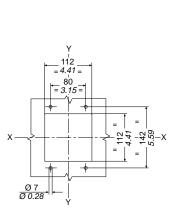


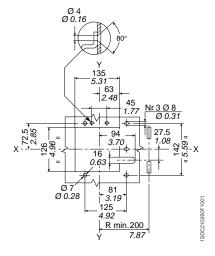


SACE S3-S4-S5

Template for drilling compartment door and fitting flange

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



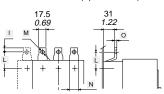


For plug in circuit breaker

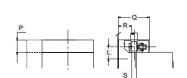
For draw-out circuit breaker

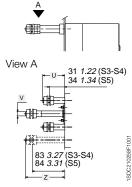
Terminals

Front for flat bars (up to 400 A)



Front for cables (up to 400 A)





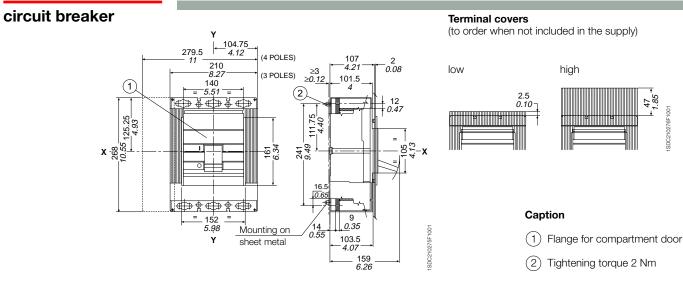
Threaded rear

	Т	L	м	Ν	0	Ρ	Q	R	S	т	U	v	z
S3	10 <i>0.3</i> 9	33.5 1.32	Ø8.2 Ø0.32	20 <i>0.7</i> 9	5 0.20	37.5 1.48	79.5 3.13	36 1.42	18x18 0.71x0.71	73.75 2.90	48 1.89	M12	100 <i>3.94</i>
S4	10 <i>0.3</i> 9	33.5 1.32	Ø8.2 Ø0.32	20 <i>0.7</i> 9	5 0.20	37.5 1.48	79.5 3.13	36 1.42	18X18 0.71x0.71	107.25 <i>4.22</i>	48 1.89	M12	100 <i>3.94</i>
S 5	14 0.55	43.5 1.71	Ø10.2 Ø0.40	25 0.98	6 0.24	47.5 1.87	91.5 <i>3.60</i>	37 1.46	24X24 0.94X0.94	107.25 <i>4.22</i>	58 2.28	M16	108 <i>4.25</i>





Fixed



For terminals threaded rear

8

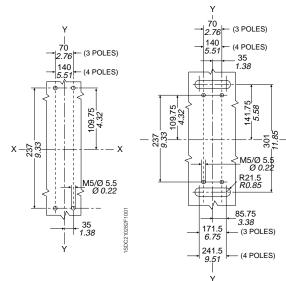
SDC210283F

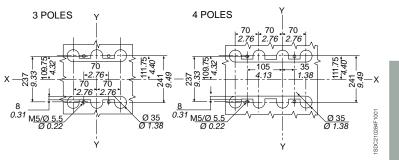
Template for drilling sheet metal support

For terminals for rear Cu/Al cables

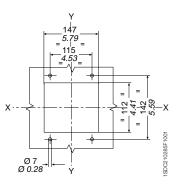
(minimum thickness of sheet metal: 0.12"/3 mm)

For terminals: Front for flat bars Front extended Front for cables





Template for drilling compartment door and fitting flange (thickness of sheet metal: 0.08"/2 mm)



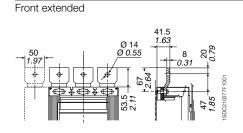


Terminals

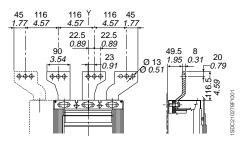
[mm/in]

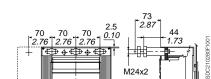
C210279F100

23 0.91 5 min.



Front extended spreaded





Front

40

(low terminal covers included in the supply)

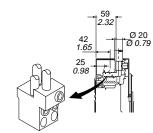
Ø 6.5 Ø 0.26

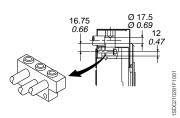
Threaded rear

22.5 ± 0.1 0.89 ± 0.04

12

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





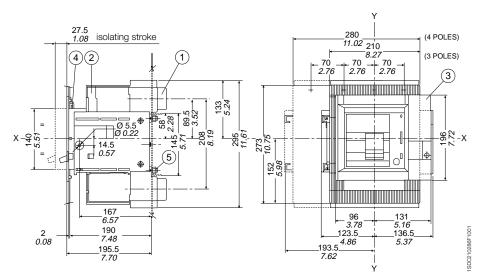
5

Draw out

circuit breaker

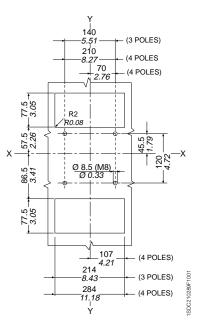
Caption

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



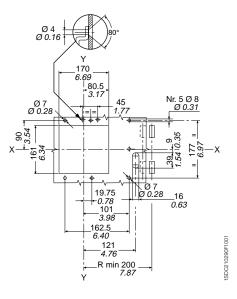
Template for drilling sheet metal support

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



Template for drilling compartment door and fitting flange

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

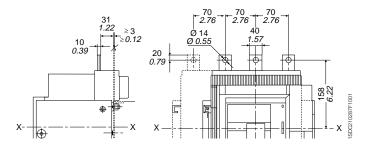




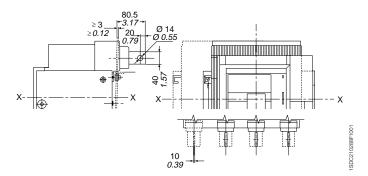
Terminals

[mm/*in*]

Front for SACE S6



Horizontal or vertical rear flat bar for SACE S6

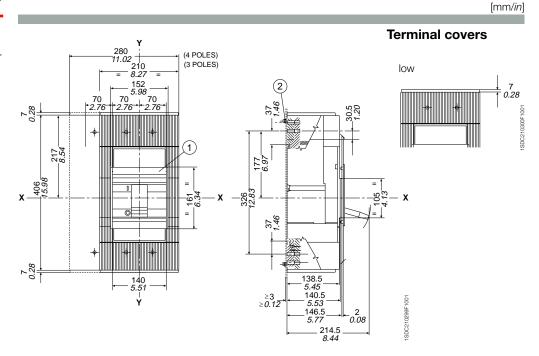




Fixed circuit breaker

Caption

- (1) Flange for compartment door
- (2) Tightening torque 2 Nm

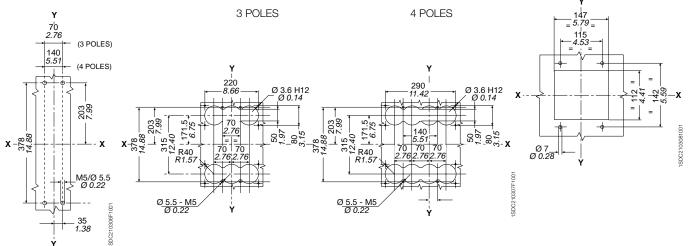


Template for drilling sheet metal support

(Minimum thickness of sheet metal: 0.12"/3 mm) For terminals: For flat bar rear terminals Front Front extended Front for Cu/Al cables

Template for drilling compartment door and fitting flange

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



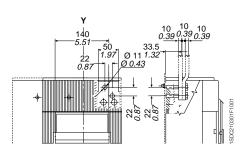
5

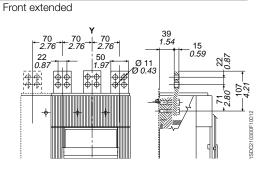


Front

Terminals

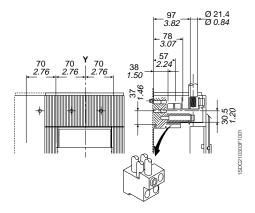
[mm/*in*]

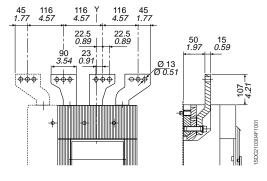




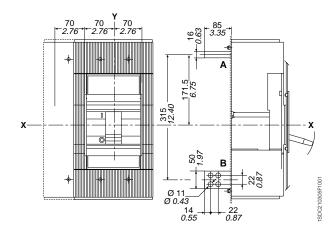
Front for Cu/Al cables for S7 1250







Horizontal or vertical flat bar rear terminals

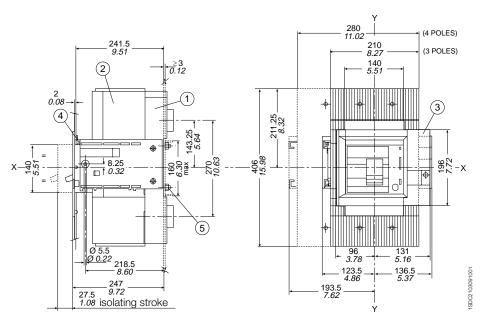


Draw out

circuit breaker

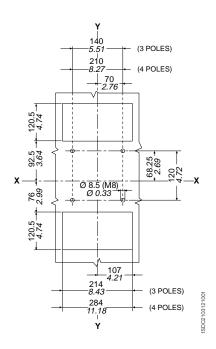
Caption

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



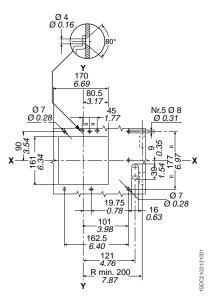
Template for drilling sheet metal support or channel

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



Template for drilling compartment door and fitting flange

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

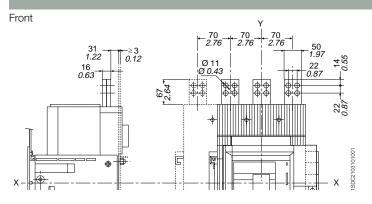


5

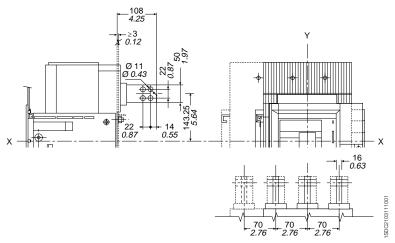


Terminals

[mm/in]



Horizontal or vertical flat bar rear terminals



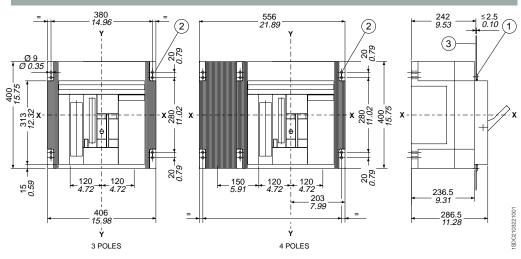


Fixed circuit breaker

[mm/*in*]

Caption

- (1) Flange for compartment door
- (2) Circuit breaker mounting holes
- (3) Internal side of compartment door



Caption

Hole for rear terminals only
 Minimum radius of rotation of

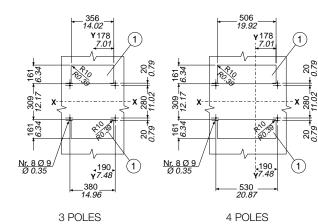
compartment door

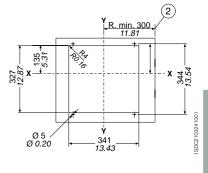
Template for drilling sheet metal support

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

Template for drilling compartment door and fitting flange

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



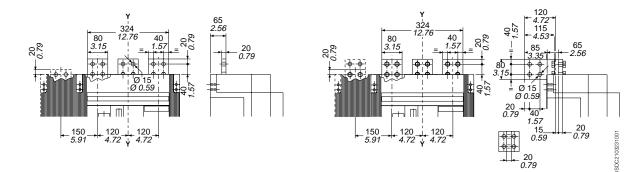


Terminals

Front

[mm/*in*]

5



Rear



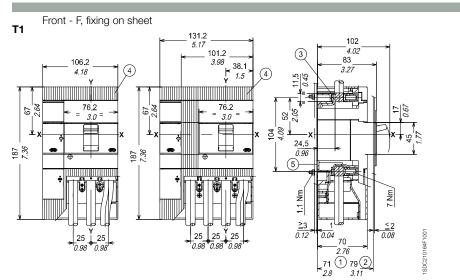
Tmax with residual current release - RC221 and RC222

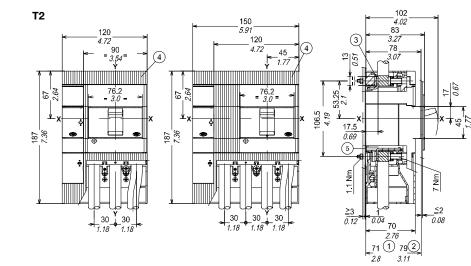
Fixed version

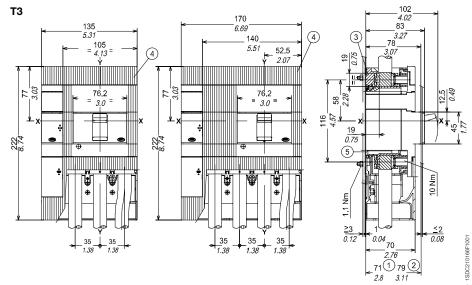
[mm/in]

Caption

- (1) Depth of the switchboard with circuit breaker face extending
- (2) Depth of the switchboard with circuit breaker face flush with door
- (3) Front terminals for cable connection
- (4) Low terminal covers with degree of protection IP40
- 5 Insulating plate



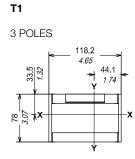


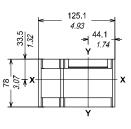


ISDC210165F1001

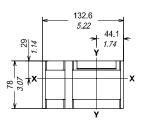
[mm/in]

Flange for the compartment door



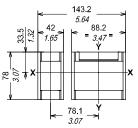


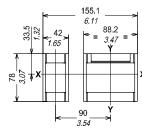
Т2

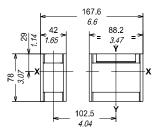


тз

4 POLES



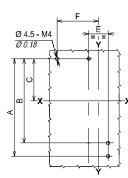


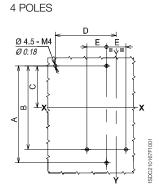


Drilling template for fixing sheet

T1 - T2 - T3

3 POLES





	Α	в	С	D	Е	F
T1	124	107	53.5	78.1	25	53.1
	4.88	4.21	2.11	<i>3.07</i>	0.98	<i>2.0</i> 9
T2	124	107	53.5	90	30	60
	4.88	4.21	2.11	3.54	1.18	2.36
Т3	141.5	122	61	102.5	35	67.5
	5.57	4.80	<i>2.40</i>	<i>4.04</i>	1.38	<i>2.</i> 66



Tmax with residual current release - RC221 and RC222

[mm/in]

Drilling templates of the compartment door

face not extending

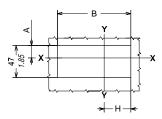
Without flange

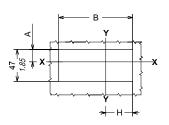
Τ1

Without flange face extending

3 POLES

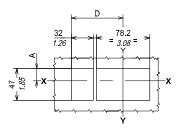
T1 - T2 - T3

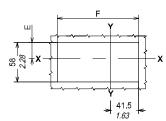






T1 - T2 - T3





With flange

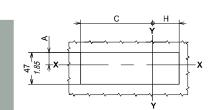
T1 - T2 - T3

face not extending

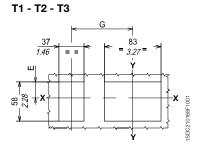
4 POLES

5

T1 - T2 - T3



- 47 - 1.85 	→ 32 1.26 	C * = 78.2 3.08 Y Y	= > X
4 3. * ×			

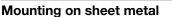


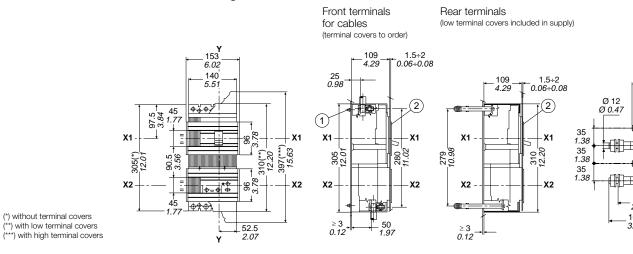
	Α	в	С	D	Е	F	G	н
T1	18 <i>0.71</i>	108.2 <i>4.26</i>	94.1 <i>3.70</i>	-	23.5 <i>0.93</i>	113 4.45	78.1 <i>3.07</i>	39.1 1.54
T2	18	122	106	76	23.5	120	90	46
	<i>0.71</i>	4.80	<i>4.17</i>	2.99	<i>0.93</i>	4.72	3.54	1.81
ТЗ	13.5	137	118.5	83.5	19	127.4	102.5	53.5
	<i>0.53</i>	5.39	<i>4.67</i>	<i>3.29</i>	<i>0.7</i> 5	5.02	<i>4.04</i>	2.11



SACE Isomax S3 with residual current release -RC211/3 and RC212/3

Vertical installation





Caption

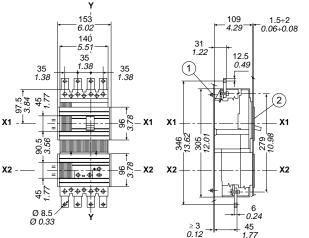
(*) without terminal covers

(1) Tightening torque 2 Nm

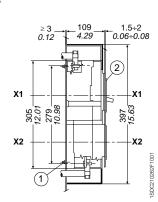
(2)Flange for compartment door

Note See the various different versions for the dimensions of the terminals





Terminals for rear Cu/Al cables (high terminal covers included in supply)

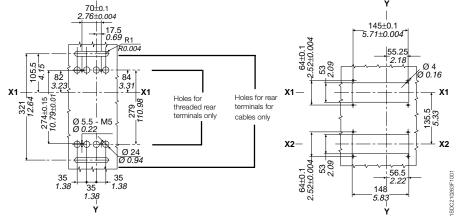


Template for drilling sheet metal support

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

Template for drilling compartment door and fitting flange

(thickness of sheet metal: 0.06+0.08"/1.5+2 mm)



[mm/in]

81.5

55 2.17

100

3.94

10261F

ISDC2

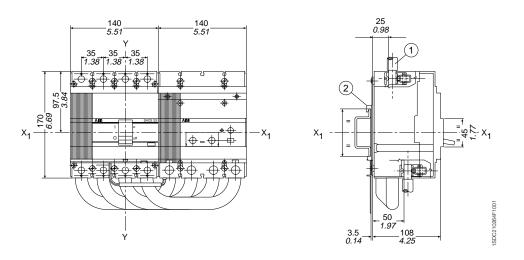
36 4



SACE Isomax S3 with residual current release - RC211/3 and RC212/3

Horizontal installation

[mm/in]



Caption

1 Front terminals for cables

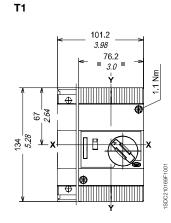
(2) Bracket for mounting on DIN EN 50023 channel



Accessories for Tmax T1 - T2 - T3

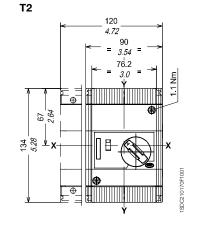
[mm/in]

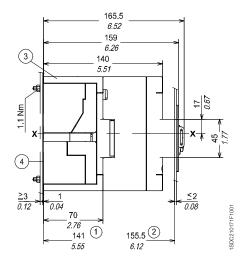
Solenoid operator superimposed

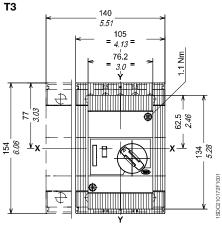


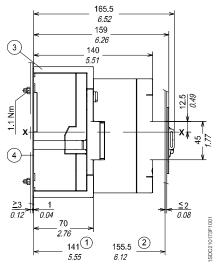
Caption

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

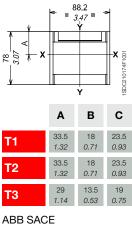




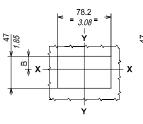




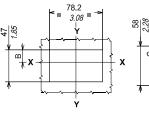
Flange for compartment door



Drilling templates of the compartment door



Without flange Operating mechanism face extending



Without flange Operating mechanism face flush with door

83 3.27 C x ISDC210175F1001

With flange Operating mechanism face flush with door



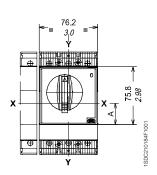
Overall dimensions Accessories for Tmax T1 - T2 - T3

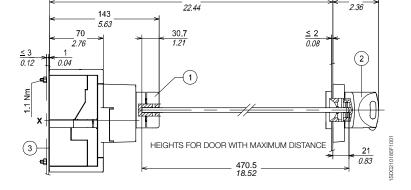
[mm/in]

Rotary handle operating mechanism on the compartment door

60

570





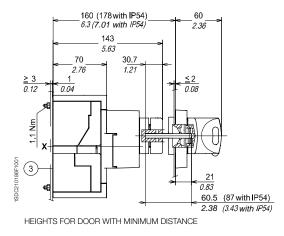
Caption

- (1) Transmission unit
- (2) Rotary handle operating mechanism on the compartment door

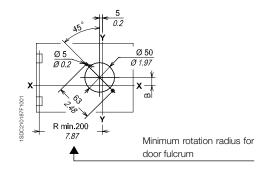
3 Insulating plate

	Α	в
T1-T2	28 1.10	14 0.55
тз	32.5 1.28	9.5 <i>0.37</i>

5



Drilling template of the compartment door



[mm/*in*]

(1)

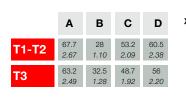
1SDC210191F1001

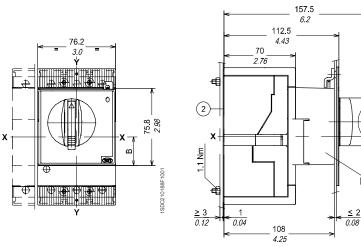
1SDC210189F1001

Rotary handle operating mechanism on circuit breaker

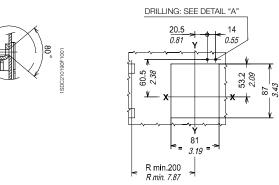
Caption



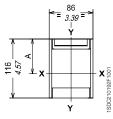




Drilling template of the compartment door



Flange for the compartment



Ø 4 Ø 0.16

DET."A"



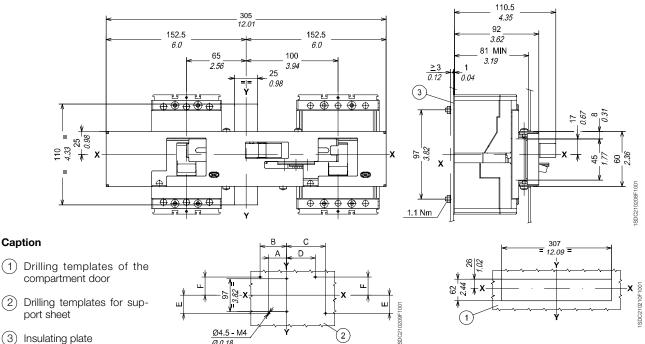


Accessories for Tmax T1 - T2 - T3

[mm/in]

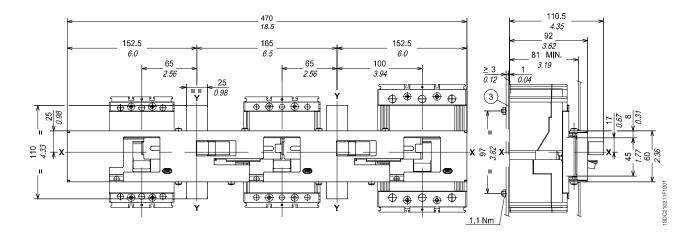
Mechanical interlock between circuit breakers

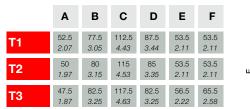


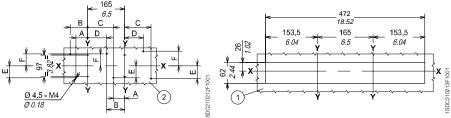


Front interlocking plate between three circuit breakers

Ø 0.18







Caption



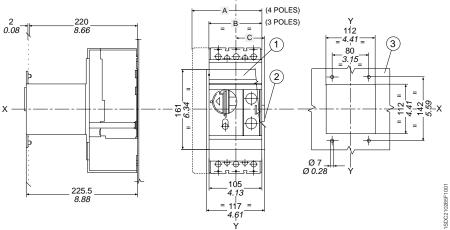
Overall dimensions Accessories for SACE Isomax S3-S4-S5

Motor operator for fixed circuit breaker

Caption

- (1) Flange for compartment door
- (2) Dimensions with connectors
- (3) Drilling of compartment door
- Note See the various different versions for the circuit breaker mounting holes

	Α	В	С
S3-S4	140	105	58
	5.51	4.13	2.28
S5	183.75	140	75.5
	7.23	5.51	2.97



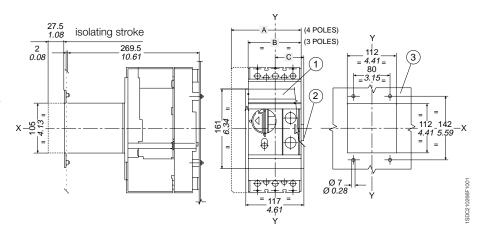
Caption

- (1) Flange for compartment door
- (2) Dimensions with connectors
- (3) Drilling of compartment door
- Note See the various different versions for the circuit breaker mounting holes

	Α	в	С
S3-S4	140	105	58
	5.51	<i>4.13</i>	2.28
S 5	183.75	140	75.5
	<i>7.23</i>	5.51	2.97

Motor operator for plug in circuit breakers

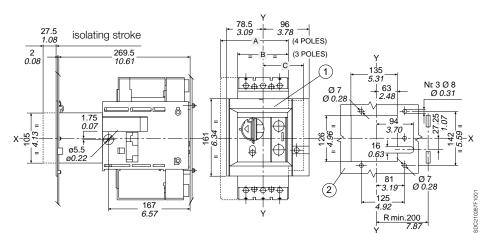
Motor operator for draw out circuit breaker



Caption

- 1) Flange for compartment door
- (2) Drilling of compartment door
- Note See the various different versions for the circuit breaker mounting holes

	Α	В	С
S3-S4	140	105	58
	5.51	<i>4.13</i>	2.28
S5	183.75	140	75.5
	<i>7.23</i>	5.51	2.97





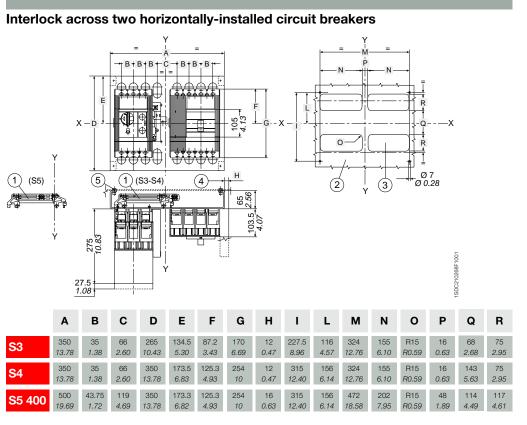
Accessories for SACE Isomax S3-S4-S5

[mm/*in*]

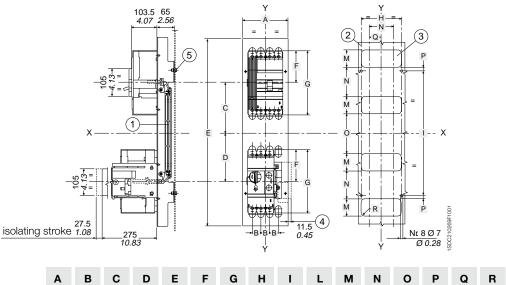
Caption

(1) Interlock device

- (2) Template for drilling mounting holes in sheet metal
- (3) Drilling template for all versions with rear terminals
- (4) Dimensions with four-pole withdrawable version mounted on right
- (5) Tightening torque 3.7 Nm
- Note See the various different versions for the dimensions of the circuit breakers



Interlock across two vertically-installed circuit breakers



	Α	в	С	D	E	F	G	н	1	L	м	Ν	0	Ρ	Q	R
S3	180	35	152.5	157.5	578	87.5	170	157.5	350	155	75	68	92	14	77.5	R15
	<i>7.0</i> 9	1.38	6.00	6.20	22.76	3.44	6.69	6.20	13.78	<i>6.10</i>	2.95	2.68	3.62	0.55	3.05	<i>R0.59</i>
S4	180	35	198.5	195.5	750	125.3	254	157.5	490	155	75	143	101	23.5	77.5	R15
	7.09	1.38	<i>7.81</i>	<i>7.70</i>	29.53	<i>4.93</i>	10	6.20	19.29	6.10	2.95	5.63	<i>3.98</i>	0.93	3.05	<i>R0.59</i>
S5 400	220	43.75	198.5	195.5	750	125.3	254	201	490	202	107	114	66	9	98.5	R15
	8.66	1.72	<i>7.81</i>	<i>7.70</i>	29.53	<i>4.93</i>	10	7.91	19.29	7.95	<i>4.21</i>	<i>4.4</i> 9	2.60	<i>0.35</i>	3.88	<i>R0.59</i>



Caption

(4)

Interlock device

(2) Drilling template for mounting

(3) Drilling template for all versions with rear terminals

(5) Tightening torque 3.7 Nm

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

circuit breakers on sheet metal

Dimensions with four-pole withdrawable version

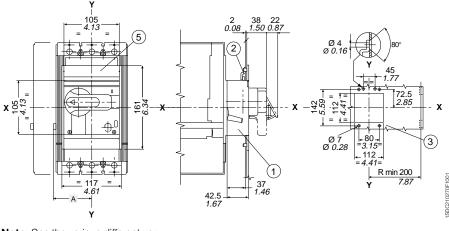
ABB SACE



Caption

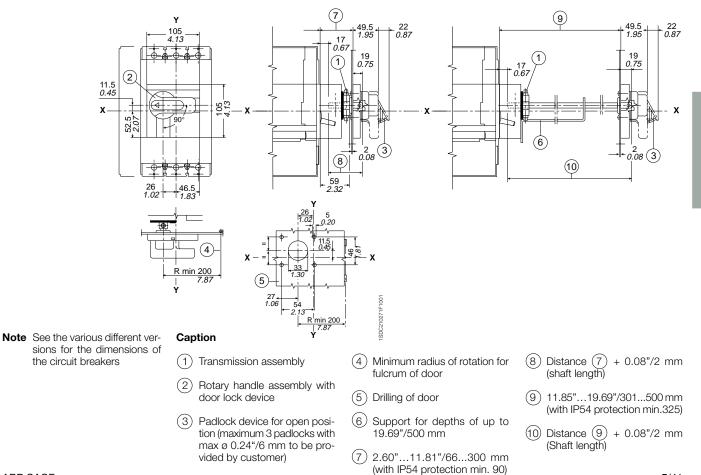
- 1 Rotary handle operating mechanism
- (2) Lock for compartment door (to order)
- (3) Drilling of compartment door
- (4) Dimensions for connector for early contact for undervoltage release
- 5 Flange for compartment door

		Α
S3-S4	III	35 1.38
S3-S4	IV	35 1.38
S5	III	43.75 1.72
S5	IV	43.75 <i>1.72</i>



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

Compartment door-mounted rotary handle operating mechanism with adjustable depth for fixed or plug in circuit breaker



Rotary handle operating mechanism on fixed or plug in circuit breaker

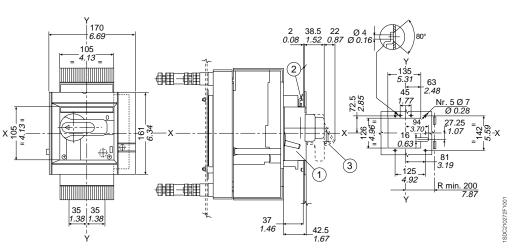


Accessories for SACE Isomax S3-S4-S5

Caption

Rotary handle operating mechanism on draw out circuit breaker

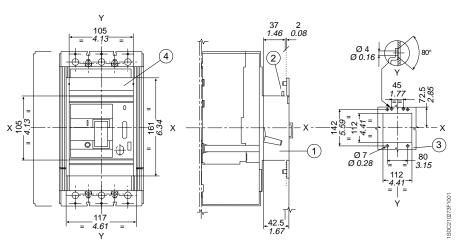
- 1 Rotary handle operating mechanism
- (2) Lock for compartment door (to order)
- (3) Padlock device for open position (maximum 3 padlocks max. ø 0.24"/6 mm to be provided by user)
- Note See the various different versions for the dimensions of the circuit breakers



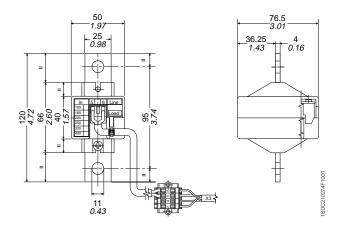
Caption

- 1 Front flange for lever operating mechanism
- (2) Lock for compartment door (to order)
- (3) Drilling of compartment door
- (4) Flange for compartment door
- (5) Tightening torque 3.7 Nm
- **Note** See the various different versions for the dimensions of the circuit breakers

Front flange for operating lever mechanism



External neutral (for SACE S4-S5 circuit breakers)

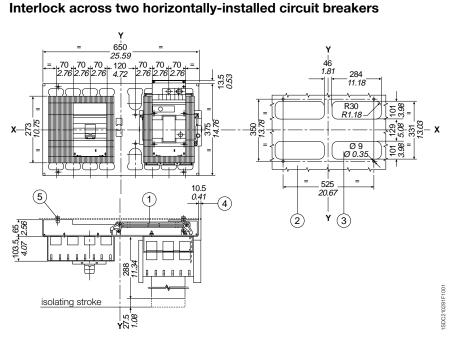




Overall dimensions Accessories for SACE Isomax S6

Caption

- (1) Interlock device
- 2 Drilling template for mounting circuit breaker on sheet metal
- (3) Drilling template for all versions with rear terminals
- (4) Dimensions with withdrawable version mounted on right
- (5) Tightening torque 9 Nm
- **Note** See the various different versions for the dimensions of the circuit breakers

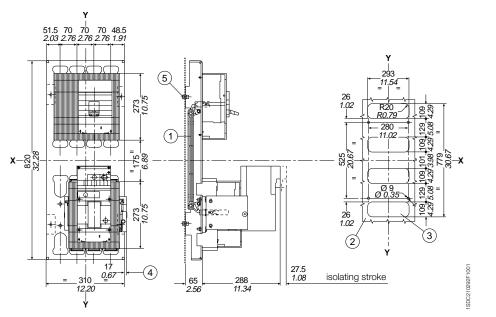


Interlock across two vertically-installed circuit breakers

(1) Interlock device

Caption

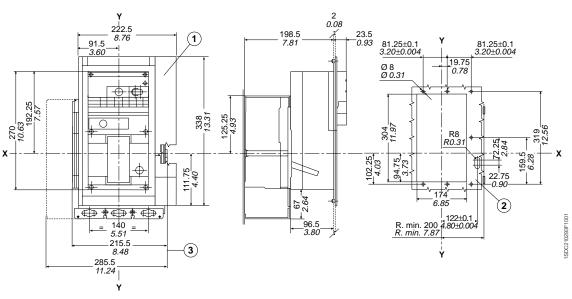
- 2 Drilling template for mounting circuit breaker on sheet metal
- (3) Drilling template for all versions with rear terminals
- (4) Dimensions with withdrawable version mounted on right
- (5) Tightening torque 9 Nm
- Note See the various different versions for the dimensions of the circuit breakers





Accessories for SACE Isomax S6

Motor operator for fixed circuit breaker



Note See the various different versions for the dimensions of

the circuit breakers

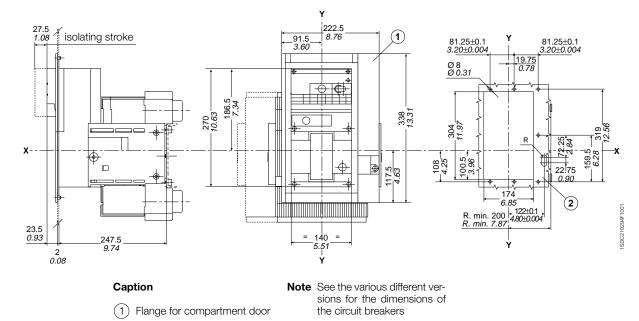
Caption

- (1) Flange for compartment door
- (2) Template for drilling compartment door
- (3) Dimensions with connectors

(2) Template for drilling compart-

ment door

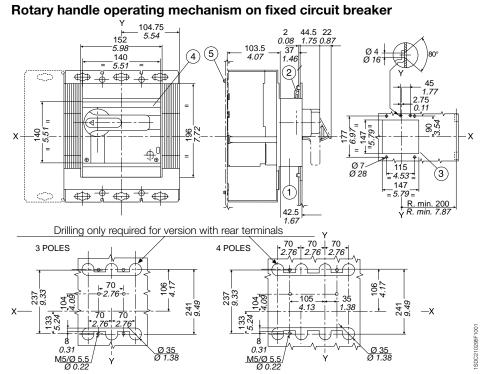
Motor operator for draw out circuit breakers



[mm/in]

Caption

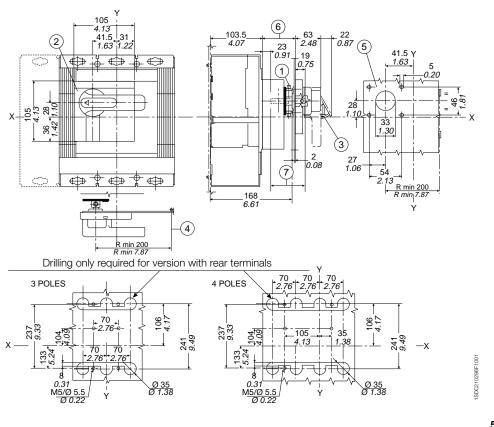
- (1) Rotary handle operating mechanism on circuit breaker
- (2) Lock for compartment door (to order)
- (3) Drilling of compartment door
- (4) Flange for compartment door
- (5) Tightening torque 2 Nm
- Note See the various different versions for the dimensions of the circuit breakers



Caption

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

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

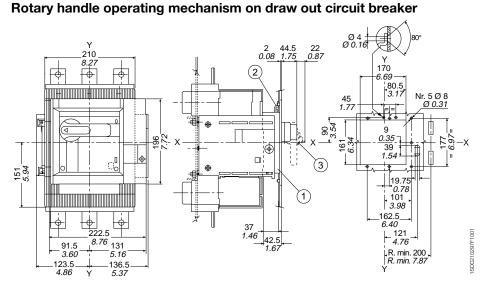




Accessories for SACE Isomax S6

Caption

- (1) Rotary handle on circuit breaker
- (2) Lock for compartment door (to order)
- (3) Padlock device for open position (maximum 3 padlocks max. ø 0.24"/6 mm to be provided by user)
- Note See the various different versions for the dimensions of the circuit breakers



Caption

mechanism

(5) Tightening torque 2 Nm

the circuit breakers

3 POLES

237 9.33

4 POLES

237 9.33

х 133

4<u>0</u>

M<u>5/Ø 5</u> Ø 0.2

Х

104 104

ā

0.31

M<u>5/Ø</u>

133 5.24

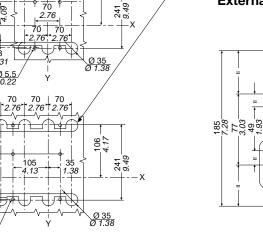
order)

Front flange for operating lever mechanism

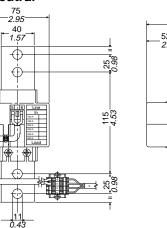
104.75 (1) Front flange for operating lever 4.12 152 103.5 *4.07* 37 2 0.08 5.98 (5) 1.46 (4)140 Ø4 Ø0.16 5.51 2 (2) Lock for compartment door (to ∉∄⊅ €‡ €€ (3) Drilling of compartment door 196 90 3.54 (4) Flange for compartment door "5.79" 140 5,51 **6.97** 147 х Ø 7~ Ø 0.28 115 (3) 4.53 Note See the various different ver-147 sions for the dimensions of ⇔ ∉∌ **(** 42.5

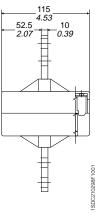
> Drilling only required for version with rear terminals

External neutral



106





[mm/in]

5

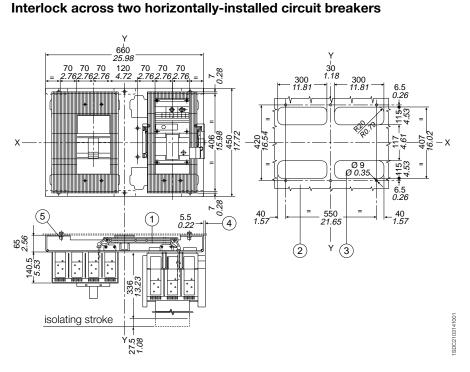


Overall dimensions Accessories for SACE Isomax S7

[mm/*in*]

Caption

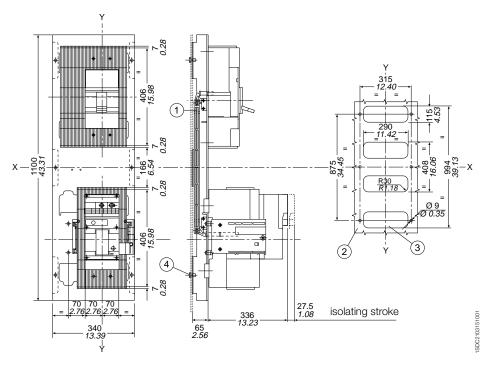
- (1) Interlock device
- (2) Drilling template for mounting circuit breaker on sheet metal
- 3 Drilling template for all versions with rear terminals
- (4) Dimensions with withdrawable version mounted on right
- (5) Tightening torque 9 Nm
- Note See the various different versions for the dimensions of the circuit breakers



Caption

Interlock across two vertically-installed circuit breakers

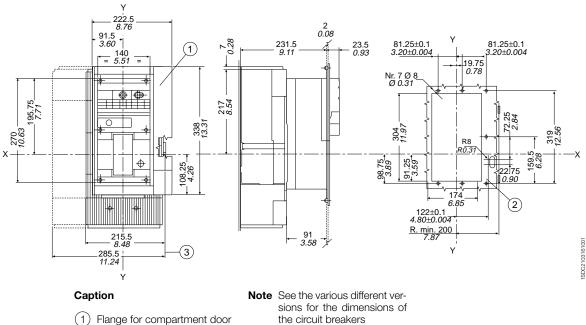
- (1) Interlock device
- (2) Drilling template for mounting circuit breaker on sheet metal
- 3 Drilling template for all versions with rear terminals
- (4) Tightening torque 9 Nm
- Note See the various different versions for the dimensions of the circuit breakers





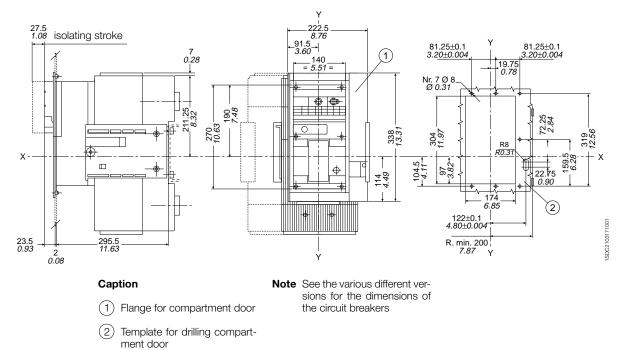
Accessories for SACE Isomax S7

Motor operator for fixed circuit breaker



- (1) Flange for compartment door
- (2) Template for drilling compartment doorl
- (3) Dimensions with connectors

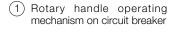
Motor operator for draw out circuit breaker



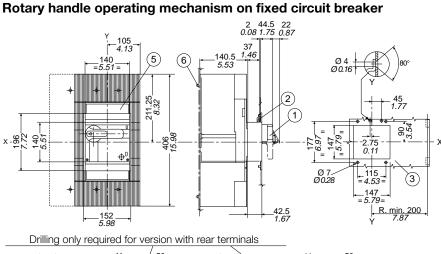
[mm/in]

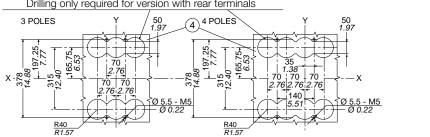
5

Caption



- (2) Lock for compartment door (to order)
- (3) Drilling of compartment door
- (4) Drilling template for mounting circuit breaker on sheet metal
- (5) Flange for compartment door
- (6) Tightening torque 2 Nm
- **Note** See the various different versions for the dimensions of the circuit breakers

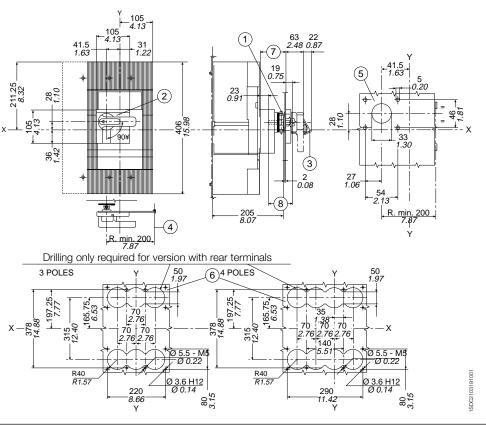




Caption

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

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



0318100

5

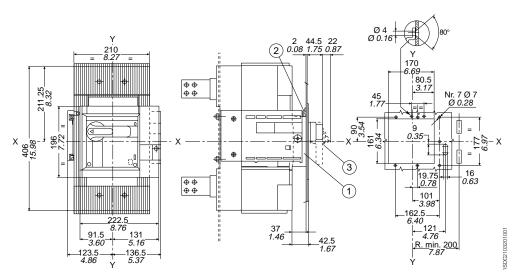


Accessories for SACE Isomax S7

[mm/in]

Caption

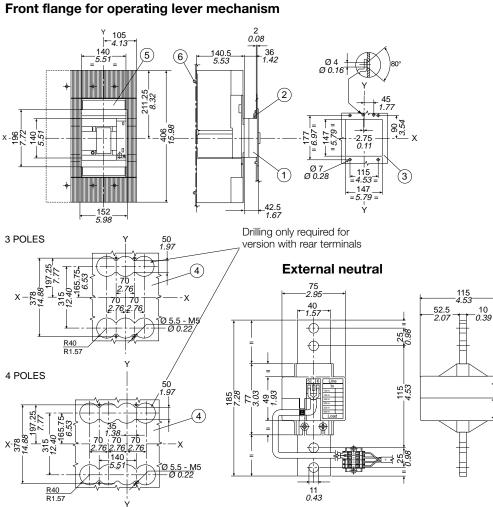
- (1) Rotary handle operating mechanism on circuit breaker
- Lock for compartment door (to order)
- (3) Padlock device for open position (maximum 3 padlocks max. Ø 0.24"/6 mm to be provided by user)
- Note See the various different versions for the dimensions of the circuit breakers



Rotary handle operating mechanism on draw out circuit breaker

Caption

- 1 Front flange for lever operating mechanism
- (2) Lock for compartment door (to order)
- 3 Drilling of compartment door
- Drilling template for mounting circuit breaker on sheet metal
- 5 Flange for compartment door
- (6) Tightening torque 2 Nm
- Note See the various different versions for the dimensions of the circuit breakers



8

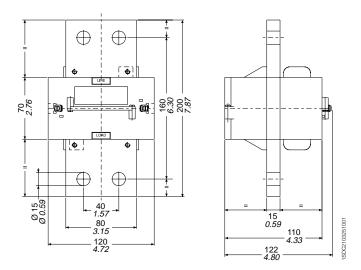
SDC210321

5/50



Overall dimensions Accessories for SACE Isomax S8

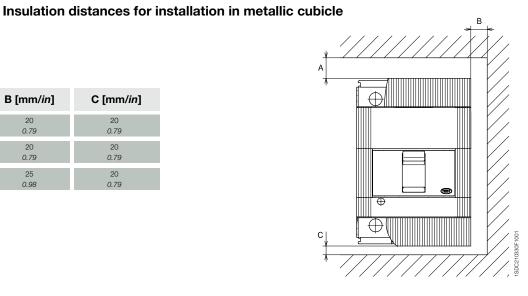
External neutral



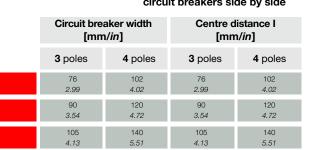
Distances to be respected - Tmax

[mm/in]

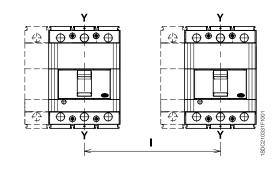
	A [mm/ <i>in</i>]	B [mm/ <i>in</i>]	C [mm/ <i>in</i>]
T1	25	20	20
	0.98	0.79	0.79
Т2	25	20	20
	0.98	0.79	0.79
ТЗ	50	25	20
	1.97	0.98	0.79



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

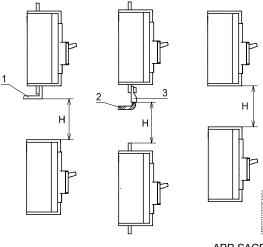


Minimum centre distance for superimposed circuit breakers

	H [mm/ <i>in</i>]
T1	60 2.36
Т2	90 3.54
тз	140 5.51

Caption

- (1) Connection not insulated
- (2) Insulated cable
- (3) Cable terminal



T1

Т2

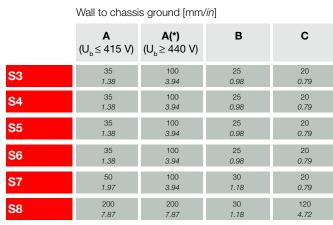
ТЗ



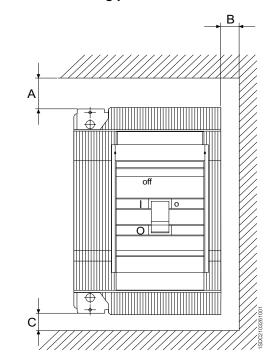
Distances to be respected - SACE Isomax S

[mm/in]

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



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



Insulation distances for installation in insulated compartment

	Insulated wall [mm/in]					
	Α	В	С			
S3	35	0	20			
	1.38	<i>0</i>	0.79			
S4	35	0	20			
	1.38	0	0.79			
S5	35	0	20			
	1.38	<i>0</i>	0.79			
S6	35	10	20			
	1.38	<i>0.3</i> 9	<i>0.7</i> 9			
S7	50	10	20			
	1.97	<i>0.3</i> 9	0.79			
S8	120	15	120			
	4.72	<i>0.5</i> 9	4.72			

The dimensions shown apply for operating voltages Ub of up to 690 V.

The dimensions to be respected must be added to the maximum dimensions of the various different versions of the circuit breakers, including the terminals.



Overall dimensions Distances to be respected - SACE Isomax S

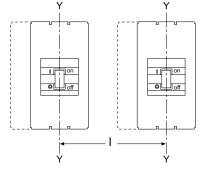
[mm/in]

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

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

Minimum distance between centres for horizontally-installed circuit breakers

		breaker [mm/ <i>in</i>]	l [mm/ <i>in</i>]			
	3 poles	4 poles	3 poles	4 poles		
S3	105	140	105/119(*)	140		
	<i>4.13</i>	5.51	4.13/4.69(*)	5.51		
S4	105	140	105/119(*)	140		
	<i>4.13</i>	5.51	4.13/4.69(*)	5.51		
S5	140	184	140	185		
	5.51	7.24	5.51	7.28		
S6	210	280	210	280		
	8.27	11.02	8.27	11.02		
S7	210	280	210	280		
	8.27	11.02	8.27	11.02		
S8	435	585	435	585		
	17.13	23.03	17.13	23.03		



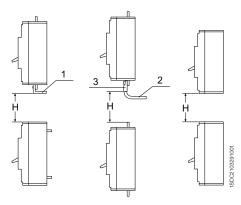
SDC210328100

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

The distances between centres are for the installation of fixed and plug in circuit breakers. When installing withdrawable SACE S3, S4, S5, S6, S7 circuit breakers you should also take into account the dimensions of the metal supporting channel that needs to be fitted between the guides of the fixed parts of two adjacent circuit breakers.

Minimum distance between centres for verticallyinstalled circuit breakers

	H [mm/ <i>in</i>]
S3	140 5.57
S4	140 5.57
S5	140 5.57
S6	180 7.09
S7	180 7.09
S8	300 11.81



- 1 Connection not insulated
- 2 Insulated cable
- 3 Cable terminals



ABB Inc.

1206, Hatton Road Wichita Falls, TX 76302 U.S.A. Tel.: (888) 385-1221 - (940) 397-7000 Fax: (940) 397-7001

http://www.abb-control.com

ABB Inc.

3299, boul. J.B. Deschamps Lachine, QC H8T 3E4 CANADA Tel.: (514) 420-3100 Fax: (514) 420-3137

http://www.abb.ca

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 Inc.