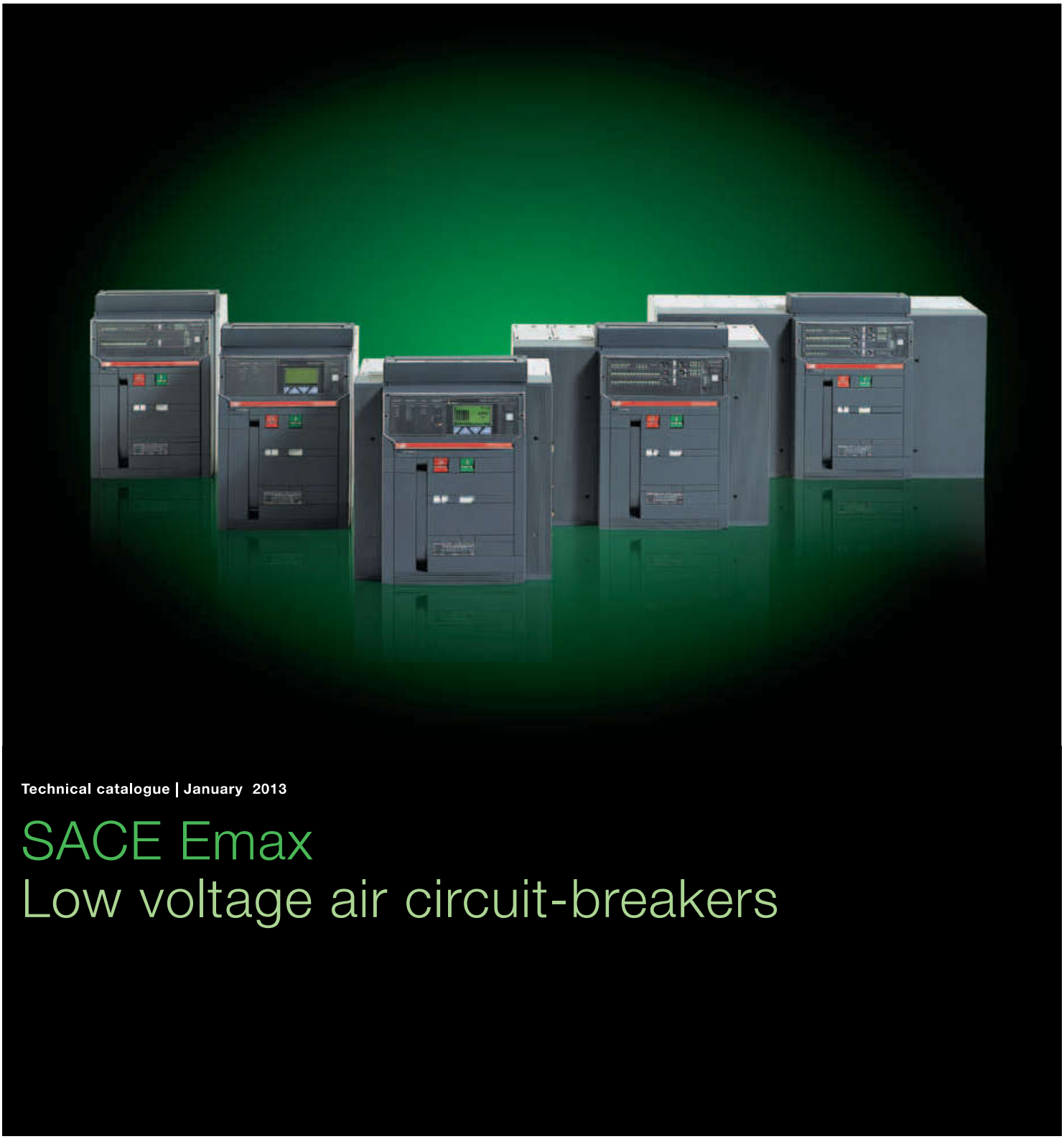

Technical catalogue | January 2013

SACE Emax
Low voltage air circuit-breakers

Power and productivity
for a better world™

SACE Emax automatic circuit-breakers

Common data			
Voltages	Rated service voltage **Ue**	[V]	690 ~
	Rated insulation voltage **Ui**	[V]	1000
	Rated impulse withstand voltage **Uimp**	[kV]	12
Operating temperature		[°C]	-25....+70
Storage temperature		[°C]	-40....+70
Frequency **f**		[Hz]	50 - 60
Number of poles			3 - 4
Versions			Fixed - Withdrawable


1SDC200076F0001


1SDC200077F0001

			E1		E2			
Performance levels			**B**	**N**	**B**	**N**	**S**	**L**
Currents: max rated uninterrupted current (at 40 °C)		[A]	800	800	1600	1000	800	1250
		[A]	1000	1000	2000	1250	1000	1600
		[A]	1250	1250		1600	1250	
		[A]	1600	1600		2000	1600	
		[A]					2000	
		[A]						
		[A]						
Neutral pole current-carrying capacity for 4-pole CBs		[%Iu]	100	100	100	100	100	100
Rated ultimate breaking capacity under short-circuit	**Icu**							
220/230/380/400/415 V ~		[kA]	42	50	42	65	85	130
440 V ~		[kA]	42	50	42	65	85	110
500/525 V ~		[kA]	42	50	42	55	65	85
660/690 V ~		[kA]	42	50	42	55	65	85
Rated service breaking capacity under short-circuit	**Ics**							
220/230/380/400/415 V ~		[kA]	42	50	42	65	85	130
440 V ~		[kA]	42	50	42	65	85	110
500/525 V ~		[kA]	42	50	42	55	65	65
660/690 V ~		[kA]	42	50	42	55	65	65
Rated short-time withstand current Icw	(1s)	[kA]	42	50	42	55	65	10
	(3s)	[kA]	36	36	42	42	50	–
Rated making capacity under short-circuit (peak value)	**Icm**							
220/230/380/400/415 V ~		[kA]	88,2	105	88,2	143	187	286
440 V ~		[kA]	88,2	105	88,2	143	187	242
500/525 V ~		[kA]	88,2	105	88,2	121	143	187
660/690 V ~		[kA]	88,2	105	88,2	121	143	187
Utilisation category (according to CEI EN 60947-2)			B	B	B	B	B	A
Isolation behaviour (according to CEI EN 60947-2)			•	•	•	•	•	•
Overcurrent protection								
Electronic trip units for AC applications			•	•	•	•	•	•
Operating times								
Closing time (max)		[ms]	80	80	80	80	80	80
Breaking time for I<Icw (max) (1)		[ms]	70	70	70	70	70	70
Breaking time for I>Icw (max)		[ms]	30	30	30	30	30	12
Overall dimensions								
Fixed: H = 418 mm - D = 302 mm W (3/4 poles)		[mm]	296/386		296/386			
Withdrawable: H = 461 mm - D = 396,5 mm W (3/4 poles)		[mm]	324/414		324/414			
Weights (circuit-breaker complete with trip units and CS,excluding accessories)								
Fixed 3/4 poles		[kg]	45/54	45/54	50/61	50/61	50/61	52/63
Withdrawable 3/4 poles (including fixed part)		[kg]	70/82	70/82	78/93	78/93	78/93	80/95

(1) Without intentional delays; (2) The performance at 600V is 100kA.

			E1 B-N			E2 B-N-S				E2 L	
Max rated uninterrupted current (at 40 °C)		[A]	800	1000-1250	1600	800	1000-1250	1600	2000	1250	1600
Mechanical life with regular ordinary maintenance		[No.operations x1000]	25	25	25	25	25	25	25	20	20
Operation frequency		[operations/hour]	60	60	60	60	60	60	60	60	60
Electrical life	(440 V ~)	[No.operations x1000]	10	10	10	15	15	12	10	4	3
	(690 V ~)	[No.operations x1000]	10	8	8	15	15	10	8	3	2
Operation frequency		[operations/hour]	30	30	30	30	30	30	30	20	20


1SDC200078F0001


1SDC200079F0001


1SDC200080F0001

	E3					E4			E6	
	N	S	H	V	L	S	H	V	H	V
	2500	1000	800	800	2000	4000	3200	3200	4000	4000
	3200	1250	1000	1250	2500		4000	4000	5000	5000
		1600	1250	1600					6300	6300
		2000	1600	2000						
		2500	2000	2500						
		3200	2500	3200						
			3200							
	100	100	100	100	100	50	50	50	50	50
	65	75	100	130	130	75	100	150	100	150
	65	75	100	130	110	75	100	150	100	150
	65	75	100	100	85	75	100	130	100	130
	65	75	85 (2)	100	85	75	85 (2)	100	100	100
	65	75	85	100	130	75	100	150	100	150
	65	75	85	100	110	75	100	150	100	125
	65	75	85	85	65	75	100	130	100	100
	65	75	85	85	65	75	85	100	100	100
	65	75	75	85	15	75	100	100	100	100
	65	65	65	65	–	75	75	75	85	85
	143	165	220	286	286	165	220	330	220	330
	143	165	220	286	242	165	220	330	220	330
	143	165	220	220	187	165	220	286	220	286
	143	165	187	220	187	165	187	220	220	220
	B	B	B	B	A	B	B	B	B	B
	•	•	•	•	•	•	•	•	•	•
	•	•	•	•	•	•	•	•	•	•
	80	80	80	80	80	80	80	80	80	80
	70	70	70	70	70	70	70	70	70	70
	30	30	30	30	12	30	30	30	30	30
	404/530					566/656			782/908	
	432/558					594/684			810/936	
	66/80	66/80	66/80	66/80	72/83	97/117	97/117	97/117	140/160	140/160
	104/125	104/125	104/125	104/125	110/127	147/165	147/165	147/165	210/240	210/240

	E3 N-S-H-V						E3 L		E4 S-H-V		E6 H-V		
	800	1000-1250	1600	2000	2500	3200	2000	2500	3200	4000	4000	5000	6300
	20	20	20	20	20	20	15	15	15	15	12	12	12
	60	60	60	60	60	60	60	60	60	60	60	60	60
	12	12	10	9	8	6	2	1,8	7	5	4	3	2
	12	12	10	9	7	5	1,5	1,3	7	4	4	2	1,5
	20	20	20	20	20	20	20	20	10	10	10	10	10

Protection trip units and trip curves
PR121/P

Characteristics

PR121/P is the new basic and complete trip unit for the Emax series. The complete range of protection functions together with the wide combination of thresholds and trip times offered make it suitable for protecting a wide range of alternating current installation. In addition to protection functions the unit is provided with multifunction LED indicators. Furthermore, PR121/P allows connection to external devices enhancing its advanced characteristics like remote signalling and monitoring, or remote supervision display.

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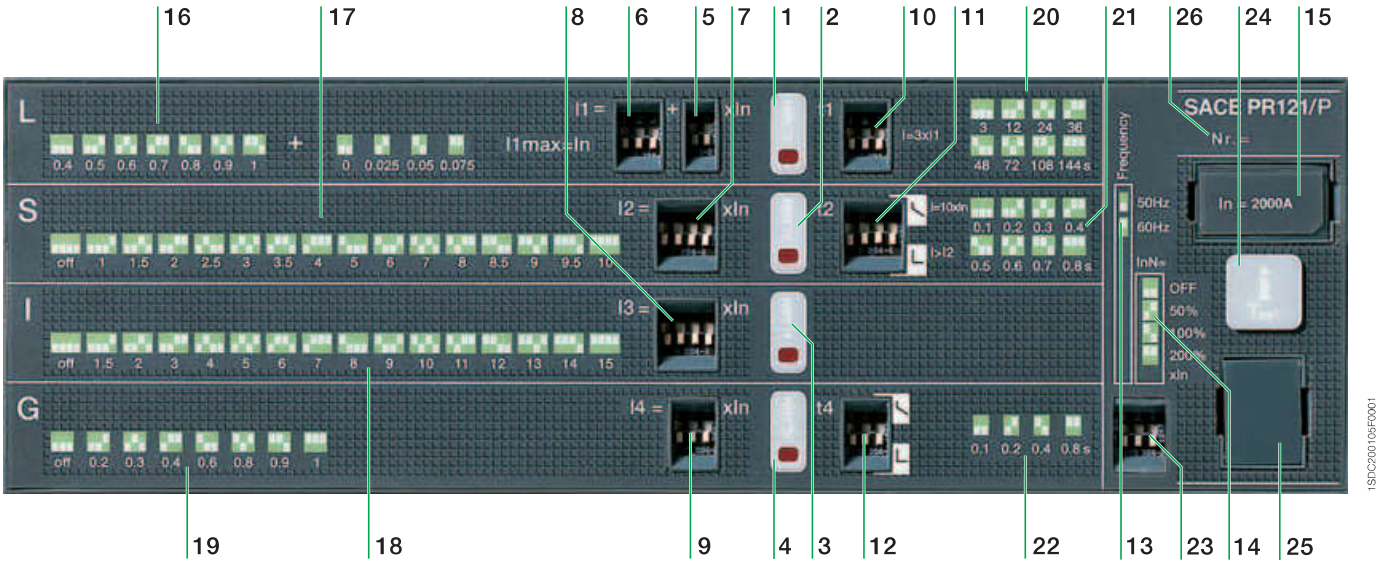


Caption

1 LED signalling Alarm for protection function L
2 LED signalling Alarm for protection function S
3 LED signalling Alarm for protection function I
4 LED signalling Alarm for protection function G
5 DIP switches for fine setting current threshold I1
6 DIP switches for main setting current threshold I1
7 DIP switches for setting current threshold I2
8 DIP switches for setting current threshold I3
9 DIP switches for setting current threshold I4
10 DIP switches for setting trip time t1 (type of curve)
11 DIP switches for setting trip time t2 (type of curve)
12 DIP switches for setting trip time t4 (type of curve)
13 Indication of the DIP switch position for network frequency
14 Indication of the DIP switch position for Neutral protection setting
15 Rating plug
16 Indication of the DIP switch positions for the various current thresholds values I1
17 Indication of the DIP switch positions for the various current threshold values I2
18 Indication of the DIP switch positions for the various current threshold values I3
19 Indication of the DIP switch positions for the various current threshold values I4
20 Indication of DIP switch positions for the various time settings t1
21 Indication of DIP switch positions for the various time settings t2
22 Indication of DIP switch positions for the various time settings t4
23 DIP switch for setting network frequency and neutral protection setting
24 Trip cause indication and trip test pushbutton
25 Test connector for connecting or testing the trip unit through an external device (PR030/B battery unit, BT030 wireless communication unit and SACE PR010/T unit)
26 Serial number of protection trip unit

Protection trip units and trip curves
PR122/P

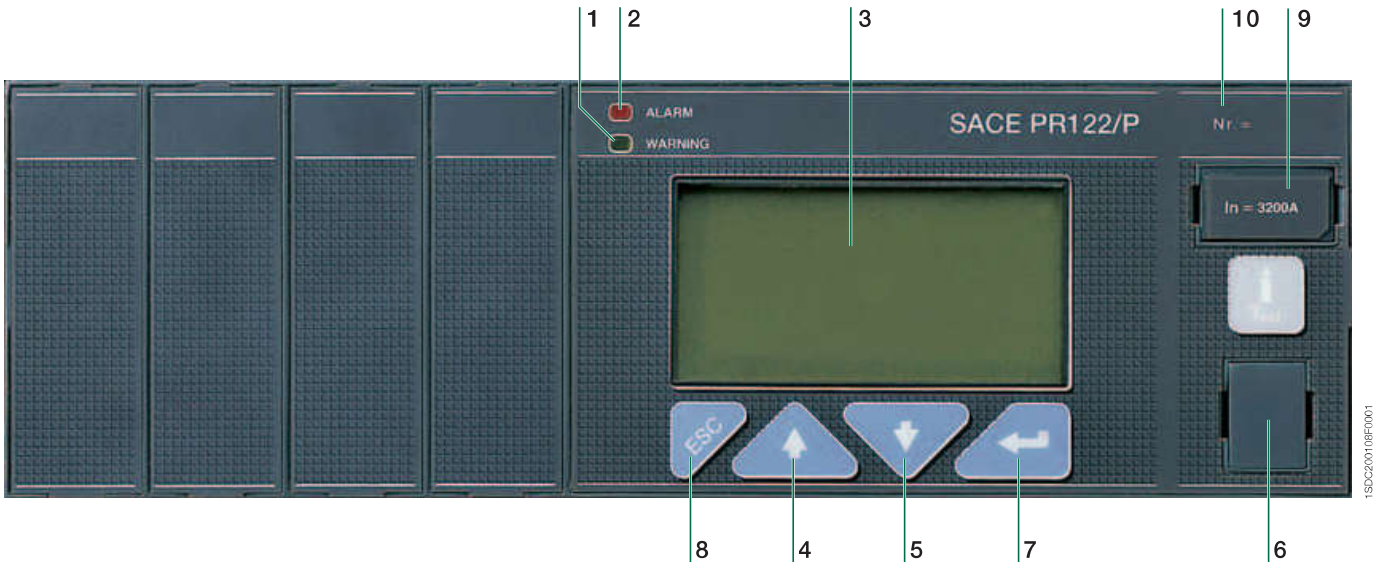
Characteristics

The SACE PR122 trip unit is a sophisticated and flexible protection system based on a state-of-the art microprocessor and DSP technology. Fitted with the optional internal PR120/D-M dialogue unit, PR122/P turns into an intelligent protection, measurement and communication device, based on the Modbus® protocol. By means of the PR120/D-M, PR122/P can also be connected to the ABB EP010 Fieldbus plug adapter, which makes it possible to choose among several different networks, such as Profibus and DeviceNet.

The new PR122/P is the result of ABB SACE's experience in designing protection trip units.
The exhaustive range of settings makes this protection unit ideal for general use in any type of installation, from distribution to the protection of motors, transformers, drives and generators.
Access to information and programming using a keyboard and graphic liquid crystal display is extremely simple and intuitive.

The interface is now common to PR122/P and PR123/P in order to give to the user maximum ease of use.
An integrated ammeter and many other additional features are provided over and above the protection functions. These additional functions can be further increased with addition on board of the dialogue, signalling, measurement, and wireless communication units.

Functions S and G can operate with a time delay independent of the current (t = k) or with an inverse time delay (constant specific let-through energy: I^2t = k), as required.
Protection against earth faults can also be obtained by connecting the PR122 trip unit to an external toroid located on the conductor that connects the transformer star centre to earth (homopolar toroid).
All the thresholds and trip curve delays of the protection functions are stored in special memories which retain the information even when no power is supplied.



Caption
1 LED Warning indicator
2 Alarm LED
3 Rear-lit graphic display
4 Cursor UP button
5 Cursor DOWN button
6 Test connector for connecting or testing the trip unit by means of an external device (PR030/B battery unit, BT030 wireless communication unit and SACE PR010/T unit)
7 ENTER button to confirm data or change pages
8 Button to exit submenus or cancel operations (ESC)
9 Rating plug
10 Serial number of protection trip unit

Protection trip units and trip curves
PR123/P

Characteristics

The PR123 protection trip unit completes the range of trip units available for the Emax family of circuit-breakers.
It is a high-performance and extraordinarily versatile trip unit, capable of offering a complete set of functions for protection, measurement, signalling, data storage and control of the circuit-breaker, and it represents the benchmark in low voltage protection units for circuit-breakers.
The front interface of the unit, common to PR122/P, is extremely simple thanks to the aid of the liquid crystal graphics display. It can show diagrams, bar graphs, measurements and sine curves for the various electrical values.
PR123 integrates all the features offered by PR122/P plus a series of evolute functionalities. As well as PR122 it can be integrated with the additional features provided by internal modules and external accessories.

Protection functions

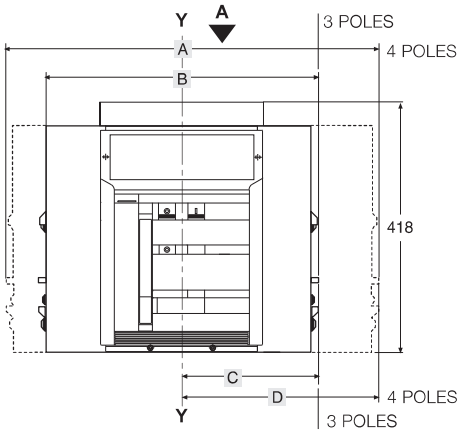
The PR123 trip unit offers the following protection functions:
– overload (L) [1],
– selective short-circuit (S),
– instantaneous short-circuit (I),
– earth fault with adjustable delay (G) [2],
– directional short-circuit with adjustable delay (D),
– phase unbalance (U),
– protection against overtemperature (OT),
– load control (K),
– undervoltage (UV),
– overvoltage (OV),
– residual voltage (RV),
– reverse power (RP),
– underfrequency (UF),
– overfrequency (OF),
– phase sequence (alarm only).

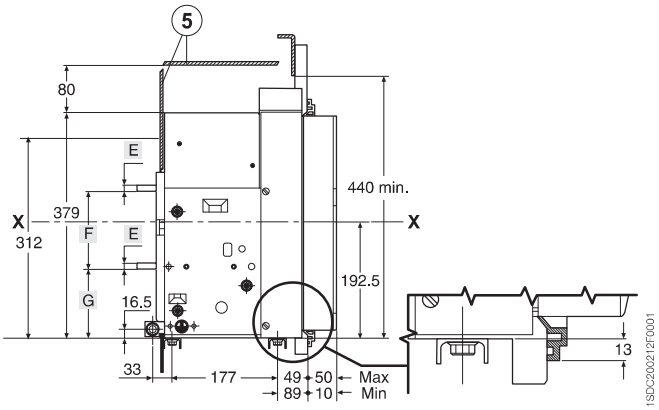
Notes:
(1) In accordance also with IEC 60255-3 Standard.
(2) The current values above which G is disabled are indicated in the installation manual.

Caption
1 LED Warning indicator
2 Alarm LED
3 Rear-lit graphic display
4 Cursor UP button
5 Cursor DOWN button
6 Test connector for connecting or testing the trip unit by means of an external device (PR030/B battery unit, BT030 wireless communication unit and SACE PR010/T unit)
7 ENTER button to confirm data or change pages
8 Button to exit submenus or cancel operations (ESC)
9 Rating plug
10 Serial number of protection trip unit
11 Power LED
12 Voltage uptake switch-disconnector

Overall dimensions
Fixed circuit-breaker

Basic version with horizontal rear terminals





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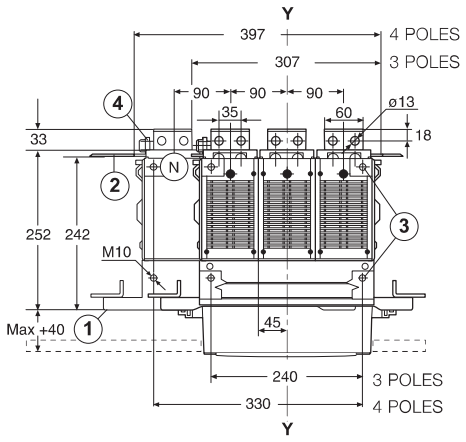
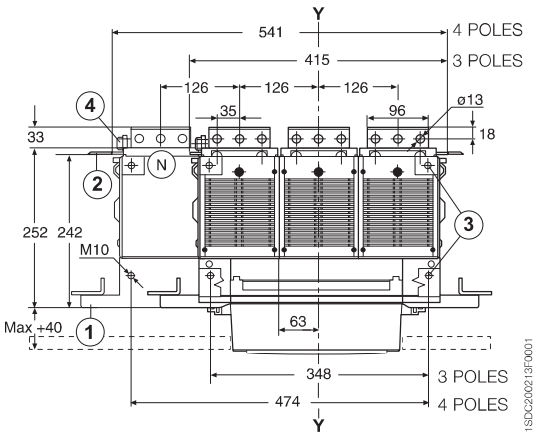
E1/E2
View **A**



E3
View **A**



Caption

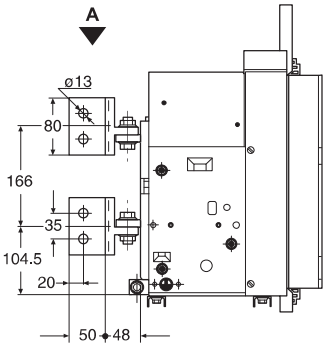
1. Inside edge of compartment door
2. Segregation (when provided)
3. M10 mounting holes for circuit-breaker (use M10 screws)
4. 1xM12 screw (E1, E2, E3) or 2 x M12 screws (E4, E6) for earthing (included in the supply)
5. Insulating wall or insulated metal wall

	A	B	C	D	E	F	G
E1	386	296	148	148	10	130	117.5
E2	386	296	148	148	26	114	117.5
E3	530	404	202	202	26	114	117.5
E4	656	566	238	328	26	166	91.5
E4/f	746	-	-	328	26	166	91.5
E6	908	782	328	454	26	166	91.5
E6/f	1034	-	-	454	26	166	91.5

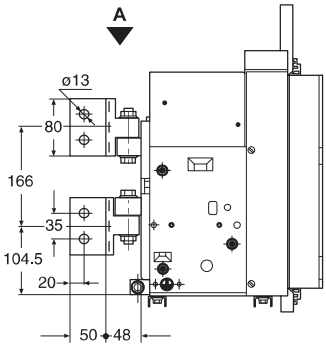
Overall dimensions
Fixed circuit-breaker

Basic version with vertical rear terminals

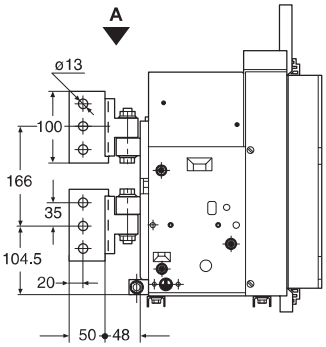
E1



E2/E4



E3/E6



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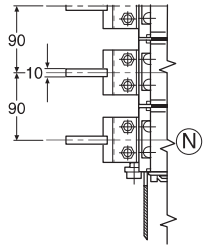
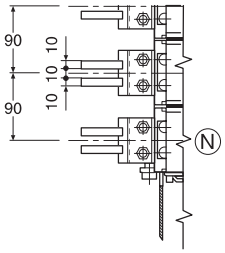
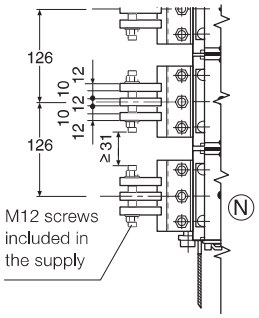
E1
View **A**



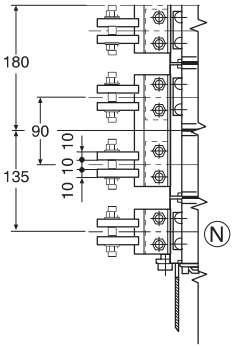
E2
View **A**



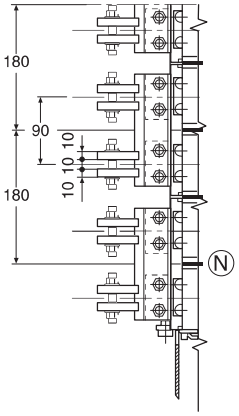
E3
View **A**



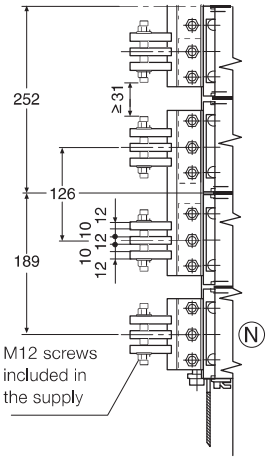
E4
View **A**



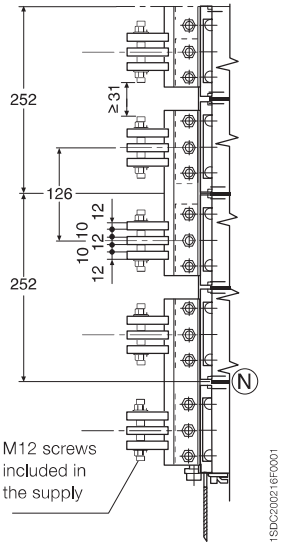
E4/f
View **A**



E6
View **A**

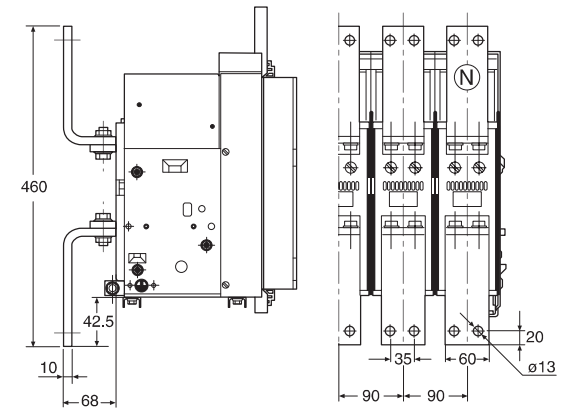


E6/f
View **A**

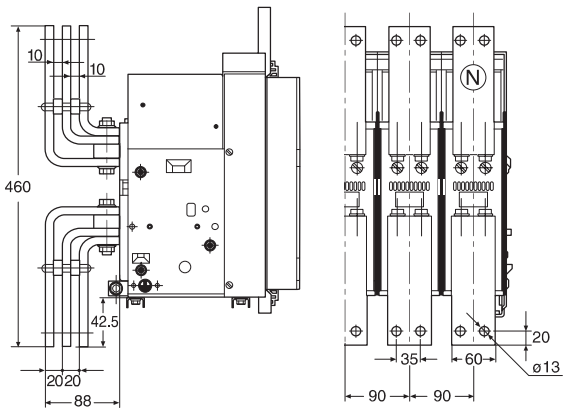


Version with front terminals

E1



E2



E3