SACE Isomax S circuit-breakers for motor protection

Protection against short-circuit

Magnetic only and electronic circuit-breakers for classical switching coordinations and motor protection of any power

690V • 80-1600 A • 70-200 kA (380/415 V)

Integrated protection

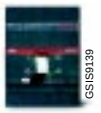
The evolution of motor protection: intelligence on board the circuit-breaker to “design” protection around the motor, optimising space and time

690V • 160-1250 A • 35-200 kA (380/415 V)

GSIS9065

SACE Isomax S circuit-breakers for motor protection (protection against short-circuit)

Electrical characteristics IEC 60947-2 and IEC 60947-4-1



			S2X 80	S3			S3X
Rated uninterrupted current, Iu		[A]	**80**	**160 / 250**			**125 / 200**
Rated service current, In		[A]	1…80	3…160 / 160…200			3… 125 / 125…200
Poles		Nr.	3	3			3
Rated service voltage, Ue (AC) 50-60Hz		[V]	690	690			690
Rated impulse withstand voltage, Uimp		[kV]	6	8			8
Rated insulation voltage, Ui		[V]	690	800			800
Test voltage at industrial frequency for 1 min.		[V]	3000	3000			3000
Rated ultimate short-circuit breaking capacity, Icu			**X**	**N**	**H**	**L**	**X**
	(AC) 50-60 Hz 220/230 V	[kA]	100	65	100	170	300
	(AC) 50-60 Hz 380/415 V	**[kA]**	**70**	**35** (1)	**65**	**85**	**200**
	(AC) 50-60 Hz 440 V	[kA]	70	30	50	65	180
	(AC) 50-60 Hz 500 V	[kA]	50	25	40	50	150
	(AC) 50-60 Hz 690 V	[kA]	10	14	18	20	75 (3)
Rated service short-circuit breaking capacity, Ics (2)		[%Icu]	75%	100%	75%	75%	100%
Rated short-circuit making capacity (415 V)		[kA]	154	74	143	187	440
Opening time (415V at Icu)		[ms]	3,5	8	7	6	3,5
Utilisation category (EN 60947-2)			A	A			A
Isolation behaviour			■	■			■
IEC 60947-2, EN 60947-2			■	■			■
Releases:	magnetic only, fixed 13xIn		■	-			-
	magnetic only, adjustable 4…12xIn		-	■			■
	microprocessor-based, PR211/P (I)		-	-			-
Interchangeability			-	-			-
Versions			F - P	F - P - W			F - P - W
Terminals	fixed		EF - FC	F - EF - ES - FC			F - EF - ES - FC
			FC CuAl - R	FC CuAl - RC - R			FC CuAl - R - RC
	plug-in		FC - R	EF - FC - R			EF - R
	withdrawable		-	EF - FC - R			EF - R
Fixing on DIN rail			DIN EN 50022	DIN EN 50023			DIN EN 50023
Mechanical life		[No. operations / hourly operations]	25000/240	25000/120			25000/120
Basic dimensions fixed, 3 poles		L [mm]	90	105			105
		D [mm]	70	103,5			103,5
		H [mm]	120	170			255
Weights	fixed, 3 poles	[kg]	1,1	2,6			3,6
	plug-in, 3 poles	[kg]	1,3	3,1			6,3
	withdrawable, 3 poles	[kg]	-	3,5			7,1

(1) All the versions with Icu=35kA are certified at 36kA
(2) For S3N/H/L, S4N/H/L, S5N/H, and S6N/H circuit-breakers, the percentage performance of Ics at 690V is reduced by 25%
(3) S3X at 690V can only be supplied from above

KEY TO VERSIONS
F = Fixed
P = Plug-in
W = Withdrawable

	S4	S4X	S5	S6	S6X	S7
	160 / 250	**250**	**400 / 630**	**630 / 800**	**400 / 630**	**1250 / 1600**
	100, 160 / 250	100, 160, 250	320, 400 / 630	630 / 800	320, 400 / 630	1000, 1250 / 1600
	3	3	3	3	3	3
	690	690	690	690	690	690
	8	8	8	8	8	8
	800	800	800	800	800	800
	3000	3000	3000	3000	3000	3000
	N **H** **L**	**X**	**N** **H** **L**	**N** **S** **H** **L**	**X**	**S** **H** **L**
	65 100 200	300	65 100 200	65 85 100 200	300	85 100 200
	35 (1) 65 100	200	35 (1) 65 100	35 (1) 50 65 100	200	50 65 100
	30 50 80	180	30 50 80	30 45 50 80	180	40 55 80
	25 40 65	150	25 40 65	25 35 40 65	150	35 45 70
	18 22 30	75	20 25 30	20 22 25 30	75	20 25 35
	100% 100% 75%	100%	100% 100% 75%	100% 100% 100% 75%	100%	100% 75% 50%
	74 143 220	440	74 143 220	74 105 143 220	440	105 143 220
	8 7 6	3,5	8 7 6	10 9 8 7	3,5	22 22 22
	A	A	B(400A) / A(630A)	B	A	B
	■	■	■	■	■	■
	■	■	■	■	■	■
	-	-	-	-	-	-
	-	-	-	-	-	-
	■	■	■	■	■	■
	■	■	■	■	■	■
	F - P - W	F -P - W	F - P(400A) - W	F - W	F - W	F - W
	F - EF - ES - FC	F - EF - ES - FC	F - EF - ES - FC	F - EF - ES	F - EF - ES	F - EF - ES -
	FC CuAl - R - RC	FC CuAl - R - RC	FC CuAl - R - RC(400A)	FC CuAl - R - RC	FC CuAl - R - RC	FC CuAl (1250A) - HR - VR
	EF - FC - R	EF - R	EF - FC - R	-	-	-
	EF - FC - R	EF - R	EF - FC - R - VR (630A)	EF - HR - VR	EF - VR - HR	EF - VR - HR
	DIN EN 50023	DIN EN 50023	DIN EN 50023	-	-	-
	20000/120	20000/120	20000/120	20000/120	20000/120	10000/120
	105	105	140	210	210	210
	103,5	103,5	103,5	103,5	103,5	138,5
	254	339	254	268	406	406
	4	5	5	9,5	15	17
	4,5	8,2	6,1	-	-	-
	4,9	9	6,4	12,1	25,4	21,8

KEY TO TERMINALS
F = Front
EF = Extended front
ES = Extended spreaded front

FC = Front for copper cables
FC CuAl = Front for copper or aluminium cables
R = Rear threaded

RC = Rear for copper or aluminium cables
HR = Rear horizontal flat bar
VR = Rear vertical flat bar

SACE Isomax S circuit-breakers for motor protection (protection against short-circuit)

General characteristics IEC 60947-2 and IEC 60947-4-1

Magnetic and electronic overcurrent releases

Three-phase asynchronous motor starting, switching and protection are essential operations for its correct use. The traditional system used for this purpose has three different devices: a circuit-breaker for protection against short-circuit, a thermal relay for protection against overload and lack of or unbalanced phase, and a counter for the motor operations. Everything must necessarily take into account the problems which arise on start-up.
In particular, different factors must be taken into account when selecting these devices, such as:

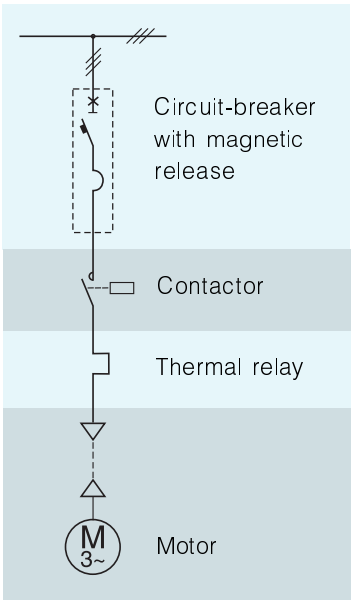
- the motor power
- the starting diagram
- the type of motor: with cage rotor or with wound rotor
- the fault current at the point of motor installation in the network.

ABB SACE proposes a wide range of circuit-breakers, which by implementing the protection against short-circuit exclusively, are suitable for use inside protected starters of traditional type.

The new SACE S2X 80, with fixed magnetic protection at 13 times the rated service current, is an extremely compact circuit-breaker, which stands out for its exceptional performances in terms of breaking capacity and limitation of the specific let-through energy.
Extremely simple and rapid to install, it has the same possibility of mounting accessories and personalisation as the S2B/N/S circuit-breakers. It can be used in a vast range of start-ups, from 0.37kW to 37kW and from 400V-50kA up to 690V-50kA.
SACE S3 N/H/L 160/250 circuit-breakers and the S3X 125/200 current-limiting circuit-breaker are fitted with a magnetic only release adjustable from 4 to 12 times the rated service current. They cover coordinations from 37 to 132kW and allow optimal motor protection thanks to their great flexibility due to the wide setting range of the magnetic threshold.
Finally, SACE S4 160/250, S5 400/630, S6 630/800, and S7 1250/1600, with different N-S-H-L breaking capacity levels, like the current-limiting S4X and S6X, can be fitted with the

Magnetic only fixed overcurrent releases

SACE Isomax S2X 80	
Phases L1 - L2 - L3	
Setting [A]	**Magnetic trip Im = 13 x In [A]**
R1	13
R1.6	21
R2	26
R2.5	32
R3.2	42
R4	52
R5	65
R6.5	84
R8.8	110
R11	145
R12.5	163
R16	210
R20	260
R25	325
R32	415
R42	545
R52	680
R63	820
R80	1040



PR211/P (I) electronic microprocessor-based release. Above all, they are used for protection of high power motors and, thanks to adjustment of the protection against short-circuit from 1.5 to 12 times, allow the optimum trip value to be selected for any type of motor.

Magnetic only adjustable overcurrent releases

Circuit-breaker					Phases L1 - L2 - L3	
S3N 160	S3H 160 S3L 160	S3N 250 S3H 250 S3L 250	S3X 125	S3X 200	Setting [A]	Magnetic adjustment [A] Im = 4 ... 12 x Ith
■					R 3	12 ... 36
■					R 5	20 ... 60
■					R 10	40 ... 120
■			■ (*)		R 25	100 ... 300
■	■		■		R 50	200 ... 600
■	■		■		R 100	400 ... 1200
■	■		■	■	R 125	500 ... 1500
■	■				R 160	640 ... 1600 (10 x Ith)
		■		■	R 160	640 ... 1920
		■		■	R 200	800 ... 2400

(*) Only to be used in coordination with contactors

SACE PR211/P (I) electronic microprocessor-based overcurrent releases for motor protection

Circuit-breaker										Phases L1 - L2 - L3	
S4N 160 S4H 160 S4L 160	S4N 250 S4H 250 S4L 250	S5N 400 S5H 400 S5L 400	S6N 630 S6H 630 S6L 630	S6N 800 S6H 800 S6L 800	S7S 1250 S7H 1250 S7L 1250	S7S 1600 S7H 1600 S7L 1600	S4X 250	S6X 400	S6X 630	Rated current of release In [A]	I (*) I3 [A]
■							■			100	150 ... 1200
■							■			160	240 ... 1920
	■						■			250	375 ... 3000
		■						■		320	480 ... 3840
		■						■		400	600 ... 4800
			■						■	630	945 ... 7560
				■						800	1200 ... 9600
					■					1000	1500 ... 12000
					■					1250	1875 ... 15000
						■				1600	2400 ... 19200

(*) I = Protection function against short-circuit

SACE Isomax S circuit-breakers for motor protection (integrated protection)

Electrical characteristics IEC 60947-2 and IEC 60947-4

			S4		
Rated uninterrupted current, Iu		[A]	**160 / 250**		
Rated service current, In		[A]	100, 160 / 200		
Poles		Nr.	3		
Rated service voltage, Ue (AC) 50-60Hz		[V]	690		
Rated impulse withstand voltage, Uimp		[kV]	8		
Rated insulation voltage, Ui		[V]	800		
Test voltage at industrial frequency for 1 min.		[V]	3000		
Rated ultimate short-circuit breaking capacity, Icu			**N**	**H**	**L**
	(AC) 50-60 Hz 220/230 V	[kA]	65	100	200
	(AC) 50-60 Hz 380/415 V	**[kA]**	**35** (1)	**65**	**100**
	(AC) 50-60 Hz 440 V	[kA]	30	50	80
	(AC) 50-60 Hz 500 V	[kA]	25	40	65
	(AC) 50-60 Hz 690 V	[kA]	18	22	30
Rated service short-circuit breaking capacity, Ics (2)		[%Icu]	100%	100%	75%
Rated short-circuit making capacity (415 V)		[kA]	74	143	220
Opening time (415V at Icu)		[ms]	8	7	6
Utilisation category (EN 60947-2)				A	
Isolation behaviour				■	
IEC 60947-2, EN 60947-2, IEC 60947-4-1, EN 60947-4-1				■	
PR212/MP (LRIU) microprocessor-based releases				■	
Interchangeability				■	
Versions				F - P - W	
Terminals	fixed			F - EF - ES - FC	
				FC CuAl - R - RC	
	plug-in			EF - FC - R	
	withdrawable			EF - FC - R	
Fixing on DIN rail DIN EN 50023				■	
Mechanical life		[No. operations / hourly operations]		20000/120	
Basic dimensions, fixed 3 poles		L [mm]		105	
		D [mm]		103,5	
		H [mm]		254	
Weights	fixed, 3 poles	[kg]		4	
	plug-in, 3 poles	[kg]		4,5	
	withdrawable, 3 poles	[kg]		4,9	

(1) All the versions with Icu=35kA are certified at 36kA
(2) For S4N/H/L, S5N/H, and S6N/H circuit-breakers the percentage performance of Ics at 500V and 690V is reduced by 25%

KEY TO VERSIONS
F = Fixed
P = Plug-in
W = Withdrawable

	S4X	S5			S6			S6X	S7	
	250	**400**			**630**			**400 / 630**	**1250**	
	100, 160, 200	320			630			320, 400 / 630	1000	
	3	3			3			3	3	
	690	690			690			690	690	
	8	8			8			8	8	
	800	800			800			800	800	
	3000	3000			3000			3000	3000	
	X	**N**	**H**	**L**	**N**	**H**	**L**	**X**	**S**	**H**
	300	65	100	200	65	100	200	300	85	100
	200	**35(1)**	**65**	**100**	**35(1)**	**65**	**100**	**200**	**50**	**65**
	180	30	50	80	30	50	80	180	40	55
	150	25	40	65	25	40	65	150	35	45
	75	20	25	30	20	25	30	75	20	25
	100%	100%	100%	75%	100%	100%	75%	100%	100%	75%
	440	74	143	220	74	143	220	440	105	143
	3,5	8	7	6	9	8	7	3,5	22	22
	A	B			B			A	B	
	■	■			■			■	■	
	■	■			■			■	■	
	■	■			■			■	■	
	■	■			■			■	■	
	F - P - W	F - P - W			F - W			F - W	F - W	
	F - EF - ES - FC FC CuAl - R - RC	F - EF - ES - FC FC CuAl - R - RC			F - EF - ES FC CuAl - R - RC			F - EF FC CuAl - R - RC	F - EF - ES FC CuAl - HR - V	
	EF - R	EF - FC - R			-			-	-	
	EF - R	EF - FC - R			EF - HR - VR			EF - VR - HR	EF - VR - HR	
	■	■			-			-	-	
	20000/120	20000/120			20000/120			20000/120	10000/120	
	105	140			210			210	210	
	103,5	103,5			103,5			103,5	138,5	
	339	254			268			406	406	
	5	5			9,5			15	17	
	8,2	6,1			-			-	-	
	9	6,4			12,1			25,4	21,8	

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