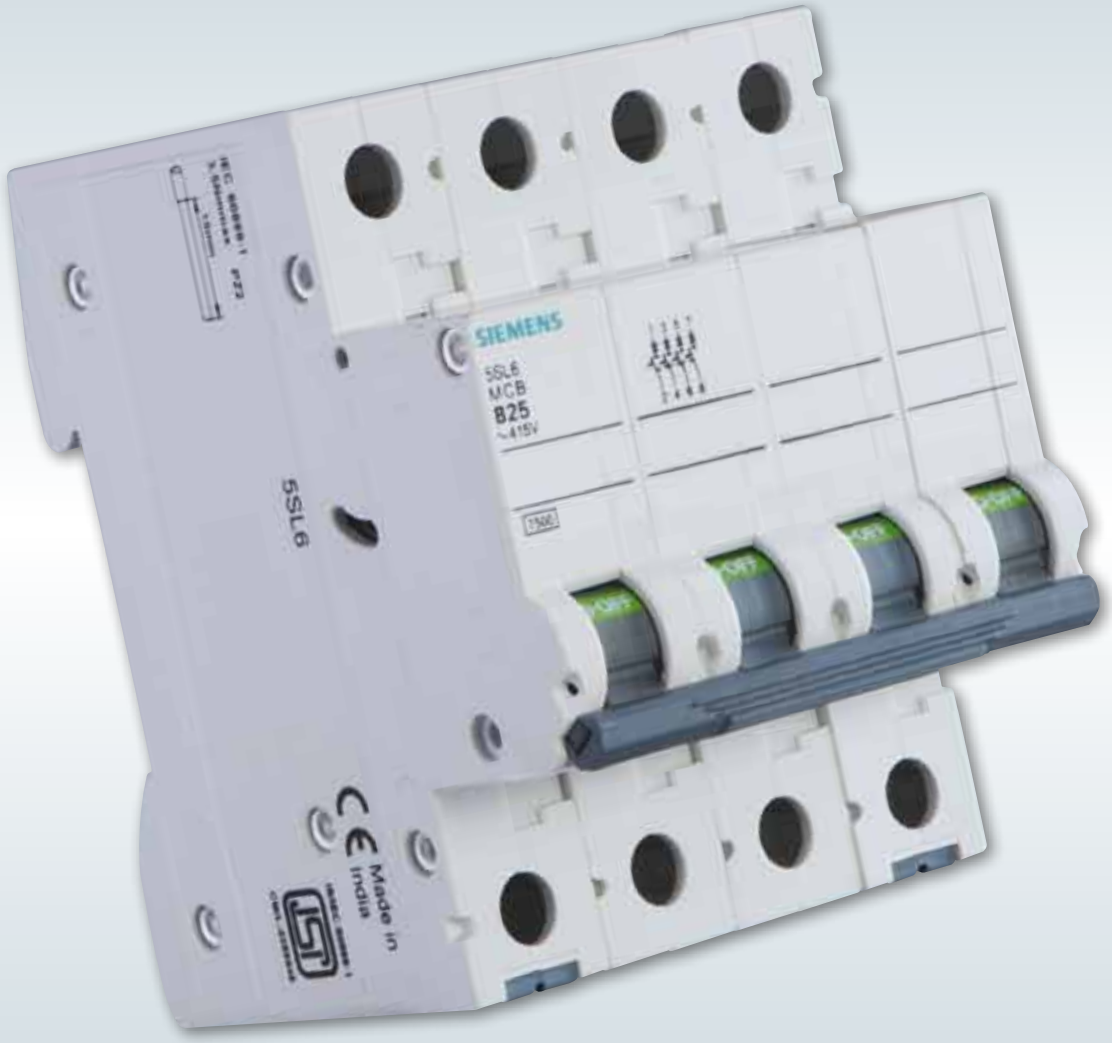
SIEMENS



Betagard Miniature Circuit Breakers and Isolators

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Betagard Miniature Circuit Breakers and Isolators

All round protection guaranteed

3	Betagard 5SL Miniature Circuit Breakers
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16	Betagard 5SP4 Miniature Circuit Breakers
18	Betagard 5TL1 Isolators
20	Accessories

Overview

As a culture Siemens has always endeavoured to introduce innovative products worldwide. The Electrical Installation R&D team has now raised the bar with the introduction of Betagard 5SL Miniature Circuit Breaker. Manufactured and designed at the Siemens Aurangabad facility, Betagard 5SL – *Inspiring Safety*, sets a new benchmark for protection.

Loaded with numerous features, Betagard 5SL is the only patented MCB with a unique **SLR** (Slide Latch-Release) feature for tool free removal of MCB from DIN rail. It also allows single MCB removal from a bus mounted assembly of MCBs. Betagard 5SL MCB is ergonomically designed and allows user-friendly switching. ON-OFF Status is easily recognizable thanks to the color coded switching position indicator on its attractive grey lever. With highly effective touch protection against accidental contact, Betagard 5SL range is available in current rating upto 63A in B and C characteristics.

Features and Benefits

IS/IEC 60898 - 1

CM/L No. 2255548

BIS approval for ISI marking as per latest IS/IEC 60898:2002 for assured quality and protection

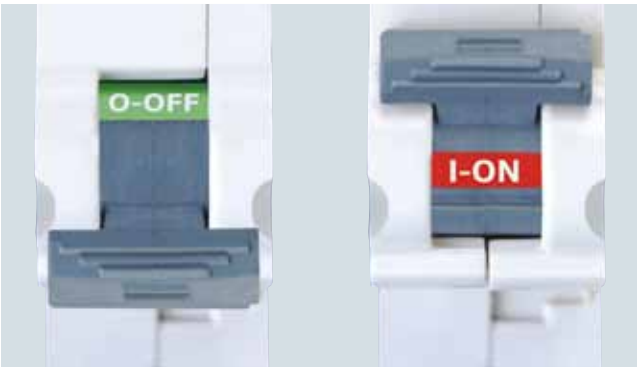
Green product – Recyclable, low watt loss, free from hazardous material like CFC and silicon (ROHS)

MCB with patented unique **SLR** (Slide Latch-Release) feature for tool free removal from DIN rail. It also allows individual MCBs to be removed from bus mounted assembly

Betagard Miniature Circuit Breakers and Isolators

Betagard Miniature Circuit Breakers Type 5SL

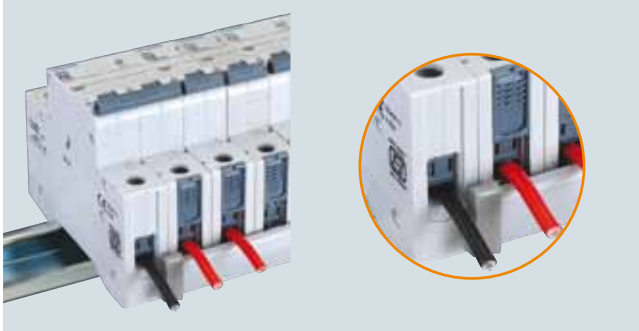
Ergonomically designed, with a user friendly lever for effortless switching



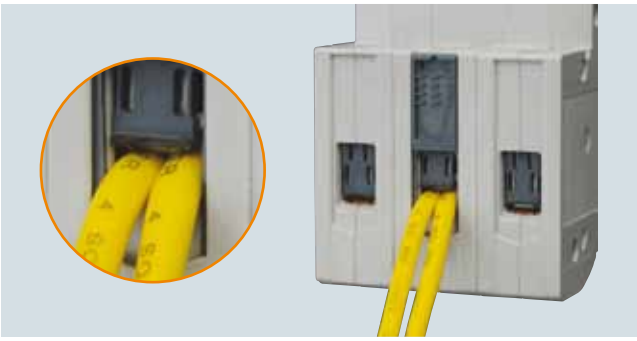
To highlight exact switching position, easily recognizable color coded ON-OFF is embedded on the attractive grey lever

Uniquely designed square terminal to accommodate wire up to 25 Sqmm

Highly effective touch protection against accidental contact



Enables firm mounting of Bus bar together with wire and front access of wires for safer installation



Terminals can accommodate 2 wires of same cross section (Solid up to 2 X 10 mm^2 and finely stranded with end sleeve up to 2 X 4 mm^2) without twisting wire strands facilitates easier and safe wiring

Side mounting accessories like auxiliary switches and fault signaling contacts available for special applications

Lever locking device with maximum 6 mm shackle

Application

'B' Characterstics

'B' Characteristic MCBs react quickly to short circuit, and are set to trip when the current passing through them is between 3 to 5 times the normal full load current. They are suitable for protecting incandescent lighting and socket-outlet circuits in domestic and commercial environments, where there is little risk of surges that could cause the MCB to trip.

'C' Characteristics

'C' characteristics MCBs are used for protection of electrical circuits in general and are most widely used because of its suitability for practically all electrical circuits, cable and line protection. They are capable of protecting the majority of inductive and capacitive loads including most motor and fluorescent lighting loads.

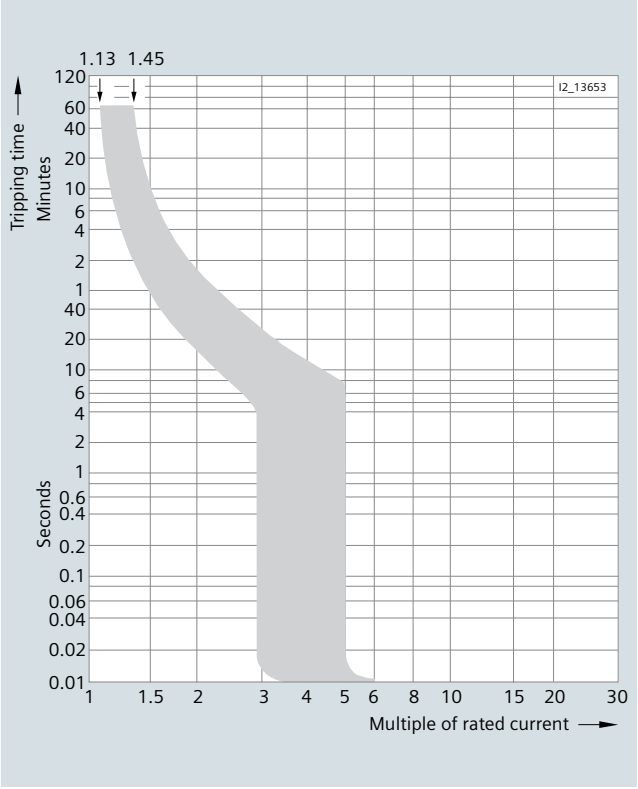
This characteristic allows applying loads having high peak currents without requiring the MCB to be oversized. In fact, thanks to this characteristic, it is possible to apply loads with peak currents up to 5 times *I*n, (rated current) and can hence be used to best advantage for handling higher inrush currents e.g. lamps, motors, etc. Under 'C' characteristics, the magnetic operating limits (for short-circuit operations) are between 5 and 10 times the rated current (*I*n) of MCB. For example the instantaneous mechanism of a 10A MCB will operate between 50A and 100A in an overcurrent situation. The thermal operating limits (for overload operation) are between 1.13 and 1.45 of the rated current (*I*n) of the MCB.

Effect of temperature on tripping characteristics:

Betagard MCBs are designed to meet the requirements of IS/IEC 60898 for tripping performance at ambient temperature 30°C. At other operating temperature the overload tripping band is modified by approximately 5% per 10° Celcius temperature difference, which increases for lower and decreases for higher temperatures than 30°C.

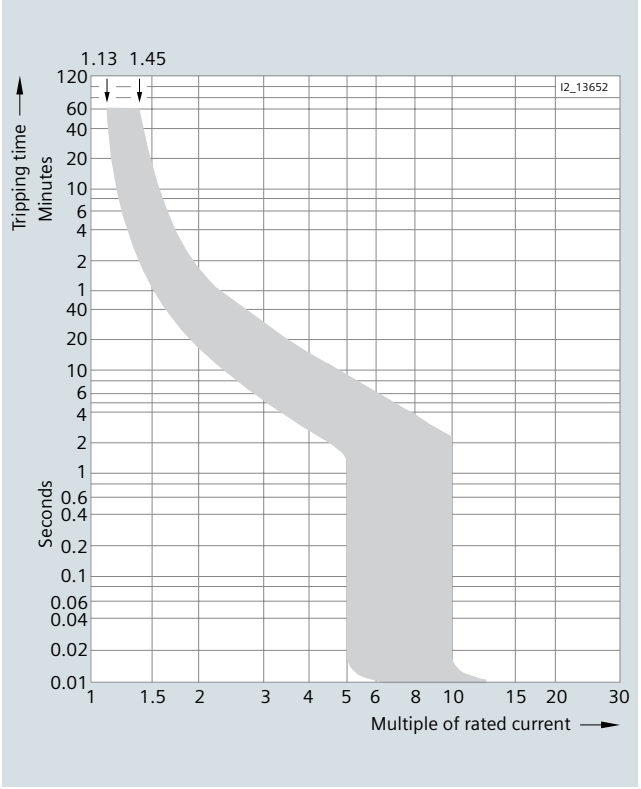
Characteristic curves

Tripping Characteristics as per IS/IEC 60898-1:2002



Tripping characteristic B

MCBs with this tripping characteristic are designed for universal use in socket outlet and lighting circuits.



Tripping characteristic C

In lamp and motor circuits with higher starting currents, MCBs with tripping characteristic C are generally used.

Betagard Miniature Circuit Breakers Type 5SL

Effect of Higher Operating Voltages

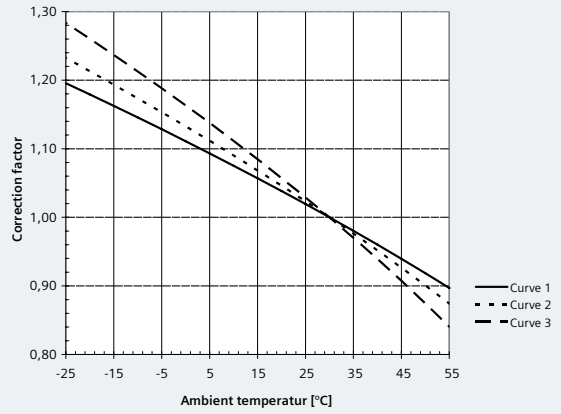
Betagard MCB is designed to operate at 240/415V, 50Hz. However the device can operate at 480V, 50/60 Hz with a reduction in breaking capacity of 50%.

DC Operation

Single pole MCBs can be used up to 60V DC and double pole up to 110V DC.

However, they should not be used below 18V DC. Though the thermal operation is delayed but this is negligible. The instantaneous tripping characteristic must be increased by 40% (e.g. a Type 'C' MCB has a magnetic tripping characteristic between 5 and 10 times the rated current. This magnetic tripping characteristic would therefore become between 7 and 14 times the rated current.

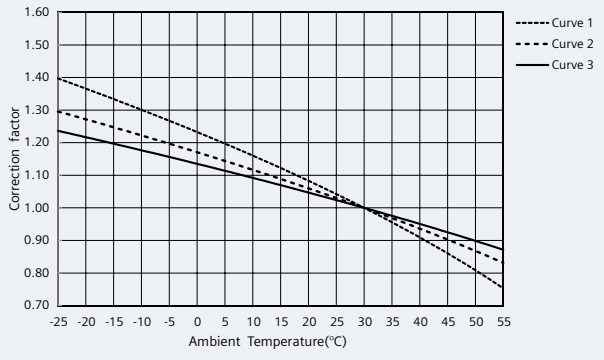
Temperature correction factor for 5SL6 MCBs



Rating [A]		0,5	1	2	3	4	6	8	10	13	16	20	25	32	40	50	63
Pole		valid curve for correction factor															
B	1/2						3		2		2	3	3	3	3	3	3
	3/4						3		2		2	3	2	3	2	3	3
C	1/2	3	2	2	3	3	3	2	3	2	2	3	3	3	3	3	3
	3/4	2	2	2		2	3		3		2	3	2	3	2	3	3

Temperature correction factor for 5SL4 MCBs

Valid curve for correction factor																	
Rated current [A]		0,5	2	3	4	6	8	10	13	16	20	25	32	40	50	63	
C	1P/2P	1	3	2	3	2	3	2	2	2	2	2	1	2	1	1	
	3P/4P	1	3	3	3	2	3	2	3	2	3	2	1	3	1	2	



Frequency Variation

MCBs may be used up to their normal voltage rating on 400Hz supplies; however the magnetic tripping characteristic must be increased by 30% (e.g. Type 'C' MCB with magnetic characteristics between 5 and 10 times the rated current would become between 6.5 and 13 times rated current.

Selectivity of miniature circuit-breakers/fuses

Generally, distribution networks are configured as radial networks. An overcurrent device must be provided at each reduction of the conductor cross section. This results in a cascade graded according to the rated current, which should, where possible, provide selectivity.

Selectivity means, that in the event of a fault, only the protective device in the vicinity of the fault trips. Thus, parallel current paths can continue to provide the necessary power.

For MCBs with upstream fuses, the selectivity limit essentially depends on the current limits and tripping characteristics of the MCB as well as on the pre-arcing I^2t value of the fuse. Therefore, MCBs with different characteristics and rated breaking capacities also have different selectivity limits. The subsequent tables show the currents up to which selectivity is provided between MCBs and upstream fuses according to DIN VDE 0636 Part 21. The values specified in kA are limit values which have been determined under unfavourable test conditions. In practice, better values can be obtained, depending on the type of the upstream fuse.

In the event of a short circuit, when using the 5SL, MCBs and fuses according to DIN VDE 0636 Part 21, Selectivity is provided up to the indicated values in kA.

Internal power loss P_v of the miniature circuit breaker 5SL (Data per pole with I_n)

Ratings	Watt loss as per IEC 60898-1 (W)	Watt loss as per testing (W)		
		5SL6 - B	5SL6 - C	5SL4 - C
0.5	3	–	0.87	0.87
1	3	–	1.2	–
2	3	–	1.25	1.25
3	3	–	1.16	1.16
4	3	–	1.3	1.3
6	3	1.15	0.86	0.86
8	3	–	1.1	1.1
10	3	1.5	1.2	1.24
13	3.5	–	1.8	1.74
16	3.5	1.9	1.7	1.92
20	4.5	2.2	1.7	2.17
25	4.5	2.3	2.2	2.92
32	6	2.4	2.5	2.73
40	7.5	3.4	3.3	4.1
50	9	3.8	3.5	4.5
63	13	5.4	4.4	5.4

Tripping characteristics

Tripping characteristics at an ambient temperature of 30°C

Tripping characteristic	Standards	Thermal trips Test currents:			Electromagnetic trips Test currents:		
		Limiting test current I_1	Minimum test current I_2	Tripping time $I_n \le 63$ A t	Hold I_4	Latest tripping instant I_5	Tripping time t
B	IS/IEC 60898-1,	$1.13 \times I_n$		> 1 h	$3 \times I_n$		≥ 0.1 s
			$1.45 \times I_n$	< 1 h		$5 \times I_n$	< 0.1 s
C	IS/IEC 60898-1,	$1.13 \times I_n$		> 1 h	$5 \times I_n$		≥ 0.1 s
			$1.45 \times I_n$	< 1 h		$10 \times I_n$	< 0.1 s

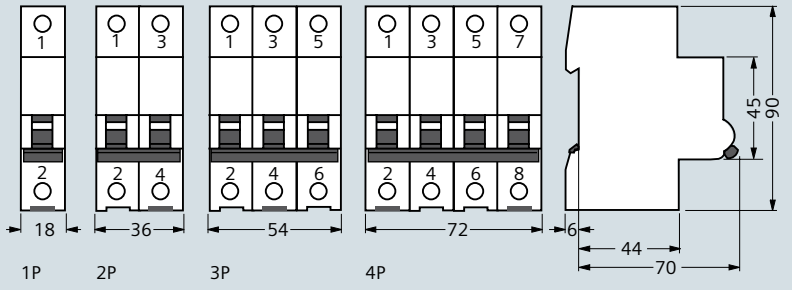
Technical Specifications

			Betagard 5SL6
Standards			IS/IEC 60898-1 :2002
Tripping characteristic			B, C
Number of poles			1P, 2P, 3P, 4P
Rated voltage		V AC	240/415
Operational voltage	min. max. max.	V AC/DC V DC/pole V AC	24 60 [1)] 440
Rated breaking capacity	acc. to IS/IEC 60898-1	kA AC	7.5
Current Rating		Ampere	B Curve: 6 - 63 C Curve: 0.5 - 63
Insulation coordination			
• Rated insulation voltage		V AC V DC/pole	250/440 60
• Degree of Pollution for overvoltage category III			2
Touch Protection	Acc to EN 50274		Yes
Line load reversibility			Yes
Degree of protection			IP20
CFC and silicone-free			Yes
• Terminal tightening torque, recommended		Nm	2.5 ... 3
Conductor cross-sections		mm^2	0.75 ... 25*
Mounting position			Any
Average Service life (with rated load)			20000 actuations
Ambient temperature		°C	-25 ... +45, max. 95% humidity, storage temperature: -40 ... +75

[1)] The operational voltage 60 V DC/pole takes into account a battery charging voltage with peak value of 72 V

* Refer table for terminal size from page no. 21

Dimensional drawings 5SL6/5SL4



Betagard Miniature Circuit Breakers and Isolators

Betagard Miniature Circuit Breakers Type 5SL6

Selection and ordering data

7500A	I_n A	Mounting width MW[1)]	Characteristic B Order No.	Characteristic C Order No.	Std. Pkg. (Nos.)
1P, 240/415 V AC	0.5	1	--	5SL61057RC	1/12
	1		--	5SL61017RC	1/12
	2		--	5SL61027RC	1/12
	3		--	5SL61037RC	1/12
	4		--	5SL61047RC	1/12
	6		5SL61066RC	5SL61067RC	1/12
	8		--	5SL61087RC	1/12
	10		5SL61106RC	5SL61107RC	1/12
	13		--	5SL61137RC	1/12
	16		5SL61166RC	5SL61167RC	1/12
	20		5SL61206RC	5SL61207RC	1/12
	25		5SL61256RC	5SL61257RC	1/12
	32		5SL61326RC	5SL61327RC	1/12
	40		5SL61406RC	5SL61407RC	1/12
	50		5SL61506RC	5SL61507RC	1/12
	63		5SL61636RC	5SL61637RC	1/12
2P, 415 V AC	0.5	2	--	5SL62057RC	1/6
	1		--	5SL62017RC	1/6
	2		--	5SL62027RC	1/6
	3		--	5SL62037RC	1/6
	4		--	5SL62047RC	1/6
	6		5SL62066RC	5SL62067RC	1/6
	8		--	5SL62087RC	1/6
	10		5SL62106RC	5SL62107RC	1/6
	13		--	5SL62137RC	1/6
	16		5SL62166RC	5SL62167RC	1/6
	20		5SL62206RC	5SL62207RC	1/6
	25		5SL62256RC	5SL62257RC	1/6
	32		5SL62326RC	5SL62327RC	1/6
	40		5SL62406RC	5SL62407RC	1/6
	50		5SL62506RC	5SL62507RC	1/6
	63		5SL62636RC	5SL62637RC	1/6
3P, 415 V AC	0.5	3	--	5SL63057RC	1/4
	1		--	5SL63017RC	1/4
	2		--	5SL63027RC	1/4
	4		--	5SL63047RC	1/4
	6		5SL63066RC	5SL63067RC	1/4
	10		5SL63106RC	5SL63107RC	1/4
	16		5SL63166RC	5SL63167RC	1/4
	20		5SL63206RC	5SL63207RC	1/4
	25		5SL63256RC	5SL63257RC	1/4
	32		5SL63326RC	5SL63327RC	1/4
	40		5SL63406RC	5SL63407RC	1/4
	50		5SL63506RC	5SL63507RC	1/4
	63		5SL63636RC	5SL63637RC	1/4
4P, 415 V AC	0.5	4	--	5SL64057RC	1/3
	1		--	5SL64017RC	1/3
	2		--	5SL64027RC	1/3
	4		--	5SL64047RC	1/3
	6		5SL64066RC	5SL64067RC	1/3
	10		5SL64106RC	5SL64107RC	1/3
	16		5SL64166RC	5SL64167RC	1/3
	20		5SL64206RC	5SL64207RC	1/3
	25		5SL64256RC	5SL64257RC	1/3
	32		5SL64326RC	5SL64327RC	1/3
	40		5SL64406RC	5SL64407RC	1/3
	50		5SL64506RC	5SL64507RC	1/3
	63		5SL64636RC	5SL64637RC	1/3

[1)] 1 MW (modular width) = 18 mm.

Overview

General

Betagard 5SL4 range of MCBs have rated breaking capacity of 10kA. They comply to the latest national and international standards, with current ratings from 0.5A to 63A.

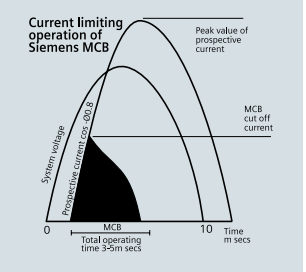
Short circuit operation

At high values of overcurrent (i.e. short circuit current) a plunger in the solenoid is moved with sufficient force to physically separate the contacts. The greater the short circuit current, the greater the force with which the plunger is moved and faster the circuit is disconnected. A secondary action will ensure that the circuit breaker mechanism is tripped and prevents the contacts from reclosing. It is the rapid speed with which the contacts are forced apart coupled with other features of MCBs, which provides the Current limiting capability and safe interruption up to 10,000A.

The rapid speed at which the contacts are parted prevents the fault current from reaching its prospective value. The arc drawn between the contacts is moved by magnetic forces into the multiple plate arc chamber where the arc is split, rapidly cooled and extinguished. The total operating time of the MCB is between 3 to 5 milliseconds. The energy let through (I^2t) of the device is kept to a minimum thus offering a very high degree of protection.

Current limiting class 3

5SL4 type MCBs significantly limit the let-through current (when a fault occurs) due to the ultra – fast contact separation and the quick quenching of the emergency arc in the chamber. Thus, generally, they fall below the permissible limiting I^2t values of the energy limiting class 3, specified in DIN VDE 0641 Part II by 50%. This guarantees excellent discrimination with the upstream protective devices and reduces the thermal stress on the downstream connected equipments. Chart indicates the let through energy values of 10kA, 16A MCB according to EN 60898.



This MCB (16Amps) will allow only 50% of 84,000 (A^2S) let-through energy thereby reducing thermal stress to bare minimum value on the downstream equipment.

As these MCBs meet the requirements of current limiting class 3, according to EN 60898 without difficulty, they are therefore marked with symbol 10000 / 3

Rated Current	Current Limiting Class according to EN 60898		
	1	2	3
16 A	Permissible let-through I^2t (A^2S)		
	No limit	2,90,000	84,000

Technical Specifications

			Betagard 5SL4
Standards			IS/IEC 60898-1 :2002
Tripping characteristic			C
Number of poles			1P, 2P, 3P, 4P
Rated voltage		V AC	240/415
Operational voltage	min. max. max.	V AC/DC V DC/pole V AC	24 60 [1)] 440
Rated breaking capacity	acc. to IS/IEC 60898-1	kA AC	10
Current Rating		Ampere	0.5 - 63
Insulation coordination			
• Rated insulation voltage		V AC V DC/pole	264/456 60
• Degree of Pollution for overvoltage category III			2
Touch Protection	Acc to EN 50274		Yes
Line load reversibility			Yes
Degree of protection			IP20
CFC and silicone-free			Yes
• Terminal tightening torque, recommended		Nm	2.5 ... 3
Conductor cross-sections		mm^2	0.75....25*
Mounting position			Any
Average Service life (with rated load)			20000 actuations
Ambient temperature		°C	-25 ... +55, max. 95% humidity, storage temperature: -40 ... +75

[1)] The operational voltage 60 V DC/pole takes into account a battery charging voltage with peak value of 72 V

* Refer table for terminal size from page no. 21

Betagard Miniature Circuit Breakers and Isolators

Betagard Miniature Circuit Breakers Type 5SL4

Selection and ordering data

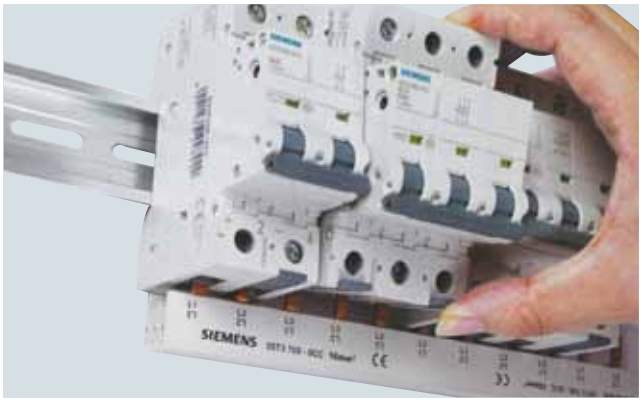
10000A	Rated current I_n (A)	MW (1 MW=18 mm)	Reference No. Characteristics C	Std. Pkg. (Nos)
1-Pole, 240/415 V AC 	0.5	1	**5SL41057RC**	1/12
	2		**5SL41027RC**	1/12
	3		**5SL41037RC**	1/12
	4		**5SL41047RC**	1/12
	6		**5SL41067RC**	1/12
	8		**5SL41087RC**	1/12
	10		**5SL41107RC**	1/12
	13		**5SL41137RC**	1/12
	16		**5SL41167RC**	1/12
	20		**5SL41207RC**	1/12
	25		**5SL41257RC**	1/12
	32		**5SL41327RC**	1/12
	40		**5SL41407RC**	1/12
	50		**5SL41507RC**	1/12
	63		**5SL41637RC**	1/12
2-Pole, 415 V AC 	0.5	2	**5SL42057RC**	1/6
	2		**5SL42027RC**	1/6
	3		**5SL42037RC**	1/6
	4		**5SL42047RC**	1/6
	6		**5SL42067RC**	1/6
	8		**5SL42087RC**	1/6
	10		**5SL42107RC**	1/6
	13		**5SL42137RC**	1/6
	16		**5SL42167RC**	1/6
	20		**5SL42207RC**	1/6
	25		**5SL42257RC**	1/6
	32		**5SL42327RC**	1/6
	40		**5SL42407RC**	1/6
	50		**5SL42507RC**	1/6
	63		**5SL42637RC**	1/6
3-Pole, 415 V AC 	0.5	3	**5SL43057RC**	1/4
	2		**5SL43027RC**	1/4
	3		**5SL43037RC**	1/4
	4		**5SL43047RC**	1/4
	6		**5SL43067RC**	1/4
	8		**5SL43087RC**	1/4
	10		**5SL43107RC**	1/4
	13		**5SL43137RC**	1/4
	16		**5SL43167RC**	1/4
	20		**5SL43207RC**	1/4
	25		**5SL43257RC**	1/4
	32		**5SL43327RC**	1/4
	40		**5SL43407RC**	1/4
	50		**5SL43507RC**	1/4
	63		**5SL43637RC**	1/4
4-Pole, 415 V AC 	0.5	4	**5SL44057RC**	1/3
	2		**5SL44027RC**	1/3
	3		**5SL44037RC**	1/3
	4		**5SL44047RC**	1/3
	6		**5SL44067RC**	1/3
	8		**5SL44087RC**	1/3
	10		**5SL44107RC**	1/3
	13		**5SL44137RC**	1/3
	16		**5SL44167RC**	1/3
	20		**5SL44207RC**	1/3
	25		**5SL44257RC**	1/3
	32		**5SL44327RC**	1/3
	40		**5SL44407RC**	1/3
	50		**5SL44507RC**	1/3
	63		**5SL44637RC**	1/3

Overview

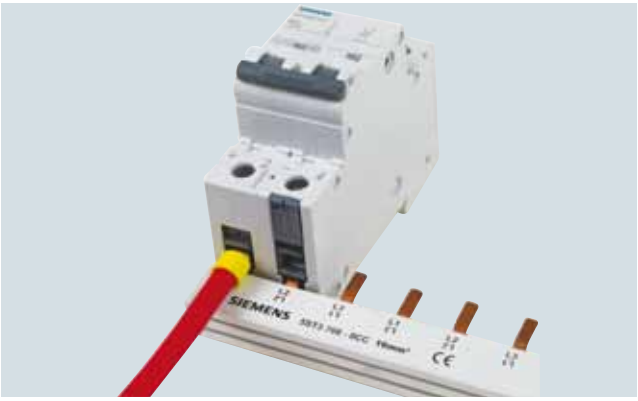
MCB are widely used in infrastructure, industry application, provide protection for circuit and device. Products are mainly used for trip and isolation. For industry and some engineering projects, the 5SY CBs can be combined with additional accessories.

Products highlight

1. Optional top or bottom infeed as the terminals are identical
2. Duplicate terminal clamps allow 2 conductors with different cross-sections (cross-section combinations upon request) to be fitted.
3. Bigger space for terminal connection

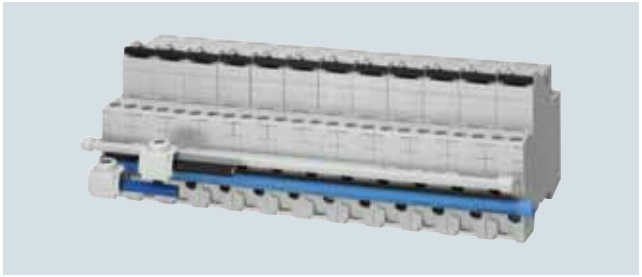


1. Easier and faster removement from busbar.
2. Fast operation will save time for installation.



Clear and visible conductor connection in front of the rear busbar facilitates controls

The 5SY circuit breakers are ideal for the quick and easy mounting of auxiliary switches and fault signal contacts without the need for tools.



The infeed can be implemented either from the top or the bottom. Additional terminals with lateral cable entry facilitate mounting when using large conductor cross-sections.

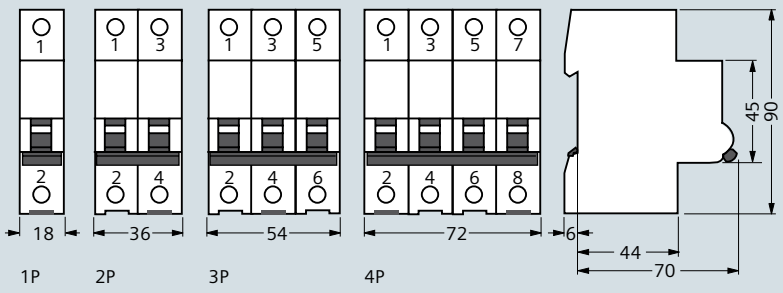
Betagard Miniature Circuit Breakers and Isolators

Betagard Circuit Breakers
Type 5SY7

Technical Specifications

			Betagard 5SY7
Standards			IEC/EN 60947-2
Rated voltage Un		V AC	230/400
Tripping characteristics			D
Rated current In		A	0.5 to 63
Operational voltage **According to IEC60898-1/** **IEC60947-2**	Min Max Max	VAC/DC/pole VDC/pole VAC	24 72 250/440
Breaking capacity			
Icn according to IEC60898-1 **Icu according to IEC60947-2**		kA AC kA AC	15 50...15*
Insulation coordination		VAC	250/440
Overvoltage category			III
Pollution degree			3
Touch protection	According to IEC50274		Yes
Main switch characteristics	According to EN60204		Yes
Handle end position, sealable			Yes
Degree of protection	According to EN60529	Directly installed Put into distribution box	IP20 IP40
Conductor cross section	Solid and stranded Finely stranded, with end sleeve	mm^2 mm^2	0.75...35 0.75...25
Installation			
Mains connection **AC** **DC**			 Any Any
Mounting position			Any
Mechnical service life			20000
Electrical service life			10000
Storage temperature		°C	-40...+75
Ambient temperature		°C	-25...+55, max 95% humidity
Shock	IEC60068-2-27	m/s^2	150 at 10ms half-sine
Resistance to vibration	IEC60068-2-6	m/s^2	50, when 25...150Hz

Dimensional drawings



* 5SY7's breaking capacity according to different current

D0.3~2A	50kA
D3~6A	30kA
D8~25A	25kA
D32A	20kA
D40~63A	15kA

Selection and ordering data

15000A	Rated current I_n (A)	MW (1 MW=18 mm)	Reference No	Std. Pkg. (Nos)
1P, 230/400V AC	0.5	1	5SY71058CC	1/12
	1		5SY71018CC	1/12
	2		5SY71028CC	1/12
	3		5SY71038CC	1/12
	4		5SY71048CC	1/12
	6		5SY71068CC	1/12
	8		5SY71088CC	1/12
	10		5SY71108CC	1/12
	13		5SY71138CC	1/12
	16		5SY71168CC	1/12
	20		5SY71208CC	1/12
	25		5SY71258CC	1/12
	32		5SY71328CC	1/12
	40		5SY71408CC	1/12
	50		5SY71508CC	1/12
	63		5SY71638CC	1/12
2P, 400V AC	0.5	2	5SY72058CC	1/6
	1		5SY72018CC	1/6
	2		5SY72028CC	1/6
	3		5SY72038CC	1/6
	4		5SY72048CC	1/6
	6		5SY72068CC	1/6
	8		5SY72088CC	1/6
	10		5SY72108CC	1/6
	13		5SY72138CC	1/6
	16		5SY72168CC	1/6
	20		5SY72208CC	1/6
	25		5SY72258CC	1/6
	32		5SY72328CC	1/6
	40		5SY72408CC	1/6
	50		5SY72508CC	1/6
	63		5SY72638CC	1/6
3P, 400V AC	0.5	3	5SY73058CC	1/4
	1		5SY73018CC	1/4
	2		5SY73028CC	1/4
	3		5SY73038CC	1/4
	4		5SY73048CC	1/4
	6		5SY73068CC	1/4
	8		5SY73088CC	1/4
	10		5SY73108CC	1/4
	13		5SY73138CC	1/4
	16		5SY73168CC	1/4
	20		5SY73208CC	1/4
	25		5SY73258CC	1/4
	32		5SY73328CC	1/4
	40		5SY73408CC	1/4
	50		5SY73508CC	1/4
	63		5SY73638CC	1/4
4P, 400V AC	0.5	4	5SY74058CC	1/3
	1		5SY74018CC	1/3
	2		5SY74028CC	1/3
	3		5SY74038CC	1/3
	4		5SY74048CC	1/3
	6		5SY74068CC	1/3
	8		5SY74088CC	1/3
	10		5SY74108CC	1/3
	13		5SY74138CC	1/3
	16		5SY74168CC	1/3
	20		5SY74208CC	1/3
	25		5SY74258CC	1/3
	32		5SY74328CC	1/3
	40		5SY74408CC	1/3
	50		5SY74508CC	1/3
	63		5SY74638CC	1/3

Betagard DC Circuit Breakers Type 5SY5

Overview

In alternating current circuits, arc quenching is assisted by the fact that current passes through zero, and that the current can only continue to flow if the arc is re-stuck across the open contacts during the following half wave. Direct current does not provide such assistance. In this case, a high arc voltage must be developed in order to stop the flow of the DC current.

Therefore, the DC switching capacity depends on the arc quenching method employed by the switching device, on the network voltage & on the inductive reactance of the circuit.

In order to address DC network protection, Siemens offers 5SY5 series DC circuit breakers from 0.5A to 63A in Single pole & Double pole version.

When using DC CBs in DC networks, care must be taken to ensure the contact polarity of the connections.

CBs for DC and AC/DC Applications

In DC networks up to 110 V, existing 5SL MCBs are suitable for single-pole and double-pole application.

For higher voltages, the versions 5SY5 are required. Contrary to the other product range, the arcing chamber area of 5SY5 is equipped with an additional permanent magnet to support the positive quenching of the arc.

For this reason, the polarity of the DC circuit breaker is clearly marked and must be observed when connecting the cables and conductors.

Technical Specifications

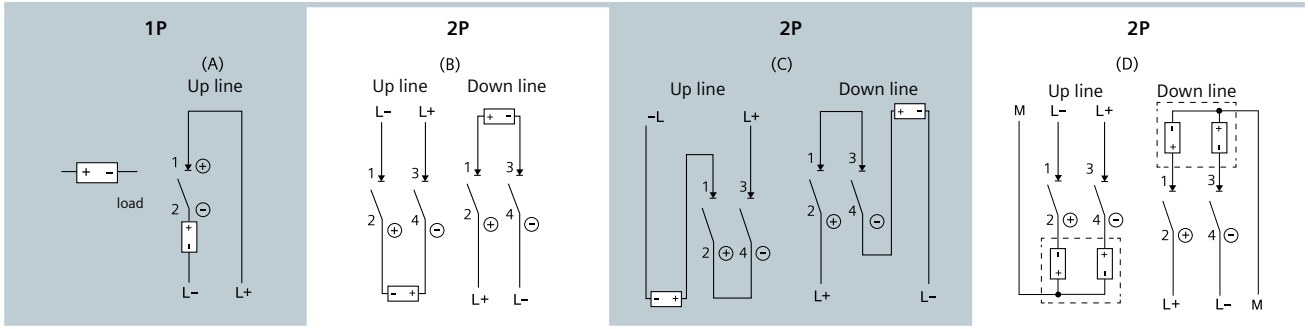
			Betagard 5SY5
Standards			IEC/EN 60947-2
Rated voltage Un		V DC	220/440
Rated current In		A	0.5 to 63
Operational voltage According to IEC60898-1/ IEC60947-2	Min Max	VDC/pole VDC/pole	24 250
Breaking capacity			
Icu according to IEC60947-2		kA DC	10
Insulation coordination		VDC/pole	250
Overvoltage category			III
Pollution degree			3
Touch protection	According to IEC50274		Yes
Main switch characteristics	According to EN60204		Yes
Handle end position, sealable			Yes
Degree of protection	According to EN60529	Directly installed Put into distribution box	IP20 IP40
Conductor cross section	Solid and stranded Finely stranded, with end sleeve	mm^2 mm^2	0.75...35 0.75...25
Installation			
Mains connection **AC** **DC**			 Specified Connections (refer connection diagram)
Mounting position			Any
Mechnical service life			20000
Electrical service life			10000
Storage temperature		°C	-40...+75
Ambient temperature		°C	-25...+55, max 95% humidity
Shock	IEC60068-2-27	m/s^2	150 at 10ms half-sine
Resistance to vibration	IEC60068-2-6	m/s^2	50, when 25...150Hz

Betagard DC Circuit Breakers Type 5SY5

Selection and ordering data

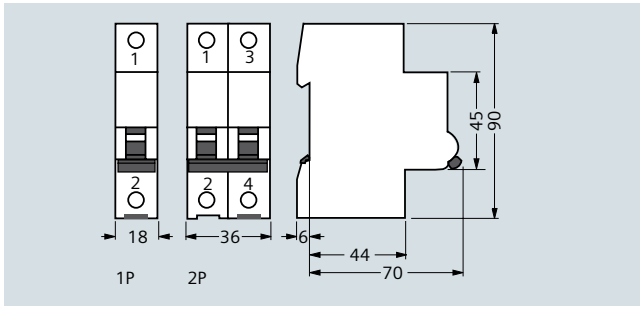
10000A	Rated current I_n (A)	MW (1 MW=18 mm)	Reference No	Std. Pkg. (Nos)
1P, 220V DC	0.5	1	5SY51057CC	1/12
	1		5SY51017CC	1/12
	2		5SY51027CC	1/12
	3		5SY51037CC	1/12
	4		5SY51047CC	1/12
	6		5SY51067CC	1/12
	8		5SY51087CC	1/12
	10		5SY51107CC	1/12
	13		5SY51137CC	1/12
	16		5SY51167CC	1/12
	20		5SY51207CC	1/12
	25		5SY51257CC	1/12
	32		5SY51327CC	1/12
	40		5SY51407CC	1/12
	50		5SY51507CC	1/12
	63		5SY51637CC	1/12
2P, 440V DC	0.5	2	5SY52057CC	1/6
	1		5SY52017CC	1/6
	2		5SY52027CC	1/6
	3		5SY52037CC	1/6
	4		5SY52047CC	1/6
	6		5SY52067CC	1/6
	8		5SY52087CC	1/6
	10		5SY52107CC	1/6
	13		5SY52137CC	1/6
	16		5SY52167CC	1/6
	20		5SY52207CC	1/6
	25		5SY52257CC	1/6
	32		5SY52327CC	1/6
	40		5SY52407CC	1/6
	50		5SY52507CC	1/6
	63		5SY52637CC	1/6

Connection Diagram

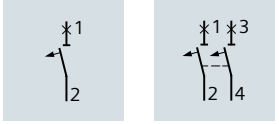


Remark: 1) L+ positive of power; L- negative of power

Dimensions



Symbols



1P 2P

Betagard Miniature Circuit Breakers and Isolators

Betagard Miniature Circuit Breakers Type 5SP4

Overview

General

Siemens Betagard range of MCBs type 5SP4 offer high short circuit breaking capacity equal to 10kA as per IS/IEC 60898 - 1: 2002. These MCBs have excellent current limiting and selectivity characteristics. MCBs are available with C as well D tripping characteristics with current range of 80A - 125A and 80A - 100A respectively.

Features at a glance

- Current limiting class 3 MCBs
- Finger touch proof terminals (FTPT)
- Trip free mechanism
- Suitable for AC/DC circuits
- DIN rail and screw mounting possible
- Accessories like auxiliary contact, shunt trip, undervoltage release, fault signal contact

Applications

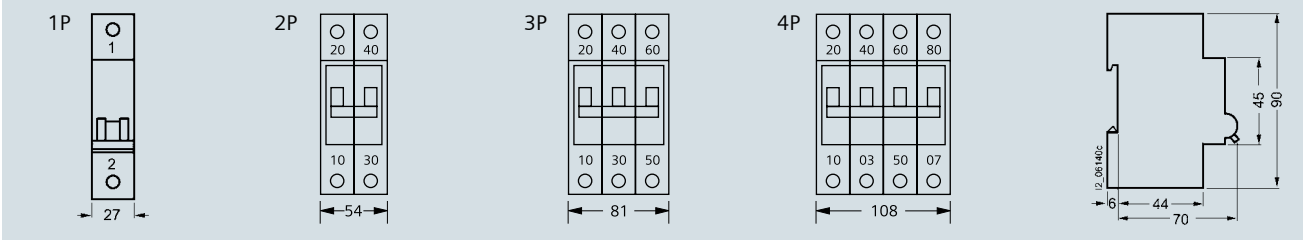
- Mainly as an incomer MCB in residential, industrial and commercial applications
- C characteristics MCBs suitable for general line protection especially with higher starting current lamps, motors etc.
- D characteristics MCBs suitable for high inrush current applications line transformers generating significant pulses, solenoid valves etc.

Technical data

Standards	IS/IEC 60898 - 1: 2002	
Series	5SP4	
Tripping characteristics	C	D
Current range	80A, 100A and 125A	80A and 100A
Rated voltage	240/415V AC and 60V DC/pole	
Operational voltage (max)	250/440V AC and 60V DC/pole	
Poles	SP, DP, TP, FP	
Rated breaking capacity	AC 10kA (as per IS / IEC 60898)	
Depth	70mm	
Terminal tightening torque	3 to 3.5Nm	
Conductor cross sections		
Solid and stranded	0.75 – 50mm^2	
Fine stranded with end sleeves	0.75 – 35mm^2	
Supply connection	As required, top or bottom Polarity to be observed for DC applications	
Ambient temperature	-25°C to +45°C occasionally +55°C, max. 95% humidity, storage temp. -40°C to +75°C	
Service life	Average 20,000 operation at rated load	

Dimensions

Betagard MCBs 5SP4



Selection and ordering data

Betagard Miniature Circuit Breakers, 5SP4, 10kA MCBs with C/D characteristics

IS/IEC 60898 - 1

CM/L No. 2255548

Un: 240/415V, 50...60Hz can be used in systems upto 60Vdc,1P and 110Vdc,2P
Breaking capacity: 10kA as per IS/IEC 60898-1; With ISI marking: CM/L No. 2255548

C characteristic

		Rated Current I_n (A)	MW#	Reference No	Std. Pkg. (Nos.)
	1-pole	80 100 125	1.5	5SP41807RC 5SP41917RC 5SP41927RC	1/10 1/10 1/10
	2-pole	80 100 125	3	■ 5SP42807RC ■ 5SP42917RC 5SP42927RC	1/5 1/5 1/5
	3-pole	80 100 125	4.5	5SP43807RC ■ 5SP43917RC ■ 5SP43927RC	1 1 1
	4-pole	80 100 125	6	5SP44807RC ■ 5SP44917RC ■ 5SP44927RC	1 1 1

D characteristic

	1-pole	80 100	1.5	5SP41808RC 5SP41918RC	1/10 1/10
	2-pole	80 100	3	5SP42808RC 5SP42918RC	1/5 1/5
	3-pole	80 100	4.5	5SP43808RC 5SP43918RC	1 1
	4-pole	80 100	6	5SP44808RC 5SP44918RC	1 1

Also available wide range of Modular Devices for various applications *

Insta Contactors

Changeover switches

Analog & Digital time switches

Voltage Relays

Digital Voltmeter & Ammeter

Phase indicators

Surge Protection Devices

* For more details, kindly contact our sales office.

Betagard Miniature Circuit Breakers and Isolators

Betagard Isolators
Type 5TL1

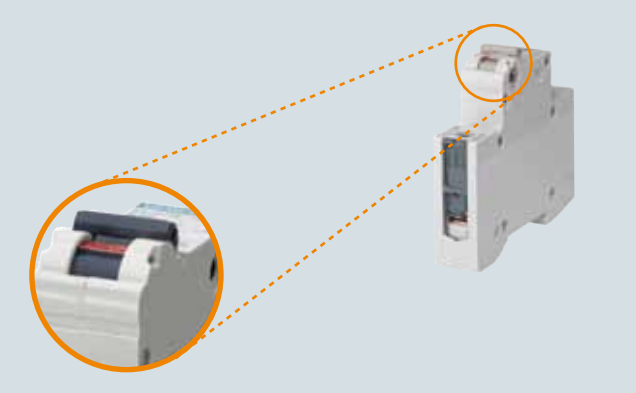
Overview

Isolators are used to switch lighting, motors and other electrical devices. They can be used as switch disconnectors according to IEC/EN 60947-3. Siemens 5TL1

Isolators can be retrofitted with auxiliary switches without tools in order to relay the switching state to a higher level.

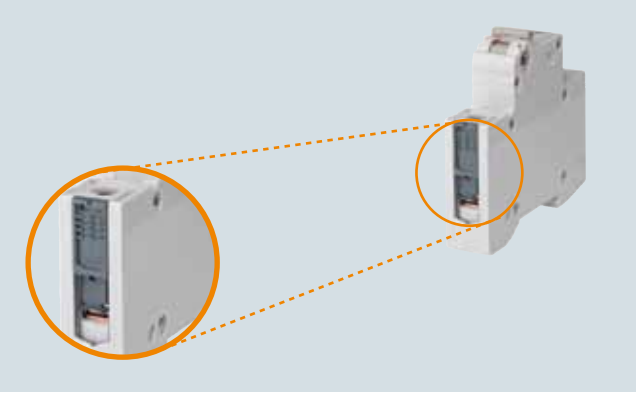
Features and Benefits

Attractive design
Easy-to-read, colored switch position indicator integrated in the handle
Actuators in gray



Ergonomically shaped handle and housing contours for user-friendly switching

Streamlined introduction of terminals thanks to the rectangular terminal version for connecting busbars together with conductors from 0.75 to 25 mm²



Effective reach-round touch protection
Manual operation of the latching slide with locking option

The ON/OFF switches are suitable for the easy and quick mounting of auxiliary switches

Replacement of a device from a busbar assembly requires no tools

Betagard Isolators
Type 5TL1

Selection and ordering data

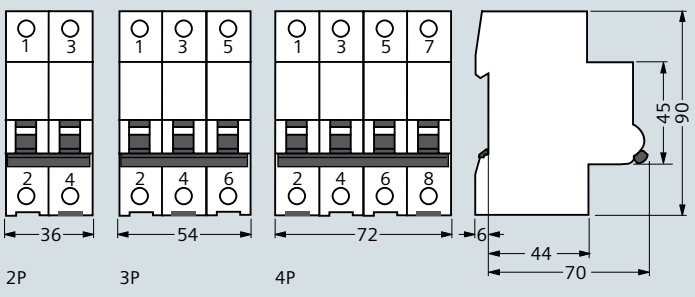
	Rated current I_n (A)		Reference No	MW (1 MW=18 mm)	Std. Pkg. (Nos)
	32	2-Pole	**5TL12320**	2	1/1
	40		**5TL12400**		1/1
	63		**5TL12630**		1/1
	80		**5TL12800**		1/1
	100		**5TL12910**		1/1
	125		**5TL12920**		1/1
	32	3-Pole	**5TL13320**	3	1/1
	40		**5TL13400**		1/1
	63		**5TL13630**		1/1
	80		**5TL13800**		1/1
	100		**5TL13910**		1/1
	125		**5TL13920**		1/1
	32	4-Pole	**5TL14320**	4	1/1
	40		**5TL14400**		1/1
	63		**5TL14630**		1/1
	80		**5TL14800**		1/1
	100		**5TL14910**		1/1
	125		**5TL14920**		1/1

Technical Specifications

	Betagard 5TL1	
Standards	IEC 60947 - 3	
Mounting depth	70 mm	
Operating voltage / rated value	440 V AC	
Operating current / rated value	32A, 40A, 63A, 80A, 100A, 125A	
Number of poles	2 Pole, 3 Pole, 4 Pole	
Short Circuit Withstand Capacity	1.5kA for 1.5 Seconds	
Utilization category	AC 22 A	
Rated Insulation Voltage	500 V	
Rated Impulse Withstand Voltage	6 Kv	
Degree of Pollution	3	
Rated Duty	Uninterrupted Duty	
Ambient Temperature	-5°Celsius to +40°Celsius	
Degree of protection	IP 20	
Terminals Size	Solid and stranded Finely stranded with end sleeve	0.75 ... 35 Sq mm 0.75....25 Sq mm
Design of the switching function	Switch Disconnector	

Dimensional drawings

5TL1



Accesories

Overview

The Siemens mounting concept supports the combination of all 5ST3 additional components with Siemens 5SY and 5SP miniature circuit breakers and with 5SU1 RCBOs.

5SL miniature circuit breakers are suitable for mounting auxiliary switches and fault signal contacts. Auxiliary switches can also be mounted on 5TL1 Isolators.

Auxiliary switches (AS)

The auxiliary switch (AS) always signals the contact position of the miniature circuit breaker, regardless of whether the miniature circuit breaker was tripped manually or as the result of a fault. An additional version is also available for the switching of small currents and voltages for the control of programmable control systems (PLCs) acc. to EN 61131-2. The auxiliary switch with test button enables the testing of control circuits without the need to switch the miniature circuit breaker.

Fault signal contacts (FC)

The fault signal contact (FC) signals the automatic tripping of the miniature circuit breaker in the event of a fault, such as an overload or a short circuit. If the fault signal contact is activated, the contact position does not change if the miniature circuit breaker is tripped manually. Fault signal contacts with TEST and RESET buttons enable the testing of control circuits without the need to trip the miniature circuit breaker. The red RESET button integrated in the handle also indicates the automatic tripping of the MCB. The signal can be acknowledged manually using the RESET button.

Shunt trips (units)

Shunt trips are used for the remote tripping of miniature circuit breakers.

Undervoltage releases (UR)

Undervoltage releases are integrated (e.g. in EMERGENCY-OFF loops), thus ensuring that the MCB trips in the event of an emergency, which, in turn, ensures disconnection of the control circuit according to EN 60204. In the event that the voltage is interrupted or too low, it also trips, i.e. prevents activation of the MCB.

Remote controlled mechanisms (RC)

Remote controlled mechanisms are used for the remote ON/OFF switching of miniature circuit breakers and the remote ON switching of RC units, as well as the local manual switching of these devices. A blocking function permits maintenance work. In the event that a miniature circuit breaker or RC unit is tripped, an acknowledgment must be carried out prior to switching back on. The remote controlled mechanism has an operating mode selector switch with the functions: “Locked”, “Manual” and “Remote Switching”.

Position of selector switch:
OFF: The remote controlled mechanism is switched off, blocked mechanically and can be sealed and/or locked.
RC OFF: Only manual operation is possible.
RC ON: Both manual and remote operation are possible.

In the event that a device is tripped by a fault (RC units, miniature circuit breakers), the handle of the basic device and remote controlled mechanism switches to the OFF position. The operator must then acknowledge the tripping by resetting the remote controlled mechanism (OFF command) before it can be reactivated. This serves the safety of the installation or to protect personnel during maintenance work.

In an RC unit/miniature circuit breaker combination, the RC unit is switched on asynchronously, i.e. prior to the miniature circuit breaker. The RC units for 5SY and 5SP4 can be switched ON via the MCB handle jumper using the supplied actuator attachment. There is no need to switch off the RC unit via the remote controlled mechanism as the MCB contacts ensure disconnection of the electrical circuit.

The switching frequency is max. 2 actuations per minute. If this actuation frequency is exceeded it may cause internal tripping of the remote controlled mechanism as a protection against possible overload. In this case, the remote controlled mechanism must be switched OFF at the function selector switch and not switched back on again for at least 5 minutes. More additional 5ST3 ... components, such as AS, FC, units and UR, can be added to the right-hand side of the remote controlled mechanism in line with the Siemens mounting concept.

Benefits

Can be universally retrofitted with all additional components

- The 5SL, 5SY and 5SP miniature circuit breakers are ideal for the quick and easy mounting of auxiliary switches and fault signal contacts.

  Captive metal brackets on the additional components ensure the quick and easy mounting of devices on the miniature circuit breakers without the need for tools.

- Fault signal contacts with TEST and RESET button enable the simple testing of auxiliary circuits and, in the event of a fault, acknowledgement of the fault over the RESET button, without the need to switch the miniature circuit breakers.

- The auxiliary switches with TEST button enable the simple manual testing of control circuits during operation of the entire installation without the need to switch the miniature circuit breakers.

Technical Specifications

		Auxiliary switches (AS)		Fault signal contacts (FC)
		5ST3 010, 5ST3 010-2 5ST3 011, 5ST3 011-2 5ST3 012, 5ST3 012-2	5ST3 013, 5ST3 013-2 5ST3 014, 5ST3 014-2 5ST3 015, 5ST3 015-2	5ST3 020, 5ST3 020-2 5ST3 021, 5ST3 021-2 5ST3 022, 5ST3 022-2
Standards		EN 62019; IEC/EN 60947-5-1; UL 1077; CSA C22.2 No. 235		
Short-circuit protection		Miniature circuit breaker or gG 6 A fuse		
Contact load				
• Min.		50 mA, 24 V	1 mA/5 V DC	50 mA, 24 V
• Max.		–	50 mA/30 V DC	–
• 400 V AC, AC-14, NO	A	2	–	2
• 230 V AC, AC-14, NO	A	6	–	6
• 400 V AC, AC-13, NC	A	2	–	2
• 230 V AC, AC-13, NC	A	6	–	6
• 220 V DC, DC-13, NO+NC	A	1	–	1
• 110 V DC, DC-13, NO+NC	A	1	–	1
• 60 V DC, DC-13, NO+NC	A	3	–	3
• 24 V DC, DC-13, NO+NC	A	6	–	6
Service life, on average, with rated load		20000 actuations	20000 actuations	20000 actuations
Conductor cross-sections	mm^2	0.5 ... 2.5	0.5 ... 2.5	0.5 ... 2.5
Terminals				
• Terminal tightening torque	Nm	0.5	0.5	0.5
Mounting position		Any	Any	Any
Ambient temperature		-25 ... +55	-25 ... +55	-25 ... +55
Storage temperature		-40 ... +75	-40 ... +75	-40 ... +75

		Undervoltage releases (UR)	Shunt trips (units)		Remote controlled mechanisms (RC)
		5ST3 04.	5ST3 030	5ST3 031	5ST3 050
Standards		EN 60947-1			
Rated voltages U_n	V AC	230	110 ... 415	24 ... 60	230
	V DC	24, 110	110	24 ... 60	–
• Operating range U_n		0.85 ... 1.1 x U_n	0.7 ... 1.1 x U_n		0.9 ... 1.15 x U_n
• Rated frequency f_n	Hz	–	50 ... 60		50 ... 60
Response limits					
• Tripping		< 0.35 ... 0.7 × Un	–		–
Short-circuit protection		Miniature circuit breakers B/C 6 A or fuse gG 6 A			
Minimum contact load		50 mA, 24 V	50 mA, 24 V		–
Tripping operations		max. 2000	max. 2000		–
Service life, on average, with rated load		20000 actuations	20000 actuations		20000 actuations 5000 at RC unit
Conductor cross-sections	mm^2	0.5 ... 2.5	0.5 ... 2.5		0.5 ... 2.5
Terminals					
• Terminal tightening torque	Nm	0.8	0.8		0.4 ... 0.5
Mounting position		Any	Any		Any
Ambient temperature	°C	-25 ... +55	-25 ... +55		-25 ... +55
Storage temperature	°C	-40 ... +75	-40 ... +75		-40 ... +75
Switching frequency		–			2 actuations per minute
Switching duration	s	–			< 2
Minimum command duration	s	–			0.2 continuous command possible
Rated power dissipation	VA	–			No power consumption, in switching operation 26
Behavior in the event of control voltage failure		–			No change

Table for Suitability of Cable size in 5SL Terminals

Number of cables/ Busbar	Solid / rigid stranded cable <=10mm^2 multi stranded rigid cable >=16mm^2	Flexible cable with not insulated sleeve on lug	Flexible cable with insulated sleeve on lug	Flexible cable without lug
Single cable	0.75...25mm^2	0.75...25mm^2	0.75...25mm^2	1...25 mm^2
Two cable	0.75...10mm^2	0.75...4mm^2	0.75...4mm^2	1...4 mm^2
Cable+Busbar	10...25mm^2	6...25mm^2	6...16mm^2	---

Accesories

Selection and ordering data

	Rated current U_n V	MW (1 MW=18 mm)	Reference No	Std. Pkg. (Nos)
	**Auxiliary switches (AS)**			
	For 5SL, 5SY, 5SP miniature circuit breakers, 5SU1 RCBOs and 5TL1 Isolators			
	1 NO + 1 NC	0.5	**5ST3 010**	1
	For low power		**5ST3 013**	1
	2 NO		**5ST3 011**	1
	For low power		**5ST3 014**	1
	2 NC		**5ST3 012**	1
	For low power		**5ST3 015**	1
	**Auxiliary switches (AS) with TEST button**			
	For 5SL, 5SY, 5SP miniature circuit breakers, 5SU1 RCBOs and 5TL1 Isolators			
	1 NO + 1 NC	0.5	**5ST3 010-2**	1
	For low power		**5ST3 013-2**	1
	2 NO		**5ST3 011-2**	1
	For low power		**5ST3 014-2**	1
	2 NC		**5ST3 012-2**	1
	For low power		**5ST3 015-2**	1
	**Fault signal contacts (FC)**			
	For 5SL, 5SY, 5SP miniature circuit breakers and 5SU1 RCBOs			
	1 NO + 1 NC	0.5	**5ST3 020**	1
	2 NO		**5ST3 021**	1
	2 NC		**5ST3 021**	1
	**Fault signal contacts (FC) with TEST and ACKNOWLEDGE button**			
	For 5SY, 5SP miniature circuit breakers and 5SU1 RCBOs			
	1 NO + 1 NC	0.5	**5ST3 020-2**	1
	2 NO		**5ST3 021-2**	1
	2 NC		**5ST3 021-2**	1
	**Undervoltage releases (UR)**			
	For 5SY, 5SP MCBs and 5SU1 RCBOs			
	With integrated auxiliary switch			
	230 AC	1	**5ST3 040**	1
	110 DC		**5ST3 041**	1
	24 DC		**5ST3 042**	1
	Without integrated auxiliary switch			
	230 AC	1	**5ST3 043**	1
	110 DC		**5ST3 044**	1
	24 DC		**5ST3 045**	1
	**Shunt trips (units)**			
	For 5SY, 5SP MCBs and 5SU1 RCBOs			
	110 ... 415 V AC	1	**5ST3 030**	1
	24 ... 60 V AC/DC	1	**5ST3 031**	1
	**Remote controlled mechanisms (RC)**			
	For 5SP MCBs and 5SU1 RCBOs			
	230 AC	3.5	**5ST3 050**	1
	For 5SY MCBs			
	230 AC	3.5	**5ST3 052**	1

low res images

Selection and ordering data

	Version	MW (1 MW=18 mm)	Reference No	Std. Pkg. (Nos)
	**Handle locking devices** Sealable to prevent undesired mechanical ON/OFF switching For 5SP and 5SY miniature circuit breakers For padlock with max. 3 mm shackle		**5ST3 801**	1
	For 5SL miniature circuit breakers For padlock with 3 ... 6 mm shackle		**5ST3 806**	5
	**Padlocks** For 5ST3 801 and 5ST3 806 handle locking devices		**5ST3 802**	1

Rotary Handle Assembly

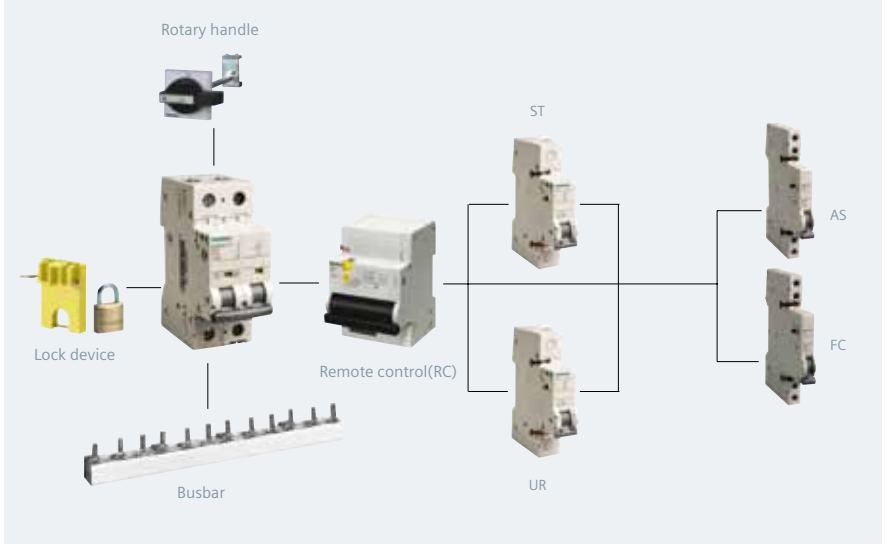
Benefits

- 5SJ, 5SL, 5SP, 5SY and 5TL1 series of MCBs/ Isolators can be fitted with Betagard Rotary Handle Assembly (ROH) for installation in Switchgear Cubicles and Distribution Panels
- The ROH gives operating uniformity and improves the aesthetics of the panel.
- The ROH can be padlocked in OFF position with the help of suitable padlocks thereby ensuring complete safety to operating personal during maintenance.
- Door interlock and defeat facility is available as a standard feature.

Technical Details:

	Product	Order No	Weight 1 item Kg	Std. Pkg. (Nos)
	Rotary Handle Assembly	**5ST38140RC**	0.584	1

Accessory mounting guide



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