

# Safeguarding millions of homes & offices



## Minigard

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**SIEMENS**

# 1

## Miniature Circuit Breakers

Round the clock protection

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## Design, Construction &amp; Features

Minigard MCB protects wires and cables automatically against overload and short-circuits in domestic, commercial and industrial installations.

In systems where proper earthing is provided the MCB provides additional protection by instantaneous interruption of the fault current, in case of faults, thereby eliminating the possibility of excessive touch voltages.

With the advent of fuseless circuit protection, MCBs with many advantages directly replace the older conventional re-wirable fuses.

The Siemens range of MCBs in India has a fault breaking capacity of 3kA with "C" characteristics in a wide range of current ratings to meet all your requirements.

MCBs of 3kA rating would find direct applications in all domestic & commercial power distribution networks, where the existing fault level conditions are met.

### Modular design:

Minigard MCBs are most compact with mounting depths up to 55mm and widths in multiples of 18mm and are part of the modular N system. They are hence totally compatible in modular width size to our range of Minigard RCCBs and can be mounted in Minigard/Betagard DBs.

### Non-weld contacts:

Minigard MCBs have contact tips made of special silver alloys ensuring higher life and maximum safety against contact welding. These contacts have low contact resistance resulting in reduced voltage drop and a very low watt loss leading to energy savings.

### Housing:

The housing of MCB is made from special thermosetting material. This housing and the other moulded components are fire-retardant, anti-tracking and non-hygroscopic. The MCB can, therefore, withstand a high temperature and is impact resistant.

### Locking arrangement:

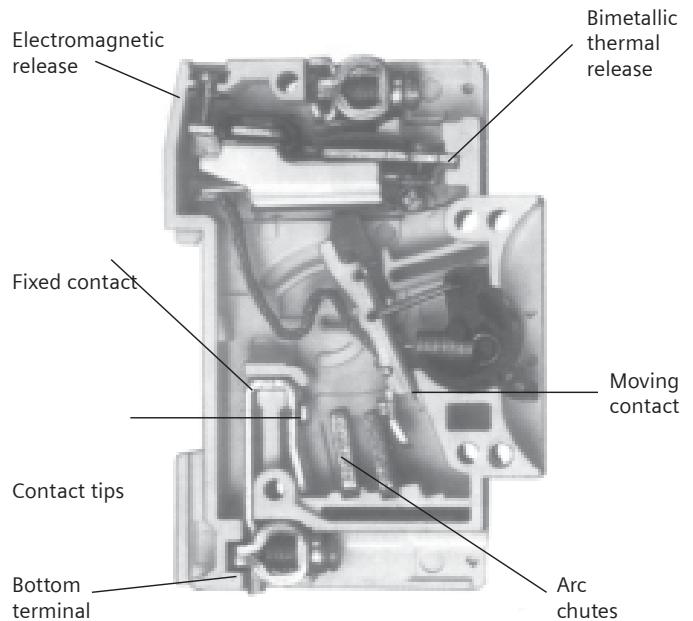
The lever locking arrangement of Minigard MCBs assures safety of the personnel working on unenergised circuits. It also prevents unauthorised switching of the MCB. This locking arrangement is achieved by simply knocking off the holes provided on the lever window and passing a thin wire through these holes and the lever.

### Trip-free mechanism:

In the event of an over-current or short-circuit the MCB automatically interrupts all poles even if the MCB toggle is held in 'ON' position.

The handle always indicates the correct contact position.

### Construction of 5SQ2 (3kA) MCB



*Operating Mechanism*

### Louvers on the housing:

The gases produced during the short circuit arc breaking are forced out through the louvers provided on the Minigard MCB housing. These are so designed to prevent any ingress of dust and thus a dust free contact operation is obtained.

### DIN Rail Mounting:

Minigard MCBs can be installed on DIN rails by a simple snap action. Similarly for removal a simple operation by a screw driver is enough. Time consuming operations like fixing screws at the time of installation or removing them at the time of replacement are not required.

### Operation of MCBs:

The MCBs have a thermal release and an electromagnetic release. The thermal release trips on overloads whereas the electromagnetic release trips instantaneously (within 10 ms) on short-circuits. In both cases a safe and rapid interruption is assured.

### Tripping in multipole MCBs:

Multi-pole MCBs are not only mechanically connected via the handles but also internally through the tripping devices. In case of the fault in any one of the phases will trip all the phases simultaneously.

### MCB for DC application:

Minigard MCBs can be used in D.C. circuits having voltages upto 60V, DC (Single Pole), and upto 110V, DC (Double Pole). Suitability for use at higher voltages can be given upon enquiry.

## Design, Construction & Features

### Isolators - 5TE:

Switch disconnectors for manual operation, as a control switch is available for switching loads in two, three and four pole versions; current ratings are from 25A to 80A.

### Back-up protection:

In most building electrification for domestic, commercial, offices, hotels etc. and other installations the fault level at the MCB terminals does not reach 3kA due to the transformer impedance and the impedance between transformer and MCBs.

Most of the faults occur close to the consumer load, which means at a distance close to the MCB itself. These fault currents are considerably lower than the breaking capacity of the MCB. Therefore 3kA MCB itself will clear the fault without the line side fuse blowing up.

If the prospective fault level exceeds the rated breaking capacity of the 3kA MCB, backup protection from a line-side fuse (according to IEC publication 269, VDE 0636, BS 88 & IS 9224) of up to 100A is required. In such case the MCB and the fuse will function together up to a fault level as high as 25 kA.

### Discrimination:

The discrimination of an MCB is defined as the current upto which the MCB breaks on its own without the line side fuse blowing as well. Higher the rated current of the line side fuse higher the current upto which discrimination is obtained.

Due to instantaneous tripping of Minigard MCBs, higher discrimination exists between MCBs when connected in series with upstream 3NA DIN type fuses.

### '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 supplying 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.

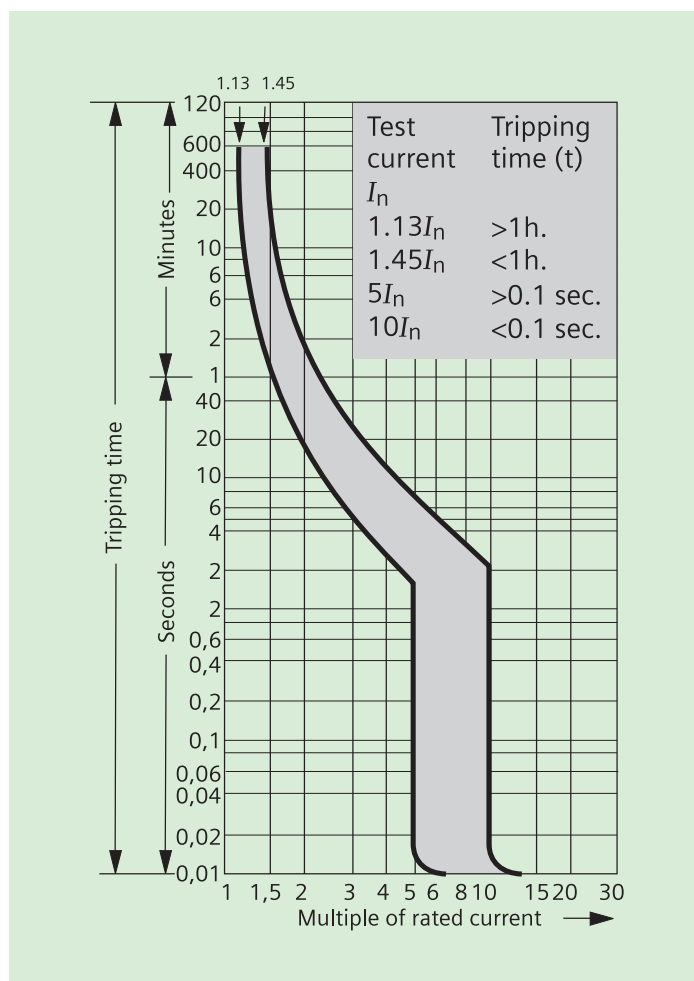
Under 'C' characteristics, the magnetic operating limits (for short-circuit operations) are between 5 and 10 times the current rating ( $I_n$ ) of MCB. For example, the instantaneous mechanism of a 10A MCB will operate between 50A and 100A in an overcurrent situation. The thermal operating limits (for overloads operation) are between 13 and 45 percent of the current ratings of MCB.

### Standards:

The 3kA MCB is available in a comprehensive range from 0.5 to 63A in 1, 2, 3 & 4 pole versions. This range of MCBs conforms to the latest National and International standards - IS 8828 (1996), IEC 898 (1995), VDE 0641/6.78, CEE Publication 19, 2<sup>nd</sup> Edition and BS 3871. Clause 5.3.4 of IS 8828 (1996)/IEC 898 (1995) clearly states the 3kA MCB as a standard value of breaking capacity.

### Features at a glance:

- Low mounting depth-only 53 mm.
- Unique "C" Tripping characteristics
- According to the latest IS 8828/IEC 898 standards
- Suitable for AC and DC circuits
- Totally safe and dependable - computer calibrated testing
- Rated current 0.5A to 63 Amps. Category of Duty-M3. Breaking capacity 3000 Amps.
- Terminals suitable for 25mm<sup>2</sup> cables.
- Space and time-saving fittings
- Silver alloy contacts for reliable weld-resistant switching



## Design, Construction & Features

- Recessed dolly ensuring no accidental operation
- Rapid mounting on DIN rail via simple clip-on fastening
- Service life: Average 20,000 operations at rated load
- Dolly sealable in ON and OFF position
- Trip-free mechanism
- Can be mounted in any position

### Typical short circuit level calculation:

It is necessary to calculate the short circuit currents to choose the correct low-voltage switching device for the network conditions.

In practice, it is mainly remote fault that have to be calculated in low voltage networks since these are fed exclusively from high power networks via transformers and the voltage at the transformer remains practically constant.

Consider supply network as shown below. For various ratings of the supply transformer in the public supply systems upto 415V Ac (assuming worst conditions) the initial symmetrical short circuit current is calculated from the equation.

$$I_{sc} = \frac{V_t}{\sqrt{3} Z_t}$$

Where

$I_{sc}$  = initial symmetrical short circuit current

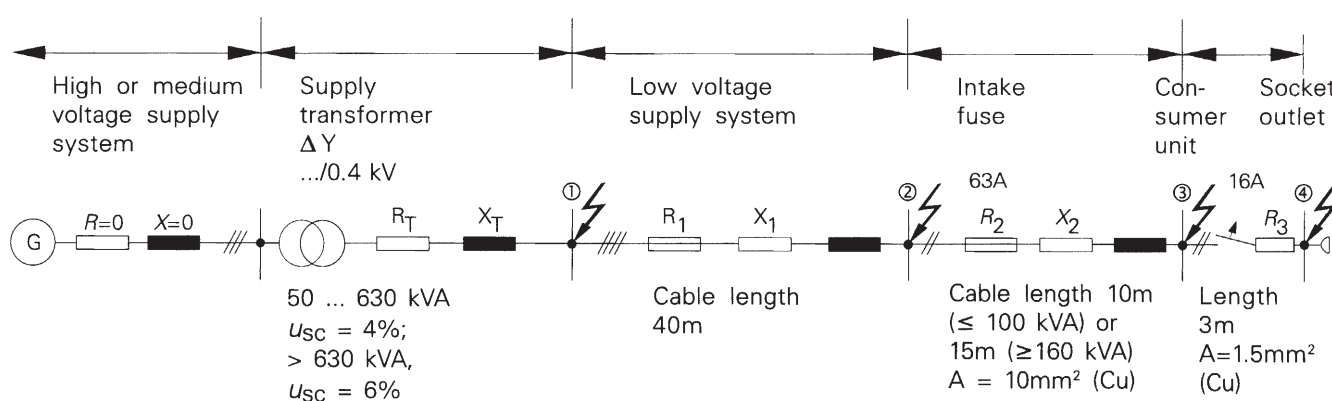
$V_t$  = Low voltage side transformer voltage

$Z_t$  = Total impedance

$$Z_t = \sqrt{(R_T + R_1 + R_2)^2 + (X_T + X_1 + X_2)^2}$$

The value of current determined has certain safety factors as this current is dampened considerably by contact resistance, current loops and the skin effect. Thus the actual value of the fault level will always be less than the calculated value.

The examples shown below clearly indicates that the fault level at the consumer unit remains well below 3 kA. The clause 5.3.4 of IS8828 (1996) and IEC898 (1995) clearly state 3kA as a standard value of breaking capacity.



Transformer			Cable <sup>1)</sup>			Fuse Cable <sup>1)</sup>		Wire
Sn kVA	In A	Isc ① kA	In A	Cross Section Area (A) mm <sup>2</sup>	Isc ② kA	Length m	Isc ③ kA	Isc ④ kA
50	72	1.8	63	10	0.9	10	0.8	0.6
100	144	3.6	125	25	2.1	10	1.6	1.1
160	231	5.8	200	70	4.4	15	2.2	1.3
250	360	9.1	160	50	4.9	15	2.3	1.3
400	578	14.5	250	95	8.9	15	2.9	1.5
630	910	22.9	315	120	12.5	15	3.1	1.6
1000	1440	24.4	315	120	13.7	15	3.2	1.6

<sup>1)</sup> Cross-sectional area of the neutral assumed being equal to one of the phase.

Fault levels (Isc 1phase) in public supply systems 240/415 VAC (general application; assumed worst case condition)

Miniature Circuit Breakers

Technical Data Overview

Standards		IS 8828, IEC 898, VDE 0641/6.78, BS3871, CEE Publ. 19
Series		5SQ2
Tripping characteristics		'C'
No. of poles		1,2,3, & 4
Rated voltage	230/415 V AC	✓
Operational voltage	min. AC/DC V	24
	max. DC V/Pole	60
	max. AC V	440
Rated short-circuit capacity acc. to IS8828/IEC898, DIN VDE 0641 AC kA		3
Conductor cross sections		
Upper terminal	mm <sup>2</sup>	25
Lower terminal	mm <sup>2</sup>	25
Rated insulation voltage	250/440 V AC	✓
Degree of protection		IP 00 according to DIN 40 050, IP 40 when mounted in distribution boards
Mounting		on a 35 mm mounting rail (EN 50 022)
Terminal tightening torque Nm		3.5
Supply connection		As required, top or bottom for DC applications, observe the polarity
Mounting position		As required in any position
Endurance		On an average 20,000 operations at rated load
Ambient temperature	°C	-25 to + 45, occasionally +55, max. 95% humidity, Storage temperature: -40 to+75
Resistance to climate		According to IEC 68-2-30 6 cycles
Resistance to vibration	m/s	60 at 10 to 150 Hz according to IEC 68-2-6

## Product Overview &amp; Accesories

## Minigard Miniature Circuit Breakers - 5SQ2, 3kA

Un: 240/415V, 50...60Hz can be used in systems upto 60Vdc, 1P and 110Vdc, 2P

Standards: IS 8828, IEC 60898





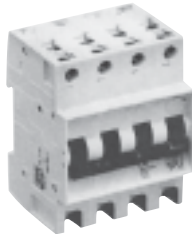
Breaking capacity: 3kA as per IS 8828

With ISI marking : CM/L No. 2255548

IS 8828



CM/L No. 2255548

	Rated current <i>I<sub>n</sub></i> (A)	MW <sup>#</sup>	Reference No.	Std. Pkg. (Nos.)		
	1 pole	0.5	1	5SQ21107YA05	1/20	
		1		5SQ21107YA01	1/20	
		2		5SQ21107YA02	1/20	
		4		5SQ21107YA04	1/20	
		6		■ 5SQ21107YA06	1/20	
		10		■ 5SQ21107YA10	1/20	
		13		5SQ21107YA13	1/20	
		16		■ 5SQ21107YA16	1/20	
		20		■ 5SQ21107YA20	1/20	
		25		5SQ21107YA25	1/20	
		32		■ 5SQ21107YA32	1/20	
		40		5SQ21107YA40	1/20	
		50		5SQ21107YA50	1/20	
		63		5SQ21107YA63	1/20	
	1-pole + N	2	2	5SQ25107YA02	1/10	
		4		5SQ25107YA04	1/10	
		6		5SQ25107YA06	1/10	
		10		5SQ25107YA10	1/10	
		16		5SQ25107YA16	1/10	
		20		5SQ25107YA20	1/10	
		25		5SQ25107YA25	1/10	
		32		5SQ25107YA32	1/10	
		40		5SQ25107YA40	1/10	
		50		5SQ25107YA50	1/10	
		63		5SQ25107YA63	1/10	
		2-pole	0.5	2	5SQ22107YA05	1/10
			1		5SQ22107YA01	1/10
			2		■ 5SQ22107YA02	1/10
		4		■ 5SQ22107YA04	1/10	
		6		■ 5SQ22107YA06	1/10	
		10		■ 5SQ22107YA10	1/10	
		16		■ 5SQ22107YA16	1/10	
		20		■ 5SQ22107YA20	1/10	
		25		5SQ22107YA25	1/10	
		32		■ 5SQ22107YA32	1/10	
		40		■ 5SQ22107YA40	1/10	
		50		5SQ22107YA50	1/10	
		63		■ 5SQ22107YA63	1/10	
		3-pole	0.5	3	5SQ23107YA05	1/10
		1		5SQ23107YA01	1/10	
		2		5SQ23107YA02	1/10	
		4		5SQ23107YA04	1/10	
		6		■ 5SQ23107YA06	1/10	
		10		■ 5SQ23107YA10	1/10	
		16		■ 5SQ23107YA16	1/10	
		20		5SQ23107YA20	1/10	
		25		5SQ23107YA25	1/10	
		32		■ 5SQ23107YA32	1/10	
		40		■ 5SQ23107YA40	1/10	
		50		5SQ23107YA50	1/10	
		63		■ 5SQ23107YA63	1/10	
		3-pole + N	2	4	5SQ26107YA02	1/10
		4		5SQ26107YA04	1/10	
		6		5SQ26107YA06	1/10	
		10		5SQ26107YA10	1/10	
		16		5SQ26107YA16	1/10	
		20		5SQ26107YA20	1/10	
		25		5SQ26107YA25	1/10	
		32		■ 5SQ26107YA32	1/10	
		40		■ 5SQ26107YA40	1/10	
		50		5SQ26107YA50	1/10	
		63		■ 5SQ26107YA63	1/10	

Note: # 1MW (Module Width) = 18mm

■ Stock Items

Miniature Circuit Breakers

Product Overview & Accesories

Minigard Isolators - 5TE3

Un: 240/415V, 50...60Hz  
Standards:IS13947-3/IEC60947-3



	Rated current <i>I<sub>n</sub></i> (A)	MW <sup>#</sup>	Reference No.	Std. Pkg. (Nos.)
2-pole	25	2	5TE39037Y	1/10
	40		5TE39047Y	1/10
	63		5TE39137Y	1/10
	80		5TE39157Y	1/10
3-pole	25	3	5TE39057Y	1/10
	40		5TE39067Y	1/10
	63		5TE39077Y	1/10
	80		5TE39167Y	1/10
4-pole	25	4	5TE39087Y	1/10
	40		5TE39107Y	1/10
	63		5TE39117Y	1/10
	80		5TE39177Y	1/10

Accessories for Minigard MCBs/Isolators

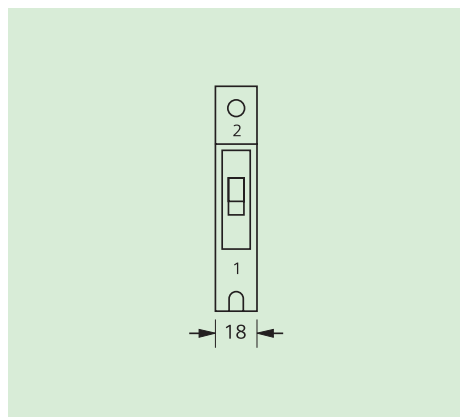
Item Description	Reference No.	Std. Pkg. (Nos.)
Terminals (35sq mm)	5ST2203	10
Vertical Spacer	5ST2120	10

Note:  
# 1MW (Module Width) = 18mm

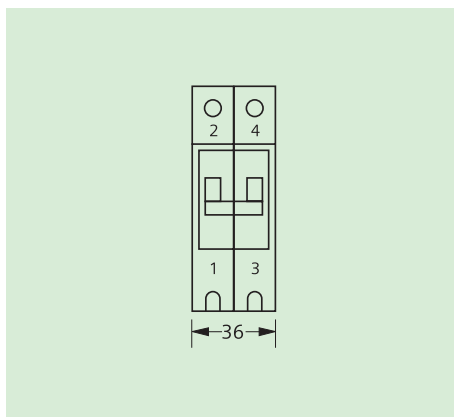


# Dimensions

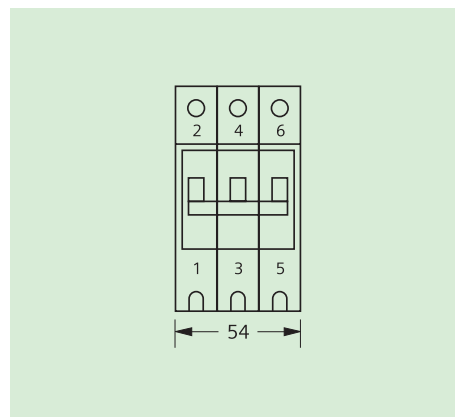
## 5SQ2 / 5TE3



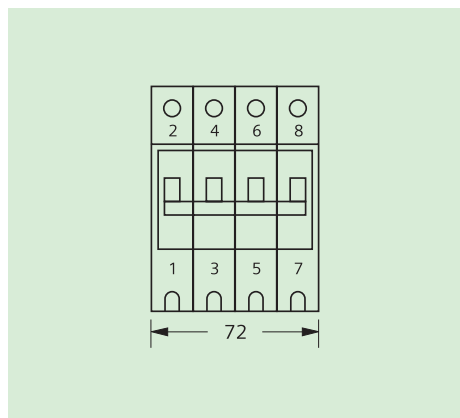
MW = 1



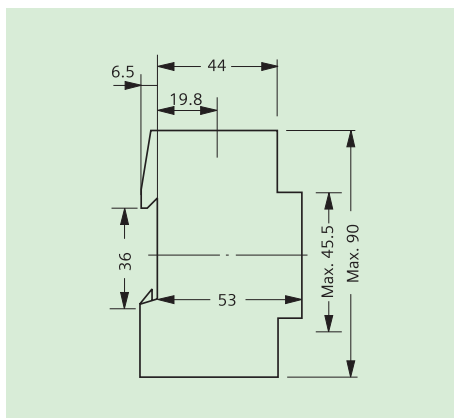
MW = 2



MW = 3



MW = 4



Dimensions (mm)



# 2

## Residual Current Circuit Breakers

Who “nose” where his finger will be tomorrow!

- 2/2 Design, Construction & Features
- 2/8 Recommendations for RCCB Selection
- 2/9 Technical Specifications
- 2/10 Product Overview
- 2/15 Additional Components
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## Design, Construction &amp; Features

**General:**

Electricity is usually taken for granted, but any imprudence could be fatal. Damaged insulation and faulty wiring cause a 'Leakage current' to flow to earth. Due to leakage currents, everyday activities like ironing, using a geyser, washing machine, a hair-dryer, an air-conditioner or industrial machinery etc. could turn out to be potentially lethal.

In addition, leakage currents of about 300-500 mA are capable of causing electrical sparks that could cause hazardous fire.

Minigard RCCB is the safest device to detect and trip on leakages and thereby offer instant protection against electrocution and electrical fire. In addition, they prevent energy wastage and thus save on electricity costs.

**Dangers of Leakage Currents:**

1. Direct / Indirect contact with a live parts
2. Electrical fires
3. Energy wastage

**The solution:**

**30mA:** Offers the highest level of protection to human and animal life against direct and indirect contact with live parts.









Recommended for residences, commercial and industrial premises, power sockets, schools, hotels etc, wet areas and during temporary construction installation. Siemens RCCBs trip between 10 to 30 ms, which is nearly 10 times faster than IEC requirements of 200 ms.

**100mA:** Normally provides protection only against indirect contact and hence protects both the entire wiring system and components e.g. in buildings, laboratories, industry, workshops etc. for faults caused through misuse, accidental damage or appliance failure.

**300mA:** Used where only fire protection is required and risk of electric shock is small. It is normal to use 300mA as incomer and subsequent 30mA/100mA protective RCCBs in the downstream circuit.

**Types of Residual Current Protection Devices**

1. Type AC
2. Type A
3. Type B

Current wave-shape	Proper functioning of residual current protective devices of type			Tripping current
	AC 	A 	B 	
	•	•	•	$0.5 \dots 1.0 I_{\Delta n}$
	–	•	•	$0.35 \dots 1.4 I_{\Delta n}$
	–	•	•	current delay angle $90^\circ$ : $0.25 \text{ to } 1.4 I_{\Delta n}$ current delay angle $135^\circ$ : $0.11 \text{ to } 1.4 I_{\Delta n}$
	–	•	•	max. $1.4 I_{\Delta n} + 6 \text{ mA}$
	–	–	•	$0.5 \text{ to } 2 I_{\Delta n}$


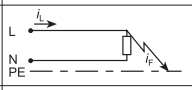
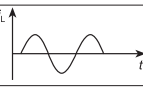
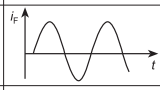

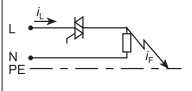
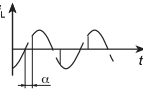
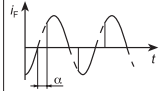

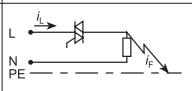
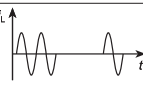

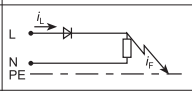
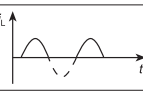
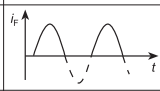
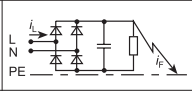
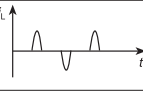
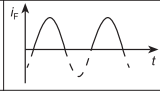
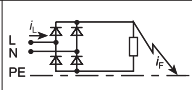
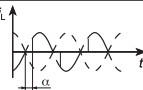
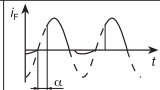
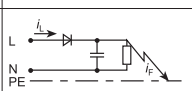
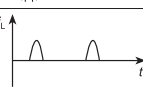
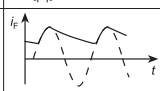
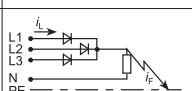
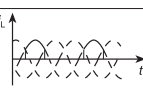
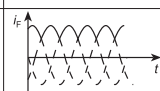
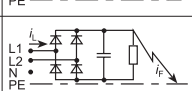
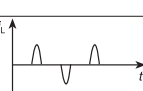
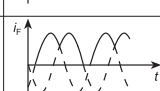
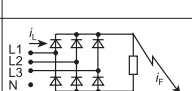
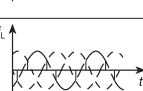
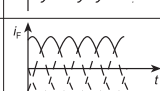
Suitable RCD type	Circuit	Load current	Residual current
B A AC			
			
			
			
			
			
			
			
			
			
			

Table 1: Possible residual current wave shapes and suitable residual current protective devices

Design, Construction & Features

Type AC: 

Residual current protective devices of type AC are suitable only for detecting sinusoidal AC residual current (see circuits 1 to 3 in Table 1). This device type to DIN VDE 0100-530 is not authorized in Germany for residual current protection, and cannot carry the VDE mark of conformity.

Type A: 

In addition to sinusoidal AC residual currents, residual current protective devices of type A also measure pulsating DC residual currents.

This device type is the most commonly used pulse current-sensitive residual current operated circuit-breaker. It also covers the residual current waveforms which can occur in power supply units (e.g. ECG, washing machines) in the case of single-phase loads with electronic components. This type of residual current protective device is suitable for electronic resources with input current circuits nos. 1 to 6 in Table 1.



There are further sub types in Type A RCCB s. They are as follows

Type S, Selective 

Type K, Super Resistant 

Type S Selective 

In order to achieve selective tripping in the case of series-connected residual current protective devices in the event of a fault scenario, both the rated residual current  $I_{\Delta n}$  and the tripping time of the devices must be staggered. The different permissible tripping times of the standard and selective residual current protective devices can be taken from Figure 1. The suitable staggering of the rated residual currents can also be seen in Figure below.

Selective residual current protective devices of type  also have a very high surge withstand capability of 5 kA (8/20  $\mu$ s current waveform). They are identified by the symbol .

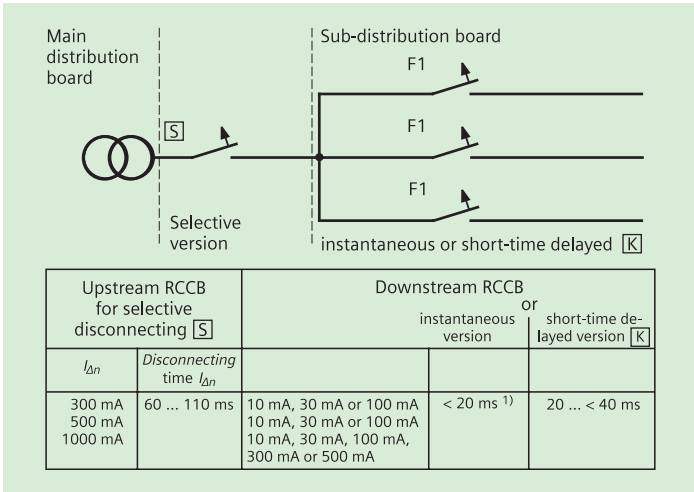


Figure 1: Layout of different residual current protective devices and their tripping times

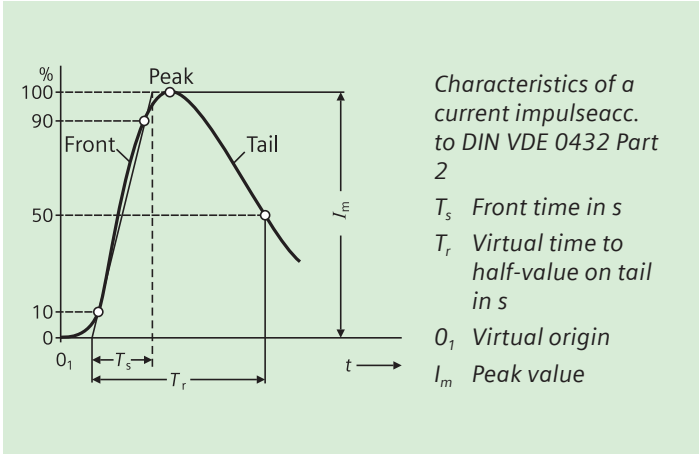




Figure 2: Surge current wave 8/20  $\mu$ s

Type K, Short Time- Delayed 

As far as the device specification is concerned, there are only two device versions: instantaneous and selective. The “K” versions must therefore fulfill the maximum permissible tripping times for instantaneous devices. Residual current protective devices of type  are slightly delayed (approx. 10 ms for high residual currents).

The tripping times for the “K” versions are therefore somewhat longer as those for the standard devices, for example for residual currents > 5  $I_{\Delta n}$ : approx. 30 ms instead of around 10 to 15 ms.

They therefore conform to the maximum permissible tripping times (40 ms) for the standard versions (see Figure 2). They are identified by the symbol .

The layout of the tripping circuit reduces the electrical interference of transient residual currents. This results in an increased surge withstand strength of 3 kA (8/20  $\mu$ s current waveform, see Figure below) compared to the standard version (1 kA). In addition, these RCCB s are insensitive to surge leakage currents, such as those which occur in switched-mode power supplies or filters when capacitors are switched on.

Type B: 

In addition to detecting residual current waveforms of type A, residual current protective devices of type B are used to measure smooth DC residual currents. Residual current operated circuit breakers of this type are suitable for use in three-phase AC systems with 50/60 Hz also upstream of input circuits No. 7 to 10 in Table 1 and therefore for all the circuits shown.

Breaking capacity:

Every RCCB requires suitable rating backup fuse in order to achieve required breaking capacity. When used along with a MCB  $\geq 10$ kA, no additional back-up fuse is required and are suitable for a network having a prospective short circuit current of 10 kA. (e.g. 5SX4 MCBs)

## Design, Construction &amp; Features

**Protection against contact welding:**

The contacts are made of special silver alloys with a large safety margin. This avoids the danger of Minigard RCCBs getting welded under heavy fault currents. Contacts are also free from Noxious Nickel & Cadmium.

**False tripping avoided:**

Travelling surges caused by thunderstorms, lightning, motor switching etc. can cause undesirable tripping of RCCBs. Minigard RCCBs have special filters and pass exacting standards to prevent this occurring.

**Modular N-system:**

Being extremely compact with space-saving dimensions, they are fully compatible in modular size to our 'Minigard' MCBs and DBs. Provides IP42 degree of protection within our Double Door DB design.

**Fixed trip setting:**

Precision tripping sensitivity (mA) is factory-set at Germany; thus hazardous tampering is prevented.

**Rugged service life:**

After tests comprising 10,000 electrical and mechanical switching cycles at rated current with no negative results, Siemens RCCBs have been found fully usable. Our RCCBs provide reliability even at 95% humidity and at ambient temperature of 45°C. They are also vibration-proof and can be mounted on machinery or mobile vehicles.

**Standards:**

Meets the highest technical standards of IEC/EN 61008, VDE 0664 part 10, IEC/EN 61543, VDE 0664 part 30 and IS 12640.

**Quality & testing:**

Precision and perfection are the only ways of assuring quality. Siemens RCCBs passes through more than 40 stringent automated tests, before it is considered reliable.

**Other key features:**

- Mounting is possible in any position and on temporary structures
- Finger-touch proof terminals for operator safety
- Podzidrive screws for use with any screwdriver (Star/Split)
- Special tunnel terminals ensure perfect cable grip.
- Current-operated mechanism provides maximum reliability
- Snap-on fit to 35mm DIN rail
- Busbar connection also possible

- Auxiliary Contacts for remotely indicating ON/OFF status of RCCB

**Protection against dangerous leakage currents acc. to DIN VDE 0100 Part 410****Application:**

- Protection against indirect contact (indirect personnel protection) – as leakage protection through tripping in the event of higher touch voltages due to short-circuits to frame on equipment
- Using residual current protective devices with  $I_{\Delta n} \leq 30\text{mA}$  also largely protects against direct contact (direct personnel protection) - as additional protection through tripping as soon as live parts are touched.

**Protective action:**

While devices for rated residual current  $I_{\Delta n} > 30\text{ mA}$  provide protection again indirect contact, using devices with  $I_{\Delta n} \leq 30\text{ mA}$  also offers the best possible additional protection against the accidental direct contact of live parts.

The diagram above shows a summary of the physiological reactions of the human body to power flows in the effective current ranges.

The dangerous values are the current/time values in range 4 as they can trigger ventricular fibrillations, which can cause death.

It also shows the tripping range of the residual current protection device with rated residual current 10mA and 30mA. The tripping time lies in the middle between 10 ms and 30 ms.

The permissible tripping time of max. 0.3 s (300 ms) acc. to VDE 0664 or EN 61008 or IEC 61008 is not reached.

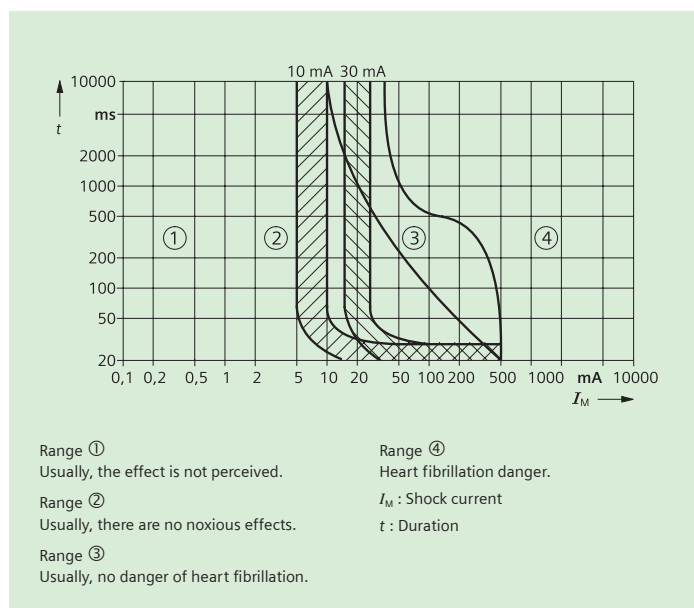


Figure 3: Effective current ranges acc. to IEC 60479

## Design, Construction & Features

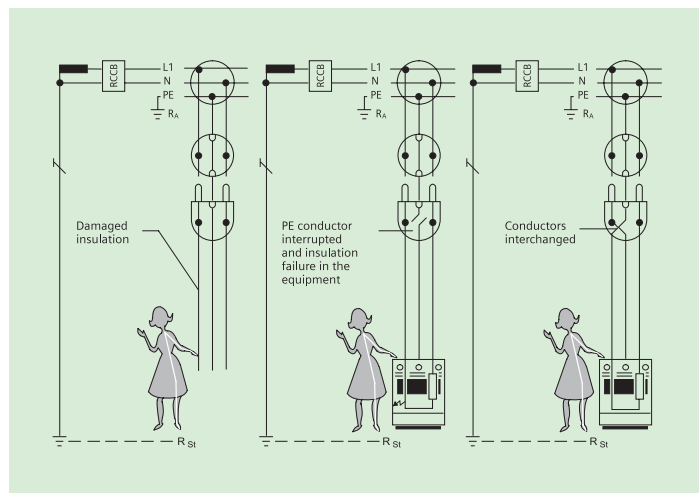


Figure 4: Examples of accidental direct contact

Residual current protective devices with rated residual current 10 or 30 mA also offer reliable protection when a current flows through a person after accidental direct contact with live parts. This protective action is not matched by any other comparable protective measure in the event of indirect contact.

*However, when using residual current protective devices, a suitably grounded PE conductor must also be fitted to the devices and equipment to be protected. This means that it is only possible for a person to be subjected to a flow of current if two faults occur or in the event of accidental contact with live parts.*

If live parts are directly touched, two resistors determine the level of the current - the internal resistance of the person  $R_M$  and the contact resistance of the location  $R_{St}$ . For a proper assessment of the accident risk, the worst case scenario must be assumed, which is that the contact resistance of the location is virtually zero.

The resistance of the human body depends on the current path. Measurements have shown that, e.g. that a current path of hand to hand or hand to foot has a resistance of approx. 1 000  $\Omega$ . Taking into account a fault voltage of 230 V AC, this produces a current of 230 mA for the current path hand to hand.

### Usage:

Residual current protective devices can be used in all three system configurations (IEC 364-4-41, HD 384.4.41, DIN VDE 0100-410).

In the IT system, tripping is not required for the first fault as this situation cannot produce any dangerous touch voltages. It is essential that an insulation monitoring device is fitted so that the first fault is indicated by an acoustic or visual signal and the fault can be eliminated as quickly as possible. Tripping is not requested until the 2nd fault.

Depending on the grounding situation, the tripping conditions of the TN or TT system must be complied with. A residual current protective device is also a suitable circuit

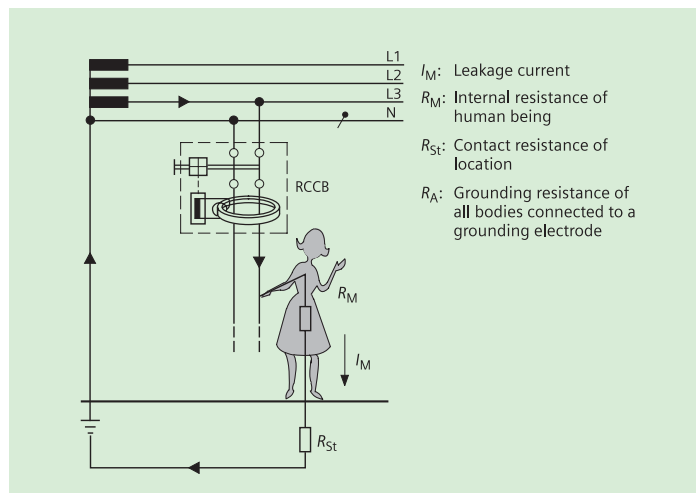


Figure 5: Additional protection against direct contact with live parts

protective device, whereby a separate residual current protective device is required for each piece of current-using equipment.

### Grounding resistances:

When using residual current protective devices in a TT system, the maximum grounding resistances (as shown in the following table) must be complied with, depending on the rated residual current and the max. permissible touch voltage.

### Fire protection acc. to HD 384.4.482, DIN VDE 0100-482

#### Application:

- When using residual current protective devices with  $I_{\Delta n} \leq 300$  mA protection against the occurrence of fires started electrically due to isolation faults

#### Protective action:

HD 384.4.482, DIN VDE 0100-482 requires measures to be taken to prevent fires in "Locations exposed to fire hazards" that may result from isolation faults.

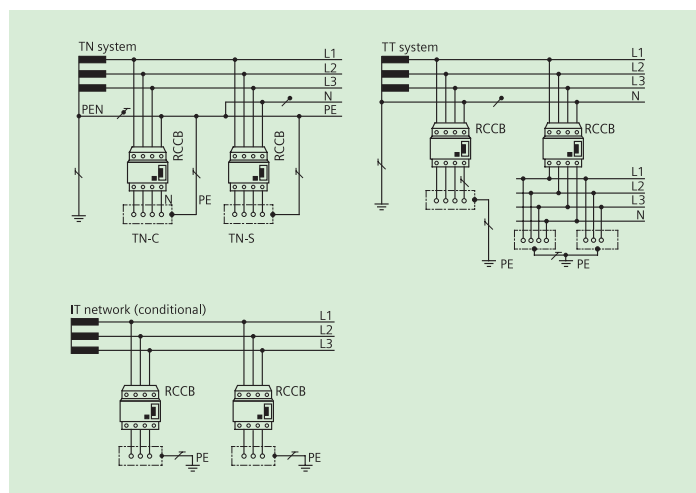


Figure 6:

## Design, Construction &amp; Features

Electrical equipment must be selected and set up taking external influences into account so that their temperature rise during normal operation, and the foreseeable temperature rise, cannot cause a fire in the event of a fault.

This is achieved by ensuring the equipment is suitably designed or by implementing additional safety measures during installation.

For this reason, additional residual current protective devices with a rated residual current of max. 300 mA is required for TN and TT systems used in "Locations exposed to fire hazards".

Where resistance-related faults may cause a fire (e.g. when using ceiling heating with panel heating elements), the rated residual current must not exceed max. 30 mA.

The additional protection against fires provided by separate residual current protective devices should not just be restricted to locations exposed to fire hazards, rather it should be universally implemented. (Ref: Figure 6)

### Setup and method of operation of residual current protective devices:

The setup of residual current protective devices is largely determined by 3 function groups:

- 1) Summation current transformers for fault-current detection
- 2) Releases to convert the electrical measured quantities into a mechanical tripping operation
- 3) Breaker mechanism with contacts

The summation current transformer covers all conductors required to conduct the current, i.e. also the neutral conductor where applicable.

In a fault-free system, the magnetizing effects of the conductors through which current is flowing cancel each other out for the summation current transformer as, in accordance with Kirchhoff's current law, the sum of all currents is zero. There is no residual magnetic field left that could induce a voltage in the secondary winding.

However, by contrast, if a residual current is flowing due to an insulation fault, this destroys the equilibrium and a residual magnetic field is left in the core of the converter.

This generates a voltage in the secondary winding, which then uses the release and the breaker mechanism to switch off the electrical circuit afflicted with the isolation fault.

This tripping principle operates independently of the system voltage or an auxiliary power supply. This is also a condition for the high protection level, offered by residual current protective devices acc. to IEC/EN 61008 (VDE 0664).

Only this way can it be ensured that the full protective action of the residual current protective device is maintained even in the event of a system fault, e.g. failure of an outer conductor or an interruption in the neutral conductor.

### Test button:

You can test whether the residual current protective device is ready to run by simply pressing a test button, with which every residual current protective device is equipped. Pressing the test button generates an artificial residual current - the residual current protective device must trip.

We recommend testing the functionality when commissioning the system and then at regular intervals - approx. every six months. Furthermore, it is also essential to ensure compliance with the test intervals specified in the pertinent rules and regulations (e.g. accident prevention regulations).

The minimum working voltage for operation of the test equipment normally is 100 V AC (series 5SM).

### Distribution Networks:

Minigard RCCBs can be used in all 3 distribution network types viz. TN, TT & an IT network system. 4 pole RCCBs can also be used in 3 pole supply networks by adhering to installation guidelines.

### 3-pole connection:

4-pole residual current protective devices can also be operated in 3-pole systems. In this case, connection must be at terminals 1, 3 and 5 and 2, 4 and 6.

The function of the test equipment is only ensured if a jumper is fitted between terminals 3 and N. (Ref: Figure 7)

Rated residual current $I_{Dn}$	Max. permissible grounding resistance at a max. permissible touch voltage of	
	50 V	25 V
10 mA	5000 $\Omega$	2500 $\Omega$
30 mA	1660 $\Omega$	830 $\Omega$
100 mA	500 $\Omega$	250 $\Omega$
300 mA	166 $\Omega$	83 $\Omega$
500 mA	100 $\Omega$	50 $\Omega$
1 A	50 $\Omega$	25 $\Omega$

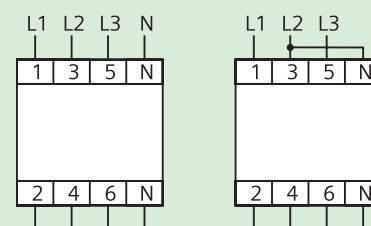


Figure 7:

Design, Construction & Features

Type of current	Current waveform	Correct function of residual current protective devices of type			Tripping current <sup>1)</sup>
		Type AC ~	Type A ~	Type B ~	
AC residual current	~	✓	✓	✓	0.5 ... 1.0 I <sub>Δn</sub>
Pulsating DC residual currents (pos. or neg. half-waves)	⋈	–	✓	✓	0.35 ... 1.4 I <sub>Δn</sub>
Started half-wave currents Start angle 90° el Start angle 135° el	⋈	–	✓ ✓	✓ ✓	0.25 ... 1.4 I <sub>Δn</sub> 0.11 ... 1.4 I <sub>Δn</sub>
Half-wave current during superimposition with smooth direct current of 6 mA	⋈	–	✓	✓	max. 1.4 I <sub>Δn</sub> + 6 mA
Smooth direct current	—	–	–	✓	0.5 ... 2.0 I <sub>Δn</sub>

<sup>1)</sup> Tripping currents according to IEC/EN 61008-1 (VDE 0664, Part-10);  
for smooth DC residual currents defined to IEC 60755 UB1 INT.



## Recommendations for RCCB Selection


Application	Required $I_{\Delta n}$ [mA]	Recommended residual current protective devices		
		5SM (Type AC)	5SM (Type A)	5SM (Type B)
Socket outlet $\leq 20A$ and branch circuits for out door use $\leq 32A$	$\leq 30$	✓	✓	–
Fire protection for particular risks or safety hazard	30, 300	✓	✓	✓
Low Voltage Genarating Sets	$\leq 30$	–	✓	–
Lumanaries and lighting installations, display stands for lights	$\leq 30$	✓	✓	–
Rooms with baths or showers, socket outlets in zone 3	$\leq 30$	✓	✓	–
Swimming Pools, zone 1 and 2	$\leq 30$	✓	✓	–
Construction and demolition site installations, socket outlet current circuits (single-phase operation) up to 32A and for hand-held equipment	$\leq 30$	✓ ✓	– ✓	– ✓
Agricultural and general horticultural premises	$\leq 500$	–	✓	–
Socket outlet current circuits	$\leq 30$	✓	✓	–
Conductive areas with limited freedom of movement	$\leq 30$	✓	✓	–
Feeding points for caravan parking spaces, camping sites	$\leq 30$	✓	✓	–
Medical Premises, depending on application group 1 or 2 and equipment	$\leq 30$ or $\leq 300$	– –	✓ ✓	✓ ✓
Classroom with experiment equipment	$\leq 30$	–	–	✓
Fountain Zones 2, General	$\leq 500$	–	✓	–
Socket outlets in Zone 2	$\leq 30$	✓	✓	–
Zones 0 and 1	$\leq 30$	✓	✓	–
Additional Protection against diret contact in homes	$\leq 30$	✓	✓	–
Mining Plants	$\leq 500$	–	✓	–
Finding of power installations with electronic equipment	General requirements for correct selection when using res. Current protection	✓	✓	✓
Traffic Signals				
- Class T1	$\leq 300$	✓	✓	–
- Class U1	$\leq 30$	✓	✓	–
Selection and Operation of electrical equipement at worksites				
General:				
Socket outlet circuits $\leq 32A$	$\leq 30$	✓	✓	✓
Socket outlet circuits $> 32A$	$\leq 500$	✓	✓	✓
Frequency Controlled Equipment:				
With Plug and socket device $\leq 32A$	$\leq 30$			✓
With Plug and socket device $> 32A$	$\leq 500$			✓
Chemical Industry and food processing industries	30 recommended	✓	✓	✓

Note:

For Reasons of Basic fire protection, we recommend a maximum rated residual current of 300mA for residual current protection devices.



# Residual Current Circuit Breakers

## Technical Specifications

Standards		IS 12640 Part 1, IEC/EN 61008, VDE 0664 Part 10, IEC/EN 61543, VDE 0664 Part 30		
Versions		DP and FP		
Rated Voltage U <sub>n</sub>	V AC	125...240 230....415	50...60Hz 50....60Hz	
Rated Current I <sub>n</sub>	A	25, 40, 63, 80, 100, 125		
Rated Residual Currents I <sub>Δn</sub>	mA	30, 100, 300, 500		
Enclosure		Grey Moulded Plastic (RAL 7035)		
Mounting Depth	mm	70		
Terminals		Tunnel terminals at both ends with wire protection, lower combined terminal for simultaneous connection of busbars (fork type) and conductors For 2 MW                   at I <sub>n</sub> = 25A, 40A at I <sub>n</sub> = 100A, 125A For 2.5 MW               at I <sub>n</sub> = 63A, 80A For 4 MW                 at I <sub>n</sub> = 25A, 40A, 63A, 80A at I <sub>n</sub> = 125A	Conductor Cross-Section mm <sup>2</sup>  1.0...16 1.5...50 1.5....25 1.5....25 2.5....50	Recommended terminal tightening Torque Nm 2.5....3.0 3.0....3.5 2.5....3.0 2.5....3.0 3.0....3.5
Surge Current Withstand capacity of RCCB s		With Current Wave Form 8/20μs		
Instantaneous		1 kA		
Super Resistant K		3 kA		
Selective S		5 kA		
Supply Connection		Optionally Top or Bottom		
Mounting position		Any		
Mounting Technique		Can be snapped onto standard mounting rail 35mm (TH 35 acc. to EN 60715)		
Degree of Protection		IP 20 acc. to EN 60529 (VDE 0470 Part 1) IP 40 for installation in distribution boards		
Protection against Contact		Protection against contact of fingers or the back of the hand acc. to EN 50274 (VDE 0660 Part 514)		
Minimum operating Voltage for test function operation	V AC	100		
Device Service Life		> 10,000 operations (electrical and mechanical; Test cycle acc. to regulations)		
Storage Temperature	°C	-40...+75		
Ambient Temperature	°C	-40...+75 For versions with the symbol  : -25...+45		
Resistance to Climate acc. to IEC 60068-2-30		28 Cycles (55 °C; 95% relative humidity)		
CFC and Silicon free		Yes		



Product Overview

Type AC

		Rated residual current $I_n$ (mA)	Rated current $I_n$ (A)	MW*	Reference No.	Std. Pkg. (Nos.)
	2 Pole	30	25	2	5SM33120RC	10
		100	25		5SM34120RC	10
		300	25		5SM36120RC	10
		30	40		5SM33140RC	10
		100	40		5SM34140RC	10
		300	40		5SM36140RC	10
		30	63	2.5	5SM33160RC	10
		100	63		5SM34160RC	10
		300	63		5SM36160RC	10
		30	80		5SM33170RC	5
		100	80		5SM34170RC	5
		300	80		5SM36170RC	5
		30	100	2	5SM33180KK	1
		100	100		5SM34180KK	1
		300	100		5SM36180KK	1
		30	125		5SM33150KK	1
		100	125		5SM34150KK	1
		300	125		5SM36150KK	1
	4 Pole	30	25	4	5SM33420RC	5
		100	25		5SM34420RC	5
		300	25		5SM36420RC	5
		30	40		5SM33440RC	5
		100	40		5SM34440RC	5
		300	40		5SM36440RC	5
		30	63		5SM33460RC	5
		100	63		5SM34460RC	5
		300	63		3SM36460RC	5
		30	80		5SM33470RC	5
		100	80		5SM34470RC	5
		300	80		5SM36470RC	5
		30	100		5SM33480RC	1
		100	100		5SM34480RC	1
		300	100		5SM36480RC	1
		30	125		5SM33450RC	1
		100	125		5SM34450RC	1
		300	125		5SM36450RC	1
		500	125		5SM37450RC	1



Product Overview

Type A

		Rated residual current $I_n$ (mA)	Rated current $I_n$ (A)	MW*	Reference No.	Std. Pkg. (Nos.)
	2 Pole	30	25	2	5SM33126RC	1
		100	25		5SM34126RC	1
		300	25		5SM36126RC	1
		30	40		5SM33146RC	1
		100	40		5SM34146RC	1
		300	40		5SM36146RC	1
		30	63	2.5	5SM33166RC	1
		100	63		5SM34166RC	1
		300	63		5SM36166RC	1
		30	80		5SM33176RC	1
		100	80		5SM34176RC	1
		300	80		5SM36176RC	1
		30	100	2	5SM33186KK	1
		100	100		5SM34186KK	1
		300	100		5SM36186KK	1
		30	125		5SM33156KK	1
		100	125		5SM34156KK	1
		300	125		5SM36156KK	1
	4 Pole	30	25	4	5SM33426RC	1
		100	25		5SM34426RC	1
		300	25		5SM36426RC	1
		30	40		5SM33446RC	1
		100	40		5SM34446RC	1
		300	40		5SM36446RC	1
		30	63		5SM33466RC	1
		100	63		5SM34466RC	1
		300	63		3SM36466RC	1
		30	80		5SM33476RC	1
		100	80		5SM34476RC	1
		300	80		5SM36476RC	1
		30	100		5SM33486RC	1
		100	100		5SM34486RC	1
		300	100		5SM36486RC	1
		30	125		5SM33456RC	1
		100	125		5SM34456RC	1
		300	125		5SM36456RC	1
		500	125		5SM37456RC	1



Product Overview

Type A

		Rated residual current $I_n$ (mA)	Rated current $I_n$ (A)	MW*	Reference No.	Std. Pkg. (Nos.)
<b>Super Resistant K</b> 	2 Pole	30	25	2	5SM33126RC01	1
		30	40		5SM33146RC01	1
		30	63	2.5	5SM33166RC01	1
		300	63		5SM36166RC01	1
	4 Pole	30	25	4	5SM33426RC01	1
		30	40		5SM33446RC01	1
		300	40		5SM36446RC01	1
		30	63		5SM33466RC01	1
		300	63		5SM36466RC01	1
		300	80		5SM36476RC01	1
<b>Selective S</b> 	2 Pole	300	40	2	5SM36148RC	1
		100	63	2.5	5SM34168RC	1
		300	63		5SM36168RC	1
		300	80		5SM36178RC	1
	4 Pole	100	40	4	5SM34448RC	1
		300	40		5SM36448RC	1
		100	63		5SM34468RC	1
		300	63		5SM36468RC	1
		300	125		5SM36458RC	1
		500	125		5SM37458RC	1

Product Overview

Type B

		Rated residual current $I_n$ (mA)	Rated current $I_n$ (A)	MW*	Reference No.	Std. Pkg. (Nos.)
<b>Super Resistant K</b> 	4 Pole	30	25		5SM33424RC	1
		300	25		5SM36424RC	1
		30	40		5SM33444RC	1
		300	40		5SM36444RC	1
		30	63		5SM33464RC	1
		300	63		5SM36464RC	1
		500	63		5SM37464RC	1
		30	80		5SM33474RC	1
		300	80		5SM36474RC	1
		500	80		5SM37474RC	1
<b>Selective S</b> 	4 Pole	300	63	4	5SM36465RC	1
		500	63		5SM37465RC	1
		300	80		5SM36475RC	1
		500	80		5SM37475RC	1



## Product Overview


## Reference Chart: Equivalent Chart for 5SM1 versus 5SM3

## Type AC

	Rated Residual Current In (mA)	Rated Current In (A)	MW *	Existing Type	New Type
2 Pole	30	25	2	5SM13120RC	5SM33120RC
	100	25		5SM14120RC	5SM34120RC
	300	25		5SM16120RC	5SM36120RC
	30	40		5SM13140RC	5SM33140RC
	100	40		5SM14140RC	5SM34140RC
	300	40		5SM16140RC	5SM36140RC
	30	63	2.5	5SM13160RC	5SM33160RC
	100	63		5SM14160RC	5SM34160RC
	300	63		5SM16160RC	5SM36160RC
	30	80		5SM13170RC	5SM33170RC
	100	80		5SM14170RC	5SM34170RC
	300	80		5SM16170RC	5SM36170RC
4 Pole	30	25	4	5SM13420RC	5SM33420RC
	100	25		5SM14420RC	5SM34420RC
	300	25		5SM16420RC	5SM36420RC
	30	40		5SM13440RC	5SM33440RC
	100	40		5SM14440RC	5SM34440RC
	300	40		5SM16440RC	5SM36440RC
	30	63		5SM13460RC	5SM33460RC
	100	63		5SM14460RC	5SM34460RC
	300	63		5SM16460RC	5SM36460RC
	30	80		5SM13470RC	5SM33470RC
	300	80		5SM16470RC	5SM36470RC

## Type A

	Rated Residual Current In (mA)	Rated Current In (A)	MW *	Existing Type	New Type
2 Pole	30	25	2	5SM13126RC	5SM33126RC
	300	25		5SM16126RC	5SM36126RC
	30	40		5SM13146RC	5SM33146RC
	300	40		5SM16146RC	5SM36146RC
	30	63	2.5	5SM13166RC	5SM33166RC
	300	63		5SM16166RC	5SM36166RC
	30	80		5SM13176RC	5SM33176RC
	300	80		5SM16176RC	5SM36176RC
4 Pole	30	25	4	5SM13426RC	5SM33426RC
	300	25		5SM16426RC	5SM36426RC
	30	40		5SM13446RC	5SM33446RC
	300	40		5SM16446RC	5SM36446RC
	30	63		5SM13466RC	5SM33466RC
	300	63		5SM16466RC	5SM36466RC
	30	80		5SM13476RC	5SM33476RC
	300	80		5SM16476RC	5SM36476RC



**Warning:**

Hazardous Voltage can cause Electric Shock and burns.  
Disconnect Power before proceeding with any work on this equipment

## Disposal

Siemens Products are environment friendly, which predominantly consist of recyclable materials.  
For disposal we recommend disassembling and separation into following materials:

**METALS :** Segregate into Ferrous & Non Ferrous types for recycling through authorised dealer.

**PLASTICS :** Segregate as per material type for recycling through authorised dealer.

Because of the long lifetime of Siemens products the disposal guidelines may be replaced by other national regulations when taking the product out of service.

The local customer care service is available at any time to answer disposal-related questions

# Residual Current Circuit Breakers

## Additional Components

### Benefits:

- An auxiliary circuit switch can be fitted to the right-hand side of the RCCB casing by the customer
- Mounting with factory-fitted brackets
- Ideal for installation in flat distribution boards

### Application:

- Remote indications of the circuit state of the RCCB: ON/OFF
- Short-circuit protection ensured by miniature circuit-breakers of C characteristic with  $I_n = 6\text{ A}$  or fuse gL 6 A
- Product standards: IEC/EN 62019 (VDE 0640).

### Technical specifications:

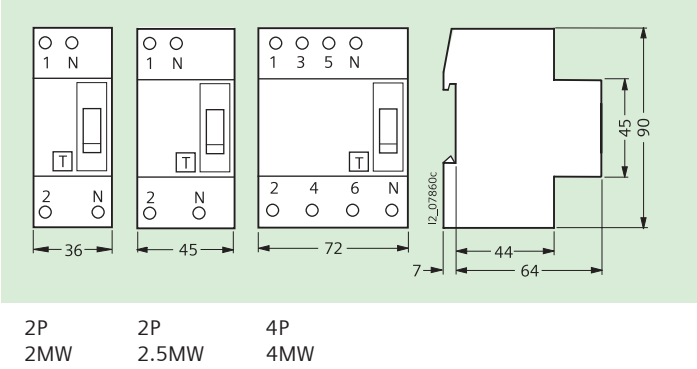
		5SW3300	5SW3330
<b>Terminals</b>	• Conductor cross section	0.75 ... 2.5	0.75 ... 2.5
	• Recommended tightening torque	0.6 ... 0.8	0.6 ... 0.8
<b>Min. contact load</b>		50 mA/24 V	50 mA/24 V
<b>Max. contact load</b>	• 230 V AC, AC-12	6	5
	• 230 V AC, AC-14	3.6	–
	• 220 V DC, DC-12	1	0.5

### Selection and ordering data:

	Circuit diagram	Version	MW	Order No.	Weight 1 item kg	PS*/ P. unit Items
	<b>Auxiliary switches (AS)</b> For 5SM3 RCCBs upto 80A 	1 NO + 1 NC	0.5	<b>5SW3300</b>	0.042	1
	<b>Auxiliary switches (AS)</b> For 5SM3 RCCBs 100 ... 125A 	1 NO + 1 NC	0.5	<b>5SW3330</b>	0.040	1

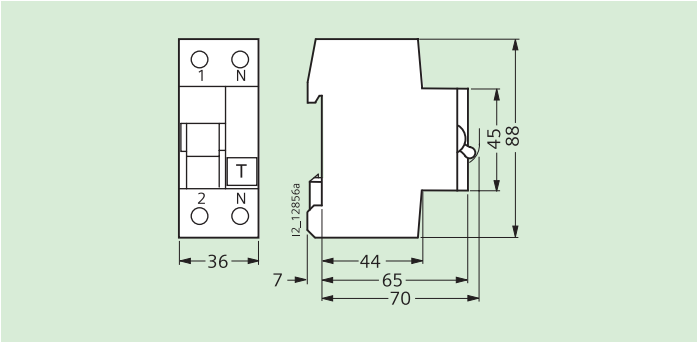
1 MW = 18 mm

RCCB up to 80 A

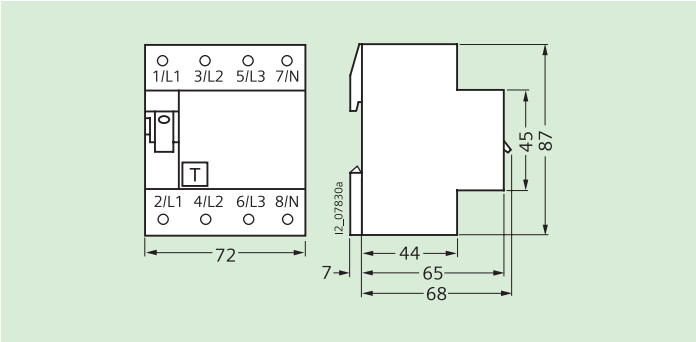


MW = 2	MW = 2.5	MW = 4
25A/2P	63A/2P	25A/4P
40A/2P	80A/2P	40A/4P
		63A/4P
		80A/4P

RCCBs 100 and 125 A



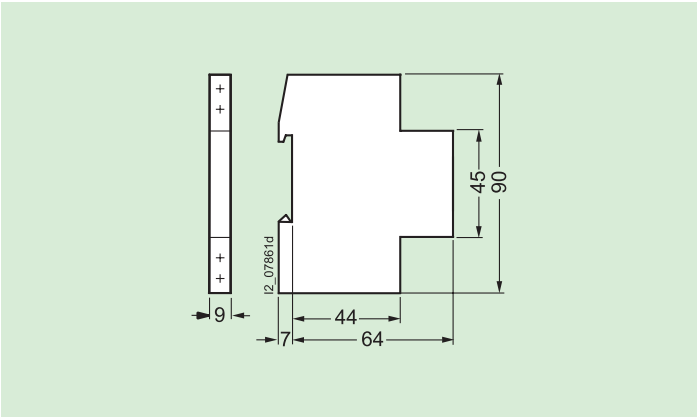
2P, 2 MW



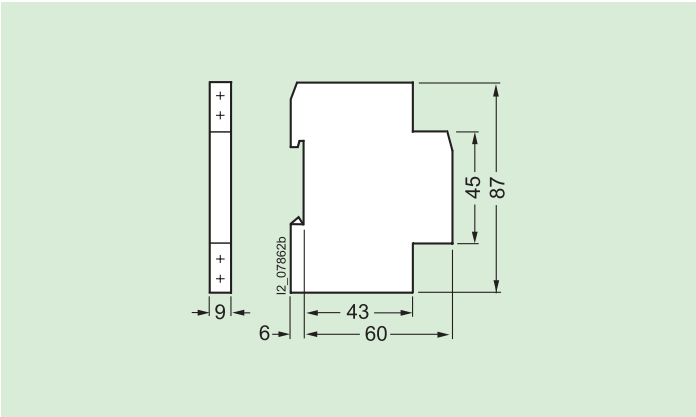
4P, 4 MW

5SW3 auxiliary circuit switches, can now be retrofitted at site

Auxiliary switches (AS)  
for RCCBs for 5SM3 up to 80 A



Auxiliary switches (AS)  
for RCCBs for 5SM3, 100A, 125A, 3P+N



# 3

## Minigard Distribution Board

- 3/2 Design, Construction & Features
- 3/4 Product Overview
- 3/7 Accessories for DBs
- 3/8 Dimensions
- 3/14 Wiring Instructions

**Slim, sleek and stylish**



## Design, Construction &amp; Features

**Design:**

Minigard Distribution Boards in sheet steel and thermoplastic have been specifically designed, keeping in view the interiors of modern day houses and commercial establishments.

**Installation:**

Adequate numbers of knock-out detachable plates of various sizes are provided both at the top and at the bottom. This enables easy installation and connection of conduits of all sizes.

In case of double door design, a specially designed hinge enables the door to be opened up to 120° for total ease of operation. During wiring/ installation, the door along with the intermediate plate can be completely removed if required.

For total ease of operation, the door is secured to the housing by means of a magnetic latch. Only a slight pull opens the door.

**Construction:**

The Distribution Boards are manufactured, with precision, out of extra thick, high quality CRCA steel sheets for lasting strength and fine finish. IP 20/IP 42 protection shall be offered for single door and double door execution respectively. All DBs are manufactured with 16/18/20SWG. The Distribution Boards are supplied duly fitted with DIN-channel, neutral links, busbars and connecting wires.

**Finish:**

The Distribution Boards have been treated with premier quality powder coating using latest techniques. The enclosures are subjected to the seven tank process to ensure smooth finish and protection against corrosive atmosphere.

**Double Door Concept for Aesthetic and Safety:**

To ensure total safety, an intermediate plate has been introduced so that even when the door is opened, no live parts are exposed. The door is earthed through a copper braid, for total safety.

**Features at a glance:**

- Removable knockout plate at the top and bottom side with sufficient knockout holes.
- Attractive styling and finish matches any decor in houses, flats or offices.

- Fully removable assembly enables quick installation and improves access for ease of cabling.
- Latest powder coated techniques prevent corrosion and is scratch resistant.
- Shorting Links/Busbar made up of Tinned Electrolytic Copper to accept Minigard MCBs, RCCBs and Isolators.
- Brass neutral links accepts cable termination up to 16 sq.mm.
- Effective earthing of DB body with two earthing terminals. Earthing of the door with the help of Copper Braid.
- Can accommodate 5SQ, 5SX, 5SJ, 5SP MCBs & 5SM, 5SU RCDs and complete range of modular devices.

**Slim, Sleek and Stylish:**

**Slim:** Lowest depth which fits into single brick wall.

**Sleek:** Vertical design distribution board which can be fitted in just 250mm width area.

**Stylish:** Aesthetically designed distribution boards that blends with all interiors.

**Minigard MB (SPN Row version DBs):**

Minigard MB distribution boards have been made from special EDD (extra deep drawing) quality steel for better strength. The attractive convex shape design has been achieved by innovative deep drawn technology.

**Installation:**

These distribution boards are provided with adequately easy removable knockouts, enabling easy installation & connection of conduits of all sizes for top & bottom entry of cable.

A unique top hung flap type door design shall facilitate easy removal of door for accessing the components. A 15 deg correction factor is possible at the concealed U-box of distribution boards if the same is not installed properly.

**4 in 1 concept:**

1. Shock proof ABS enclosure
2. 6/16A 3pin Delta vega socket with safety shutter
3. Over load and short circuit protection for connected equipment and cables
4. Power ON indication to indicate status of equipment

## Design, Construction & Features

### Design and construction:

Electrical equipment makes an important contribution to the amenities in terms of aesthetic look, apart from protecting electrical equipments.

In certain cases, the effect of these amenities are perceived directly. e.g.: matching decor with elegant Air conditioner in residence.

Siemens Minigard 4 in 1 protective devices are made in completely ABS material which is non-corrosive and shock proof.

The flush design of 4 in 1 comes with sheet steel base (which goes in side the wall) and thermoplastic aesthetic front cover with 16A IP/2P MCB with 6/16A socket and 25A IP/2P MCB with 25A socket depending on the configuration you select.

### Installation:

Minigard 4 in 1 protective device are available in flush as well as surface mounting versions.

All versions of 4 in 1 are supplied with factory fitted and calibrated MCB of 16A SP or DP and pre wired which eventually in ready to use condition. However depending on the application the rating of MCBs has to be selected. The recommendations are given below for selecting the right MCB for right appliances.

Appliance	Capacity (Watts)	MCB current ratings (Amps)
Iron	1200	6
Mixer/Juicer	200	2
Microwave oven	750	6
Hot plate	2000	10
Electrical kettle	1500	10
T.V./VCR/Audio system	200	2
Refrigerator 165 liters	400	2
Refrigerator 350 liters	750	4
Geyser	1000	10
	2000	16
	3000	20
Air conditioners 1 ton	1500	10
1.5 ton	2500	16
2.5 ton	3500	20

Please calculate using actual wattages, if one or two equipments are clubbed.

Due to elegant look and compact design these products are highly recommended for following home appliances.

1. Air conditioners
2. Geysers
3. Kitchen equipment like refrigerators, micro ovens, water filters
4. Washing machine

Apart from residential equipment protection these devices are also can safely used to protect following expensive equipments in commercial segment.

1. Hospital equipment
2. Studio equipment
3. Commercial shops
4. Multiplexes and shopping malls

### Unique features:

1. Socket life of 4in1 is enhanced since the making / breaking of circuit is done by MCB which has a built-in arc quenching mechanism.
2. Total safety due to thermo plastic design and ideal for installations in bathrooms, kitchen and club houses etc.
3. The aesthetic ivory white ABS enclosure matches all kind of decor.
4. Built-in C characteristic MCB will guard both resistive (lighting) and inductive (air conditioners) loads against overload and short circuits.

## Product Overview

## Minigard Distribution Boards - 8GB0/8GB1

Item Description		Incoming Slots	Outgoing Slots	Total Slots	Reference No.	Std Pkg Nos.
<b>Plastic Enclosure, IP20 :</b>						
	1/2 Way	—	—	2	8GB0002	1/100
	3/4 Way	—	—	4	8GB0004	1/50
	6 Way	—	—	6	8GB0006	1/25
<b>Retail Segment SPN Single Door DBs, IP20 :</b>						
	1/2 Way	—	—	2	■ 8GB0101	1/50
	3/4 Way	—	—	4	■ 8GB0103	1/50
	4 Way	—	—	4	8GB0104	1/20
	6 Way	—	—	6	8GB0106	1/20
	8 Way	—	—	8	■ 8GB0108	1/20
	10 Way	—	—	10	■ 8GB0110	1/20
	12 Way	—	—	12	■ 8GB0112	1/20
	16 Way	—	—	16	8GB0116	1/10
<b>Double Door SPN DBs, IP42 :</b>						
	4 Way	2	4	6	8GB0204RC	1/20
	6 Way	2	6	8	■ 8GB0206RC	1/15
	8 Way	2	8	10	■ 8GB0208RC	1/15
	12 Way	2	12	14	■ 8GB0212RC	1/10
	14 Way	2	14	16	8GB0214RC	1/10
<b>Minigard MB (Ivory White) :</b>						
	1Row, 6Mod	2	4	6	8GB31810RC01	1/10
	1Row, 8Mod	2	6	8	■ 8GB31811RC01	1/10
	1Row, 10Mod	2	8	10	■ 8GB31812RC01	1/10
	1Row, 12Mod	2	10	12	8GB31813RC01	1/10
	1Row, 14Mod	2	12	14	■ 8GB31814RC01	1/10
	1Row, 16Mod	2	14	16	8GB31815RC01	1/10
<b>Minigard MB (Metallic Grey) :</b>						
	1Row, 6Mod	2	4	6	8GB31810RC02	1/10
	1Row, 8Mod	2	6	8	8GB31811RC02	1/10
	1Row, 10Mod	2	8	10	8GB31812RC02	1/10
	1Row, 12Mod	2	10	12	8GB31813RC02	1/10
	1Row, 14Mod	2	12	14	8GB31814RC02	1/10
	1Row, 16Mod	2	14	16	8GB31815RC02	1/10
<b>Minigard MB (Metallic Carbon) :</b>						
	1Row, 6Mod	2	4	6	8GB31810RC03	1/10
	1Row, 8Mod	2	6	8	8GB31811RC03	1/10
	1Row, 10Mod	2	8	10	8GB31812RC03	1/10
	1Row, 12Mod	2	10	12	8GB31813RC03	1/10
	1Row, 14Mod	2	12	14	8GB31814RC03	1/10
	1Row, 16Mod	2	14	16	8GB31815RC03	1/10

Note:







■ Stock Items

# 1MW (Module Width) = 18mm

# Minigard Distribution Board

## Product Overview

### Minigard Distribution Boards - 8GB0/8GB1





Item Description		Incoming Slots	Outgoing Slots	Total Slots	Reference No.	Std Pkg Nos.
Single Door TPN DBs (Horizontal), IP20 :						
	4 Way	8	12	20	■ 8GB0804	1/5
	6 Way	8	18	26	8GB0806	1/5
	8 Way	8	24	32	8GB0808	1/5
	12 Way	8	36	44	8GB0812	1/5
Double Door TPN DBs (Horizontal), IP42 :						
	4 Way	8	12	20	■ 8GB0404HRC	1
	6 Way	8	18	26	8GB0406HRC	1
	8 Way	8	24	32	■ 8GB0408HRC	1
	12 Way	8	36	44	8GB0412HRC	1
Double Door TPN DBs (Vertical), IP42 :						
	4 Way	8	12	20	8GB0404VRC	1/5
	6 Way	8	18	26	8GB0406VRC	1/5
	8 Way	8	24	32	8GB0408VRC	1/5
	12 Way	8	36	44	8GB0412VRC	1/5
Double Door, Per Phase Isolation TPN DBs (Horizontal), IP42 :						
	4 Way	8	18	26	8GB0405HRC	1
	6 Way	8	24	32	■ 8GB0407HRC	1
	8 Way	8	30	38	■ 8GB0409HRC	1
	12 Way	8	42	50	8GB0413HRC	1
Double Door, Per Phase Isolation TPN DBs (Vertical), IP42 :						
	4 Way	8	18	26	8GB0405VRC	1/5
	6 Way	8	24	32	8GB0407VRC	1/5
	8 Way	8	30	38	8GB0409VRC	1/5
	12 Way	8	42	50	8GB0413VRC	1/5
Double Door, Phase Segregated TPN DBs (7 segment), IP42 :						
	4 Way	12	12+12	36	8GB0504	1
	6 Way	12	12+18	42	■ 8GB0506	1
	8 Way	12	12+24	48	■ 8GB0508	1
	12 Way	12	12+36	60	8GB0512	1

Note:

■ Stock Items

# 1MW (Module Width) = 18mm

## Product Overview

Item Description		Incoming Slots	Outgoing Slots	Total Slots	Reference No.	Std Pkg Nos.
<b>Plug &amp; Socket, IP20 with provision for MCB mounting :</b>						
 	1Phase 20A, 1P MCB	—	—	1	■ 8GB0501RC	1/20
	1Phase 20A, 2P MCB	—	—	2	■ 8GB0501SRC	1/20
	3Phase 32A, 3P MCB	—	—	3	■ 8GB0502	1/15
	3Phase 32A, 3P+N MCB	—	—	4	8GB0502S	1/15
	5 Pin (3P+N+PE) 3Phase 32A MCB	—	—	8	■ 8GB050332	1/5
	5 Pin (3P+N+PE) 3Phase 63A MCB	—	—	8	8GB050363	1/5
<b>4in1 Appliance Protector pre wired, IP20 with factory fitted MCB :</b>						
<b>Flush Mounting</b>						
	4in1, FM with 16A, 1P MCB and 6/16A socket	—	—	1	■ 8GB11611RC	1/20
	4in1, FM with 16A, 2P MCB and 6/16A socket	—	—	2	8GB11612RC	1/20
	4in1, FM with 25A, 1P MCB and 25A socket	—	—	1	■ 8GB11621RC	1/20
	4in1, FM with 25A, 2P MCB and 25A socket	—	—	2	8GB11622RC	1/20
<b>Surface Mounting</b>						
	4in1, SM with 16A, 1P MCB and 6/16A socket	—	—	1	■ 8GB13611RC	1/20
	4in1, SM with 16A, 2P MCB and 6/16A socket	—	—	2	8GB13612RC	1/20
	4in1, SM with 25A, 1P MCB and 25A socket	—	—	1	8GB13621RC	1/20
	4in1, SM with 25A, 2P MCB and 25A socket	—	—	2	8GB13622RC	1/20

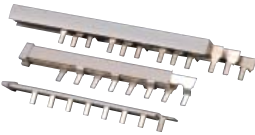





Note:

# 1MW (Module Width) = 18mm

# Minigard Distribution Board

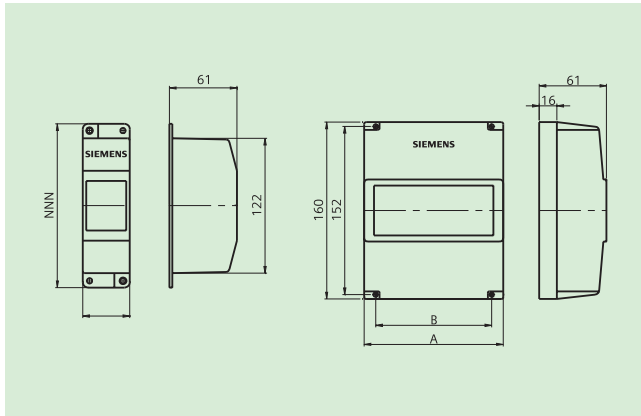
## Accessories

### Accessories for Distribution Boards (Minigard/Betagard DBs)

Item Description		Reference No.	Std. Pkg. (Nos.)
<b>Blanking Plate :</b>			
	1 MW	8GB9901	25
	1.5 MW	8GB9902	25
<b>Insulated Shorting Links :</b>			
<b>Single Phase (Bend design) for shorting 1P MCBs in SPN DBs</b>			
	4 Way	8GB9904LSP	10
	6 Way	8GB9906LSP	10
	8 Way	8GB9908LSP	10
	10 Way	8GB9910LSP	10
	12 Way	8GB9912LSP	10
	14 Way	8GB9914LSP	10
	16 Way	8GB9916LSP	10
<b>Single Phase (Hole at last Tooth) for shorting 1P MCBs in TPN DBs</b>			
	4 Way	8GB9905LSP	10
	6 Way	8GB9907LSP	10
	8 Way	8GB9909LSP	10
	10 Way	8GB9911LSP	10
	12 Way	8GB9913LSP	10
	14 Way	8GB9915LSP	10
	16 Way	8GB9917LSP	10
<b>Two Phase for shorting 2P MCBs</b>			
	4 Way	8GB9904LDP	5
	6 Way	8GB9906LDP	5
	8 Way	8GB9908LDP	5
<b>Three Phase for shorting 3P MCBs</b>			
	4 Way	8GB9904LTP	5
	6 Way	8GB9906LTP	5
	8 Way	8GB9908LTP	5
<b>Three Phase Neutral</b>			
	4 Way	8GB9904LTPN	5
	6 Way	8GB9906LTPN	5
	8 Way	8GB9908LTPN	5
<b>Neutral Terminal :</b>			
	N terminal for 4Way circuit	8GB9904SNPE	10
	N terminal for 6Way circuit	8GB9906SNPE	10
	N terminal for 8Way circuit	8GB9908SNPE	10
	N terminal for 12Way circuit	8GB9912SNPE	10
	N terminal for 14Way circuit	8GB9914SNPE	10

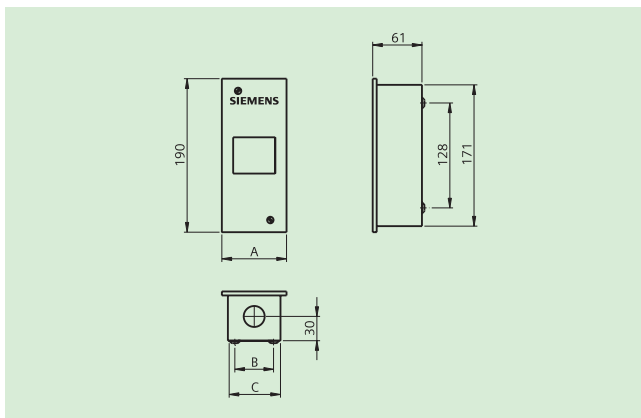
## Dimensions

## Plastic Enclosure (8GB000)



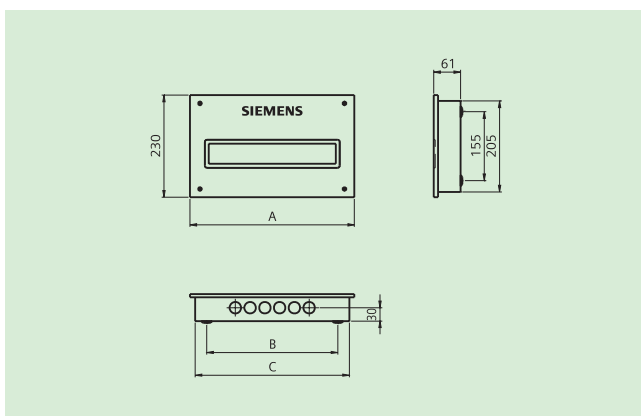
Model	A	B
8GB0002	40	30
8GB0004	90	80
8GB0006	126	105

## Sheet Steel Enclosure (8GB010)



Model	A	B	C	Knock out Per side (Top & Bottom) Ø26
8GB0101	85	35	70	1
8GB0103	105	55	90	2

## SD SPN Consumer DB (8GB01)



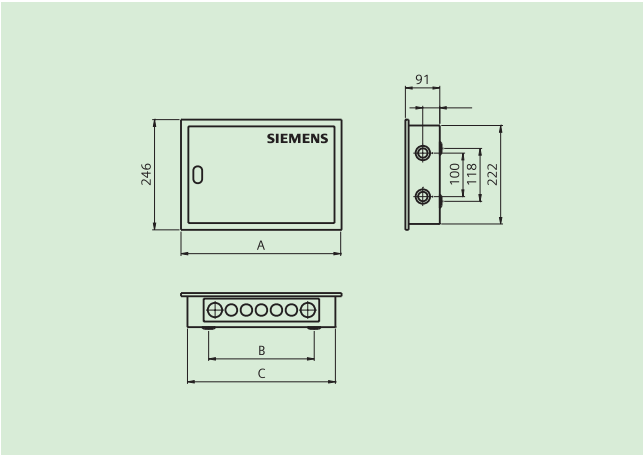
Model	A	B	C	Knock out Per side (Top & Bottom) Ø26
8GB0104	157	82	132	2
8GB0106	193	118	168	3
8GB0108	229	154	204	3
8GB0110	265	190	240	4
8GB0112	301	226	276	5
8GB0116	373	298	348	6

Dimensions (mm)

Minigard Distribution Board

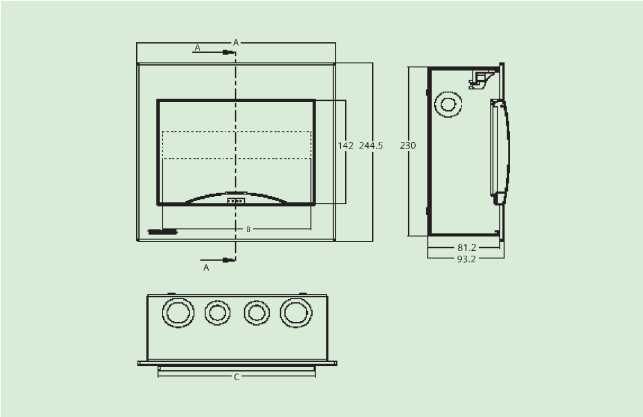
Dimensions

DD SPN DB (8GB02)



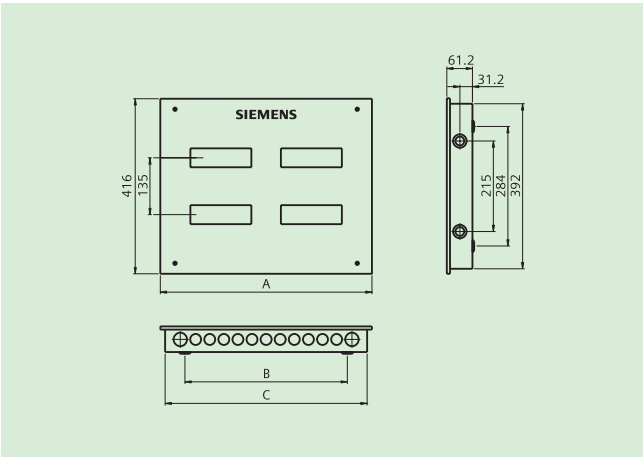
Model	A	B	C	Knock out		
				Per side (Top & Bottom)		Per side flap Ø32 & Ø20
				K/O Ø32	K/O Ø26	
8GB0204RC	216	118	188	2	1	2
8GB0206RC	252	154	224	2	2	2
8GB0208RC	288	160	260	2	3	2
8GB0212RC	360	232	332	2	4	2
8GB0214RC	396	268	368	2	5	2

Minigard MB



Model	A	B	C	Knock out Per side (Top & Bottom)	
				Ø32	Ø40
8GB31810RC..	253	108	200	2	2
8GB31811RC..	253	144	200	2	2
8GB31812RC..	325	180	272	3	2
8GB31813RC..	325	216	272	3	2
8GB31814RC..	397	252	344	5	2
8GB31815RC..	397	288	344	5	2

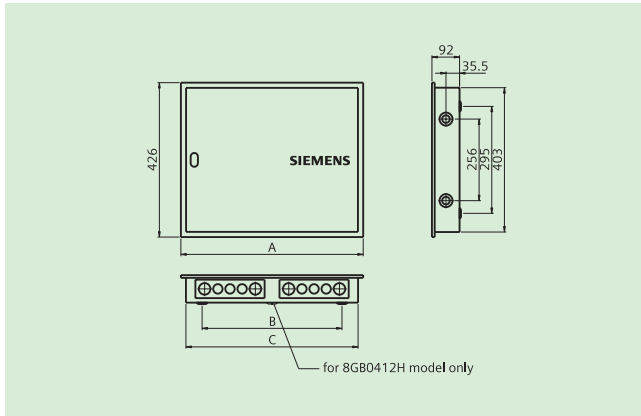
SD TPN Horizontal DB (8GB08)



Model	A	B	C	Knock out		
				Per side (Top & Bottom)		Per side flap Ø32 & Ø21
				Ø32	Ø26	
8GB0804	379	258	355	2	7	2
8GB0806	379	258	355	2	7	2
8GB0808	504	387	480	2	11	2
8GB0812	649	520	625	2	15	2

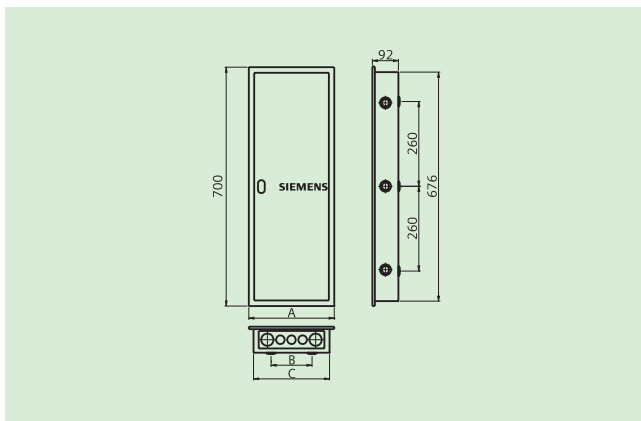
## Dimensions

## DD TPN Horizontal DB (8GB04 HRC)



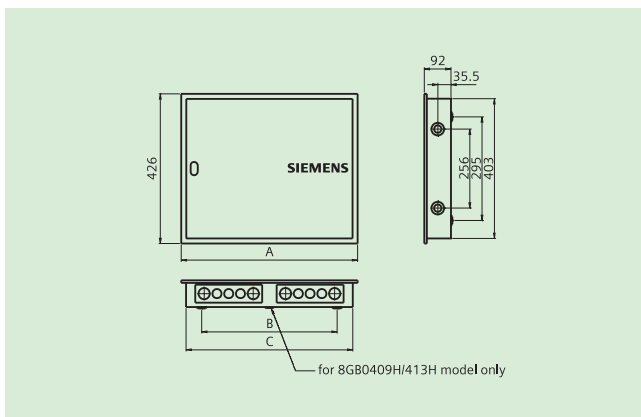
Model	A	B	C	Knock out		
				Per side (Top & Bottom)		Per side flap Ø32 & Ø21
				Ø32	Ø26	
8GB0404HRC	382	258	356	2	5	2
8GB0406HRC	382	258	356	2	5	2
8GB0408HRC	503	386	477	4	6	2
8GB0412HRC	650	520	624	4	8	2

## DD TPN Vertical DB (8GB04 VRC)



Model	A	B	C	Knock out		
				Per side (Top & Bottom)		Per side flap Ø32 & Ø21
				Ø32	Ø26	
8GB0404VRC	250	120	224	2	3	3
8GB0406VRC	250	120	224	2	3	3
8GB0408VRC	286	155	260	2	3	3
8GB0412VRC	358	228	332	2	5	3

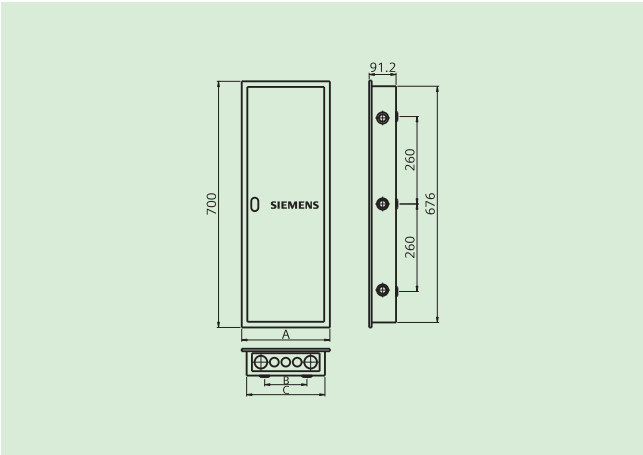
## DD TPN Horizontal per Phase Neutral Link DB (8GB04 HRC)



Model	A	B	C	Knock out		
				Per side (Top & Bottom)		Per side flap Ø32 & Ø21
				Ø32	Ø26	
8GB0405HRC	382	258	356	2	5	2
8GB0407HRC	503	386	477	4	6	2
8GB0409HRC	503	386	477	4	8	2
8GB0413HRC	650	520	624	4	8	2

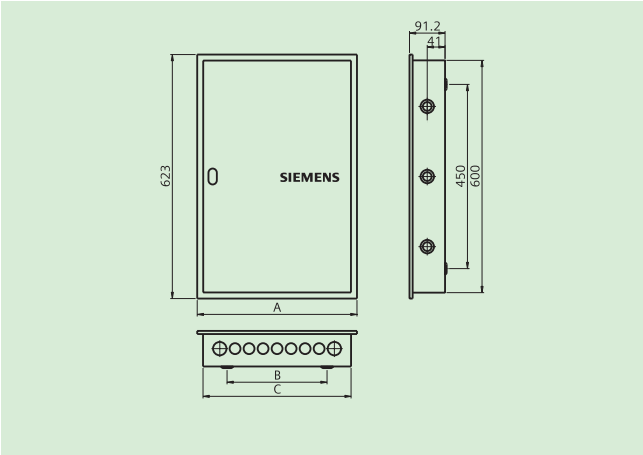
Dimensions

DD TPN Vertical per Phase Neutral Link DB (8GB04 VRC)



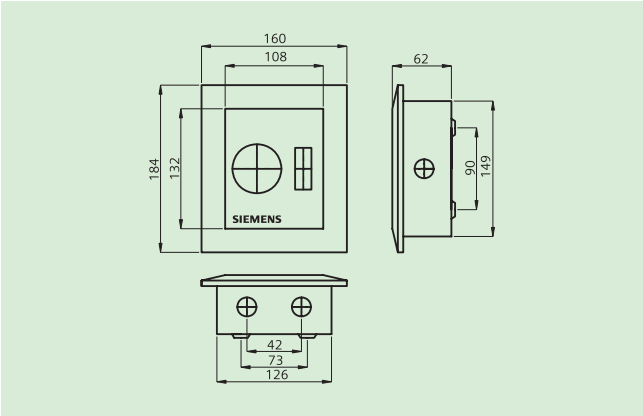
Model	A	B	C	Knock out		
				Per side (Top & Bottom)		Per side flap Ø32 & Ø21
				Ø32	Ø26	
8GB0405VRC	286	155	260	2	3	3
8GB0407VRC	286	155	260	2	3	3
8GB0409VRC	358	228	332	2	5	3
8GB0413VRC	412	282	386	2	5	3

DD Phase Segregated 7 Segment TPN DB (8GB05)



Model	A	B	C	Knock out		
				Per side (Top & Bottom)		Per side flap Ø32 & Ø21
				Ø32	Ø26	
8GB0504	451	324	424	-	6	3
8GB0506	559	432	532	-	6	3
8GB0508	667	540	640	-	6	3
8GB0512	883	756	856	-	6	3

Single Phase Plug and Socket (8GB0501)

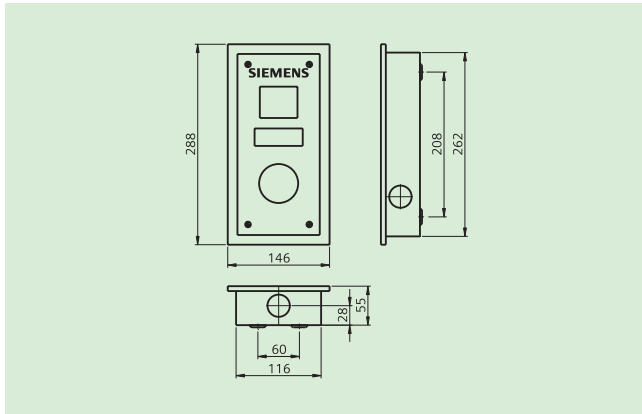


Model	Cutout Width
8GB0501RC	18
8GB0501SRC	36

- \* 2 Pin Plug
- 2 Knock outs of Ø21 on Top & Bottom
- 1 Knock out of Ø21 on per Side flap

## Dimensions

### Three Phase Plug and Socket (8GB0502)



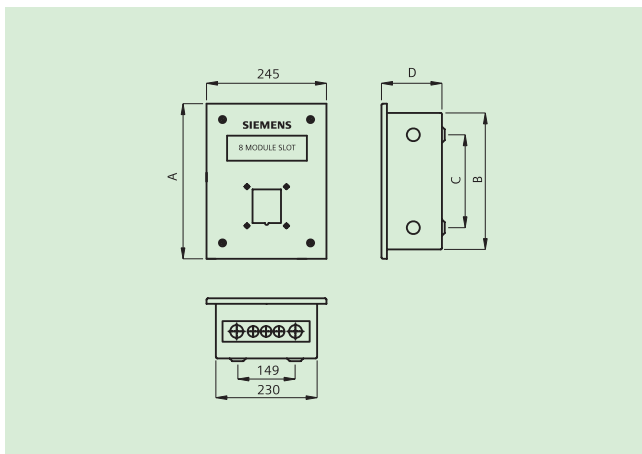
Model	Cutout Width
8GB0502RC	54
8GB0502SRC	72

\* 3 Pin Plug

1 Knock outs of Ø32 on Top & Bottom

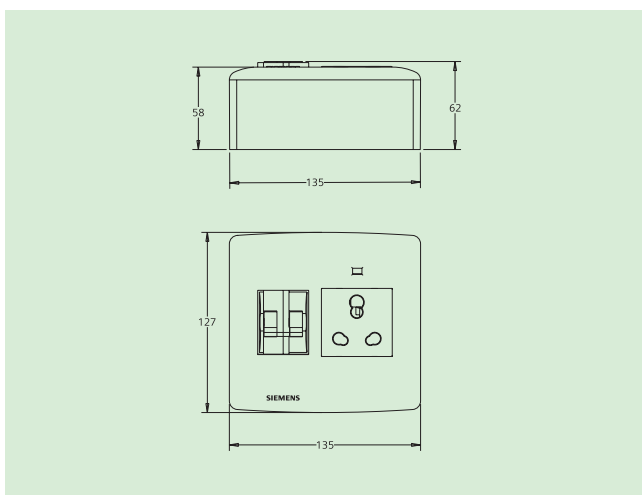
1 Knock out of Ø32 on per Side flap

### 5 Pin Three Phase+N+PE Industrial Plug and Socket (8GB0503)

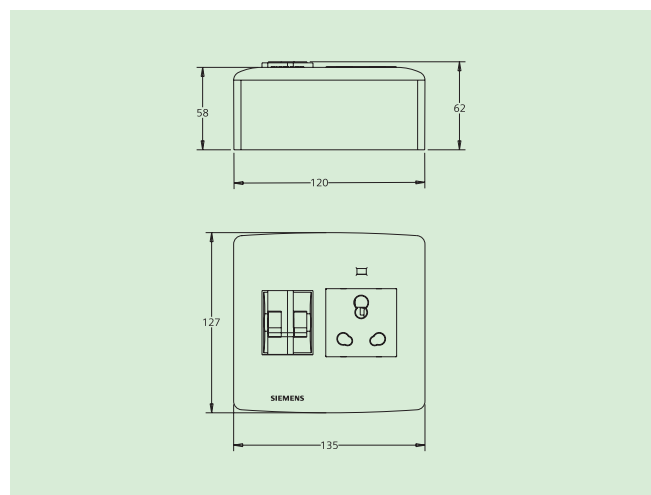


Model	A	B	C	D
8GB050332	265	247	182	91.5
8GB050363	290	272	207	121.5

### Minigard 4in1



Surface mounting

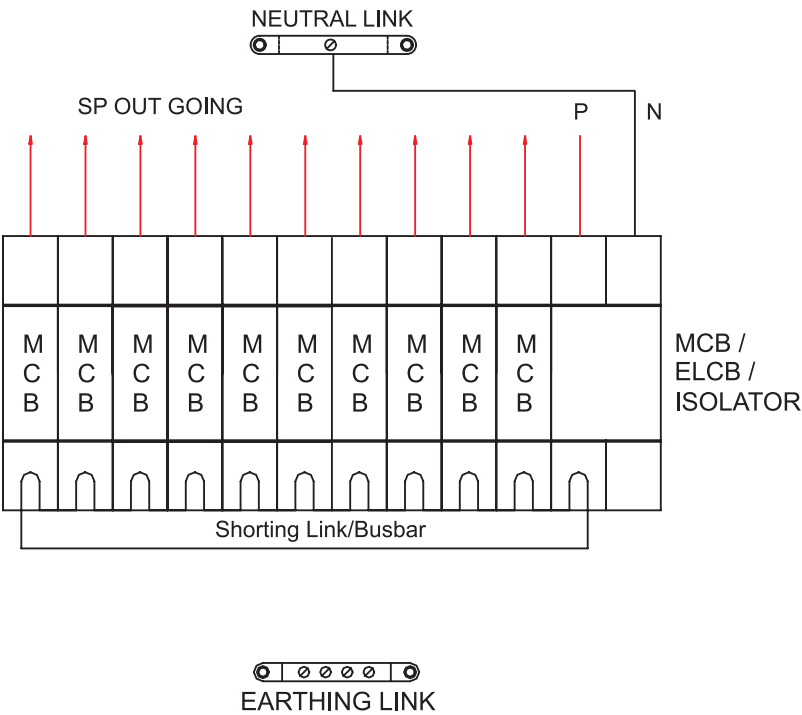


Flush / Concealed mounting

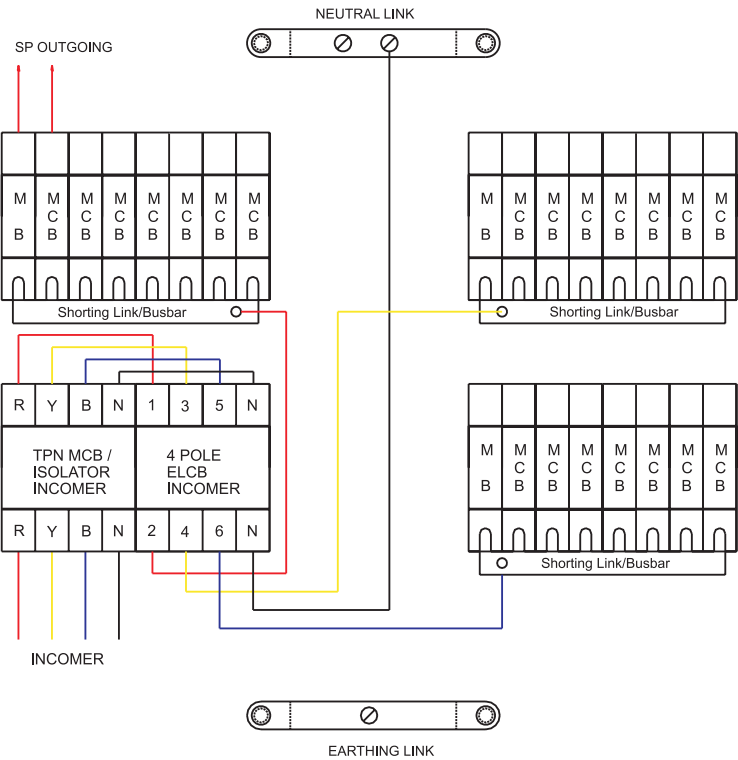
Dimensions (mm)

Wiring Instructions

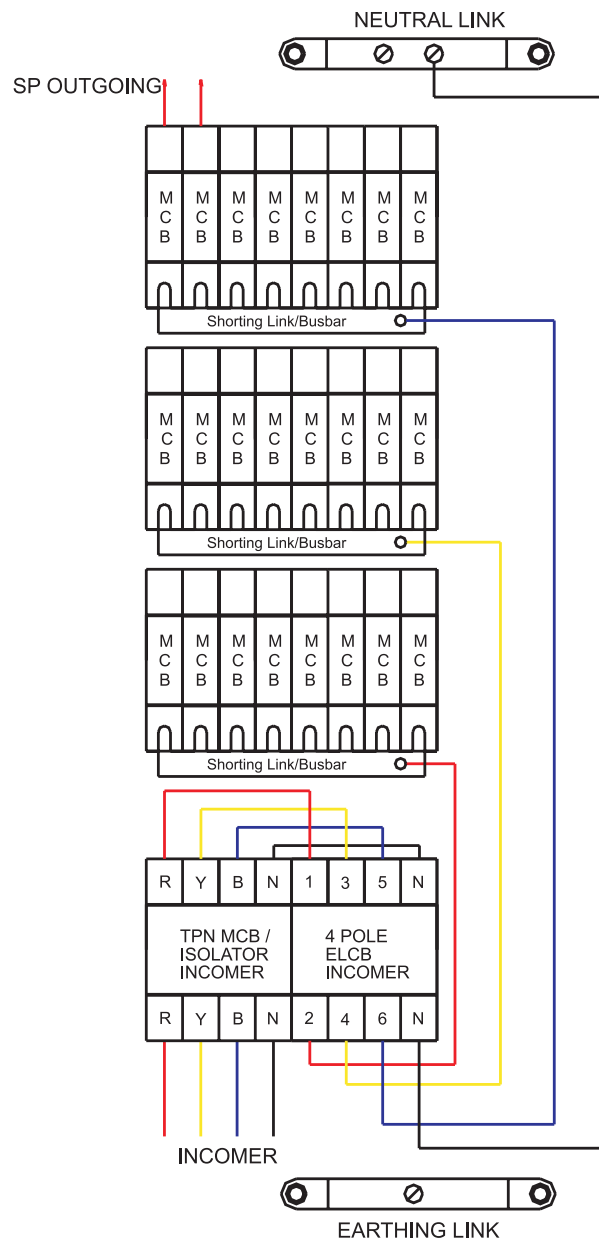
Single Phase Neutral DBs



Three Phase Neutral DBs (Horizontal)

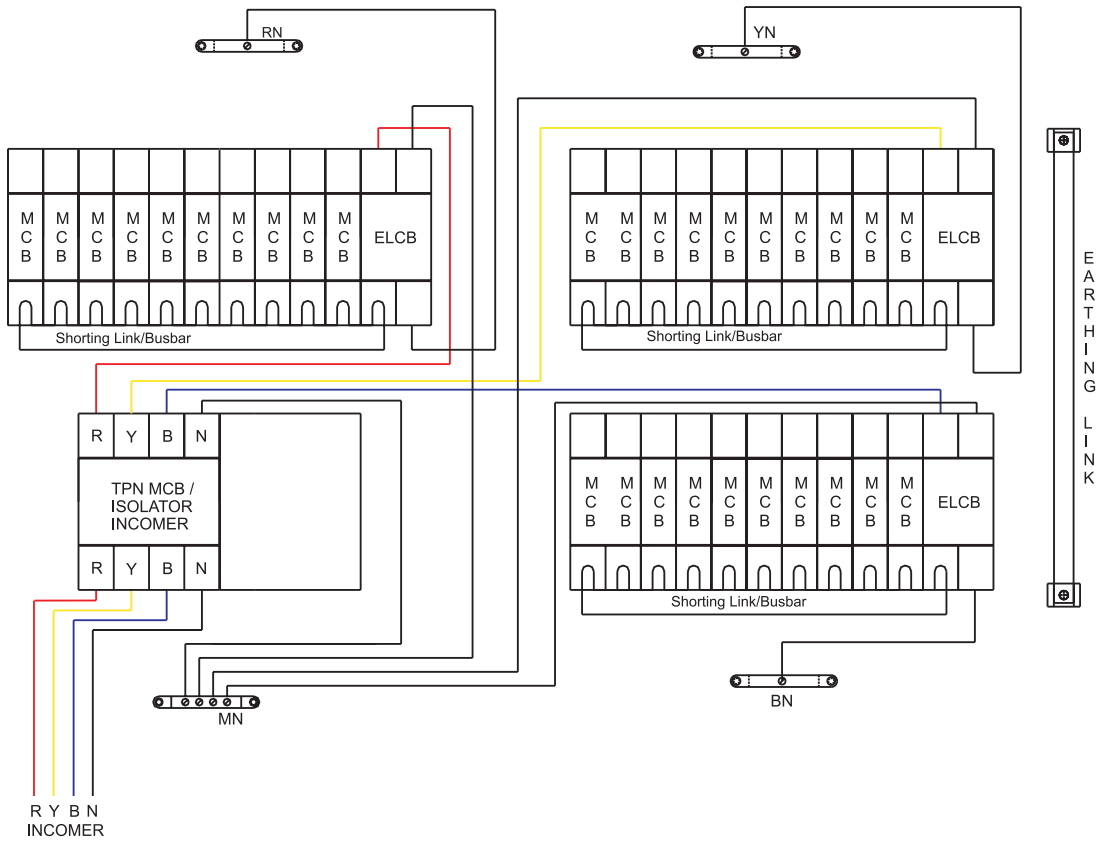


## Three Phase Neutral DBs (Vertical)

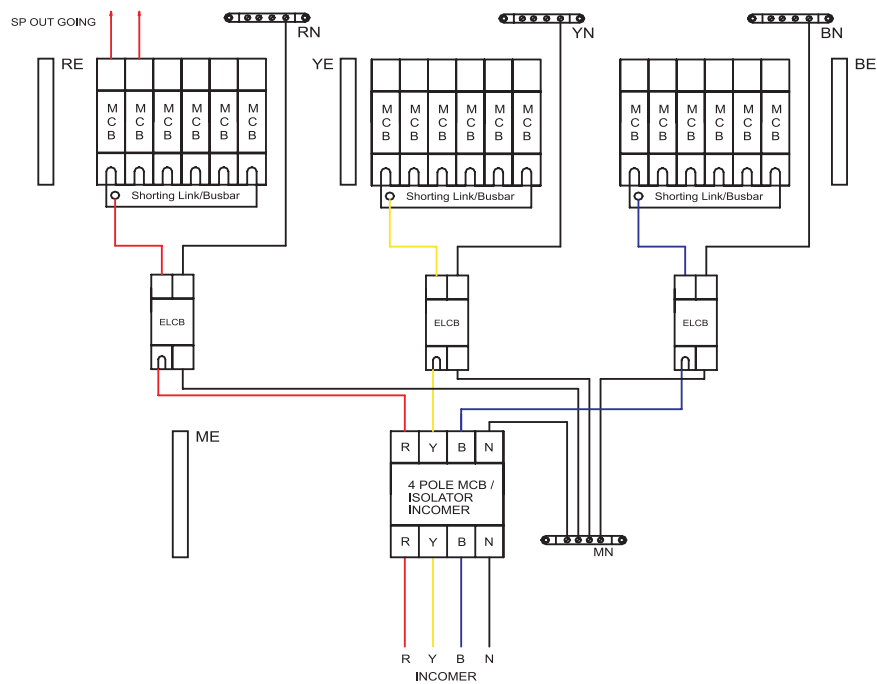


Wiring Instructions

Per Phase Isolation TPN DB



Seven Segment Three Phase Neutral DBs



## Notes

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