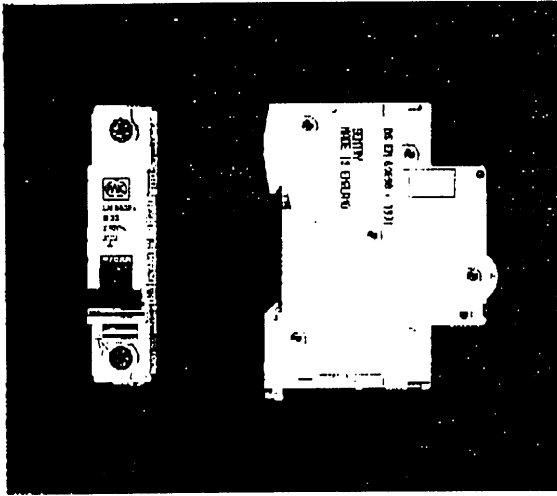


# Miniature Circuit Breakers (MCBs)

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## MCB product range

Type B Single pole	Rating	Type C Single pole	Rating
S903s	3A	8703s	3A
S906s	6A	8706s	6A
S910s	10A	8710s	10A
S916s	16A	8716s	16A
S920s	20A	8720s	20A
S932s	32A	8732s	32A
S940s	40A	8740s	40A
S945s	45A	-	-
S950s	50A	8750s	50A
5567s	Retrofit kit		

## Standards and approvals

All Sentry range of current limiting MCBs is designed to fully comply with the relevant requirements of BS EN 60898: 1995.

The MCBs feature positive contact status indication in accordance with 16th edition IEE Wiring Regulations (537-02-03 and 537-03-02).

## Description

Sentry MCBs are of the thermo-magnetic, current limiting type and are available with either Type B or Type C operating characteristics.

The operating dolly may be locked in either the ON or OFF position without affecting the ability of the trip mechanism to operate. The contacts themselves are manufactured from carefully chosen materials, selected specifically for their low electrical resistance and low propensity to weld under fault conditions.

## Positive contact status indication

When the green portion of the dolly is visible, then a contact gap of 4 mm has been achieved. Sentry MCBs may therefore be used as single pole isolating switches where appropriate.

## Features

- Meet BS EN and IEE Wiring Regulation requirements
- 'Trip-free' mechanism
- Positive contact status indication
- Tunnel type, touch-proof, captive terminals
- Generous terminal capacity
- Can be used as single pole isolating switch

## Terminals

The Sentry MCB features tunnel terminals of generous capacity, with 25 mm<sup>2</sup> on ratings up to and including 20A, and 35 mm<sup>2</sup> on all ratings 32A and above. The terminal screws are touch proof to IP2X, captive and feature combination heads. Sealable terminal shields (5595s) are available as an option should full shrouding of screw heads be required.

## Retrofit kit 5567s

The Sentry MCB retrofit kit is designed for use when installing MCBs into old Sentry Consumer Units. The kit contains a busbar extension terminal (5562s), a 100A rated cable and a 25 mm<sup>2</sup> capacity spade connector terminal with clamp screw. It may be used to fit up to 3 new Sentry MCBs. If more need to be installed, then use the MK 5511s busbar with kit.

## Modes of operation

The mechanism of the Sentry MCB has been carefully designed and engineered using thermal and magnetic elements to detect overcurrents due to both overload and fault currents. The MCB will operate and interrupt the supply to prevent damage to the installation.

The thermal component is a carefully calibrated, thermally operated bi-metal element.

Larger overloads and fault current situations are dealt with using the magnetic tripping mode of the MCB. This acts very quickly, overriding the thermal operation.

BS EN 60898 requires the tripping to occur within 100 milliseconds and the design of the Sentry MCB allows fault currents of up to 6 000A (M6) to be safely interrupted well within this time scale.

## Operating characteristics

### TYPE B

The magnetic operating limits are between 3 and 5 times the current rating of the MCB. Under these conditions the mechanism of a 10A MCB will operate between 30A and 50A in an overcurrent situation

### TYPE C

In the case of Type C MCBs, the magnetic operating limits are between 5 and 10 times the current rating of the MCB. Under these conditions the mechanism of a 10A MCB will operate between 70A and 100A in an overcurrent situation.

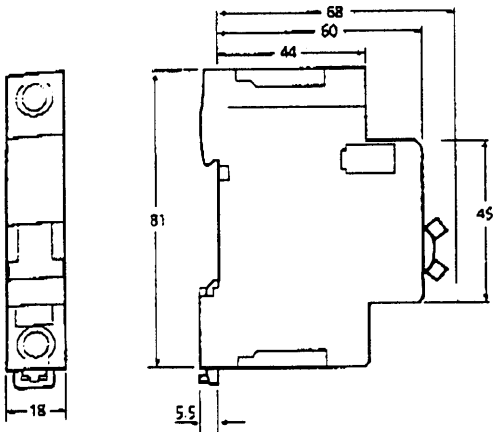
Type C devices are capable of supplying the majority of inductive and capacitive loads such as motors, transformers and tungsten or fluorescent lighting.

Time/Current and Energy let through characteristics of Sentry MCBs are shown graphically on pages 3.6 - 3.10.



For further information  
telephone: 01268 563720

**MCB dimensions**



**Technical specification**

**Electrical**

Operating voltage: 240V/415V a.c.  
 Operating frequency: 50 Hz  
 Short circuit breaking capacity: 6,000A (M6)  
 When backed up by a BS 88.100A fuse, then the breaking capacity of the MCB is increased to 20,000A.

**Physical**

Ambient operating temperature: -25°C to +60°C  
 IP rating: Front face IP4X, screw IP2X;  
 Max installation altitude: 2,000 metres

**Installation**

Selection of the most suitable MCB should take into account the following considerations:

**1. Operating voltage and frequencies**

It is possible to use the Sentry MCB on other voltages than 240/415V a.c. 50Hz., but it should be noted that this takes the MCB outside the scope of BS EN 60898.

**2. Type of load**

**RESISTIVE**

No derating is required in the case of resistive loads.

**INDUCTIVE**

In the case of inductive loads from direct-on-line motors, the surge on energisation can produce up to 9 times full load current, which may be present for several seconds. It is therefore recommended that Type C MCBs are used for such circuits.

**2. Type of load (continued)**

When using assisted start motors, the usually quoted figures are 2.5 times the full load current, for periods generally longer than those for direct-on-line starters. It is thus important to establish the degree of inrush current in order to select a suitable MCB. In all instances, reference should be made to both the motor manufacturer's curves and MK's circuit breaker curves in order to select the compatible miniature circuit breaker.

**CAPACITIVE**

Surges on energisation, for example with discharge lighting, may well reach 25 times the rated current of the device, but only for very short duration. Type B devices will often be adequate, but for more specialised circuits, a Type C may be required. The lighting fitting manufacturer's recommendations should be observed.

**3. Fault breaking capacity**

All Sentry MCBs have a short circuit breaking capacity of 6,000A (M6).

For applications where the prospective fault current is in excess of this, a BS 88, 100A (maximum) fuse should be used upstream of the MCB to provide a system breaking capacity of 20,000A.

**4. Discrimination with HRC fuses**

A Sentry MCB consumer unit will normally be supplied via an HRC fuse. The HRC in such instances will be the major device and remain unaffected by any fault current which causes the MCB to operate.

The level of fault current up to which this can be assured is determined by comparing the  $I^2t$  characteristics of the two devices. Discrimination will theoretically occur up to the level at which the value of the total operating  $I^2t$  of the MCB is below the minimum pre-arcing  $I^2t$  of the fuse, although in practice, discrimination will be achieved at higher levels than this.

**5. Cable protection**

The current carrying capacity of the cable should always exceed the current rating of the MCB to prevent damage. However, should this not be the case, a further calculation may show that the MCB can still interrupt the current in a sufficiently short time to prevent overheating of the cable insulation. Although this will prevent mechanical damage to the cables, further overload protection should be provided by a separate device, eg a motor overload relay. In case of doubt, please contact the MK Technical Sales & Service Department.

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