



Switchgear Systems Ltd

Manufacturers of Electrical Switchgear



MCCB / RCBO INSTRUCTIONS

Issue: 130918



All items are sold under Switchgear Systems Limited standard terms and conditions, a copy of which can be found on our website (www.switchgear-systems.com).

It is the responsibility of the installer to ensure items are fitted to the requirements of BS 7671 (Wiring Regulations) and best working practice.

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Instructions for MCCBs and MCCBs with earth leakage devices (RCBOs)

Please ensure you have the correct device to meet your requirements before installation.

Please visit www.switchgear-systems.com for more information.

All breakers in the standard range come fitted with padlockable and defeatable door interlocking rotary handles for safety.

Our standard range of MCCBs use adjustable thermomagnetic trips up to 250A and adjustable electronic LSI trips from 400A and above. We have chosen kA ratings to suit typical applications but alternatives are available on request, as well as different trip units, accessories and brand options for the breakers.

The ELR versions are fitted with toroidal RCD devices, internally housed to prevent tampering. To adjust to auto reset please see pages 12-13.

This unit adheres to European standard IEC60947-2 for MCCBs. The ELR units are fully mains tested prior to leaving Switchgear Systems Ltd.

Test certificate number:

Signature:

The installer is responsible for ensuring that the installation conforms to the requirements of BS 7671 (Wiring regulations) and best safe working practice.

PANEL FEATURES

Enclosed MCCBs

<https://tinyurl.com/y9cx3w4v>

- IP2X internal shrouding
- Fully load rated Terasaki breakers
- BSEN 60947-2 and IEC 60439-1 conformity
- Settable overload and short circuit tripping limits
- Door interlocked padlockable handle



Enclosed RCBOs also feature

<https://tinyurl.com/y8dbtz75>

- Built in one piece toroid and RCD interface
- Variable tripping current 0.025A - 25A
- Adjustable time delay 0.02 - 5 sec
- Auto or manual trip reset



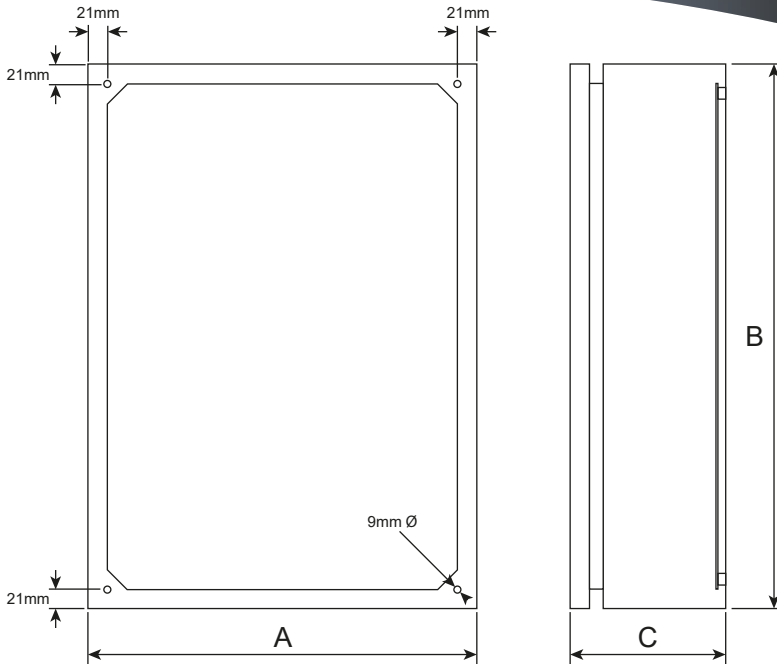
MCCB RATINGS

TYPE (SERIES)			63A	100A	125A	160A	200A	250A
Rated Thermal Current At 50° I _{th}	Enclosed	A	63	100	125	160	200	250
Adjustable Current Range	-	A	40 63	63 100	80 125	100 160	125 200	160 250
Rated Operational Voltage U _e	a.c. 50/60 Hz	V	525	525	525	525	525	525
	d.c.	V	250	250	250	250	250	250
Impulse Withstand Voltage U _{imp}	-	kV	8	8	8	8	8	8
Rated Insulation Voltage U _i	-	V	690	690	690	690	800	800
Ultimate Breaking Capacity (IEC, JIS AS/NZS) I _{cu}	690V AC	kA	-	-	-	-	-	-
	525V AC		6	6	6	6	7.5	7.5
	440V AC		10	10	10	10	15	15
	400/415V AC		16	16	16	16	25	25
	220/240V AC		25	25	25	25	35	35
	250V DC		13	13	13	13	15	15
Service Breaking Capacity (IEC, JIS AS/NZS) I _{cu}	690V AC	kA	-	-	-	-	-	-
	525V AC		3	3	3	3	6	6
	440V AC		5	5	5	5	12	12
	400/415V AC		8	8	8	8	19	19
	220/240V AC		13	13	13	13	27	27
	250V DC		7	7	7	7	12	12
Rated Breaking Capacity (NEMA) I _e	480V AC	kA	6	6	6	6	10	10
	240V AC		25	25	25	25	35	35
Mechanical Endurance	Operations	n°	20,000	20,000	20,000	20,000	18,000	18,000
Electrical Life	Operations	n°	10,000	10,000	10,000	10,000	6,000	6,000

MCCB RATINGS

TYPE (SERIES)			400A	630A	800A	1000A	1250A
Rated Thermal Current At 50° I _{th}	Enclosed	A	400	630	800	1000	1250
Adjustable Current Range	-	A	160 400	250 630	320 800	400 1000	500 1000
Rated Operational Voltage U _e	a.c. 50/60 Hz	V	690	690	690	690	690
	d.c.	V	250	-	-	-	-
Impulse Withstand Voltage U _{imp}	-	kV	8	8	8	8	8
Rated Insulation Voltage U _i	-	V	800	800	800	800	800
Ultimate Breaking Capacity (IEC, JIS AS/NZS) I _{cu}	690V AC	kA	20	20	20	20	20
	525V AC		30	30	30	30	30
	440V AC		45	45	50	50	50
	400/415V AC		50	50	50	50	50
	220/240V AC		85	85	85	85	85
	250V DC		40	-	-	-	-
Service Breaking Capacity (IEC, JIS AS/NZS) I _{cu}	690V AC	kA	15	15	20	15	15
	525V AC		30	30	30	23	23
	440V AC		45	45	50	43	43
	400/415V AC		50	50	50	38	38
	220/240V AC		85	85	85	65	65
	250V DC		40	-	-	-	-
Rated Breaking Capacity (NEMA) I _e	480V AC	kA	25	25	30	30	30
	240V AC		85	85	85	85	85
Mechanical Endurance	Operations	n°	15,000	15,000	10,000	10,000	5,000
Electrical Life	Operations	n°	4,500	4,500	4,000	4,000	4,000

INSTALLATION



Rating	A (Width)	B (Height)	C (Depth)	Stud Size/ Terminal Width	Torque
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Enclosed MCCBs

63-100A	300mm	400mm	200mm	M8 / 17mm	11.8...18.6Nm
125-160A	400mm	500mm	200mm	M8 / 17mm	11.8...18.6Nm
200-250A	400mm	600mm	200mm	M10 / 23mm	22.5...37.2Nm
400-630A	600mm	800mm	250mm	M12 / 28mm	40.2...65.7Nm
800A	800mm	1000mm	300mm	M12 / 40mm	40.2...65.7Nm
1000-1250A	600mm	1200mm	300mm	M12 / 45mm	40.2...65.7Nm

Enclosed MCCBs with RCD Modules

63-100A	400mm	500mm	200mm	M8 / 17mm	11.8...18.6Nm
125-160A	400mm	600mm	200mm	M8 / 17mm	11.8...18.6Nm
200-250A	500mm	700mm	250mm	M10 / 23mm	22.5...37.2Nm
400-630A	600mm	1000mm	300mm	M12 / 28mm	40.2...65.7Nm

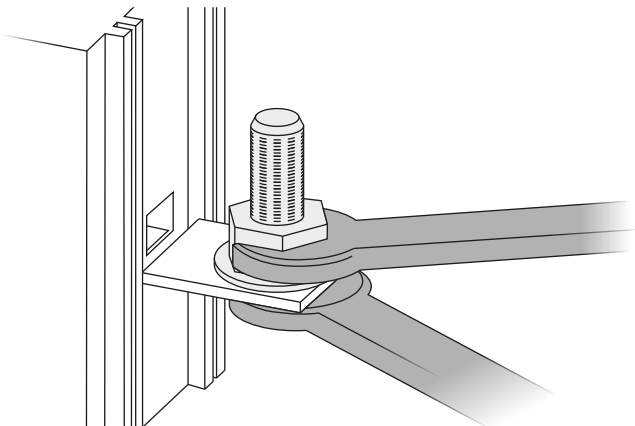
INSTALLATION

Cabling

The MCCB provided is not affected by the direction of the flow of current. As such it does not matter which side you connect your incoming or outgoing supply cables to so long as all poles flow in the same direction.

The same is true for the ELRC toroidal RCD device fitted in the earth leakage protection models, though if you want to use the manual reset feature it must be the incoming cables which are terminated on the side of the switch with the RCD on; **whichever cabling option you choose, you must run all of the supply cables from either the input or output through the aperture in the RCD module.** This includes the three phases and the neutral but **not the earth.**

Tighten all connections, including those factory fitted before connecting the mains supply. Use spanners on both the nut and the bolt where applicable and follow the torque settings shown on page 06.

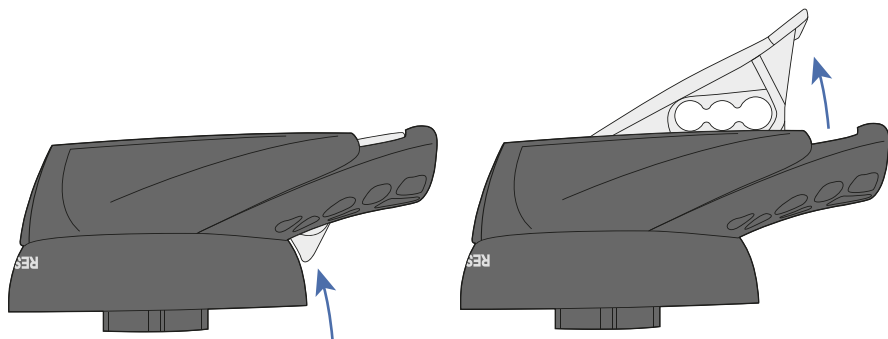


HANDLE OPERATION

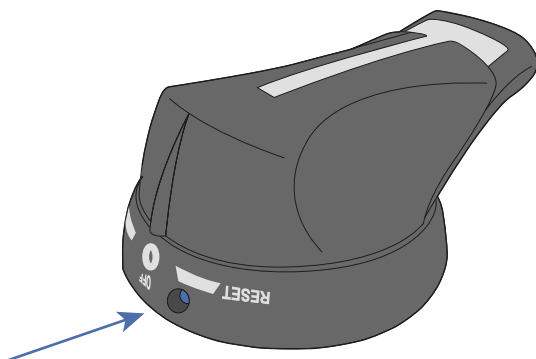
Padlocking/Defeating the handle

Our IP55 and IP65 enclosed range of MCCBs come with door interlocking rotary handles preventing access when the switch is in the 'ON' position.

The handle is padlockable in the 'OFF' position by lifting the grey padlocking lever as shown in the diagram below.



The handle interlock (which prevents the opening of the enclosure while in the 'ON' position) can be defeated by inserting a thin tool into the small hole on the side of the 'OFF' symbol on the handle.



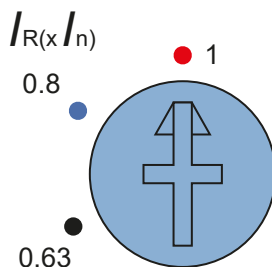
MCCB TRIPPING

Thermomagnetic Trips

MCCBs with thermal magnetic trips are identified by the dial/s below the handle. These dials can be turned to adjust the tolerances of the trip unit. All breakers up to 250A come with an adjustable thermal trip which is used to set the rated current to match the requirements of the installation. The 200-250A units also come with an adjustable magnetic trip dial which is used to set the short circuit tripping threshold. Breakers up to 160A have a fixed setting for the magnetic trip.

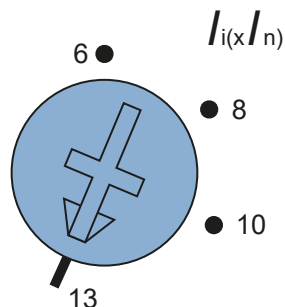
Adjustable Thermal Trip Dial (standard units up to 250A)

- At 1 (the preset) the MCCB will trip at its full current rating.
- At 0.8 the MCCB will trip at 80% of the full current rating.
- At 0.63 the MCCB will trip at 63% of the full current rating.



Adjustable Magnetic Trip Dial (standard units 200-250A)

- Adjust this dial to set the short circuit trip threshold.
- On the 200A breakers this ranges from $6-13 \times I_n$
- On the 250A breakers this ranges from $5-11 \times I_n$



Electronic Trips (standard units 400A and above)

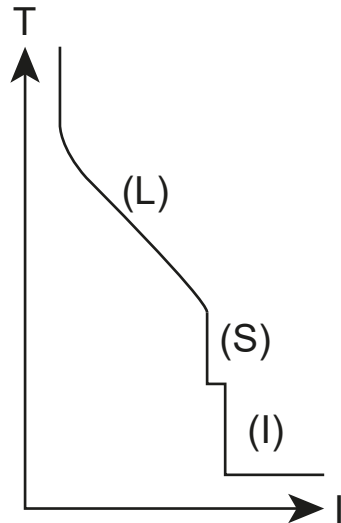
The left hand dial (A) is used to set the maximum trip rating to between 40% and 100% of the nominal rating of the breaker. Adjusting this will reduce the breaker's tripping threshold so that it can be adjusted down when the installation it is protecting is below that of the nominal rating.

The right hand dial (B) sets the tripping characteristic of the breaker. This shows how quickly the breaker will trip depending on how much higher the current passing through the switch is compared to the nominal rating. This is indicated on the graph below as increasing time against increasing current.

(L) Long time trip: This part of the graph shows the speed / overload of relatively slight overloads.

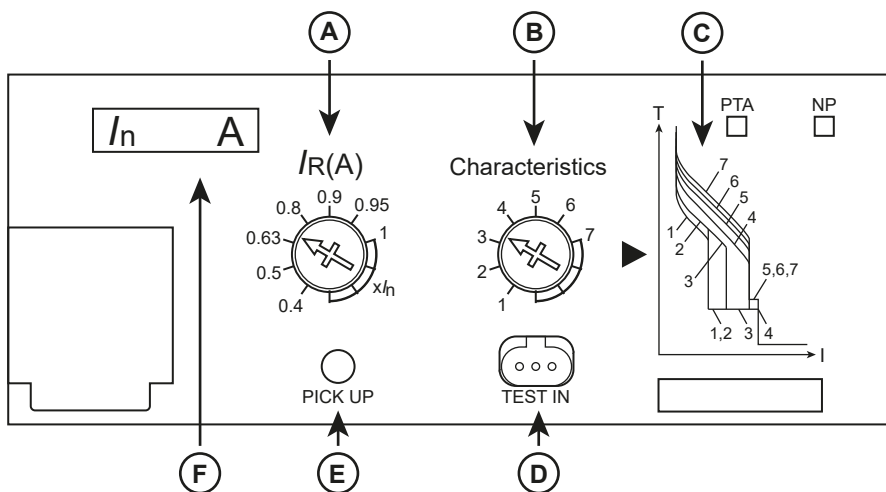
(S) Short time trip: This part of the graph shows at what point the short time trip will open the breaker under fault and overload.

(I) Instantaneous trip: This part of the graph shows the limit threshold before the instantaneous trip will kick in and open the breaker.



MCCB TRIPPING

- A) Adjusts the maximum current rating of the breaker from 40% to 100% of its nominal rating.
- B) Changes the trip curve characteristics of the MCCB. Used for adjusting the sensitivity of the device.
- C) Shows the trip curves as time against current of the settable characteristics.



- D) Test plug for use with a Terasaki secondary indication tester.
- E) The 'PICK UP' LED will begin to glow when the MCCB is nearing a point where it will trip. The nearer it is to that point the brighter it will glow.
- F) Indicates the maximum nominal rating of the MCCB.

EARTH LEAKAGE RELAY DEVICE

Earth Leakage Relay Device **Where fitted*

All incoming (or outgoing) supply cables must pass through the aperture in the ELRC unit for the device to function.

The functions for the dip switches (K) are as follows (from top to bottom):

- The first dip switch sets the ELRC into manual or auto reset mode.
Please note: Auto mode does not reset the main switch itself, only the relay.
- The second dip switch sets the timer multiplier. This works in conjunction with the top dial (I) labelled 't (sec)' and multiplies the dial increments by either 1 or 10.
- The bottom two dip switches set the current sensitivity multiplier. This works in conjunction with the bottom dial (J) labelled ' $I\Delta n(A)$ ' and multiplies the dial increments by either 0.1, 1 or 10.
E.g. Setting the dial to 0.5 will cause the relay to act on 50mA if both of these dip switches are to the right, 500mA if the bottom is set right and the second from bottom is set to left and 5A if both of these switches are set to the left.

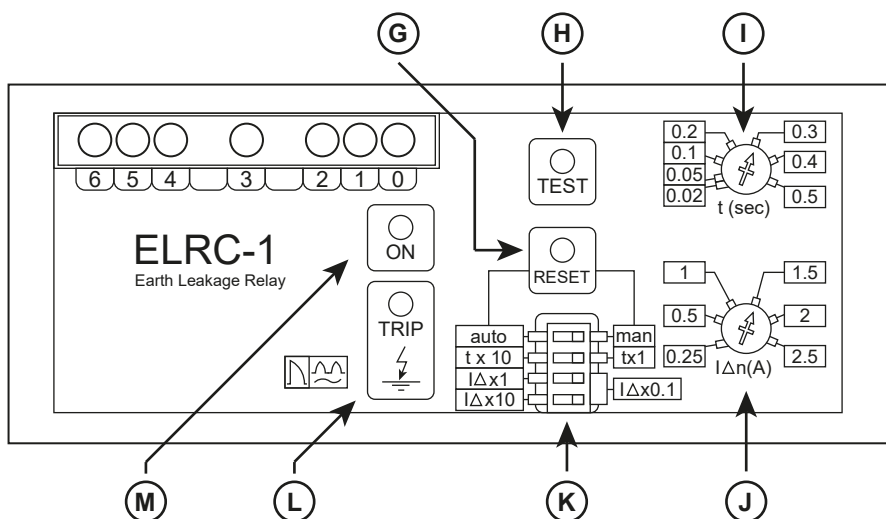
Pressing the test button (H) will actuate the shunt trip and trip the MCCB in the panel.

Pressing the reset button (G) is required any time the ELRC trips whilst set to manual mode.

Additional threaded holes are provided in the back plate and the control wires have been made long enough so that the ELRC unit can be moved up/down the plate depending on whether you require more room to spread cables nearer to the gland or the switch terminals.

EARTH LEAKAGE RELAY DEVICE

- G) **Reset button:** Used to reset the ELRC when it has tripped in manual mode.
- H) **Test Button:** Used to test the actuation of the shunt trip in the MCCB.
- I) **Time setting dial (measured in seconds):** This dial sets the tripping delay. Used in conjunction with the dip switches.



- J) **Current Sensitivity Setting Dial (measured in Amps):** This dial sets the earth leakage limits before the relay trips. Used in conjunction with the dip switches.
- K) **Dip Switches:** Used to program the ELRC (See instructions on page 12)
- L) **'TRIP' Indicator:** LED will glow red when the relay has tripped due to an earth leakage fault.
- M) **'ON' Indicator:** LED will glow green when the relay is receiving a power supply.

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