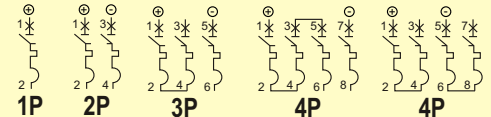
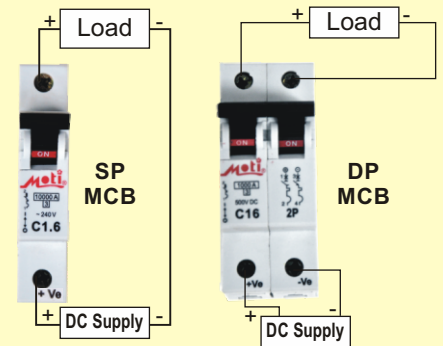


## DC Electric Circuit Breaker

Overview	Ideal Use For Low Voltage Dc Circuit Breaker In Battery,Solar,Wind Energy Systems,Communacation, Locomotives, Dedicated To Electric Cars & Electric Motorcycle, Unipolar Rated Voltage DC 12V To 1000 Volt
	Rated Current Up To 63A Of The Circuit From Overload, Short Circuit Protection As Well As For Circuit Isolation.
	Also For Use In Normal Circumstances Are Not Frequent On - Off Electrical Installations And Electric Vehicle Lighting Circuits.
	This Product Complies IEC60898-1 Standards.
	Function Wiring Must Pay Attention To + / - Polarity
	Dc Minature Circuit Breaker Is A New Product In The mcb, Based On Research And Development Using Magnetic Blow Interrupter Characteristic Arcing Time Is Short , High Breaking Capacity, Reliable Performance .

PARAMETER	
voltage (Ue)	12V,48V, 64V,72V, 110 Volt (above 110 V on Request)
Current (In)	0.5A,1.6A,2A, 4A ,5A,6A,8A,10A,16A, 20A, 25A, 32A, 40A,& 63Amp
Press instantaneous release forms breaker:	B type (3In ~ 5In) Thermal Trip ( Overload Current) C type (5In ~ 10In) Magnetic Trip (Short circuit Current)
Short circuit Breaking Capacity (Icn)	Up to 3 Ka (3000 Amp)
No. of Poles (Execution)	1P & 2P (SP & DP) 3P & 4P on request
DIN Rail Mounting	mounted on standard 35mm DIN Rail by snap action(Potential free DIN Clip)
Housing	Injection molded from special grade PBT RAL 7035
Contact	Contacts are made of special silver inlaid into copper strip, ensuring higher life for maximum safety against contact welding and erosion. These contacts have low contact resistance resulting in reduced watt loss
Mechanical & Electrical life	Electrical life : not less than 4,000 time Mechanical life ( O-C ) not less than 10,000 times

### DC MINATURE CIRCUIT BREAKER



overcurrent protection characteristics (see Table 1)

Table 1

ID	Rated current In (A)	Initial state	T est current (In)	Specified Time (In≤63A)	Expected Results	Notes
1	0.5 to 63	cold	1.13In	t≥1h (In≤63A)	Non Trip	
2	0.5 to 63	immediately after a trial conducted	1.45In	t <1h (In≤63A)	Trip	current within 5s Stable up to a predetermined value
3	0.5 to 63	cold	2.55In	1s to 60sec	t <0.1s	
4	6 to 63	cold cold	3In 5In	t≤0.1s t <0.1s	Non Trip Trip	B Type
5	0.5 to 63	cold cold	5In 10In	t≤0.1s t <0.1s	Non Trip Trip	C Type

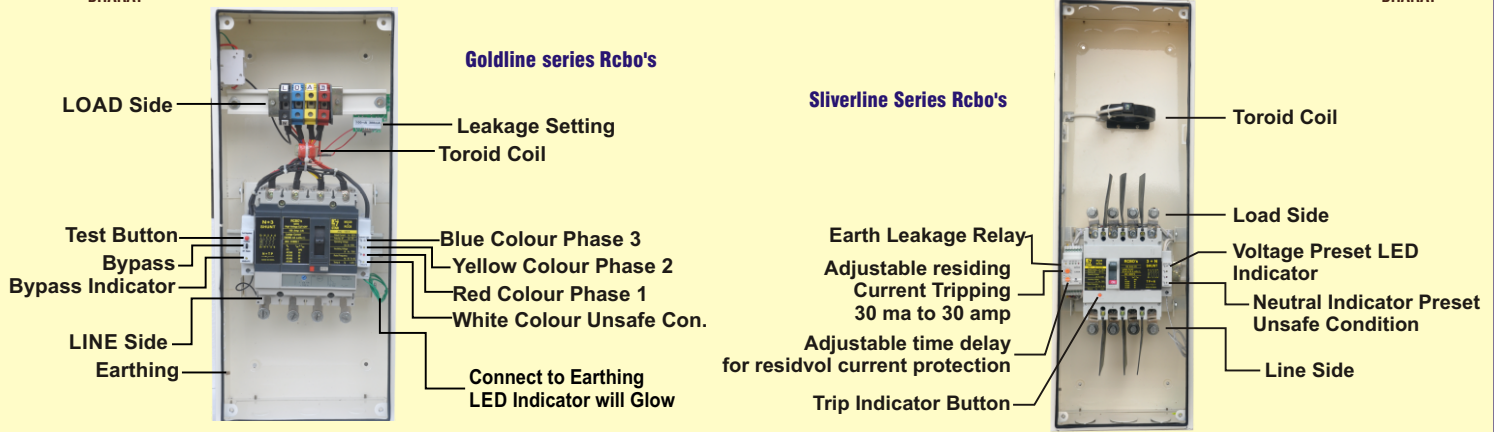
Wiring: Use 25 mm<sup>2</sup> or less wire connection (see Table 2)

Table 2

Rated current In (A)	copper wire nominal cross-sectional area (mm <sup>2</sup> )
0.5 TO 6	1
10	1.5
16 ,20	2.5
25	4
32	6
40	10
63	16

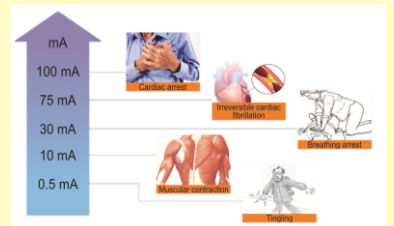


Short Circuit Currents	The maximum short circuit current possible on a DC system is determined by the voltage of the battery and the total internal resistance of the cell It is given by Ohm's law $I_{cs} = V_b/R_b$ Where $I_{cs}$ is the short circuit current $V_b$ is the voltage of the battery( with 100% cahrged battery) $R_b$ is the internal resistance of the battery cell
Circuit time constant:	The time constant is given by $L/R = 15ma$ max where L is the inductance of the circuit R is the resistance of the circuit The time constant is usually given in mill second (ms) ideally, DC circuit would be mainly resistive( i.e a low number) as inductive circuit produce a back emf when the current suddenly falls. This in turn tends to prolong arcing during switching operation, and so reduce contact life.
Circuit Voltage	The voltage of the circuit is dependent upon the power supply. The lower the voltage the easier switching operations will be, but the voltage makes no difference to the running of the MCBs. Contact life can be significantly increased by reducing the voltage,drop across each pole.This can be achieved by wiring poles in series.



### Introduction & Working Principal:

- Earth Leakage Relay Introduction Majority of us has experienced electrical shock while using electrical equipment at some point of our lives. Though momentary, it is quite dangerous. Earth leakage occurs due to reasons like normal wear and tear of equipment or moisture around terminals which can result in partial breakdown of insulation between supply and earth.
- Earth leakage currents are dangerous as it can lead to cable heat generation and insulation failure. This can result in a major catastrophe thus leading to significant loss of property and human lives.
- Difference between Earth Fault and Earth Leakage According to IEC 60947-2, Annex B, Earth fault current is the current flowing to earth due to insulation fault and Earth leakage current is the current flowing from the live parts of the installation to earth in the absence of an insulation fault.
- Earth Leakage Circuit breaker (ELCB or RCCB) has integral current breaking device. It detects as well as protects the system by opening the protected circuit when the residual current exceeds the set value. ELR is a relay that send a signal to the shunt coil of a circuit breaker (MCB/MCCB or ACB) whenever the leakage current exceeds the set level.
- Effect of earth leakage on human body Earth Leakage current beyond 30mA can be lethal leading to death.
- 30mA sensitivity is required for protection in domestic installations where the person may come in direct contact with electric equipment in locations for Example labs, schools, workshops, etc.
- 100mA and 300mA protection is required where there is indirect contact or due to insulation failure in the cables.
- ELR with CBCT: The Earth Leakage relay with Core Balanced Current Transformer provides protection from earth leakage with advanced intimation of impending occurrence of the event. The user can probatively take action to avoid occurrence of any mishaps.
- Earth Leakage relay is a micro controller based device meant to measure low level of leakage current and isolate the faulty circuit from the system. Leakage current is sensed through core balanced current transformer. Definite Time Trip occurs when Earth Leakage Current exceeds the trip time which is adjustable by means of a front mounted potentiometer. The user can set the threshold level ranging from 30mA to 30A. In case of earth leakage then the LED indicators will glow depending upon the percentage of set threshold value. For Example: If the set level is 30mA and the leakage current is around 23mA then 75% LED indicator will glow which will provide a visual alert to the user. This empowers the user to take corrective actions before any accident. Output 1C/O can be given to shunt trip of MCB/MCCB or ACB and 1 NO output for alarm indication. The relay has Fail-safe feature inbuilt in it. Core Balanced Current Transformer (CBCT) uses the technology of residual magnetic flux. All conductors to be protected shall pass through the core balance current transformer. The vector sum of all the currents should be equal to zero and can be expressed as
  - $I_r + I_y + I_b = 0$  for 3 phase 3 wire system.
  - $I_r + I_y + I_b + I_n = 0$  for 3 phase 4 wire system
 for the above condition the CBCT/ZCT produces zero resultant magnetic flux keeping the system healthy.



**The new circuit breaker with residual current protection provides protection from electric shock overloads, short circuit & over voltage 4 types of protection are combined in a standard mccb frame size**

**“It is a small value to pay for safety,”**

### RESIDUAL CURRENT CIRCUIT BREAKER + MCCB WITH ELR

PARAMETER	Goldline series Rcbo's			Sliverline Series Rcbo's		
	MCCB + RCCB WITH ELCTRONICS CIRCUIT= RCBO'S WITH HV CUTOFF			MCCB + ELR = RCBO'S		
RATING (In)	100 AMP	160AMP	250AMP	100 AMP	160AMP	250AMP
RATED OPERATIONAL VOLTAGE (Ue)	400/415V AC	400/415V AC	400/415V AC	400/415V AC	400/415V AC	400/415V AC
NUMBER OF POLE	4P	4P	4P	4P	4P	4P
BREAKING CAPACITY UP TO	25kA	25kA	25kA	25kA	25kA	25kA
THERMAL TRIP fixed type	At 6×In 5sec ± 20%	At 6×In 5sec ± 20%	At 6×In 5sec ± 20%	At 6×In 5sec ± 20%	At 6×In 5sec ± 20%	At 6×In 5sec ± 20%
MAGNETIC TRIP fixed type	At10xIn(+/-20%)	At10xIn(+/-20%)	At10xIn(+/-20%)	At10xIn(+/-20%)	At10xIn(+/-20%)	At10xIn(+/-20%)
LEAKAGE ADJUSTABLE	100 & 300 mA	100 & 300 mA	100 & 300 mA	30mA TO 30A	30mA TO 30A	30mA TO 30A
TIME DEALY (when leakage set to 30mA)	NA	NA	NA	0 TO 9 sec	0 TO 9 sec	0 TO 9 sec
TRIPPING TIME	<0.05 sec	<0.05 sec	<0.05 sec	<0.05 sec	<0.05 sec	<0.05 sec
VOLTAGE PROTECTION	above 305 volt trip	above 305 volt trip	above 305 volt trip	NA	NA	NA
BYPASS FACILITY	YES	YES	YES	YES	YES	YES
DIMENSION	h580xw254xd152	h830xw337xd152	h830xw337xd152	h580xw254xd152	h830xw337xd152	h830xw337xd152
Cable size	Aluminum Armor cable up to 70mm <sup>2</sup>	Aluminum Armor cable up to 70mm <sup>2</sup>	Aluminum Armor cable up to 185mm <sup>2</sup>	Aluminum Armor cable up to 70mm <sup>2</sup>	Aluminum Armor cable up to 70mm <sup>2</sup>	Aluminum Armor cable up to 185mm <sup>2</sup>
REFERENCE STANDARD	IS 12640(Part 2)	IS 12640(Part 2)	IS 12640(Part 2)	IS 12640(Part 2)	IS 12640(Part 2)	IS 12640(Part 2)
Application:	motor control panels & switchboards earth mines steel plants Generators & transformers			Cement plants Oil refineries Buildings Mobile operating Equipment		Circuits of portable appliances and temporary set-ups (event halls, theatres, operas, stage technology in swimming pools and saunas

### Central Government Act

Section 61A in The Indian Electricity Rules, 1956

1[61A. Earth leakage protective device.—The supply of Energy to every electrical installation other than low voltage installation below 5 KW and those low voltage installations which do not attract provisions of section 30 of the Indian Electricity Act, 1910, shall be controlled by an earth leakage protective device so as to disconnect the supply instantly on the occurrence of earth fault or leakage of current: Provided that the above shall not apply to overhead supply lines having protective devices which are effectively bonded to the neutral of supply transformers and conforming to rule 91 of I.E. Rules, 1956.]

**INSTALL TODAY :**

**LIFE SAFETY IS PRIMARY OBJECTIVE....MONEY IS SECONDARY OBJECTIVE**