

Practical No. 13: Connect MCB in electrical circuit and check its operation at normal and abnormal conditions.

I Practical Significance:

MCB is the most important component of power distribution system. It provides safety, proper operation of the system and ease in smooth operation of the installation. Therefore, it is essential to know the working of this component.

II Industry/ Employer Expected Outcomes(s):

Select proper rating of MCB for different electrical applications.

III Course Level Learning Outcomes(s):

Use electrical safety devices in electrical circuit.

IV Laboratory Learning Outcomes(s):

Connection of MCB in electrical circuit.

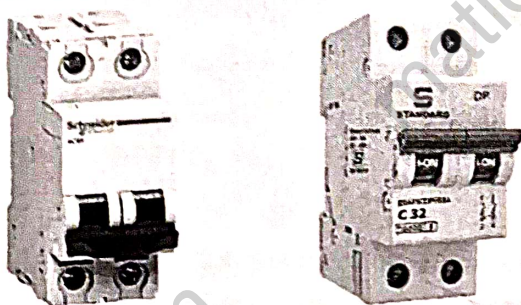
V Relevant Affective Domain related outcome(s):

Follow safety electrical rules for safe practices.

VI Relevant Theoretical Background:

MCB switches "OFF" the electrical circuit during overload and short circuits. MCBs have current ratings ranging from A to 100 A & as their name implies, they have a compact size. There are three main types of MCBs, classified according to the current range at which they trip instantly.

- Type B- Trips at 3 To 5 times rated current, suitable for resistive or slightly inductive loads.
- Type C- Trips at 5 to 10 times rated current, suitable for moderate inductive loads.
- Type D- Trips at 10 to 20 times rated current, suitable for loads with a high inductive components.



XI Resources Used (Students should write the required resources):

Sr. No.	Name of resources	Broad Specifications	Quantity
1	Single pole MCB.	0.5/1A, type B, 6KA, 240V.	1
2	Auto-transformer (Dimmer)	Single phase, 0-270V, 50Hz, 6A	1
3	A.C ammeter.	range, 0-10A	1
4	A.C voltmeter.	range 0-300 V.	1
5	Resistive load / lamp load	Suitable Size.	1

(bank).

XII Actual Procedure followed:

- 1] connect the circuit as per the circuit diagram shows.
- 2] Switch on the supply.
- 3] Apply the rated voltage to the MCB.
- 4] Increase the load up to 3 times current rating of MCB.
- 5] Record the tripping time of MCB & ammeter reading in the observation table.
- 6] Increase the load up to 4 to 5 time of current rating of MCB.

XIII Observation table:

Sr. No.	Current through circuit	Tripping time of MCB
1	3 Amp.	0.08
2	2.5 Amp.	0.15
3	2 Amp	0.18
4	1.5 Amp	0.2
5	1 Amp	No trip.

XIV Results:

When the value of current is above the rated value when the MCB will trip within 1 second.

XV Interpretation of Results:

XVI Conclusions and recommendation:

Hence, we learnt to connect MCB in electrical circuit & check its operation at normal & abnormal conditions.

XVII Practical Related Questions: (Use separate sheet for answer)

1. State the applications of MCB.
2. MCB selection needs to be done carefully; explain.
3. State the specification of MCB.

1] $\rightarrow$ MCBs are widely used as isolating components in domestic, commercial & industrial setting. They form part of a broader family of more powerful circuit breaking components.

2] $\rightarrow$ There are several factors to consider during your miniature circuit breaker selection processes. You can't go just randomly & buy one. Tripping characteristics, the breaking capacity & the number of switches are the three essential factors of miniature circuit breaker selection.

3] $\rightarrow$ Current rating: MCBs are available in a range of current ratings, typically from 1 Ampere to 63 Ampere (A).

Voltage operating: MCBs are designed to operate at specific voltage levels, typically 230 V AC or 415 V AC.

XVIII References/suggestions for further reading:

1. <https://byjus.com/physics/miniature-circuit-breaker>
2. <https://www.electronicsforu.com/technology-trends/learn-electronics/miniature-circuit-board-mcb>
3. <https://www.electrical4u.com/miniature-circuit-breaker-or-mcb/>