

Residual Current Device (RCD) in Date Centre

► How do you prevent the unwanted tripping of RCDs during voltage dips?

1 ABC company
A colleague from the Marketing Department requests the IT Department for assistance.

I couldn't hold an internet teleconferencing call with an overseas customer. Would you please fix it?

Marketing officer IT Engineer

2 Tripped RCDs under adverse weather condition

After checking, we found that the RCDs used to protect the servers were tripped off, causing the servers to shut down after UPS had fully discharged. After the RCDs were reclosed manually, the internet has now resumed normal service.

Thank you!

Marketing officer IT Engineer

3

Last Friday, the RCDs in our server room were suddenly tripped off, finally causing our internet service to be interrupted. Why did the RCDs suddenly trip off?

IT Engineer CLP Engineer

This was caused by an inevitable voltage dip. Let's conduct a joint study and site investigation to seek some mitigation solutions.

4 After site investigation:

It was found that an RCD, used to protect many servers, was tripped due to appearance of transient high-frequency interference under voltage dip conditions.

IT Engineer CLP Engineer

5 Recommended solutions:

To prevent such unwanted tripping of RCDs under voltage dip conditions, you should reduce the number of servers, say less than six sets, connected to a single RCD and replace the RCDs with advanced RCDs which can suppress the influence of the transient high-frequency interference under voltage dips.

IT Engineer CLP Engineer

6 After modification...

After implementing the solutions recommended by CLP Power, our internet service hasn't been interrupted again under voltage dip conditions.

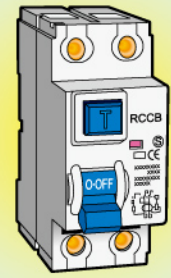
IT Engineer

Different types of RCD have different performance characteristics, so they need to be studied case by case. If you have any power quality queries about your Residual Current Device (RCD), please contact us at 2678 2678 to carry out a joint study and site investigation.

Try our Consultancy Service on Power Quality now!

Want to know more...

A Residual Current Device (RCD) is used to provide protection against electrocution and electrical fire by disconnecting a circuit when it detects leakage current exceeding its rated residual operating current. However, RCDs are sometimes tripped off unnecessarily, even if there is no real fault.

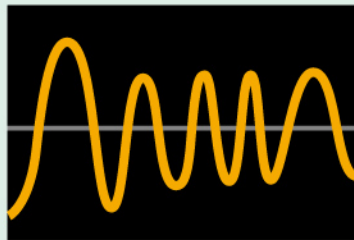


RCD

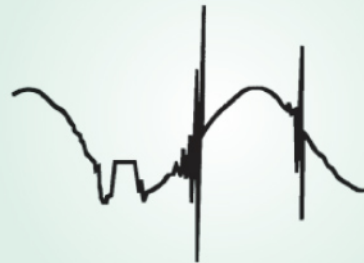
Reasons for unwanted tripping of RCD:

- Too many devices, say more than five sets, are protected by an RCD.
- Supply frequency deviates significantly during voltage dip incidents.
- Transient surge voltage on distribution network due to switching of loads and lightning strikes.

Under normal supply conditions, every device has some degree of earth leakage due to parasitic capacitance existing inside the devices. If an RCD is used to protect too many devices in a circuit, the transient harmonic leakage current will easily cause instability and even tripping of an RCD in the event of supply frequency deviation during voltage dip incidents and transient surge voltage during switching of loads and lightning strikes. This could cause the unwanted tripping of an RCD under these various electrical disturbances.



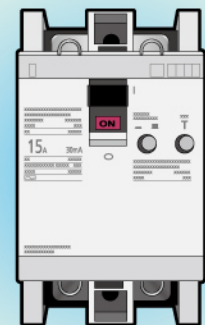
Significant supply frequency deviation under voltage dip condition



Transient surge voltage

Recommendations:

- Protecting several devices by an RCD in a circuit. Never connect too many devices to an RCD!
- Replacing an RCD sensitive to electrical disturbances with an advanced RCD which can suppress the influence of high harmonic leakage current under voltage dips and transient voltage surge.



RCD with suppression of high harmonic leakage current

Supplementary Information:

Residual Current Breaker with Overcurrent Protection (RCBO), which includes the function of an RCD and also protection of abnormal rise in potential difference between neutral and earth conductors, would trip off under the conditions of high-impedance or broken neutral cable.



RCBO

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