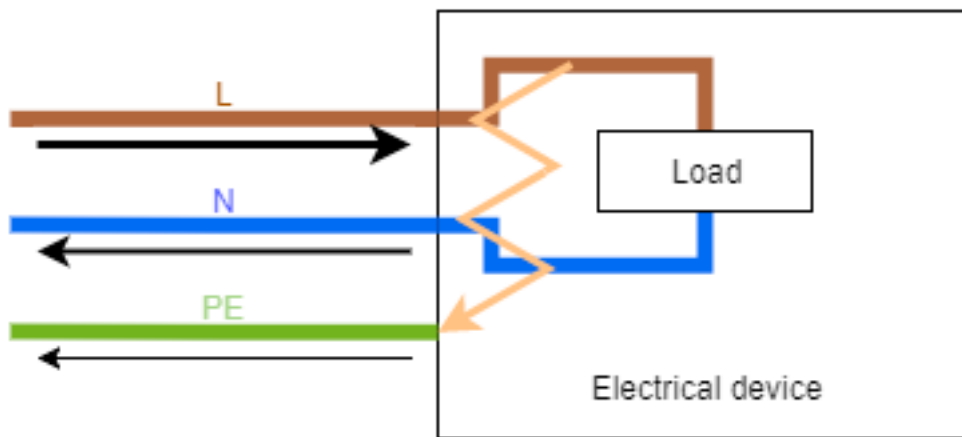


## MOTOR INSTALLATION

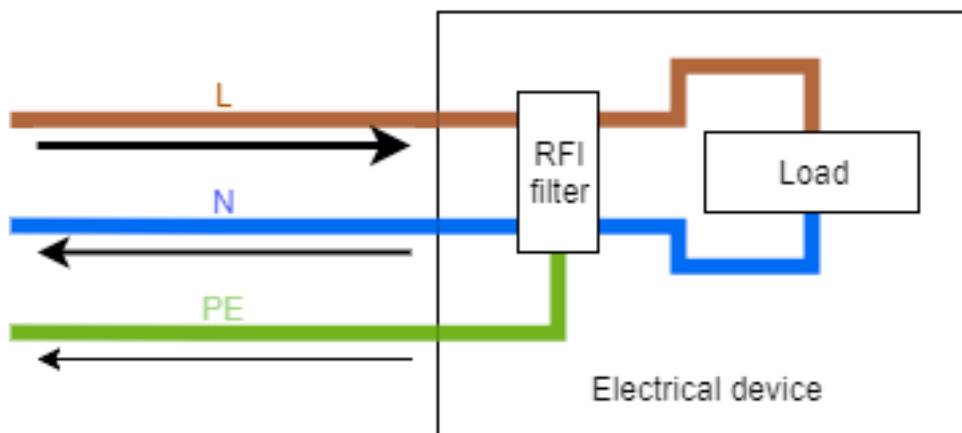
# WHAT IS LEAKAGE CURRENT?

Leakage current is the current that is sent back to the earth return path by any electrical device. It can be caused by two main things:

- Faulty connection of an electrical component:



- RFI filters: Radio-frequency interference filters are connected to the mains and filter current to reduced harmonics in the power supply or generated by the electrical device. To suppress those harmonics an RFI filter outputs the filtered current to the earth. Because an RFI filter contains capacitors, it will produce a current spike at power-up.



**Variable Frequency Drive (VFD)** require such RFI filters to comply to the EMC directive.

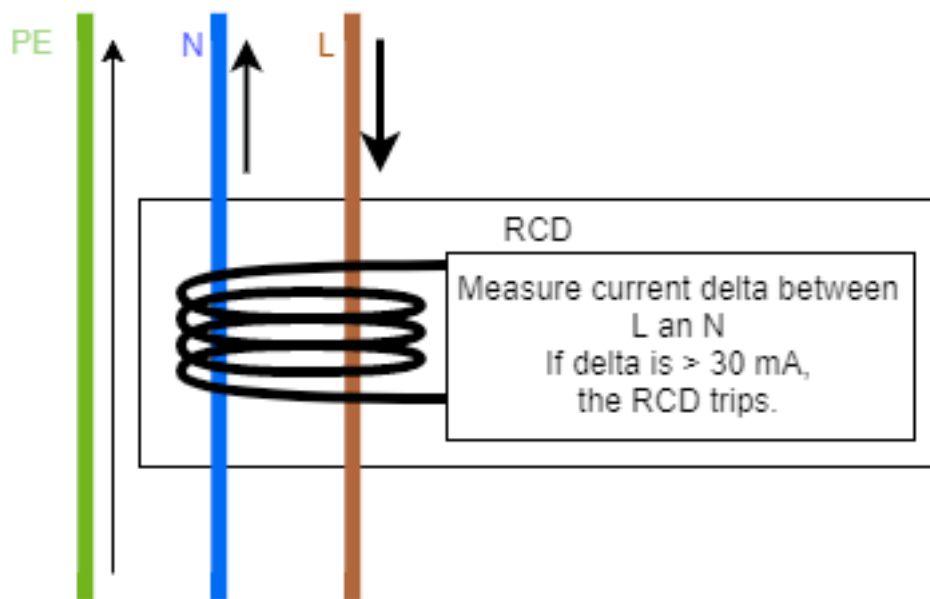
The EMC directive specifies limits for the radio interferences generated by any electrical appliance.

As a consequence, the manufacturer integrates an RFI filter in every VFD.

## MOTOR INSTALLATION

# WHY DOES A RESIDUAL CURRENT BREAKER (RCB) CARE ABOUT LEAKAGE CURRENT?

A Residual Current Breaker is a device designed to reduce fire risk and improve user safety in an electrical installation.



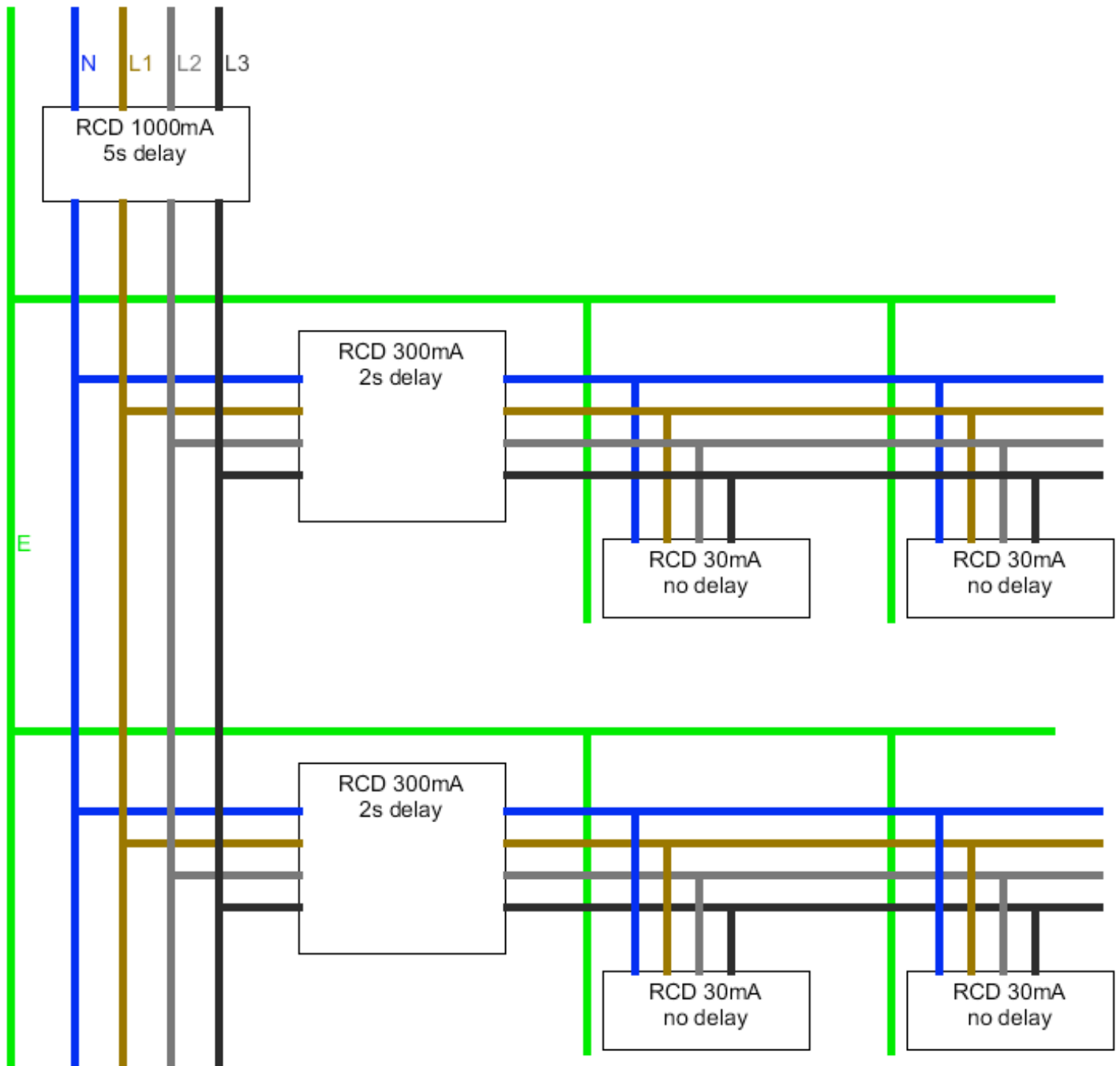
It is required in every electrical installation. The main specifications for an RCB are:

- Threshold current: in mA or A, common ones are 30mA, 300mA and 500mA
- Trip delay: from 0.1s to 5s

### Power distribution

The first method and the simplest is to control your power distribution plan. You can ask for specific power distribution to allow certain leakage current.

Here a simple power distribution schematic:

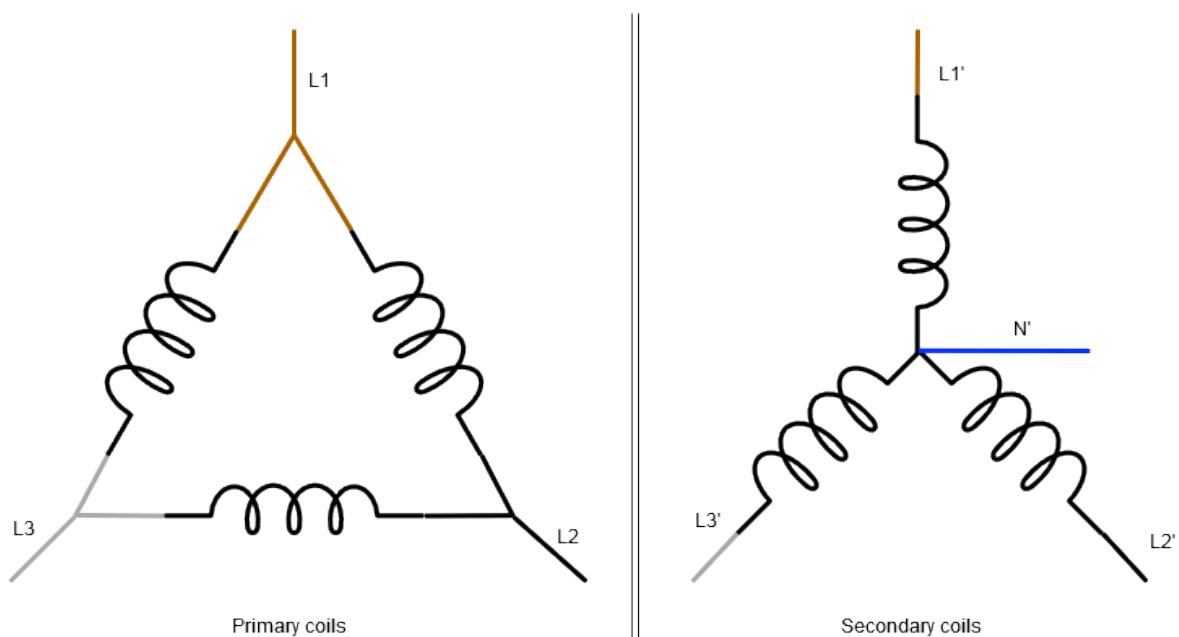


### Isolation transformer

An isolation transformer provides a physical barrier between the power supply side and the outlet. This allows to safely disconnect the earth return path to prevent EMIs from getting back into the power supply.



An isolation transformer contains 3 primary coils and 3 secondary coils. Each primary coil transmits the magnetic field to its secondary thus providing power to the secondary output. The neutral is generated by connecting one of each end of the secondary coils.



**Suppress integrated RFI filter**

It is also possible to suppress RFI filters. Whoever, this will break the EMC compatibility. As a consequence, VFDs will generate all sort of RFIs. Depending on your electrical setup, it can lead to interferences in the sound and lighting systems.

**NOTE:** This procedure should be considered as a last option when all of the above methods fails/are not possible!

**⚠ Do NOT use this operation in IT network configuration ⚠**

**As stated in the notice below, in this configuration, if an earthing fault occurs, the VFD will be destroyed.**

**NOTICE****Operation in IT networks**

The use of this frequency inverter on an **IT network** is possible after modification of the integrated mains filter.

It is urgently recommended that the frequency inverter is only operated on a IT network if a braking resistor is connected. If an earthing fault occurs in the IT network, this measure prevents an impermissible charging of the link circuit capacitor and the associated destruction of the frequency inverter.

**Have a great show!**