The problem

Unwanted nuisance tripping

If there is disturbance on the electric network, RCCBs or RCD blocks which are normally in the installation trip and interrupt the circuit even if there is no real fault.

Disturbance of this kind is most commonly caused by:

- operational discharges produced by connecting or disconnecting of loads (opening or closing of protection and command devices, starting and stopping of motors, switching on and off of fluorescent lighting, etc.), if conditions in the circuit are abruptly modified, this causes temporary disturbances such as impulse voltages at high frequency;
- atmospheric discharges caused by direct or indirect lightning onto the power line; when lightning strikes, it generates an electromagnetic field which produces a transient impulse voltage in the network; this generates capacitive earth leakage in the network cables. In these circumstances, the nuisance tripping of the residual current protection device is unwanted since it does not prevent the risks caused by direct and indirect contact. A sudden and unjustified cut off of the power supply, on the other hand, may cause very serious problems and jeopardize the continuity of service of refrigerators, freezers, computers, lighting and air-conditioning systems, burglar alarms, data transmission systems, etc.

Standards

The IEC 61008 and IEC 61009 standards impose the use of a 0.5 μs/100 kHz damped oscillator wave (ring wave) to test the ability of residual current protection devices to withstand operational disturbances. All RCCBs and RCD blocks must pass the test with a peak current equal to 200 A.

With regard to atmospheric discharges, IEC 61008 and 61009 standards establish the 8/20 μs surge current test with 3000 A peak current but limit the requirement to residual current protection devices classified as selective. No test is required for other types.

The ABB solution

AP range of RCCB and RCD blocks

The AP range of anti-nuisance tripping RCCBs and RCD blocks of ABB SACE pass the ring wave test at 0.5 μs/100 kHz and also withstand the 8/20 μs impulse with the same peak current of 3000 A prescribed for selective devices. For this reason, they offer the most direct solution to the problem of unwanted tripping caused by atmospheric or operational discharges.

The electronic components they are equipped with is capable of distinguishing between temporary leakage caused by network disturbances and permanent leakage caused by actual faults and only opens the circuit if the latter occurs.

A slight delay in the tripping time has also been introduced into the AP range of RCCBs and RCD blocks which nevertheless respects the safety limits imposed by the standards (tripping time at 2.1 μs ≤ 150 ms).

When installed in electric circuits, they therefore prevent unwanted tripping in installations in the residential and commercial sector where continuity of service is important and, at the same time, guarantee traditional residual current protection.

The AP range of RCCBs and RCD blocks are available in A and AC types and in 2P and 4P versions.

To obtain continuity of service for priority circuits and, at the same time, protect the loads and installations from transient overvoltage peaks, we recommend combining the AP range of RCCBs and RCD blocks with OVR surge protective devices (SPD).

For more effective and extensive protection, a cascaded system on several levels, as shown in the diagram, may be useful.