

Application Note: Surge testing according to IEC/EN 61008-1 and IEC/EN 61009-1

Introduction

The standards IEC/EN 61008-1 and IEC/EN 61009-1 describe testing of residual current circuit-breakers without (RCCBs) or with (RCBOs) integral overcurrent protection for household and similar uses. These standards require different tests. This application note focuses on the current surge and voltage surge tests.

Current surge tests

The current surge tests are used to verify the resistance against unwanted tripping due to current surges. Two different impulse shapes are required:

- Current impulse 100kHz ring wave 200A or 25A peak
- Current impulse 8/20us 3kA peak

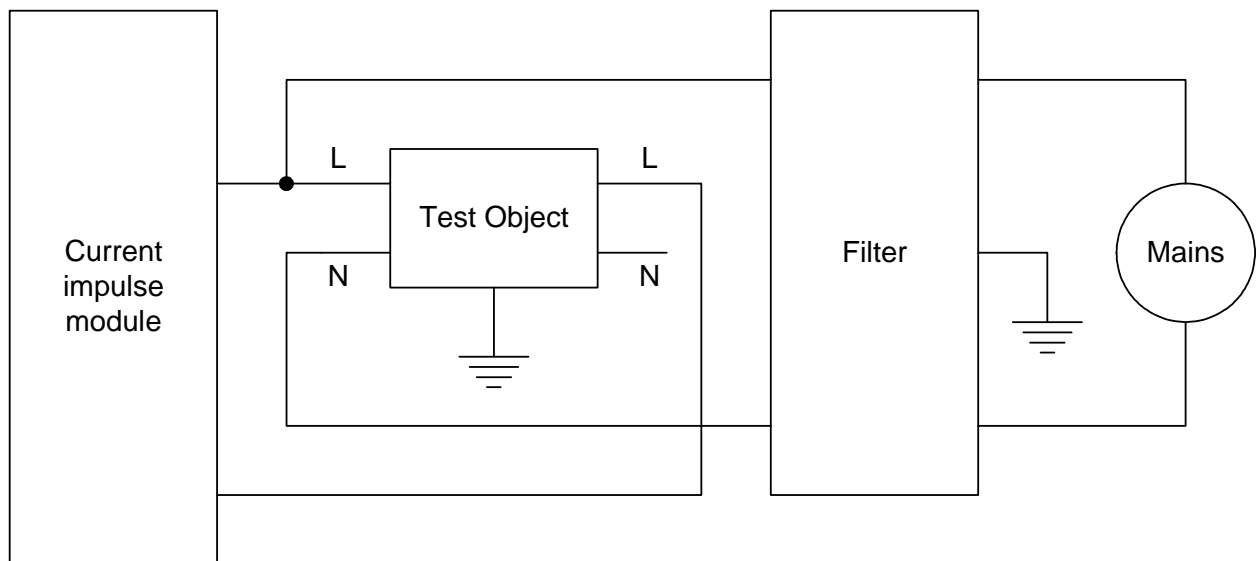


Figure 1:
Test circuit for 8/20us and 100kHz impulse shapes, as given by the IEC/EN standards.

Test procedure

One pole of the test object, chosen at random, shall be submitted to surge currents of both polarities. During the test, the test object must be supplied with power mains, so that the residual current circuit-breaker can work properly.

Filter

The function of the filter shown in figure 1 is to protect the mains from surges, in case that test object trips during testing. If the test object is connected as shown in figure 2, no filter is required, i.e. a simplified test setup can be used and costs for test equipment can be reduced significantly.

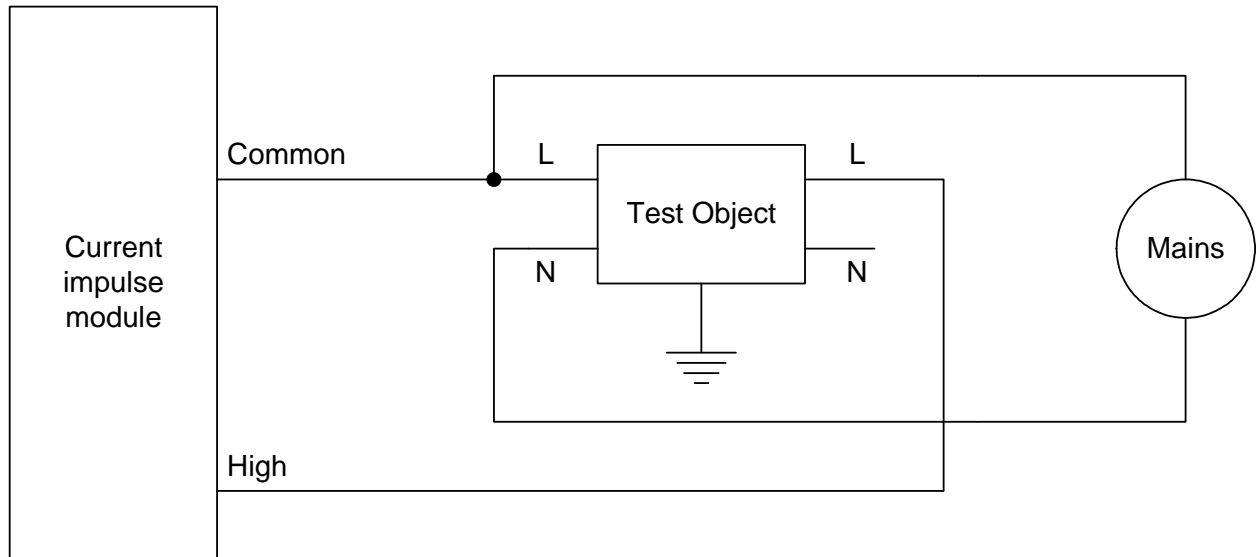


Figure 2:
Test circuit for 8/20us and 100kHz impulse shapes, without a filter required.

When using a current impulse generator with floating output, i.e. the output terminals are not referenced to earth, the test setup according figure 2 can be used, which is equal to the test setup according to figure 1. All surge generators from Haefely provide floating output terminals.

It is strongly recommended to place a fuse, for example 1A T, in the L and N lines coming from the mains. These fuses will protect the current impulse generator from overloads that may be the result of wrong connections in the test setup.

It is also recommended to place a VDR having adequate ratings between L and N coming from the mains. This is to protect the mains from surge impulses in case of wrong connections in the test setup.

The same test setup is used for single-phase and three-phase test objects.



Be sure that the current impulse generator's high and common terminals are connected as shown in figure 2. Otherwise, in case the test object trips, current surge flows into the power mains and may affect other equipment connected to it!

Impulse voltage test

The impulse voltage withstanding capability of the test object is tested using a 1.2/50us voltage impulse having 6kV or 8kV peak. PIM 100 can be used to test up to 7.4kV peak. PIM 100 together with VTM 15000 can be used to test up to 15kV peak.

Ordering information for Haefely test equipment according to IEC/EN 61008-1 & IEC/EN 61009-1

All of the following Haefely equipment is fully compliant to the relevant sections of the standards.

Type	Article No.	Short description
PSURGE 8000	249900	Controller
PIM 100	249902	Combination wave module - impulse voltage 1,2/50us up to 7.4kV - impulse current 8/20us up to 3.7kA
PIM 110	249903	Ring wave tr 0.5us±30% / 100kHz module up to 640A
PIM 200	249949	Impulse current module 8/20us up to 12kA
VTM 15000	249996	Voltage doubler for the 1,2/50us impulse. Up to 15kV impulse voltage when using with PIM 100. Used to test the impulse voltage withstanding capability of the test object isolation.

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