

Application Note: Dips and Interrupt Testing according to IEC 61000-4-11 Edition 2 (2004)

Introduction

There has been a great deal of change recently to the IEC 61000-4-11 standard for dips and interrupt testing. In March 2004 the latest version, IEC 61000-4-11 Edition 2 (2004) was approved by the IEC.

The new EN 61000-4-11:2004 which is derived from the IEC 61000-4-11 Edition 2 (2004) can be used from the first of March 2005 on and must be used from first of June 2007 on. This is also the withdrawal date of the current EN 61000-4-11:1994 + EN 61000-4-11:1994/Amendment 1 :2001.

IEC 61000-4-11 Edition 2 incorporates IEC 61000-4-11 edition 1 (1994) + IEC 61000-4-11 Amendment 1 (2000) and also includes additional requirements and clarifications:

- Introduction of a new dips level
- Clarification of how to test three-phase equipment
- Better definition of the over- and undershoot and the voltage change
- New definition of the optional voltage variations test
- Clear definition of EUT classes, preferred test levels and test durations

The new edition brings better defined test equipment and test procedures to increase the reproducibility. It also deals with the problems of three phase EUTs.

The intention of this application note is to describe the most important changes such as the new dips level and the three-phase requirements and to discuss current products offered by Haefely for complying with the new requirements.

What is really new in IEC 61000-4-11 Edition 2?

Introduction of a new dips level

The dips level 80% is added to the known levels from IEC 61000-4-11 Edition 1. So the required dips levels are 0%, 40%, 70% and 80%. In table 1 of the Edition 2 it is specified which dips level must be used for which class of EUT. The dips level depends on of the environmental class of the EUT.

Voltage Variations

The time parameters for the voltage variations specified in Edition 2 are completely different from those specified in Edition 1. However, experience in the real world has shown that voltage variations seldom occur in the power network. Thus, voltage variation tests are specified as an optional test only.

Detailed description how to test three-phase equipment

Unlike Edition 1, the Edition 2 clearly defines how to perform three-phase tests.

Short interruptions should be applied in all three phases simultaneously. This shortens the test time compared to the phase by phase test as described in edition 1.

Unlike the interruption test, the voltage dip test is performed at each individual voltage (i.e. each phase to phase and phase to neutral combination consecutively). Edition 2 distinguishes between systems with and without neutral. For systems with a neutral there are six series of tests. For systems without a neutral the series of tests is reduced to three. Figures 1 to 3 show the different test series. Figure 4 shows an unacceptable series of phase to phase voltage dips.

Product standards may require the more severe balanced three phase dips. This means that all three phases have dips at the same time.

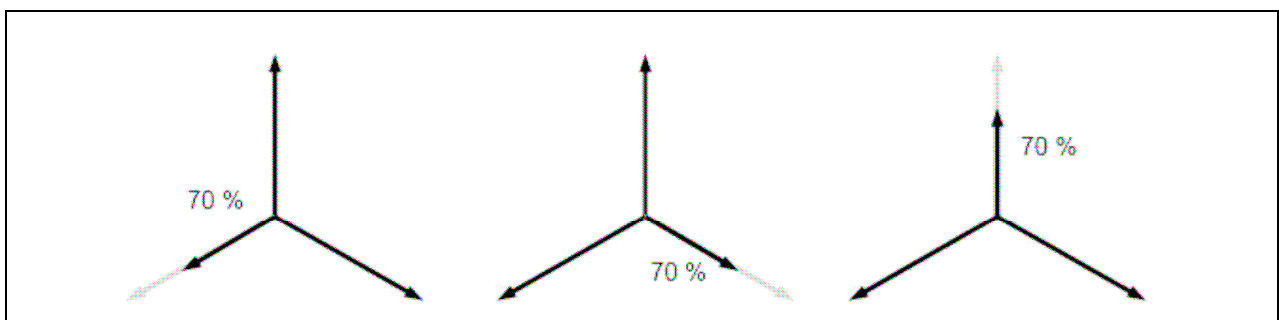


Figure 1: Phase to neutral testing on three phase systems. Phase to neutral testing on three phase systems is performed one phase-neutral combination at a time.

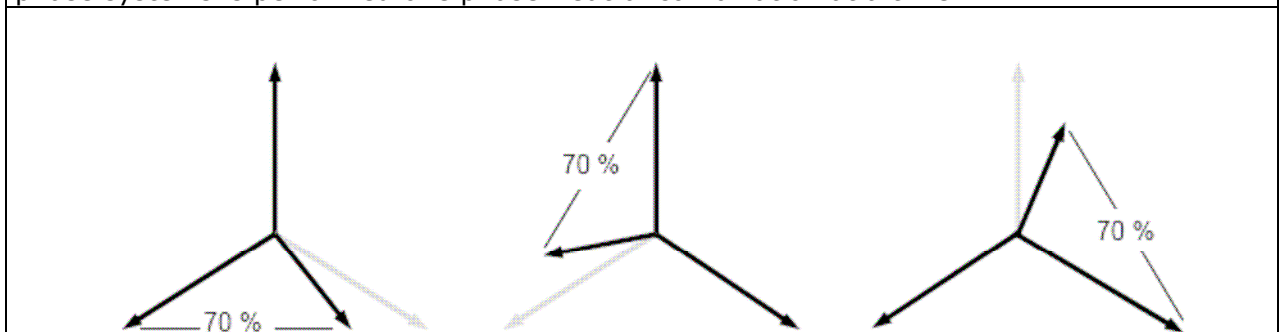


Figure 2: Phase to phase testing on three phase systems - preferred phase shift. The system may have a neutral or not. Phase to phase testing on three phase systems is also performed one phase at a time.

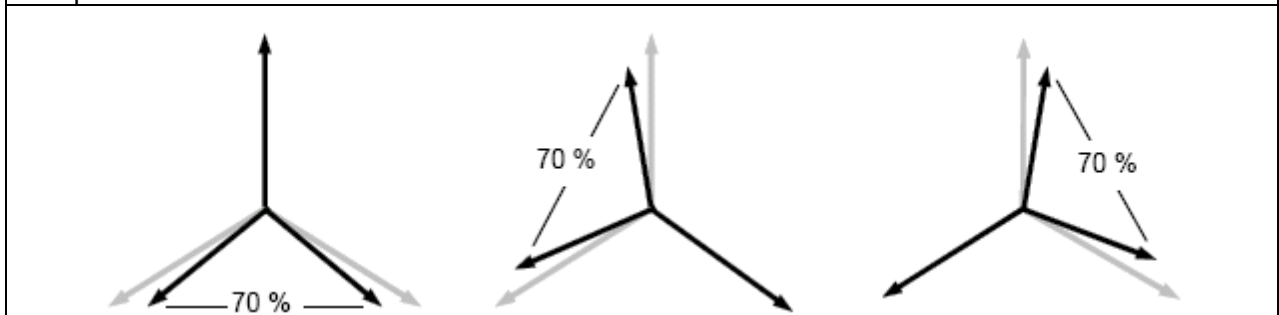


Figure 3: Phase to phase testing on three phase systems -acceptable phase shift. The system may have a neutral or not. Phase to phase testing on three phase systems is also performed one phase at a time.

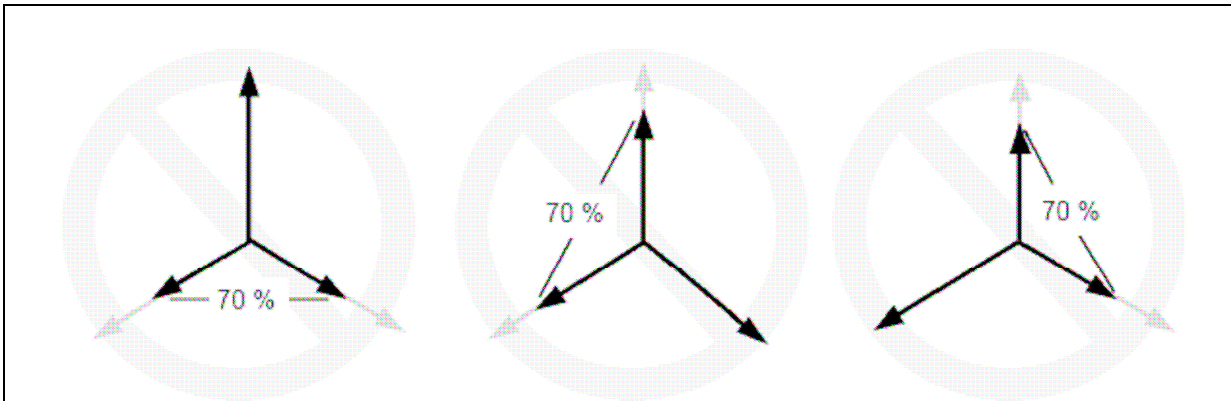


Figure 4: Not acceptable - Phase to phase testing without phase shift. This occurs when dips transformers are connected in star configuration to test phase to phase voltages.

This description of the three phase test procedures is also true for the IEC 61000-4-34. (Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase).

Haefely Products for testing IEC 61000-4-11 Edition 2 (2004)

PLINE 1610 and ECOMPACT 4 (also those ones delivered in the past) are fully compliant to single-phase dips and interrupt requirements of Edition 2.

As the voltage variation time parameters specified in Edition 2 are completely different to those specified in Edition 1, PLINE 1610 voltage variation test does not comply to the requirements of Edition 2. Voltage variation tests are specified as "optional" in Edition 2 and need not to be performed usually.

As Edition 2 has new requirement for simultaneous test of interrupts and phase shift for phase to phase dips, PLINE 1610 with three phase extension PLS 1630 is not fully compliant to Edition 2, but can be still used for meaningful precompliance tests.

Haefely plans to provide a fully compliant solution for three-phase tests soon.

Ordering Information for Haefely Equipment according to IEC / EN 61000-4-11 Edition 2

Type	Article No.	Short description
PLINE 1610	249555	Single-phase generator for dips and interrupts
ECOMPACT 4	249100	Compact tester for burst, surge and single phase dips and interrupt testing

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