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Manual

iec.control

Manual for iec.control Software
(Version ≥ 10.2.0)

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Preliminary note

This manual describes the operating software to control AMETEK CTS transient generators of the series 500, NX-series, NSG 30x0A-series, motorized variacs, AC/DC-sources and their 3-phase switches for Power Fail applications from EM TEST and Teseq.
Further information about the technical data and the pulse parameters are listed in the manuals of the test generators.

Generators offering customized features are not explained in this manual. The parameter windows for special pulses are basically the same as for the standard pulses.

For supplementary information about the referred standards, the technical data and the pulse parameters can be found in the manual for the customized generators of AMETEK CTS.

Update Version 10.2.0

New Devices

- vsurge NX8.1
- vsurge NX8.2
- DCD 5-A sr-8-4.1

New Equipment

- HSC 4-8.1

Device Firmware

- App.sw.industry V6.5.0

New Features

- vsurge NX20 : Display of Ipeak / Vpeak at window and report
- vsurge NX20 : Setting of Vmin
- IEC61000-4-34 : Support of Voltage Dip according "C3 Acceptable Method 2"
- Interface Setup now with tabs
- Editor window’s with new menue line
- Saving coupling settings after disabling the device is now possible

Table of Contents

1 Introduction

1.1 Preliminary Remarks

The software *iec.control* is operated under MS-Windows. It is the remote-control software for **EM TEST** transient generators (families NX and 500N and older 500M series) and some devices from the **Teseq** (NSG family)
The capabilities of the software are (without license key):

- Remote control of EM TEST transient generators of the series 500 and NX
- Remote control of Teseq NSG 1007 and NSG 2200-3
- Remote control of Teseq NSG 3040A and NSG 3060A
- Remote control of Teseq NSG 3040, NSG 3060 and NSG 3150
- Saving all parameter settings of a test as a test file (generate test files).
- Running a test with pre-selected parameters.
- Combining various test files in one test sequence (generate link files).

With an additional license for each connected device, following functions are available:

- Creating a test report into an RTF-file which allows further procurement within another word processing software recognizing RTF-file format.
- Using the standard library.
- Running standard tests at different standard test levels.

The manual explains as detailed as possible all the functions of the software which are available for the user.
Due to the extensive variety, however, not all possibilities and options can be addressed in this manual.

The program is subject to change without notice.

1.2 Upgrade from previous versions

With the upgrade of the software to version 10.x the formerly used test- and link files can no longer be used. This is due to some control commands being extended compared to former versions.

Therefore the most test- and link files from *iec.control* versions < 10.00 are not running and the user have to generate them again.

1.3 Requirement to the reader

The reader must be familiar with the EMC matter. This manual includes only limited information concerning to standard application. Please consult the relevant standard.

1.4 Technical Requirements

Before you install the iec.control software please make sure that your PC meets the system requirements of the iec.control.

Your computer should at least meet the following characteristics:

Processor	Dual Core or better
Memory	2 GByte at least
Hard disk	at least 500 MByte memory available
Windows™	Windows 7, Windows 8, Windows 10 (32/64 Bit)
Interface	USB or IEEE 488 Interface card (National-Instruments)

Table: Supported Operating Systems (Windows)

Windows	XP	Vista (32 Bit)	Vista (64 Bit)	7 (32 Bit)	7 (64 Bit)	8 (32 Bit)	8 (64 Bit)	10 (32 Bit)	10 (64 Bit)
iec.control V10.x.x				X	X	X	X	X	X

All not listed operating systems are not supported.

Interface
Single devices may be operated via the serial interface whereas in configurations of several devices the parallel IEEE interface is used. Therefore the computer has to be equipped with the corresponding interfaces.

	Interface				
Device family	**RS 232**	**USB**	**Opto - (USB)**	**GPIB**	**Ethernet**
NX series			X		X
500 series	(X)			X	
500 M/N series		X		X	
NSG 1007	X			X	
NSG 2200	X				
NSG 30x0A			X		X
NSG 3040/3060					X
NSG 3150					X

USB interface
The USB interface is a standard interface that you can find in every computer. Unfortunately, this interface is not designed for use in a high voltage environment and therefore, depends on the interface design, it is possible to get interferences when operating with higher test voltages with burst and surge tests. Such errors can happen at test voltage above 2000V.

The problems can be reduced or eliminated when using the follow rulers:
- using high quality screened cables
- using ferrites for suppress transient interferences
- using a correct test setup
- cabling, earthling, and filtering must be according the requirements of electrical installation in an EMC environment

Alternatively, the Optolink is recommended with a USB port on the computer side, which guarantees an isolated connection.

1.4.1 National Instruments driver software and settings

For use the GPIB interface it is necessary to have installed a driver version who match the current software version.

As standard we recommend to use : IEEE Interface **Type PCI-GPIB** of **NATIONAL INSTRUMENTS**

The table below shows the list of supported GPIB card. All not listed IEEE cards are not supported.

Table: Supported IEEE Cards (National Instruments)

Card			
AT-GPIB	PCIe-GPIB[2)]	PCMCIA-GPIB[2)]	GPIB-USB-A[1)]
AT-GPIB/TNT	PCI-GPIB[2)]	ExpressCard-GPIB[2)]	GPIB-USB-B[1)]
AT-GPIB/TNT (Plug and Play)			GPIB-USB-HS[2)]

1) only under Windows2000 and Windows XP
2) from driver **version 3.0**

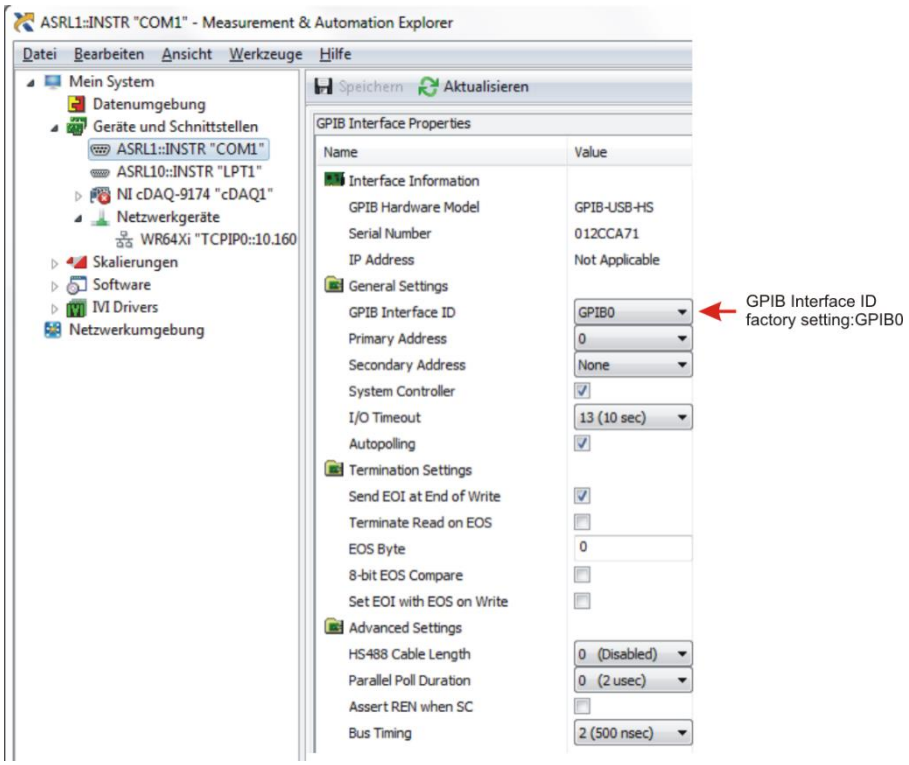
Possible Error after installation

This error occurs under the following circumstances:

- GPIB Interface ID is not GPIB0
- NI-488 driver version is too old for this software and must be updated

IEC.control recognize the GPIB interface only under the

GPIB Interface ID= **GPIB0**



1.5 Directory Structure of the Software *iec.control*

The software shows the following directory structure:

1.5.1 Program files

C:\Program Files (x86)\AMETEK CTS\ ieccontrol

PROGDATA	
USB	This directory includes the Microsoft Windows USB drivers
VISA	This directory includes the National Instruments VISA drivers

1.5.2 Data files

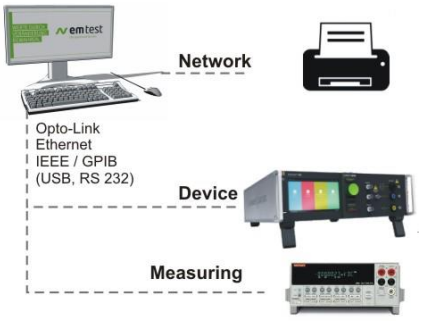
C:\ProgramData\AMETEK CTS\iec.control

Equipment	Correction factors magnetic field accessories
Instrument	Measuring instruments parameter settings
Link	The directory LINK is used to store your own created link files.
Media	DCD setup-pictures
ProgData	
Device	Directory with the supported devices and their settings
Standard	Place where the modified standard files are stored. (*.nox and *.nop)
Update	NX com.cts.appsw software related to the current iec.control version
Report	
Header	Proposals for report header files in different languages.
Plot	This directory includes the plots created from oscilloscope created plot files.
Test	This is the directory where you store your own created test files.
ieccontrol.ini	Ini file for iec.control configuration
Monitor.txt	Monitor file
Commentx.txt	List of comments during an ongoing test

1.6 Structure of the Test System

The setup includes the computer with *iec.control* software for Windows, a printer and the IEEE bus / Ethernet / Opto-Link connecting to the used generator, device or instrument model. The software only enables functions of devices which have been properly initialized.

For using the USB, a shielded connecting cable is recommended. In case of RS232 use a 9 pin Sub-D connection cable with direct wiring (no crossed wires).



1.7 Computer settings restrictions

The following computer settings are mandatory for proper software operation.

Settings	Remark
Energy safe or **Suspend Mode** must be disabled.	Windows sets the IEEE interface in the standby mode. The software can switch to simulation mode. Problems occur with long durations tests, where the PC is idle for a long time.
Screen safer must be disable	Screen safer can influence the running program.
Hard disk sleep mode must be disable	The access of programs to a hard drive in sleeping mode may be a reason for program conflicts.
Notebook operation use mains power	When the storage battery is low, the notebook will close the program and shut down the computer. The test generators keep in remote status.

2 Setting up the Test System

This chapter covers the installation of the software and all the different settings which are necessary to allow the proper operation with the connected test generators. Further and more detailed information is given in the corresponding chapters of this manual.

The setting up procedure of the Test System includes the following points:

- Install the Software
- Startup and check of the connections
- Select the devices in use
- Configure the interface and select the desired operation mode
- Set the EUT voltage

2.1 *iec.control* Software Install and Uninstall

2.1.1 Installation

To start the installation selects the routine **ieccontrolSetup.exe** from the software CD.

1. Press **Next** to continue

The installation routine guides you with an easy dialogue through the installation procedure. During the installation, the relevant data will be expanded, copied and the user program will be installed either in a new or in an existing program group.

2. Press the field: I accept the terms of **License Agreement**.

3. Press **Next** to continue

4. Accept the default Product install path

5. Check the available disk space

6. Press **Next** to continue

7. Press **Install** continue

8. Press **Finish** for terminate the installation.

2.1.2 Uninstall

1. Start the uninstall procedure in the **System control** and

   select iec.control for **uninstall**

2. Select **Uninstall** for remove installation

3. Press **Next** for start the uninstall procedure

4. Click **Uninstall** to remove iec.control

5. Click **Finish** after a successful uninstall procedure

2.1.3 Start-up and Communication Check

Start-up Window of *iec.control*

Upon start-up *iec.control* recognizes all registered and operational test generators.

At the first start-up no generators are registered and *iec.control* is in simulation mode.

Figure 2-1: Window during start-up

2.1.4 Desktop and Operating Areas

The following figure shows the desktop of *iec.control*.

1 Menu Bar
2 Mode (Standard or Device)
3 Selected Standard
4 Selected Application
5 Available applications / pulses
6 Functions
7 Available Pulses depend on selected application
8 Operating Mode (Active no indication / Simulation)
9 Connected devices

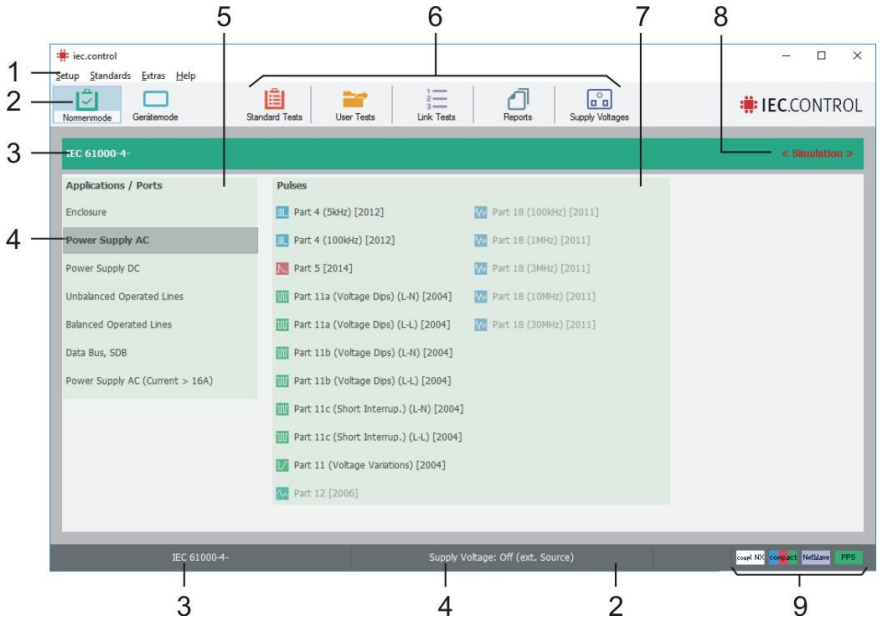


Figure 2-2: Desktop of *iec.control* in the simulation mode

The software *iec.control* distinguishes two different operating areas:

- **Standard Mode**

  In the **Standard Mode** the selected test standard and test application forms the basis for all tests. Based on the standard the required test pulses and parameters are automatically loaded by *iec.control*. Depending on the selected pulse *iec.control* initializes the necessary test generator.
  Further information about this operating area is provided in chapter 4.

- **Device Mode**

  In the **Device Mode** the test generator forms the basis for all tests. Based on the selected test generator *iec.control* automatically loads and provides all possible test pulses on the desktop. In this area, the access to the standard library is disabled. Further information about this operating mode is provided in chapter 5.

2.1.5 First step after Software Installation

NX- series

N- series

500 series

NSG 2200 / NSG 1007

NSG 3040/3060

NSG 3150

This software is designed to support the new EM Test NX and N-series.
Therefore, after the installation only the EM Test devices from the NX- and N-series are visible in the Device setup.

All: Shows all EM TEST generators supported since 1994 like equipment from the **previous 500 series** and all **NX- and N-series** and supported **Teseq NSG devices**

N- Series: Shows all generators of the **NX- and N-series** in the list (from 2008)

NX-Series: Shows only generators of the **NX series** from 2015 and later

NSG-series Shows the Teseq **NSG 3040A, NSG 3060A, NSG 3040/3060, NSG 3150, NSG 1007** source and the **NSG 2200-3** AC switch

1. Select menu **Setup / General** for open the General Setup
2. Activate in the frame Device List the field **All** to open the full device list with all supported EM Test and Teseq devices.
3. Click to **OK**
4. Select menu **Setup / Device** for enters your devices into the list.

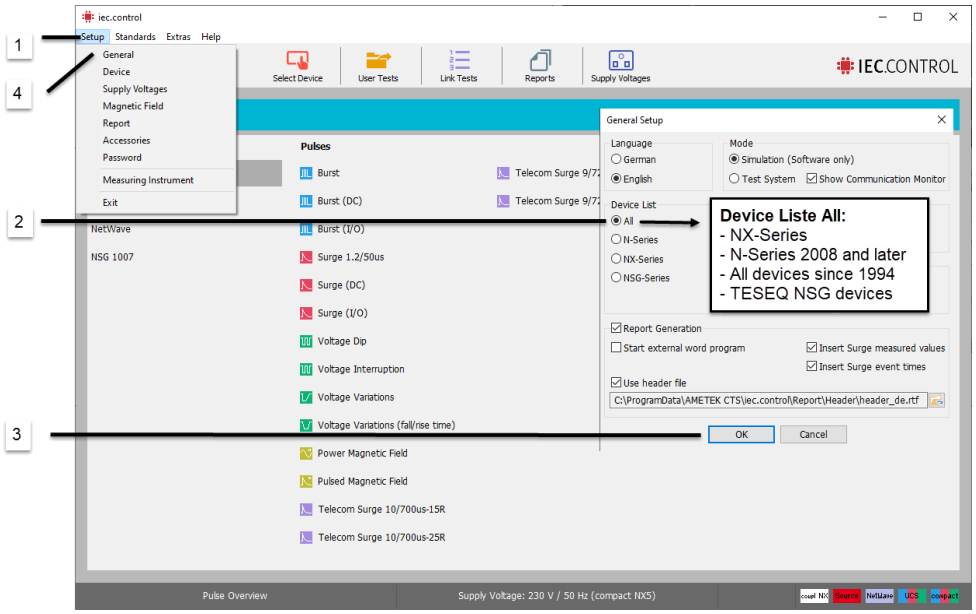


Figure 2-3: Settings for show all devices

2.1.6 Setting of operating mode of the system

The next step is to set the operating mode to Test System. This is done in the menu **Setup / General** in the field Mode.

See the following system configuration:

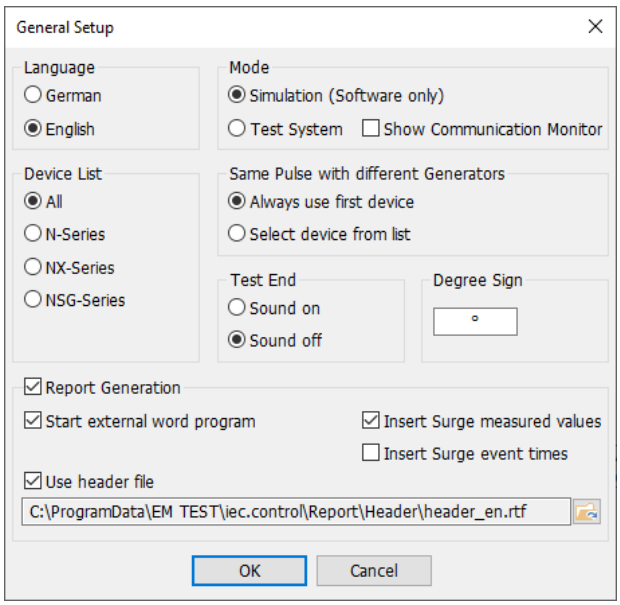


Figure 2-4: Device Set-up

How to proceed for set the Area Mode (Figure 2-6)

1. Set the mode to **Test System**
2. Press **OK**

2.1.7 Configuration of the system

After the first start-up of *iec.control* you need to register the available or connected test generators. This is done in the menu **Device Setup**. See the following system configuration:

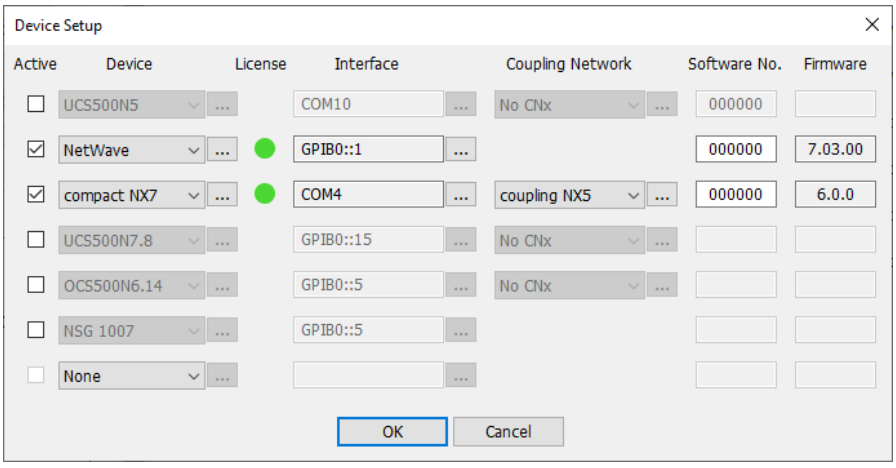


Figure 2-5: Device Set-up

In a first step you need to specify the test generators which shall be controlled via software. All actual available devices that can be controlled via *iec.control* are listed in the pull-down menus. To control special test generators that are not offered in the pull-down menus the general description shall be selected for this device.

Figure 2-6 : Software licenses

Software licenses (if ordered) will be provided on a separate document which comes along with *iec.control* (Figure 2-6)

For each device, the software license code, the serial number, and the device's address shall be entered.
When entering the device's address please make sure that this address is identical with the one of the devices. Furthermore, each address can only be used once. When completed please confirm all entries with **OK**.

2.1.8 Settings for EUT supply voltage

The variac transformer parameters are settable in the menu Setup / Supply voltage. For detailed information about the settings, see chapter 3.2.3 Supply Voltage.

Window for using Variable Transformer

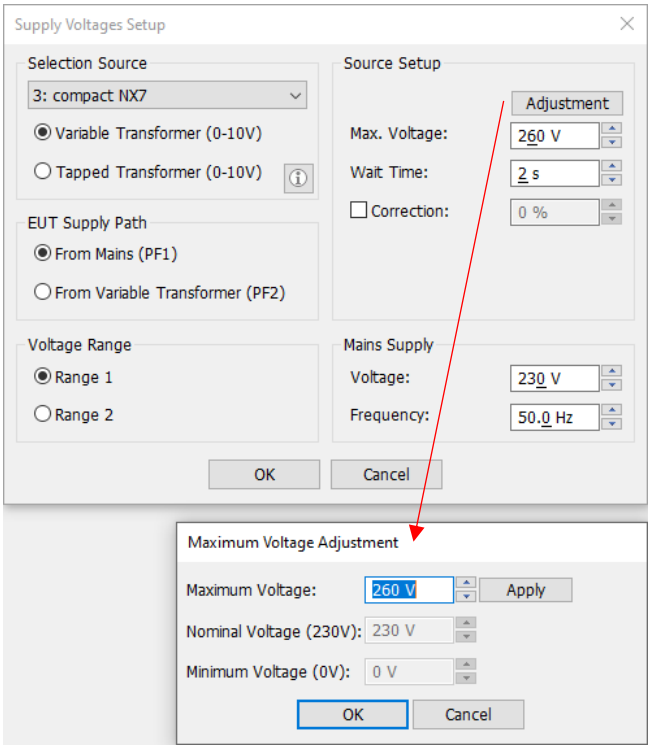


Figure 2-7: Settings for variac transformer parameters

Parameter setting:

Supply Path: Default channel for compact NX, UCS, NSG 30x0A and PFS generator. After initialization, the generator switches to this channel.

Voltage Range

Pre-selectable voltage range of the variable transformer. The program offers two ranges settings for user testing equipment for “High” 230 V and “Low” 120V.
The user can individually set the ranges in the field **Mains Supply**.

Example:
- Range 1: 230 V / 50 Hz
- Range 2: 115 V / 50 Hz

Source Setup
Max.Voltage: maximum voltage of the variac
Wait Time: Time requirement for move 0-100%. The SW will calculate the moving time and starts the test when the variac is in the correct position
Correction: Correction values for adjusting the Variac control speed

Window for using Tapped Transformer

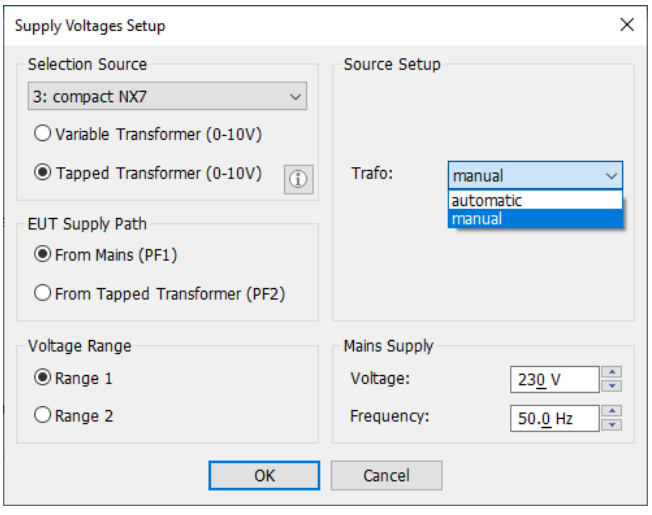


Figure 2-8: Settings for Tapped transformer parameters

Parameter setting:

Supply Path: Default channel for compact NX, UCS, NSG 30x0A and PFS generator. After initialization, the generator switches to this channel.

Voltage Range

Pre-selectable voltage range of the tapped transformer. The program offers two ranges settings for user testing equipment for “High” 230 V and “Low” 120V.
The user can individually set the ranges in the field **Mains Supply**.

Example:
- Range 1: 230 V / 50 Hz
- Range 2: 115 V / 50 Hz

Trafo: Select whether you use a manual or automatic transformer

Window for using NetWave

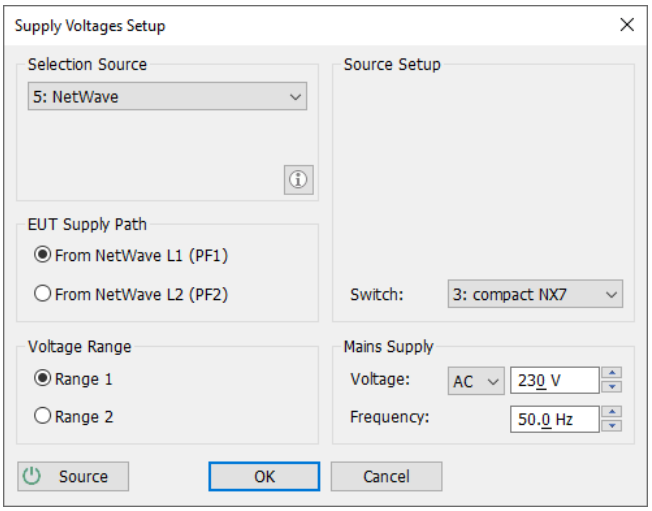


Figure 2-9: Settings window using a NetWave

Parameter setting

Supply Path: Default channel for compact NX, UCS, or PFS generator. After initialization, the generator switches to this channel.

Voltage Range

Pre-selectable voltage output of the Netwave. The program offers two ranges settings for user testing equipment for “High” 230 V and “Low” 120V.
The user can individually set the ranges in the field **Mains Supply** (L-N).

Example:
- Range 1: 230 V / 50 Hz
- Range 2: 115 V / 50 Hz

Source: Switch for power ON/OFF the EUT Supply at the NetWave

Switch: Set the generator to be used as a switch here

Star Connection: Line to Neutral
- Mains supply voltage: Voltage between Line and Neutral
- Angle offset (AC sync): Phase shift between the zero crossing of the mains and NetWave. (approx. 2.7º)

Delta Connection: Line to Line
- Mains supply voltage: Voltage between Line and Line. Enter the voltage L-N. (The software will multiply wit 1.73).
- Delta connection Line to Line; Enter the line -neutral voltage
- Angle offset (AC sync): Phase shift between the zero crossing of the mains and NetWave. (approx. 2.7º)

Window for using NSG 1007 with NSG 2200-1

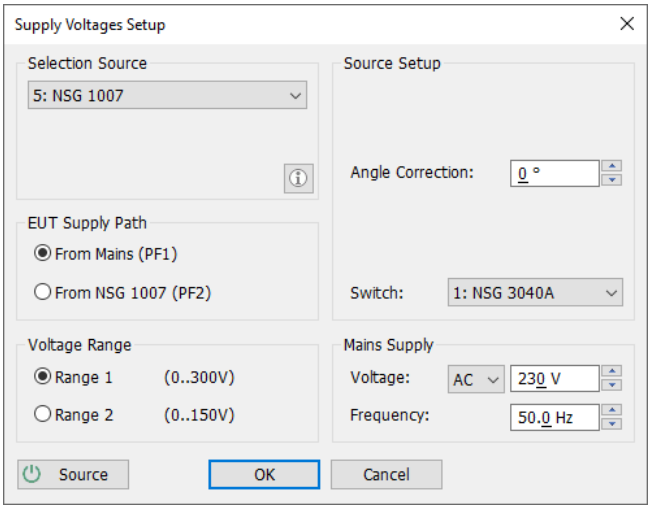


Figure 2-10: Settings window using a NetWave

Parameter setting

Supply Path: Default channel for PFS generator. After initialization, the generator switches to this channel.

Voltage Range

Pre-selectable voltage range of the variable transformer. The program offers two ranges settings for user testing equipment for “High” 230 V and “Low” 120V.
The user can individually set the ranges in the field **Mains Supply** (L-N).

Example:
- Range 1: 230 V / 50 Hz
- Range 2: 115 V / 50 Hz

Source: Switch For power ON/OFF the EUT Supply at the NSG 1007 source

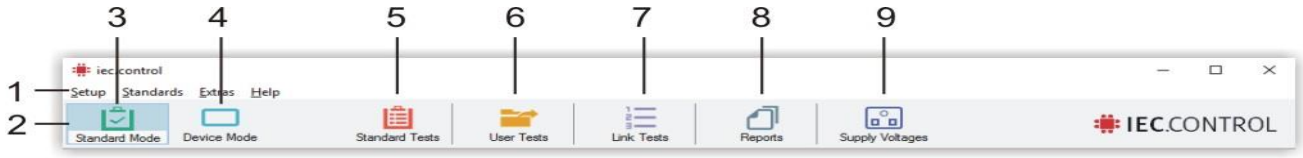
Switch: Set the generator to be used as a switch here

Star Connection: Line to Neutral
- Mains supply voltage: Voltage between Line and Neutral
- Angle offset (AC sync): Phase shift between the zero crossing of the mains and NetWave. (approx. 2.7º)

Delta Connection: Line to Line
- Mains supply voltage: Voltage between Line and Line. Enter the voltage L-N. (The software will multiply wit 1.73).
- Delta connection Line to Line; Enter the line -neutral voltage
- Angle offset (AC sync): Phase shift between the zero crossing of the mains and NetWave. (approx. 2.7º)

3 Structure of the menus

3.1 Overview



Menu Bar (1)

Setup:	System configuration and setting
Standards:	List of the last used standard tests
Extras:	Enable and disable of input protection, change standard levels, instruments and Standard factory setting, Local / Remote operating
Help:	Show log file, program setting, data path; About

Tile Bar (2)

Standard Mode:	Switch to “Standard Mode” from “Device Mode”; enable “Standard Tests”
Device Mode:	Switch to “Device Mode” from “Standard Mode”; enable “Select Device”
Standard Tests:	Loads a Standard from the library
User Test:	Load a User Test from the library
Link Tests:	Load a Link Test from the library
Report:	Opens a Report
Supply Voltage	Opens the supply voltage setup

Menu “Setup“

General	Selection of - Language - Operating Mode - Device List - Beep at Test End - Same Pulse with different Generators - Phase shift degree Sign - Report settings
Device	Selection of – Devices activate in table – Devices to be controlled – License code – Interface address (GPIB, RS232 / USB, Ethernet – Coupling Network definition Display of – Software number – Firmware version or actual device status
Supply Voltage	Selection of - Selection of Source type - Source setup (Star Connection and Delta connection settings) - max variac voltage - Mains supply voltage - Wait time - Default Supply Path - Voltage range variac transformer - Mains supply setting
Report	Entry of information (name, test object, temperature etc.) which will be included in the data file for reporting.
Accessories	Entry up to 10 additional devices used during a test which will be included in the data file for reporting.
Password	Change password to change standard settings.
Measuring Instrument	- Settings and selection of measuring device - Measuring cycle time - Plot directory
Exit	Close the program

Menu “Extras”

Enable / Disable “Input Protection”	Activation / Deactivation of the input protection
Enable / Disable „Change standard level“	Activation / Deactivation of the password protected area to change standard settings.
Reset all pulses to factory settings	All pulse parameters will be set back to factory settings.
Local device control	Set device from remote to local mode.

Menu “Help“

Log Information	Opens the file monitor.txt
Service Information	Opens the file Settings.txt
Show Data Path	Opens the directory with the data path
Open Manual	Opens the iec.control User manual
About *iec.control*	Software version

3.2 Menu for configuration and operating

3.2.1 Setup General

In the menu **Setup / General** according to (Figure 3-1) you can select the language, the operating mode, a filter for device list, the degree Sign, the report and the beep setup.

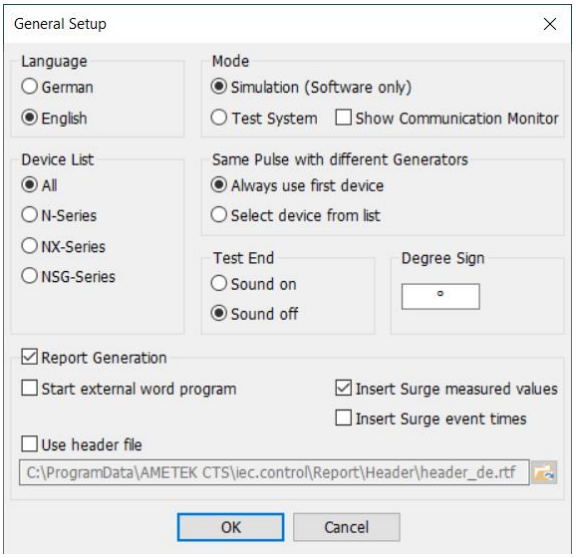


Figure 3-1 : Windows General Setup

Language

You may choose between German and English. The test report will be created in the selected language.

Device List

If you select the “All” option, the Device List will show you the complete list of available devices. Otherwise only the new N-series or NX-Series or NSG Series devices are shown.

Option	
All	The Device List displays a complete list of available EM TEST generators.
N-Series	The device list shows the N- series generators from 2008 and later.
NX-Series	The device list shows the actual NX- series generators form 2016 and later.
NSG Series	Supported Teseq devices

Mode

The program offers two operating modes.

Option	**Mode**
Test System (Devices active)	The program runs with all defined devices with the selected interface. The symbol in the right bottom corner shows the recognized and used devices.
Simulation (Software only)	*iec.control* simulates the selected impulse with the defined hardware components.
ShowCommunication Monitor	The program shows in a new window all commands between the computer and the device. For see the data select menu ***Info / Show Log File***.

Same Pulse with different Generator

By choosing the option “always use first device”, the selected pulse / standard will be played from the first device able to do it.

By choosing the option “Select device from list”, before the opening from a pulse / standard, a pop-up windows appear to give you the opportunity to choose the device witch them it will be played.

Monitor function

By selecting the option ”Show communication monitor”, the communication monitor will be open automatically by starting the iec.control. The interfaces can be controlled during a running test. This function shall only be used for diagnostics.

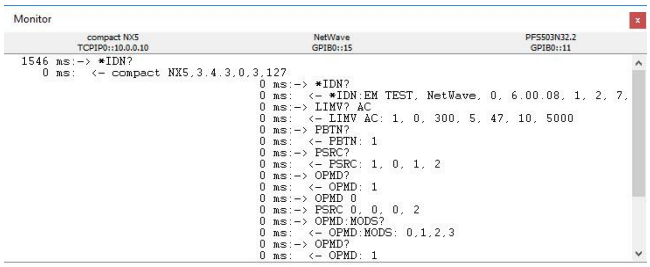


Figure 3-2: Interface Monitor window

Test End

When a test is completed the software can deliver an acoustic signal. This function can be selected in this section.

Option	End of test
Sound on	At the end of a test the software delivers an acoustic signal.
Sound off	At the end of a test the software doesn't deliver an acoustic signal.

Report

In this section, you may select some setting for the report generation.

Option	Report
Report Generation	When this check box is activated, a report will be automatically generated at the end of a test.
Start external word program	To launch the word processing program and show the report.
Use header file	If activated and a header file is selected iec.control will use the selected header file for the RTF-base report generation (see chapter 3.2.4).
Insert Surge meas. values	Will display the peak values of surge voltage and current in the report.
Insert Surge event time	A time stamp at every surge impulse will be displayed in the report.

3.2.2 Device Configuration / License entry

In the menu **Setup / Device** the setup dialog for the device configuration is shown (Figure 3-3). In this dialog the devices are specified which shall be controlled by *iec.control*. For each device, the software license code, its serial number, and the device address shall be entered. Furthermore, single devices can be enabled or disabled.

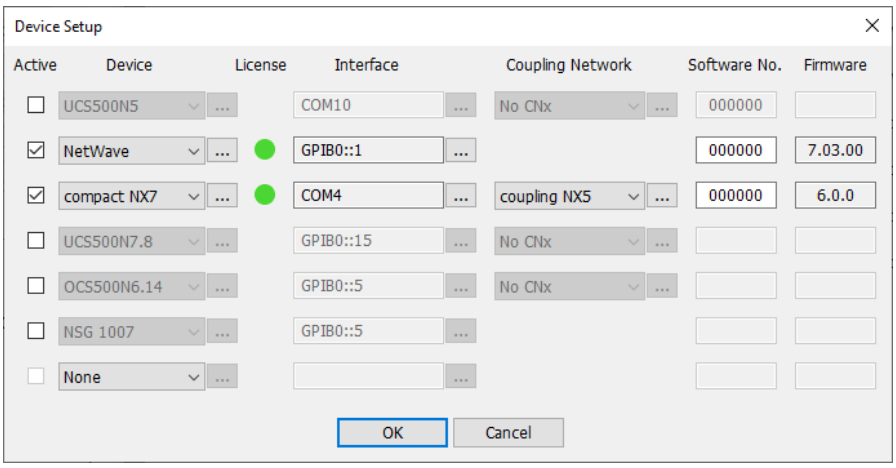


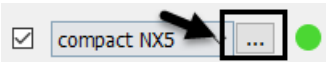
Figure 3-3: Dialogue Config / Device

When the initialization of devices was successful its software number and the device status or firmware version will be displayed. When the dialogue box is left with **OK** *iec.control* initializes the communication with the specified devices and checks the entered license codes. After successful initialization, all enabled test generators can be controlled.

Active
Any of the specified test generators can be enabled or disabled by marking or unmarking this box.
Devices being disabled will not be initialized and controlled by *iec.control*.

Device
The selection of the desired test generators is done from the pull-down menu the row **Device**. Each list contains all test generators that can be controlled via *iec.control*.
If special devices shall be controlled via *iec.control* the general description of the device is selected from the pull-down menu.
iec.control supports a maximum of seven devices. A coupling network used in a complete setup will be recognized automatically.
In the simulation mode all selectable test devices can be simulated within *iec.control*.
When specifying the devices please take care that the order of entering the devices is very important. If the same test pulse is generated by several devices *iec.control* will always work with the first device in the list providing the required test pulse.

Device option […]



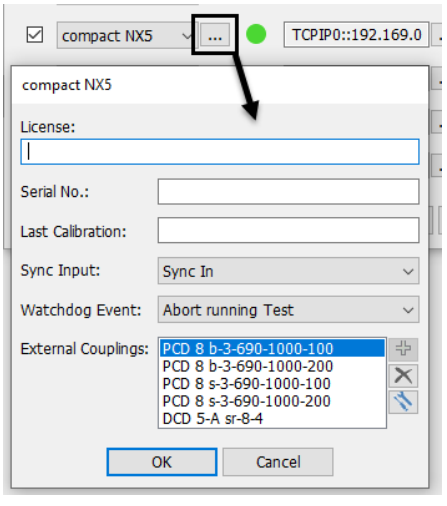
Selecting the field with the tree dots will open an option menu for the selected generator:

License
In the **License** field the license code of the related test generator has to be entered. The license code is provided together with the software USB key.
Without a valid license, *iec.control* only allows to remote control the test generators. Together with a valid license, the standard library is accessible, and it is possible to create test reports as DOC or RTF files for further processing in any other word processing software which is able to handle rtf files.

Serial No
An entry in this row is not mandatory. If the serial number is entered it will appear in the test report. For traceability reasons it is recommended to enter the serial number.

Last Calibration
The last calibration date could be setup. This is shown in the report.

Sync Input
The sync input of the compact NX could be setup to “EUT Mains” or “Sync In”.



Watchdog Event

By a lost communication, the device will react according to the selected option.

- Abort running Test: The test will be stopped
- Continue Test: The test continues

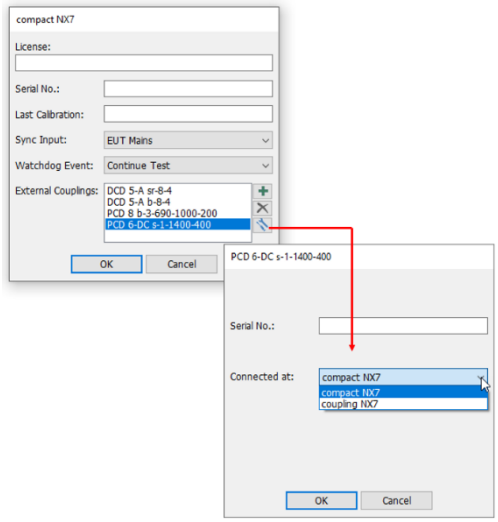
Ext. Couplings
External manual and automatic couplers can be added to use for testing.

The user must select to which device / coupler the external coupler is connected.

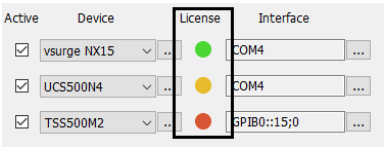
Add External Coupling (NX generators only)
Additional external couplings like PCD 6-DC s-1-1400-400 can be added into the test setup by pressing the "**+**" Button.

Pulse output definition for ext. couplings
Select the Tool button to define where the external coupler will be connected.

Example: The PCD 6-DC s-1-1400-400 will be connected to the compact NX generator.



License indicator LED
The LED-colour indicates the state of the license.
- ● green: License OK
- ● orange: License empty or unchecked (need a restart from the software)
- ● red: License invalid



A click on the indicator LED open the same option menu windows as for the device

Interface
In the "Address"-field the interface address, normally IEEE488 device address or Ethernet IP Address, needs to be entered.
The same address as shown in the display of the related test generator must be entered here. This is the address *iec.control* will search for to communicate with connected test generator.
The addresses given in 4 show the factory settings. When changing any of this address check the related test generator for equal setting of the interface address. Click into field on the right side of the device address for open the interface setup and configure the interface. The user can select between

- NX series: Ethernet and optical RS232/ USB
- All other generators: GPIB / and RS232/ USB interface.

GPIB: Check STB (Status Bit)
Card: the factory setting of the interface card is zero (0)
Address: GPIB Address 0-31

Ethernet: TCP IPO / VICP (LeCroy)
IP address, default 10.0.0.10 (compact NX)

RS 232/COM: Port, COM 1….
Baudrate, default 9600

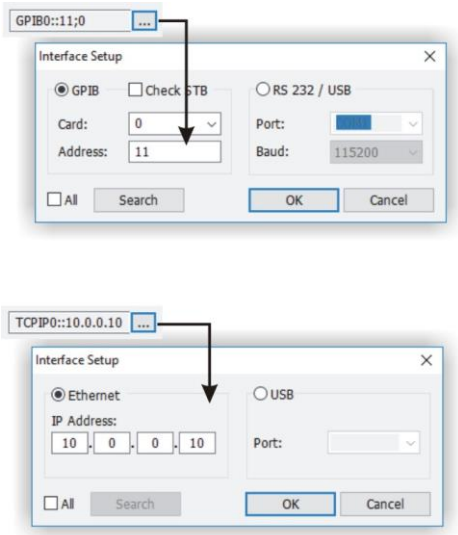
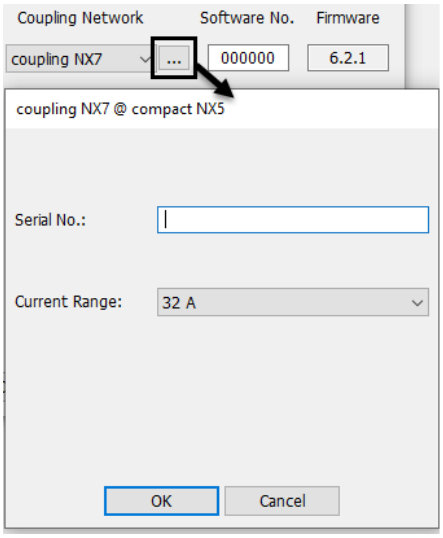


Figure 3-4: Interface setting

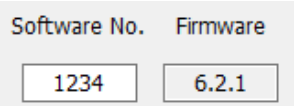
Coupling Network



Serial No
An entry in this row is not mandatory. If the serial number is entered it will appear in the test report. For traceability reasons it is recommended to enter the serial number.

Current Range
If a coupling has a selectable current range the user can selecting an available range.

Software Number
When a device is successfully initialized its software-number will be displayed in this row.

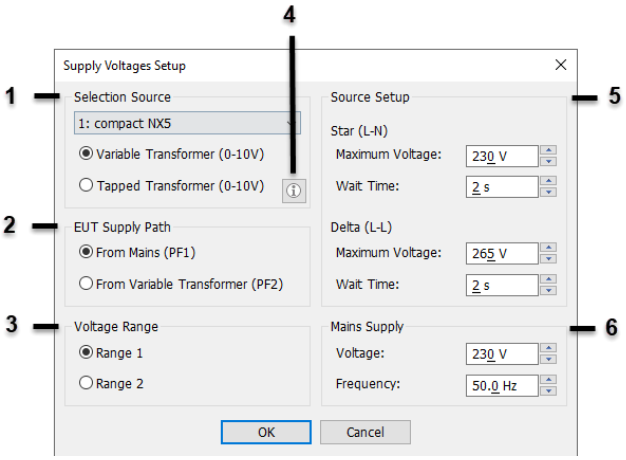


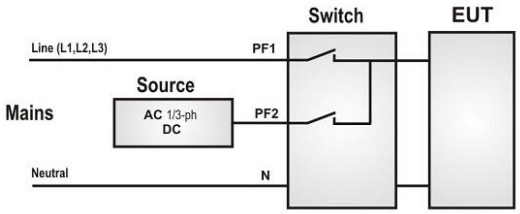
No license entry or the entry of a wrong license will cause "False" to be displayed in place of the software number. If the entered license code is valid the related symbol will show up in the desktop in the bottom right corner

Firmware
In this row the firmware version will appear upon the successful initialization of a device. Using older generators which are not able to communicate their firmware version to *iec.control* the status message „OK“ will be displayed.

3.2.3 Supply Voltage

Within this menu the operator can specify the actual supply voltage used for testing (see Figure 3-5).





Information connection NetWave / NSG 1007

Figure 3-5: Dialogue box Setup / Supply Voltage

1 Selection Source
Selection of the used Source type for voltage dips that is connected to PF2 port. The following settings are possible:

Option	Description
Variable Transformer (0-10 V)	Motorized variac transformer; control with 0-10 Vdc
Tapped Transformer (0-10 V)	Controlled tapped transformer with steps 40%, 70%, 80%; control with 0-10 Vdc
NetWave / NSG 1007	AC/DC source any NetWave or NSG 1007 model.

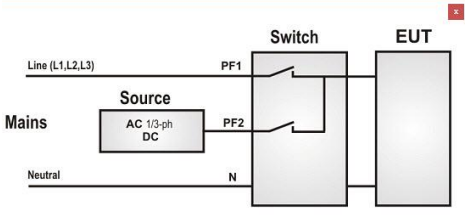
2 EUT Supply Path
Following settings are possible:

Option	Description
PF1	Mains supply.
PF2	External or tapped supply for DIP tests.

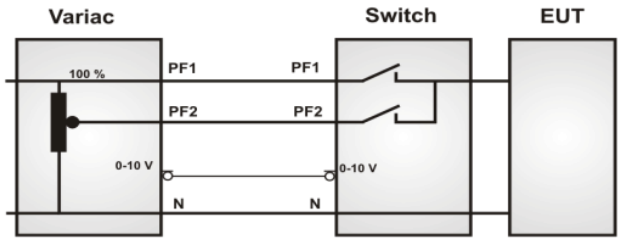
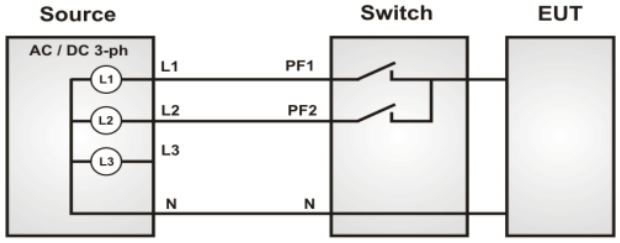
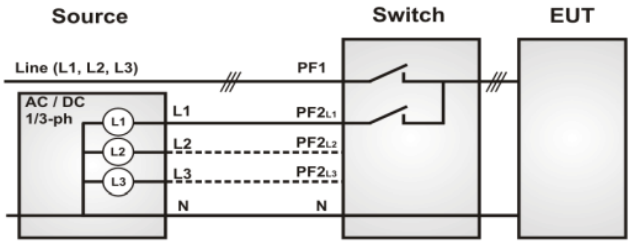
3 Voltage Range
Voltage range offers two tables for enter the parameters of the voltage **Line to Neutral** in this window. This allows to preset the parameters for two EUT voltage level for test labs testing equipment for 230 V (Europe/Asia), 120 V (USA/Japan)

Option	Description
Range 1: 220 … 240 V	Settings for EUT using mains 220 V to 240 V
Range 1: 100 … 120 V	Settings for EUT using mains 100 V to 120 V.

4 Information button
This information button shows the principle connection of the AC source in the setup.

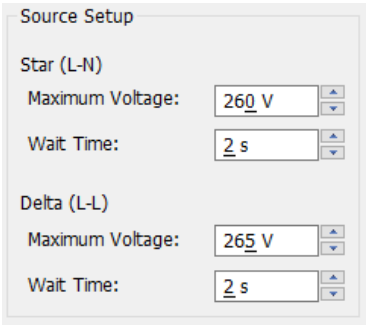
General principle: PF1 → 100%: Mains voltage direct from the grid PF2 → Reduced voltage: Delivered from the AC source 1 / or 3-phase	

Example:

UCS 500N5/N7 compact NX NSG 30x0A NSG 3040	
Netwave	
NSG 1007	

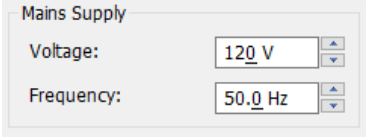
5 Source setup

In this setup, the maximum voltage for 1- and 3-phase operating voltages has to be set, for both star and delta connection.



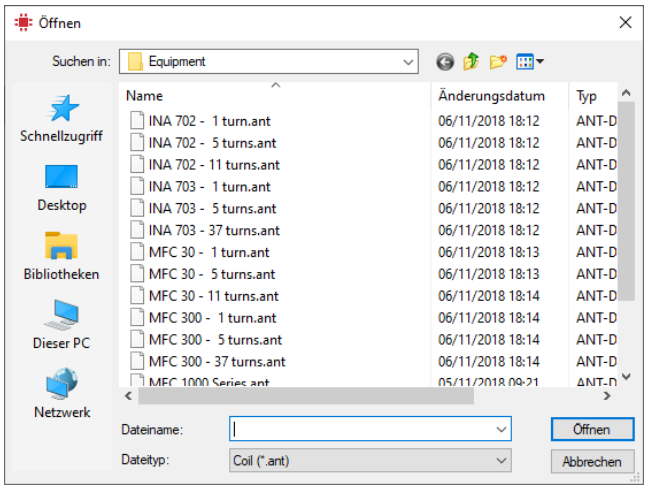
6 Mains supply

The nominal operating voltage has to be set here. This allows to preset the parameters for two EUT voltage level for test labs testing equipment for 230 V (Europe/Asia), 120 V (USA/Japan)

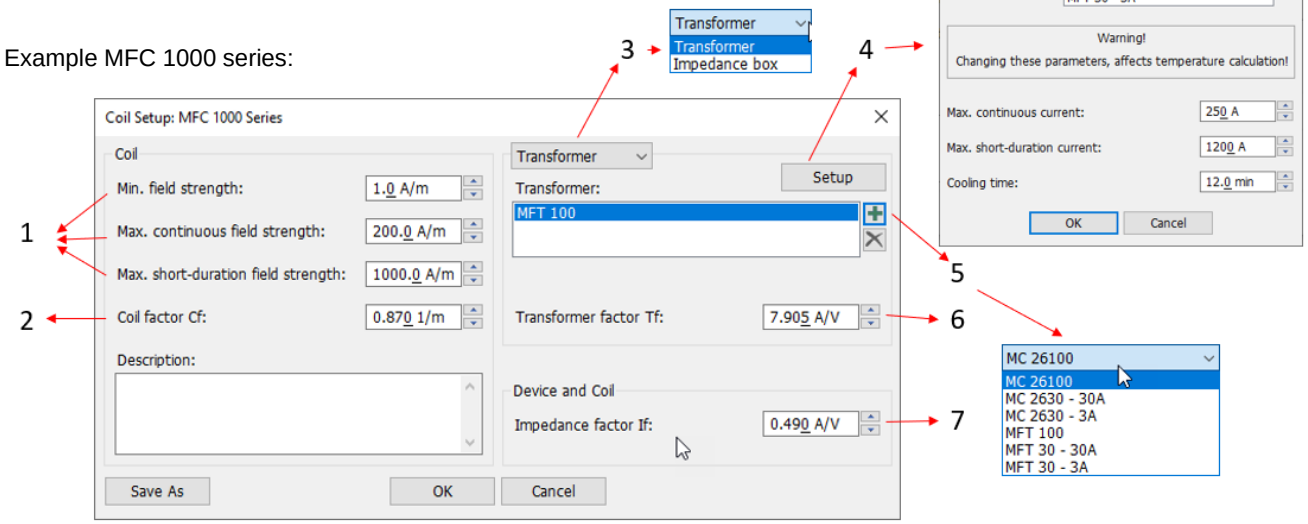


3.2.4 Magnetic Field

To change the coil or transformer factors or to add the current transformer or impedance box first select the appropriate antenna from the list.



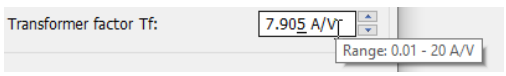
Example MFC 1000 series:



Parameters

1. Minimum and maximum field strength of selected antenna
2. Coil factor
3. Choose if you want to add a current-transformer or an impedance box
4. Parameter-Setup of transformer or impedance box
5. Press "+" button to add a transformer or impedance box
6. Transformer factor of selected transformer
7. Impedance factor of selected device

Hovering with the Mouse over the values will show the possible adjustable range:



3.2.5 Report Configurations

In the dialogue as shown in Figure 3-6 the entries of the report header information can be specified. This header information will be saved together with the test data in the data file of a test.

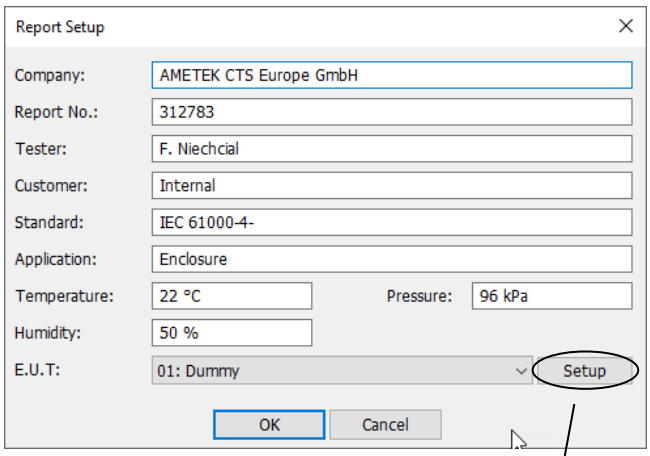


Figure 3-6 : Report configuration

The following information may be altered prior to saving the data file at the end of a test:

- Company/Department
- Report number
- Tester
- Customer
- Standard used
- Application
- Ambient temperature
- Pressure ºC
- Rel. humidity
- EUT

The entry for "Standard“ is automatically adapted by *iec.control* when the standard has been changed. However, manual adjustment is possible at any time.

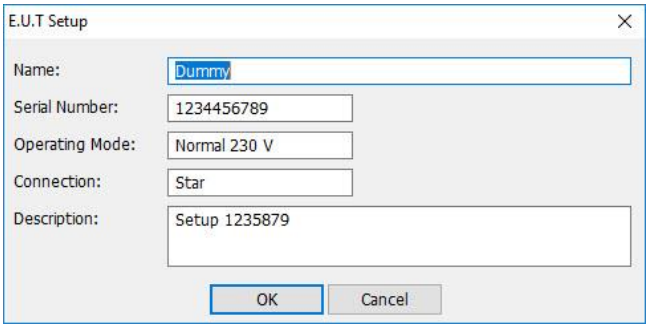


Figure 3-7: D.U.T Setup

With the dialogue "E.U.T Setup" the input of D.U.T data is possible. The following information may be altered prior to saving the data file at the end of a test:

- Name
- Serial Number
- Operation Mode
- Connection
- Description

3.2.6 Additional accessories used in the Test setup

iec.control allows entering accessories which are used in a test. They will be included in the test report to complete the information about the test set-up. See the dialogue box (Figure 3-8)

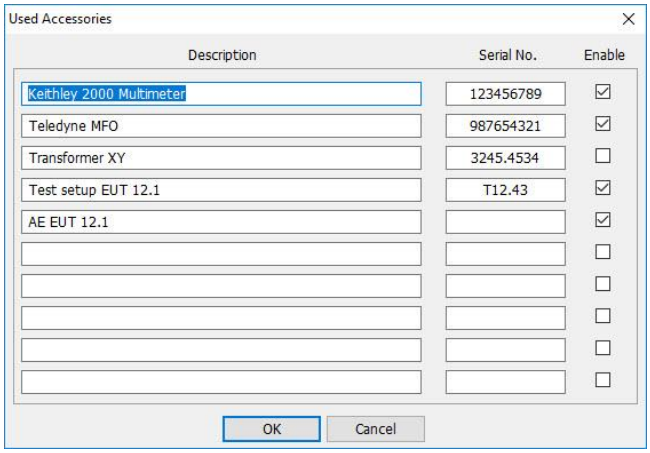


Figure 3-8 : Used accessories

A maximum of 10 accessories (measuring devices, EMC test accessories etc.) can be specified with their **description** and their **serial number**. Each entered accessory must be enabled to show up in the test report. This requires a mark in the related box in the row **Enable**.

This information can be altered prior to the data file is saved at the end of a test.

3.2.7 Changing the Password

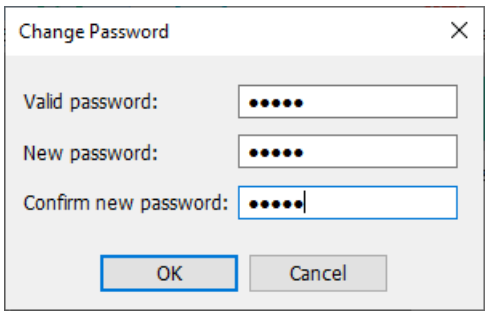


Figure 3-9 : Dialog box Config / Change password

With the dialogue **Change Password** it is possible to protect the dialogue **Change Standard Levels** (refer to chapter 4.6) from unwanted access by using a password. To change the password please enters the password as required in the dialogue box as shown in Figure 3-9.

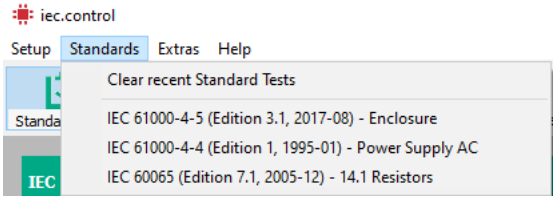
By default setting, no password is specified.

3.2.8 Measuring Instrument

For further Information's about the setup with an external measuring instrument please refer to chapter 10 of this manual.

3.3 Menu Standard Tests

In the standard area, it is possible to select the last used standards plus application via the menu "Standards"
The software stores the last twelve standards and application.



"Clear recent Standard Tests" will delete the last used standards.

3.4 Menu Extras

3.4.1 Input Protection

Enable or Disable **Input Protection** can be done within this menu. For detailed information about the Input Protection function please refer to chapter 4.6

3.4.2 Change Standard Levels

Enable or disable **Change Standard Levels** can be done within this menu. For detailed information about how to change the standard levels please refer to chapter 4.7.

3.4.3 Reset all Pulses to Factory Settings

When **Change Standard Levels** is activated it is possible to reset all pulse parameters to the factory settings using this menu (refer to chapter 4.7.3).

3.4.4 Enable / Disable Measuring instrument

This menu option disables or enables a selected measuring instrument, if previously selected in menu “Setup / Measuring Instrument”.

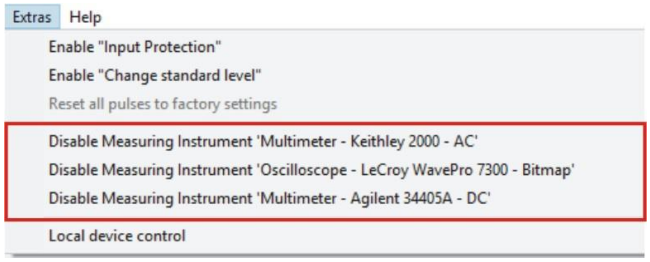


Figure 3-10: enable/disable measuring instrument

This function allows to enable/disable any instrument in a opened test window. So, it is not necessary to disable an unwanted measuring device in the menu Setup / Measuring device

3.4.5 Device local control

When working with the software the connected test generators will be remote-controlled. A local operation of the generators from the front panel is not possible in this case.

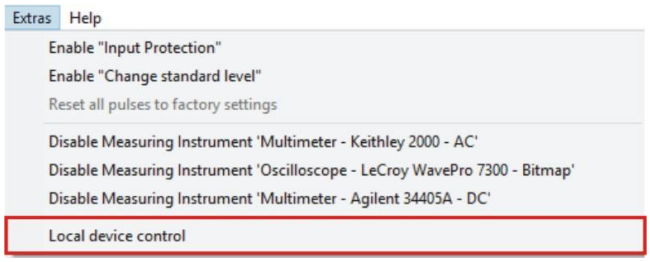
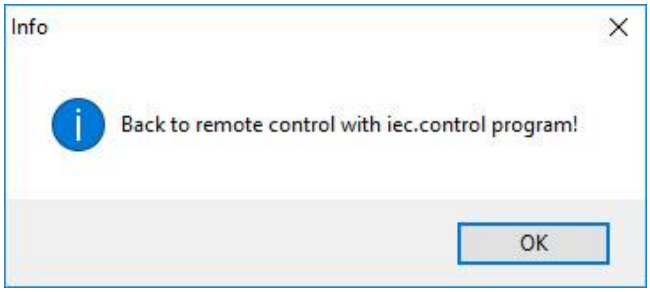


Figure 3-11: Dialog box Local device control

If you select Local device control in the Extras menu all the test generators will be reset and set temporarily to Local mode. Every generator can then be operated manually at the front panel.

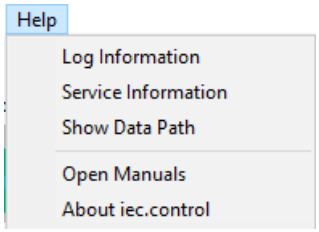
Click here to set all devices in Local Mode



When pressing the OK-button all the test generators will be set back to remote control again.

Figure 3-12 : Dialog box remote Mode

3.5 Help Menu



The Help menu offers various options for collect useful service information about iec.control software

Log Information:	List of commands between computer – devices
Service Information:	List of all setting parameters
Data path:	Opens the Data Directory
Open Manuals:	Opens the User Manuals directory
About:	Software name and version

3.5.1 Log Information

The communication on the interface channels can be controlled during a running test. This function shall only be used for diagnostics.

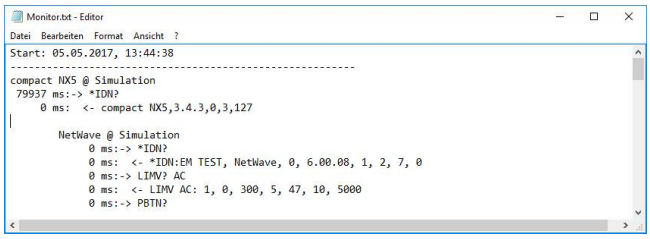


Figure 3-13: Log file monitor

The log file **monitor.txt** will be created in the directory *\iec.control*. By starting the monitor, the old log file monitor.txt will be overwritten

Note: In case of short repetition time between the transients or test events the monitor program can delay the communication to the generator. Therefore, a timeout can occur and the test stops.

3.5.2 Service Information

This file includes all program parameter and settings for iec.control.

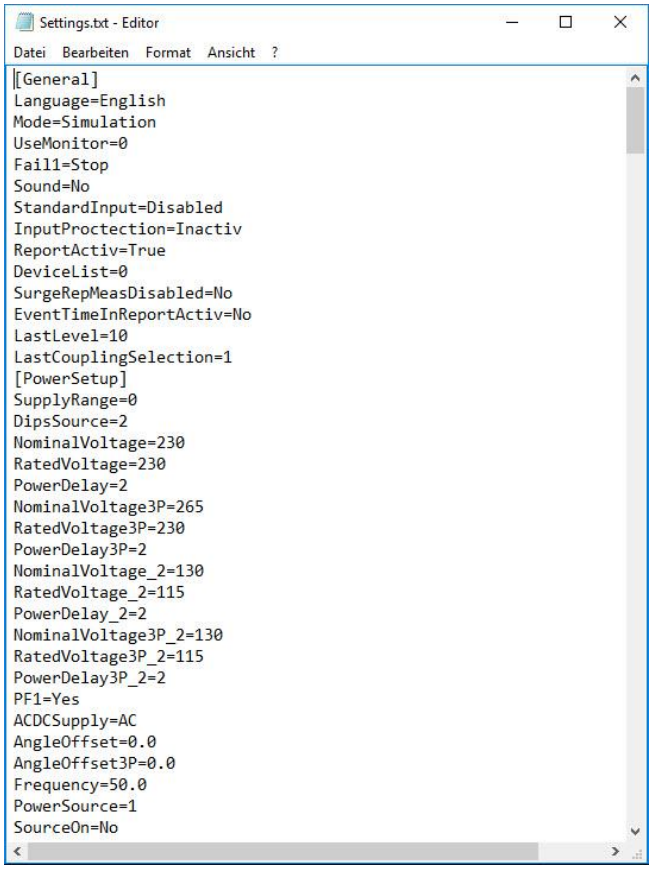


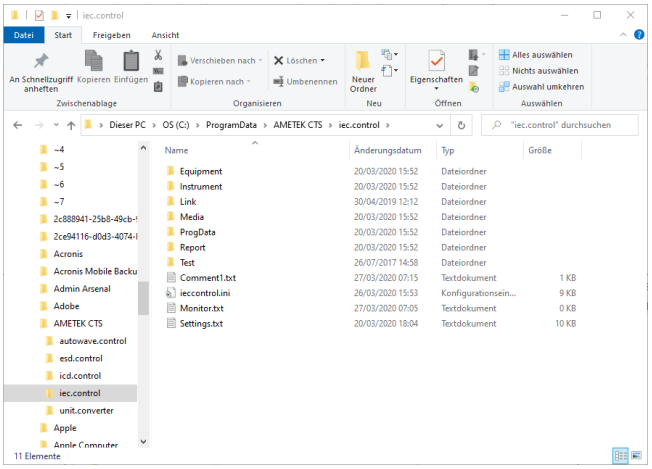
Figure 3-14: File Settings.txt for Program setting

The file **Settings.txt** includes all parameters the program uses for configure the software at the program start. The file is an actual copy of the valid ieccontrol.ini file and is stored in the directory *\iec.control*.

The file includes the settings for:
- General settings
- Standards and Application
- Used devices
- Used measuring instruments
- EUT and Accessory information
- Report settings and mask files
- Settings for magnetic field antennas

3.5.3 Show Data Path

The function opens the data path with the directory that shows all files and directories where iec.control software stores the data.



Directories

Equipment:	Library for Magnetic Fields accessories
Instrument:	Library with measuring instrument.
Link:	Library for user defined link files
Media:	Setup-pictures of manual couplers
ProgData:	Library for Standards and devices. Do not use this directory.
Report:	Place for save the test reports and plots. Directory **Header**: Mask files for reports
Test:	Library for user defined test files

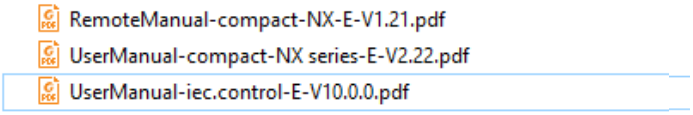
Files

Commentx	Automatic created file for test-comments
Ieccontrol.ini	Parameter file for iec.control
Monitor.txt	Communication to the generator
Settings.txt	copy of the file ieccontrol.ini for display in menu Info / Show Program Settings

Figure 3-15: Data path window

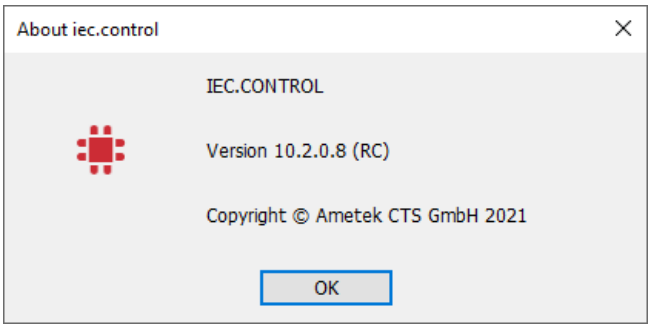
3.5.4 Open Manuals

Will open the windows explorer and the directory: C:\Users\Public\Documents\AMETEK CTS\iec.control\Manual



- Manual for remote commands
- User manual compact NX
- User manual iec.control

3.5.5 Info about *iec.control*



The name and the actual version number of the software is indicated in the window Figure 3-16 : Dialogue box Info about iec.control

Figure 3-16 : Dialogue box Info about iec.control

4 *iec.control*, Concept (Standard Mode)

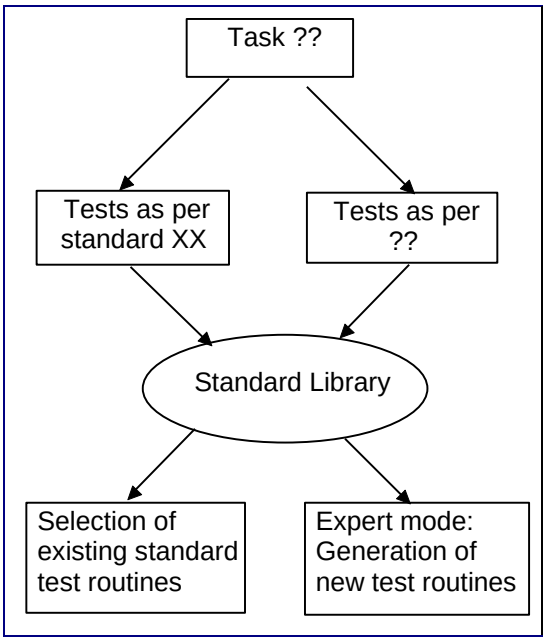


Figure 4-1 : Concept

iec.control includes a much-extended library of standards in which the most important International Standards as IEC, EN and ETSI are included; see also the reference list in the annex of this manual. The starting point for pulse testing is always the standard library

To get access to the standard library you need to select the operating area **Standard Mode** first.

Attention

A license must be entered for each device for use in Standard Mode!

4.1 Menu board and Desktop

General explanations for the menu board please read in chapter 3. The fastest and easiest way to navigate through the software is via desktop.

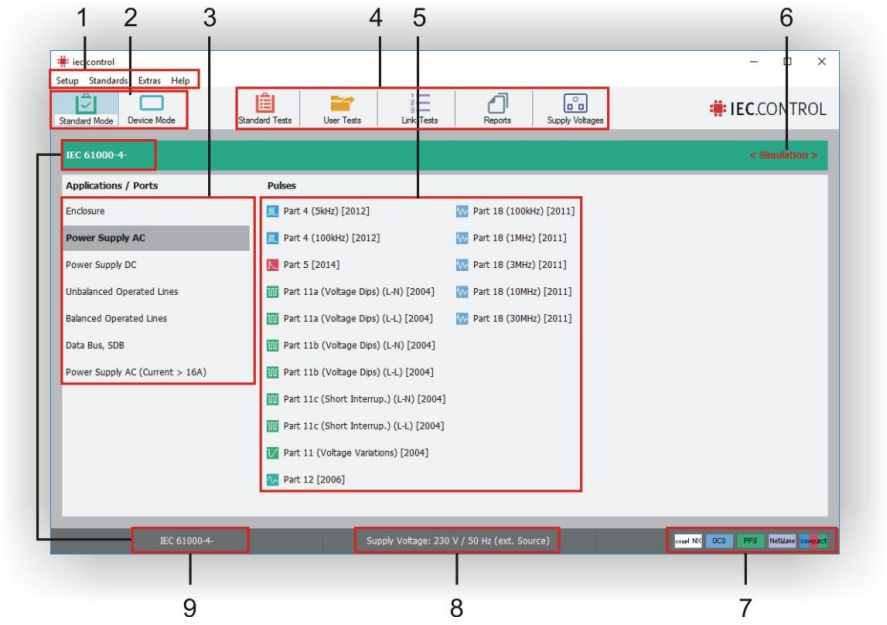


Figure 4-2 : Desktop in Standard Mode

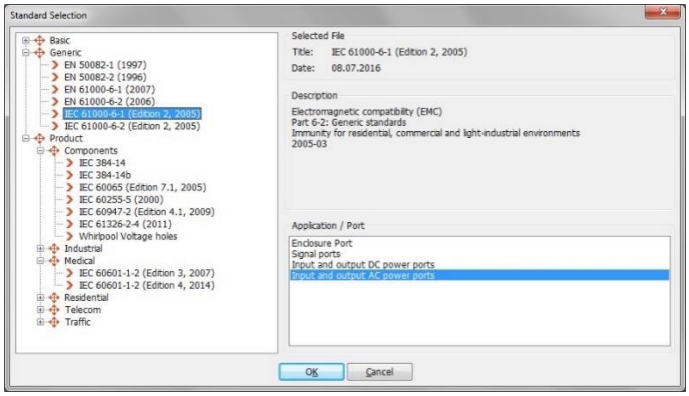
1	**Menu Bar** Setup, Standards, Extras, Help
2	**Working Modes** **Standard Mode** area for using the standard library of iec.control for standard testing. **Device Mode** shows all internal pulses of the selected device. The user can operate the device similar as operate in manual mode at the device itself
3	**Application / Ports** Indicates all ports of the selected standard. The pulses of the selected port are shown in the field pulses
4	**Test selector** **Standard Tests**: Opens the standard library for load any test **User Tests**: Opens the User test library for load User tests **Link Tests**: Window for create and load the Link tests **Reports**: Opens any stored report
5	**Pulses** Shows all pulses of the selected application port. Text in black: Indicates, that the connected generator Text in grey: Indicates that the generator for this pulse is not connected to iec.control.
6	**Operating Mode** Simulation or using the connected devices (no indication))
7	**Used Devices** In the bottom right corner of the desktop the recognized test generators and measuring instruments are shown by their symbols. All devices which are shown here can be controlled by *iec.control*. If there are no devices shown in this place you first need to configure the devices via *iec.control* in the menu **Setup / Device** (refer to chapter 3.2.2). After that a list of recognized devices and the related test pulses will become available.
8	**Supply Voltage** applied to the EUT
9	**Standard Mode**: indicate of the selected standard **Device Mode**: Pulse overview

4.1.1 Select the standard

The required standard can be selected either from the menu board under “Standard Tests / select Standard“ or easier by a double click on the actual standard in the lowest line of the desktop.
The standard and the application can be changed at the same time.
The same can be realized by a double click on the application in the lowest line of the desktop.

Select the required standard:
The standards are listed into three categories. A list of all available standards is available in chapter 11 Standard reference.
The operator can select between the following categories:

- Basic standards
- Generic standards
- Product standards



The Product standard are separated in different categories as following listed

- Industrial
- Components
- Medical
- Residential
- Isolation
- Telecom
- Traffic

Figure 4-3 : Window with the international standards

If you know standards which are not part of this software, please let us know. We will try to implement the standard.

AMETEK CTS GmbH
Sternenhofstr 15
CH-4153 Reinach BL1
Fax: + 41 61 204 41 00
email: sales.conducted.cts@ametek.com

Decide which lines of the DUT shall be tested:

Only functions will be enabled which are really specified within the selected standard.

Confirm your selection:

After click on **OK** the desktop will show the actual parameters:

- The actual selected standard and its application will be displayed.
- The actual available pulses which are specified in this standard are displayed.

4.1.2 Selection of the Test Pulses

The operator has decided to use a specific standard and the related application. After that he can decide which type of pulse he want to use for the actual test. Click on the individual pulse buttons on the desktop or select via the menu board under **Pulses.**

Figure 4-4: Pulse buttons on the desktop with all test impulses of the selected standard

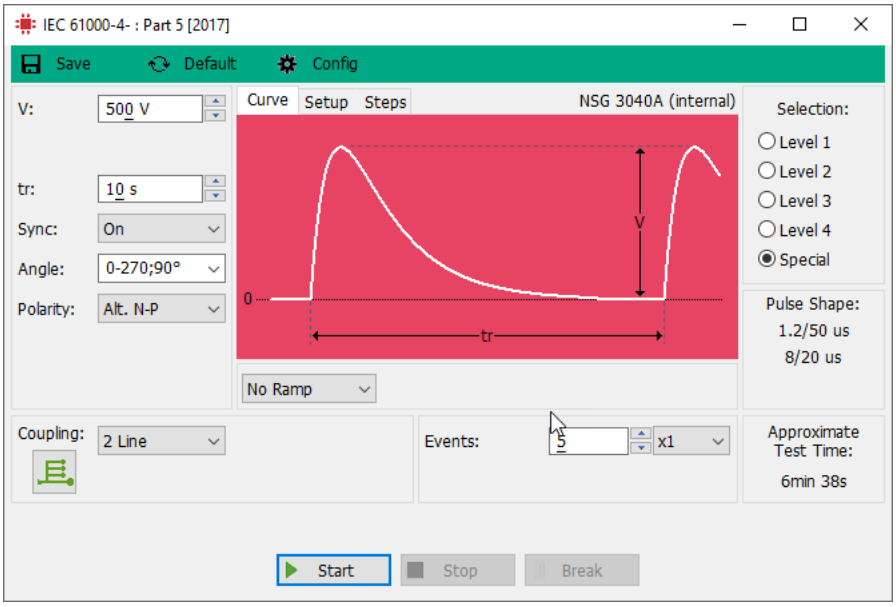
After the selection the so-called **Pulse Window** is displayed on the monitor.
It is possible to get an error message which shows:

No generator connected for selected pulse!

This means that there is no communication available with the device (wrong interface connection or device is not switched on). Another possibility is, that the device needs a special hardware option for generate this standard test pulse.

4.2 The Pulse Window Surface

The Pulse Window (Figure 4-5) is the main part of the software. The test can be started, the test levels can be specified, or a complete new set of parameters can be selected and saved.

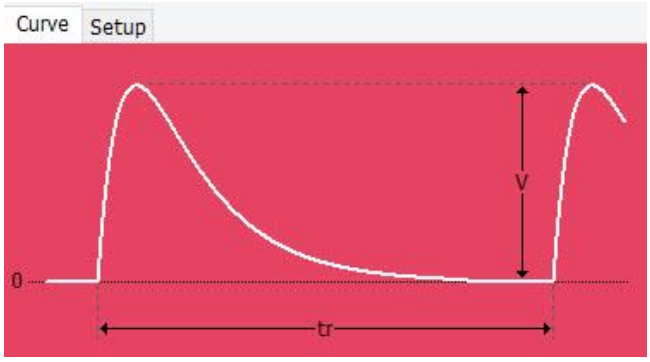


The pulse window of the Surge according to IEC 61000-4-5 is used as an example to explain the use of it. Of course, the pulse windows adapt it to the different pulses. However, the basic structure and the functions remain the same.

Figure 4-5 : Pulse Window for pulse 5 according IEC 61000-4

4.2.1 The Pulse Window

This window (Figure 4-6) shows the waveform of the selected pulse. Also the pulse parameters and its short terms are displayed.



All parameters which are included in the graphic are listed in the test report.

Setup Picture

For load / clear a setup picture (*.bmp), click

SETUP / right click
load or clear picture

Figure 4-6 : Pulse waveform

Just on the right hand of the Pulse Window those parameters are shown which are fix and cannot be changed. Normally these values are related to rise time and duration of the individual pulses.

Figure 4-7 : Pulse type

4.2.2 Test Level Window

On the right part of the Pulse Window the Test Level Window is shown.

Figure 4-8 : Test Level

In this section the operator can select the test procedure as follow.

Test level Modus
The operator selects one of the proposed test levels and performs the test according to the selected standard.

Expert Modus
The operator selects **Special** and may then adjust several pulse parameters according to his specific requirements (refer to chapter 4.2.4).

4.2.3 Test Level

For easy and fast standard test routines click on the specified **test level** and start immediately with the test. All test levels which are specified in the related standard are shown. In case that the standard only specifies one level, only this level is available.
In the Test Level mode, you select exact the parameters which are described in the standard. All these parameters are displayed grey and cannot be changed.

The following test parameters which are displayed black and active can be adjusted:

- The repetition rate of the pulses
- The phase angles
- Synchronization and polarity
- Current limit
- The coupling
- Number of test pulses

In case that the operator wants to specify complete new test routines he can do this under **"Special**". Click on the **Special** button.

4.2.3.1 Polarity

The polarity setting offers the following parameter settings.

Parameter	Description	Example with n= 4 Events	Total pulses
Pos	Positive Impulse	+ + + +	4
Neg	Negative Impulse	- - - -	4
Alt N-P	Alternate each n pulses negative beginning	- - - - + + + +	8
Alt P-N	Alternate each n pulses positive beginning	+ + + + - - - -	8

4.2.4 Special Mode

As soon as the Special Mode is selected all parameters are shown in black and active. All these parameters can be changed in Special Mode. All the parameters that have appeared in grey and have been inactive so far now change to black and are active. The listed parameters may now be set to any value within the range according to the test generator connected.

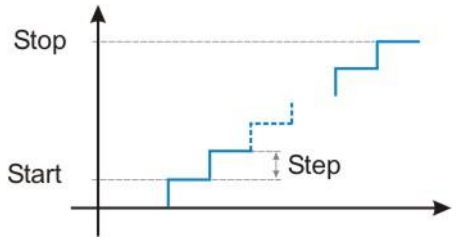
In this mode the menu button **Default** will be added to allow the operator to store the selected pulse parameters as a user defined test file. The stored test files are used to create link files.

4.2.5 Ramp

The Ramp mode is another function which is available in Expert mode.

Ramp will enable an automatically change of the test level during the running test. The operator can specify a start level an end level and a certain step width for the pulse peak voltage.

Figure 4-9 : Window at enabled ramp function



The software controls this function automatically and can therefore be used for a fast detection of the threshold level of the DUT.

Figure 4-10 : Test voltages at a ramp function

When the Ramp mode is switched off the “Start / Stop / Step” parameters will no longer be displayed.

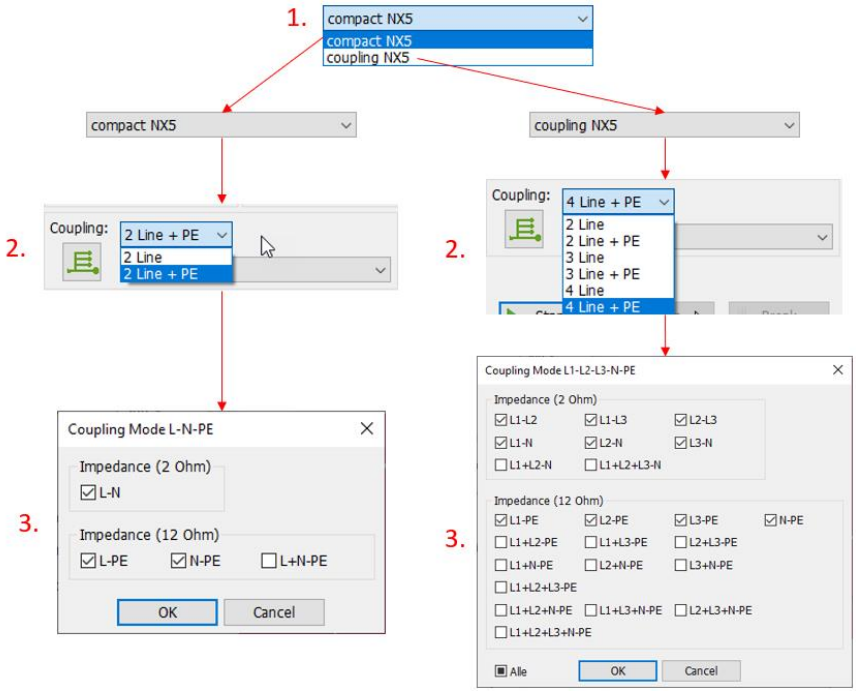
4.2.6 Number of pulses

The operator can select the number of pulses which are required for this test.

The actual test time will be shown. In case that the number of pulses or the repetition rate is changed the test time is automatically recalculated.

Figure 4-11 : Setting of the number of pulses

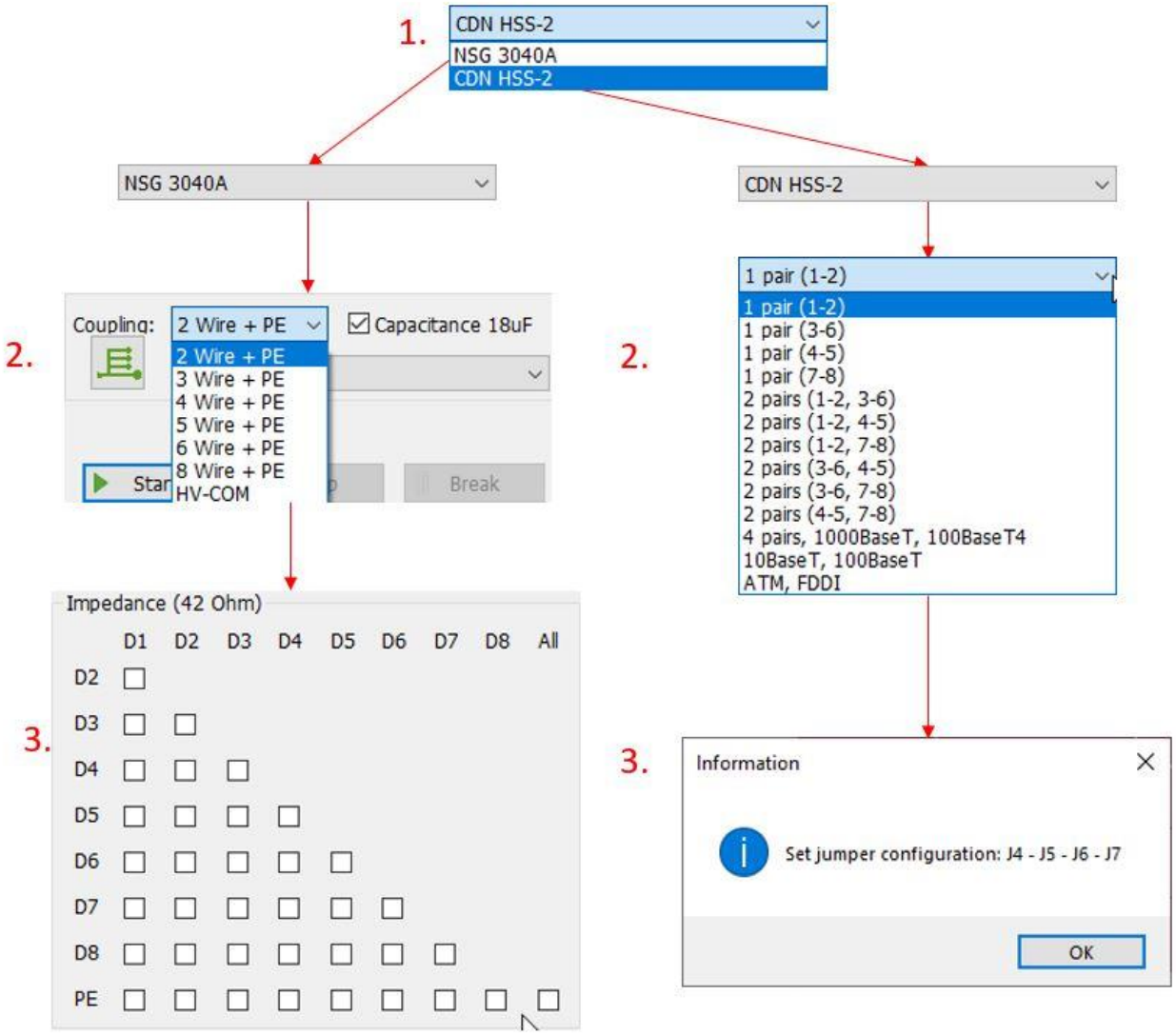
4.2.7 Coupling



1. Select whether you want to use the internal or external coupling network
2. Select the number of lines and with or without PE
3. Select the required coupling modes. 3-phase coupling networks offers the possibility to activate all coupling modes with a check box in the lower left corner: Alle

4.2.8 Coupling with CDN HSS-2

Surge on IO lines can also be performed with the CDN HSS-2. To do this, the CDN HSS-2 must be selected in the Coupling area, then the corresponding number of data pairs to be checked. After the test start, the software shows which jumpers are to be set on the CDN HSS-2.



4.3 Upper Menu bar

Figure 4-12: Menu bar in the pulse window

4.3.1 Config

Select input Trigger, EUT/Fail reaction and Surge measure limits (for Surge testing only, available only with compact NX).

4.3.2 Default

This button is used to reset a test level to the original setting (factory setting according to the standard).
All changes that have been made in the parameter settings in the actual test will be automatically stored. If the saved setting is different from the standard setting the user can reset them by the Reset button and reload the factory setting for the selected standard. The Default button is active only when the standard setting has been changed.

4.3.3 Save

Click on Save will save the actual test file to the hard disk. This function is not available if the input protection is enabled (see also chapter 4.5). The filename inclusive path is limited to **max. 80 characters**.

4.4 Lower Menu bar

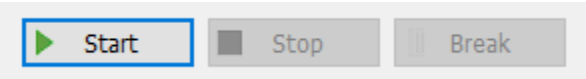


Figure 4-13: Menu bar in the pulse window

4.4.1 Start

After click on Start the test is started immediately. (Also read chapter 4.5)

4.4.2 Stop

This function is only available during a running test. Click on Stop will stop the running test immediately. (see chapter 4.5)

4.4.3 Break

This function is only available during a running test. Click on Pause will break a running test immediately. (see chapter 4.5)

4.5 Start the Test Procedure

The test routine can be started by a mouse click on the **Start** button.

Figure 4-144: Pulse window during a test

Remark: The test runs only the sequences of the selected level.

	Level 1:	Level 2	Level 3	Level 4
Line to Line	na	500 V	1000 V	2000 V
Line to Earth	500 V	1000 V	2000 V	4000 V

4.5.1 Start and Stop with Space-bar

For “**Start**“ and „“**Stop**“ press the **Space-bar**.

To stop in the shortest time, a keystroke to the Space-bar is in each case faster than to stop via mouse.

4.5.2 Actual Parameter Display

On the left side the actual parameters of the running test are displayed as shown in Figure 4-15,

- the actual test voltage, in black if the level is fix, in blue if the level is changed in the Ramp mode
- the actual repetition rate of the pulses
- the actual phase angle
- the voltage and current peak value (surge-testing)

Figure 4-15 : Actual parameters display

4.5.3 Running Test Time

Under the Pulse Window the running test time is indicated in a bar graph.

Figure 4-16 : Bar display during a test run

Additionally, the absolute test time is shown and for longer test routines the pulse release is indicated by blinking lamps:
Red blinking ==> a pulse is released
Yellow blinking ==> the test routine is running

4.5.4 Break

After break click the test is interrupted and the break window is shown. The operator can enter any comment which may explain why the test was paused. A counter indicates the last entered messages for fast reload.
The operator use **Continue** to continue the test or **Stop** to stop the test completely.

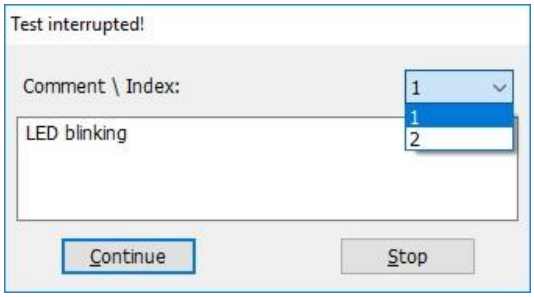


Figure 4-17 : Comment window

4.5.5 Fail 1 and Fail 2

If a Fail1 or Fail2 event occurs during the test this will be indicated as shown in Figure 4-18.
In case of a Fail2 the test will not be interrupted but Fail2 will be indicated as long as the failure occurs.
After the Fail 1 event the break dialogue appears (see 4.5.4) depending on the Fail 1 reaction setting (see chapter 3.2.1)

Figure 4-18 : Window in case of fail 1 or fail 2

4.5.6 Trigger

In case that a manual trigger is needed, the Step button will appear after the test has been started. A green indication right from the bar graph shows you that the generator is expecting a manual release of the pulse (see Figure 4-19).

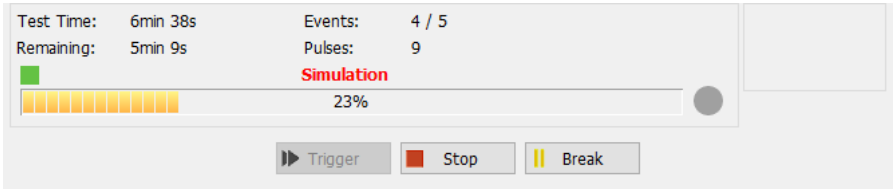


Figure 4-19 : Window with step

When pressing the button „Trigger“ the pulse will be released. To release several pulse the Trigger button needs to be pressed for every pulse to be released.

4.5.7 Stop

Click on **Stop** and the test is stopped immediately. The **Test Result Window** is displayed. (see chapter 4.5.9)

4.5.8 End of Test

After the last impulse, the test will be finished, and the **Test Result Window** is displayed.
If the option „End of Test - Beeper on“ has been selected (Config menu - „General“) an acoustic signal will indicate that the test is completed.

4.5.9 Test Result Window

The operator can enter a comment concerning to the Test Stop or to the complete test run. This comment is included in the final test report.
After a Stop the test will be noted as **Not successful**. The operator may change this into **Successful** if necessary. The selected result will also be listed in the final test report.

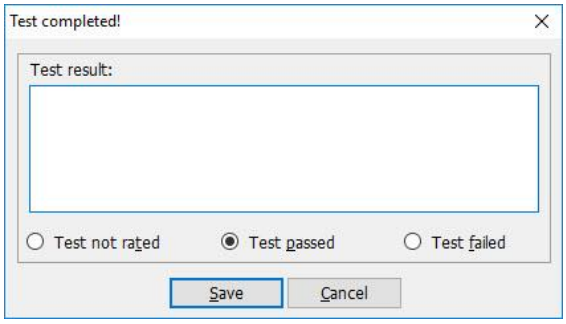


Figure 4-20 : Test Result Window

Cancel (no test report)

By click on Cancel the test routine is interrupted completely and no test report is generated.

Save (with test report)

The operator can enter a file name and the path for the data file. A mouse click on **OK** saves the file and a test report can be generated.

4.5.10 Save a Test Report

Enter the name of the data file in the desired root (Figure 4-21). The data are directly saved in RTF format. The extension of the RTF files is defined as „*.rtf“.
OK Button will save the file and the report header will appear.
Cancel will exit without saving a report.

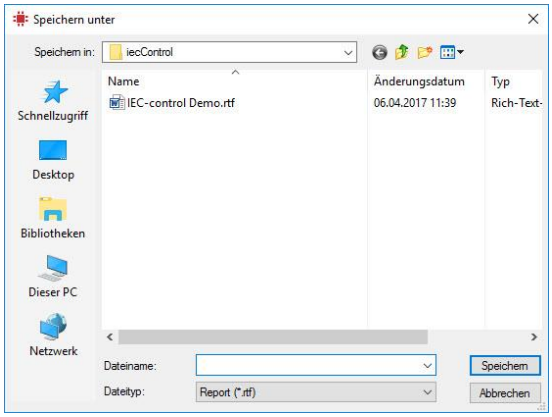


Figure 4-21 : Save window

4.5.11 Test Report comment

In the report comment windows (Figure 3-6) you can check the header of the report, see also Chapter 3.2.4.

The **OK** button includes the altered entries in the report header. The **Cancel** button ignores all changes.

4.6 Input Protection

Enable "Input Protection"

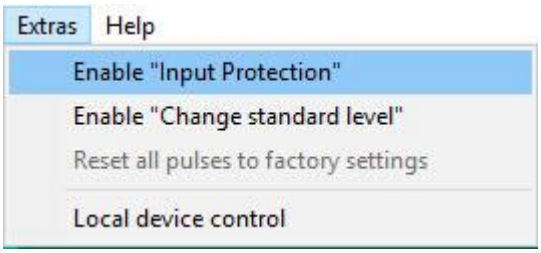


Figure 4-22: Menu Enable "Input Protection"

Enable of the input protection is done via the menu **Mode Enable "Input Protection"**.
If the input protection is active, some inputs are locked for the users. The user cannot change any pulse values, save no test file and cannot create link files.

Disable "Input Protection"

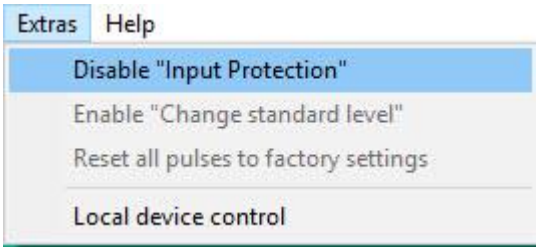


Figure 4-23: Menu Disable "Input Protection"

Figure 4-24: Dialog Disable Input Protection

After selection the user must input a password to disable the input protection.

The password can be being changed (see chapter 3.2.7).

4.7 Enable/disable of Change Standard Levels

iec.control offers the opportunity to change test parameters of pre-programmed standard test pulses.

⇒ Please note that the factory setting for standard test pulses should not be changed unless necessary

4.7.1 Enable Change Standard Levels

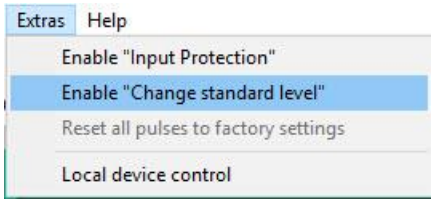


Figure 4-25 : Change Standard Level from the mode menu

To enable the mode **Change Standard Levels** the corresponding menu is selected from the **Extras** menu (only available in **Standard Mode**).

Figure 4-26 : Password dialog to enable Change Standard Levels

When selected the password dialogue will show up requesting the input of a valid password. If no password is specified just quit via **OK**.

The password can be changed (refer to chapter 3.2.7).

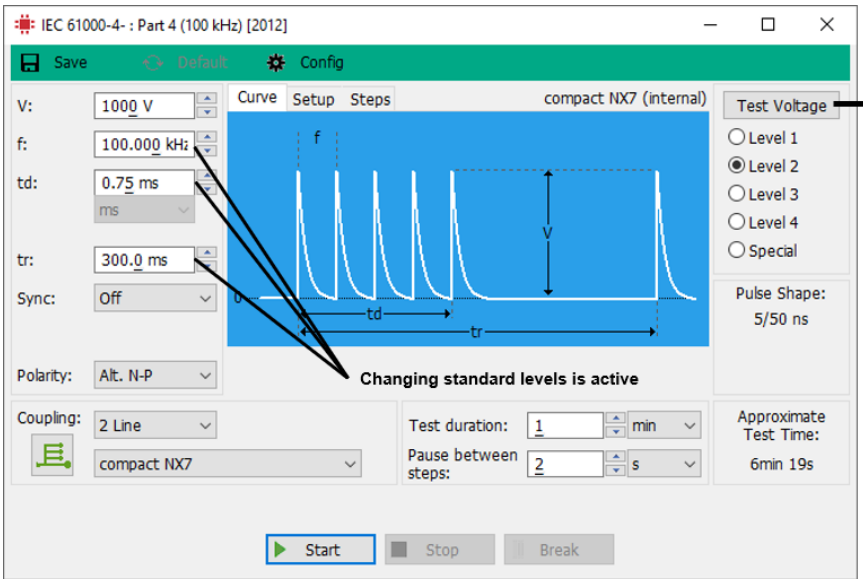


Figure 4-27 : Changing of the factory settings

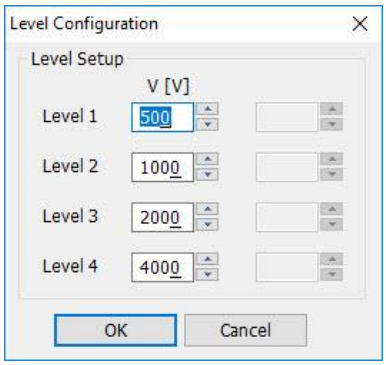


Figure 4-28 : Changing of the levels

4.7.2 Disable Change Standard Levels

The mode **Change Standard Levels** remains active as long as this mode is not disabled again (see Figure 4-29) or until the operating area is changed to **Device Area** or until *iec.control* has been restarted.

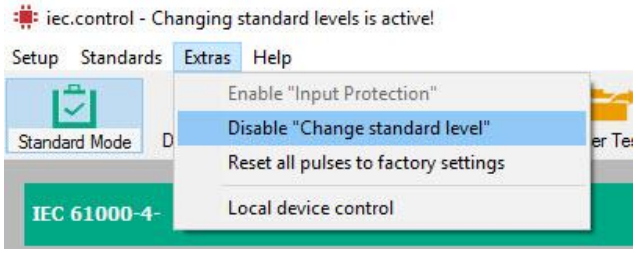


Figure 4-29 : Menu to disable Change Standard Levels

4.7.3 Reset all Pulses to Factory Settings

Once standard test setting has been changed *iec.control* offers a simple menu to reset all pulse parameters to the original factory settings. Open the menu **Extras** and select **Reset all pulses to factory settings**.

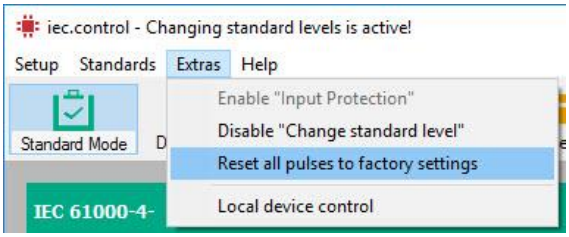


Figure 4-30 : Menu to reset all pulses to factory settings

Before the parameters are set back the following dialogue will be shown.

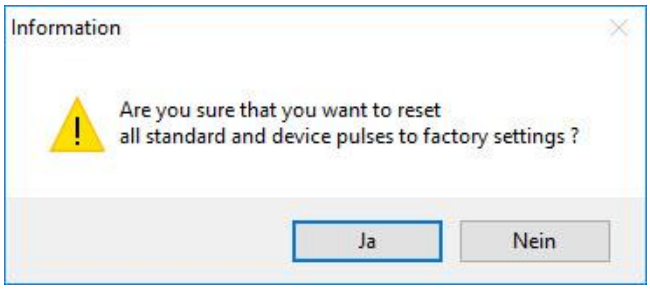


Figure 4-31 : Dialogue before reset of pulses to factory settings

4.8 Customized Pulse Specifications

Of course the user of *iec.control* is also able to generate specific test routines which are not related to standards. All parameters can be changed and are only restricted by the hardware limitations of the pulse generators itself.
The starting point to define special test routines is again the desktop, see also chapter 4.1
In the annex of this manual the user can find a table where all kind of pulses and functions are listed which are supported by this software and the related generators.

For the specification of special pulses, e.g. with different internal resistor or with different test level the user may select an existing pulse and change the desired parameters as described for the Expert mode.
The basic standard for most of all special requirements is the IEC 61000-4-x. Most of the manufacturer's standards are related to this paper and are changing only some specific parameters.

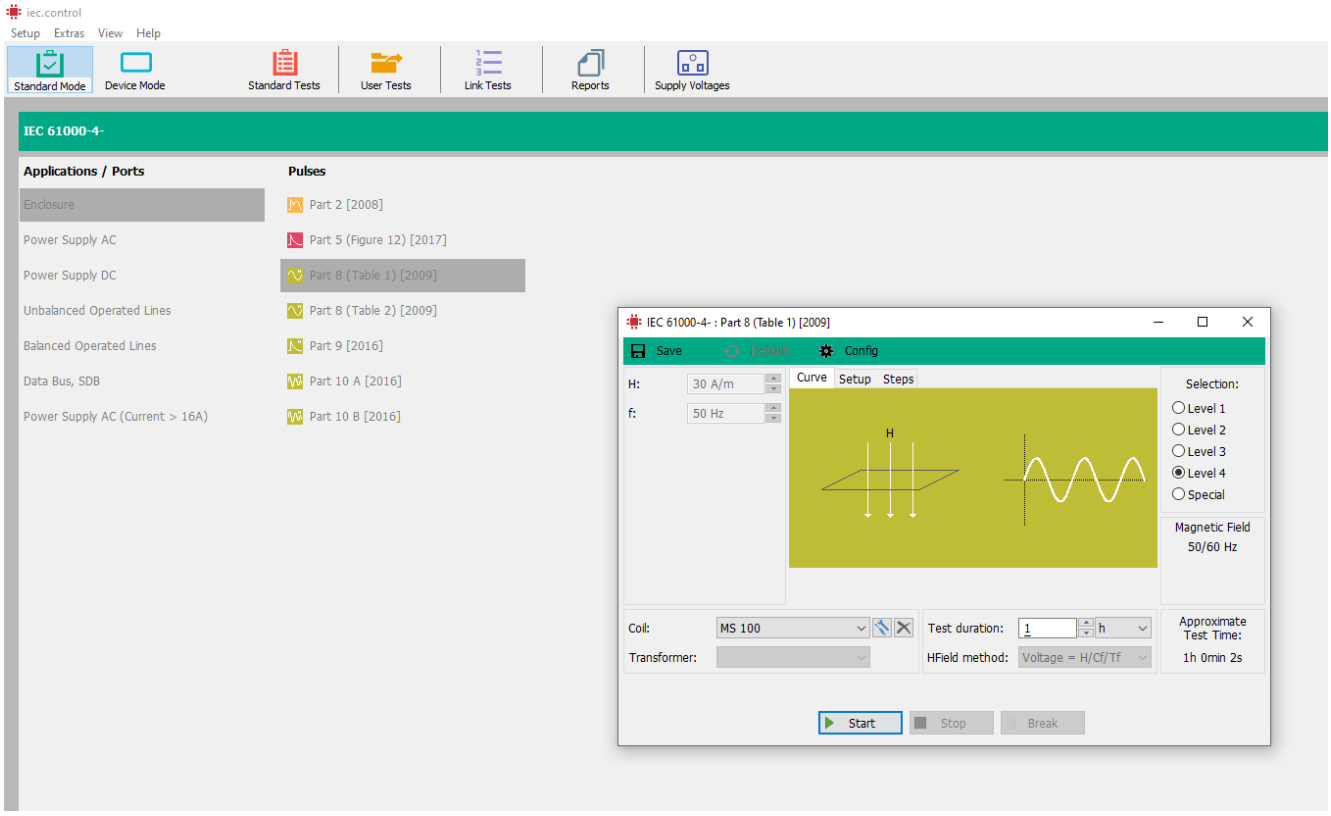
For new pulse specifications, the following questions shall be answered:

1. Which type of pulses shall be tested? (rise time, pulse duration).
2. Which of the standard pulses can be used for this application? (See annex)
3. What is the difference to existing pulses?
4. In which way standard pulses can be matched?
5. Which parameters of the standard pulses can be changed?

Select a standard pulse or the required function within the related standard, change into the Expert mode and change the desired parameters. The new test procedure can now be saved under a specific name which the operator has to define.

5 Magnetic field testing

For open and configure a magnetic field test the user must select In the Device Mode or Standard Mode the magnetic field test.



5.1 Setup

Please also refer to the “UserManual-MFC1000_MFT30-100-E” which explains the test setup and how to connect the accessories.

The desktop presents the easiest and fastest way to navigate through the software (Figure 6-1).

Magnetic Field	Setting of - Antenna type - Antenna Factor - Transformer Factor - Impedance Factor - Setup magnetic field transformer

6 Device Mode

In the operating mode “Device Mode” the test generators and their pulse generation capabilities form the basis for the tests. Depending on the registered and initialized test generators *iec.control* shows all possible test pulses on the desktop. In this operating mode the user has no access to the standard library.
The operating mode **Device Area** is almost identical with the operating mode **Standard Area**. Therefore, we will only show the differences between these two areas within this chapter. All other information is already provided in chapter 4.

6.1 Desktop

Please refer to chapter 3 for a detailed description of the menu bar. The desktop presents the easiest and fastest way to navigate through the software (Figure 6-1).

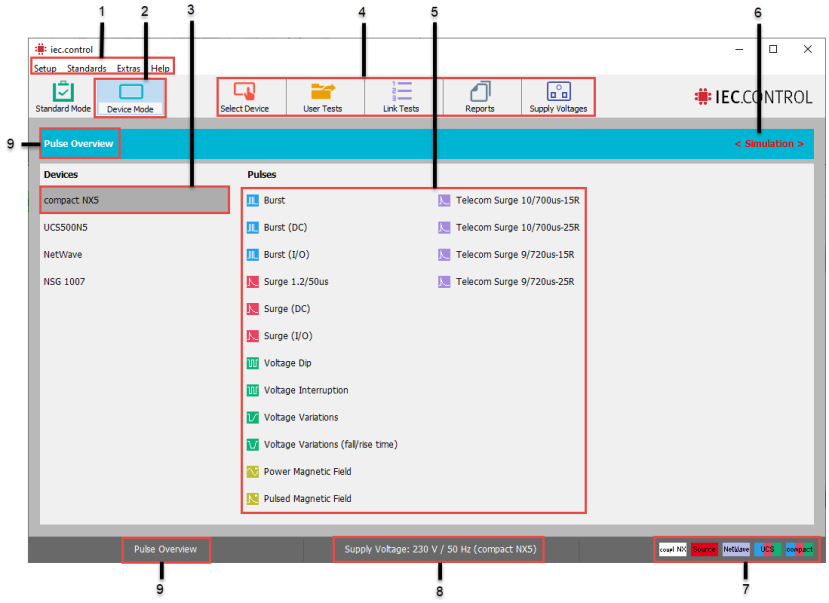


Figure 6-1 : Desktop in the operating mode **Device Area**

1	**Menu Bar** Setup, Standards, Extras, Help
2	**Working Mode** **Device Mode** shows all internal pulses of the selected device. The user can operate the device similar as operate in manual mode at the device itself
3	**Devices** Selected device in the list of recognized devices. The pulses are shown in (4)
4	**Test selector** **Standard Tests**: Opens the standard library for load any test **User Tests**: Opens the User test library for load User tests **Link Tests**: Window for create and load the Link tests **Reports**: Opens any stored report
5	**Pulses** Shows all pulses of the selected device (3)
6	**Operating Mode** Simulation or using the connected devices (no indication))
7	**Used Devices** In the bottom right corner of the desktop the recognized test generators and measuring instruments are shown by their symbols. All devices which are shown here can be controlled by *iec.control*.
8	**Supply Voltage** applied to the EUT
9	**Device Mode**: Pulse overview

7 Test Files

7.1 Save a Test File

The operator can store the setted pulse parameters as a user defined test file.
These stored test files can also be used to create link files.

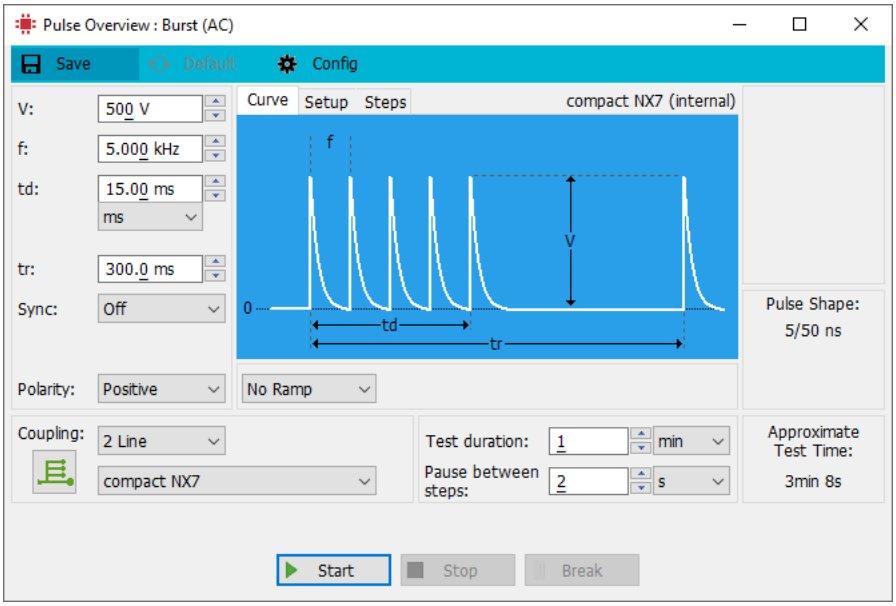


Figure 7-1 : Save a test file

In the dialogue (Figure 7-3) you enter the name of the test file in the desired root.
The extension of the test files is defined as „*.tst“ and needs to be retained.

Save of Test files:

1. Click **Save** for store at the test sequence in a *.tst file
2. Complete the comment and press **Continue**.
3. Enter the filename and press **Save**

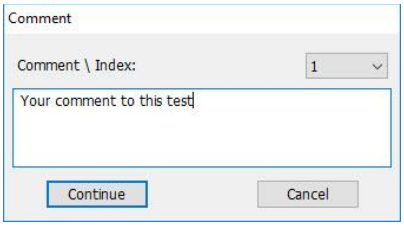


Figure 7-2: Field for comments

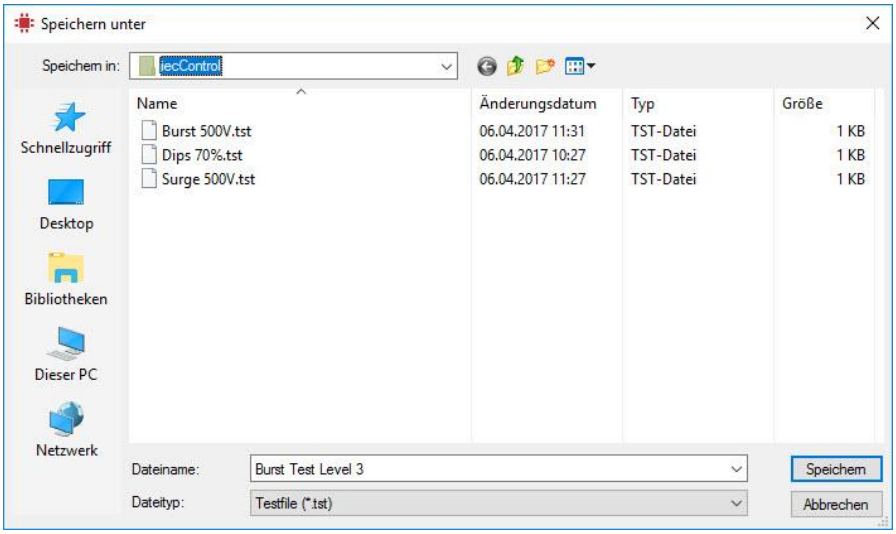


Figure 7-3 : Save window

Figure 7-3 shows the dialogue box to save a test file

Save Button will save the file.

Cancel will exit without saving.

7.2 Load a test file

Already saved and stored test files can be loaded by a mouse click on the test file button or by selecting one with **Files / Open Test File** in the menu list.

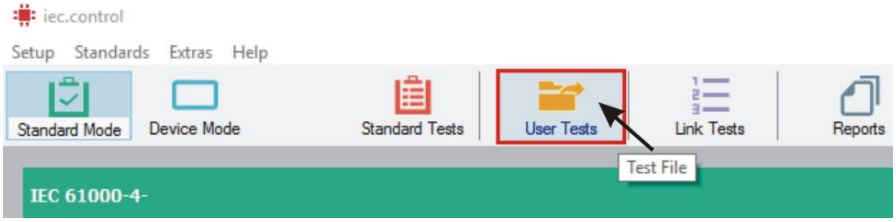


Figure 7-4 : Loading of Test files

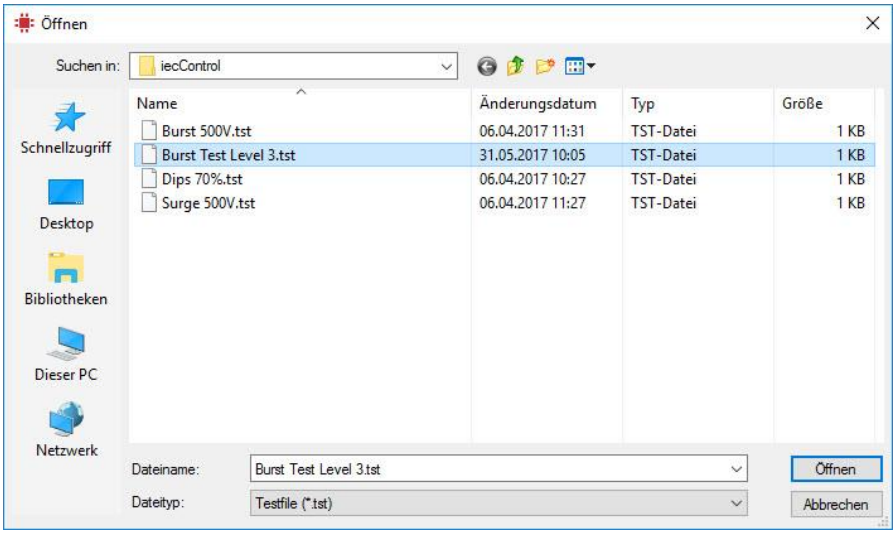


Figure 7-5 : Open test file

Figure 7-5 shows the dialogue box to open a test file. The list shows all stored test files.

A click on **Open** opens the file. To return to the desktop use the button **Cancel**.

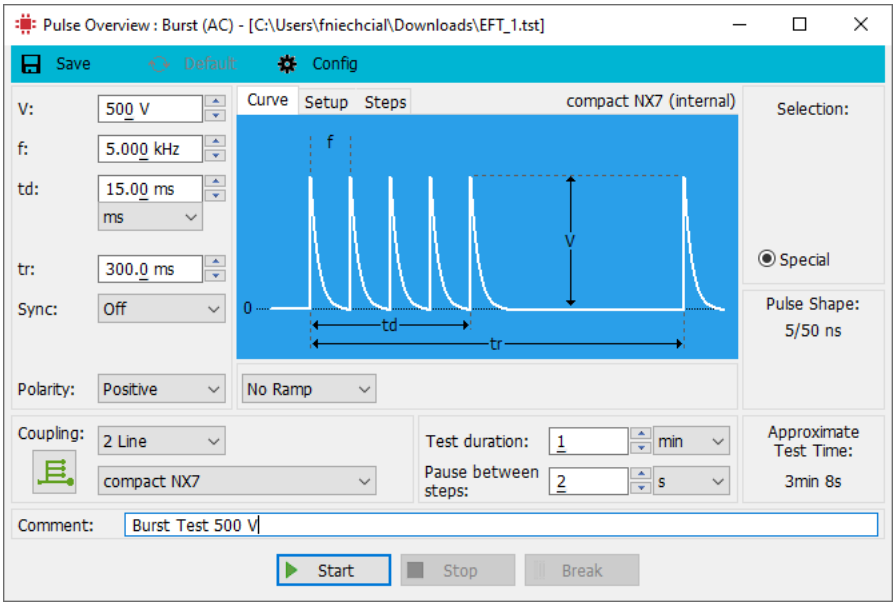


Figure 7-6: Loaded testfile with comment and test duration

When selecting any of these test files the *iec.control* informs you at the bottom about the content of the selected file.

Not only the kind of test routine but also the estimated test time and a comment about this file are shown.

An opened test file can be changed and saved with another file name.
A loaded test file is always used in the Expert mode. This means that test files are executed independently from the standard settings.

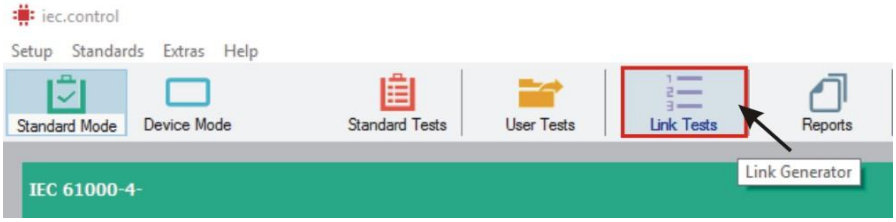
8 Link File

8.1 Generation of a Link File

Link files are a set of sequenced test files with a defined order for execution. With this tool you can create complex test procedures using one or several test generators. A test can be conducted fully automatic using a link file.

8.1.1 Start of the Link File Generator

With the link file generator, you create a test routine consisting of several different test files. Figure 8-1 shows the handling of the link file generator.

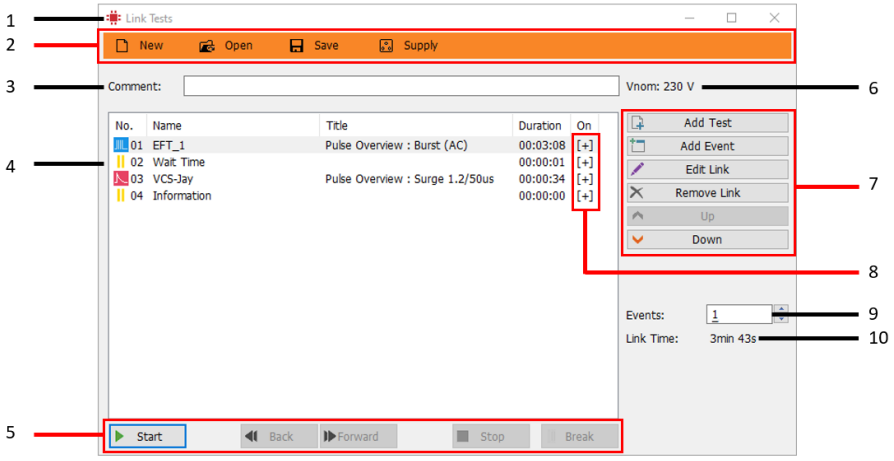


To generate a link file, you first have to create a library of distinct test files. The test files are created as described earlier and saved. From this test file library, you select the files you want to use in your link file. For each EUT you can generate a specific link file.

Figure 8-1 : Start the Link file Generator

8.1.2 Creation of a Link File

By means of the link file generator a link file can be created that consists of different test files. Already existing link files can be checked and changed.



1 Filename linkfile
2 Manage linkfiles
3 Comment to linkfiles
4 Testfiles and Events
5 Control buttons for the test
6 Supply voltages setup
7 Buttons for Link generation
8 Enable/disable test sequences
9 Number of repetitions
10 Complete test duration

Figure 8-2 : Link file Generator, Dialogue box

Open and save Linkfiles

New	Deletes all files in the list except from start and stop.
Open	Open a selected link-file
Save	Saves the created link file under the file name specified under **Link file Name**. The filename inclusive path is limited to **max. 80 characters**.
Supply	To change mains supply voltage from selected source

Create and modify Linkfiles

Add Test	A selected test file is added to the file list at the position after the last highlighted bitmap. The new bitmap is recognized and highlighted. The estimated test time is calculated and the display will be updated accordingly.
Add Event	Insert a Wait time, Information or break with comment
Edit Link	Open the test-file for modify.
Remove Link	The highlighted Link and the related test routine are deleted from the file list.

8.1.3 Link Message (Add Event)

Between two tests, during Link process, the user could define an action.

- Wait time in second with displayed message
- Information with displayed message (Test is stopped).
- Break with comment which gives the user the opportunity to enter a comment

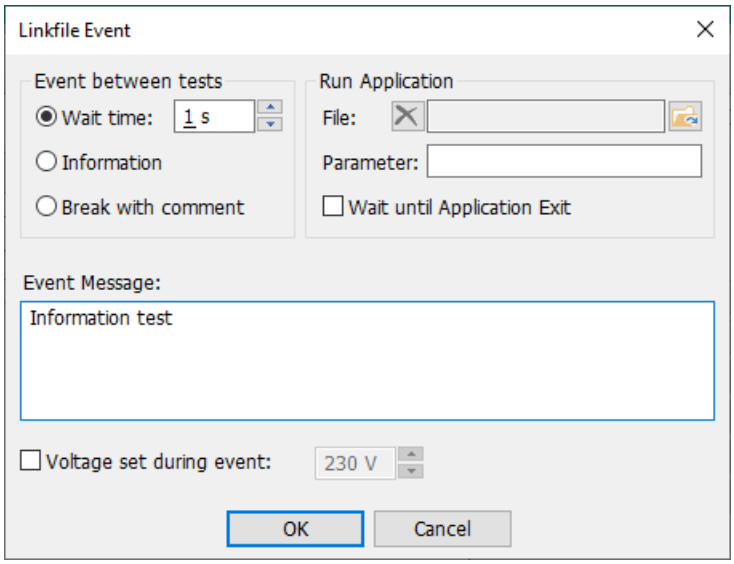


Figure 8-3 : Link file Action

The user selects an action and inserts a message.

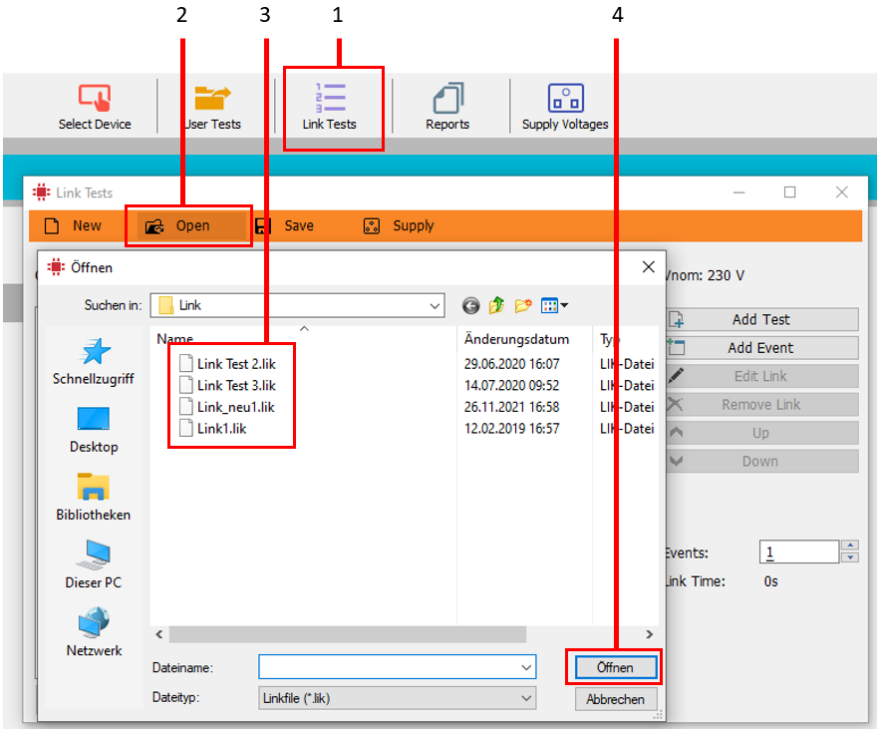
By pressing Insert the action is included into the file list.

It is possible to delete the action from the file list by selecting the highlighted bitmap and press delete.

8.2 Working with Link File

8.2.1 Load a Link File

Stored link files are loaded with a click to one of the two areas shown in Figure 8-4.



1 Press **Link Tests**
2 Press **OPEN**
3 Select the link-file
4 Press **OPEN**

Figure 8-4 shows the dialog box to open a link file. All existing link files are listed. The test duration is indicated along with other comments about this file if inserted any. Press **OK** to open the selected link file.

Press **Cancel** to return to the desktop.

Figure 8-4 : Load a Link file

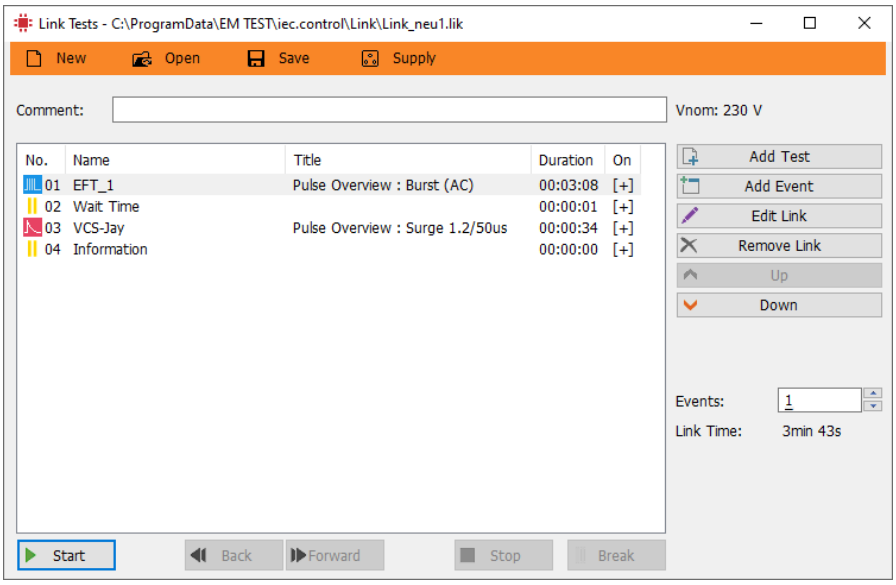


Figure 8-5 : Link file

Figure 8-5 shows the link file with all tests and events. A selected Test / Event can be changes with Edit Link or double click.

Events: Number of repetitions of the Link Files

Link Time: Total Link Test time

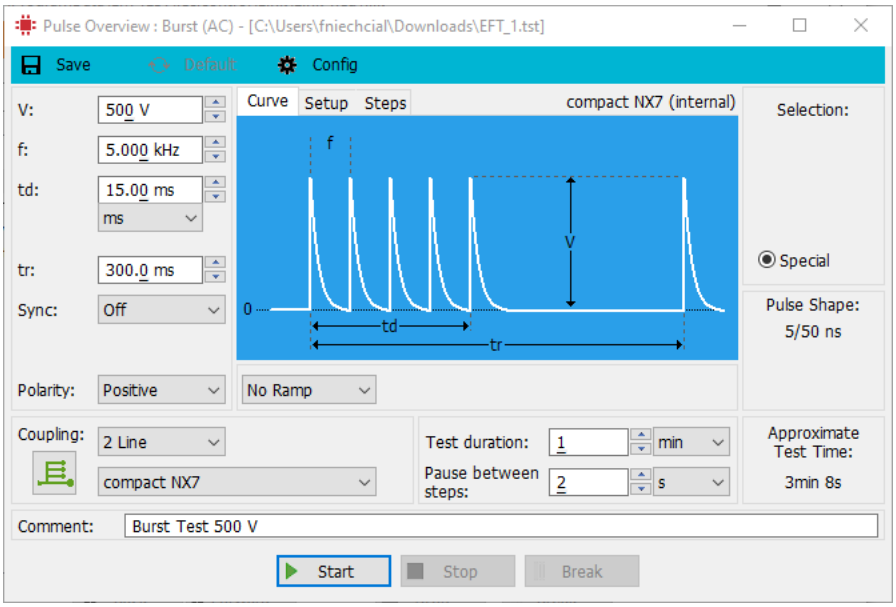
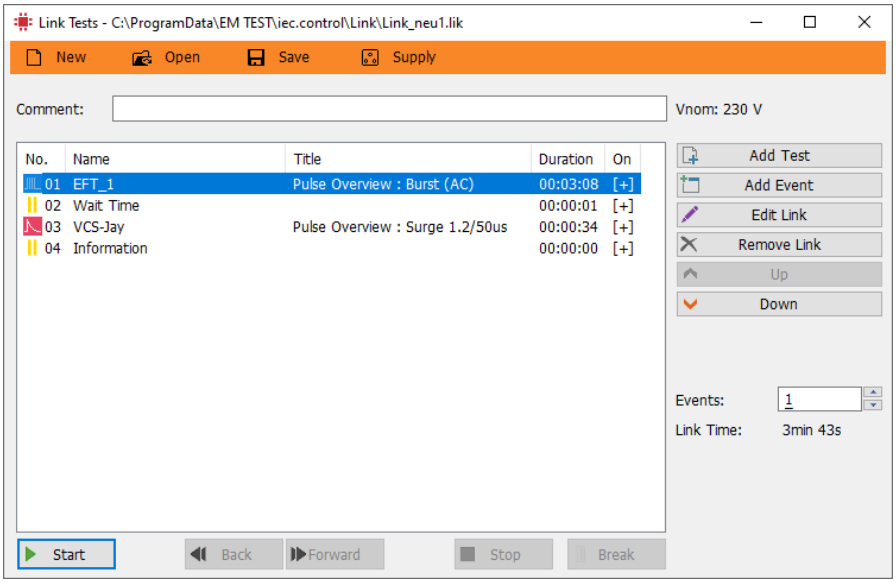


Figure 8-6 : Opened Test in a Link file

Figure 8-6 Shows the opened test file with all details of this test.

8.2.2 Link File Test Window

After having selected the program opens the link file test window (refer to Figure 8-7). The link-file test window shows all linked files of the selected link-file.



With **Forward** and **Back** you may select the test-file to start the test sequence with.
A **double click** on a **symbol** loads the corresponding file.

Pressing **Start** button will run the test

Figure 8-7 : Link file test window

8.2.2.1 Start a Link File

When the link file is started with **Start** it is executed step by step following the linked test files. The corresponding pulse windows are shown (refer to Figure 8-8).
The button **Pause** allows interrupting the test procedure. The dialog box to enter a comment automatically appears.
When the test is completed another dialog box appears to enter a final comment about the test. Every test creates a data file containing the test data with the name of the link file and the extension „.rtf“.
iec.control provides the following functions:

Stop	By means of this button a test is immediately stopped. The **Stop** button is only active when the link file test is in progress.
Break	By means of this button a test is immediately interrupted. The **Pause** button is only active when the link file test is in progress.
Forward	Selects the next test file in the list and starts the link file automatically.
Back	Steps one test file back (refer to chapter 8.2.2.2).

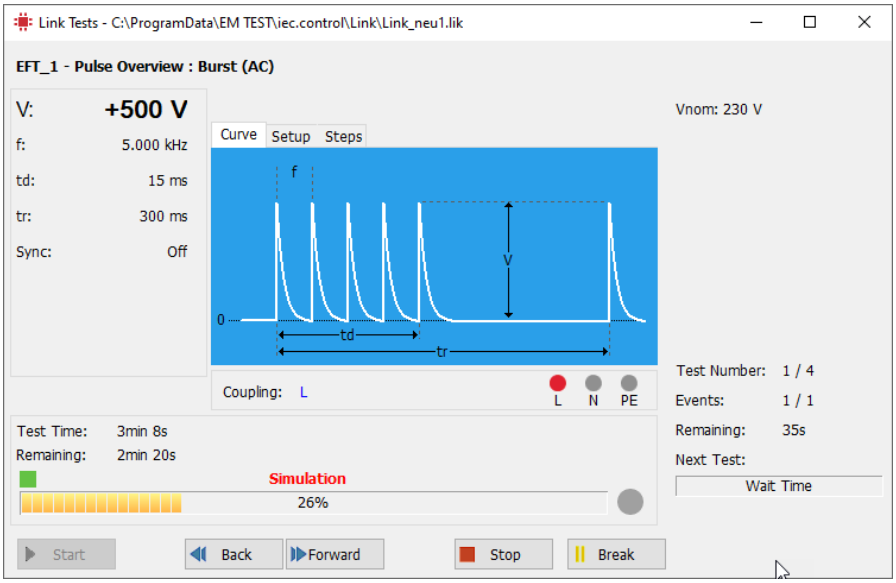


Figure 8-8 : Active link file test window

8.2.2.2 Back to the Link File Sequence

When **Back** has been pressed during a link file sequence the following dialogue "**Continuation of Test"** (see Figure 8-9) appears. The user continues the test with the previous test file or with the actual test file to repeat the same test.

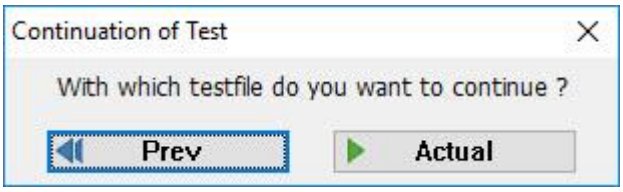


Figure 8-9 : Link Back

The following functions are available:

Prev	Previous test in the list will be started.
Actual	Actual test in the list will be repeated.

8.2.2.3 Break a Link File in Progress

When a test is interrupted with **Break** the operator can to enter a comment (figure 7.10). There are three opportunities to continue the test r:

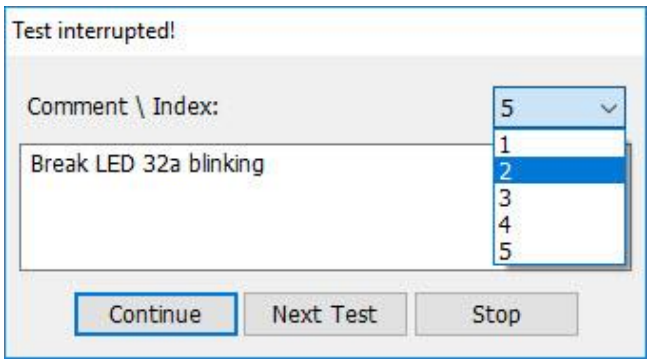


Figure 8-10 : Link Pause

The following functions are available:

Continue	The comment is saved in a data file and the link file continues at the same test file.
Next Test	The comment is saved in a data file and the link file continues with the next test file.
Stop	The data file will register the interruption but no comment will be saved. The link file will be continued at the same test file.
Index	Memory for recall the last used comments

8.2.2.4 Wait Time during Link Progress

If the user has selected an action during Link progress, it is stopped for the selected time.
At the end of waiting time the program automatically continues.

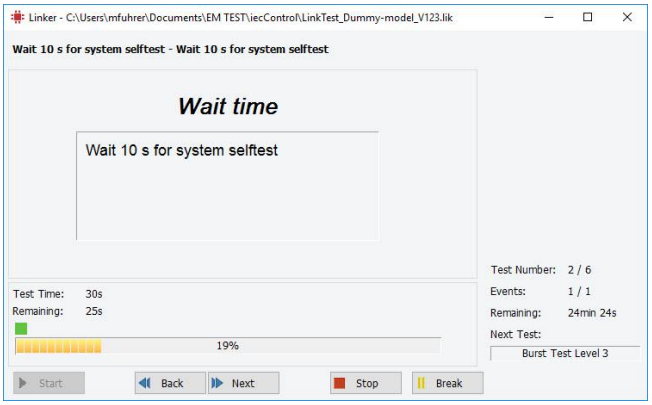


Figure 8-11 Wait Time

Following functions are available:

Stop	The test is immediately stopped.
Break	The test is immediately interrupted (refer to chapter 8.2.2.3).
Next	Selects the next test file in the list and starts the link file automatically.
Back	Steps one test file back (refer to chapter 8.2.2.2).

8.2.2.5 Display of Information during Link Progress

Information is displayed. To start next test the user has to press Next button.

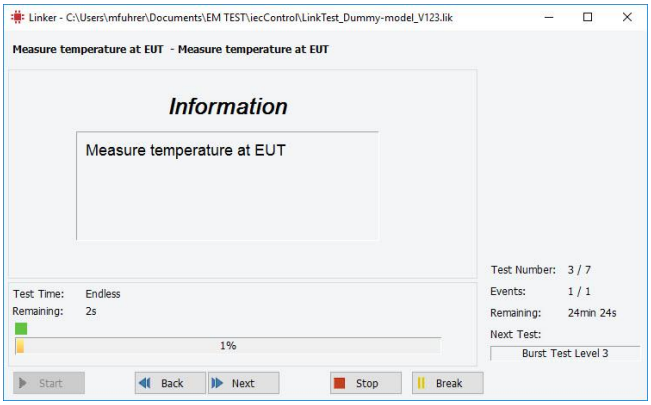


Figure 8-12 Information

Following functions are available:

Stop	The test is immediately stopped.
Break	The test is immediately interrupted (refer to chapter 8.2.2.3).
Next	Selects the next test file in the list and starts the link file automatically.
Back	Steps one test file back (refer to chapter 8.2.2.2).

9 Report

9.1 General

The generation of an RTF-file for your word processing software is very simple.
The results of the tests are written into an RTF-file (Rich Text Format). The RTF-files can be used with any word processing program such as Microsoft Word or WordPad that is able to recognize the RTF-format.
The generated RTF-test report file can then be changed according to your own specific needs and requirements. You may insert e.g. your company logo or you may change the layout of the test report.
Further to this you may create so-called mask files which are saved in the rtf-format. If this feature is selected the converter automatically transferred the test report file into the selected mask. This mask file offers you all the opportunity of your word processing system to configure headlines and foot lines and to design your individual front page of the test report.

- Insert your company logo.
- Insert your complete company address and references.
- Insert any other individual information.

9.2 View and Print

9.2.1 Load data file

A created report file can be loaded and displayed by means of a click on one of the two areas as shown in Figure 9-1.

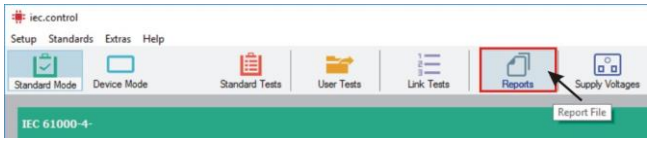


Figure 9-1 : Load and Display of Reports from the Desktop

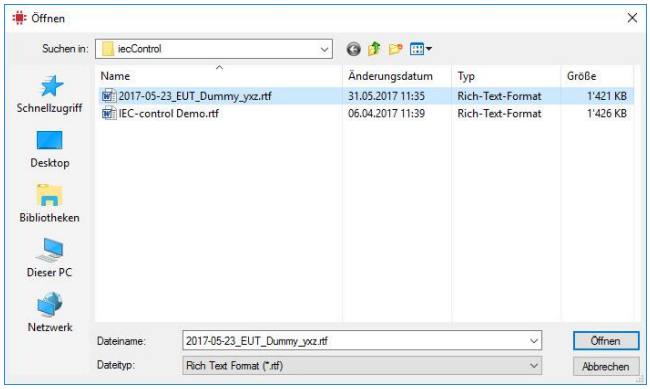


Figure 9-2 : load report file

Figure 9-2 shows the dialog box to load and display of a report. All available report files are listed.

With **OK** the selected report file will be loaded and displayed (see Figure 9-3).

Cancel will take you back to the desktop.

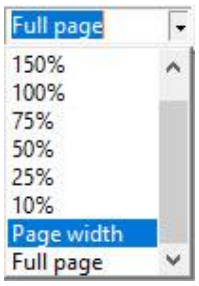
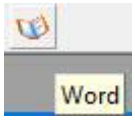
9.2.2 View a Report File

The test report is shown in the Report File window (Figure 9-3). You can move through the document with help of the scroll bar on the right-hand side.

Figure 9-3 : Report file window

The windows operating system requires a standard defined printer for printing the report to the screen. *iec.control* selects this printer to print the report. Is the printer missing or not defined, a Windows error message appears.

The following functions are provided:

	Enlarges / Reduces the displayed test report.
	Opens the Document in the default RTF Word Processor.
	Prints out the test report.
X	To return to the desktop.

Two examples are shown below. In one case a mask file has been used (see Figure 9-5) and in the second case the conversion has been carried out without this option (see Figure 9-4).

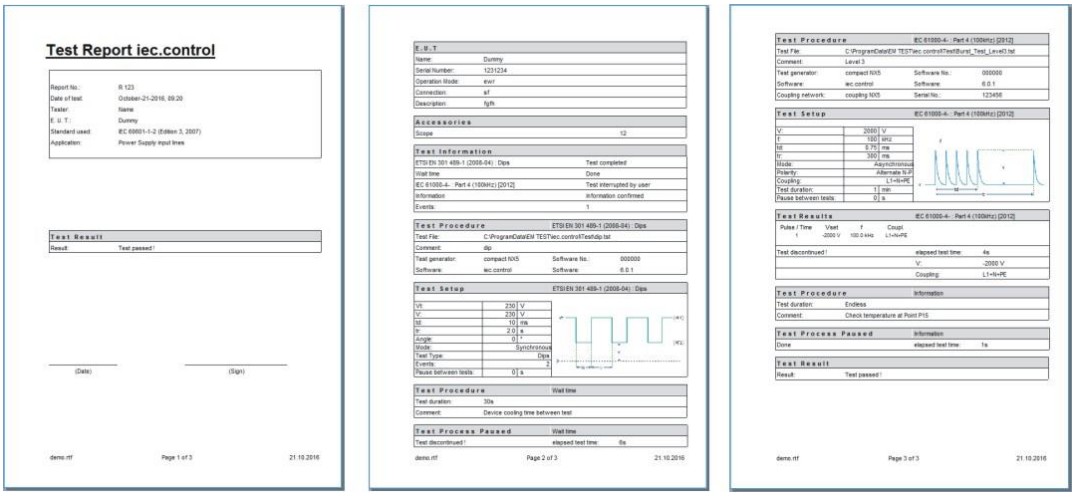


Figure 9-4 : Example of a RTF-Test Report without Mask File

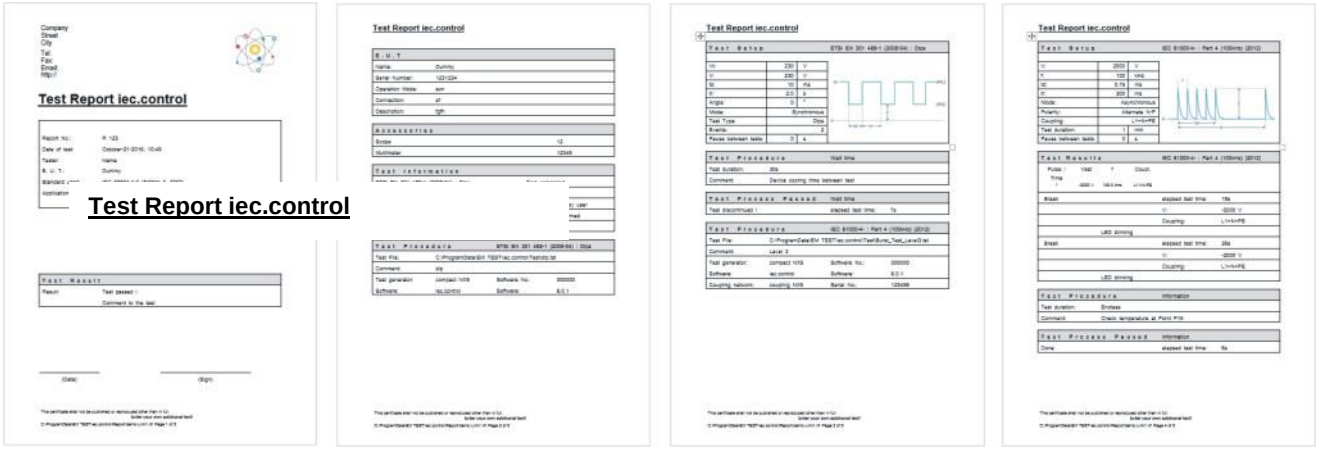


Figure 9-5 : Example of a RTF-Test Report with Mask File

9.3 Generation of a Mask File

To generate a mask file you have to use a word processing software which allows you to save a document as a „*.rtf“ file, for example Microsoft Word or WordPad.

The following chapter describes the generation of a mask file and shows an example (see Figure 9-6).

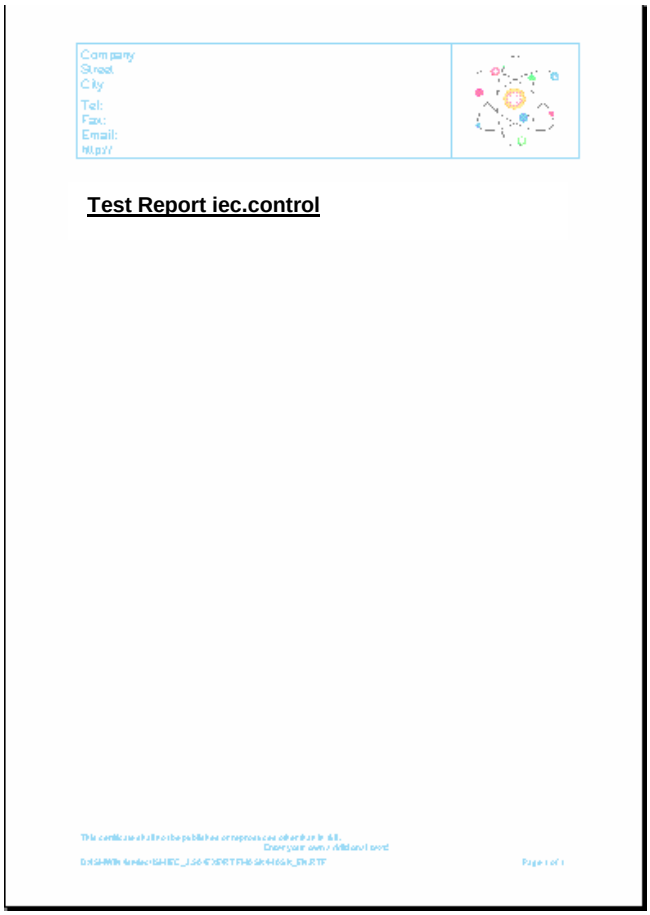


Figure 9-6 : Example of an RTF-Mask File

Start your word processor and design the page and mask file according to your needs and requirements.

You may use headlines and foot lines and include company logo and address information on the front page as well as insert individual information.

End mark for the mask file

Before you save the file please make sure that you have defined the location where *iec.control* shall start to insert the data from the original test report file.

This mark requires the expression „**0xFF**“ at the beginning of the line where the test report data shall be inserted. All other text below this mark (excluding foot lines) will be cut off.

End mark for the mask file

The font of the report is defined with the font of the 0xFF format.

Example for the mask file

In the directory HEADER an example is saved with the name „header_us.rtf“.

10 Measuring instrument

A measuring instrument could be inserted in the process using an IEEE/GPIB, RS 232, USB or Ethernet interface.
The measuring instrument can communicate with *iec.control* and release a measure. *iec.control* will get information if a threshold level was reached and will react as predefined. The measured values are stored in the report or in a file at the end of the test.
The IEEE commands for the measuring instrument are stored in a configuration file (*.mdf).
The actual measuring data are displayed in the test window.
The measuring data are stored in the report file (see 4.5.10)

The instrument can be controlled via IEEE interface and:

- information about the status of the equipment and measuring values can be acquired.
- The returned measuring value is in exponential format.

10.1 Configuration

In the menu **Setup / Measuring Instrument** the setup dialog for the measuring instrument configuration is shown

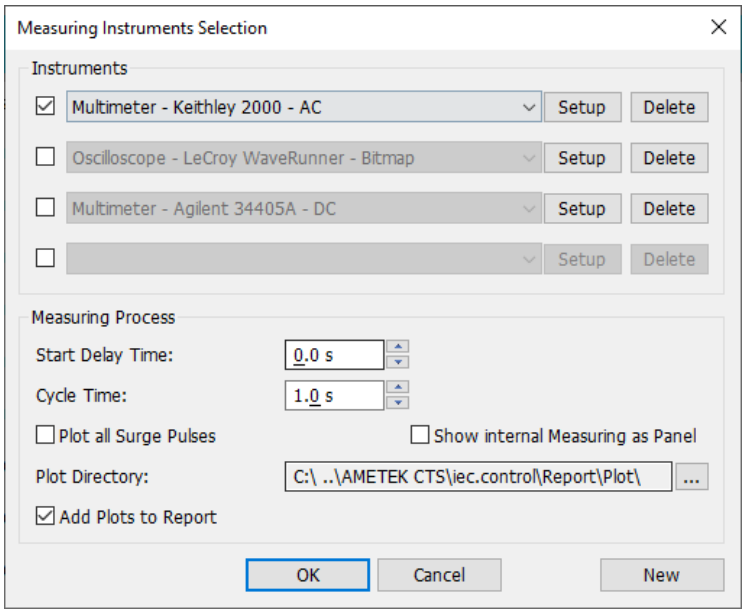
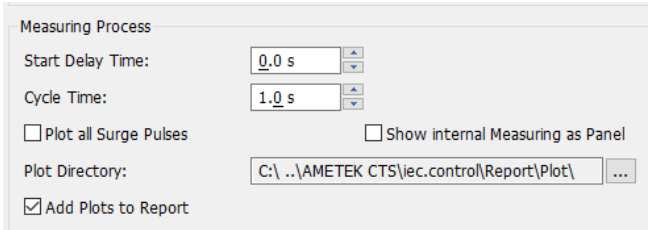


Figure 10-1 : Measuring Instrument Selection

Setup	Configuration for all measuring device settings
Delete	Delete the indicated instrument from the measuring device list
OK	Close the window and returns to the desktop with saving the settings
Cancel	Close the window and returns to the desktop without save
New	Creates a new measuring device.

10.1.1 Measuring process



Repetition
Time between each measure in 100 ms step.

Figure 10-2 : Measuring process

Is the realized data transfer of the measurements longer than the settled repetition time; the data transfer is performed with the shortest possible repetition time.
The software shows no warning.

Instrument settings

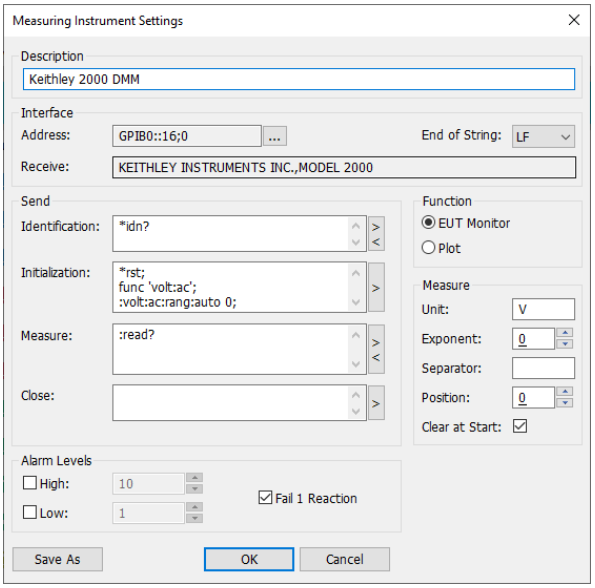


Figure 10-3: Instrument parameter window

The window on the left side is for modify the parameters and commands for the instrument control

Enter the instrument parameters

Save as: Save all settings

OK: Closes the window and returns to the window Measuring instrument selection.

Cancel: Closes the window without save.

10.1.2 Function

Figure 10-4 : Function selection

EUT Monitor
Read the measuring data.

Plot
At the end of the test the data are saved in a plot file. This function is generally used for oscilloscopes to execute a screen dump in a file.

10.1.3 Receive

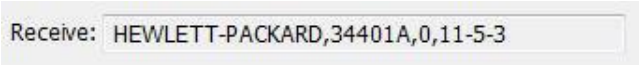


Figure 10-5 : Measuring instrument identification

Identification

During the initialization of the measuring instrument an identification command is sent. The instruments answers by sending back the identification code which is compared with the Receive Identification string. It is possible to enter the identification in the field automatically by executing a single identification command with instrument connected.

10.1.4 Send

Each measuring instrument uses a certain set of commands to communicate with other instruments. The instrument can be controlled via IEEE interface and can be set into a specified operating mode. Status information's and measuring values can be requested.

- Search and identify the instrument at the specified IEEE address (Identification).
- Initialize the measuring instrument (Initialization).
- Trigger a measuring event and wait until the data has been received (Measure).
- Reconfigure the instrument in another mode (Close).

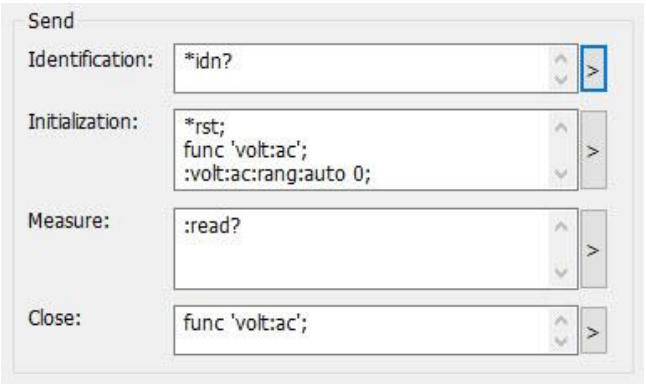


Figure 10-6: Send commands

Identification

This command is used to identify the measuring device. An instrument which receives this command changes into remote operation and sends back its identification code. During the initialization, the identification code is compared with Receive/Identification string.

Initialization

The measuring instrument must be configured (Measuring range, unit, ...). More than one command is sometimes necessary. The commands are sent before each test to change the measuring instrument in required operation mode.

Measure

This is the read of measure command. The measuring instrument performs a measurement and sends the result back.

Close

This command is sent at the end of the test. It is possible to reconfigure the instrument in another mode if necessary.

Sending the commands

The different commands can be sent individually. In the monitor window, the sent commands and the responses are displayed.

Click on this button 

10.1.5 IEEE Address

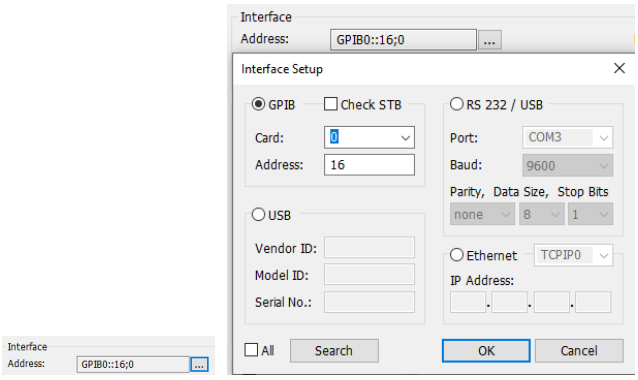


Figure 10-7 : IEEE Address

The IEEE address shall be defined here. The displayed addresses are those which are not used by the test generators. If the needed address is not listed the generator addresses must be changed (See chapter 3.2.2).

10.1.6 Measure

Depending of measuring instrument, the measured value format is different:

- The value is sending in exponential form.
- Additional parameter is sending back for example by oscilloscope, the channel, the type of parameter, the measure, the unit and the status.

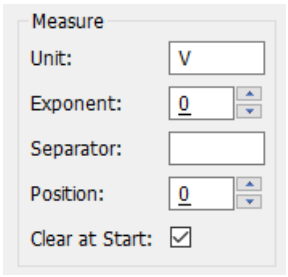


Figure 10-8 : Measure parameters

Unit: Unit of measured variable.

Exponent: Above right added exponent indicating how often an expression to be exponentiated is to be set as a factor

Separator: If the string contains several parameters, the separator could be defined here.

Position: The position of measured value in the string could be defined here (start by 0).

Clear at start: Clear all measurements at the test begin.

10.1.7 Alarm Levels

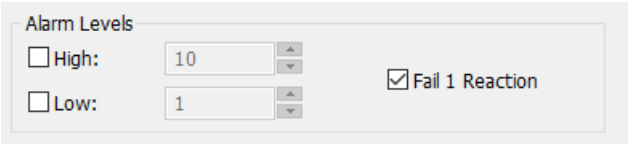


Figure 10-9 : Alarm

High/Low

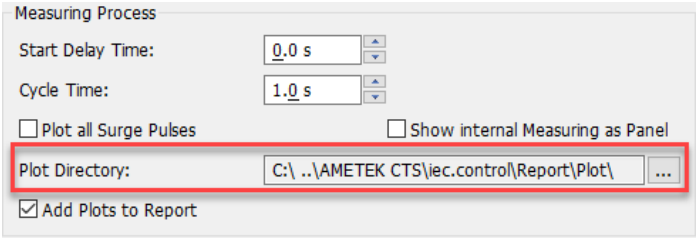
The high and low threshold levels could be specified and activated in this dialog.

Fail 1 Reaction

After an alarm, if Fail 1 reaction is activated and depending of parameter Reaction Fail 1 in menu Setup / General (see 3.2.1) the test is stopped or interrupted and could be continued.

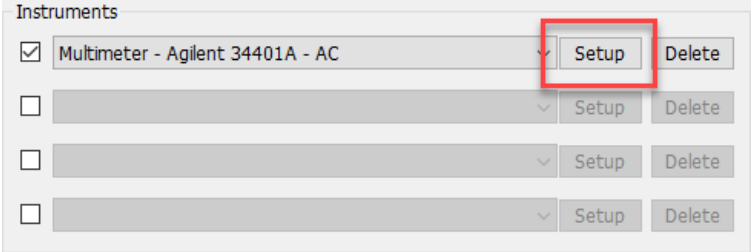
10.1.8 Plot Directory

Directory in which the data would be stored at the end of the test.



10.1.9 Setup

To change the different parameters for the measuring instrument or to create a new file the different fields are enabled by pressing the button Setup.
The field measuring instrument corresponds to file name and is updated after the save dialog.



10.2 Activation of measuring instrument

The measuring instrument is activated:

- After acknowledgement of the parameters in measuring instrument selection dialog.
- After start of *iec.control*, if a measuring instrument was selected.

The measuring instrument could be enabled / disabled:

- In menu item Mode / Enable or disable measuring instrument

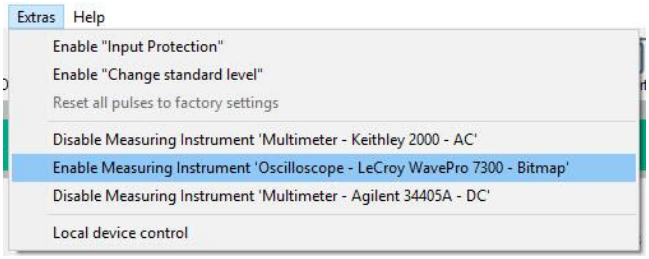


Figure 10-10 : Enable / Disable measuring instrument

- In the bottom right corner of the desktop the recognized measuring instrument is shown and represented by the relevant symbol (MI). Switching between the two modes is possible by means of a double clicking with the left mouse key on this button.

Figure 10-11 :

10.3 Display of measured value

During the test, the measured values are displayed in the test window. A separate graph window shows the readings.

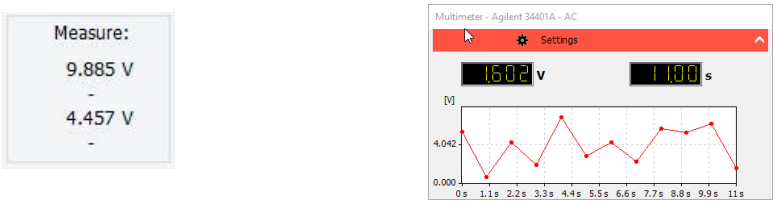


Figure 10-12 : Display of measure value and graph window

In case of a threshold reaching in alarm mode the test is stopped or interrupted.

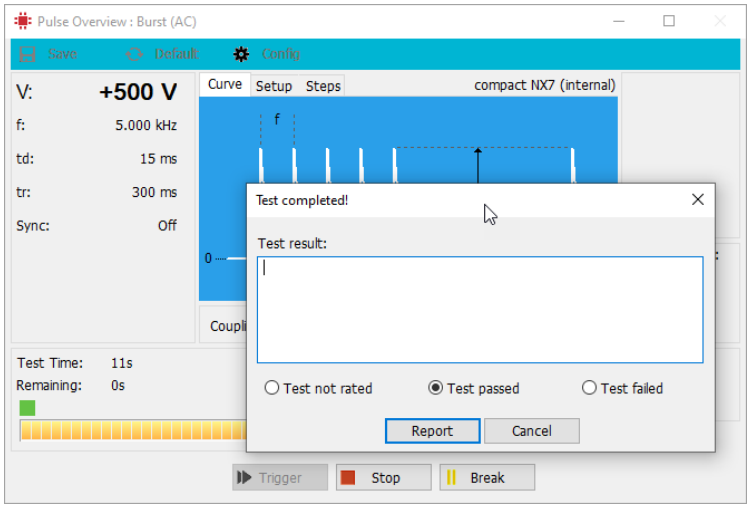


Figure 10-13 : Interruption/test ended

10.4 Measuring instrument in the report

The actual parameters of measuring instrument are documented in the report.

Measuring Device	
Setup File:	Multimeter - Agilent 34401A - AC
Comment:	6 1/2 Digit Multimeter
Unit:	V
Alarm High Level:	8.000 V
Alarm Reaction:	Stop
Repetition (ms):	1000

Figure 10-14 : Measuring instrument setting

The measured values are inserted in the report as table.

Test Results

Pulse / Time	Vset	f	Coupl.	Meas.1 [V]
1	-2000 V	5.0 kHz	L1	
00.0				7.896
01.0				7.438
02.0				6.152
03.0				3.611
04.0				8.567

Figure 10-15 : Measured values in report

If the test is stopped by an alarm, the event is documented.

Test Break Off		
Measuring Device Alarm	elapsed test time:	4s
	V:	-2000 V
	Coupling:	L1
Result:	Test failed !	

Figure 10-16 : Alarm event documentation

10.5 Example

10.5.1 Example 1

Measuring instrument: Keithley 2000
Function: Measuring

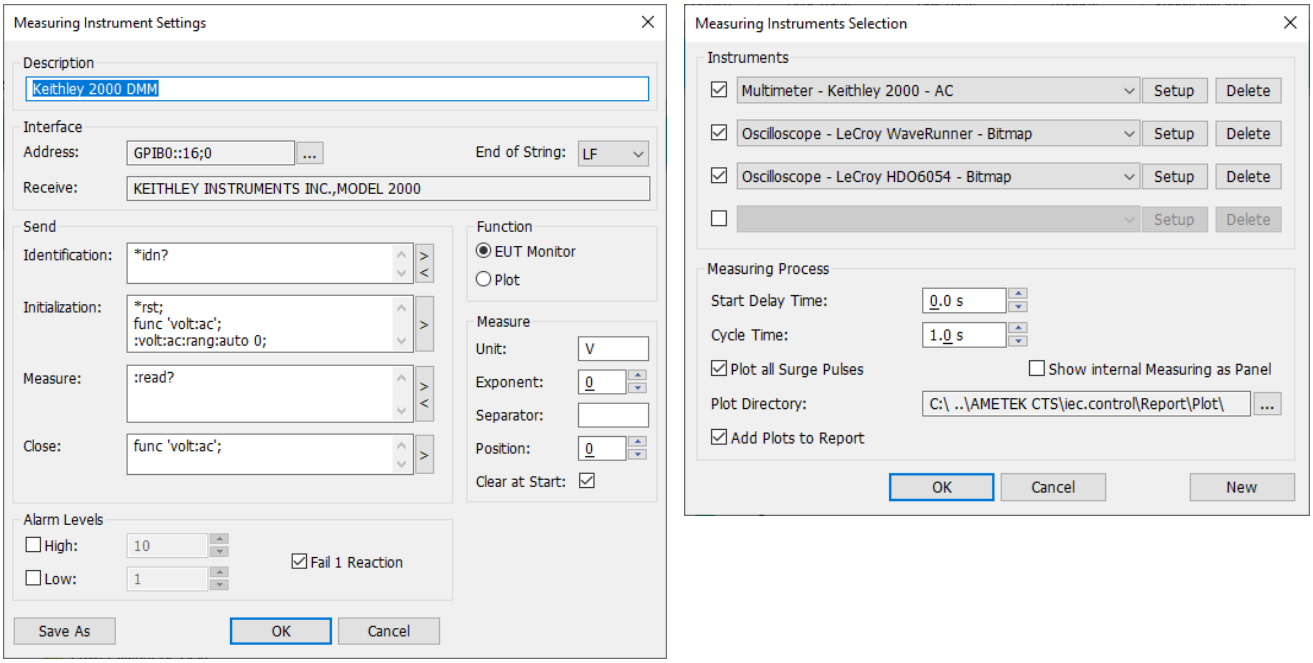
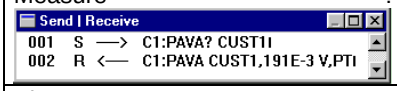


Figure 10-17 : Example 1

Identification:	*idn?
Initialization:	Operation mode Volt AC. Auto Range disabled.
Measure : 	: read? The DMM Keithley 200 sends back the measured value in exponential mode without additional parameter. No separator is needed and the position in the string is 0.
Alarm: High Level: 100 Fail 1 Reaction: Activated	The limit test is performed and when the high level is reached a Fail 1 reaction is executed.
Measuring process Repetition 10	A measure is read each second (10x100ms).

10.5.2 Example 2

Measuring instrument: Lecroy Wave Runner Xi-AMXi-A
Function: Measuring

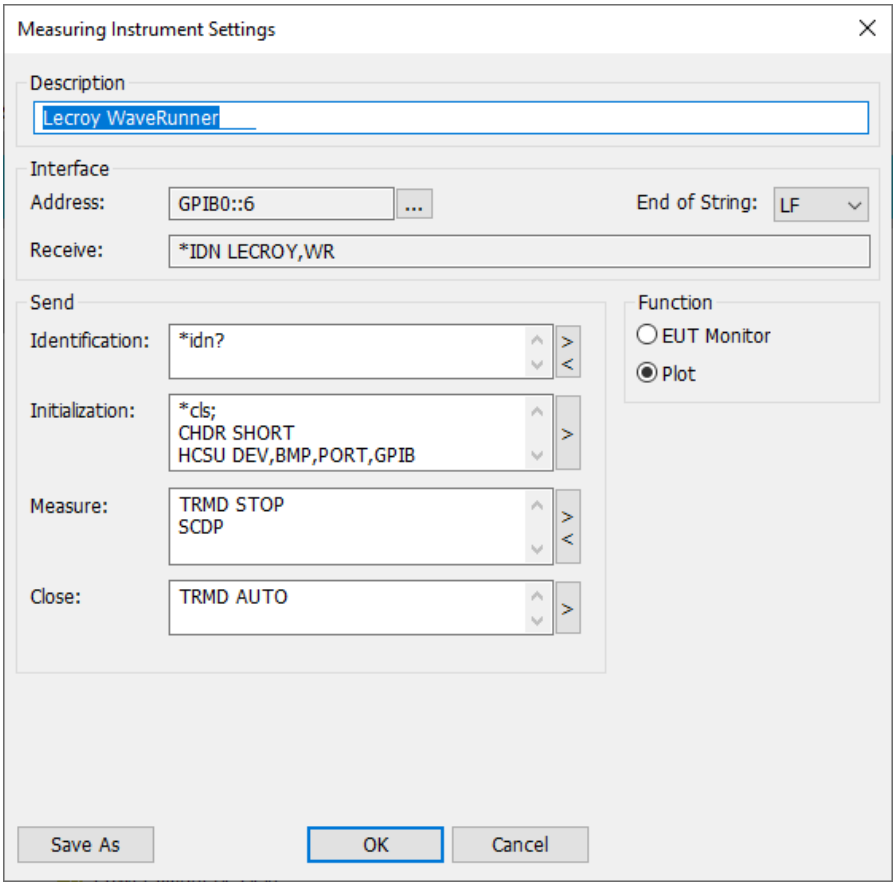
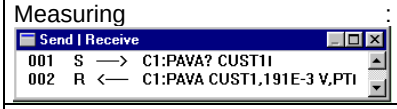


Figure 10-18 : Example 2

Identification:	*idn?
Initialization:	Measuring range 5V
Measuring : 	C1: PAVA? CUST1 Read customer value of channel 1 They are additional parameters in returned string.
Separator: „“	The separator is “,”
Position: 1	The value is at position 1 (Begin 0).
Alarm: High Level: 2 Fail 1 Reaction: not active	The limit test is performed and when the high level is reached the color of displayed value is red, no Fail 1 reaction is executed.
Measuring process Repetition 5	A measure is done all 500 ms (5x100ms).

10.5.3 Example 3

Measuring instrument: LeCroy Wave Runner Xi-AMXi-A
Function: Plot

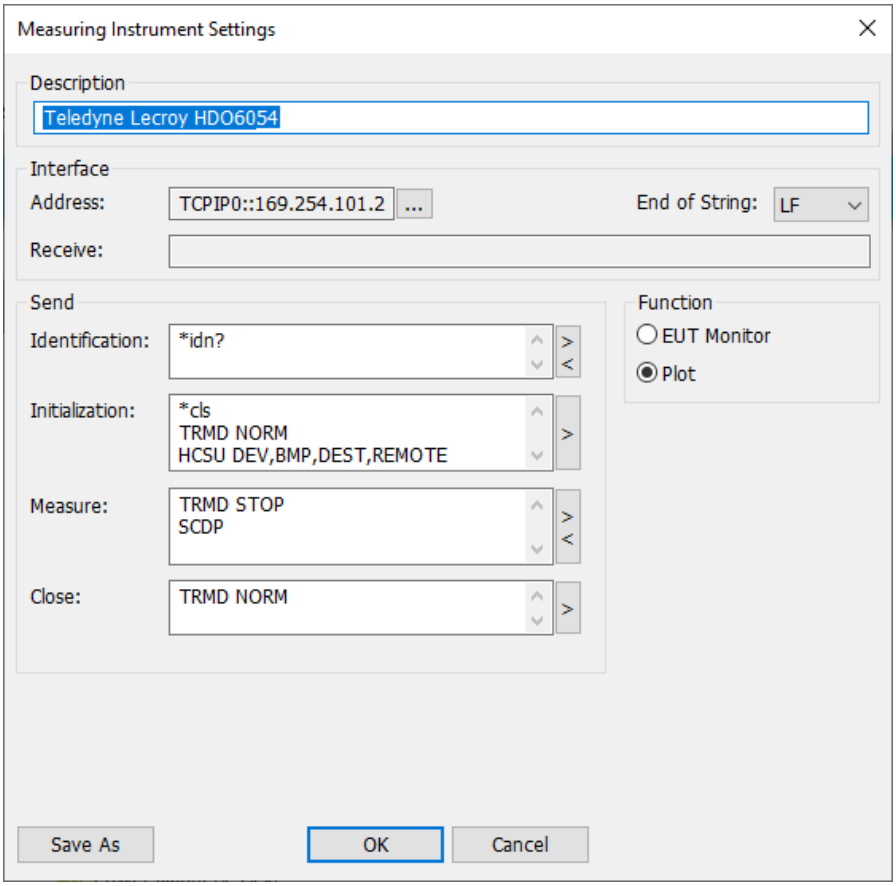


Figure 10-19 : Example 3

Identification:	*idn?
Initialisation: HCSU DEV, BMP, PORT, GPIB	Configure the instrument's hard-copy. Device type : BMP Port : GPIB
Measure: SCDP	Dump the screen contents onto the hard-copy device.
Plot File	At the end of the test the waveform is saved as bitmap in the plot file.

10.6 Supported measuring instrument

Supported measuring devices in iec.control

Type	Manufacturer	Model
DMM	Agilent Technologies	34401A - AC 34401A - DC 34405A - DC
	Keithley	2000 - AC 2000 - DC DAQ6510 DMM6500
Power Meter	Rohde & Schwarz	NRVS NRVD
Oscilloscope	Agilent Technologies	MSO-X 3054A - Bitmap MSO-X 3104A - Bitmap MSO-X 3154A - Bitmap
	Hewlett Packard	HP 54522A - Monitor
	LeCroy	9304 - Bitmap 9350 - Bitmap 9350 - Plot 9361 - Bitmap 9361 - Monitor HDO6054 - Bitmap HDO6154A - Bitmap LT 374M - Bitmap LT 342L - Bitmap LC 534AM - Bitmap WaveJet 354 - Bitmap WavePro 7300 - Bitmap WaveSurfer 424 - Bitmap WaveRunner - Bitmap
	Rhode & Schwarz	RTO 1014 - Monitor RTO 1014 - Plot
	Tektronix	DPO 4054B - Monitor DPO 4104 - Monitor DPO 7254 - Bitmap DPO 7254 - Monitor DPO 7354 - Bitmap DPO 7354 - Monitor MSO 4104B - Bitmap MSO 54 - Bitmap MSO 54 - Monitor
	Yokogawa	DL 7440 - Bitmap

11 Standard Application

11.1 ECE-R10 Standard test

This test recommends configuring the vehicle in "RESS charging mode coupled to the power grid" at rated power until the AC current reached at least 80 per cent of its initial value. This needs to use an external instrument for measure the AC current. iec.control measures the current and stops after fulfilling the selected % value of the initial level or settled 100% value.

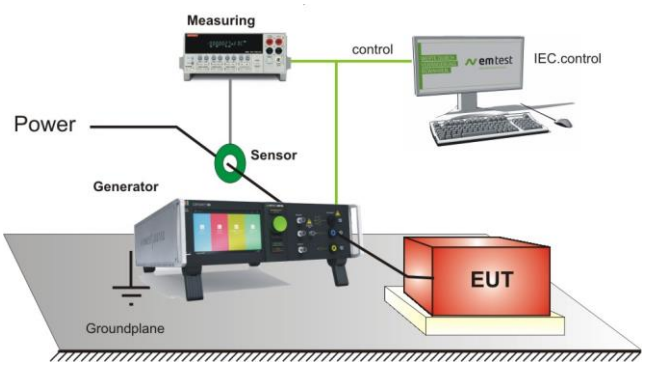
For perform the test follow the guidelines below:

A. Test Setup

The setup must be according the tested standard. For more setup information refer to the related standard.

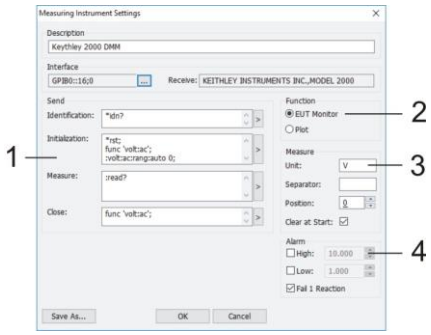
Current measurement:
Use a suitable current-meter or current sensors for the current measuring.

Interface:
GPIB interface is the proposed interface for EMC testing. Take care to the correct EMC proof wiring when using interface like USB.



B. Instrument programming

1. Commands for instrument control. Refer to the instrument manual for the correct commands.
2. Disable all Alarms
3. Select DUT Monitor
4. Use the correct Unit for measuring. Using current sensors, the take care to the transfer ratio and unit of the sensor.

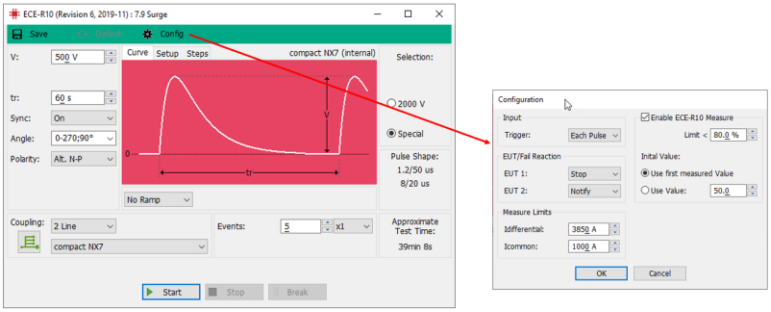


C Generator and test settings

Select the ECE-R10 Standard in the desktop and press to **Burst** or **Surge** test pulse

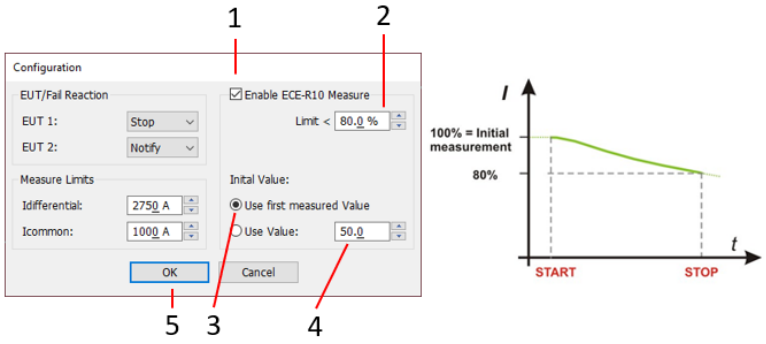
Check and correct the settings like Coupling, Test duration…

Press button Config for open the ECE-R10 settings window.



D ECE-R10 Settings

1. Enable the Measuring
2. Set the limit to < **80%**
3. Select "**Use first measurement Value**" if iec.control shall use the first measuring.
4. Use initial Value if necessary and set the value.
5. Press **OK** for return



E Test running

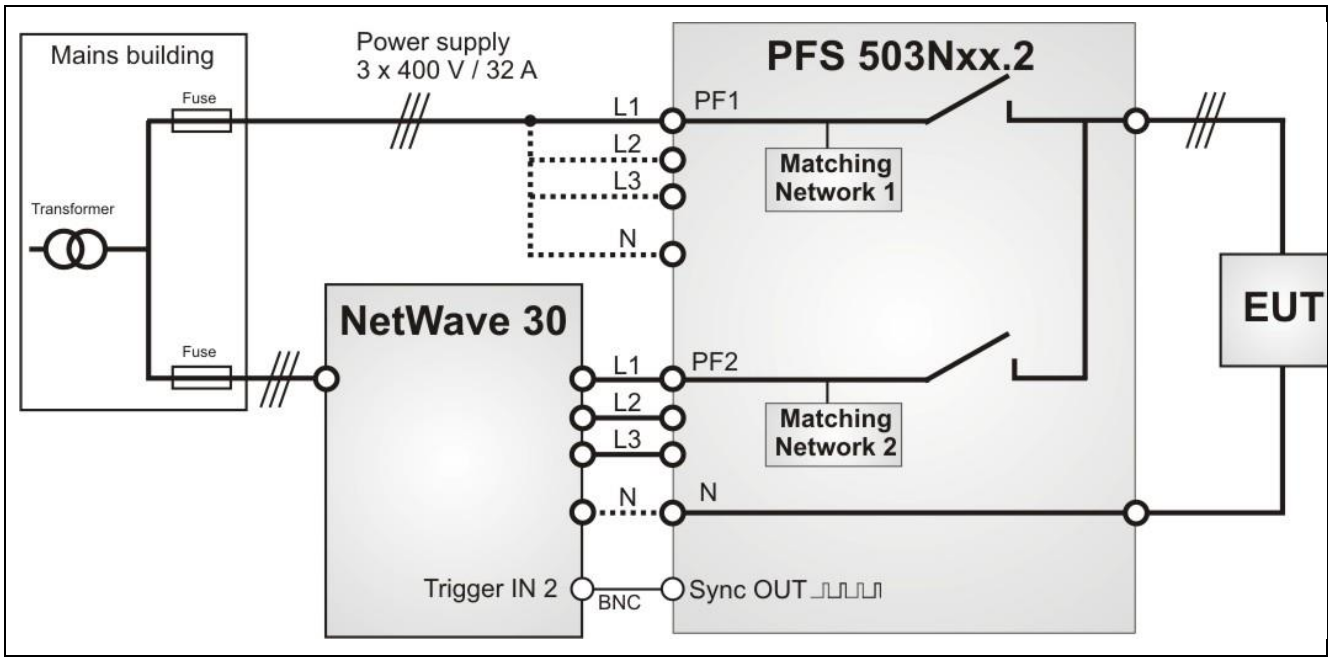
Press start for proceed the test

11.2 Three-phase dips test with Netwave and PFS 503Nxx.2

Voltage dips and interruptions application with a Netwave operates according the following principle.

100 % voltage: From the mains of the building
Reduced dip voltage: From the Netwave 3-phase AC source

For dips the power source changes from mains (100%) to Netwave (reduced voltage)

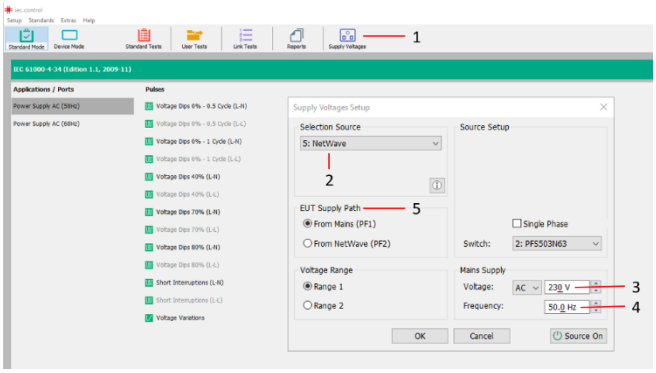


Example of the schematic principle of the wiring with 3-phase Netwave and PFS 503Nxx.2

For more detail please refer to the PFS 503Nxx manual.

11.2.1 Application with IEC control software for testing as per IEC 61000-4-11 and IEC 61000-4-34

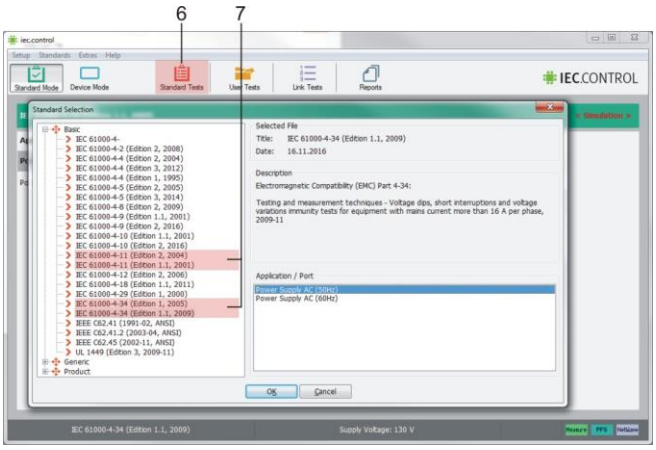
A System configuration



1. Select **Supply voltage**
2. Select **Netwave**
3. Enter applied voltage **Line to Neutral**. Insert the same voltage for **Star** and **Delta** setting.
4. Enter the **mains frequency** (50 Hz or 60 Hz)
5. Select EUT supply path

Exit with **OK**

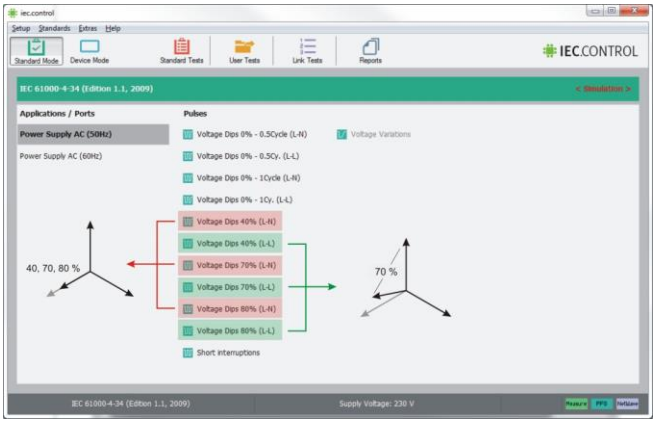
B Standard selection



6. Select **Standard Test**
7. Select the desired Standard for testing as per IEC 61000-4-11 for current ≤ 16 A or IEC 61000-4-34 for current > 16 A

Exit with **OK**

C Test selection

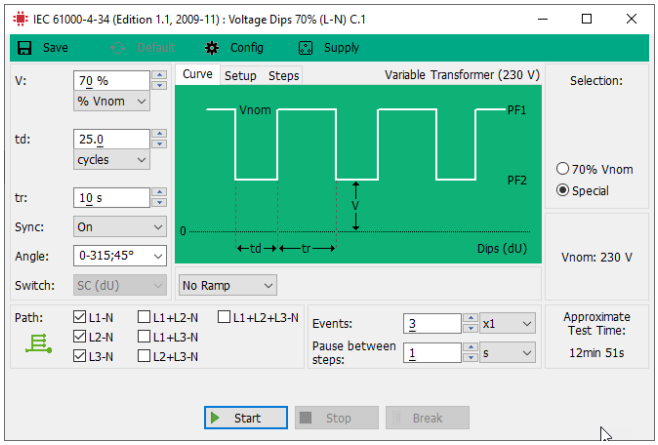


Select in the Test window the correct frequency for dips or interruption.

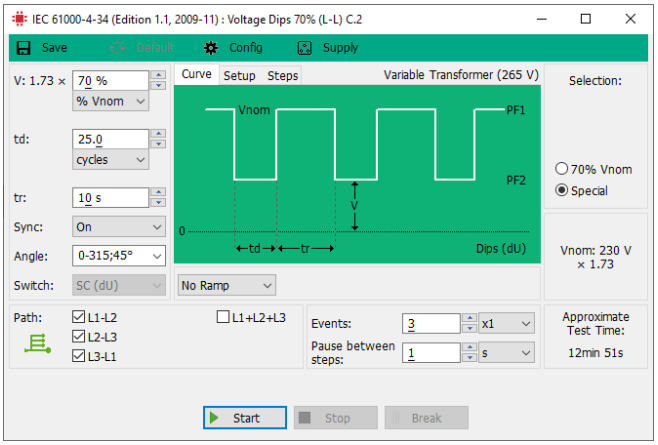
STAR: Select a red test for 40, 70, 80% dips. The Netwave runs as connected in star supply.

DELTA: Select a green test for 40, 70, 80% dips. The Netwave runs as connected in delta supply.

Dropout: The Netwave is set to zero volt for star and delta connection.



Example for star connection L1-N, L2-N, L3-N

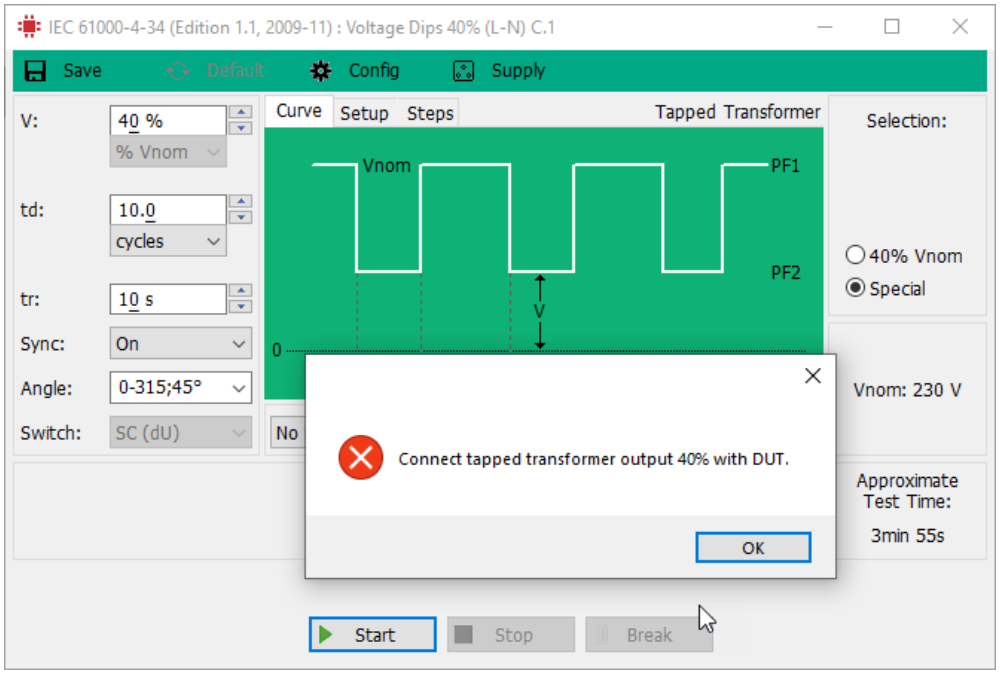


Example for delta connection L1-L2, L2-L3, L3-L1

For more information, refer to the PFS 503N manual.

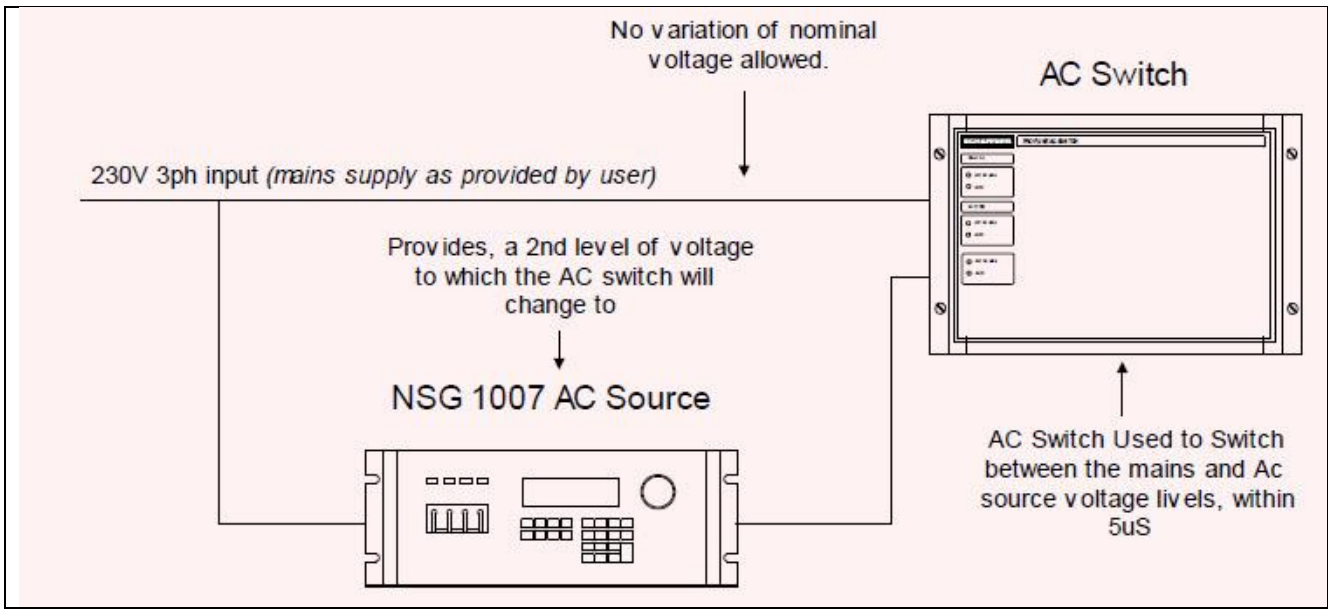
Use of a TVT 1-250-16

When using the manual tapped-transformer TVT 1-250-16, only the levels 40, 70 and 80 % required by the standard can be selected as test levels. When the test is started, the software reports which TVT output must be used:



11.3 Power Fail tests with Teseq NSG1007 and NSG2200 series

11.3.1 Setup NSG 1007 with NSG 2200



11.3.2 Interface settings

Generator	NSG 1007	NSG 2200
RS 232 Baudrate	38400 Baud	9600 Baud
GPIB Address	0-31	0-31

12 Standard Reference Guide

The following table shows the actual standards which supported by iec.control. This list will be completed from time to time.

Basic Norm

IEC61000-4	Electromagnetic Compatibility (EMC) Part x: Testing and measurement techniques - Immunity tests
IEC61000-4-2 Ed. 2 (2008)	Electromagnetic Compatibility (EMC) Part 2: ESD - Immunity tests
IEC61000-4-4 Ed. 2 (2004)	Electromagnetic Compatibility (EMC) Part 4: Burst - Immunity tests
IEC61000-4-4 Ed. 3 (2012)	Electromagnetic Compatibility (EMC) Part 4: Burst - Immunity tests
IEC61000-4-4 Ed. 1 (1995)	Electromagnetic Compatibility (EMC) Part 4: Burst - Immunity tests
IEC61000-4-5 Ed. 2 (2005)	Electromagnetic Compatibility (EMC) Part 5: Surge - Immunity tests
IEC61000-4-5 Ed. 2 (2014)	Electromagnetic Compatibility (EMC) Part 5: Surge - Immunity tests
IEC61000-4-8 Ed. 2 (2009)	Electromagnetic Compatibility (EMC) Part 8: AC mains magnetic fields - Immunity tests - Immunity tests
IEC61000-4-9 Ed. 1.1 (2001)	Electromagnetic Compatibility (EMC) Part 9: Pulsed magnetic fields - Immunity tests
IEC61000-4-9 Ed. 2 (2016)	Electromagnetic Compatibility (EMC) Part 9: Pulsed magnetic fields - Immunity tests
IEC61000-4-10 Ed. 1.1 (2001)	Electromagnetic Compatibility (EMC) Part 10: Damped oscillatory magnetic fields - Immunity tests
IEC61000-4-10 Ed. 2 (2004)	Electromagnetic Compatibility (EMC) Part 10: Damped oscillatory magnetic fields - Immunity tests
IEC61000-4-11 Ed. 2 (2004)	Electromagnetic Compatibility (EMC) Part 11: Voltage dips, short interruptions AC ports - Immunity tests
IEC61000-4-11 Ed. 1.1 (2001)	Electromagnetic Compatibility (EMC) Part 11: Voltage dips, short interruptions AC ports - Immunity tests
IEC61000-4-12 Ed. 2 (2006)	Electromagnetic Compatibility (EMC) Part 12: Ringwave - Immunity tests
IEC61000-4-12 Ed. 3 (20)	Electromagnetic Compatibility (EMC) Part 12: Ringwave - Immunity tests
IEC61000-4-18 Ed. 1.1 (2011)	Electromagnetic Compatibility (EMC) Part 18: Damped oscillatory wave- Immunity tests
IEC61000-4-29 Ed. 1 (2000)	Electromagnetic Compatibility (EMC) Part 29: Voltage dips, short interruptions AC ports - Immunity tests
IEC61000-4-34 Ed. 1 (2005)	Electromagnetic Compatibility (EMC) Part 34: Voltage dips, short interruptions AC ports > 16 A - Immunity tests
IEEE C62.41 (1991-02, ANSI)	Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits
IEEE C62.41.2 (2003-04, ANSI)	Recommended Practice on Characterization of Surges in Voltages in Low-Voltage <1000 V s AC Power Circuits
IEEE C62.45 (2002-11 ANSI)	Recommended Practice on Characterization of Surges in Voltages in Low-Voltage <1000 V s AC Power Circuits
UL 1449 (Ed. 3, 2009-11	UL Standard for Safety for Surge Protective devices

Generic

EN 50082-1	Residential, commercial and light industry Generic immunity standard Part 1, August 97
EN 50082-2	Industrial environment Generic immunity standard Part 2, August 96
EN 61000-6-1 (2007)	Residential, commercial and light industry Generic immunity standard Part 1,
EN 61000-6-2 (2006)	Industrial environment Generic immunity standard Part 2
IEC 61000-6-1 Ed. 2 (2005)	Residential, commercial and light industry Generic immunity standard Part 1,
IEC 61000-6-2 Ed. 2 (2005)	Industrial environment Generic immunity standard Part 2

Components

IEC 384-14	Isolation Test Resistors and Condensators
IEC 384-14b	Isolation Test Resistors and Condensators b
IEC 60065 Ed.7.1:2005	Audio, video and similar electronic apparatus Safety requirements – Ed 7.1 – (12-2005)
IEC 60255-5	Insulation coordination for measuring relays and protection equipment – Electric relays
IEC 60950-1 (2007)	Electrical equipment for measurement, control and laboratory use

Product	Industrial
EN 12016 (1998)	Electromagnetic compatibility – Immunity Lifts, escalators and passenger conveyors Product family standard, 1998
EN 12016 (2002)	Electromagnetic compatibility – Immunity Lifts, escalators and passenger conveyors Product family standard, 1998
EN 12016 (2004)	Electromagnetic compatibility – Immunity Lifts, escalators and passenger conveyors Product family standard, 1998
EN 12016 (2013)	Electromagnetic compatibility – Immunity Lifts, escalators and passenger conveyors Product family standard, 1998
EN 50054 (1995)	Electromagnetic compatibility – Immunity Electrical apparatus for the detection and measurement of combustible gases Particular EMC-requirements and test methods, 1995
EN 50199 (1996)	Electromagnetic compatibility - Arc welding equipment - Product standard
EN 60255-26 (2014)	Measuring relays and protection equipment – Part 26
EN 61326 (1997)	Electrical equipment for measurement, control and laboratory use - Immunity requirements for equipment performing or intended to perform safety related functions (1997)
EN 61326-3-1 (2013)	Electrical equipment for measurement, control and laboratory use - Part 3-1: Immunity requirements for equipment performing or intended to perform safety related functions (2013)
EN 61326-3-1 (2010)	Electrical equipment for measurement, control and laboratory use - Part 3-1: Immunity requirements for equipment performing or intended to perform safety related functions (2010)
EN 61800-3 Ed. 1999	Electromagnetic Compatibility - Part 3 Adjustable speed electrical power drive systems EMC product standard including specific test methods, 1999
GL (Germ. Lloyd) 2003	Electromagnetic compatibility – Part 7, Section 3
GL (Germ. Lloyd) 2012	Electromagnetic compatibility – Part 7, Section 3
EN 60255-22-1 Ed. 3 (2007)	Measuring relays and protection equipment - Part 22-1: Electrical disturbance tests - 1 MHz burst immunity test
EN 60255-22-4 Ed. 3 (2008)	Measuring relays and protection equipment - Part 22-4: Electrical disturbance tests - Electrical fast transient/burst immunity test
EN 60255-22-5 Ed. 3 (2008)	Measuring relays and protection equipment - Part 22-5: Electrical disturbance tests - Surge immunity test
EN 60255-26 Ed 2 (2008)	Measuring relays and protection equipment – Part 26
EN 60255-26 Ed 3 (2013)	Measuring relays and protection equipment – Part 26
EN 50199 (1996)	Electromagnetic compatibility Arc welding equipment Product standard, 1995
PrEN 50240 (1996)	Electromagnetic compatibility Resistance welding equipment Product standard, 1996
EN 61326 (1997)	EMC requirements Electrical equipment for measurement, control and laboratory use 1997
EN 61800-3 Ed. 2005	Electromagnetic Compatibility - Part 3 Adjustable speed electrical power drive systems EMC product standard including specific test methods, 2005
IEC 60255-22	Measuring relays and protection equipment- Part 22-1: Electrical disturbance tests – 1Mhz Burst immunity tests
IEC 62052-11	Electricity metering equipment (AC) - General requirements, tests and test conditions - Part 11: Metering equipment
	Medical
EN 60601-1-2 Ed. 3 (2007)	Electromagnetic compatibility - Part 2 Requirements and tests Medical electrical equipment International standard, Draft, 2007
EN 60601-1-2 Ed. 4 (2014)	Electromagnetic compatibility - Part 2 Requirements and tests Medical electrical equipment International standard, Draft, 2014

Residential

EN 55103-2 (2009)	Electromagnetic Compatibility - Part 2 Immunity Audio, video, audio-visual and entertainment lighting control apparatus for professional use Product family standard, 1996
EN 55014-2 (2009)	Electromagnetic compatibility - Part 2 Immunity Immunity requirements for household appliance, electronic tools and similar apparatus Product family standard, 2002
EN 55014-2 (2002)	Electromagnetic compatibility - Part 2 Immunity Immunity requirements for household appliance, electronic tools and similar apparatus Product family standard, 2002
EN 55020 (1995)	Electromagnetic immunity of broadcast receivers and associated equipment
EN 55020 (2002)	Electromagnetic immunity of broadcast receivers and associated equipment
EN 55103-2 (1996)	Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part 2: Immunity
EN 55103-2 (2009)	Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part 2: Immunity
EN 55104 (1995)	Electromagnetic compatibility Immunity requirements for household appliances, tools and similar apparatus Product family standard, 1995
EN 61547 (1995)	Electromagnetic compatibility Equipment for general lighting purposes Prod. Fam. standard, 1995
EN 61547 (2001)	Electromagnetic compatibility Equipment for general lighting purposes Prod. Fam. standard, 2001
EN 61547 (2010)	Electromagnetic compatibility Equipment for general lighting purposes Prod. Fam. standard, 2010
EN 60335 (2006)	Household and similar electrical appliances – Safety Part1 : General requirements

Traffic

PrEN 50121-3-2: 1999	Electromagnetic compatibility Part 3-2 Rolling stock - Apparatus
PrEN 50121-4 : 1999	Railway applications Electromagnetic compatibility – Immunity Part 4: Signalling and telecommnunications apparatus
PrEN 50121-5 : 1999	Railway applications Electromagnetic compatibility Part 5: Immunity Fixed power supply apparatus and installations, 1997
EN 50293	Electromagnetic Compatibility (EMC) : Road traffic signal systems - Product standard
prEN 50121-3-2 (2006)	Electromagnetic Compatibility Part 3-2 Rolling stock – Apparatus
PrEN 50121-4 (2006)	Railway applications Electromagnetic compatibility – Immunity Part 4 : Signaling and telecommunications apparatus

Product	Telecom
Telcordia (Issue 5, 2009-08)	TELCORDIA (Bellcore) GR-1089-CORE (Issue 5, 2009-08) Electromagnetic Compatibility and Electrical Safety Generic Criteria for Network Telecommunications Equipment
Telcordia (Issue 4, 2006-06)	TELCORDIA (Bellcore) GR-1089-CORE (Issue 4, 2006-06) Electromagnetic Compatibility and Electrical Safety Generic Criteria for Network Telecommunications Equipment
GR-1089-CORE (Rev.1,1999 –02)	Electromagnetic Compatibility and Electrical Safety. Generic Criteria for Network Telecommunications Equipment. February 1999
PrEN 300386-2 (1997)	Electromagnetic compatibility and Radio spectrum Matters (ERM) Requirements for Telecommunication network equipment Part 2: Product family standard, 1997
EN 55024(CISPR24) (1998)	Information technology equipment - Immunity characteristics - Limits and methods of measurement, 1998
PrETS 300046	Electromagnetic compatibility Integrated Services Digital Network (ISDN) Primary rate access- safety and protection Part3: Interface 1a Protection, Part5: Interface 1b Protection
PrETS 300047	Electromagnetic compatibility Integrated Services Digital Network (ISDN) Basic access- safety and protection Part3: Interface 1a Protection, Part5: Interface 1b Protection
ETS 300329 ed.2 (1997)	Electro-Magnetic Compatibility (EMC) Radio Equipment and Systems (RES) for Digital European Cordless Telecommunications (DECT) equipment 1997
ETS 300340 ed. 2 (1997)	Electro-Magnetic Compatibility (EMC) Radio Equipment and Systems (RES) for European Radio Message System (ERMES) paging receivers 1997
PrETS 300342-1 ed 2 (1997)	Electro-Magnetic Compatibility (EMC) Radio Equipment and Systems (RES) for European digital cellular telecommunications system (GSM 900MHz and DCS 1800MHz) Part 1: Mobile and portable radio and ancillary equipment,1997
FCC 97-270 (1997-08)	Federal Communications Commission Part 68 August 1997
ITU K17	Tests on power-fed repeaters using solid-state devices in order to check the arrangements for protection from external interference
ITU K20	Resistibility of telecommunication switching equipment to overvoltages and overcurrent

This list is not exhaustive and is constantly updated.

12.1 Limitations

12.1.1 Test level with Burst as per IEC 61000-4-4 Ed.2.

Burst generators, which the specifications in accordance with. IEC 61000-4-4 Ed2: 2004 fulfills, have a limitation of the maximum output voltage. The efficiency of the Burstpulse decreases with the numbers of couplings.

Therefore, the maximum test level is limited by the number of coupling on several lines.

Generators with the modification in accordance with IEC 61000-4-4 Ed2: 2004 the. max. test levels have the following limits:

Coupling	**UCS 500 >Vers.3.0 UCS 500N4 >Vers.3.0**	**compact NX5 UCS 500N5 >Vers.3.0 >Vers.3.0**	**UCS 500N6 >Vers.3.0 UCS 500N6A >Vers.3.0**	**UCS 500N6B UCS N7**
50 Ω	4400V	5500V	5500V	5500V
1 coupling any	4400V	5500V	5500V	5500V
2 couplings any	4400V	5500V	5000V	5000V
3 couplings any	4400V	5500V	5000V	5000V

Generator with CNI 503 / CNE 503	**UCS 500 >Vers.3.0 UCS 500N4 >Vers.3.0**	**compact NX5 UCS 500N5**	**UCS 500N6 >Vers.3.0 UCS 500N6A >Vers.3.0**	**UCS 500N6B UCS N7**
50 Ω	4400V	5500V	5500V	5500V
1 coupling any	4400V	5500V	5500V	5500V
2 couplings any	4000V	5000V	5000V	5000V
3 couplings any	4000V	5000V	5000V	5000V
4 couplings any	4000V	4500V	4500V	4500V
5 couplings any	4000V	4500V	4500V	4500V

12.2 List of supported devices

Devices (NX-Series)	Devices (N-Series)
compact NX5 series (all models)	CSS500N1.1
compact NX7 series (all models)	CSS500N2
NSG 3040A (all models)	CSS500N2.1
NSG 3060A (all models)	CSS500N2.2
vsurge NX15	CSS500N6
vsurge NX20	CSS500N10
burst NX8 (all models)	CSS500N10.1
vsurge NX8.1	CSS500N10.2
vsurge NX8.2	
	EFT500N5
	EFT500N5.1
	EFT500N5.2
AC/DC sources	EFT500N5.6
	EFT500N5.7
NetWave (1- and 3-phase)	EFT500N5.8
NSG 1007	EFT500N8
NSG 2200-1	EFT500N8.1
NSG 2200-3	
iX series	OCS500N6 with CNV508N4
MX series	OCS500N6.1
	OCS500N6.2
	OCS500N6.3
Teseq devices	OCS500N6.3
	OCS500N6.4
NSG 3040	OCS500N6.5
NSG 3060	OCS500N6.6
NSG 3150	OCS500N6.7
	OCS500N6.8
	OCS500N6.9
	OCS500N6.10
	OCS500N6.11
	OCS500N6F
	OCS500N6F.1
	OCS500N6F.2
	OCS500N6F.3
	PFS503N32
	PFS503N32.1
	PFS503N32.2
	PFS503N63
	PFS503N63.1
	PFS503N63.2
	PFS503N100
	PFS503N100.1
	PFS503N100.2
	TSS500N2B
	TSS500N2F
	TSS500N4
	TSS500N4B
	TSS500N4.1
	TSS500N6B
	TSS500N10
	TSS500N10.1
	UCS500N4 (all models)
	UCS500N5 (all models)
	UCS500N6 (all models)
	UCS500N7 (all models)

Actual product range (N-Serie)	Devices up to 2008
	CSS500 M2
VCS500N4	CSS500 M10
VCS500N7T	CSS500 M10C2
VCS500N7	
VCS500N7.1	EFT500
VCS500N7.2	EFT503
VCS500N8	EFT800
VCS500N8.1	EFT803
VCS500N8.2	EFT500 M4
VCS500N8.3	EFT500 M8
VCS500N10	
VCS500N10.2	OCS500 M6
VCS500N10.3	OCS500 M6S8
VCS500N10T	
VCS500N12	PFS500
VCS500N12.1	PFS503
VSS500N6	TSS500
VSS500N10	TSS500 M2
VSS500N10.2	TSS500 M2B
VSS500N12	TSS500 M2F
VSS500N12.1	TSS500 M4
VSS500N12.2	TSS500 M4B
VSS500N15.1	TSS500 M6B
	TSS500 M10
	UCS500
	UCS500 M2
	UCS500 M4
	UCS500 M6
	UCS500 M6B
	UCS500M6BS5
	VCS500
	VCS500 M4
	VCS500 M4S6
	VCS500 M6
	VCS500 M6T
	VCS500 M8
	VCS500 M10
	VCS500M10S6
	VCS500M12S6
	VSS500 M12
	VSS500M12S2
	ESD30/P18
	ESD30/P30