HAEFELY TECHNOLOGY

USER MANUAL

axos 5

COMPACT IMMUNITY TEST SYSTEM

SURGE | EFT / BURST | VOLTAGE DIPS | MAGNETIC FIELD

www.axos.haefely.com

a brand of HAEFELY

Haefely is a subsidiary of Hubbell Incorporated.

Hubbell High Voltage Test Business

precision. swiss made.

A Note to Begin

Thank you for choosing the Haefely AXOS^5. Please take a little time to read through this user manual and familiarize yourself with the instrument controls and some potential dangers.

We hope you have many productive years of operation from the AXOS^5 Compact Immunity Test System .

HAEFELY TEST AG

Document Title	User Manual: AXOS^5 Compact Immunity Test System
Reference No.	4700787_pr4

Contents

1 Safety

1.1 General Safety Information

Significant: Please read carefully the safety requirements before using the AXOS[5]!

⚠	This warning sign is visible on the equipment. Meaning: The documentation must be consulted before connecting the equipment to any voltage supply
⚠	Dangerous mains voltage or high voltages are present inside the AXOS[5].
⚠	The earth connection of the AXOS[5] must be connected to a good earth. If trigger is pressed without connection to earth, electrical shock may occur!
⚠	Before removing any covers, remove all external connection cables.
⚠	The AXOS[5] should only be maintained by trained personnel.
⚠	Do not open any system modules, they contains no user replaceable parts.
⚠	People with heart pacemakers must not be in the vicinity of the system, when it is in operation.
⚠	Do not switch on or operate the AXOS[5] System if an explosion hazard exists. The system should be operated in a dry room. If condensation is visible the unit should be dried before operating.
⚠	Never touch the Equipment Under Test (EUT), when the AXOS[5] is operating. Establish a safety barrier around the test setup (Close the circuit pin 4 and pin 5 in Table 5-3).
⚠	If any part of the AXOS[5] is damaged or it is possible that damage has occurred, for example during transportation, do not switch on the unit.
⚠	Before opening any units remove the mains power cord.
⚠	Before changing the mains fuse, remove the mains power cord.
⚠	Fuses should only be replaced with the same type and value.
⚠	This user manual is an integral part of the test system. Haefely Test AG and its sales partners refuse to accept any responsibility for consequential or direct damage to persons and/or goods due to none observance of instructions contained herein or due to incorrect use of the AXOS[5].
⚠	When applying Magnetic field, do not touch the coil when test is running. Only direct output HI and COM must be used to connect the coil. The coil loop (from HI till COM) must be closed.
⚠	Never connect a supply voltage directly to the HI/COM surge outputs. This will damage the unit!!!. Always use a suitable CDN

Table 1-1: Safety requirements AXOS

When a test is started on the AXOS[5] the symbol in Figure 1-1 is displayed on the screen.

Figure 1-1: Safety sign

1.2 Safety Standards

The AXOS[5] fulfils the requirements of IEC 61010-1.

2 Product description

2.1 Basic information

The AXOS^5 compact immunity test system integrates all of the best pieces of our stand alone test systems into one single economic solution. It combines 5 kV Burst/EFT, Surge combination wave, AC/DC Dips & Interrupts, along with an integrated single-phase coupling / decoupling network into one compact system. This allows for quick and completely automated testing to the most common IEC standards.

AXOS^5 can either be operated via front panel by large colour graphic touch screen interface or remotely from the PC. The menu together with the availability of predefined test routines for different standards makes testing easy and reliable, even for less frequently users.

All the test parameters can be varied in a broad range. Together with the ability of changing test parameters during test, AXOS^5 is not only the ideal product for compliance and pre-compliance testing, it is useful for monitoring & debugging function during design phase.

A wide range of cost-efficient and user friendly coupling / decoupling networks for power lines as well as for symmetrical and asymmetrical data- and signal-lines are available as options.

In Figure 2-1 is the starting menu of the ASOX5 version displayed. The menu is fully controlled by a touch screen. Every command is entered through the touch screen. By pressing the Surge, EFT/Burst, Voltage Dips or Magnetic field an under menu gets open. If purchasing an individual version for Surge (includes Magnetic field), EFT/Burst and Voltage Dips it shows only the particular function.

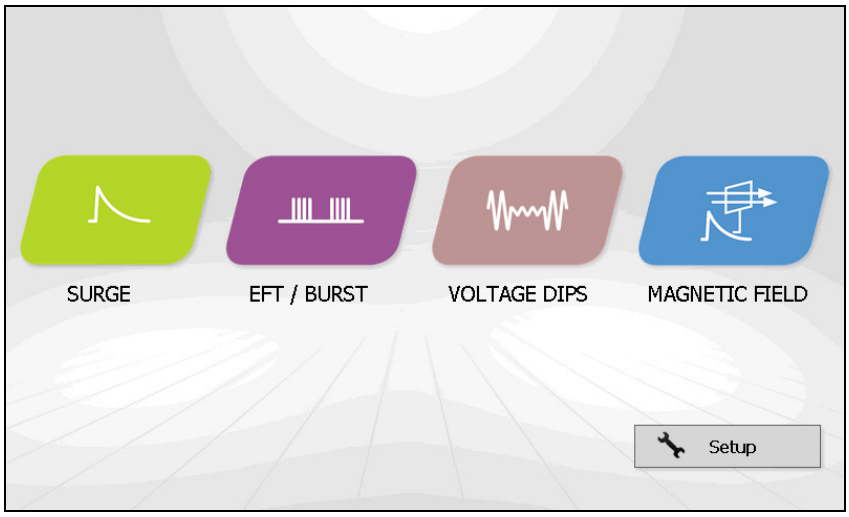


Figure 2-1: Start display

After selecting one of the functions as shown in the Figure 2-1, there are generally two operating modes of the menu available. Only in pre-compliance it is possible to change parameters even though the EUT is testing. In addition, by pressing a function parameter a basic description gets open and describes the characteristic of it. The values can be directly specified as for each criteria necessary. The same is possible in standard operating mode. Additionally Ipeak and Upeak to the EUT gets displayed on the screen.

It is possible to come back from every application to the start menu as shown in Figure 2-1, when pressing the “home” button. Every test procedure stops.

The LED on every output & coupling paths flashes when specific paths has been in the menu selected. This selection is equal for Surge, Burst as well as Voltage Dips & Interrupts.

2.2 Standards covered by AXOS[5]

Table 2-1 Basic standards covered by the AXOS[5]

Standard	Description	Test equipment
IEC/EN 61000-4-4	EST/Burst	AXOS[5]
IEC/EN 61000-4-5	Surge	AXOS[5]
IEC/EN 61000-4-9	Magnetic field	AXOS[5] & MSURGE-A
IEC/EN 61000-4-11	AC Voltage Dip and Interrupt	AXOS[5] & DIP 116 (optionally)
IEC/EN 61000-4-29	DC Voltage Dip und Interrupt	AXOS[5]

Table 2-1: IEC norm covered by AXOS

For detailed test description of each particular norm please read IEC/EN standard carefully. This is the overall norm, many product norm consist further tests. Indeed, for many products the requirements will be described more detailed in the product norm. Note: Product norms will be partly fulfilled by the AXOS[5] as well. Please contact for further assistance your sales representative or HAEFELY TEST AG directly.

3 Technical data

3.1 General

General Data				
Control Power	85V - 264V 50/60 Hz		Dimensions (W x H x D)	19" / 4U (45 x 18 x 49 cm)
User Test Storage	Unlimited		Weight	30kg
Remote Interface	Ethernet RJ45		USB	for USB memory stick
Display	7" / 800x480 / 24bit with touch-screen		AUX Interface	D-sub 37p for external CDN, external transformer etc.
External Trigger Input	5V TTL		Synch Input	BNC, 10V – 264V AC
Trigger Output	5V TTL		External Start / Stop Input	5V TTL, starts / stops predefined test sequence
EUT failed Input	5V TTL		Analog Output	0 – 10V, for use with external options
Warning Lamp Output	2 x 24V / 1A DC		Safety Circuit	stops the test when unlocked

Table 3-1: General data

3.2 Surge

IEC / EN 61000-4-5 Edition 2 Surge Combination Wave				
Output Voltage	0.2 – 5.0kV ±10%		Output Current	0.1 – 2.5kA ±10%
Voltage Rise Time	1.2us ±30%		Current Rise Time	8us ±20%
Voltage Duration	50us ±20%		Current Duration	20us ±20%
Polarity	pos / neg / alternate			
Output Impedance	2 Ohms		Integrated Single Phase CDN	264V AC / 16A 220V DC / 10A
Phase Sync	0 – 359° with 1° steps or asynchronous mode			
Counter preselect Counter	1 – 1000 infinite 100000		Impulse Trigger	automatic 2s – 100 minutes manual external trigger input
Peak Voltage Monitor	BNC output: 1000:1 Display: 3 Digits		Peak Current Monitor	BNC output: 1kA/V Display: 3 Digits

Table 3-2: Surge data

3.3 Burst

IEC / EN 61000-4-4 Edition 2 EFT / Burst				
Output Voltage	0.2 – 5.0kV ±10% at coaxial output		Spike Frequency	1Hz – 1MHz
Polarity	pos / neg / alternate		Burst Duration	10us – 1s
Output Impedance	50 Ohms		Burst Period	1ms – 10s
Rise Time	5ns ±30%		Test Time	1s– 1000 minutes
Impulse Duration	50ns ±30% at 50 Ohm 50ns –15 +100ns at 1000 Ohm		Trigger	automatic manual external trigger input
Burst Mode	normal continuous real random		Integrated Single Phase Coupling / Decoupling Network	264V AC / 16A 220V DC / 10A

Table 3-3: Burst data

3.4 Voltage dips

IEC / EN 61000-4-11 Edition 2 and IEC / EN 61000-4-29 Dips & Interrupts				
Max. Voltage	264V AC/DC		Interrupt Time	0.5 period – 800 periods 100us – 1000 minutes
Max. Current	16A AC/DC continuous 20A for 5s 40A for 3s 500A inrush Current		Interval Time	1 period – 800 periods synch 100us – 1000 minutes async
Trigger	automatic manual external trigger input		Test Time	1s – 1000 minutes Infinite
Interrupt Dip Level	0% 0% – 99% with external voltage source		Phase Sync	0 – 359° 16 / 40 / 50 / 60 Hz asynchronous Mode
RMS Voltage Monitor	BNC Output: 100:1 Display: 4 Digits		RMS Current Monitor	BNC Output: 10A/V Display: 4 Digits

Table 3-4: Voltage dips and interrupts data

3.5 Integrated single-phase CDN

AXOS^5 provides an integrated single-phase coupling / decoupling network for Burst and Surge tests.
It is protected against over-current by an integrated protection circuit. Current limit can be selected between 1A to 16A in the PROPERTIES menu.
The integrated CDN may be used with AC or with DC power lines.
The input of the integrated CDN (i.e. EUT Supply Input) must be connected to power lines which are protected by a line safety switch equal or less 16A rated current and characteristic B or C.

4 Initial operation

4.1 Visual check

During transport AXOS^5 may be subjected to excessive shocks and vibrations, even though every care is taken by HAEFELY Test AG to provide suitable packaging. Before operating the unit, check for signs of mechanical damage. Damaged packing cases may by a sign of transport damage. Damage caused in transit must be reported to the shipping agent immediately.

4.2 Installation

All safety measures must be followed, as described in Table 1-1.

4.3 Earth connection

The "Earth Stud" on the back panel must always be connected to a solid earth before the "EUT Supply Input" is connected to power source. Cross section of connection must be at least 2.5mm squared.

4.4 EUT Supply Input

The "EUT Supply Inpu" on the back is the connection to the integrated single-phase CDN, which can be used up to 16A / 264V.
There are three banana-plugs (stackable) delivered with the standard accessories set:
- black: line conductor
- blue: neutral conductor
- green/yellow: protection earth conductor

These banana plugs shall be mounted on a suitable connection cable.

The EUT Supply Input must be connected to power lines which are protected by a line safety switch equal or less 16A rated current and characteristic B or C.

Inside the AXOS, there are filter capacitors connected between L-PE and N-PE, as required by the standard.
These capacitors will cause a residual current, which will trip the residual current circuit breaker.

Hence, an isolation transformer needs to be inserted between main power supply and "EUT Supply Input" as shown in Figure 4-1 below.

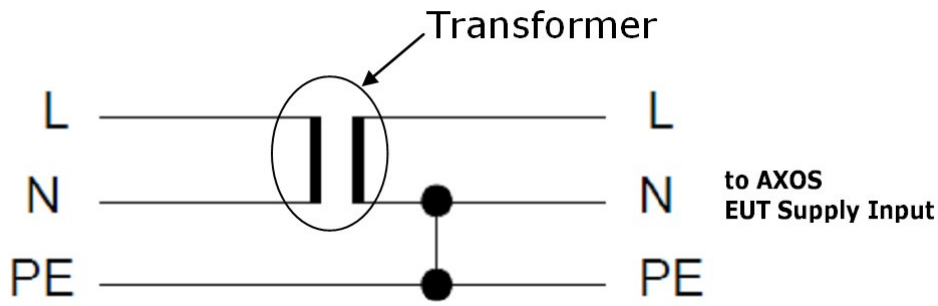


Figure 4-1: Transformer connection

Note:
N and PE need to be connected as shown in the figure. This enables that a possible follow current from the mains can be delivered to the EUT.

All further equipment connected after the isolation transformer are not protected any more by the residual current circuit breaker.

4.5 Connection to EUT

The L, N and PE banana sockets on the front panel are the outputs of the integrated single-phase CDN.
For power line testing, the EUT is connected here.

There are three banana-plugs (non-stackable) delivered with the standard accessories set:
- black: line conductor
- blue: neutral conductor
- green: protection earth conductor

These banana plugs shall be mounted on a suitable connection cable.

4.6 V dip Input

The "V dip" input is used to supply voltage having XX% level for Dips testing.
For example, for testing 40% Dips level, 92V supply need to be connected between "V dip" and neutral (at nominal voltage 230V).

In case of interrupt testing i.e. 0% Dips test level, "V dip" must be connected to "N" (neutral) input, using the purple coloured safety banana cable supplied with the standard accessories

5 General operation

5.1 Front view

The Figure 5-1 shows the front view of the AXOS[5]. In the Table 5-1 is the detail description of every physical input and output.

Figure 5-1: AXOS[5] Front view

Pos.	Function	Description
1	On/off switch	Turns on and off the power of AXOS[5]
2	Surge impulse voltage monitor output	1000:1 divider for surge impulse. Direct connection to oscilloscope. Example: 5000Vsurge impulse output will show 5V on this BNC socket
3	Surge impulse current monitor output	1000A/V surge impulse current monitor. Direct connection to oscilloscope. Example: 2500A surge current will show 2.5V on this BNC socket
4	Urms monitor output 100:1	Monitoring the signal of the generator when creating voltage dips or voltage interrupts. Direct connection to oscilloscope.
5	Irms monitor output 10A/V	
6	HI Generator output Surge; (Direct output)	Direct output of surge generator Connection to external CDN. Do not connect directly any external supply voltage, generator will be damaged.
7	COM Generator output Surge (Direct output)	
8	Burst Output	Direct output of burst generator to external CDN or EUT
9	L output to EUT	Connection for single phase EUT to the internal coupling/decoupling network
10	N output to EUT	
11	PE output to EUT	
12	PE	Connection to ground reference plane or the verification adater
13	USB port for data transfer	Save report data or test files onto USB memory stick
14	Colour touch screen	Every command and adjustment will be controlled and entered via the touch screen

Table 5-1: Description front view function

5.2 Rear view

The rear view of the AXOS[5] is shown in Figure 5-2. A detailed description of every input and output is written in the Table 5-2 below the graphic.

Figure 5-2: AXOS[5] rear view

Pos.	Function	Description
1	L “EUT Supply Input” (direct connection of power supply via banana plug)	direct single-phase connection of power supply to the EUT. It can either be connected to a DC power supply or to AC power supply. Awareness, the power supply should NOT be secured by a ground fault Switch. If yes please take capture **Fehler! Verweisquelle konnte nicht gefunden werden.** in consideration
2	N “EUT Supply Input” (direct connection of power supply via banana plug)	
3	PE “EUT Supply Input” (direct connection of power supply via banana plug)	
4	V dip (for Voltage dips & interrupts)	Input for the voltage dips und interrupts. For voltage interrupts it has to be connected via banana plug with position 2. However. when using external transformer, the only connection to the generator is through the V dip input
5	“Link” to external HAEFELY transformer DIP 116	Input for HAEFELY transformer DIP 116 for voltage dips, then adjustable on 0%,40%, 70% and 80% in reference to the U1 nominal voltage of AXOS[5]. In any other case the transformer has to be controlled independently and it will be connected only through the “position 4” with the AXOS[5].
6	“AUX” inputs and outputs	detailed description of function in Table 5-3
7	“RJ 45”Ethernet Interface	operation of the AXOS[5] through an external device, likely a PC for the remote software
8	Sync. BNC Interface	The BNC interface is used for external synchronization of a manual CDN
9	Main power switch for AXOS5	Switching on/off total power supply
10	Electrical grounding	The generator must always be connected to a reference earth before every use

Table 5-2: description rear view

AUX (Pos. 7.)	function	description
1	Red warning lamp	Indicates when safety circuit closed
2	Green warning lamp	Indicates when safety circuit opened
3	GND	0 V
4	GND	0 V
5	Safety interlock	When safety barriers installed, connection must be done between pin 5 and pin 4 to close the circle (safety instruments), however, bridge between pin 4 and pin 5 exist as delivery setting
6	GND	0 V
7	Start/Stop program 1 is running (Input)	Start/Stop automatic for starting a predefined program in the “Setup” menu “start file (Figure 5-3)”, signal for instance external device, PLC signal
8	GND	0 V
9	Trigger Input	Input for external trigger to start for instance through an external signal a generator
10	GND	0 V
11	EUT Fail (Input)	External condition (e.g. device or PLC signal), the position becomes 1 and causes an action (Ignore, Alarm, Test Stop or test stop & line off)
12	GND	0 V
13	0-10V Analogue output	Reserved and used for further application
14	GND	0 V
15	Trigger output	When Burst, Surge or Voltage dips package in use, signal becomes 0, after the applied package has finished the signal becomes 1(negation); used for indication of signal on oscilloscope
16	GND	0 V
17	Spare (Reserve)	Not in use
18	GND	0 V

Table 5-3: AUX function description

5.3 SETUP menu

The Figure 5-3 shows the “Setup” menu after selecting this button in the starting field. Every button is explained in the Table 5-4.

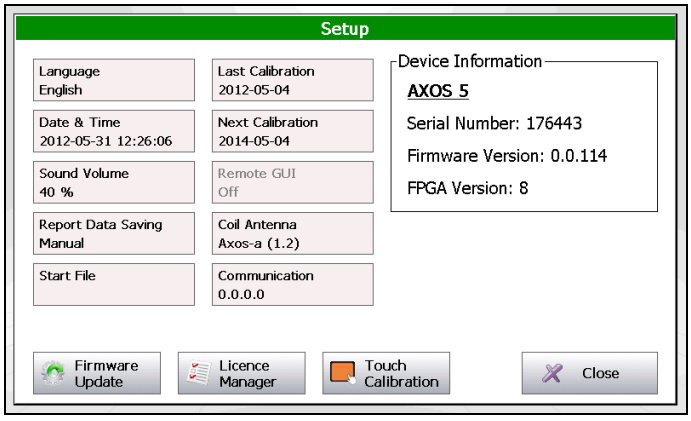


Figure 5-3: Setup menu

In the right upper corner the current software version, serial number can be seen. The FPGA indicates the hardware of the chip version.

Menu field	Description
Language	Selection of different language, in the moment only English available
Date & Time	Entering of current date and time
Sound Volume	Adjusting of sound operating volume and warn signals
Report data saving	Reporting data can be automatically saved when pushing the device in USB port or manually by pressing the “Rep.Data” in the menu of every application and then entering the device
Start file	Selection of predefined test in accordance with particular norm for Surge, Burst, Magnetic field and Voltage dips & interrupts; it gets only applied from an external start/stop automatic (
Last Calibration	Factory calibration from HAEFEY TEST AG, in future term the “next calibration” becomes “last calibration
Next calibration	Recommended calibration period from HAEFELY TEST AG is 2 years, however, it always depends on the quality management system of every company and certainly the test requirements of equipment and certification environment
Remote GUI	Remote GUI is possible to access when license key purchased from the HAEFELY TEST AG; switch on/off of communication between remote computer and AXOS5 possible
Coil Antenna	Entering of new “coil Antenna” factor as described in
Communication	Communication via RJ45 at the rear view of AXOS^5
Firmware update	For updating the new operating software of the AXOS^5
License Manager	Entry of license codes for Surge, Burst, Magnetic field and Voltage Dips & Interrupts and remote GUI. After entering the license code, accessible in main menu
Touch calibration	In normal delivery mode there is a pre-calibration of the touch screen. However, if required, please follow and press for few seconds with a pen the cross at the screen. It requires five different positions. Then confirming and as a control measure four different yellow dots get open. Again confirming and the calibration has finished.

Table 5-4: Setup description

After setting has been finished the “Setup” gets closed when pressing the “close” button. Afterwards the starting window gets displayed. It can be selected between Surge, Burst, Magnetic field and Voltage Dips & Interrupts.

5.4 Predefined standard program

The AXOS^5 contains predefined standards test for “Surge”, “Burst”, ”Magnetic field” and “Voltage Dips & Interrupts” according to each particular norm. Each test can be selected and applied through the Generator to the EUT. The Figure 5-4 reflects the save and option of data at the “Surge” generator. These application works similar for “Burst”, “Magnetic field” and “Voltage Dips & Interrupts. The basic understanding of the tool is similar to normal office applications. Data can be “load”, “Save”, “Save as”, “Copy” and “Delete” as for instance in word. These options occur on the screen, when “file” button is pushed.

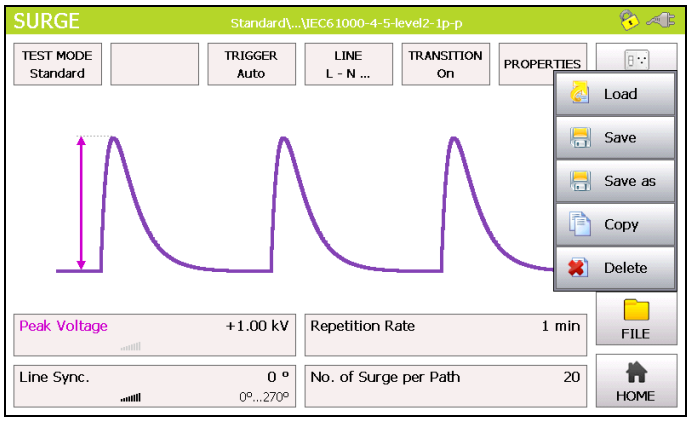


Figure 5-4: Save and load option of data

Two directories can be selected as shown in Figure 5-5. However, the “standard” directory can only read and load the predefined test procedure in accordance to the particular norm. These files can only be read. The second directory is “Internal”. The internal data (customized testing files) can be saved, loaded and deleted. Either of the directories can only be accessed out of the particular menu, like for instance the “surge” generator.

In addition, the loaded program is displayed in the upper line in either of the standard and pre-compliance menu.

However, through the “Setup” menu predefined programs can be loaded and applied via an external “start/stop” device. There get controlled though Pin 7 in Table 5-3. When particular file has been selected, it must be confirmed with “load”.

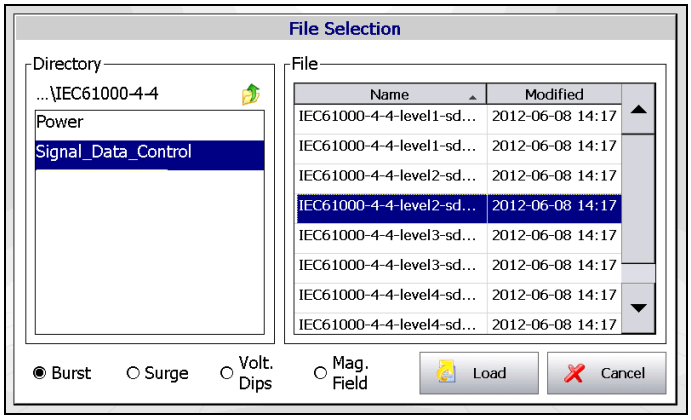


Figure 5-5: File selection Internal/Standard

Note: When file wants to be applied and started without any external signal parameter, it must be selected inside the specific modus (e.g. Surge”) via “load”. However, if controlled from an external signal, it must be selected through the “Setup” (Figure 5-3) and then confirmed as seen in Figure 5-5. Selection in “setup” menu will not be applied to generator when not external control of the program.

5.5 Icon bar

The Table 5-5 presents a overview of icons in the operating menu. The icons get displayed in the right upper corner of the operating menu, except position 3.

Position	Symbol	function
1		When button “line” pushed in the operating menu, connection between “EUT supply inputs (L, N, PE)” and “EUT supply output (L, N, PE)” is existing; note: no actual “EUT Supply Input” required for the connection
2		When circuit closed between PIN 5 and PIN 4 in Table 5-3, either through existing factory bridge or external circuit connection
3		When generator charging, symbol gets displayed at touch screen
4		“Reporting data symbol”, when pushing “Rep.Data” button, this icon comes up in the right upper corner of the window and the report of the test will be saved via USB-port on a connected device; Note: only accessible when test has finished
5		Symbol, when L and N on “EUT Supply Input” are exchanged, therefore, L and N must be changed back

Table 5-5: Icon bar menu

5.6 Test Report Data

Test report data can be automatically saved to USB memory stick. If "Report Data Saving: Automatic" is selected in the "Setup" menu, test data are saved automatically after each test. If "Report Data Saving: Manual" is selected, test data can be saved on the memory stick by using the "REPORT" key within the accordingly menu.
The test data are saved into five CSV files which can easily imported into Excel or similar applications.
Data are saved as follows:

Prg_Log.csv : Test conclusion
Prg_Set_Seq.csv : Test header data
PrgItem002_Log.csv : Test log data
PrgItem002_Set.csv : Test setup data
PrgItem_Res.csv : Test overview data

6 Surge

6.1 General information

Please read carefully the Table 5-1 and Table 5-2 in detail before first use of the Surge generator. The short voltage impulse stays on the EUT during several µs. The peak voltage gets with the Axos5 up to 5 kV. The generator fulfils the requirements according to the IEC 61000-4-5 norm. The source impedance of the generator is 2 Ω. The HI and COM signals should be used from the beginning as scheduled, because in extern CDN the polarity becomes important. It can be select either between the Hi and Com output or the coupling network (Position 9,10,11 in Figure 5-1).

6.2 Combination wave generator

In General waveforms are specified as open circuit voltage (OCV) and short circuit current (SCC). The Surge is applied directly from the Generator to the Surge HI and COM output, the waveforms are specified in the next two under captures. The function graphic and the key parameter can be read in the Table 6-1. In accordance to the IEC 60060-1 the front time for the OCV is 1,2 µs ± 30% and the SCC is 8 µs ± 20%.

Definitions	**IEC 60060-1**	
	Front time [µs]	Time to half value [µs]
Open circuit voltage	1,2 ± 30%	50 ± 20%
Short circuit current	8 ± 20%	20 ± 20%

Table 6-1: Key parameter wave generator

For a detailed description please read the topic “test instrumentation” in the IEC 61000-4-5 norm.

6.2.1 Open Circuit Voltage (OCV)

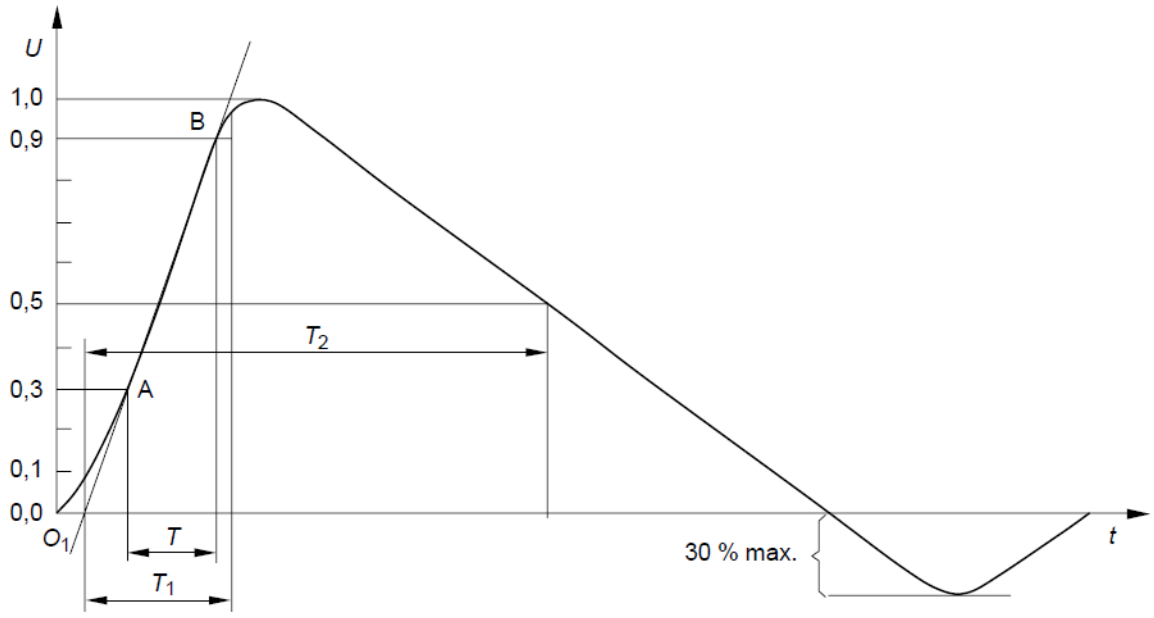


Figure 6-1: Open circuit voltage (OCV) [1]

Front time: T1 = 1,67 x T = 1,2µs ± 30%
Time to half value: T2 = 50µs ± 20%

Verification of the Surge output signal (HI and COM) in the front view can be done with the help of the in capture 12.1.1 described PDP 8000.

6.2.2 Short Circuit Current (SCC)

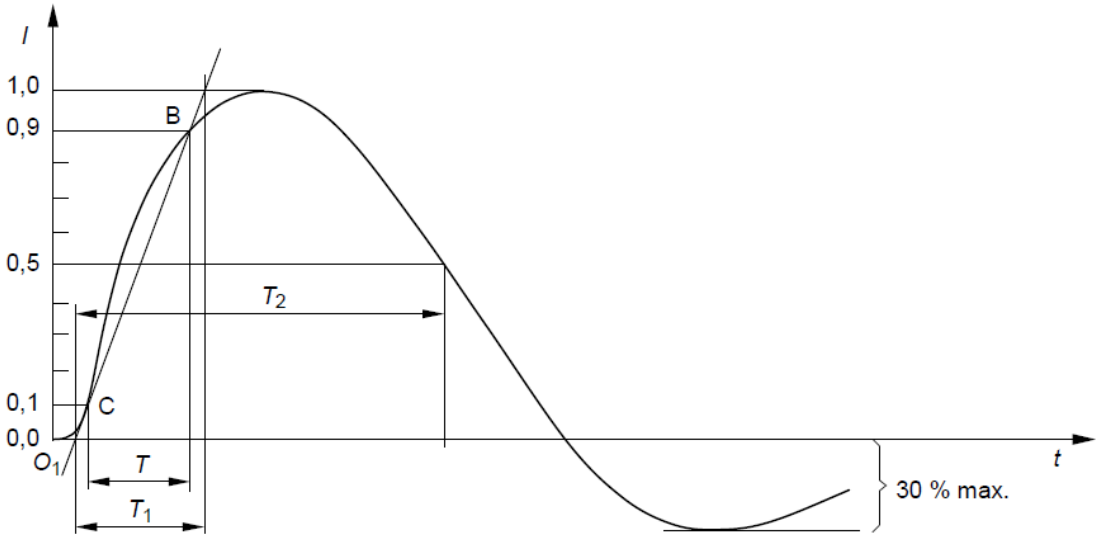


Figure 6-2: Short circuit current (SCC) [1]

Front time: T1 = 1,25 x T = 8 µs ± 20%
Time to half value: T2 = 20 µs ± 20%

For verification of the output signal, a current transformer must be connected between position 6 and position 7 as shown in Figure 5-1. EUT Supply Input must be disconnected. The current transformer from capture 12.1.2 is for the verification necessary.

6.3 SURGE Menu

Test requirements must be achieved by the user according to the IEC 61000-4-5 norm. The safety standards as written in Table 1-1 must be unconditionally fulfilled, when operating the AXOS[5].

In the next step, the user selects either the pre-compliance or the standard operation mode. The Figure 6-3 and Figure 6-4 reflects either of the appliance modes. As seen by pressing on each particular function parameter a purple bow comes up and the definition of the function gets displayed.

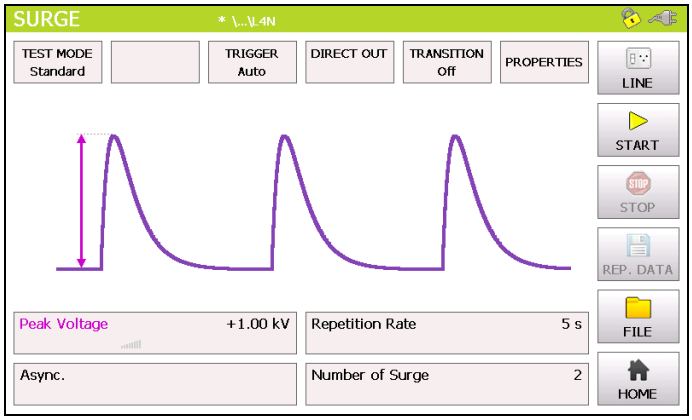


Figure 6-3: Surge Standard mode

When pressing the “home” button the user gets transferred automatically to the start menu as shown in Figure 2-1.

In the Figure 6-4 it shows the use of the pre-compliance mode. Indeed, every parameter can be changed by simply pressing on the black bows next to the value. Furthermore, it can be changed between direct and line output. All data entries can be done while the generator is operating.

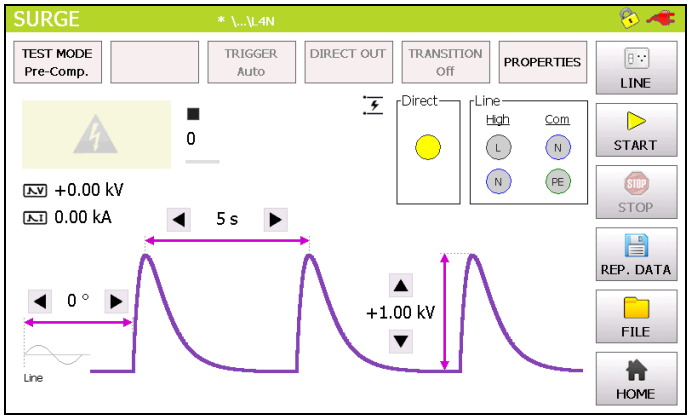


Figure 6-4: Surge pre-compliance mode

For instance, in the standard mode after selecting the peak voltage field the Figure 6-5 opens up and the parameter can be entered. In a similar way works the repetition rate and the number of surge. Awareness is to give for line synchronization; hence, it has been described more detailed in the capture 6.3.5.

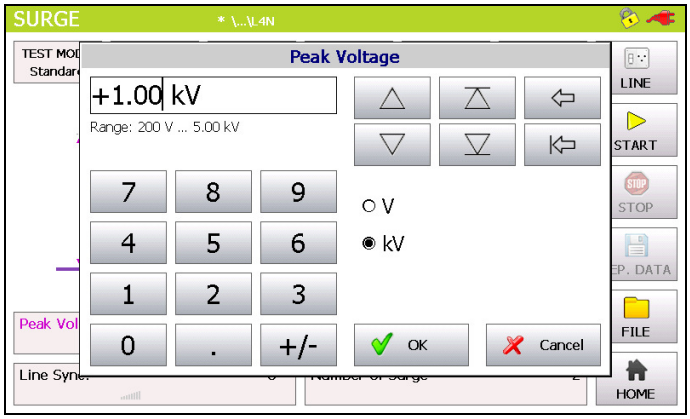


Figure 6-5: Surge peak voltage

After values entered, the start button can be pushed and the window Figure 6-6 opens up, if selected pre-compliance mode.

The safety symbol, the direct output and the output voltage and output current are displayed. In addition, the user is able to see nominal values of the peak voltage, reputation time and the synchronization period. Additionally, these values can be modified while the test is proceeding. It happens by simply pressing each particular function. The test stops when pushing the “STOP” button.

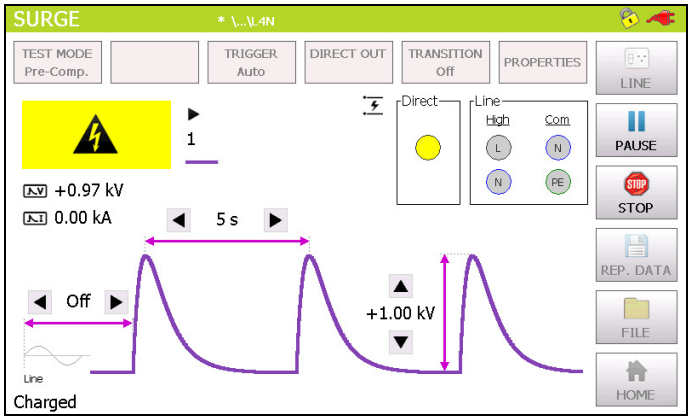


Figure 6-6: Surge Pre-compliance mode charging

In the right corner of the graphic is the plug flashing in red, when direct connection between L, N, PE to the “EUT Supply Input” and button “line” has been pushed. The safety lock symbols shows that the safety circuit has been closed between PIN 4 and PIN 5 in Table 5-3.

Information about Transition, Trigger and properties has to be entered independently if the test has stopped. “Transition” and “Trigger” are only accessible in standard operating mode.

6.3.1 Output & Coupling Paths

In the IEC norm 61000-4-5 it is written that every coupling phase has to be tested against each other. That realizes the AXOS^5 with the line output and selecting the options independently. The HI and Com output gets active when in operating menu “direct” output is selected. L, N, PE can be selected when in “line”.

6.3.2 Properties

In the Figure 6-7 below is the properties menu displayed. The Table 6-2 explains the function more detailed.

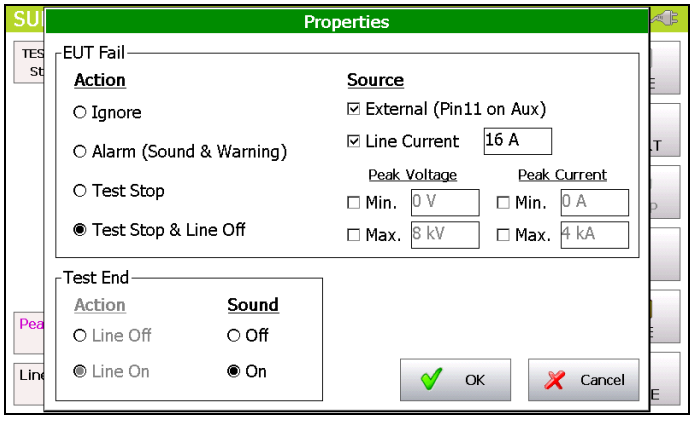


Figure 6-7: Surge properties

The Table 6-2 describes the different functions more detailed. The window gets closed, when confirming the “OK” button.

Position	Description
External (Pin11 on Aux)	External condition (e.g. device or PLC signal), the position becomes 1 and causes an action (Ignore, Alarm, Test Stop or test stop & line off)
Line Current	Limits the current (L, N, PE front view) to the EUT.
Peak voltage	It defines an area (min. and max.) within the peak voltage value of the surge waveform becomes. If not successful, it causes an action, which can be: Ignore, Alarm, Test Stop or test stop & line off.
Peak current	It defines an area within the peak current (min. and max.) value of the surge waveform can become. If not successful, it causes an action, which can be: Ignore, Alarm, Test Stop or test stop & line off.
Action: Ignore, Alarm, Test stop, Test stop & line off	Due to EUT fails, AXOS^5 cause an action which can be: Ignore, Alarm, Test Stop, Test Stop & Line off.
Line off	Voltage locked at L, N, PE when test has finished
Line on	Voltage unlocked at L, N, PE when test has finished
Sound on or off	Acoustic signal when test ends

Table 6-2: Surge properties

6.3.3 Transition

The Figure 6-8 reflects the transition window of the AXOS^5. The “alternative polarity” makes possible to switch between positive and negative. Alternate polarity, peak voltage and phase can be selected and parameter entered. It is only possible to select phase in either external synchronization or synchronization mode. According to IEC 61000-4-5 alternate polarity at the EUT must be tested.

Significant awareness must be given in the transitions mode, that Trigger “auto” mode is selected, otherwise it is not possible to access the “Transition” function.

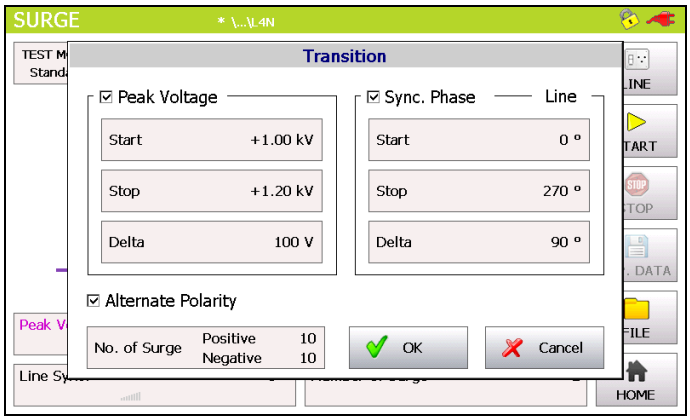


Figure 6-8: SURGE transition mode

After successfully entering the parameter, “OK” button can be pushed and then the “Start” button in the main menu. Test should be proceeding now.

6.3.4 Trigger

In the trigger window it is possible to select between “auto”, “manual” or “external trigger”. When being in “manual mode” the user controls the trigger by pressing the start button first, after the generator is charged the menu button “trigger” flashes up and can be pushed. “Auto mode” provides the signal according to set up and works completely automatically. All key parameter like “peak voltage” sets the user through the touch screen in the main operating window. In “external trigger” the signal for the trigger comes from an external source and gets connected via PIN 11 in the AUX input at the rear view of the AXOS^5.

6.3.5 Synchronization AC

To synchronize the surge signal with the main supply source it is necessary to adjust in the menu “Synchronization” and then “Line Sync.”. Further adjustments of the angle can be done in a range from 0° to 359°. However, if no power supply is connected to the EUT input at the rear view, it has to be entered “Async.”, otherwise it is impossible to get a Surge impulse of the generator.

In external synchronization, the output with the position 8 Figure 5-2 in the rear view is in use. As an external source could be used for instance a manual CDN. Normal operation through the touch screen is possible.

7 Magnetic field

7.1 General Information

The test setup is described in accordance to the norm IEC 61000-4-9. A SCC waveform will be created. For the magnetic field the coil gets connected directly via banana plug to the surge output HI and COM as written in position 6 and Position 7 in Figure 5-1. Significant is that only these outputs can be used for the Surge impulse.

Do not touch the coil when the test is proceeding. Do fulfil safety requirements as described in capture 1.1.

In Figure 7-1 is the pre-compliance mode presented. The parameter can be entered by pressing the numbers. For instance to change the magnet field the parameter “+120 A/m” must be selected and then e new parameter entered.

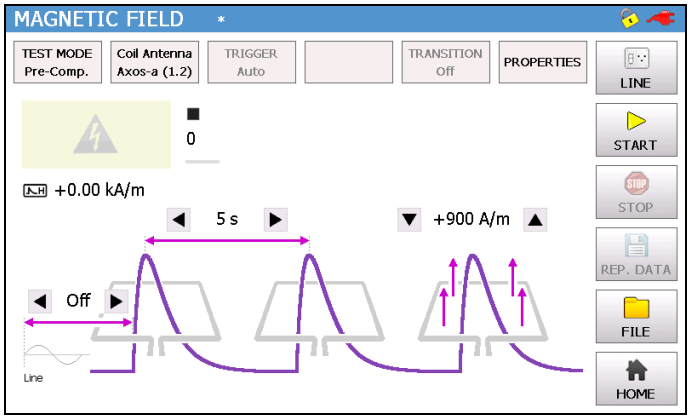


Figure 7-1: Magnetic field Pre-compliance mode

In addition, the purple bow describes the function. On the top of the window it shows which “Coil Antenna” is selected. In the standard mode (Figure 7-2) the values can be changed by pressing on the particular parameter as well. Additionally, the “transition” (capture 8.2.3) can be adjusted.

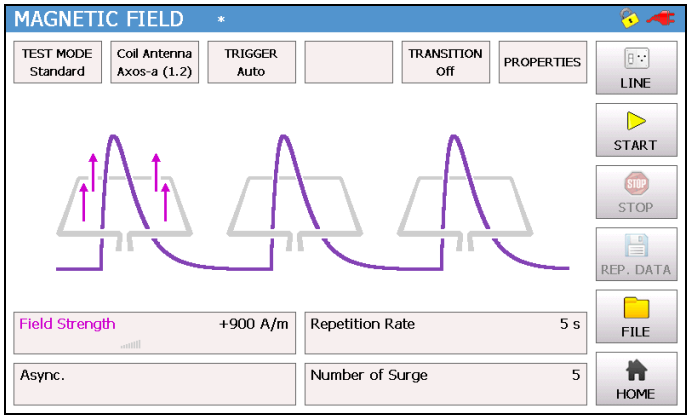


Figure 7-2: Magnetic field Standard mode

When “Line” button pushed, “EUT Supply Input” connected with L, N, PE front view and in the right corner the plug flashes red. After pushing the “Start” button the surge impulse gets applied.

In Figure 7-3 is the Surge impulse proceeding. The magnetic field will be displayed and the safety symbol is flashing. The test can be stopped by pushing the “Stop” button. When pushing the “home” button the starting screen as shown in Figure 2-1 gets displayed.

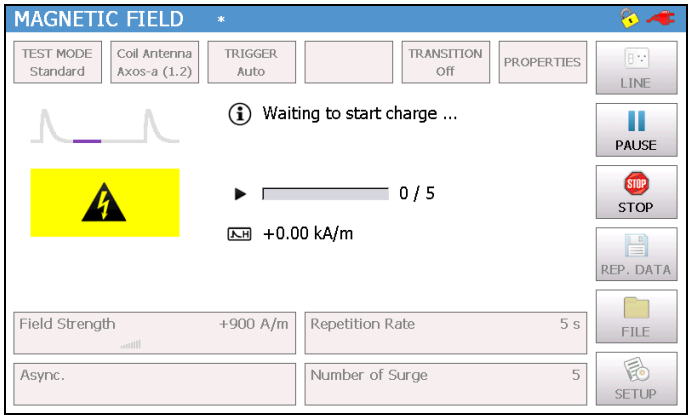


Figure 7-3: Magnetic field charging

In following points “Coil Antenna”, “Trigger”, “Transition” and “properties” will be described. When being in the “Setup” menu Figure 5-3, manual has been selected for “rep data”, therefore a test report can be written on a USB device simply by pressing “Rep.Data”. However, first connect device to USB port.

7.1.1 Coil antenna

When the AXOS5 has started, the setup menu contains a standard predefined coil in accordance to IEC 61000-4-9. It can be up to 10 different coil factors added to the menu.

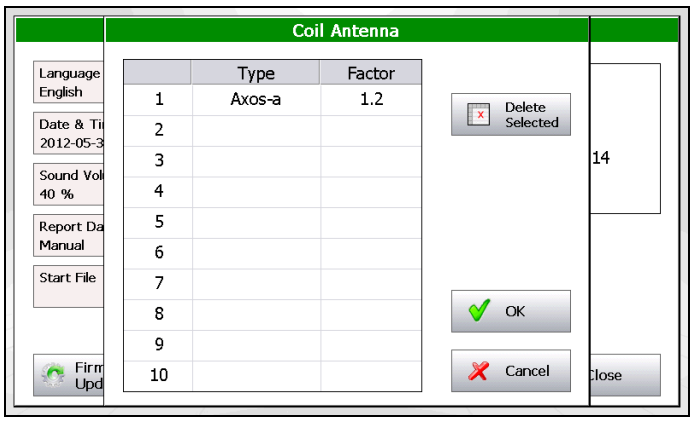


Figure 7-4: Coil Antenna factor

To add a different coil, it will be entered in setup (Figure 5-3). This selection can be seen in the operating menu in the magnetic field.

7.1.2 Transition

In “Transition” (Figure 7-5) the user can adjust the “Field Strength”, “Sync. Phase” and “Alternative Polarity”. The description from capture 6.3.3 is valid, except “peak voltage” has been changed to “field strength”. The other parameters stay equal, since an OCC will be applied to the coil antenna and is basically a Surge impulse.

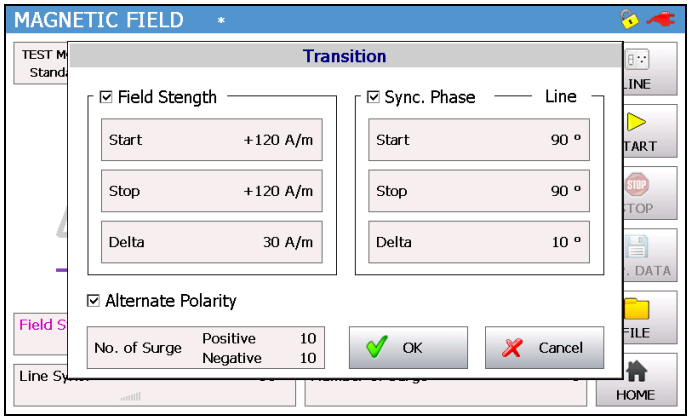


Figure 7-5: Magnetic field transition

When all parameters has been entered then simply confirming with ok and in the menu is showing “transition on”, this indicates the settings will be applied to the coil antenna when pushing the “start” button. Furthermore, when test is proceeding, the intervals for instance of the “field strength” gets displayed.

7.1.3 Properties

Position	description
External (Pin11 on Aux)	External condition (e.g. device or PLC signal), the position becomes 1 and causes an action (Ignore, Alarm, Test Stop or test stop & line off)
Line Current	Limits the current (L, N, PE front view) to the EUT.
Action: Ignore, Alarm, Test stop, Test stop & line off	Due to EUT fails, AXOS^5 causes an action which can be: Ignore, Alarm, Test Stop, Test Stop & Line off.
Line off	Voltage locked at L, N, PE when test has finished
Line on	Voltage unlocked at L, N, PE when test has finished
Sound on or off	Acoustic signal when test ends

Table 7-1: Magnetic field properties

8 Electrical Fast Transient Burst

8.1 General information

The Burst generator generates Electrical Fast Transient Bursts (EFT) as described in IEC 61000-4-4. The source impedance of the generator is 50 Ω. The burst is a common mode transient, coupled simultaneously to all selected paths with respect to ground. It can be selected between using the coaxial output or the built in mains coupling network.

8.2 BURST TEST

Test requirements must be achieved by the user according to the IEC 61000-4-4 norm. The safety standards as written in capture Figure 1-1 must be unconditionally fulfilled.

After selecting in the start menu the function “Burst”, the user has the choice between standard and pre-compliance mode. It gets selected in the top icon bar. The Figure 8-1 shows the standard menu. When pressing “peak voltage”, “repetition frequency”, “burst duration” a purple bow opens up and describes visually the waveform impulse.

Furthermore, the user can select between “properties”, “trigger manual”, “Burst mode” and “direct out”. Detailed description is to find in the following under captures. However, when no further adjustment necessary the “Start” button can be pushed and the window (Figure 8-4) gets open. When pressing the “line” button, the plug in the right corner flashes red. As a result L, N, PE front view are connected with L, N, PE rear view and full power supply for the EUT is provided.

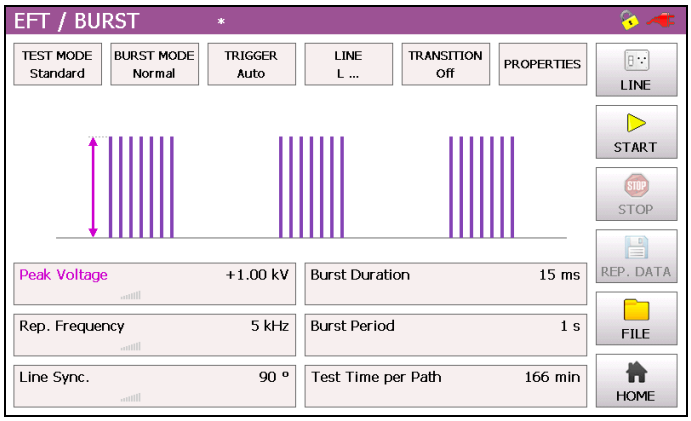


Figure 8-1: EFT/BURST Standard mode

By pressing at each particular value, a new parameter (Figure 8-1) can be entered. Then confirming with “OK” and the parameter will be written in the standard test mode. In Addition it can be immediately selected between kV and V.

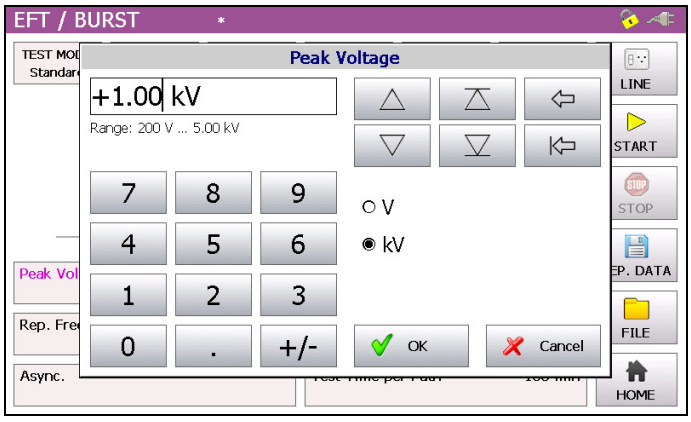


Figure 8-2: EFT/BURST peak voltage configuration

The following graphic represents the pre-compliance mode. In comparison with the standard menu, every command gets displayed the entire visual description of the function is described through purple bows. Main advantage of the pre-compliance mode is that the parameter can be changed while the test is operating.

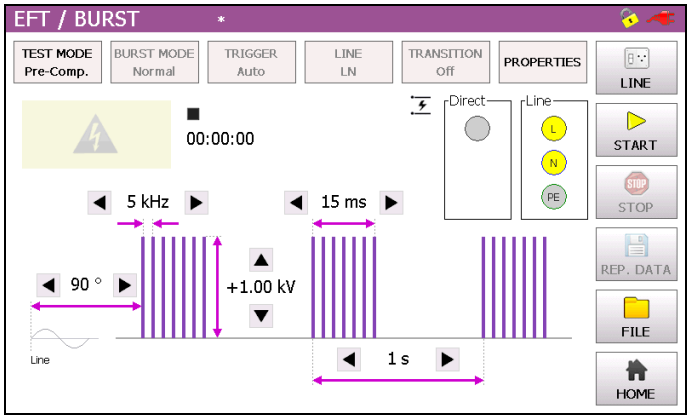


Figure 8-3: EFT / BURST pre-compliance mode

However, when every parameter has been adjusted, the “Start” button can be pushed and generator is charging. Now, the following graphic should be displayed. The selected output path (direct or line) is flashing yellow.

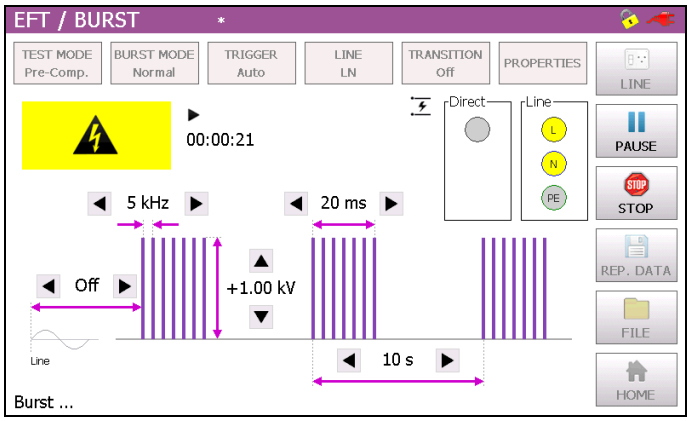


Figure 8-4: Burst pre-compliance mode charging

The Burst waveform gets stopped, when pushing the “Stop” button. Afterwards, test report can be saved on the USB device.

8.2.1 Output & Coupling Paths

In Burst testing mode every line signal gets tested against GND (PE). In direct output the signals stands on the position 8 in Figure 5-1. It gets connected directly to the EUT or will be used for verification of the Burst waveform. Furthermore, it can be connected to three-phase test CDN. For further assistance please contact the HAEFELY TEST AG directly.

8.2.2 Properties

The next window shows the property window of the Burst waveform. Detailed description of each parameter can be read in the Table 8-1.

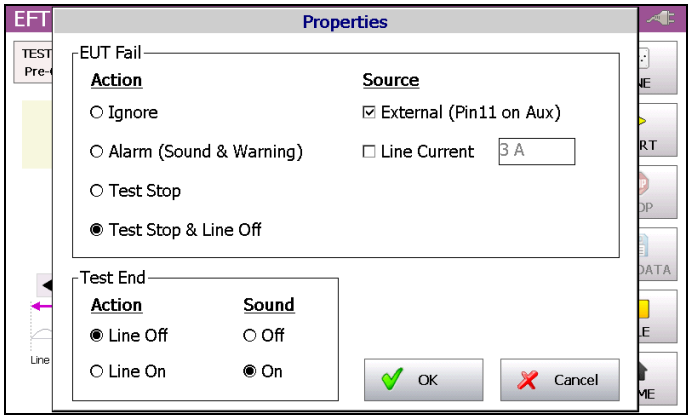


Figure 8-5: BURST properties

Position	Description
External (Pin11 on Aux)	External condition (e.g. device or PLC signal), the position becomes 1 and causes an action (Ignore, Alarm, Test Stop or test stop & line off)
Line Current	Limits the current (L, N, PE front view) to the EUT
Action: Ignore, Alarm, Test stop, Test stop & line off	Due to EUT fails, AXOS5 cause an action which can be: Ignore, Alarm, Test Stop, Test Stop & Line off.
Line off	Voltage locked at L, N, PE when test has finished
Line on	Voltage unlocked at L, N, PE when test has finished
Sound on or off	Acoustic signal when test ends

Table 8-1: BURST properties description

After selection has been finished, the button “OK” must be confirmed and setting gets applied to the Burst generator.

8.2.3 Transition

The Figure 8-6 shows the “transition” menu. It is possible to select independently “peak voltage”, “Repetition frequency”, “Phase” and “Alternate polarity”. To be able to select “phase” the Synchrony has to be either set as Synchronization or external Synchronization, otherwise it is not possible to select it. Eventually, every parameter can be changed by pushing the certain value and entering a new.

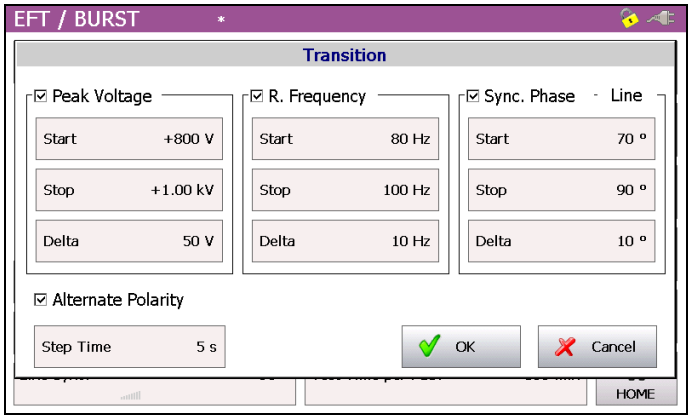


Figure 8-6: BURST Transition

When finalizing the parameter, it must be confirmed with “OK” and either the pre-compliance or standard mode gets open depending on what has been previous operation mode.

8.2.4 Trigger

When selecting “manual trigger” the following window opens up. It gets applied to EUT by pressing the “Trigger” button. It gets always only one Burst package applied.

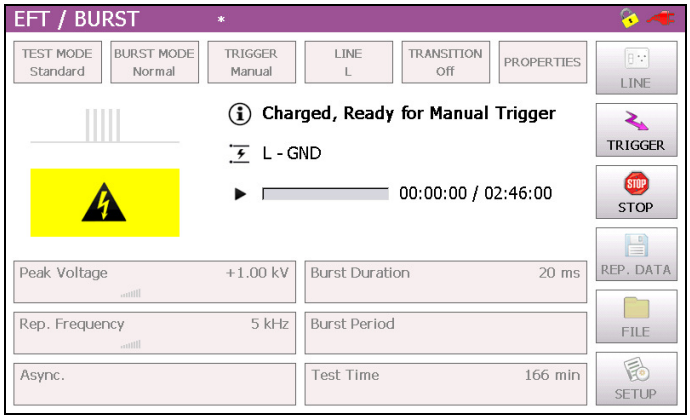


Figure 8-7: BURST mode Trigger normal

Furthermore, it shows between which line and GND the burst package gets applied. After finalizing the process, it will be stopped when pushing the “Stop” button. A manual report gets saved on the USB device, after selecting “Rep.Data” and “manual” selection in the “Setup” menu.

8.2.5 Synchronization

To synchronize the burst signal with the main supply source it is necessary to select in the menu “Synchronization” and then “Line Sync.”. Adjustments of the angle can be done in a range from 0° to 359°. However, if no power supply is connected to the EUT supply input at the rear view, it has to be entered “Async.”, otherwise it is impossible to get a Burst waveform.

In external synchronization, the output with the position 8 Figure 5-2 in the rear view is in use. An external source could be for instance a manual CDN. Finally, normal operation through the touch screen is possible.

8.2.6 Burst mode

The Burst mode gives the user the option to select between “Normal”, “Continuous”, “Real” and “Random BURST” signals. Afterwards the function gets automatically displayed on the screen and can be applied to the EUT after pushing the “Start” button.

9 Voltage dips & interrupts

9.1 General information

For the voltage dips & interrupts only the EUT will be only connected through the output (L, N, PE) in the front view. The EUT Supply Input (L, N, PE) in the rear view gets connected to the power supply. For verification of the signal, Pos.4 and Pos.5 in Figure 5-1 can be connected to the oscilloscope. Only these five outputs in Figure 5-1 can be used, when applying or verifying voltage dips & Interrupts at the EUT. Further adjustments of the operation menu will be described in the following under captures.

9.2 Interrupts

Only the voltage interrupts it is possible to create without an external transformer. To create those interrupts there must be a connection between V dip and N via banana plug, as seen in Figure 9-1. Additionally, an external powers supply source has to be connected to EUT supply Input. Afterwards it can be selected between pre-compliance mode and standard operating menu. The entering of “duration”, “interval”, “test time”, “synchronization” via touch screen by pressing each specific function (Figure 9-3). When pushing the function name a purple bow opens up and defines the parameter in the graphic. After successfully selecting the key parameter, the “start” button can be pushed and the parameter gets applied.

Figure 9-1: Voltage interrupts electrical installation

9.3 Dips

To create the Voltage dips an external transformer is necessary, because a second voltage level is required. When purchasing the DIP 116 from the HAEFELY TEST AG the position 5 at the rear view graphic can be used. The Figure 9-2 gets displayed when DIP 116 is successfully connected. Exact hardware configuration of DIP 116 is described in capture 9.3.1. Fully compatibility is guaranteed with the AXOS^5.

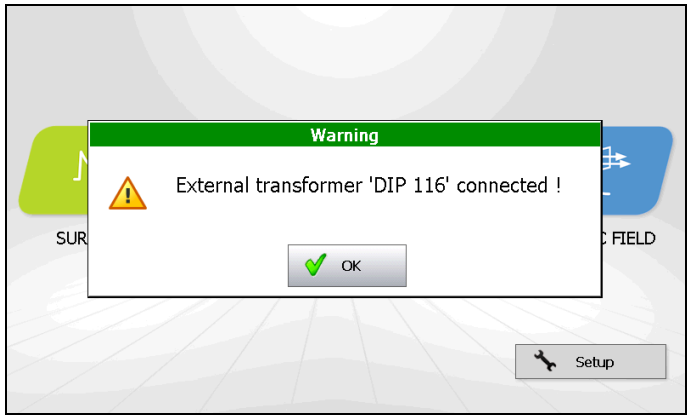


Figure 9-2: DIP 116 Transformer connected

Only in this case the V dip voltage can be proportionally controlled regarding to the U1 nominal voltage via the touch screen or via remote software. Moreover all other adjustments are compatible with the AXOS^5. Reference voltage according to the U1 nominal can be selected. V dip can either be 0%, 40%, 70% or 80% in reference to U1 nominal,

when using the D116 transformer. The selection happens in the “Dip Voltage” menu field. When selecting 0% it creates a voltage interrupt, since the V dip becomes 0V.

The Figure 9-3 shows the voltage dips in standard mode. When pushing the particular function name: “Dip Voltage”, “Line sync.”, “Duration”, “interval” and “test time a visual description gets open with a purple bow as seen below. For changing the parameter the value has to be pushed, for instance 5 min. New parameter can be entered. When pushing the button “file” data can be saved and loaded.

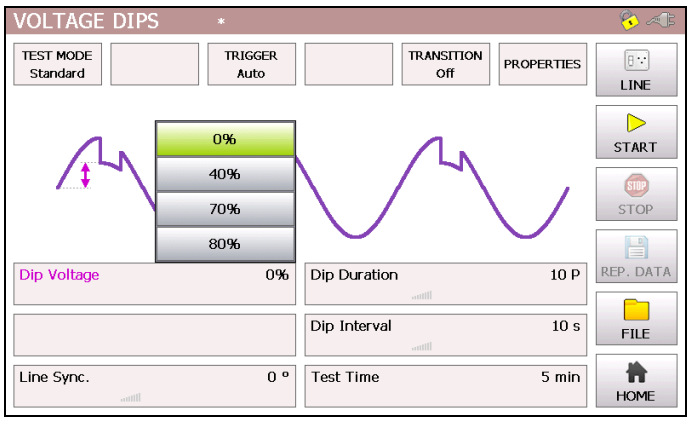


Figure 9-3: Voltage Dips Standard mode

The Figure 9-4 represents the pre-compliance mode of the “voltage dips” menu. The purple bows define the function and show which particular parameter influenced the function. All parameters can be adjusted, when test is operating.

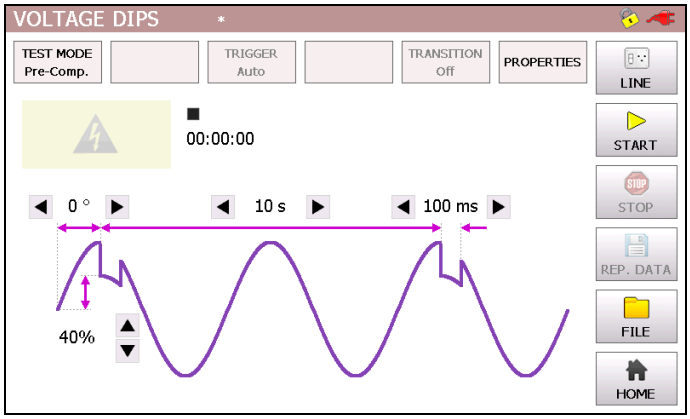


Figure 9-4: Voltage Dips pre-compliance mode (External transformer)

After all parameters have been adjusted and selected the “start” button can be pressed and the voltage dips starting. Significant, is the right selection of “Line Sync”, “Sync” and “external”. Only in either “line Sync” or “Sync” can the phase angle be selected, since an external power supply has to be connected, otherwise the synchronization with the phase would not be technical possible. However, by pushing the “home” button the starting menu as seen in Figure 2-1 gets open.

9.3.1 Transformer DIP 116

The HAEFELY TEST AG DIP 116 transformer will be connected through the V Dip and the Link input at the rear view of the AXOS5. The DIP 116 has an independent connection to an external power supply via banana plug. Once the setup is done it can be fully automatically controlled through the touch screen of the AXOS^5, when being in the menu field of the “Voltage Dips”.

Figure 9-5: Transformer DIP 116

Then V dip 0%, 40%, 70% and 80% in reference to U1 nominal. Only with the DIP 116 the proportional voltage adjustment through the menu is possible. The second main advantage will be reflected in the compatibility of the transformer with the AXOS^5 compact immunity tester.

9.3.2 External transformer

The only connection from the external transformer (Figure 9-6) with the compact immunity tester happens through V dip and N' at the rear view via banana plug. L and N from the external transformer gets connected to the power supply. The output voltage (between V dip and N) gets displayed as adjusted at the transformer. However, no further adjustment of the second nominal voltage in the AXOS^5 menu possible.

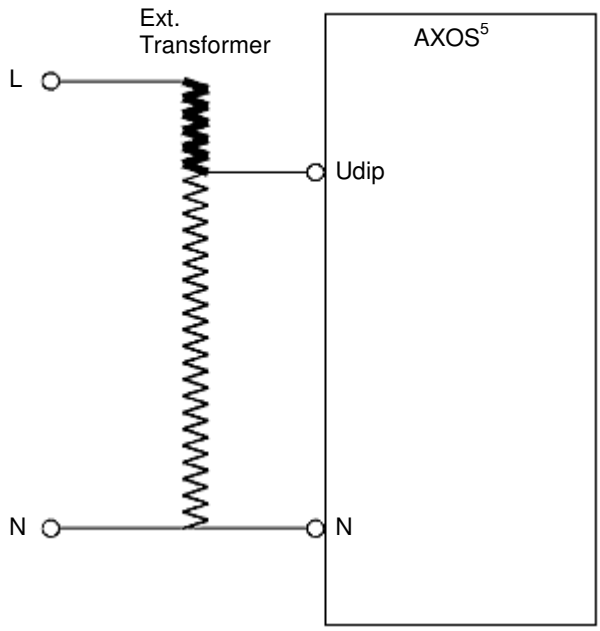


Figure 9-6: External transformer

Now the incoming V dip can be regulated directly at the transformer. Note: No further connection of the link data cable at the rear view possible.

9.3.3 Properties

Position	description
External (Pin11 on Aux)	External condition (e.g. device or PLC signal), the position becomes 1 and causes an action (Ignore, Alarm, Test Stop or test stop & line off)
Line Current	Limits the current (L, N, PE front view) to the EUT.
Action: Ignore, Alarm, Test stop, Test stop & line off	Due to EUT fails, AXOS^5 cause an action which can be: Ignore, Alarm, Test Stop, Test Stop & Line off.
Line off	Voltage locked at L, N, PE when test has finished
Line on	Voltage unlocked at L, N, PE when test has finished
Sound on or off	Acoustic signal when test ends

Table 9-1: Properties Voltage Dips & Interrupts

9.3.4 Transition

The Figure 9-7 shows the “transition” menu. It is possible to select independently “Duration”, “Interval”, “Phase” and “Alternate polarity”. To be able to select “phase” the Synchrony has to be either set as Synchronization or external Synchronization, otherwise it is not possible to access it. Eventually, every parameter can be changed by pushing the certain value.

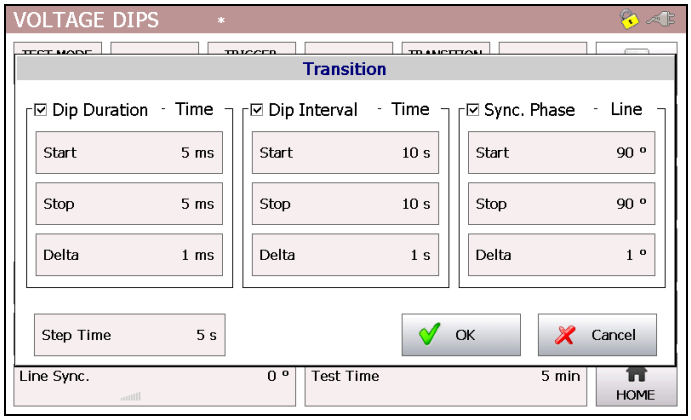


Figure 9-7: Voltage Dips Transition

When finalizing the parameter, it must be confirmed with “OK” and either the pre-compliance or standard mode gets open depending what selection was previously done. In addition the incremental intervals get displayed at each particular function name, like for example “interval”.

9.3.5 Trigger

The trigger can be accessed either from pre-compliance mode or standard mode when generator is not in use. The user can select after pressing the “trigger” button between: “auto”, “manual” and “external”. In “Auto”: signal gets applied automatically in accordance to parameters. In “Manual”: pushing the start button after “manual” selection, then pressing the “trigger” button. In “External”: Signal will be controlled from external source, connection through PIN 11 in Table 5-3.

10 Error Messages

10.1 Error messages

In the menu is a short summary of possible alarm messages which can occur when operating the AXOS[5].

10.2 Troubleshooting

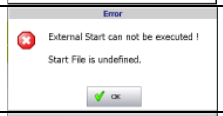
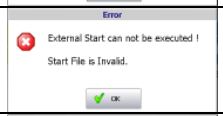
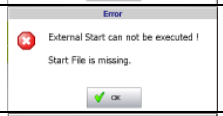
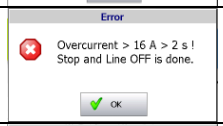
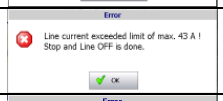
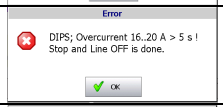
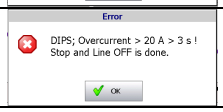
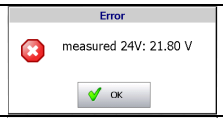
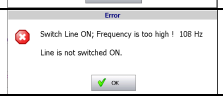
Alarm message	Possible cause	Action needed
	Safety Circuit opened	close Safety Circuit
	tried to start a Test with open Safety Circuit	close Safety Circuit and Start Test again
	no file defined in Setup Start File	define a Start File
	no valid file	define a valid Start File
	no valid file	define a valid Start File
	EUT requires more than 16 A support current, may EUT defect, short circuit EUT	-check Inominal of EUT (max. support with AXOS5 16A) -control EUT independently, short circuit might occurred, -External CDN necessary, if higher Inominal required
	EUT requires more than 16 A support current, may EUT defect, short circuit EUT, protection of AXOS[5]	
	EUT requires more than 16 A support current, may EUT defect, short circuit EUT	
	EUT requires more than 16 A support current, may EUT defect, short circuit EUT	
1 x beep and automatic shut down	at system startup any of internal supply voltages (not 24V) are out of range	send AXOS[5] for repair
	at system startup internal supply voltage 24V is out of range	send AXOS[5] for repair
	- bad or missing Function Key - internal storage card missing or damaged	- go to Setup License Manager and check for correct numbers - send for repair
	Frequency of EUT Supply Input is too high	use EUT Supply Input voltage with nominal frequency of 50 or 60 Hz
	L and N on EUT Supply Input are exchanged	Exchange L and N on EUT Supply Input

Table 10-1: Error messages

10.3 Logic errors

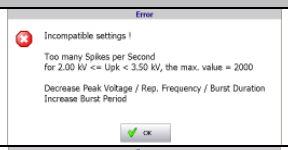
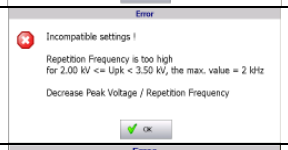
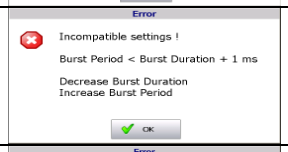
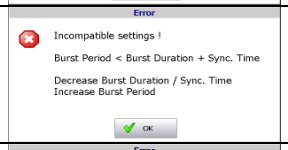
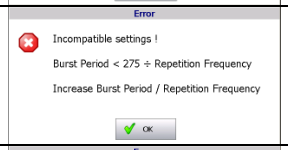
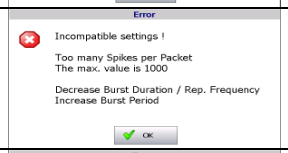
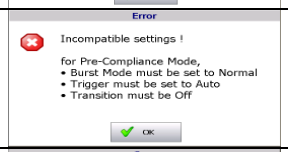
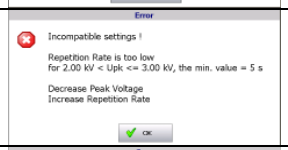
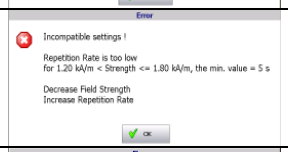
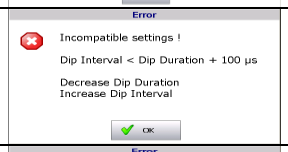
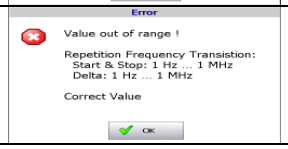
Alarm message	Possible cause	Action needed
	Too many spikes per second	Decrease peak voltage / rep. frequency / Burst or increase burst period
	Repetition frequency is too high	Decrease peak voltage , repetition frequency
	burst period / burst duration incompatible	Decrease burst duration / Sync. time
	Incompatible settings	Decrease burst duration /Sync. Time increase Burst period
	Incompatible settings	Increase burst period, repetition Frequency
	Too many spikes per packet	Decrease Burst duration, Rep. Frequency, Increase Burst period
	Incompatible settings for pre-compliance mode	Burst mode must be set to Normal, Trigger must be set to Auto, Transition must be set off
	Incompatible settings	Decrease peak voltage, increase repetition rate
	Incompatible settings	Decrease field strength, increase repetition rate
	Incompatible settings	Decrease dip duration or increase dip interval
	Entered value out of range	Value must be in the range of min. and max. value Note: Similar error can occur, only with different units, however, similar action for solving

Table 10-2: Logic causes and actions

11 Software

11.1 Remote Software

A remote software for the AXOS^5 is available. Connection through RJ45 input at the rear view. If further assistance required, please contact either your HAEFELY TEST AG representative or the sales department of the HAEFELY TEST AG.

The license code for the “remote GUI” will accessed in the “setup” menu in Figure 5-3 and then in “license manager”. After entering the license code (Figure 11-1), the “remote GUI” section becomes enabled and it can be either operated just from the PC or parallel with the touch screen as well. For communication via PC is the IP address required, it is written in the communication window of the “Setup” menu.

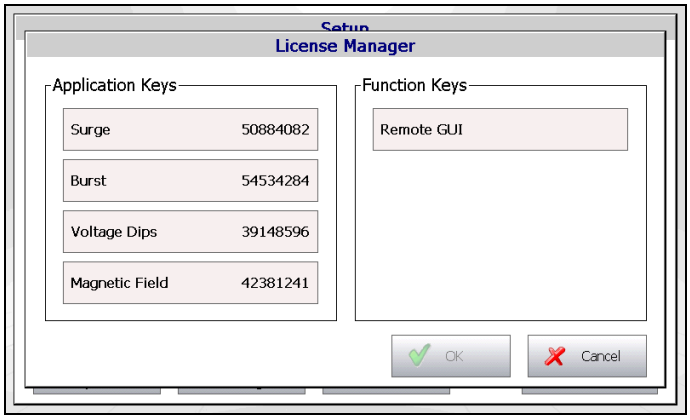


Figure 11-1: License manager

When information and data entered it must be confirmed with “OK”.

12 Service

12.1 Verification

In the next under captures are descriptions of our additional verification equipment for the AXOS[5]. If further information required of any of the equipment, please either contact your sales representatives or the HAEFELY TEST AG technical support team directly.

12.1.1 Waveform OCV (Surge)

The HAEFELY PDP8000 is a differential impulse measurement probe that can be used to measure surge pulses. Two banana plug cables are provided as the High and Common inputs to the PDP8000, and a coaxial output is provided for connection to an oscilloscope. The divider ratio is 1000:1 and the PDP8000 is rated up to 8kV for surge, 690VAC or 400VDC. The two banana plug will be directly connected to “direct” or “line” output in the front view.

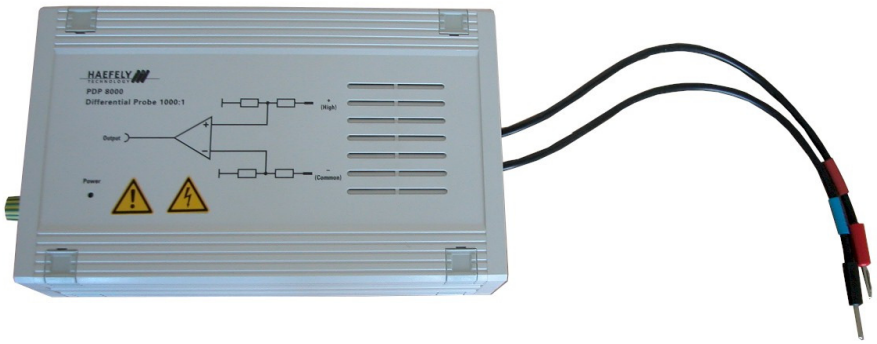


Figure 12-1: PDP 8000

12.1.2 Waveform SCC (Surge)

The current transformer is necessary to verify the SCC waveform. It will be connected with pos.6 and pos.7. Then the outgoing BNC output creates the connection to the oscilloscope. The SCC gets displayed on the oscilloscope and can be compared with the parameter as shown in the operation menu from the AXOS[5]. It represents the signal in accordance to the IEC 61000-4-4. The same test procedure gets applied for L, N, PE output at the front view. Significant: Do not connect the “EUT Supply Input” with external power supply at the rear view, when using the current transformer. It can be directly purchased through the HAEFELY TEST AG or contact your sales representative.

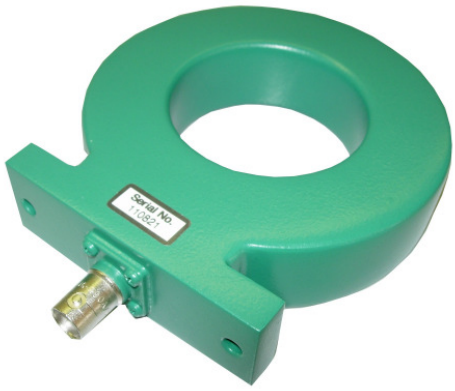


Figure 12-2: Current transformer

12.1.3 Electrical fast transient/Burst

The HAEFELY EFT Verification Kit includes a 50 Ω and 1000 Ω attenuator as required in the IEC 61000-4-4 standard. The appropriate attenuator is fitted to the “Burst” coaxial output, and an oscilloscope is then connected to the output of the attenuator. For measuring the waveform at the output of the coupling filter, single phase and three phase adapters are available. NOTE: Be sure to disconnect mains power from the “EUT Supply Input” before connecting the measuring attenuators. Measuring attenuators are designed for burst voltages only and will be destroyed if subjected to AC/DC voltage.

Figure 12-3: EFT Verification Kit

12.1.4 Burst verification adapter

Additionally, an EFT verification adapter is available for testing of every single phase (L, N, PE front view from AXOS[5]). It gets connected with the PE pin (Pos.12 Figure 5-1) and every single phase (L, N, PE Figure 5-1). The BNC output of the burst adapter is then connected to the oscilloscope. Do not connect “EUT Supply Input” to power supply, when verification of burst output.

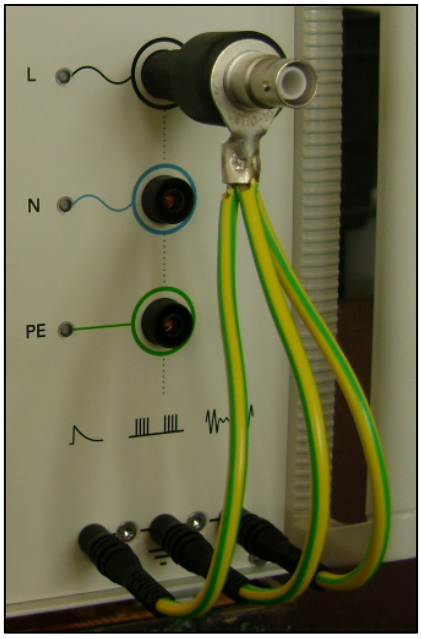


Figure 12-4: Burst verification adapter

12.2 Calibration

Calibration period of the AXOS[5] has to be determined by the user, and depends on the intensity of use and end user requirements. Typically, a calibration is recommended every 2 years. The AXOS[5] is factory calibrated before shipped and supplied with the calibration certificate.

12.3 Recycling

When the instrument reaches the end of its working life it can, if required, be disassembled and recycled. No special instructions are necessary for dismantling.

The instrument is constructed of metal parts (mostly aluminium) and synthetic materials. The various component parts can be separated and recycled, or disposed of in accordance with the associated local rules and regulations.

13 Accessories and Options

13.1 AXOS5 Accessories

Article	Article number
FP-COMB 32 3-Phase / 32A Power Line CDN Surge & EFT	2490430
FP-EFT 100M2 3-Phase / 100A Power Line CDN EFT	2495860
IP4A Capacitive coupling clamp for EFT	2491300
FP-SURGE 100M2 phase / 100A Power Line CDN SURGE	2490181
PCD 121 Symmetrical Data & Control Line Coupler	2498010
PCD 126A Asymmetrical Data & Control Line Coupler	2498030
DEC 5 Symmetrical Data & Control Line Decoupler	2490141
DEC 6 Symmetrical Data & Control Line Decoupler	2490151
DEC 7 Asymmetrical Data & Control Line Decoupler	2490161
DIP 116 Automatic Dips Transformer 16A 40/70/80%	2490410
MSURGE Magnetic Field Test IEC / EN 61000-4-9	2495591
VTM 15000 Isolation Test 1.2/50us up to 10kV	2499960
PDP 8000 HV differential Probe 1000:1 for Surge	2499911
CP 101 Current Probe Model for Surge	2499931
ES External emergency stop Switch P12	4700751
WL External warning Lamp P12	4700750
WinFEAT'R Control, Measurement & Reporting Software	2499701
Calibration Accredited Calibration AXOS^5	2490420

Table 13-1: Article for AXOS5

14 Additions

14.1 Addresses

14.1.1 International customer service

e-Mail: EMC-Support@haefely.com

Address: Haefely Test AG
Birsstrasse 300
4052 Basel / Switzerland

Fax : + 41.61.373 45 99

Internet: www.haefelyEMC.com

14.1.2 USA customer service

e-Mail: EMC-Support@haefely.com

Address: Hipotronics Inc.
Department EMC
1650 Route 22
Brewster, NY 10509 / USA

Telephone : (845) 279 3644
Fax : (845) 279 2467

Internet: www.haefelyEMC.com

14.1.3 China customer service

e-Mail: EMC-Support@haefely.com

Address: Haefely Representative Office
8-1-602, Fortune Street
No.67, Chaoyang Road, Chaoyang District
Beijing, China 100025

Telephone : +86 10 8578 8099 / 8199 / 8299
Fax : +86 10 8578 9908

Internet: www.haefelyEMC.com

14.1.4 Manufacturer

e-Mail: EMC-Sales@haefely.com

Address: Haefely Test AG
Birsstrasse 300
4052 Basel / Switzerland

Telephone : + 41.61.373 41 11
Fax : + 41.61.373 49 12

Internet: www.haefelyEMC.com

14.2 Glossary of terms and abbreviations

meaning: Helpful hints, notes, tips or remarks

meaning: Attention!

EUT	Equipment Under Test
CDN	Coupling Decoupling Network
HV	High Voltage
LED	Light Emitting Diode
IEC	International Electro-technical Committee
EN	European Norm
ANSI	American National Standards Institute
EMC	Electro Magnetic Compatibility
EMV	German equivalent of EMC
DEC	Decoupling network
PCD	Coupling / Decoupling module (Electrical circuit for transferring energy between networks with the minimum loss and that attenuates the Surge signal so that it does not cause undue interference to equipment other than the EUT)
STBY	Standby
HV DC	High Voltage Direct Current
Hybrid	Same as Combination
f.s.d.	full scale deflection

14.3 Reference

- [1] IEC 61000-4-5 Testing and measurement techniques-Surge immunity test, part 4-5, edt.2, 2005/11
- [2] IEC 61000-4-4 Testing and measurement techniques – Electrical fast transient/burst immunity test, part 4-4, edt.2, 2004/07
- [3] IEC 61000-4-11 Testing and measurement techniques-voltage dips, short interruptions and voltage variations immunity tests, part 4-11, edt. 2, 2004/03

14.4 Table of figure

14.5 Table of table

15 Appendix

15.1 CE conformity

HAEFELY

Declaration of Conformity

Haefely Test AG
Birsstrasse 300
4052 Basel
Switzerland

declare, under his own responsibility, that the below mentioned product complies with the requirements of the listed standards or other normative documents.

So, the product complies with the requirements of the EMC directive 2004/108/EC and the low voltage directive 2006/95/EC.

Product: **AXOS 5**

Description: The product AXOS 5 generates electrical interferences according to IEC/EN 61000-4-4, IEC/EN 61000-4-5, IEC/EN 61000-4-11 and other standards. It is used to verify the conducted immunity of electrical products.

Standards: EN 61010-1: 2001
EN 61326-1: 2006

R. Mäder
Quality Department Manager
Haefely Test AG
4052 Basel
Switzerland

Basel, February 21, 2012

.....
(Signature)

Notice:
The function of this equipment is to generate electrical interference. Because of this the limits defined for emission can be exceeded for short periods when the high voltage is switched on.