AC Source Soft Panel

615_616XX Series

User's Manual

Chroma

www.chromaate.com

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615_616XX Series
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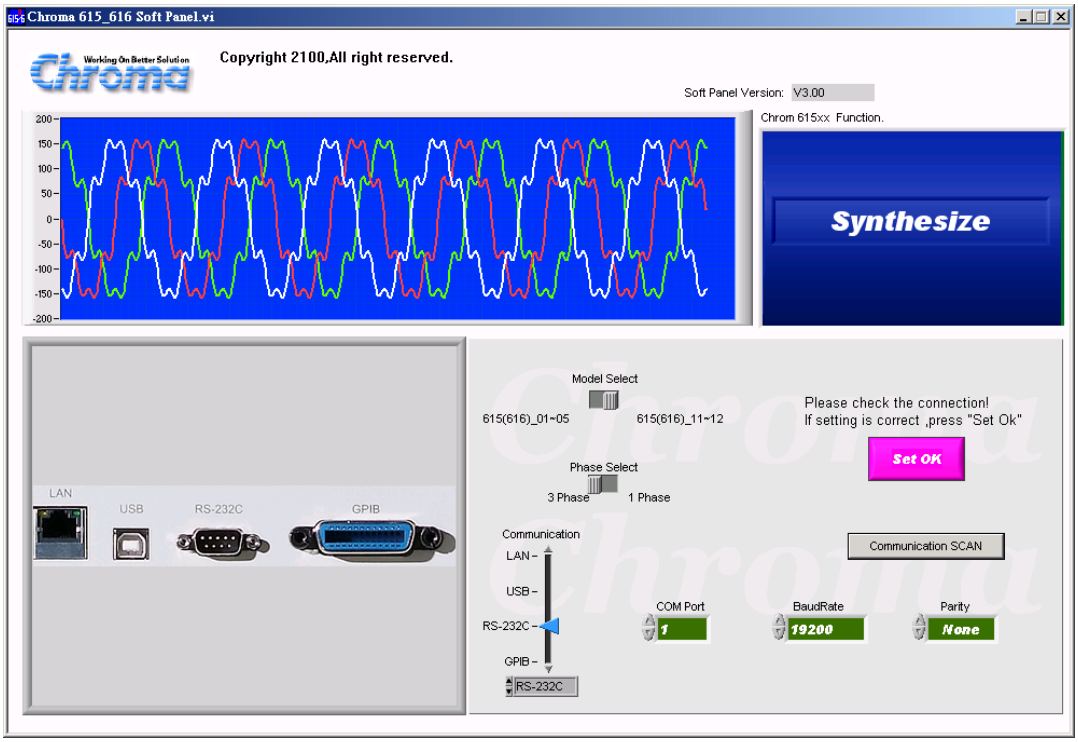

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Revision History

The following lists the additions, deletions and modifications in this manual at each revision.

Date	Version	Revised Sections
Dec. 2002	1.0	Complete this manual
June 2004	1.1	Add the Soft Panel info for Model 616xx
July 2005	1.2	Change the address and phone no. of Chroma ATE Inc. Major change of contents due to software function change.
Sep. 2006	1.3	Update the chapter of "*IEC61000-4-13*" for regulation changes.
Jan. 2007	1.4	Update the chapters of "*IEC61000-4-11*" and "*Chroma AC Source Waveform Editor*" for changes.
Oct. 2009	1.5	Add a new model 61512.

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1. System Structure

This chapter explains the structure and functions of Chroma 615_616XX Soft Panel application. The supported instruments and communication interfaces are listed below for you to identify the required environment easily.

1.1 Introduction

This software is applicable to CHROMA AC Source 615_616XX Series only. The remote transmission between PC and AC Source must be active before using the software in order to communicate by commands.

The software application can perform internal parameter settings for AC Source and monitor the output measurement. Another feature of the application is to preview the simulated output waveform. Before sending the parameters set for voltage frequency, the screen will display an output waveform element for previewing the waveform. Once the waveform is confirmed by the user, the voltage will be sent. In addition the software is able to save the parameter settings so that users can open an existing file for execution from hard disk easily.

1.2 Supported Hardware

Chroma 615_616XX Series Programmable AC Sources contain the following models:

- 61501
- 61502
- 61503
- 61504
- 61505
- 61511
- 61512
- 61601
- 61602
- 61603
- 61604
- 61605
- 61611
- 61612

1.3 Communication Interface

There are two types of communication interfaces between PC and AC Sources:

- GPIB
- RS232
- USB (applicable for 61611_12 and 61511_12)
- LAN (applicable for 61611_12 and 61511_12)

1.4 Software and Hardware Requirements

The soft panel program is quite large; therefore, the following PC software and hardware environments are suggested.

- Intel CPU 500MHz or above
- Microsoft Windows 98 (Second edition), Windows 2000, Windows XP or NT (SP5 or above.)
- 400 MB hard disk space at least
- 512 MB memory at least
- VGA or SVGA color monitor
- PS2 mouse

2. Installation

First install the Chroma 615_16XX Soft Panel software to the hard disk on PC before using it. This chapter describes how to install the software on Windows step by step.

- Ensure there is at least 40 MB or above hard disk space on PC.
- Insert the software CD of Chroma AC Source 615_16XX Soft Panel into the CD drive.

2.1 Files in CD

The CD contains the files shown in Figure 2-1.

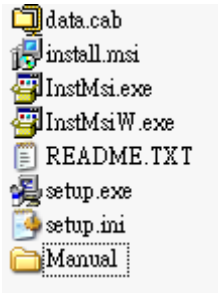


Figure 2-1 Files in CD

2.2 Installation Procedure

Place the CD that came along with the application into the CD drive, the installation begins automatically. If not, execute the `Setup.exe` file in CD to start the installation as Figure 2-2 shows.

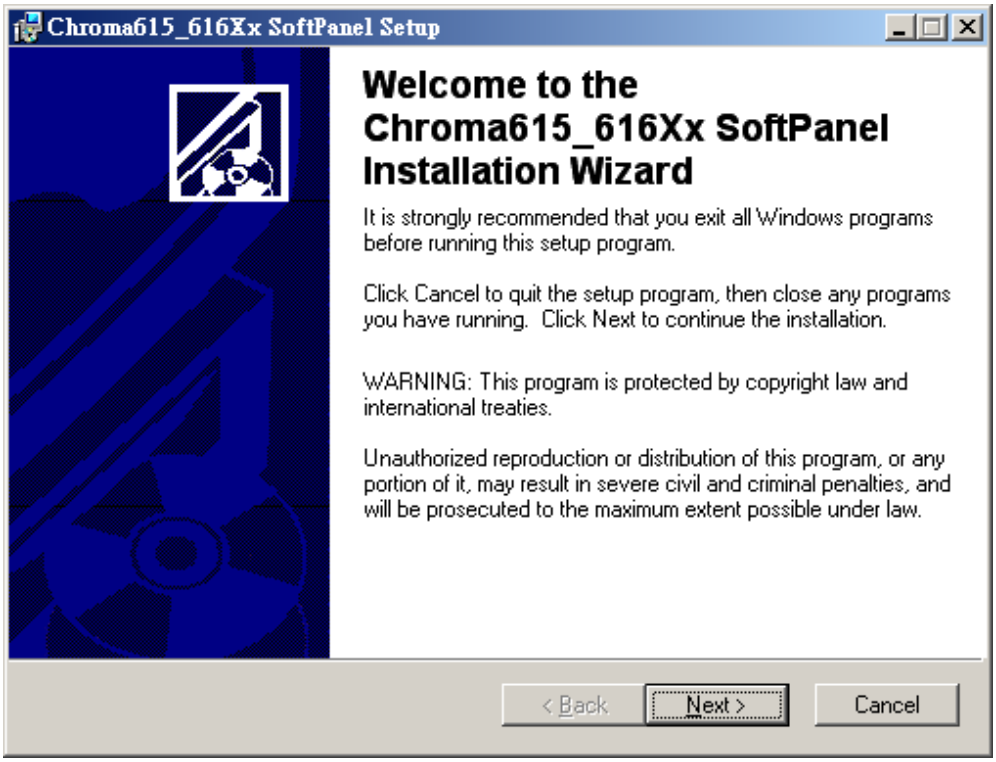


Figure 2-2 615_616XX Soft Panel Setup Home Page

2.2.1 Installing Chroma 615_16XX System Software

Click **Next >**, the screen prompts Figure 2-3 to let users setup the installation path.

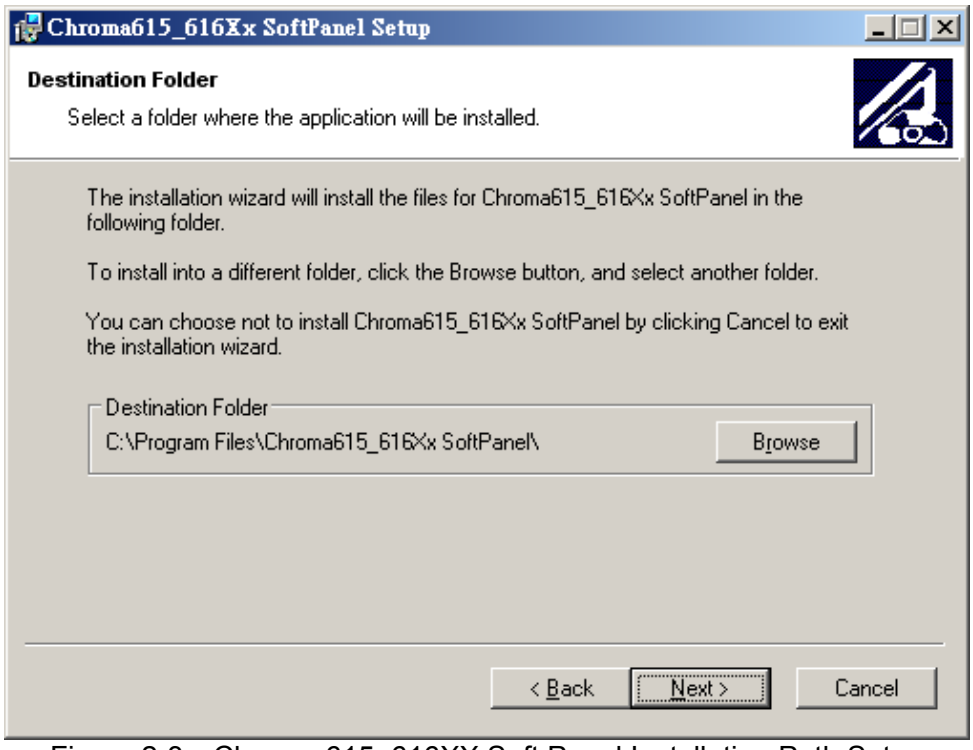


Figure 2-3 Chroma 615_616XX Soft Panel Installation Path Setup

- The program is default installed in `C:\Program Files` directory as Figure 2-3 shows. To change it, click **Browse** and specify the path for installation.
- Click **Next >**, the screen shows Figure 2-4 that is ready for installation.

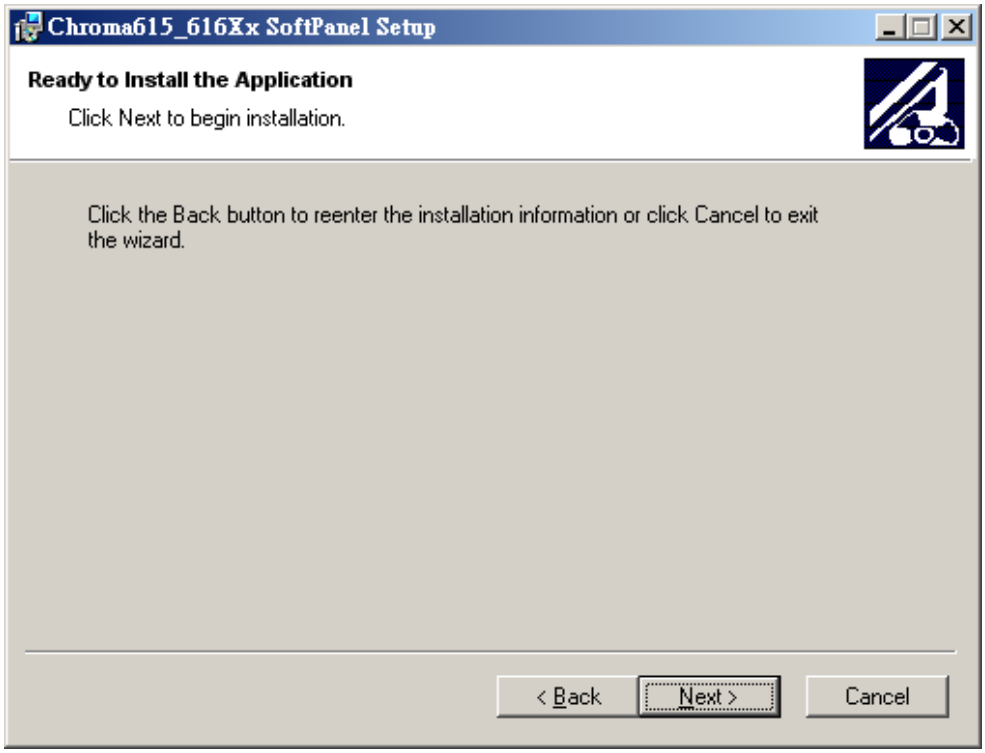


Figure 2-4 Screen of Ready to Install the Application

- Click **Next >** to start the installation immediately as Figure 2-5 shows.

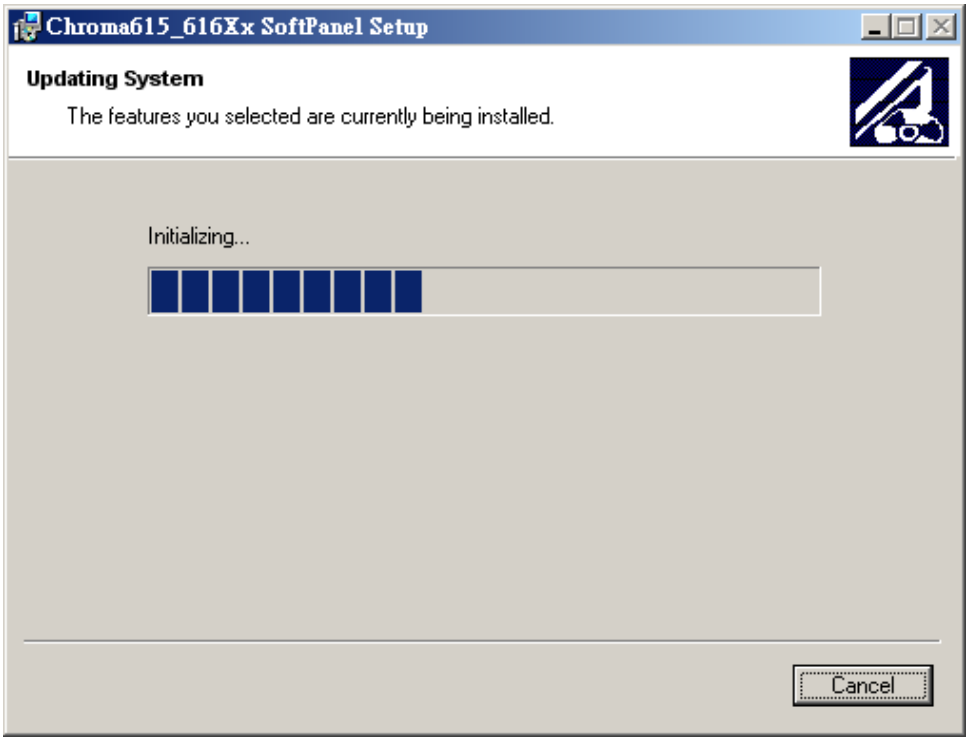


Figure 2-5 Installation Proceeding Screen

- Figure 2-6 prompts once the installation is completed. Click **Finish** to end the installation.

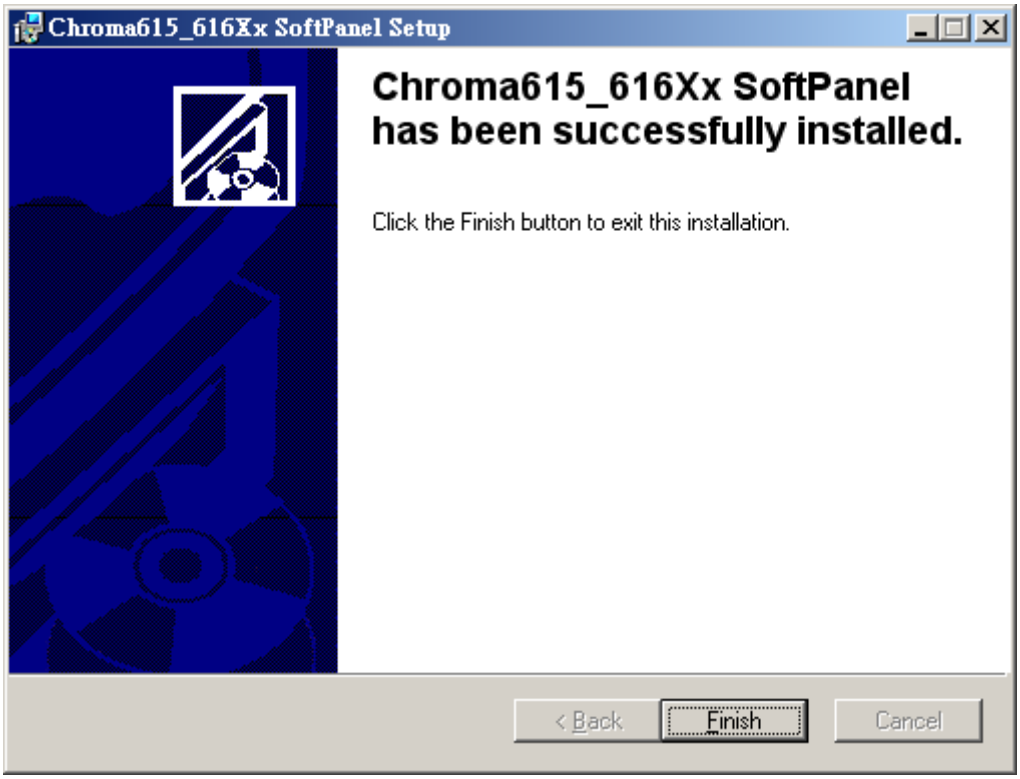


Figure 2-6 Installation Complete Screen

2.2.2 Installing NI VISA

Please follow the procedures described in NI VISA Installation Manual for installation. The version of NI VISA should be 3.0.1 or greater. If the OS is Microsoft XP, it is suggested to install NI VISA version 3.0.1 or above.

2.3 Installing GPIB Interface Driver

■ Follow the steps listed in the user's manual of GPIB Interface Driver for installation.

2.4 Uninstalling Chroma 615_616XX Soft Panel Software

If it is necessary to remove the Chroma 615_616XX Soft Panel software for reinstallation, just uninstall the related programs as Figure 2-7 shows.

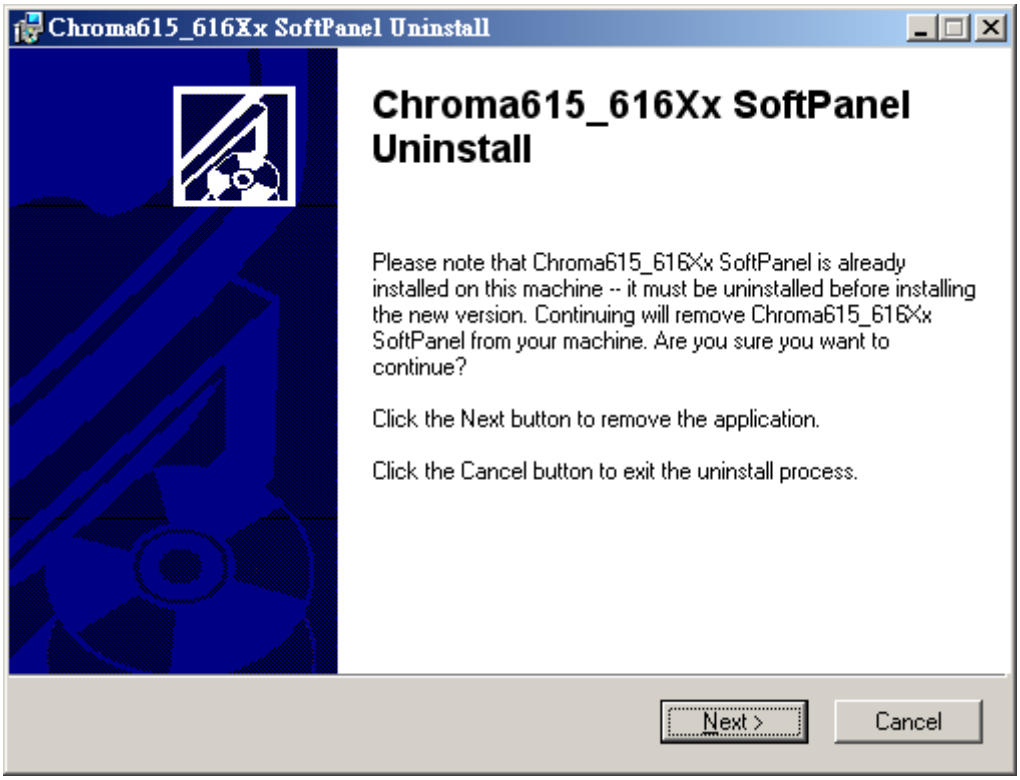


Figure 2-7 Uninstalling the Program

Click **Next >** to show Figure 2-8.

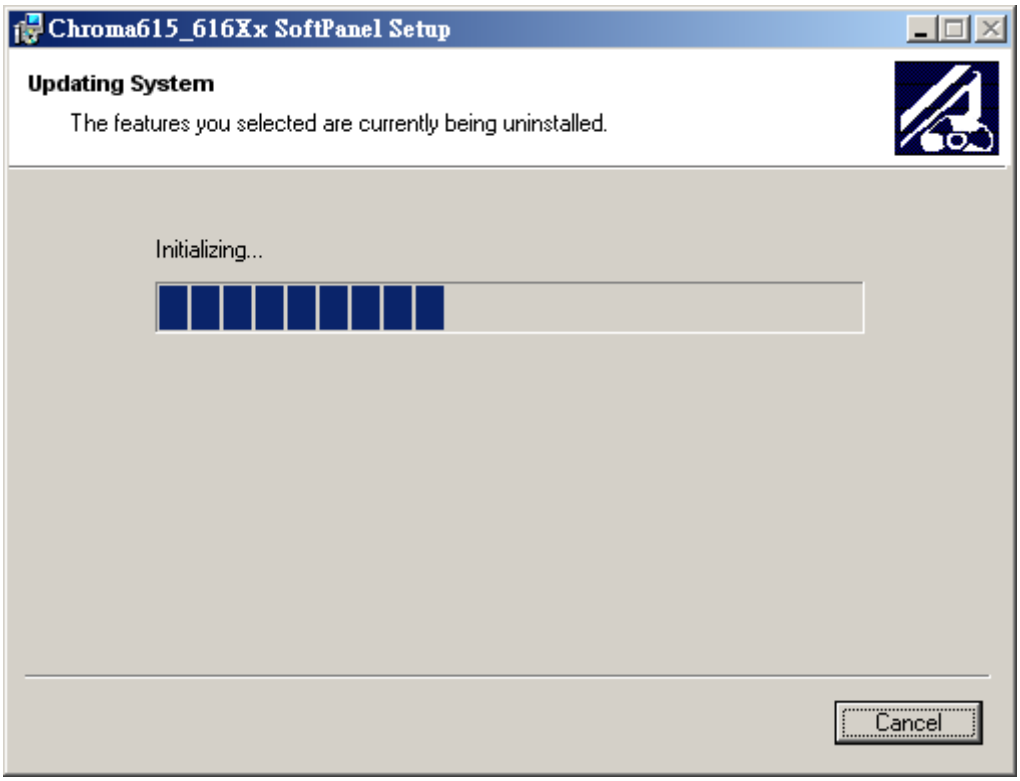


Figure 2-8 Proceeding of Uninstalling

Figure 2-9 shows the completion of removal. Click **Finish** to end the program.

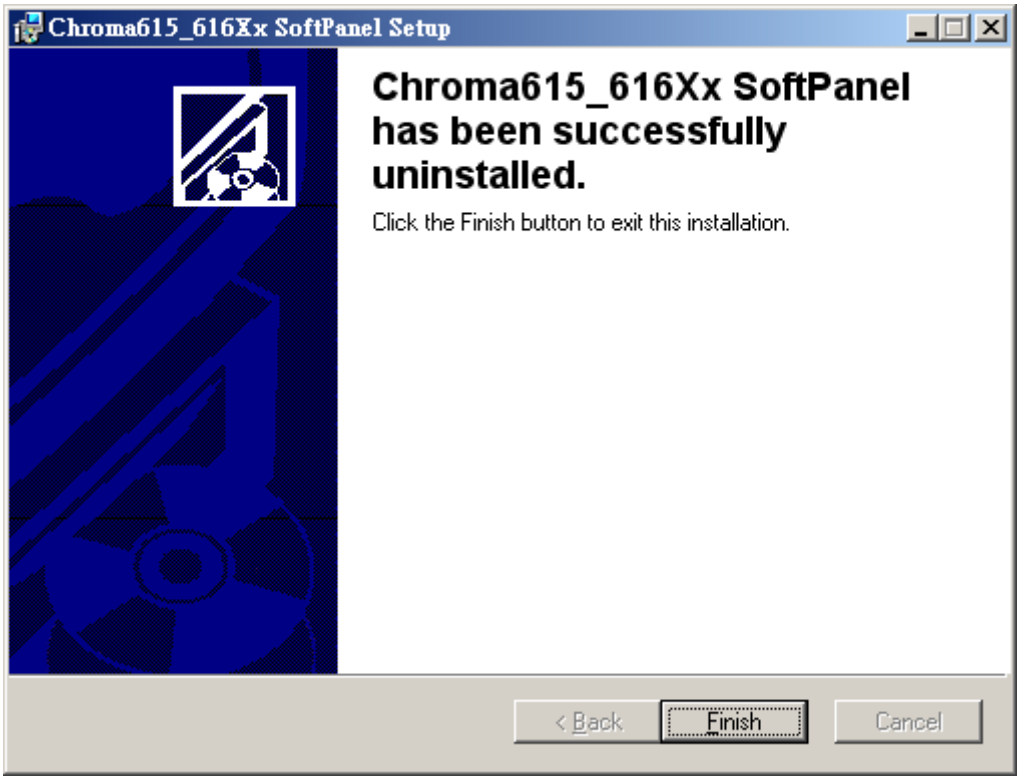


Figure 2-9 Uninstalled the Program Successfully

3. Starting Chroma 615_616XX Soft Panel

3.1 Starting

After the installation is done, click **`Start\Programs\Chroma 615_616XX Soft Panel`** will prompt the start screen as Figure 3-1 shows.

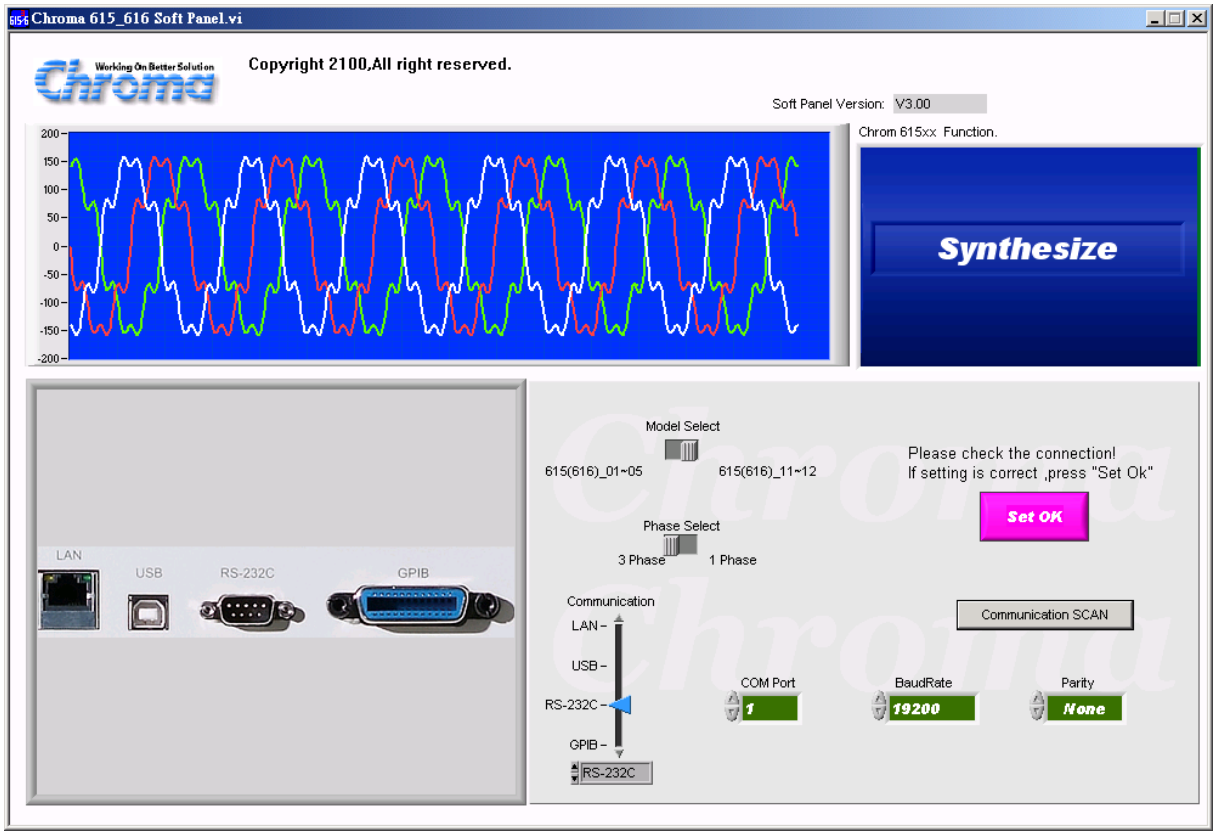


Figure 3-1 Start Screen

Description: The start screen is mainly composed of 4 modules: a. Chroma 615_616XX Functions, b. Demo Waveform Window, c. Product Presentation, and d. Communication Selection.

a. Demo Waveform Window: Display the mapped AC Source output waveform following its function.

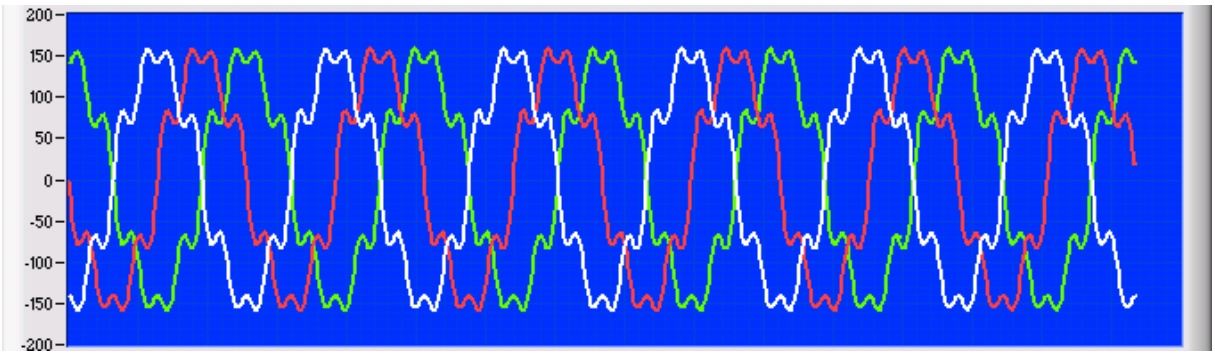


Figure 3-2 Demo Waveform

b. Product Presentation: This portion introduces the device outline.

Figure 3-3 Product Picture

c. Communication Selection: This part sets the communication protocol of PC and AC Source. The communication protocols Chroma 615_616XX Soft Panel provides are: GPIB and RS232 for 61501~61505 and 61601~61605 Series, and LAN, USB, GPIB and RS232 for 61511~61515 and 61611~61615 Series. When selecting GPIB as the communicating protocol, there must have a GPIB card in PC.

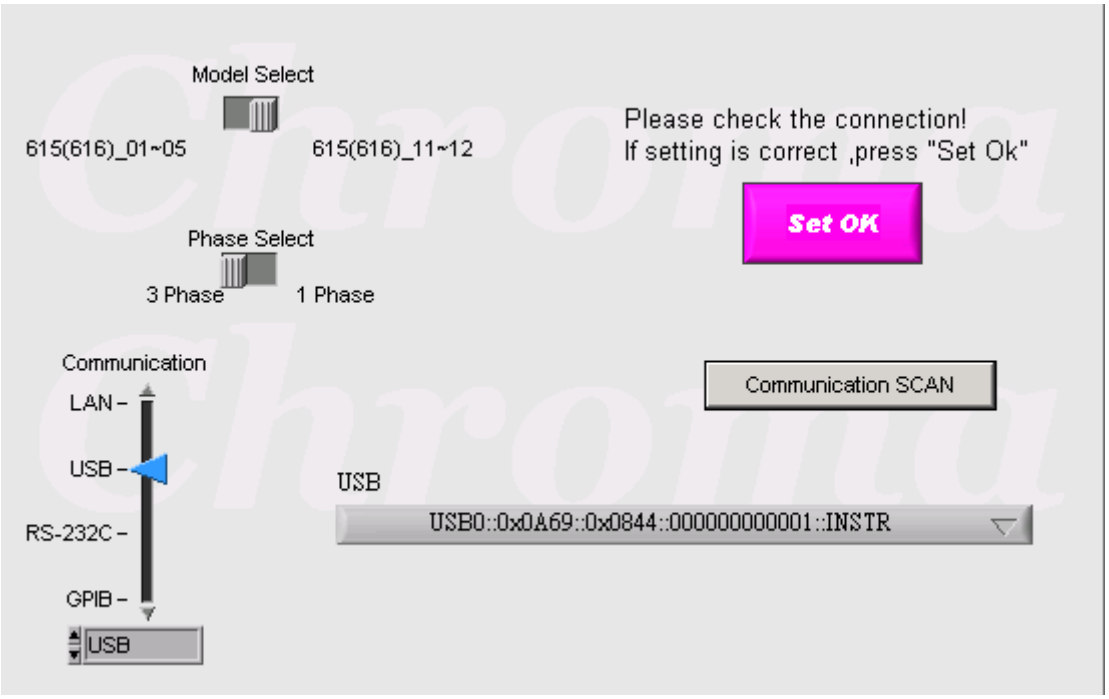


Figure 3-4 Communication Selection

Set the GPIB Address same as the one on AC Source when GPIB is selected in the Chroma 615_616XX Soft Panel. Set the COM Port, Baudrate and Parity same as the one on AC Source when RS232 is chosen. When USB is selected, it has to set the Produce ID and Vendor ID. When selecting LAN, it has to set the TCP/IP contents on the PC site, IP address, sub network mask and default gateway to be the same as the AC Source or use auto detection to check the relative position.

When the communication protocol is confirmed, click **Set OK** on Soft Panel to enter into next screen (Fixed Mode screen also called main screen.)

Model Select: It selects the communication interface for 615(616)_01~05 (single phase) or 615(616)_11~12 (3 phases.)

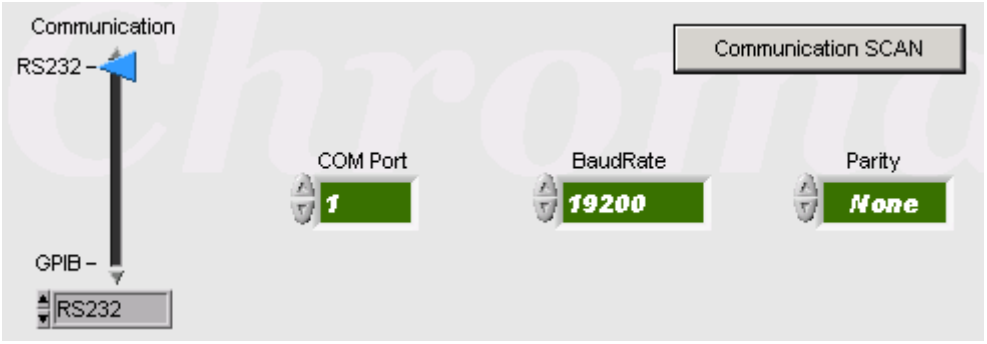


Figure 3-5 615 (616)_01~05 (single phase) Communication Interface

Figure 3-6 615(616)_11~12 (3 phases) Communication Interface

Communication SCAN:
Click this button the software will scan the communication protocols linked successfully in the sequence of USB, RS232 and GPIB at last. Once the communication protocol is detected, it will stop at the first one scanned. On the contrary, it will stop at the software default if none is detected. The user can define the desired Communication Interface; however, if USB interface is selected, it is suggested to click this button to scan it as the ID is too long and is easily to be entered mistakenly.

USB:
When USB is selected, a mapping pull-down menu will appear. If there are many different USB devices are connected, be sure to select the correct Produce ID and Vendor ID as shown below.

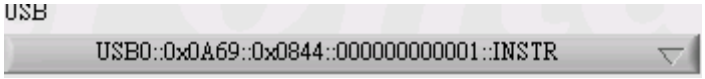


Figure 3-7 USB Interface

LAN:
When LAN is selected, an IP address will appear. It needs to enter the IP address that maps to the device if Manual is selected. As to other subnet mask and default gateway settings, they can be set the same as the device.

Figure 3-8 LAN Interface

Here shows the settings of TCPIP connection in LAN.

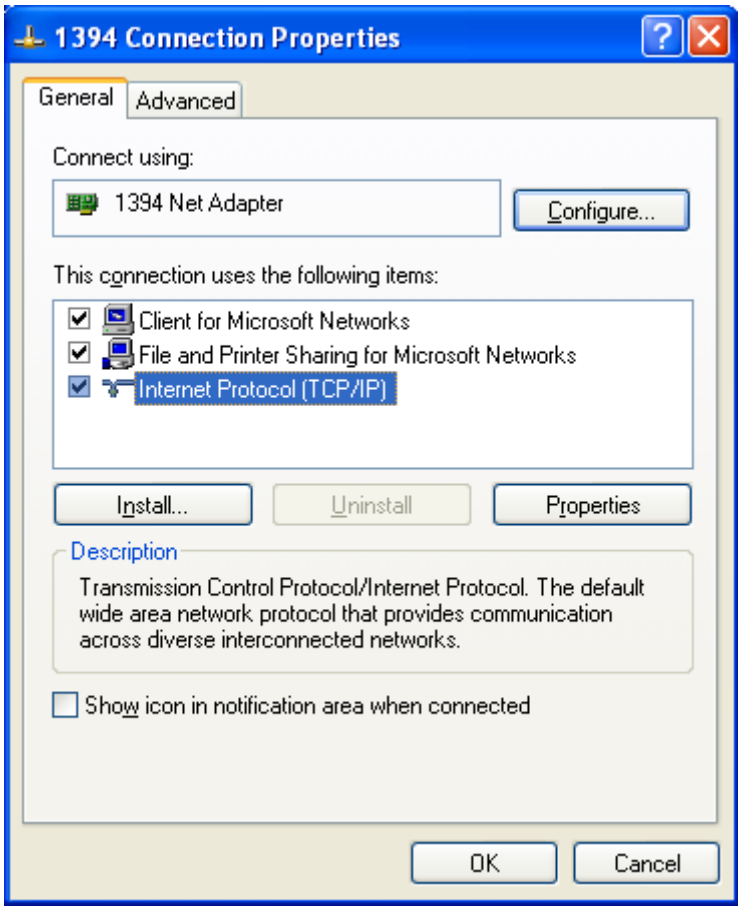


Figure 3-9 Setting TCPIP

Set the correct IP address.

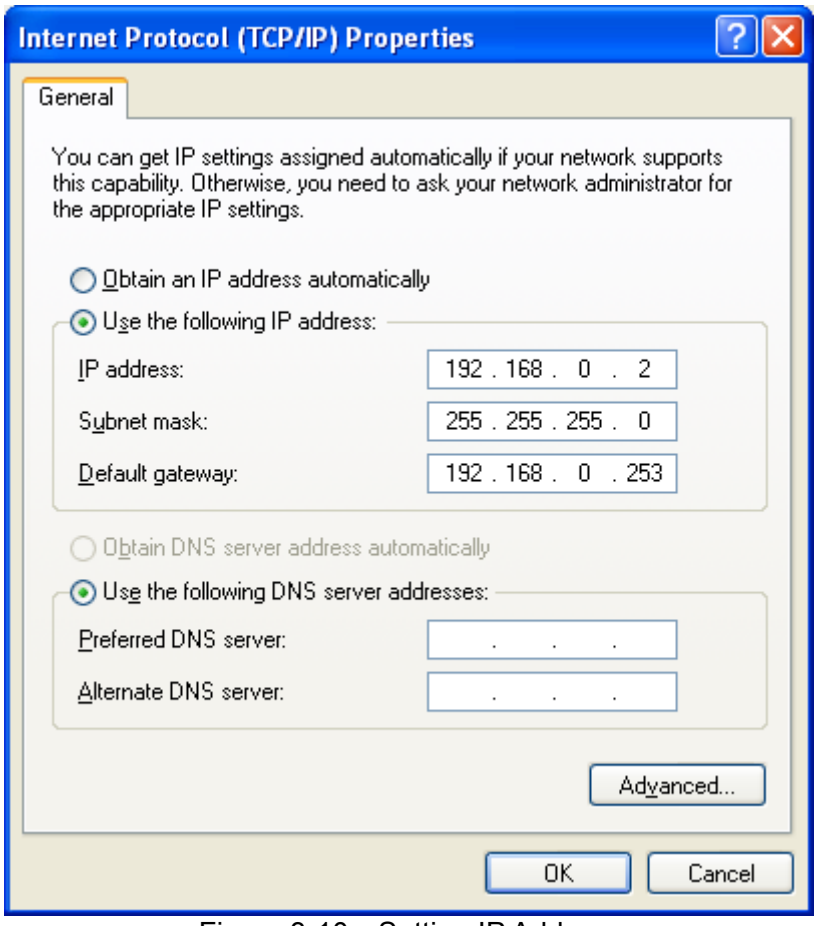


Figure 3-10 Setting IP Address

4. Main Screen (Fixed Mode)

When the communication protocol is set, it enters into the main screen as Figure 4-1 shows.

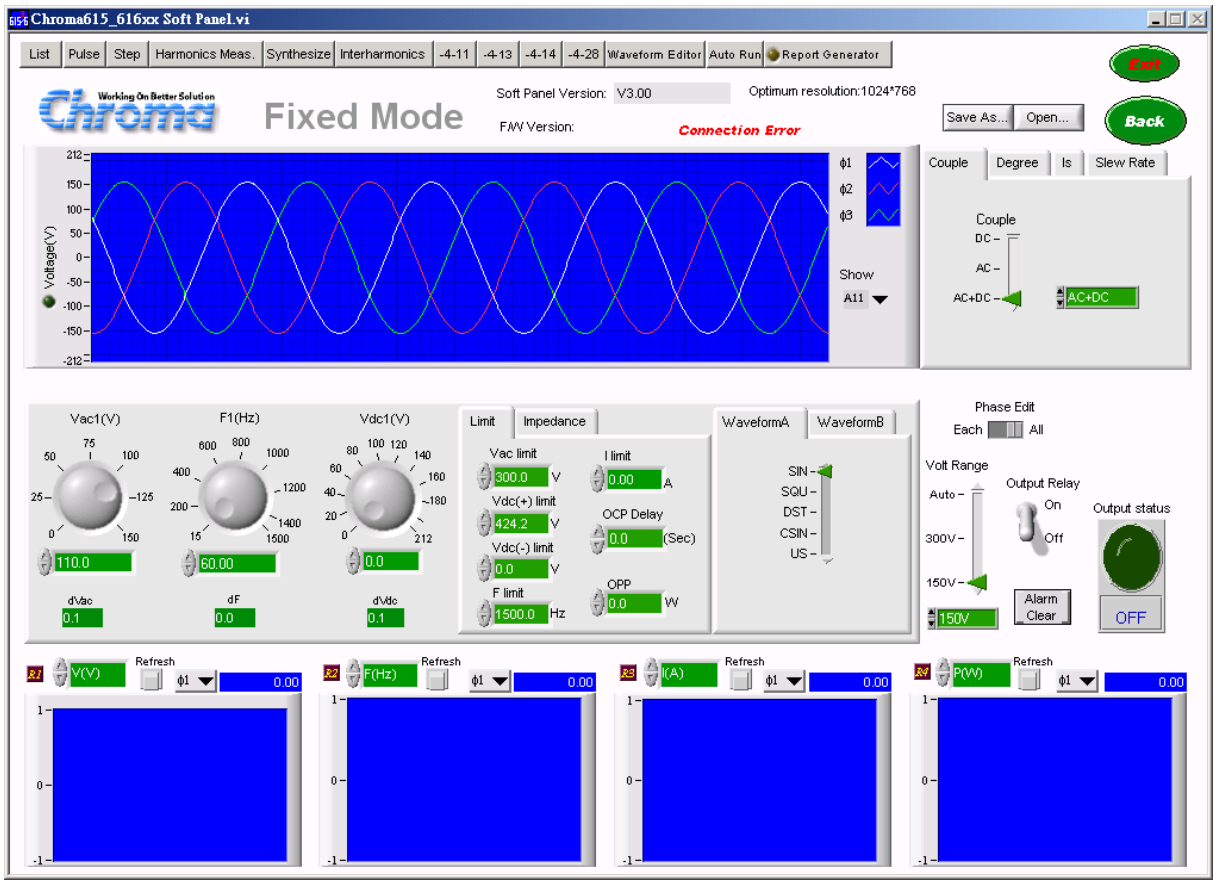


Figure 4-1 Chroma 615_616XX Soft Panel Main Screen

Here is the organization chart of functions:

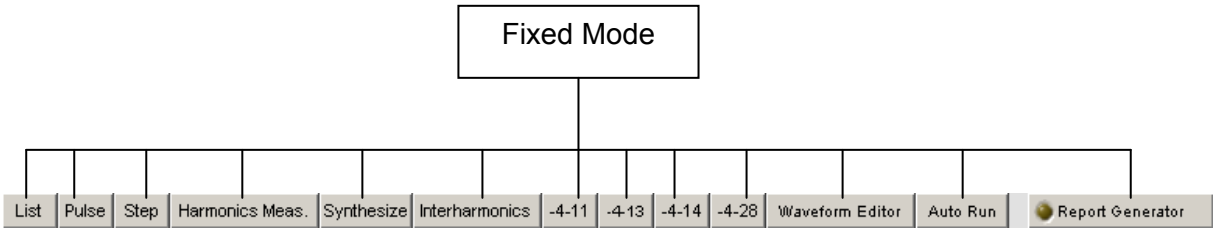


Figure 4-2 Chroma 615_616XX Function Structure

The last two functions: Save As… and Open… are for Soft Panel only. (They cannot be found in the AC Source.) All parameters set in the Fixed Mode can be saved for operation next time.

Parameters to be saved are: AC Voltage, Frequency, DC Voltage, I Limit, Vac Limit, Vdc(+) Limit, Vdc(-) Limit, Is start, Is interval, Waveform Set up, Couple, On Degree, Off Degree, Vs, Fs, DCs Slew rate, L impedance, R impedance, Voltage Range, Output Relay, OCP Delay.

4.1 Fixed Mode Screen Description

4.1.1 Waveform Display Window & AC Source F/W Version

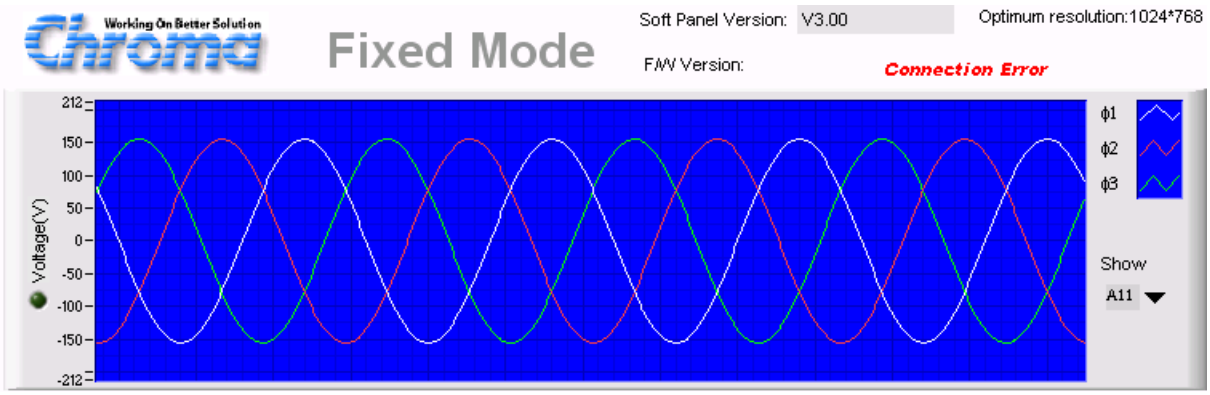


Figure 4-3 Chroma 615_616XX AC Source Output Waveform Simulation

Be noted if the AC Source is connected when entering into the main screen. If the hardware is connected, the Firmware Version number will appear as Figure 4-3 shows.

Chroma ATE,61502,000002,1.07,1.06,1.05

If the hardware is not connected, the Firmware Version will show **`Connection Error`**.

4.1.2 Setting 615_616XX Fixed Mode Parameters

The detail parameter setting methods and ranges, please refer to *Programmable AC Power Source 615_616XX User's Manual*.

4.1.3 Output Setting

The Output Setting as Figure 4-4 shows can set the output voltage and frequency of AC Source. If DC is set in Couple, the Frequency and AC Voltage are invalid. (The 3 phases can be set separately.)

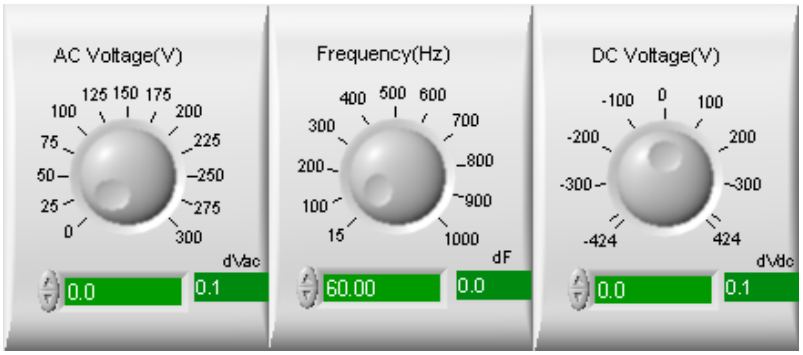


Figure 4-4 Voltage & Frequency Parameter Setting

The setting of dVac, dF and dVdc is to tune the mapping AC Voltage, Frequency and dc Voltage (V) by clicking the up/down arrow forward or backward to adjust the value.

4.1.4 Setup Setting

Setup Setting contains Limit and Impedance two pages for I Limit, Vac Limit, Vdc(+) Limit, Vdc(-) Limit, OCP Delay, F limit (61511_12 only), OPP (61511_12 only) setting as Figure 4-5 shows. Please refer to the user's manual of individual AC Source. (The 3 phases can be set separately.)

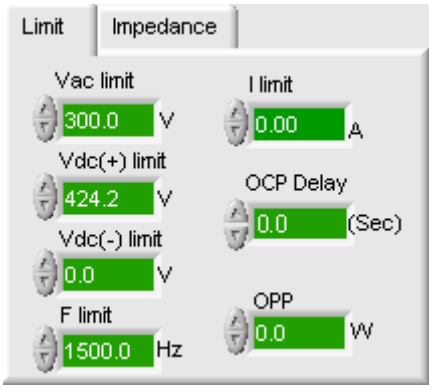


Figure 4-5 V, I Limit and Impedance Parameter Settings

Impedance:
It sets the output impedance. When Prog Zo is set to On, the value of L (mH) and R (ohm) can be set. Please refer to the user's manual of individual AC Source for detail information.

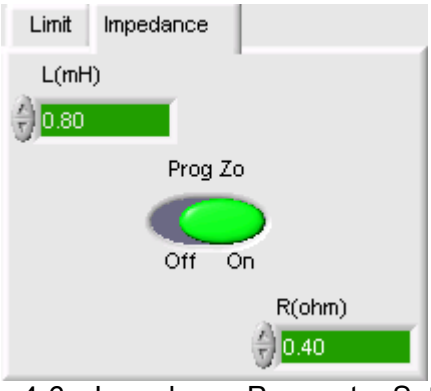


Figure 4-6 Impedance Parameter Settings

4.1.5 Waveform Setup

Waveform Setup contains the selection of Waveform A or Waveform B output. Figure 4-7 shows the setting of Waveform A. The parameters are same in both A and B pages including SIN, SQU, DST, CSIN and US for output waveform selection. When selecting DST or CSIN or US, there is mapped value available for selection and the equivalent waveform will show on the Soft Panel display window for confirmation. 1-30 can be set in DST for 30 types of harmonic waveforms output (refer to the user's manual of individual AC Source for the harmonic type.) THD or AMP output are available for selection in CSIN, where the setting range of THD is 0-43 and AMP is 0-100. The US setting range is 1-6. (The 3 phases can be set separately.)

In the setting of US (User define), since the existing setting in AC Source is unknown, the display window will show "`The User-define waveform won't be displayed. Please find it on AC Source.`" Then the users have to check it by themselves.

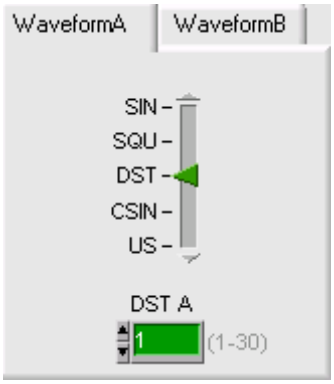


Figure 4-7 Waveform Parameter Setting

CSIN:
When the waveform output CSIN is selected, it can set to AMP or THD, and their mapping elements will appear for setting. The setting range for THD is 0-43 and for AMP is 1-100. The setting is the change from sine wave to the square-wave.

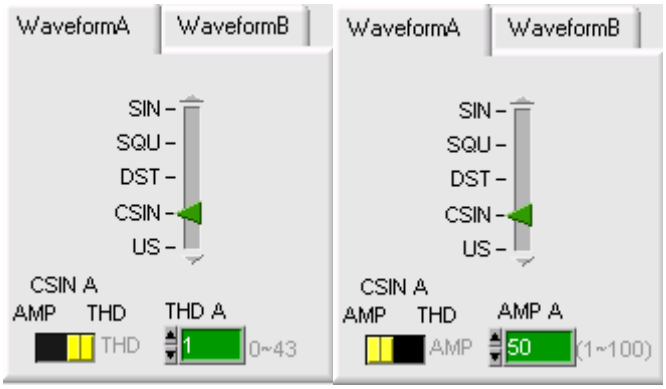


Figure 4-8 Setting Waveform CSIN

4.1.6 Output Function Setting

Output Function Setting contains Couple, Degree, Slew Rate and Is 4 pages. The user can switch to any pages to display the mapped element for setting.

Couple: It sets the output of pure AC or DC, or the mixed AC+DC.

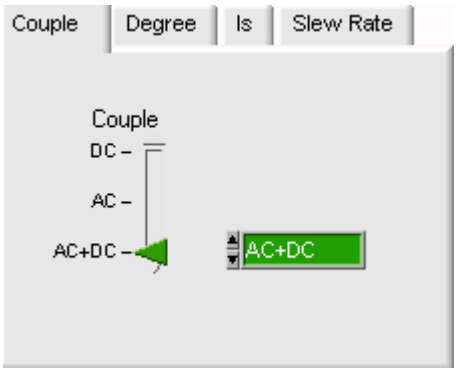


Figure 4-9 Setting Couple

Degree: It can set ON and Off Degree. On Degree is direct map, while Off Degree is relative to Immed and the selection of Degree. If Immed is selected, it indicates there is no need to care about the Off Degree. However, the Degree needs to be selected on the relative parameter position if Off Degree is to be set.

P1_2 Degree: It sets the output angle of phase 1 to phase 2. (61511_12 and 61611_12 only)
P1_3 Degree: It sets the output angle of phase 1 to phase 3. (61511_12 and 61611_12 only)

Figure 4-10 Setting Degree

Slew Rate: It contains Vs (V/ms), Fs (Hz/ms), DCs (V/ms). Vs: It sets the AC voltage to change every microsecond. Fs: Set the frequency (Hz) to change every microsecond. DCs: It sets the DC voltage to change every microsecond.

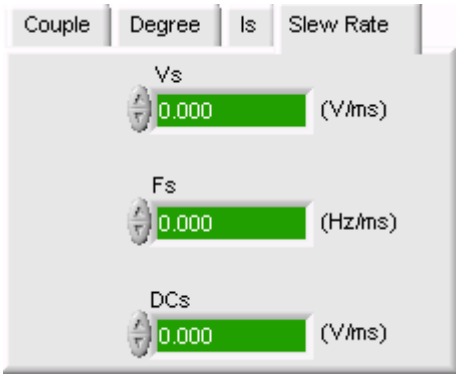


Figure 4-11 Setting Slew Rate

Is: I Inrush is able to set Is start and Is interval as Figure 4-12 shows. Refer to the user's manual of individual AC Source for detail information.

Figure 4-12 Setting Is

4.1.7 Voltage Range

There are voltage ranges of AUTO, 300V and 150V for selection. A sound of Relay switching will be heard when execution. The Output Relay depends on the voltage set when the range sets to Auto, for example, if the output is set to120V, the Relay will be set to the range of 150V.

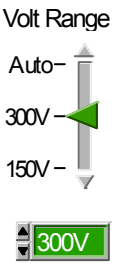


Figure 4-13 Setting Voltage Range

4.1.8 Output Relay

This element allows the Output Relay to be fixed at the ON or OFF position. The Relay hook up sound will be heard when it is turned on from the OFF position. The Relay will skip when it turns to Off.

Figure 4-14 Setting the Output Relay On or Off

4.1.9 Alarm Clear

When 615_616XX devices are having protection alarms, the button can be used to clear it.

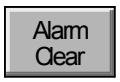


Figure 4-15 Alarm Clear Button

4.1.10 Output Status

This element controls the AC Source output voltage. Only when the Output Status is On the Display area has returned readings.

Figure 4-16 Output Status

4.1.11 Phase Edit

The usage of this element is to control the output voltage settings of 3 phases for consistence or convenience. If All is selected, only 1 element will be left for the setting of 3 phases and all settings will be the same except the phase angle difference. If Each is selected, the 3 phases output are set respectively. The setting of this element will affect the Function Mode setting.

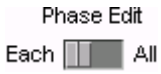


Figure 4-17 Phase Edit

4.1.12 Exit

Click the button to exit the Soft Panel.

Figure 4-18 Exit Button

4.2 AC Source Display

This reading area is composed of 4 blocks of the same. Figure 3-16 shows an individual block. Each block has same functions for selection: including graphic display, numeric display, return value type selection, a button to clear the data in graphic display area and output phase selection (61511_12 only.) The readings only appear when the Output Status is ON.

Figure 4-19 Readings Display Structure

4.2.1 Readings Graphic Display Area

The element is to display the readings grabbed from hardware. The red vertical line indicates the updated position (the latest value). The reading vertical scale will adjust automatically. The X axis indicates the time and the Y axis is the mapped measurement.

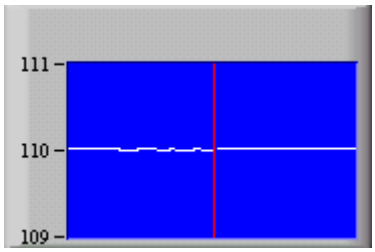


Figure 4-20 Readings Graph

4.2.2 Numeric Display

The latest retuned data displays in digit. It will update constantly.

Figure 4-21 Numeric Readings

4.2.3 Return Value Type Selection

This element is able to select the return value type. To monitor the voltage value, click **R1** and slide as Figure 4-22 shows, where Empty indicates no return value or stop the return value.

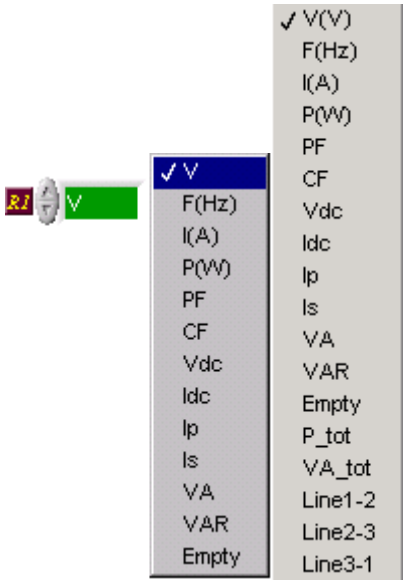


Figure 4-22 Return Value Type Selection

4.2.4 Refresh

This element is to clear the remaining data in graphic area.

Figure 4-23 Refresh the Chart Data

4.3 Saving and Opening Parameters

There are two buttons at the top right of Soft Panel. One is **Save As…** and the other is **Open…**. It can save all of the set parameters in Fixed Mode and open them for use next time.

4.3.1 Save As…

Click the **Save As…** button as Figure 4-24 shows can save the settings on the present screen to a .fixed file. To open a saved .fixed file for use can save you from doing the settings again. Do not save the file to “Desktop” and “My Document” folder. It is suggested to create a new folder for access.

Figure 4-24 Save As Button

To save the current parameters when executing the 615_616XX Soft Panel for next time use, click **Save As…** will prompt a dialog box as Figure 4-25 shows. Select the path and enter a filename (extension .fixed is appended automatically by instrument model) to save it. Various setting files can be saved respectively as long as the hard disk space is enough.

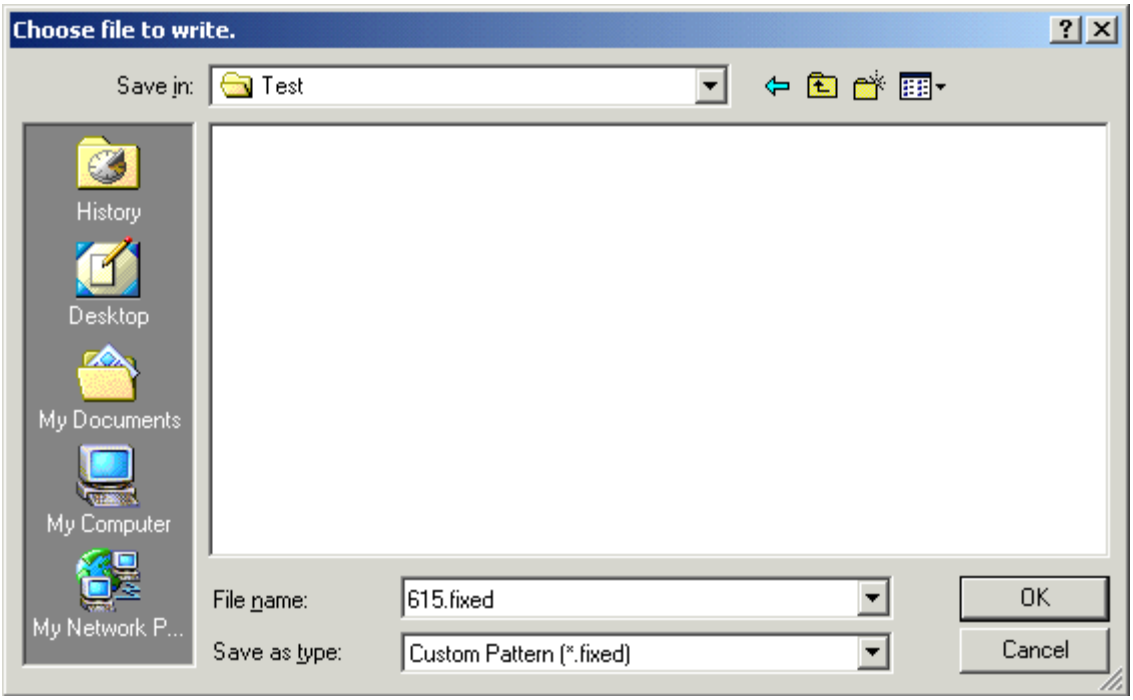


Figure 4-25 Save Dialog Box

4.3.2 Open…

Click the **Open…** button as Figure 4-26 shows to open an existing .fixed file. This way reduces the action of parameter input and avoids errors from occurring.

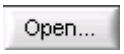


Figure 4-26 Open… Button

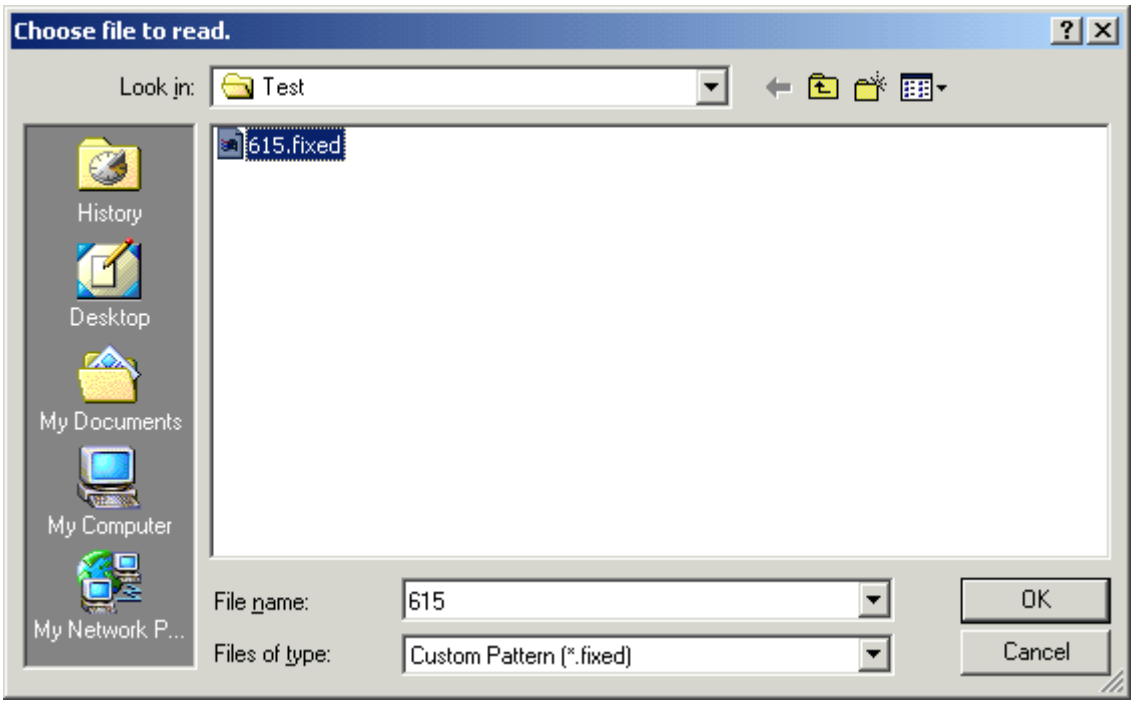


Figure 4-27 Open Dialog Box

5. Using List Mode

5.1 Function Description

The 616XX Series do not support this function. List mode can be used in single and 3 phases. (The 3 phases can be set separately.)

The List control screen as Figure 5-1 shows has 3 blocks, which are Simulation Display Area, Setting Area and Reading Display Area. The operation in reading display mode is same as in the Fixed Mode. There are **Save As…** and **Open…** buttons as well for users to save the sequence settings of List, and open it for next time use.

To meet the requirements for various waveform output, there are 100 sequences for setting. Each sequence can set Degree, Waveform Type, AC voltage start, AC voltage end, frequency start, frequency end, DC voltage start, DC voltage end, and run time or cycle number. The sequence internal settings are following for execution. The upper layer of sequence is Count, which is to set the valid sequence execution times. When Count=1, it indicates the run time is the sum of all valid sequence time.

The structure of this mode contains a simulation output waveform window. This window will show the mapped waveform when each sequence is set. When trigger is executed, it will map to the total run time and indicate the progress by Run Bar. The remaining time is also listed meanwhile the Display area has readings returned. Figure 5-1 shows the List Mode control screen.

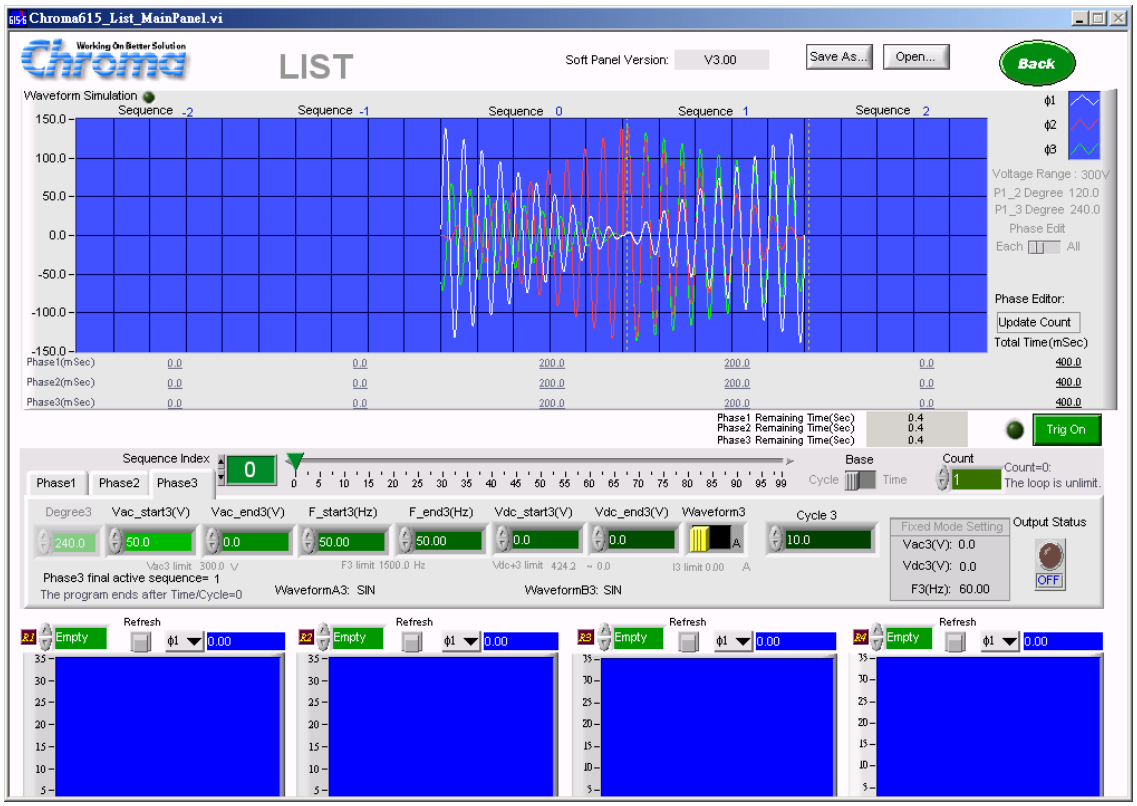


Figure 5-1 List Mode Control Screen

5.2 Setting List Mode Parameters

The detail parameter setting methods and ranges, see *Programmable AC Power Source 615XX Series User's Manual*.

5.2.1 Sequence

AC Source 615XX Series List Mode has 100 sequences. The function of sequence is to set the output waveform features of List Mode. The setting area element as Figure 5-2 shows can set the sequence by entering the number 1-100 in the numeric display area or by clicking the slider bar at right. If it is necessary to fine tune 1 sequence only, use the up/down button on the numeric display area or the left/right arrow of slider bar to adjust it. The parameters at the lower layer include Degree, Vstart, Vend, F_start, F_end, Vdc_Start, Vdc_end, Waveform Type, and Time or Cycle.

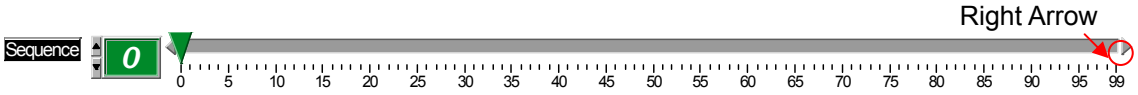


Figure 5-2 Slider Bar Selection

5.2.2 Degree

Every sequence is able to set the start degree using this element. The initial setting is 0. (The 3 phases can be set separately.)

Figure 5-3 Degree

In the Sequence number 0 of Phase2 and Phase3, the angle set by Degree is derived from the angles set by Phase1_2 and Phase1_3 in Fixed Mode. The user is unable to set the Degree of the Sequence number 0.

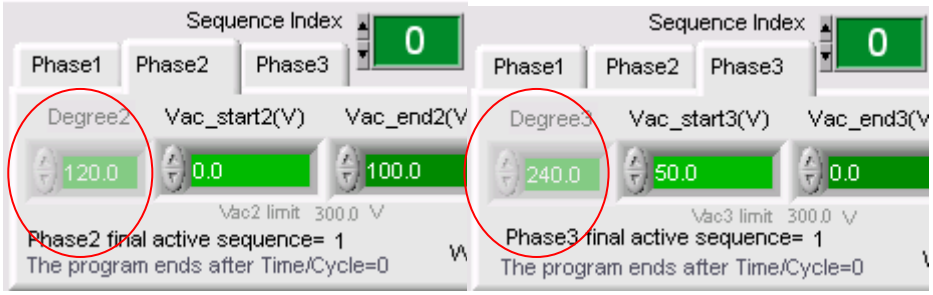


Figure 5-4 Display of Sequence No. 0 for Phase2 and Phase3

5.2.2.1 Vstart (V)

Every Sequence is able to set the AC voltage start. The initial setting is 0. The voltage setting is adjusted following the Voltage Range. If the range is set to 150, the maximum input is 150V and the element is marked as L. If the range is set to 300 or Auto, the maximum input is 300V and the element is marked as H. (The 3 phases can be set separately.)

Figure 5-5 Vstart(V)

5.2.2.2 Vend (V)

Every sequence is able to set the AC voltage end. The initial setting is 0. The voltage setting is adjusted following the Voltage Range. If the range is set to 150, the maximum input is 150v and the element is marked as L. If the range is set to 300 or Auto, the maximum input is 300V and the element is marked as H. (The 3 phases can be set separately.)

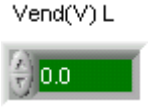


Figure 5-6 Vend(V)

5.2.2.3 F_start (Hz)

Every sequence is able to set the frequency start. The initial setting is 50Hz. The maximum is 1000 Hz for 61501~05 or 1500 Hz for 61511~12 and minimum is 15Hz. (The 3 phases can be set separately.)

Figure 5-7 F_start(Hz)

5.2.2.4 F_end (Hz)

Every sequence is able to set the frequency end. The initial setting is 50Hz. The maximum is 1000 Hz for 61501~05 or 1500 Hz for 61511~12 and minimum is 15Hz. (The 3 phases can be set separately.)

Figure 5-8 F_end(Hz)

5.2.2.5 Vdc_start (V)

Every sequence is able to set the DC voltage start. The initial setting is 0. The voltage setting is adjusted following the Voltage Range. If the range is set to 150, the maximum input is 212.1V and the element is marked as L. If the range is set to 300 or Auto, the maximum input is 424.2V and the element is marked as H. (The 3 phases can be set separately.)

Figure 5-9 Vdc_start(V)

5.2.2.6 Vdc_end (V)

Every sequence is able to set the DC voltage end. The initial setting is 0. The voltage setting is adjusted following the Voltage Range. If the range is set to 150, the maximum input is 212.1V and the element is marked as L. If the range is set to 300 or Auto, the maximum input is 424.2V and the element is marked as H. (The 3 phases can be set separately.)

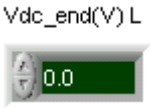


Figure 5-10 Vdc_end

5.2.2.7 Waveform

Every sequence is able to set the Waveform output. The initial setting is Waveform A. The output waveform follows the Waveform A setting on the main screen for output. For instance, the Waveform A on the main screen is set to sine wave output, and Waveform B is square wave, then they can be switched when in List Mode. (The 3 phases can be set separately.)

Figure 5-11 Waveform

5.2.2.8 Cycle/Time

Every sequence is able to set the run time. The initial setting is 0. Only Cycle or Time can be selected for output in the setting. From the viewpoint of time, set Time is the easiest way. To set Cycle, the frequency setting is a must for run time conversion. So, from the viewpoint of frequency, set Cycle is easier. (The 3 phases can be set separately.)

Figure 5-12 Cycle/Time for List Mode Sequence

Notice

When setting Vstart, Vend, Vdc_start and Vdc_end four parameters, they not only follow the settings of Voltage Range on the main screen to limit the input value, but also are restricted by the settings of Vac Limit, +VdcLimit and -VdcLimit. A warning message will appear as Figure 5-13 shows if the setting exceeds the range.

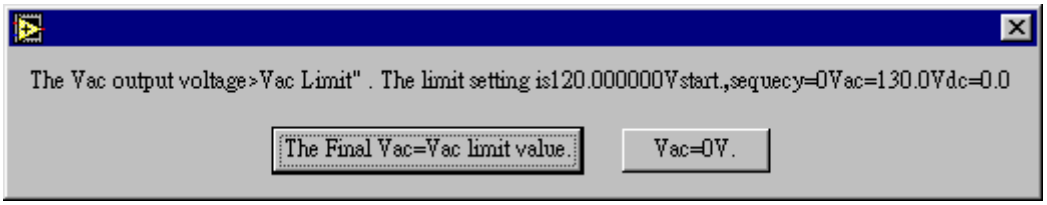


Figure 5-13 When the Voltage Exceeds Limit in List Mode

5.2.3 Count

This parameter in List Mode indicates the number of execution times for valid sequence. The initial setting is 1. Set count to 0 if endless loop is required. The maximum can set to 65536.

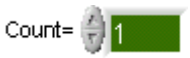


Figure 5-14 Count

5.2.4 The Final Active Sequence

This is a display element that indicates the valid sequence. The sequence can set 100 sets of combined parameters; however, the run time is the one to follow when execution. If the time or cycle sets to 0 in a sequence, the sequence and its subsequence are invalid. For instance: If the execution time is set for sequence 1-4 and Time/Cycle is set to 0 in sequence 5, The final active sequence = 4 no matter if there is any other parameters are set. It indicates the execution stops at sequence 4 even though there is run time set in sequence 5. (The 3 phases can be set separately.)

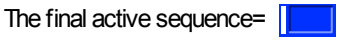


Figure 5-15 The final active sequence

5.2.5 Time Remaining(s)

This element indicates the total execution time. It will show the remaining execution time after the run time and count value are set in each sequence. If Count = 0, the element will show ∞. The remaining time appears in countdown of second. (The 3 phases can be set separately.)

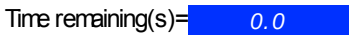


Figure 5-16 Time remaining (s)

5.2.6 Trig On

Click this element to output voltage in List Mode. There are 3 displaying areas when executing, the first one is the green highlight before this element, the second one is the Time remaining will start to count down, and the third one is Run Bar will show the execution time percentage. Click Trig Off if it is necessary to stop it in the midway, or it will wait until the execution is done to exit.

Figure 5-17 Trig On / Off Button

When it is Trig On, there will be a countdown of the execution time: Phase Remaining Time (Sec) and Phase Run Bar to show the execution percentage.

Figure 5-18 Phase Remaining Time (Sec) and Phase Run Bar

5.2.7 Output Status

This is the Output Status element of Fixed Mode. When it is on it indicates to output Fixed voltage. It allows users to decide if a voltage output is needed before Trig On when working in List Mode, and then output the edited Sequence voltage under List mode.

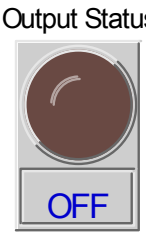


Figure 5-19 Output Status

The current output voltage settings of Fixed Mode will show in the area below for reference. If any modification is required, please return to Fixed Mode for correction.

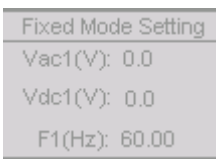


Figure 5-20 Fixed Mode Setting Display

5.3 Simulation Display Screen

As the waveform simulation on the simulation display screen has 100 sequences, so when handling the display screen, only 1 count will be displayed. The screen is divided into 5 sections by dot lines and the mapped sequences as well as run time are appeared on the top or bottom. It indicates the waveform currently in use and voltage range on the screen top. When different sequence is set, the middle area will show the waveform set at present. The sequence simulation waveform will shift when switching a sequence.

The light gray fonts at the bottom of the waveform display shows the execution time set in Sequence and the Total time is displayed at the far right. In addition, the Voltage Range, Phase1_2 and Phase1_3 angle differences as well as the Phase Edit set in the Fixed Mode on the previous page will show in this block.

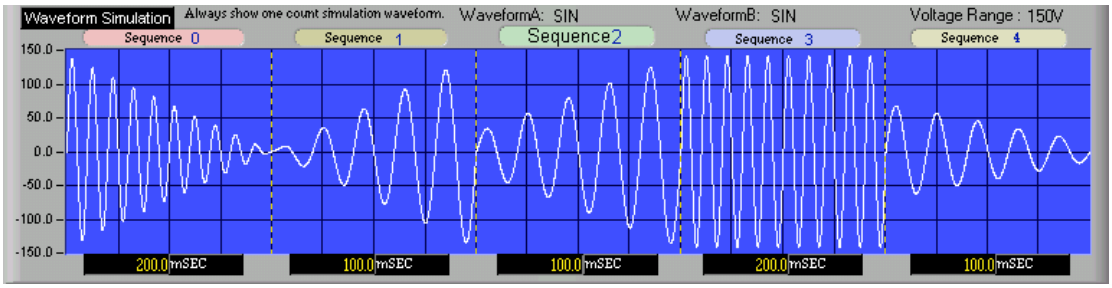


Figure 5-21 Waveform Simulation Screen in List Mode

5.4 Back

Click this button to exit the current screen and return to main screen. It is invalid when functioning.

Figure 5-22 Back Button

5.5 Save As…

Click this button will save the parameters on the current screen (to a .List file). Do not save the file to “Desktop” and “My Document” folder. It is suggested to create a new folder for access. Please be noted that the file saved will save the Voltage Range as well. The saved settings will be executed during opening.

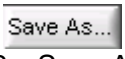


Figure 5-23 Save As… Button

5.6 Open…

Click this button can open an existed file (a .List file). This reduces the action of parameter input and avoids errors from occurring.

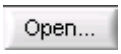


Figure 5-24 Open… Button

5.7 Reading Display Screen

The display and operation are same as in Fixed Mode. The read action only actives when Trig On is executed.

6. Using Pulse Mode

6.1 Function Description

The 616XX Series do not support this function.

The voltage set in the Main Screen (Figure 4-1) will follow the parameter setting to add the Pulse Mode voltage. As to the addition of waveform, see the user's manual of individual hardware. The control screen of Pulse Mode appears as Figure 6-1.

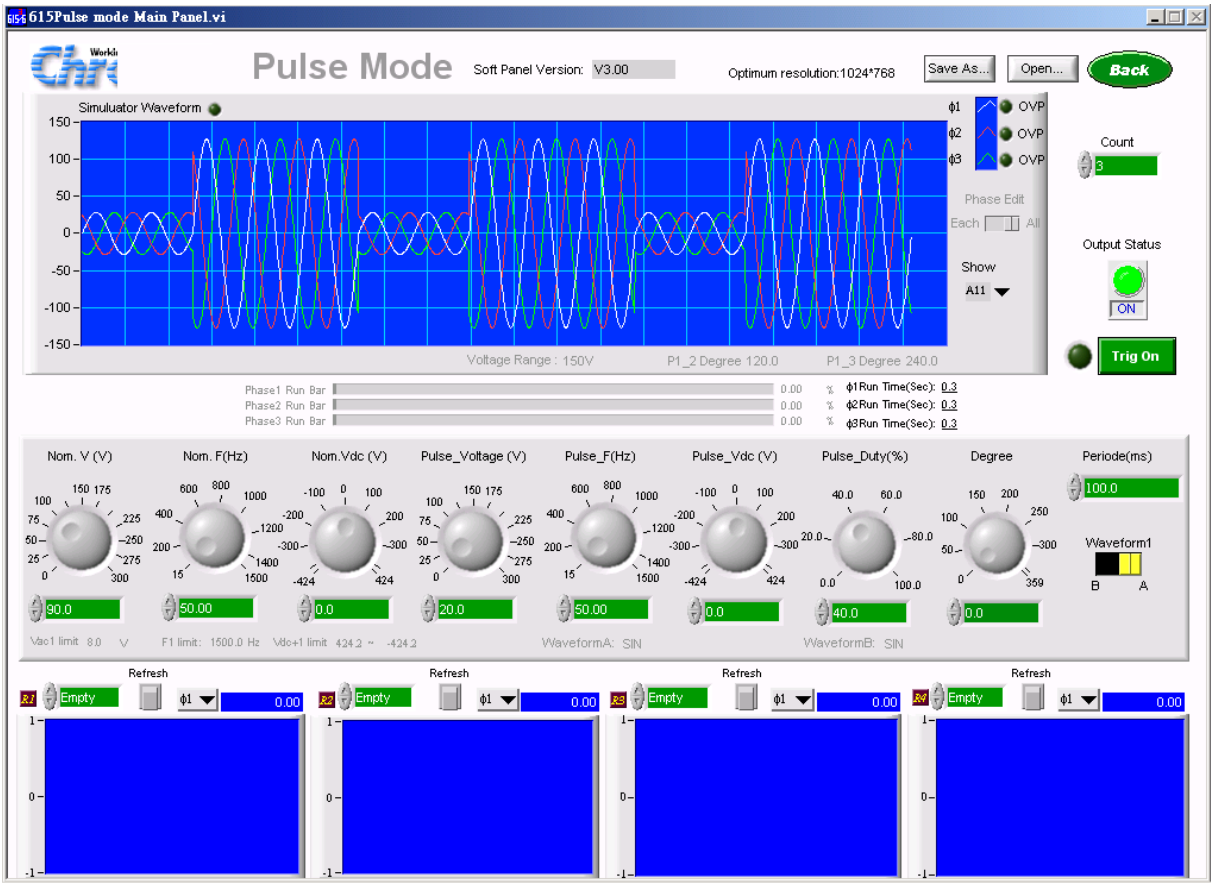


Figure 6-1 Pulse Mode Control Screen

6.2 Function Key Description

6.2.1 Nom. Voltage (V)

This control element will refer to the voltage AC setting of previous Fixed Mode screen. However, the main control voltage can be changed here as well. (The 3 phases can be set separately.)

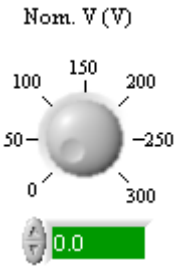


Figure 6-2 Nom. Voltage (V)

6.2.2 Nom. F (Hz)

This control element will refer to the frequency setting of previous Fixed Mode screen. However, the main control frequency can be changed here as well. The maximum input is 1000 Hz for 61501~05 or 1500 Hz for 61511~12. (The 3 phases can be set separately.)

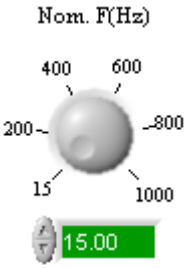


Figure 6-3 Nom. F (Hz)

6.2.3 Nom. Vdc (V)

This control element will refer to the voltage DC setting of previous Fixed Mode screen. However, the main control DC voltage can be changed here as well. (The 3 phases can be set separately.)

Figure 6-4 Nom. Vdc (V)

6.2.4 Pulse_Voltage (V)

This is the AC voltage set in Pulse Mode. (The 3 phases can be set separately.)

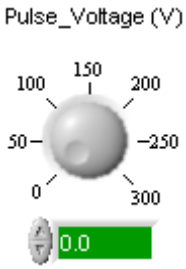


Figure 6-5 Pulse_Voltage (V)

6.2.5 Pulse_F (Hz)

This the frequency set in Pulse Mode. The maximum input is 1000 Hz for 61501~05 or 1500 Hz for 61511~12. (The 3 phases can be set separately.)

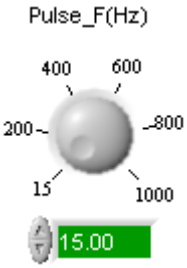


Figure 6-6 Pulse_F (Hz)

6.2.6 Pulse_Vdc (V)

This is the DC voltage set in Pulse Mode. (The 3 phases can be set separately.)

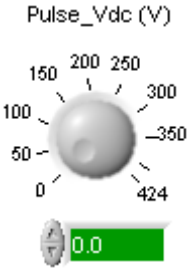


Figure 6-7 Pulse_Vdc (V)

6.2.7 Pulse_Duty (%)

It sets the occupation ratio of voltage frequency in Pulse Mode. If 40% is set, it indicates the execution of a count is 60% for Nominal settings and 40% for Pulse settings. (The 3 phases can be set separately.)

Figure 6-8 Pulse_Duty (%)

6.2.8 Degree

It can set the start phase degree or no start degree (Immed). Assuming the setting is Phase=240 degree, it indicates the output voltage will execute 240/360 Nominal cycles first, and then continue to run the Duty of Pulse Mode. (The 3 phases can be set separately.)

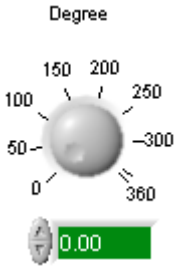


Figure 6-9 Degree

6.2.9 Period (ms)

It sets the run time of each count. (The 3 phases can be set separately.)

Figure 6-10 Period (ms)

6.2.10 Count

It sets the number of execution times of Pulse.

Figure 6-11 Count

6.2.11 Save As…

Click this button can save the parameter settings on the current screen to a .pulse file. Do not save the file to "Desktop" and "My Document" folder. It is suggested to create a new folder for access.

Figure 6-12 Save Button

6.2.12 Open…

Click this button can open an existed .pulse file in the hard disk. This reduces the action of parameter input and avoids errors from occurring.

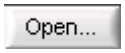


Figure 6-13 Open… Button

6.2.13 Waveform

The Waveform A and Waveform B set in the Fixed Mode main screen can be switched for use. (The 3 phases can be set separately.)

Figure 6-14 Waveform Switch

6.2.14 Trig

It sends the voltage parameter set under the Pulse Mode. The Run Time element in Waveform Display Area indicates how many seconds to be executed to end the output voltage. In addition, a Run Bar will appear to show the complete percentage. If it is 3 phases output, the time is displayed separately. Click Trig Off can stop it.

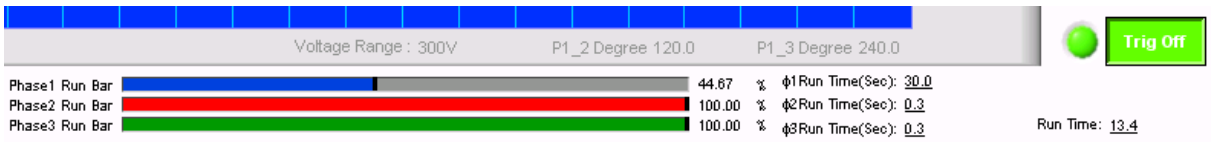


Figure 6-15 Trig On/Off, Time Remaining & Run Bar

6.2.15 Back

Click this button to exit the present screen and return to the main screen. It is invalid in grayscale when executing Trig On and must stop the execution to return to previous window.

Figure 6-16 Back Button

6.2.16 Output Status

It controls the output voltage of Fixed Mode. It maps to the Nom Voltage, Nom Frequency and Nom Vdc for output setting in Fixed Mode under Pulse. It only shows readings when Output On.

Figure 6-17 Output Status

6.3 Reading Display Screen

The display and operation are same as in Fixed Mode. The read action only actives when Trig On is executed.

7. Using Step Mode

The 616XX Series do not support this function.

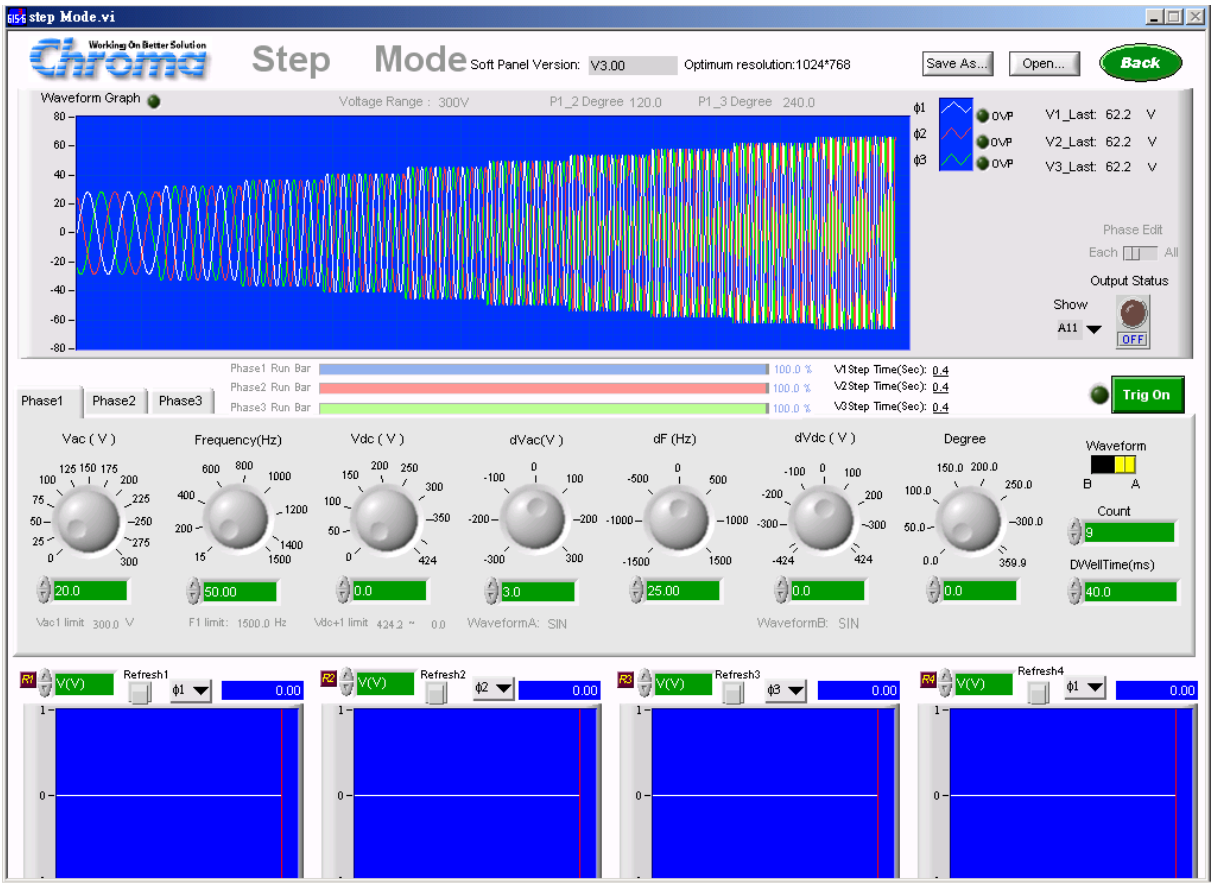


Figure 7-1 Step Mode Control Screen

7.1 Function Description

Click Step Function on the main screen goes into Figure 7-1. The main function of this mode is to scale the output voltage up and down in time step by setting different parameters for waveform output. The simulated waveform will show up on the screen top. Click Trig to send out the voltage if it is confirmed. There are also 3 areas in Figure 7-1: Simulation Waveform Area, Parameter Setting Area and Reading Display Area. The operation of Reading Display Area is same as in Fixed Mode, of which can refer to the description of Fixed Mode main screen.

7.2 Function Keys Description

7.2.1 Vac (V)

This element is used to set the start AC voltage. Its range is also limited by the Voltage Range set in Fixed Mode. The initial setting is 0V. (The 3 phases can be set separately.)

Figure 7-2 Vac (V)

7.2.2 Frequency (Hz)

This element is to set the frequency of start voltage, range from 15-1000Hz. The maximum input is 1000 Hz for 61501~05 or 1500 Hz for 61511~12 and the initial setting is 50hz. (The 3 phases can be set separately.)

Figure 7-3 Frequency (Hz)

7.2.3 Vdc (V)

This element is set the DC voltage start. The range is limited by the Voltage Range set in Fixed Mode. The initial setting is 0V. (The 3 phases can be set separately.)

Figure 7-4 Vdc (V)

7.2.4 dAC (V)

This element is to set the step variation of AC voltage. The range is limited by the Voltage Range set in Fixed Mode. The initial setting is 0V and both positive as well as negative are available for setting. Positive indicates ascending while negative indicates descending. (The 3 phases can be set separately.)

Figure 7-5 dAC (V)

7.2.5 dF (Hz)

This element is to set the step variation of frequency. The setting is from –100 to +1000 and the initial setting 0V. (The 3 phases can be set separately.)

Figure 7-6 dF (Hz)

7.2.6 dDC (V)

This element is to set the step variation of DC voltage. The range is limited by the Voltage Range set and -DC Limit in Fixed Mode. The initial setting is 0V and both positive as well as negative are available for setting. Positive indicates ascending while negative indicates descending. (The 3 phases can be set separately.)

Figure 7-7 dDC (V)

7.2.7 Degree

This element is to set the start phase degree. The range is from 0 to 359.9 and the default is 0. (The 3 phases can be set separately.)

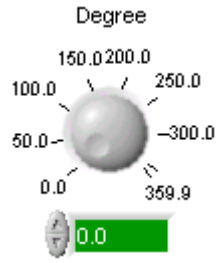


Figure 7-8 Degree

7.2.8 DwellTime (ms)

This element sets the run time of each Step with maximum setting =99999999.9ms. The default is 100ms. (The 3 phases can be set separately.)

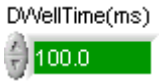


Figure 7-9 DwellTime (ms)

7.2.9 Count

This is to set the count for executing Step.

Figure 7-10 Count

7.2.10 Save As…

Click this button to save the setting parameters on the present screen to a .step file. Do not save the file to "Desktop" and "My Document" folder. It is suggested to create a new folder for access.

Figure 7-11 Save As… Button

7.2.11 Open…

Click this button can open an existed .step file in the hard disk. This reduces the action of parameter input and avoids errors from occurring.

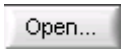


Figure 7-12 Open… Button

7.2.12 Waveform

The Waveform A and Waveform B set in the Fixed Mode main screen can be switched for use. Waveform A and Waveform B set in Fixed Mode are shown beneath the waveform simulation area; users can follow the setting in Fixed Mode to select different waveform.

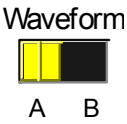


Figure 7-13 Waveform Switch

7.2.13 Trig On

It sends out the voltage. Once triggered the Time remaining in Waveform Display area will show how much many seconds are left to end the output voltage. In addition the Run Bar will indicate the complete percentage. Click **Pause** will suspend the output voltage to stay at current voltage and click **Trig Off** will end the execution.

Figure 7-14 Trig On/Off, Trig Pause, Time remaining & Run Bar

7.2.14 Back

Click this button to exit the present screen and return to the main screen. It is disabled when executing Trig On and must stop the execution (Trig Off or time off) to return to previous window.

Figure 7-15 Back Button

7.2.15 Output Status

It controls the output voltage of Fixed Mode. Only when the output is ON (or Trig On) will show the readings.

Figure 7-16 Output Status

7.3 Reading Display Screen

The display and operation are same as in Fixed Mode. The read action only actives when Trig On is executed.

8. Using Harmonic Measurement Mode

8.1 Function Description

The 616XX Series do not support this function.

This mode performs measurement functions; refer to the user's manual of individual hardware for the definition of each function. Figure 8-1 shows the Harmonic Measurement screen.

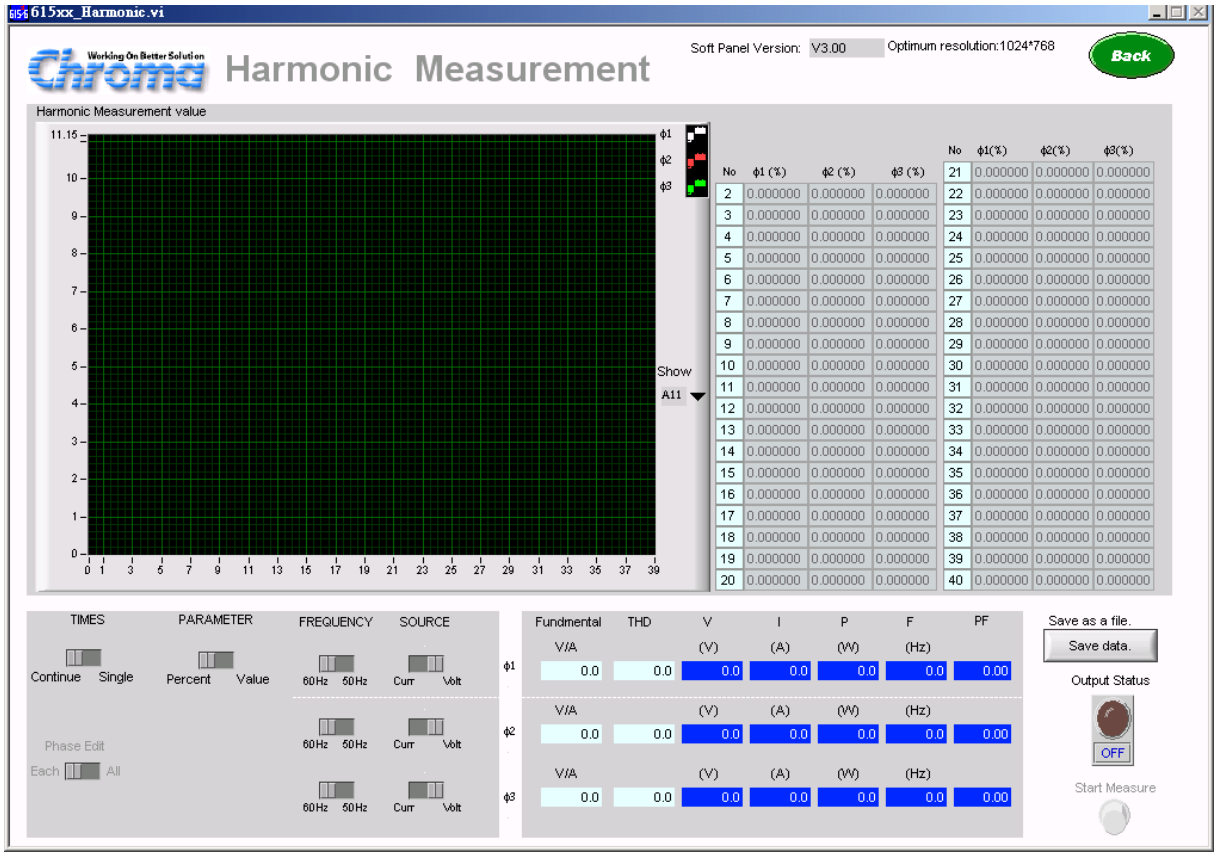
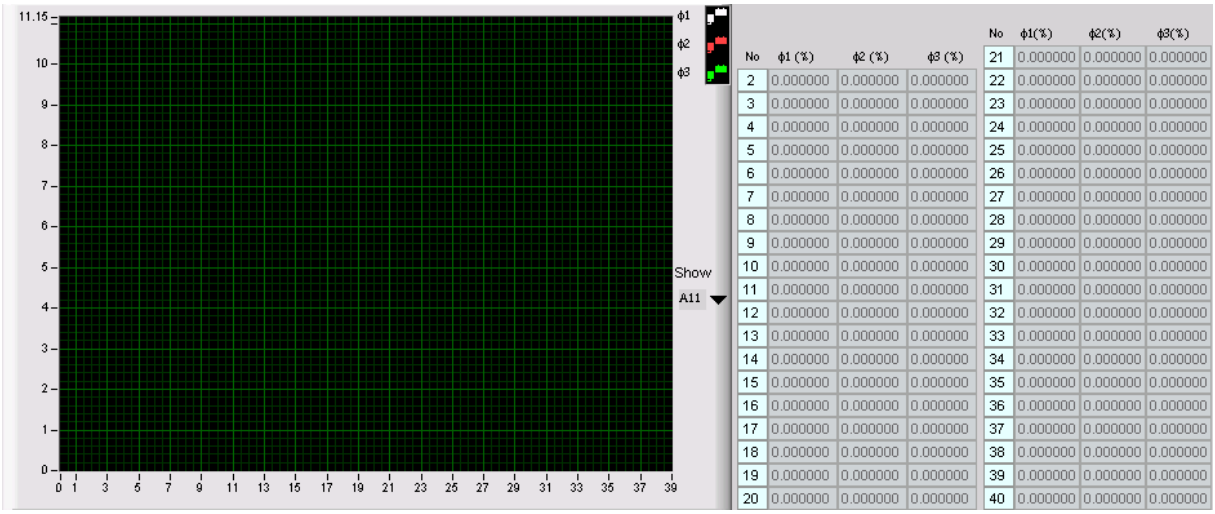


Figure 8-1 Harmonic Measurement Screen

8.2 Setting Element

8.2.1 Reading Display Screen 1 (Harmonic)



No	ϕ1 (%)	ϕ2 (%)	ϕ3 (%)	No	ϕ1(%)	ϕ2(%)	ϕ3(%)
2	0.000000	0.000000	0.000000	21	0.000000	0.000000	0.000000
3	0.000000	0.000000	0.000000	22	0.000000	0.000000	0.000000
4	0.000000	0.000000	0.000000	23	0.000000	0.000000	0.000000
5	0.000000	0.000000	0.000000	24	0.000000	0.000000	0.000000
6	0.000000	0.000000	0.000000	25	0.000000	0.000000	0.000000
7	0.000000	0.000000	0.000000	26	0.000000	0.000000	0.000000
8	0.000000	0.000000	0.000000	27	0.000000	0.000000	0.000000
9	0.000000	0.000000	0.000000	28	0.000000	0.000000	0.000000
10	0.000000	0.000000	0.000000	29	0.000000	0.000000	0.000000
11	0.000000	0.000000	0.000000	30	0.000000	0.000000	0.000000
12	0.000000	0.000000	0.000000	31	0.000000	0.000000	0.000000
13	0.000000	0.000000	0.000000	32	0.000000	0.000000	0.000000
14	0.000000	0.000000	0.000000	33	0.000000	0.000000	0.000000
15	0.000000	0.000000	0.000000	34	0.000000	0.000000	0.000000
16	0.000000	0.000000	0.000000	35	0.000000	0.000000	0.000000
17	0.000000	0.000000	0.000000	36	0.000000	0.000000	0.000000
18	0.000000	0.000000	0.000000	37	0.000000	0.000000	0.000000
19	0.000000	0.000000	0.000000	38	0.000000	0.000000	0.000000
20	0.000000	0.000000	0.000000	39	0.000000	0.000000	0.000000
				40	0.000000	0.000000	0.000000

Figure 8-2 Reading Display

8.2.2 Setting Measurement Parameter

This block is divided into Frequency, Source, Times and Parameter. Frequency: The current instrument can measure the fundamental frequency for 50Hz or 60Hz only. Source: To measure the Harmonic of voltage or current. Times: To select single or continuous measurement. Parameter: To select Value or Percentage to display the readings.

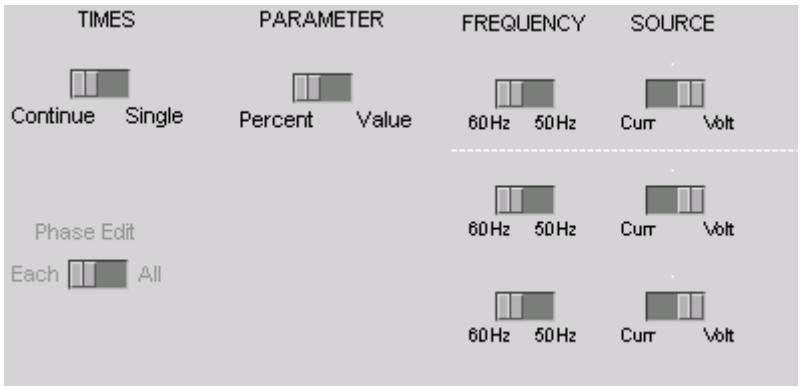


Figure 8-3 Measurement Parameter Setting

8.2.3 Reading Display Screen 2 (Other Measurements)

This block is divided into fundamental voltage or current readings. V voltage readings, F frequency readings and I current readings, P power readings, PF power factor readings, and THD readings.

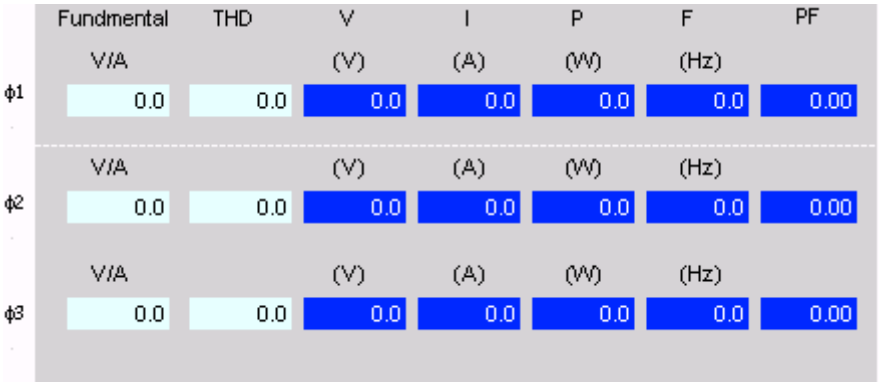


Figure 8-4 Non-harmonic Measurement

8.2.4 Accessing the Measurement

Save as a file.

Save data. button: When the 2-40 steps harmonics are measured, click this button will prompt a dialog box as Figure 8-5 shows to save the measurement to a .CSV file in hard disk. The file can be opened by Microsoft Excel.

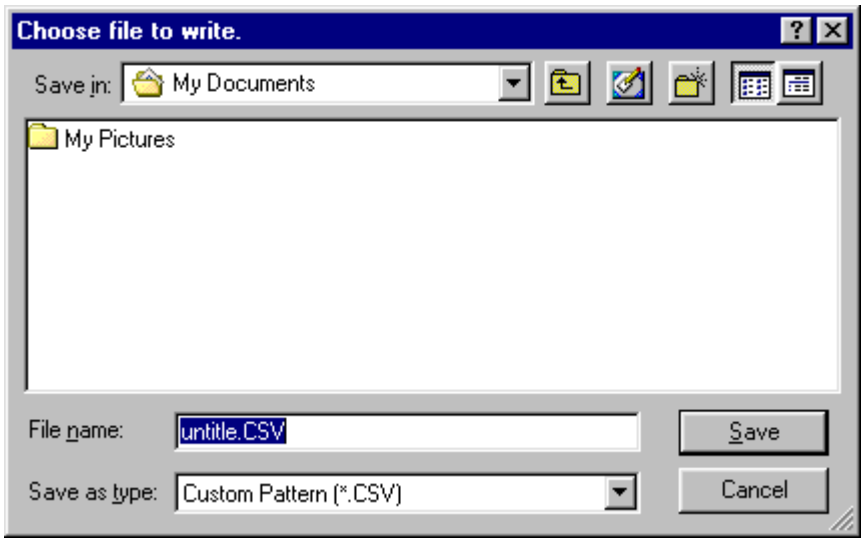


Figure 8-5 Saving Harmonic Measurement

Start Measure

button: Click this button to start the measurement. Be aware that it is necessary to wait for the test load to be stable to click Start Measure so that the AC source can select the suitable current range and would not cause Over Current. A message indicates to wait for 3 seconds will appear after clicked Start Measure and it means each test takes 3 seconds.

Data loading.Please Wait 3 Secs..... : It needs about 3 seconds for measuring and transmitting the data.

It uses Single or Continue to identify if it is necessary to return the new readings during measurement. If select Continue, the message "`Data Loading. Please Wait 3 Secs.....`"

will appear until Start Measure Off is clicked to stop the measurement. Please be noted that Start Measure can only be clicked where there is output voltage.

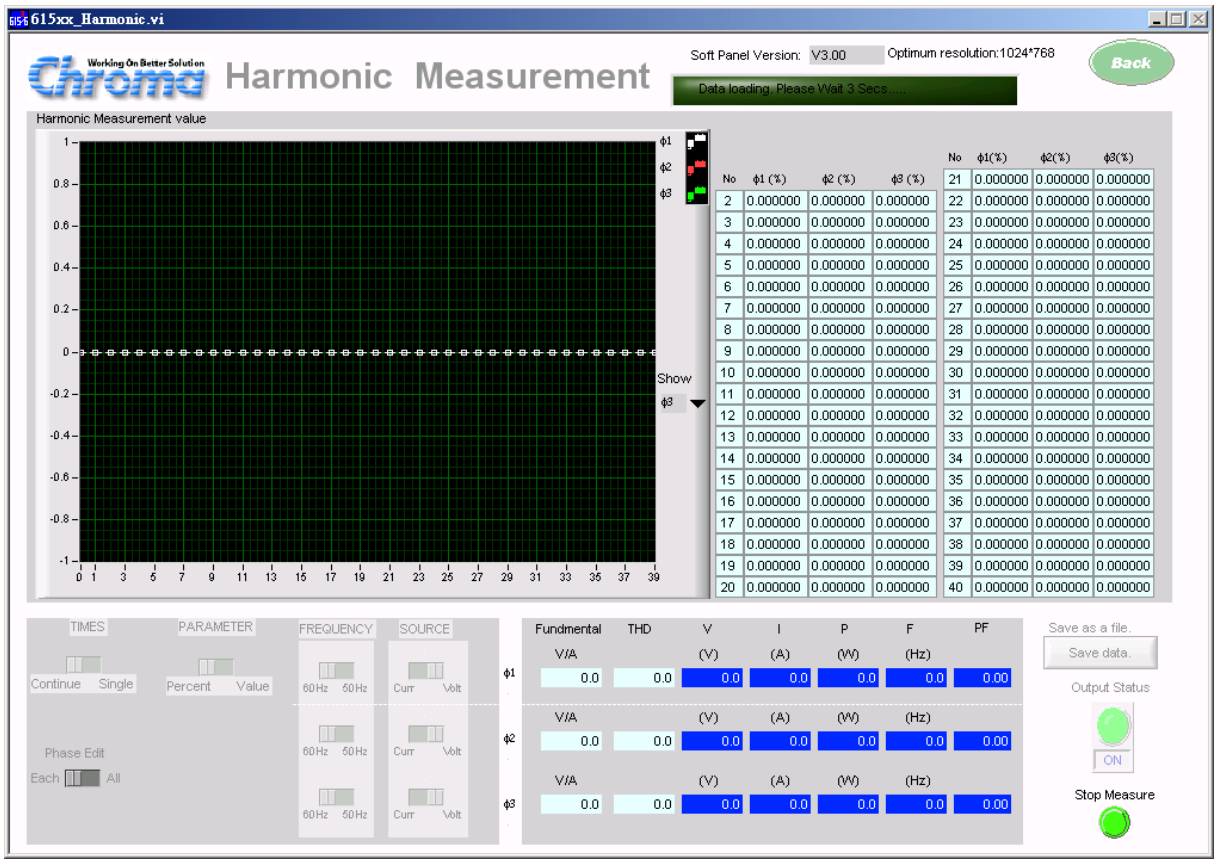


Figure 8-6 Measurement Display

8.2.5 Back

Click it can exit the present screen and return to main screen. It is not available during Start Measure; it has to stop the action or when time is off to return to previous window.

Figure 8-7 Back Button

9. Synthesize Waveform

9.1 Function Description

The 616XX Series do not support this function.

The main function is to edit the 2 to 40 steps of harmonic. The main waveform of fundamental frequency is Sine wave. In Waveform simulation the synthesized waveform will be drew and can be Trig output directory. The major difference between this function and User Waveform is that a waveform template must be saved inside the instrument for User Waveform, then use the Waveform Type to select the saved User Number when return to Fixed Mode and output last.

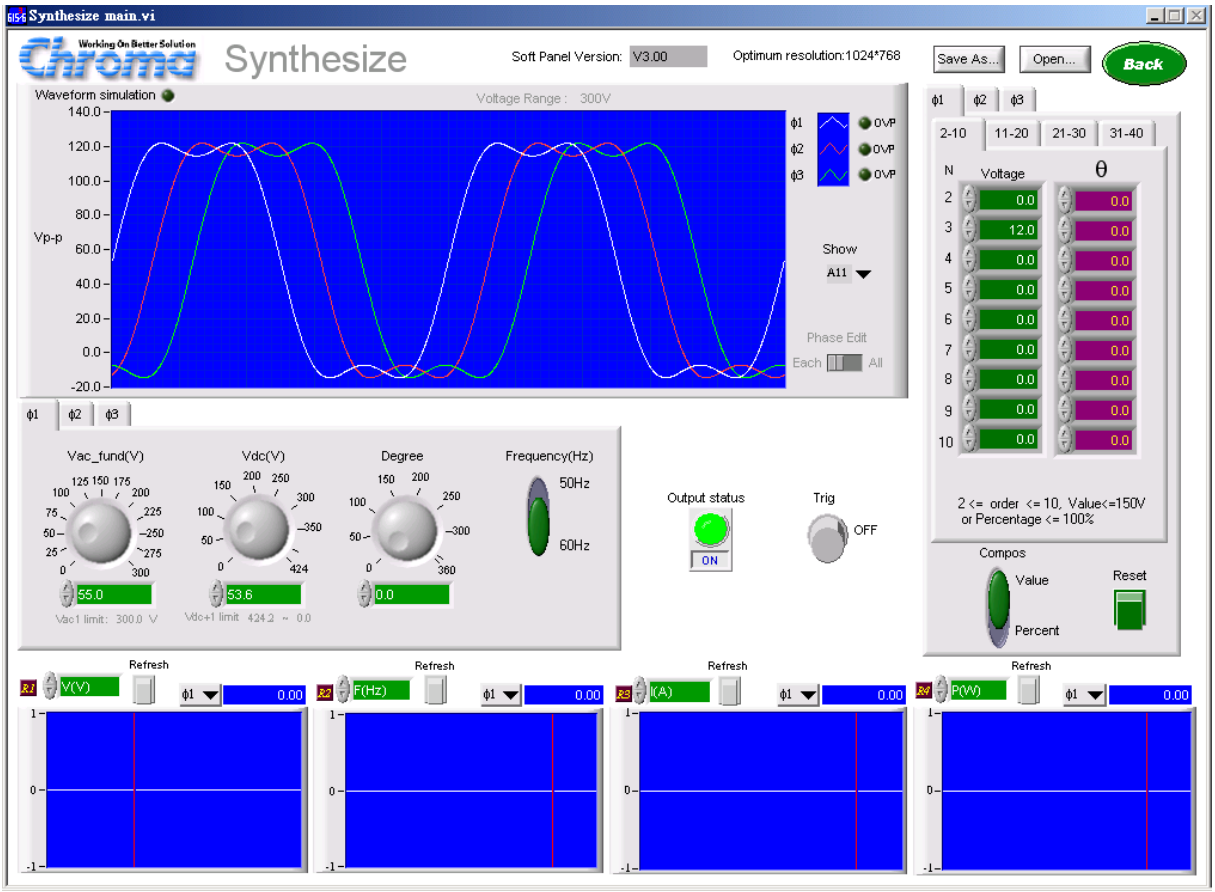


Figure 9-1 Synthesize Waveform Main Control Screen

9.2 Description of Keys

9.2.1 Waveform Simulation

This element draws the synthesized waveform, where the voltage is indicated in peak to peak (Vp-p).

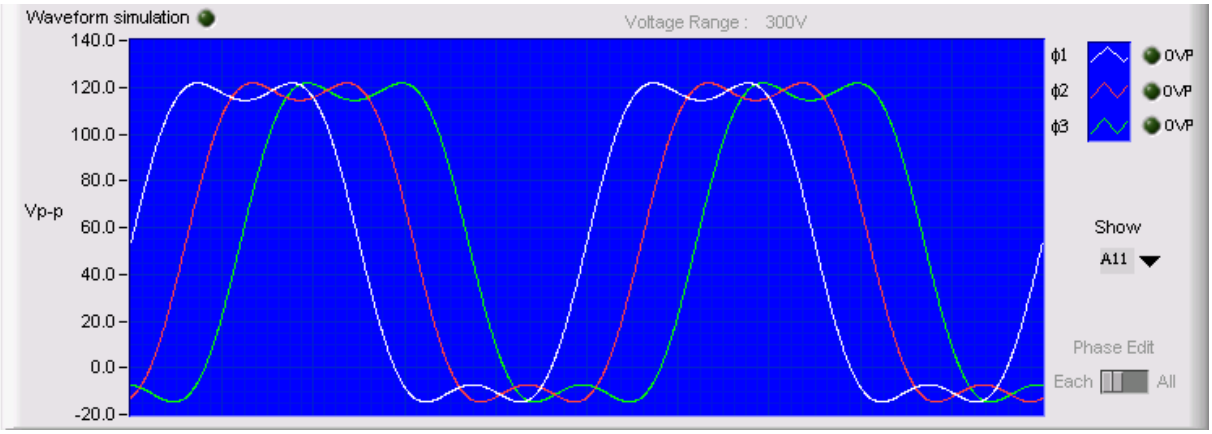


Figure 9-2 Synthesize Waveform Simulation Screen

9.2.2 OVP Indicator

If the synthesized peak voltage exceeds the present voltage range when setting different harmonic, this indicator will illuminate to indicate the current setting is over the output voltage and to remind users to pay attention that the output state is not in expected waveform. It is located at the left of Waveform Simulation.

Figure 9-3 OVP Indicator

9.2.3 Voltage Range

This element shows the selected range of the voltage.

Figure 9-4 Voltage Range

9.2.4 Fundamental Frequency ac Voltage

This element can reset the fundamental frequency ac voltage, and its value is brought in by Fixed Mode. (The 3 phases can be set separately.)

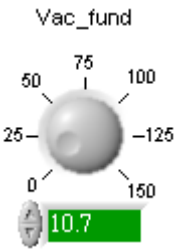


Figure 9-5 Fundamental Frequency ac Voltage

9.2.5 Fundamental Frequency dc Voltage

This element can reset the fundamental frequency dc voltage, and its value is brought in by Fixed Mode. (The 3 phases can be set separately.)

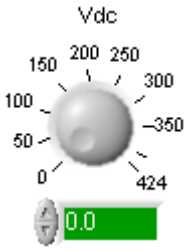


Figure 9-6 Fundamental Frequency dc Voltage

9.2.6 Degree

This element is able to set output start phase degree. The setting is the shift degree after the waveform is synthesized instead of shifting the fundamental frequency first and then merged the harmonic. (The 3 phases can be set separately.)

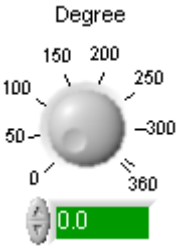


Figure 9-7 Degree

9.2.7 Setting Frequency

This element selects the fundamental frequency. The present AC Source offers 50Hz or 60Hz only. (The 3 phases can be set separately.)

Figure 9-8 Frequency

9.2.8 Compose

This element sets the 2-40 steps harmonic. If Percent is selected, it indicates the current referenced harmonic is fundamental frequency voltage. If Value is selected, it indicates the referenced harmonic is the current set voltage. (The 3 phases can be set separately.)

Figure 9-9 Compose

9.2.9 Setting Harmonic Parameters

There are 4 pages to set the harmonic parameters, 2-10, 11-20, 21-30 and 31-40. Each page has mapped parameters for setting. (The 3 phases can be set separately.)

The settings of each page are based on Percent or Value with defined ranges:

2 <= order <= 10, Value<=150V or Percentage <= 100%, 11 <= order <= 20, Value<=120V or Percentage <= 50%, 21 <= order <= 30, Value<=80V or Percentage <= 30%, 31 <= order <=40, Value<=45V or Percentage<=15%.

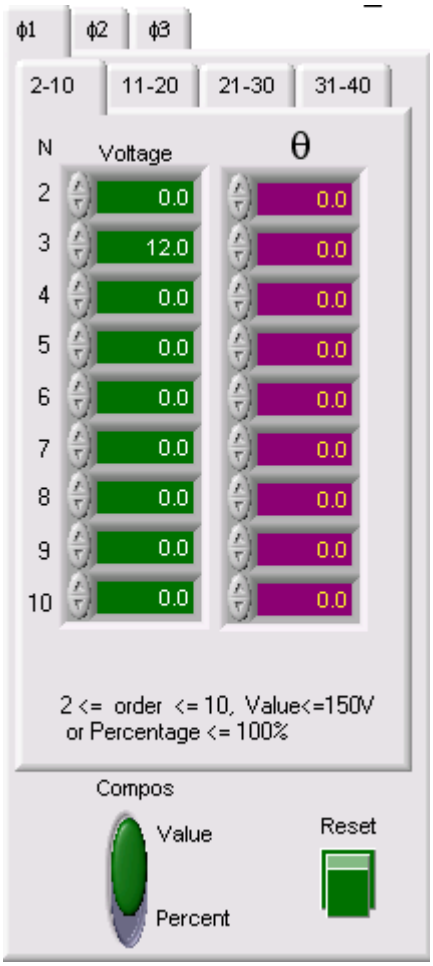


Figure 9-10 2 to 40 Steps Parameters Setting

Click a tab in Figure 9-10 for selection; for example, select 2-10 tab can set the parameter of step 3.

9.2.10 Reset

This element can set the harmonics of the selected tab to 0 for entering again.

Figure 9-11 Reset

9.2.11 Input Range Indication

The screen bottom displays the range for different steps setting to indicate if the input value is acceptable.

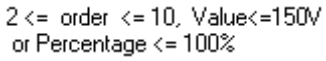


Figure 9-12 Input Range Indication

9.2.12 Save As…

Click this button to save the setting parameters on the present screen to a .615Syn file. Do not save the file to “Desktop” and “My Document” folder. It is suggested to create a new folder for access.

Figure 9-13 Save As… Button

9.2.13 Open…

Click this button can open an existed .615Syn file in the hard disk. This cuts down the action of parameter input and avoids errors from occurring.

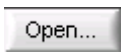


Figure 9-14 Open… Button

9.2.14 Synthesize Trig

It sends out the voltage in Synthesize waveform.

Figure 9-15 Trig On/Off Button

9.2.15 Back

Click this button to exit the present screen and return to the main screen. This button is invalid when Trig On is executed. Start Measure or the execution time has to be stopped to return to previous window.

Figure 9-16 Back Button

9.2.16 Output Status

It controls the output voltage of Fixed Mode.

Figure 9-17 Output Status

9.2.17 Reading Display Screen

The display and operation are same as in Fixed Mode.

10. Interharmonic

10.1 Function Description

The 616XX Series do not support this function.

This software is for Chroma 615XX Series AC Source only. It can set the start and end frequencies for scanning within a period of fixed time, and then add the varied levels to the fundamental waveform output. This test is able to find if there is any abnormal or resonant spot that may create a surge current at a certain frequency to observe the UUT's feature or to simulate the combination of any two different frequencies waveforms. Figure 10-1 shows the screen of Interharmonic.

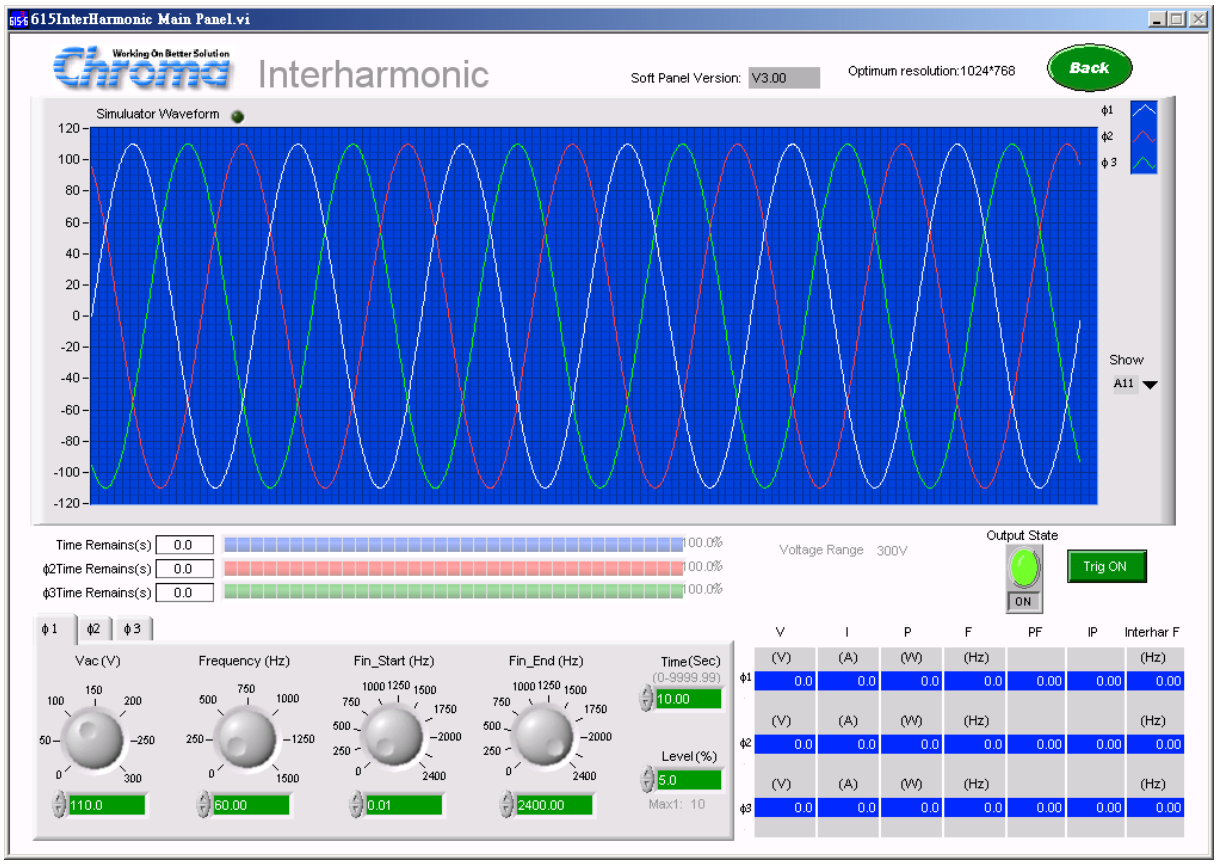


Figure 10-1 Interharmonic Display Screen

10.2 Function Keys Description

10.2.1 AC Voltage (V)

This control element will refer to the AC voltage set in the previous main screen; however the main control voltage can be changed here as well. (The 3 phases can be set separately.)

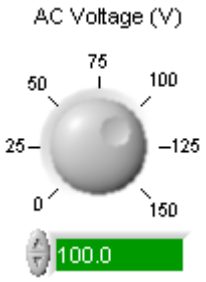


Figure 10-2 AC Voltage (V)

10.2.2 Frequency (Hz)

This element sets the frequency of start voltage and refers to the settings in previous screen. The maximum input is 1000 Hz for 61501~05 or 1500 Hz for 61511~12 and its initial setting is 50Hz. (The 3 phases can be set separately.)

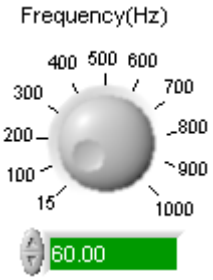


Figure 10-3 Frequency (Hz)

10.2.3 Fin_Start (Hz)

It sets the start frequency of Interharmonic. The range is from 0.01 to 2400Hz. (The 3 phases can be set separately.)

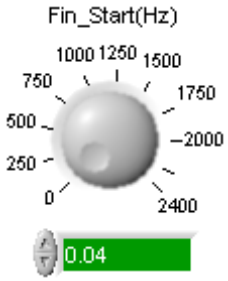


Figure 10-4 Fin_Start (Hz)

10.2.4 Fin_End (Hz)

It set the end frequency of Interharmonic frequency. The range is from 0.01 to 2400Hz. (The 3 phases can be set separately.)

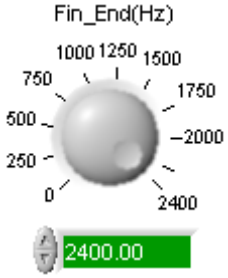


Figure 10-5 Fin_End (Hz)

10.2.5 Time (Sec)

It sets the scanning time of Interharmonic with the range of 0-9999.99 seconds. (The 3 phases can be set separately.)

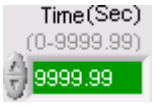


Figure 10-6 Time (Sec)

10.2.6 Level (%)

It sets the voltage of Interharmonic and refers to the AC Voltage. Ex. Assuming the AC Voltage is set to100V and Level is set to 10%, then the Interharmonic voltage is 10V. When Frequency is less than 500 the Level range is 0-30, when Frequency is in-between 500 and 1000 the Level range is 0-20 and when Frequency is larger than1000 the Level range is 0-10. (The 3 phases can be set separately.)

Figure 10-7 Level (%)

10.2.7 Fixed Mode Output State

It sets the output voltage ON or OFF of Fixed Mode.

Figure 10-8 Fixed Mode Output State

10.2.8 Trig ON

It starts to output Interharmonic from hardware. The waveform simulation will follow the settings to simulate the output.

Figure 10-9 Trig ON Button

10.2.9 Pause

Once the hardware started to output Interharmonic, click this button can pause the Interharmonic frequency. This output will keep the frequency being executed.

Figure 10-10 Pause Button

10.2.10 Continue

Once the hardware started to output Interharmonic, click this button can continue the unfinished work if it has been paused at certain frequency.

Figure 10-11 Continue Button

10.2.11 Trig Off

Once the hardware started to output Interharmonic or has been paused, click this button to stop Interharmonic immediately.

Figure 10-12 Trig Off Button

10.2.12 Back

Click this button to exit the present screen and return to the main screen.

Figure 10-13 Back Button

10.3 Display Screen

10.3.1 Simulator Waveform Display

The Y axis is the voltage. The waveform is a program simulated frequency change for the variation. Click Trig ON will activate the changed waveform for display.

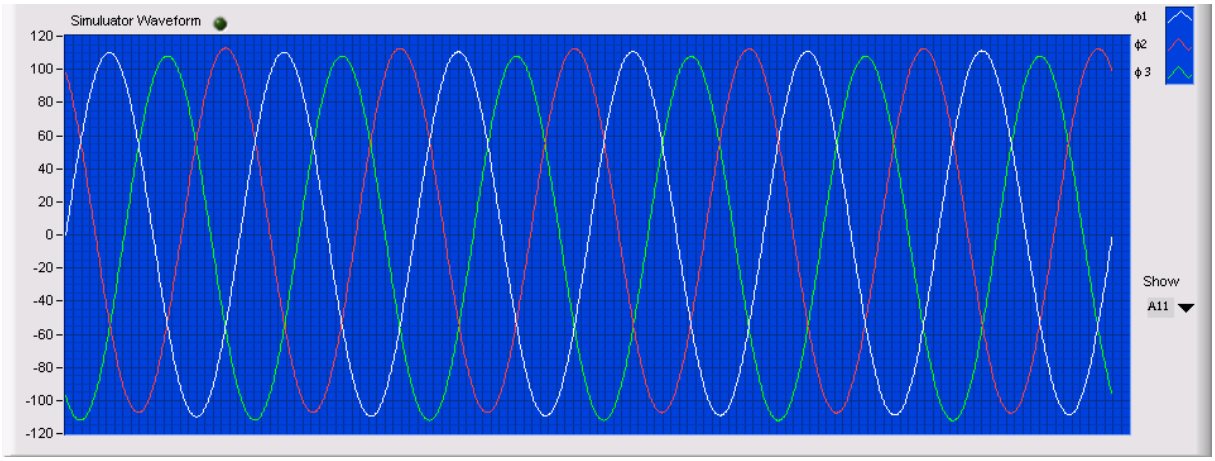


Figure 10-14 Simulation Waveform Display Screen

10.3.2 Time Remains

It shows the remaining execution time. This element follows the setting of Time to countdown.

Figure 10-15 Time Remains (s)

10.3.3 Reading Display Screen

The display and operation are same as in Fixed Mode, only the displayed X axis is the Interharmonic frequency for easier observation.

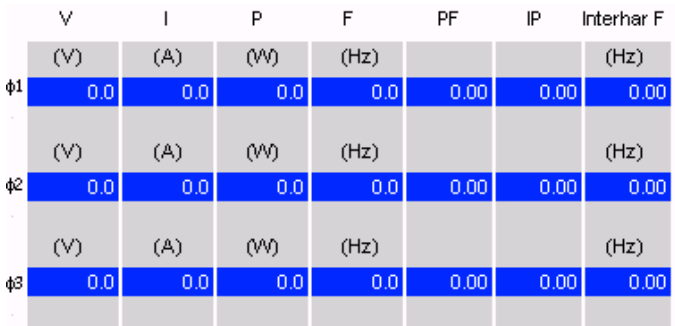


Figure 10-16 Reading Display

10.3.4 Interhar F (Hz)

It shows the Interharmonic Frequency reading.

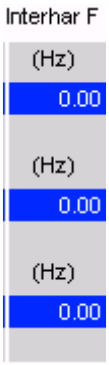


Figure 10-17 Interharmonic Frequency Reading Display

11. IEC61000-4-11

11.1 Function Description

The 616XX Series do not support this function.

This function follows the regulation of IEC61000-4-11 Voltage dips, short interruptions and voltage variation immunity Test for testing. It contains user-defined parameters. Select User Define if partial parameters need to be modified.

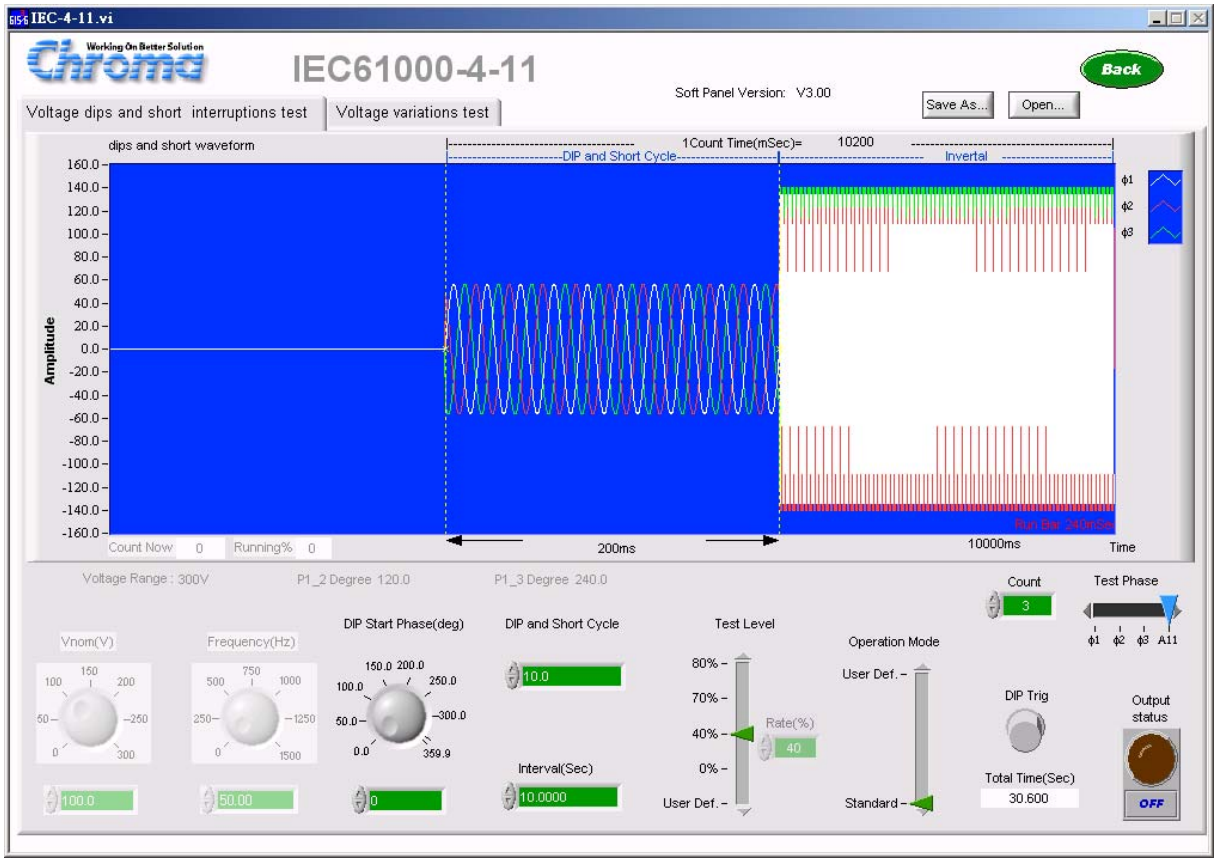


Figure 11-1 IEC6100–4-11 Control Screen

11.2 Function Keys Description

11.2.1 Voltage Dips and Short Interruptions Test

11.2.1.1 Vnom (V)

This element sets the AC voltage for AC Source output. The Standard is fixed to 230Vac while User Define is adjustable.

Figure 11-2 Vnom (V)

11.2.1.2 DIP Start Phase (deg)

This element sets the start phase degree of AC Source output.

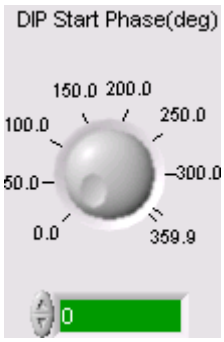


Figure 11-3 DIP Start Phase (deg)

11.2.1.3 DIP and Short Cycle

This element is set the execution time for DIP in the unit of cycle. For instance, if it is set to 10 cycles and the Frequency is set to 50Hz, then the DIP execution time is 200mSec.

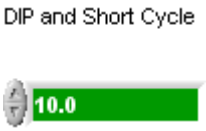


Figure 11-4 DIP and Short Cycle

11.2.1.4 Interval (Sec)

This element is to set the execution time after performing DIP. The DIP and Short Cycle plus the time of Interval together are 1 count. The execution voltage at present is Vnom.

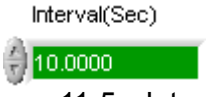


Figure 11-5 Interval

11.2.1.5 Operation Mode

This element is able to select Standard or User Define. Vnom is unable to adjust when Standard is selected.

Figure 11-6 Operation Mode

11.2.1.6 Test Level

This element will refer to Vnom to adjust the output percentage when adjusting dip. When User Define is selected, Rate element will open (as Figure 11-7 shows) for user to define.

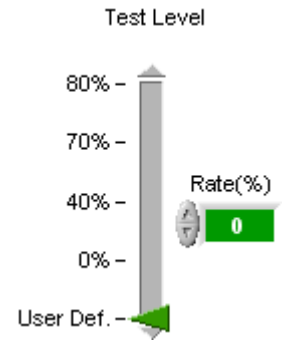


Figure 11-7 Test Level

11.2.1.7 DIP Trig

Click this element to start testing voltage dips and short interruptions.

Figure 11-8 DIP Trig

11.2.1.8 Rate (%)

This element sets the Dip Level percentage (relative to the percentage of Vnom).

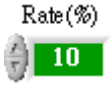


Figure 11-9 Rate (%)

11.2.1.9 Count

This element sets the repeated numbers for executing DIP and short cycle and Interval after adding up their time.

Figure 11-10 Count

11.2.1.10 Output Status

This element set the output voltage status before executing Voltage dips and short interruptions test. It outputs Vnom voltage when On.

Figure 11-11 Output Statue

11.2.1.11 Simulation Waveform

It displays the timing graph of output voltage. The waveform and time of DIP and Short cycles and Interval are marked on the graph. In addition it also shows the executed Count number and Running%.

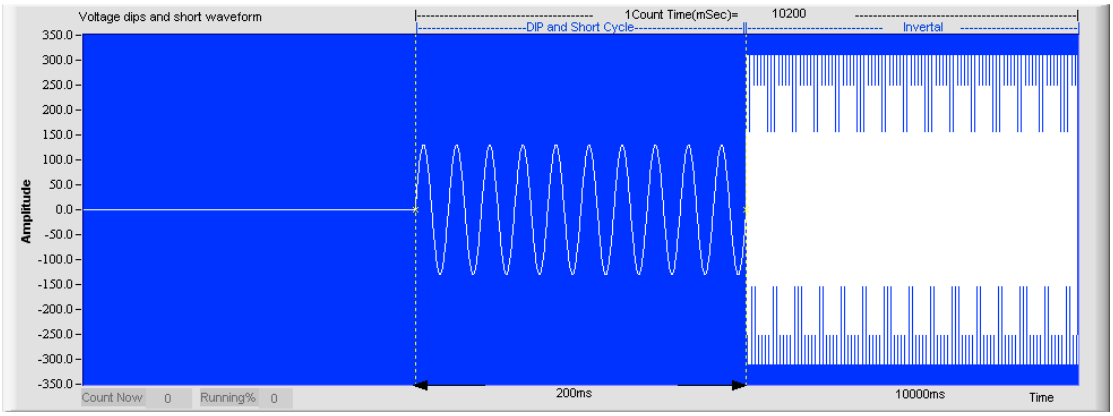


Figure 11-12 Simulation Waveform

11.2.1.12 Test Phase

This element supports 61511_61512 3 phases output voltage only. It sets the test voltage of DIP to be outputted by what voltage phase.

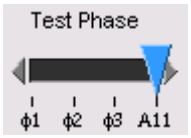


Figure 11-13 Test Phase

11.2.2 Voltage Variations Test

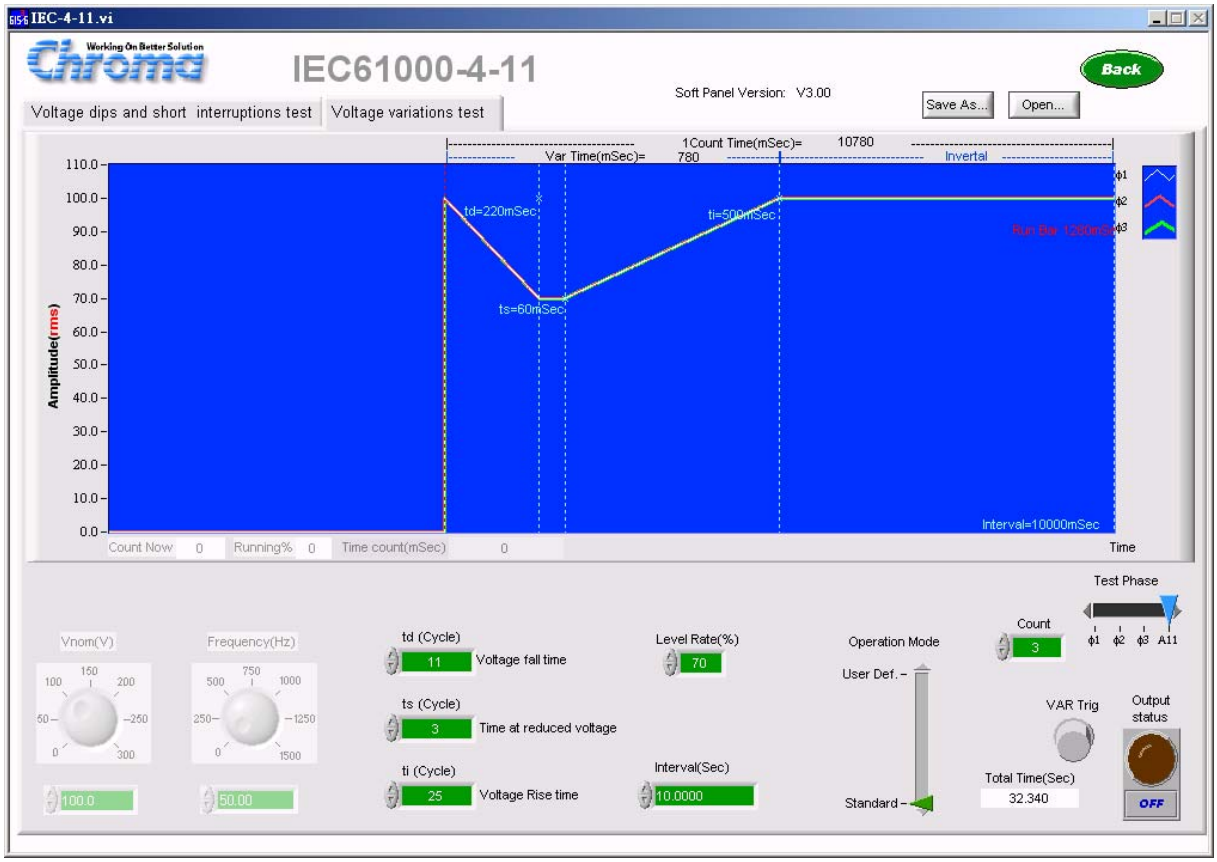


Figure 11-14 Voltage Variations Test Panel

11.2.2.1 Vnom (V)

This element sets the value of Voltage Variation. The Standard is fixed to 100Vac, while User Define is adjustable.

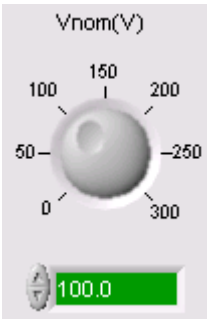


Figure 11-15 Vnom (V)

11.2.2.2 Count

This element sets the number of times to repeat for Voltage Variations Test.

Figure 11-16 Count

11.2.2.3 Output Status

This element sets the output voltage status before executing Voltage Variations Test. It outputs Vnom voltage when On.

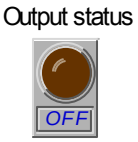


Figure 11-17 Output Status

11.2.2.4 VAR Trig

Click this element to start Voltage Variations Test.

Figure 11-18 VAR Trig

11.2.2.5 td (Cycle)

This element sets the time for voltage to drop from Vnom to Level Rate (%) in Cycle. Frequency is referred to time calculation.

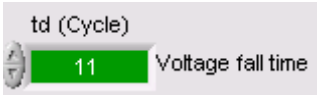


Figure 11-19 td

11.2.2.6 ts (Cycle)

This element sets the execution time after the voltage dropped to Level Rate (%) in Cycle. Frequency is referred to time calculation.

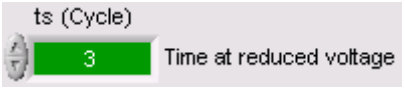


Figure 11-20 ts

11.2.2.7 ti (Cycle)

This element sets the time for voltage to rise from Level Rate (%) to Vnom in Cycle. Frequency is referred to time calculation.

Figure 11-21 ti

11.2.2.8 Level Rate (%)

This element sets the drop voltage percentage of Voltage Variations Test. If 70% is set and Vnom voltage is set to 230V, it executes 161V after voltage drop.

Figure 11-22 Level Rate

11.2.2.9 Interval (Sec)

This element sets the execution time after performing Voltage Variations Test. The time of Voltage Variations Test plus Interval is 1 count. The execution voltage at present is Vnom.

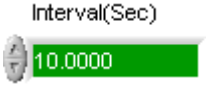


Figure 11-23 Interval

11.2.2.10 VAR_Operation Mode

This element is able to select Standard or User Define. Vnom is unable to adjust when Standard is selected.

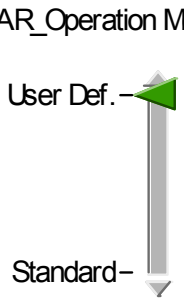


Figure 11-24 VAR_Operation Mode

11.2.2.11 Simulation Waveform

This display screen shows the output voltage timing graph of Voltage Variations Test. Voltage Variations Test: td, ts, ti and the RMS waveform of Interval as well as the time are marked on the graph. In addition it also shows the executed Count number and Running%.

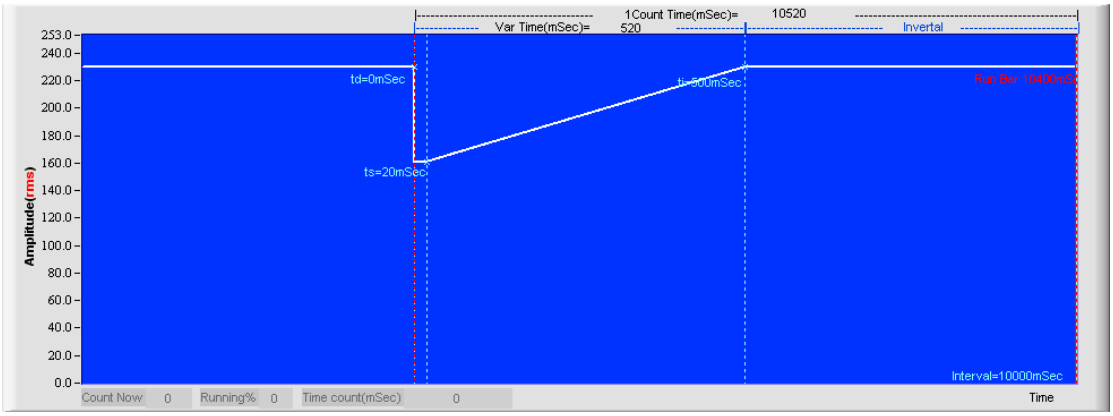


Figure 11-25 Simulation Waveform

11.2.3 Back

Click this button to exit the present screen and return to the main screen.

Figure 11-26 Back Button

12. IEC61000-4-13

12.1 Function Description

The 616XX Series do not support this function.

This function follows the regulation of IEC61000-4-13 Harmonics, Iinterharmonics Immunity tests for testing. It contains 5 test programs including Flat Curve Test, Over Swing Test, Sweep in Frequency Test, Individual harmonic & Interharmonics and Meister Curve. Select User Define if partial parameters need to be modified. Figure 12-1 shows the IEC61000-4-13 control screen.

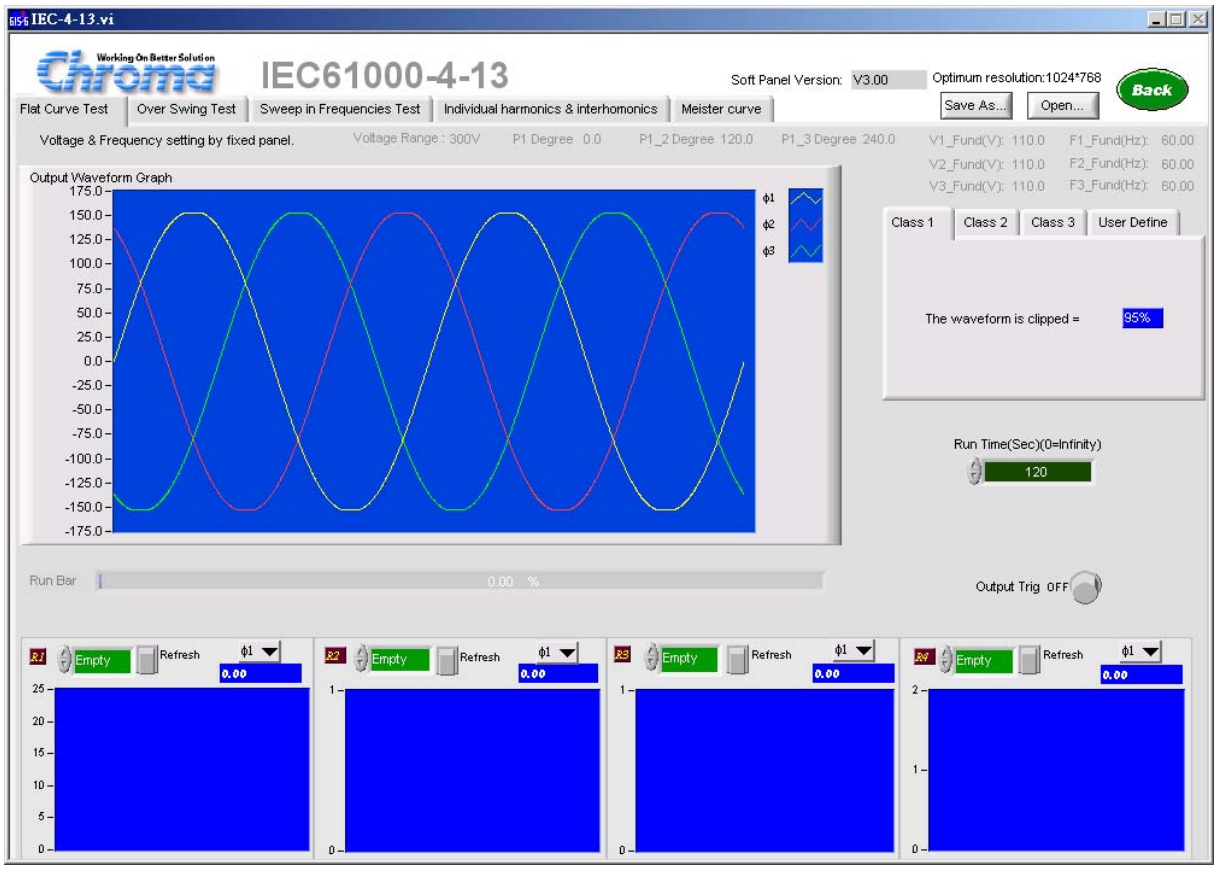


Figure 12-1 IEC61000–4-13 Control Screen

Refer to the regulation description for detail control procedures and usages.

12.2 Flat Curve Test

It sends a Clipped Sine waveform output. There are Class 1, Class 2, Class 3, and User Define 4 tabs of parameter settings for users to select different Clipped Sine Level. Figure 12-2 is the Clipped Sine simulation output waveform diagram.

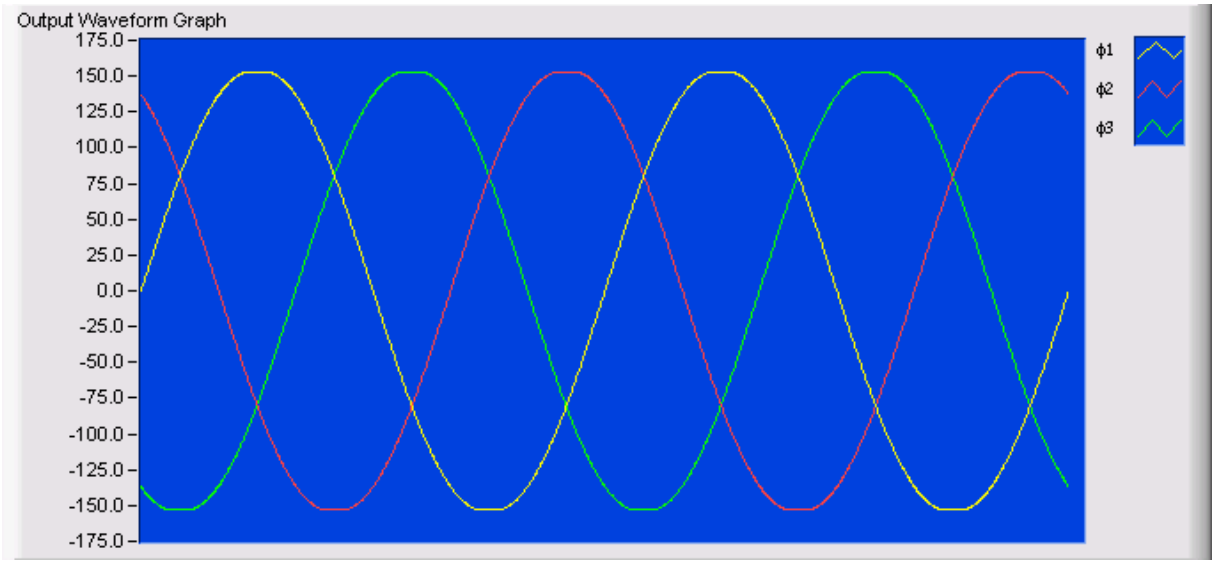


Figure 12-2 Clipped Sine Simulation Output Waveform Diagram

12.2.1 Flat Curve Tabs

There are Class 1, Class 2, Class 3, and User Define 4 tabs. Class 1, Class 2 and Class 3 are fixed setting for regulation, while User Define is able to change the output voltage, frequency, and Clipped %.

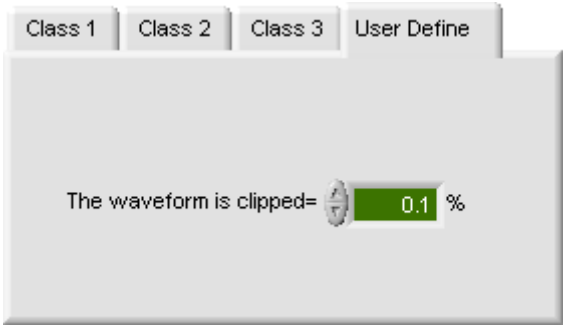


Figure 12-3 Flat Curve Parameter Setting Screen

12.2.2 Flat Curve Output

Output Trig ON/OFF controls the output ON or Off after the Flat Curve set is completed. All measurement readings must be done under Output Trig On while Back is unable to use when it is on. Fixed Mode Output status controls the set voltage output or not in Fixed window.

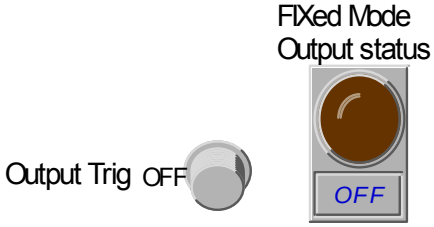


Figure 12-4 Flat Curve Output

12.2.3 Run Time

It sets the run time for Flat Curve Test and the unit is second. The run time is unlimited if it is set to 0.

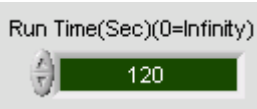


Figure 12-5 Run Time

12.2.4 Display

The display and operation are same as in Fixed Mode.

12.3 Over Swing Test

It sends a waveform containing 3 times and 5 times harmonic. There are Class1, Class 2, Class 3, and User Define 4 tabs of parameter settings for users to select different harmonic waveform. Figure 12-6 is the Over Swing simulation output waveform diagram.

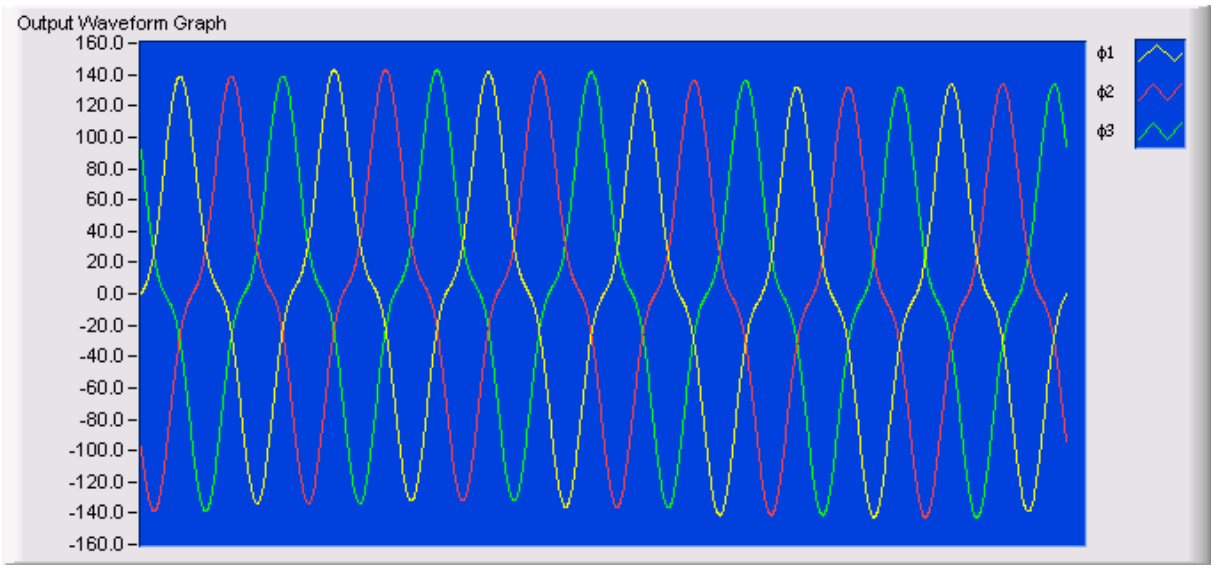


Figure 12-6 Over Swing Simulation Output Waveform Diagram

12.3.1 Over Swing Tabs

Class 1, Class 2 and Class 3 are fixed setting for regulation, while User Define is able to change the output voltage, frequency (50Hz or 60Hz only), and 3 times/5 times harmonic %. Click Trig when output is needed. When the OVP illuminates it indicates the output voltage is exceeding the hardware output range. This function is invalid if the frequency of Fixed Mode is not set to 50 or 60Hz.

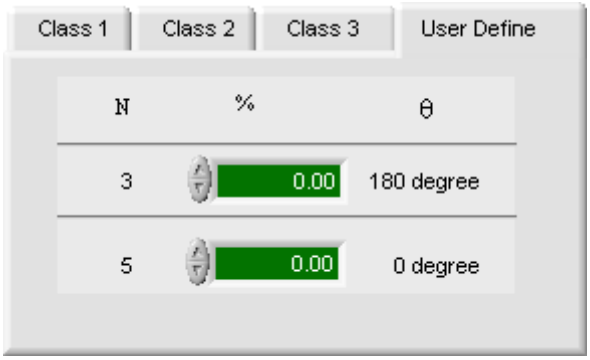


Figure 12-7 Over Swing Test Tabs for Parameter Setting

Figure 12-8 Over Voltage Protection Indicator

12.3.2 Over Swing Output Trig

It is same as described in section 12.2.2.

12.3.3 Run Time

It sets the run time of Over Swing and the unit is second. The run time is unlimited if it is set to 0.

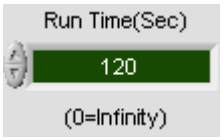


Figure 12-9 Run Time

12.3.4 Display

The display and operation are same as in Fixed Mode.

12.4 Sweep In Frequencies Test

It sends an Interharmonic waveform output. There are Class1, Class 2, Class 3, and User Define 4 tabs for parameter setting. Class 2 and Class 3 are fixed setting for regulation, while User Define is able to modify the output voltage, frequency, and each Level %. Click Trig when output is needed.

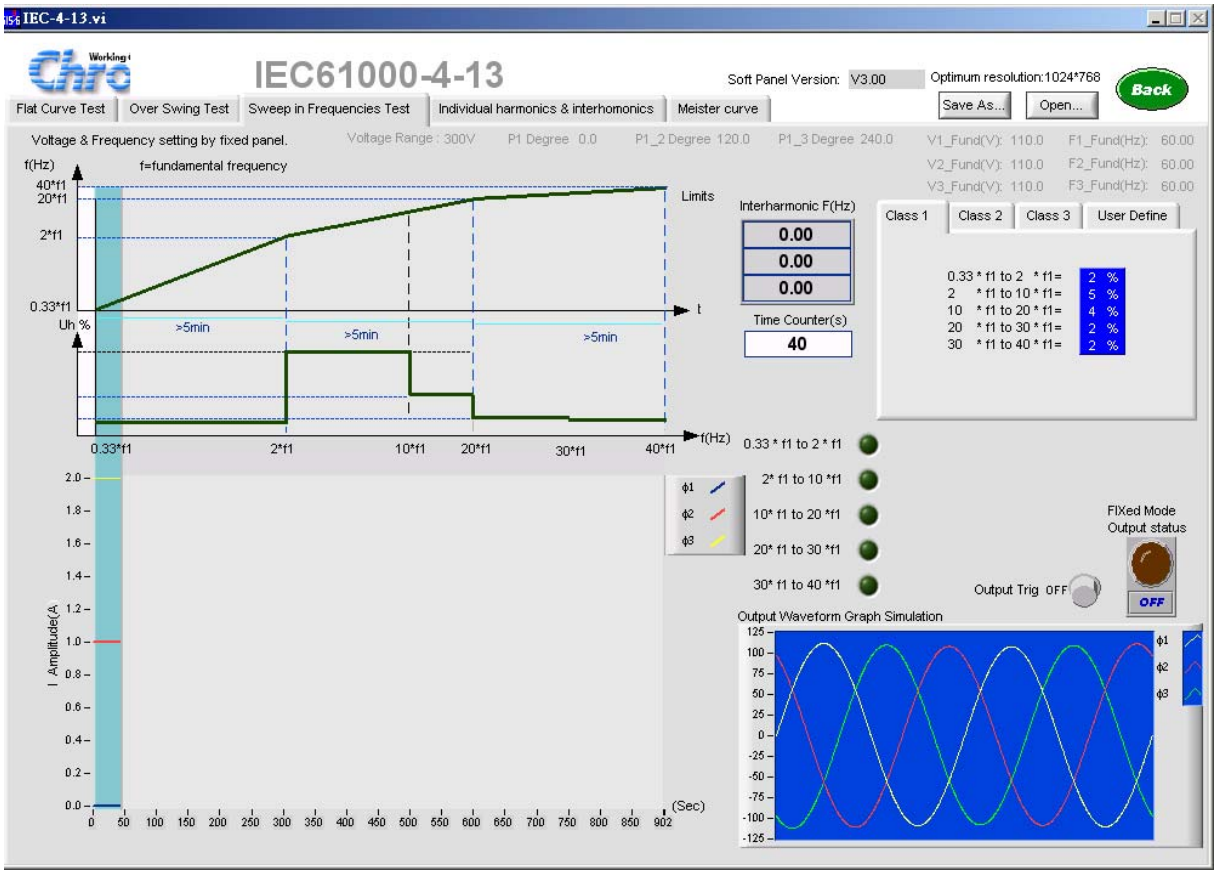


Figure 12-10 Diagram of Sweep In Frequencies

12.4.1 Sweep In Frequencies Tabs

Class1, Class 2 and Class 3 are fixed settings for regulation, while User Define is able to change the 5 Levels of Interharmonic % (equal to Voltage Setting). Click Trig when output is needed.

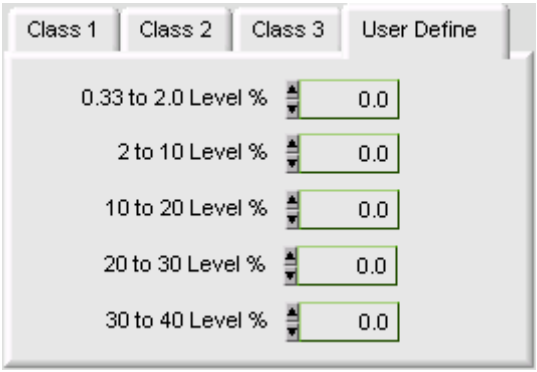


Figure 12-11 Tabs of Sweep In Frequencies

12.4.2 Sweep In Frequencies Output Trig

It is same as described in section 12.2.2.

12.4.3 Output Waveform Graph Simulation

This screen shows the waveform currently outputting that includes Voltage Setting and Level synthesized value of Interharmonic.

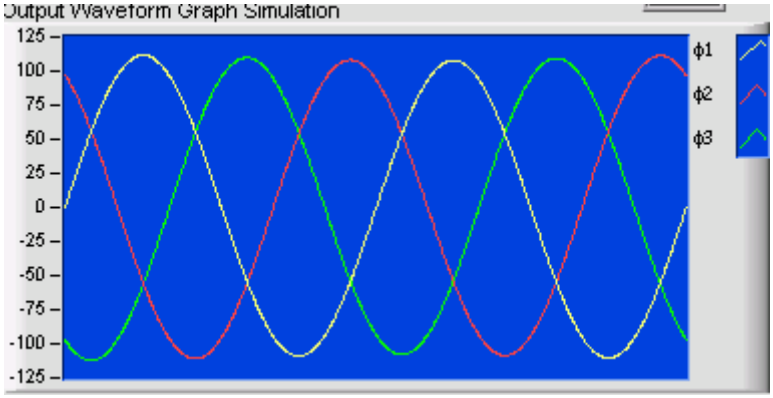


Figure 12-12 Output Waveform Graph Simulation

12.4.4 Current Measurement Display

This element is to scan the interharmonic for above average current in order to find the resonant frequency.

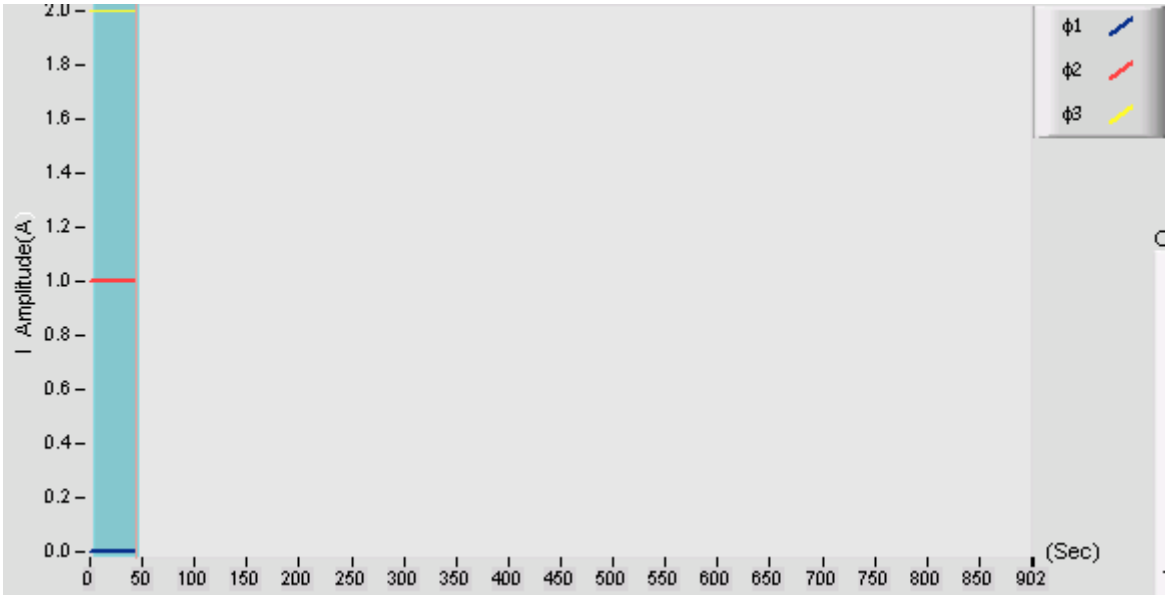


Figure 12-13 Current Measurement Display

12.4.5 Sweep In Frequencies Level Indicators

There are 4 indicators to show the percentage of Interharmonic Level currently used as well as the number of procedure.

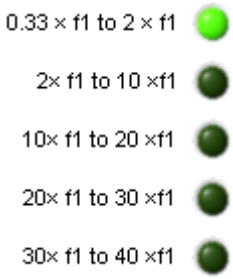


Figure 12-14 Sweep In Frequencies Level Indicators

12.5 Individual Harmonic & Interhomonics

There are Individual Harmonic and Interhomonics 2 function tabs. Under the Interhomonics tab, there are For 50Hz and For 60Hz 2 tabs, and each of them has Class 2, Class 3 and User Define 3 tabs. Users are able to set the Level parameter for different interhomics. When in Individual Harmonic tab, there are Odd harmonic non-multiple of 3, Odd harmonic multiple of 3 and Even harmonic 3 tabs, and each of them has Class1, Class2, Class3 and User Define 4 tabs.

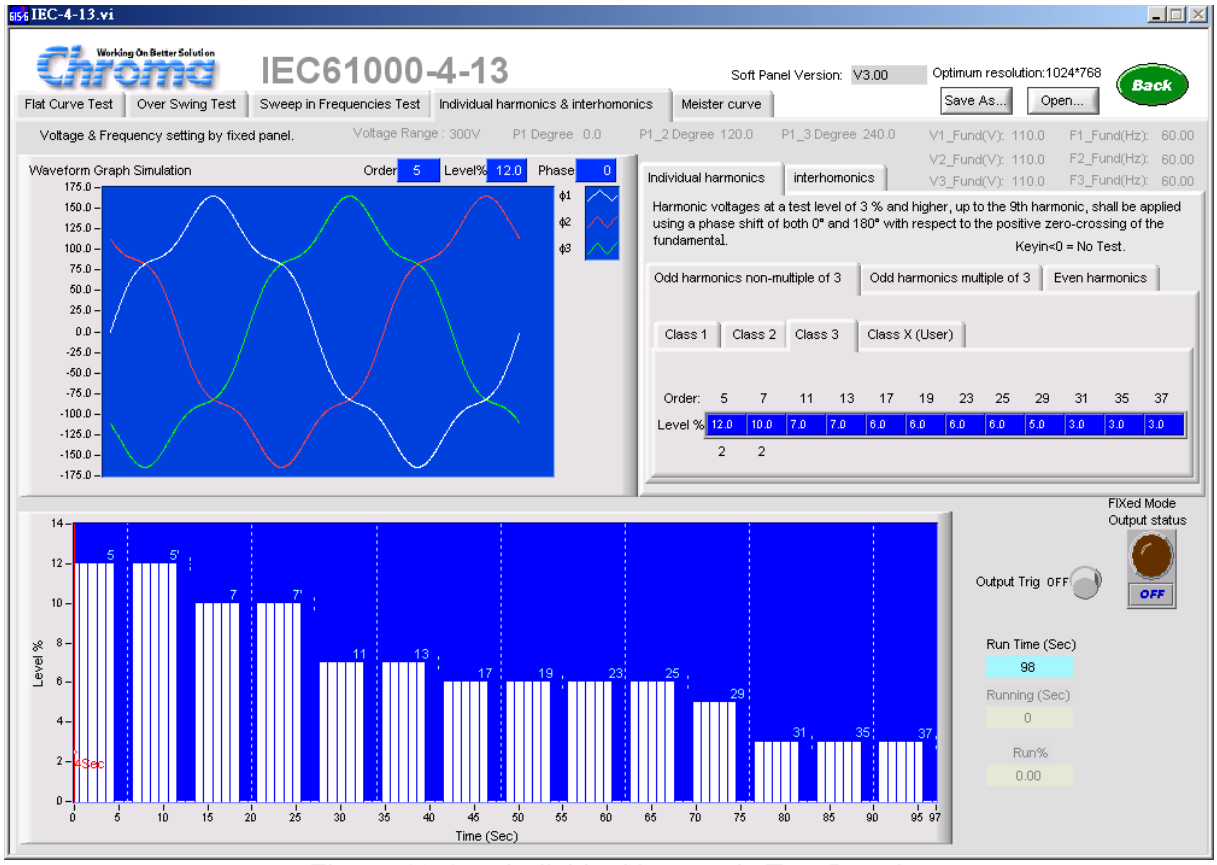


Figure 12-15 Individual harmonic Test Panel

12.5.1 Individual Harmonic Tab

It contains Odd harmonic non-multiple of 3, Odd harmonic multiple of 3 and Even harmonic 3 tabs. Each tab has Class 1, Class 2, Class 3 and Class X (User) 4 pages. In Class X (User) defined page, different Level value can be set for different Order. If the value is smaller than 0, it indicates the order is not tested.

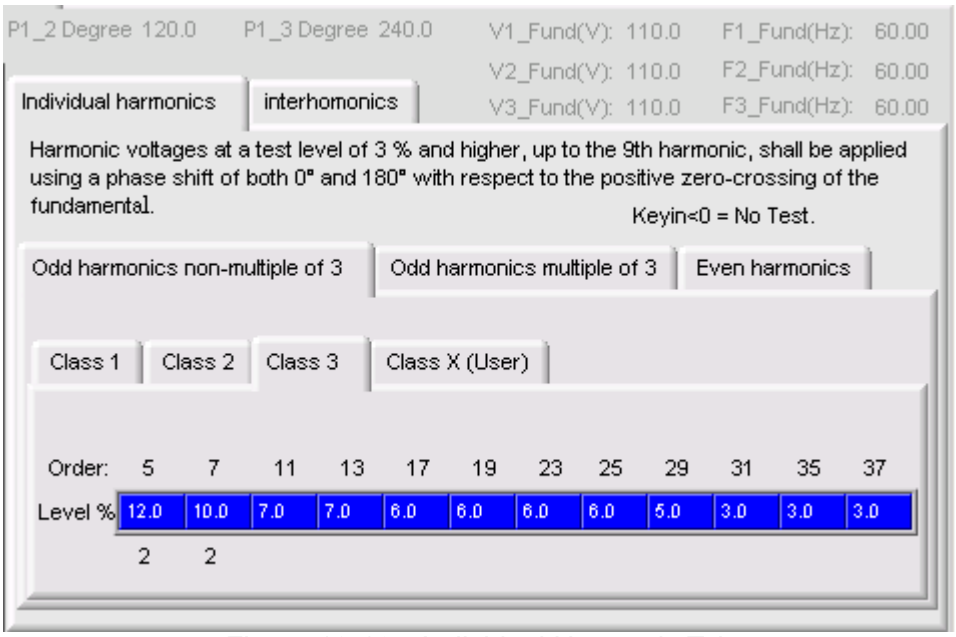


Figure 12-16 Individual Harmonic Tab

12.5.2 Individual Harmonic Level% & Time Simulation Diagram

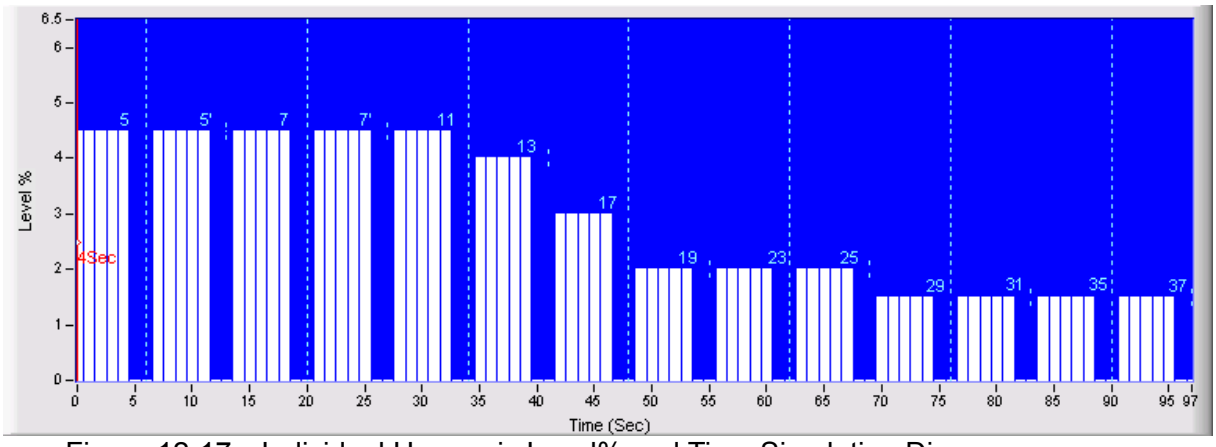


Figure 12-17 Individual Harmonic Level% and Time Simulation Diagram

The execution will interrupt every 5 seconds (the execution voltage waveform of Fixed Mode). The blue value display in the figure is the level defined by regulation where the difference of 5 and 5` is the phase start angle in the level. . The Y-axis is the Level percentage and the X-axis is the test time.

12.5.3 Interhomonics Tab

It has For 50Hz and For 60Hz 2 tabs, and each of them has Class 2, Class 3 and User Define 3 tabs. The timings are 0.33 × f1 to 2 × f1(16-100Hz), 2 × f1 to 10 × f11(100-500Hz), 10 × f1 to 20 × f11(500-750Hz), 20 × f1 to 30 × f11(750-1000Hz), 30 × f1 to 40 × f1(1000-2000Hz) that is to add different percentage under base frequency for different interhomonics.

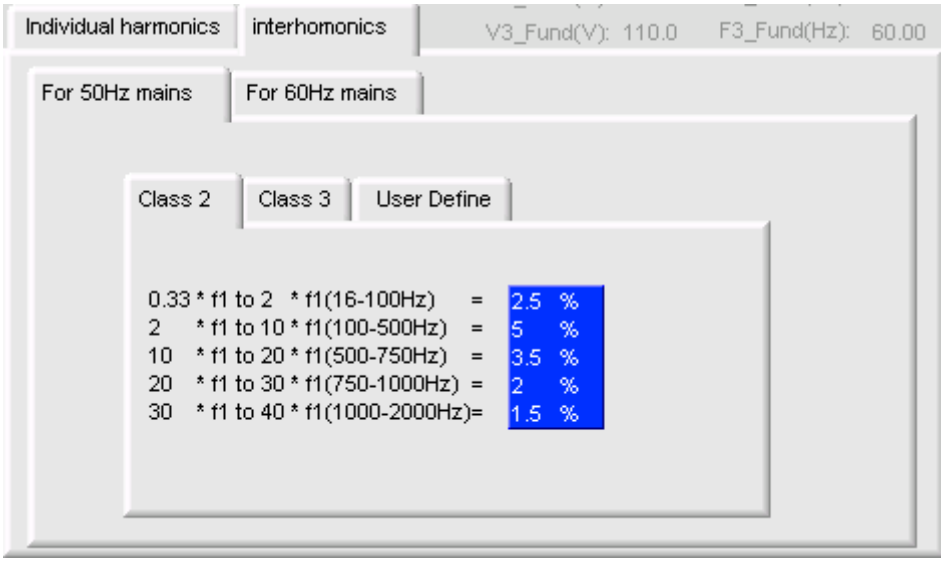


Figure 12-18 Interhomonics Parameter Setting

12.5.4 Interhomonics Output

It is same as described in section 12.2.2.

12.5.5 Interhomonics Level% & Time Simulation Diagram

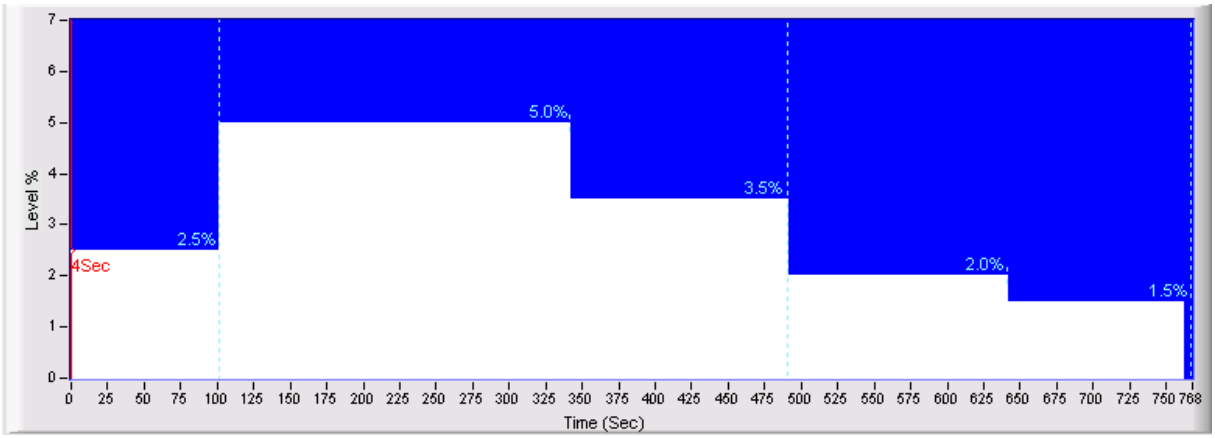


Figure 12-19 Interhomonics Level% and Time Simulation Diagram

The Level % of different interharmonics and its execution time are indicated in Figure 12-19. Select User Define can see the status of edited Level.

12.5.6 Interhomonics Execution Time Display

Run Time (Sec) indicates the execution time while Running (Sec) is the time counter, which will turn to black from gray when executing. Run% indicates the percentage of the present execution time and total execution. It will turn to black from gray during execution.

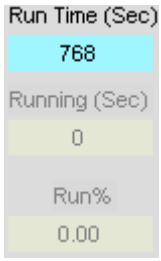


Figure 12-20 Interhomonics Execution Time Display

12.6 Meister Curve

It sends out a waveform that contains Interharmonic. There are Class 2, Class 3 and User Define 3 tabs for parameter setting when entered. Class 2 and Class 3 are fixed settings for regulation, while User Define is able to change for output voltage, frequency, and each Level %. Click Output Trig when there is a need to output it.

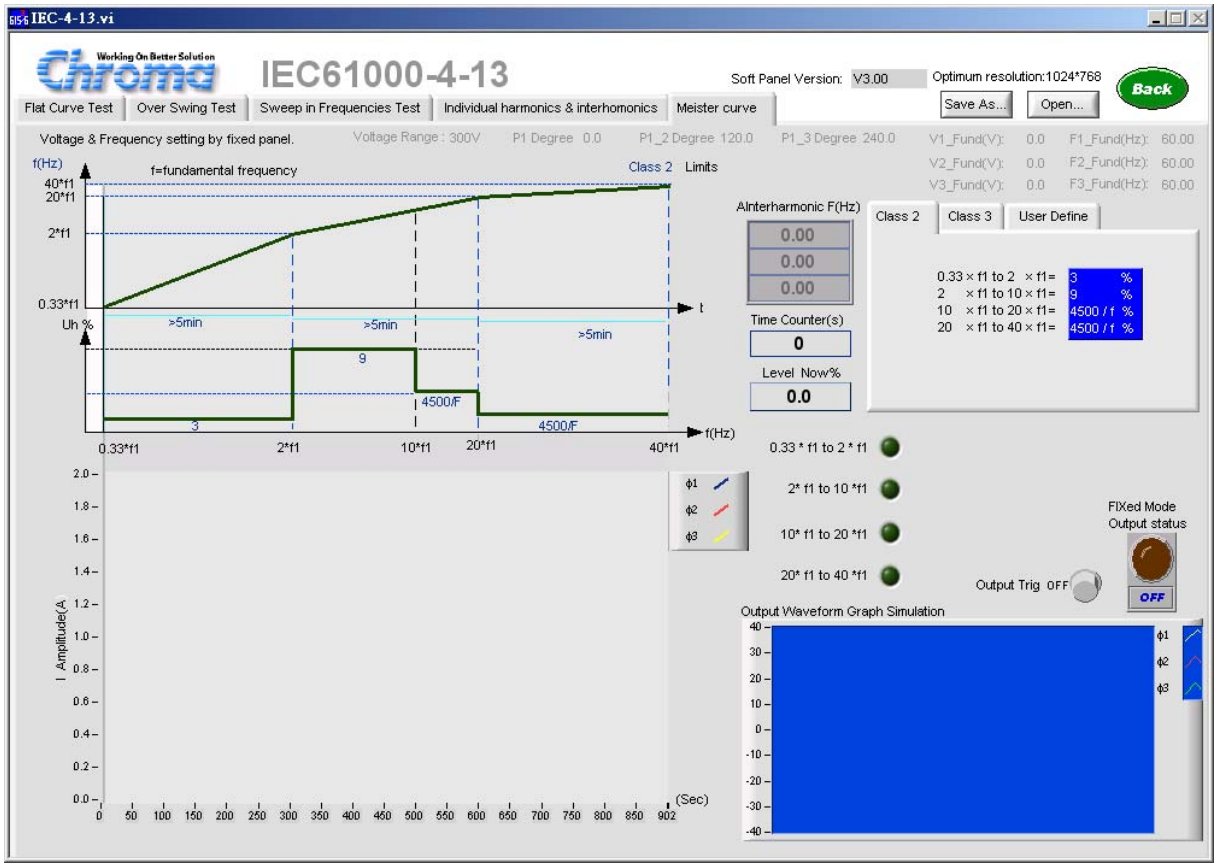


Figure 12-21 Meister Curve Test Panel

12.6.1 Meister Curve Tab

There are Class 2, Class 3 and User Define 3 tabs. The timings are 0.33 to 2 Level%, 2 to 10 Level%, 10 to 20 Level%, 20 to 40 Level% that is to add different percentage under base frequency for different interhomonics.

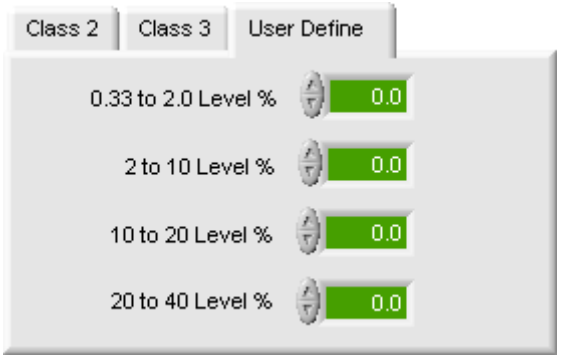


Figure 12-22 Interhomonics Parameter Setting

12.6.2 Meister Curve Output

It is same as described in section 12.2.2.

12.6.3 Meister Curve Waveform Simulation Diagram

It is same as described in section 12.4.3.

12.6.4 Meister Curve Current Measurement Display

It is same as described in section 12.4.4.

12.6.5 Meister Curve Timing Indicators

It is composed of 4 indicators to inform users the Meister curve used at present as well as the number of procedure executed.

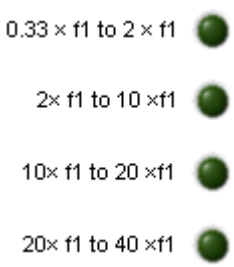


Figure 12-23 Meister Curve Timing Indicators

12.6.6 Interharmonic Frequency Measurement

It will show the measured Interharmonic Frequency when Trig On. If it is 3 phases voltage output, Phase1, Phase2 and Phase3 will prompt in sequence.

Figure 12-24 Interharmonic Frequency Measurement

12.7 Back

Click this button can exit the present screen and return to main screen. It will disappear when Trig On and reappear when Trig OFF.

Figure 12-25 Back Button

13. IEC61000-4-14

13.1 Function Description

The 616XX Series do not support this function.

This function follows the regulation of IEC61000-4-14 Voltage fluctuation immunity test for testing. It uses 615XX List Mode to meet the requirements during its irregular change. As the entire test procedures have been defined internally, click Trig can activate one of it. Select User Define if partial parameters need to be modified. Figure 13-1 shows the IEC61000-4-14 control screen where picture A indicates the detail steps of Voltage Fluctuation Immunity Test in the above picture and picture B indicates the detail steps in picture A.

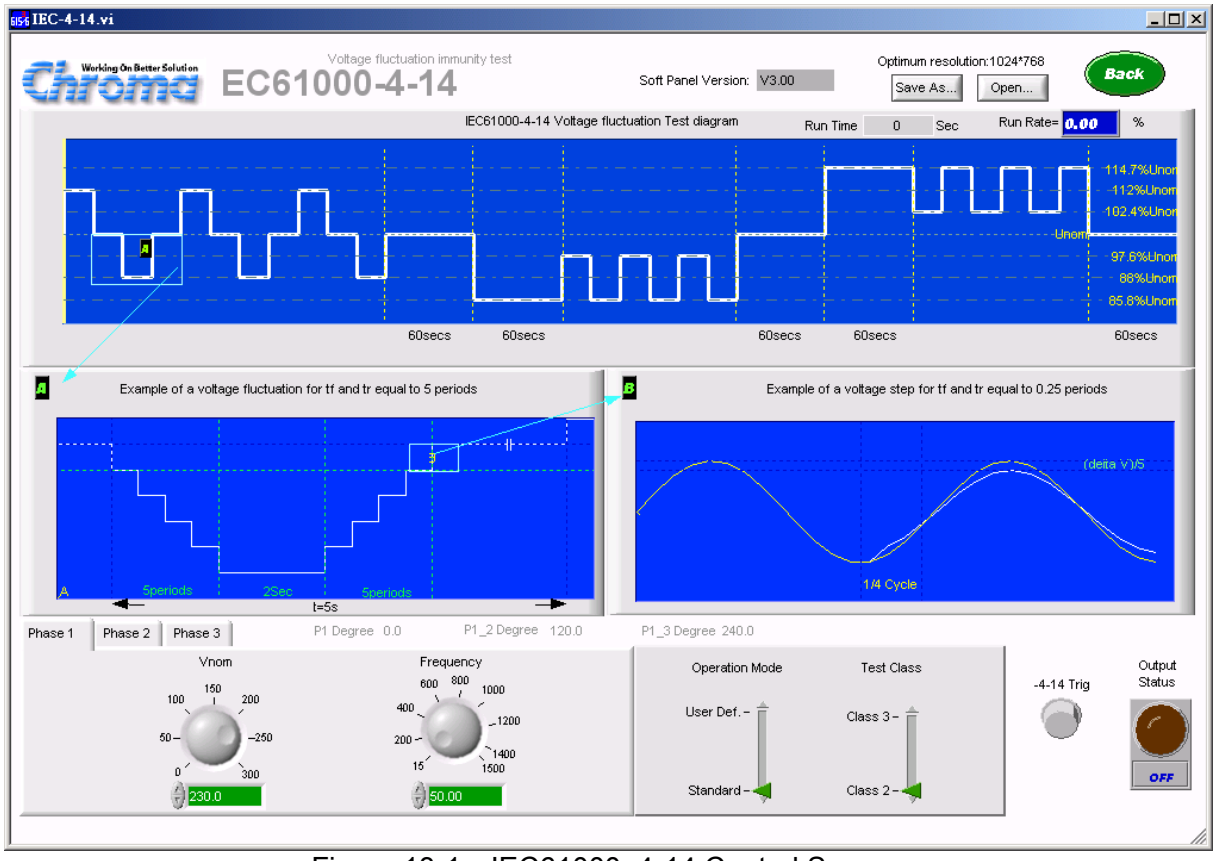


Figure 13-1 IEC61000–4-14 Control Screen

13.2 Function Keys Description

There are functions of Vnom, Frequency, Operation Mode, Test Class, 14-14 Trig and Output Status.

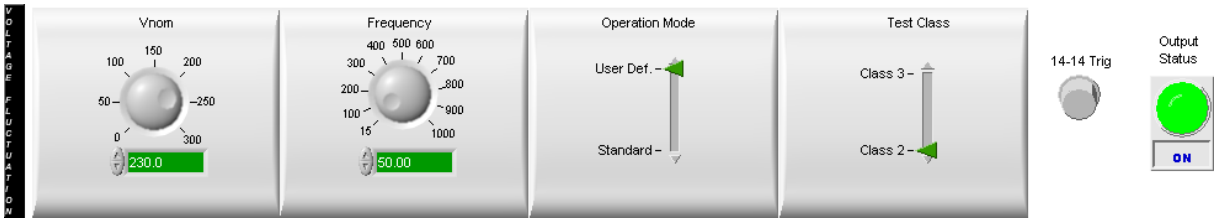


Figure 13-2 IEC61000–4-14 Control Elements

13.2.1 Vnom (V)

This element sets the AC voltage for AC Source output. The Standard is fixed to 230Vac while User Define is adjustable.

Figure 13-3 Vnom (V)

13.2.2 Frequency

This element sets the output frequency of AC Source.

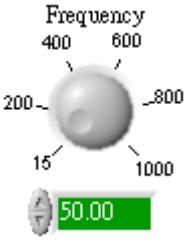


Figure 13-4 Frequency

13.2.3 Operation Mode

This element is able to select Standard or User Define. Vnom is unable to adjust when Standard is selected.

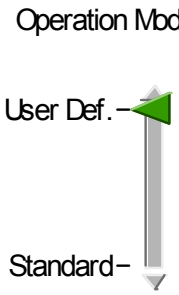


Figure 13-5 Operation Mode

13.2.4 Test Class

It is able to select Class 2 or Class 3.

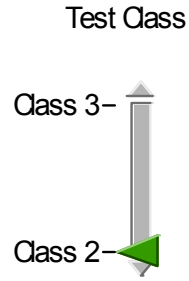


Figure 13-6 Test Class

13.2.5 Output Status

This element sets the Fixed Mode output voltage ON or OFF.

Figure 13-7 Output Status

13.2.6 14-14 Trig

Click this element to start testing regulation 14-14 Voltage Fluctuation Immunity. Once triggered, Trig Off will appear to let users decide if abort the test.

Figure 13-8 14-14 Trig

13.3 Display Description

The display area is composed of 3 pictures containing Timing Control and illustrations A and B. Picture A is the addendum explanation of Timing Control while picture B is the addendum explanation of picture A.

13.3.1 Timing Control Graph

Figure 13-9 is the timing control procedure of this function, of which contains the execution time and voltage level. In order to make the screen visible, the time axis is not presented in scale. The green portion marked with A is zoomed in Figure 13-10.

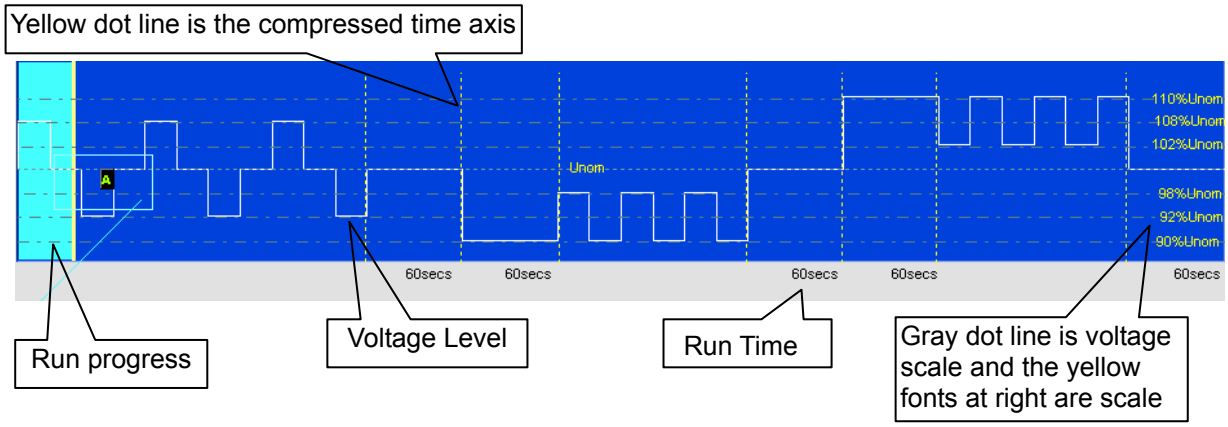


Figure 13-9 Timing Control Screen

Figure 13-10 is the zoom in of Timing Control Screen block A that indicates after 5 steps are descended it stopped for 2 seconds and then ascended 5 steps back to the original voltage that took about 5 seconds. The voltage variation of each step is explained in picture B.

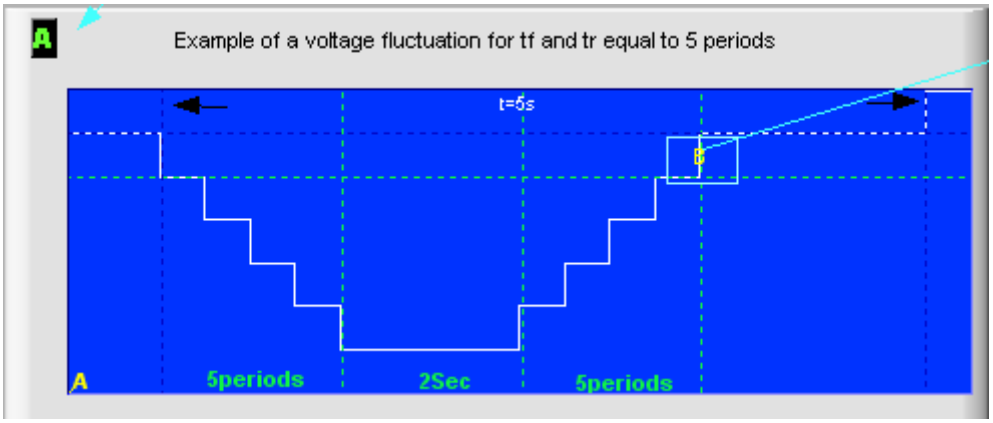


Figure 13-10 Zoom In of Block A

Figure 13-11 is the zoom in of block B in block A that indicates the changes of waveform.

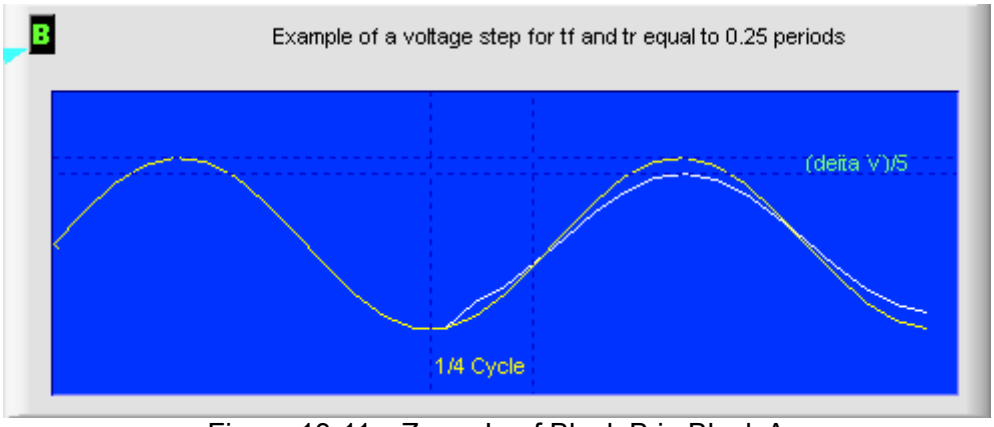


Figure 13-11 Zoom In of Block B in Block A

13.4 Back

Click this button can exit the present screen and return to main screen. This button is unable to work when 14-14 Trig On is running.

Figure 13-12 Back Button

14. IEC61000-4-28

14.1 Function Description

The 616XX Series do not support this function.

This function follows the regulation of IEC61000-4-28 Variation of power frequency immunity test for testing. It uses 615XX List Mode to meet the requirements during its irregular change. As the entire test procedures have been defined internally, click Trig can activate one of it. Select User Define if partial parameters need to be modified. Figure 14-1 shows the IEC61000-4-28 control screen.

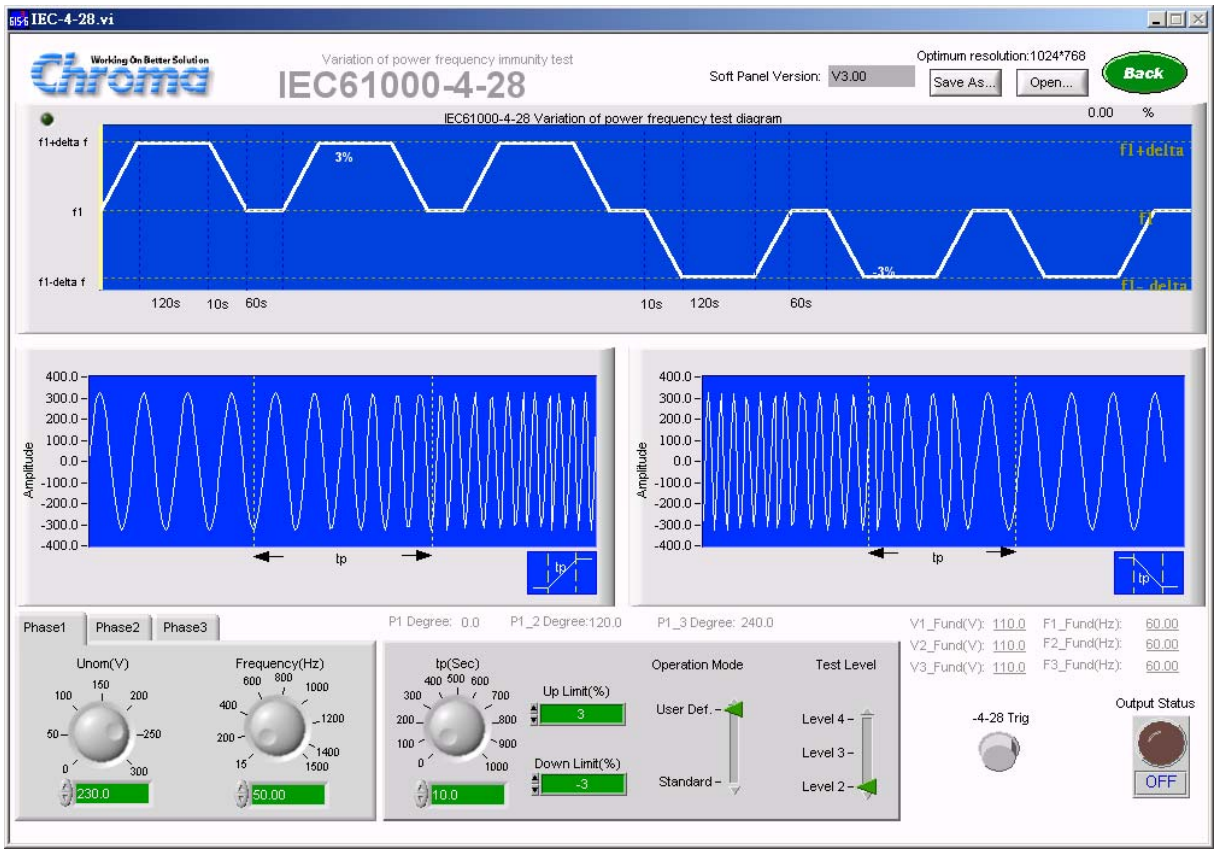


Figure 14-1 IEC61000–4-28 Control Screen

14.2 Function Keys Description

There are functions of Vnom, Frequency, tp, Up Limit, Down Limit, Operation Mode, Test Level, 14-28 Trig and Output Status.

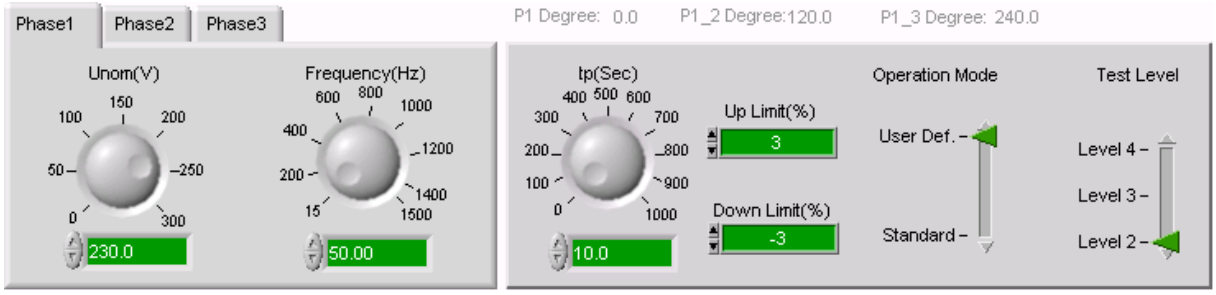


Figure 14-2 IEC61000–4-28 Control Element

14.2.1 Vnom (V)

This element sets the AC voltage for AC Source output. The Standard is fixed to 230Vac while User Define is adjustable.

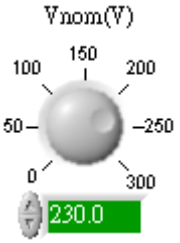


Figure 14-3 Vnom (V)

14.2.2 Frequency

This element set the frequency of AC Source output.

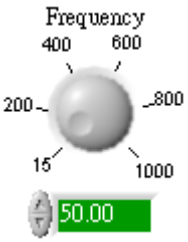


Figure 14-4 Frequency

14.2.3 Operation Mode

This element is able to select Standard or User Define. Vnom is unable to adjust when Standard is selected.

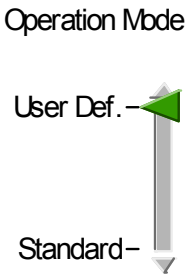


Figure 14-5 Operation Mode

14.2.4 Test Level

It is able to select Level 2 or Level 3 or Level 4.

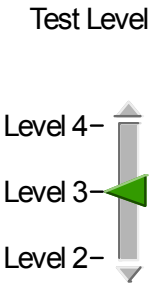


Figure 14-6 Test Level

14.2.5 Output Status

This element sets the Fixed Mode output voltage ON or OFF.

Figure 14-7 Output Status

14.2.6 Trig

Click this element to start testing Voltage Dips and Short Interruptions.

Figure 14-8 Trig

14.2.7 tp (sec)

This element sets the ascending or descending time.

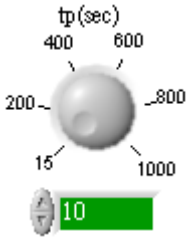


Figure 14-9 tp (sec)

14.2.8 Up Limit (%)

This element sets the percentage of up voltage.

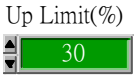


Figure 14-10 Up Limit (%)

14.2.9 Down Limit (%)

This element sets the percentage of down voltage.

Figure 14-11 Down Limit(%)

14.3 Display Description

The display is composed of 3 graphs including the IEC61000-4-28 variation of power frequency test diagram control procedure as well as the variations of frequency rise and fall.

14.3.1 Control Process

Figure 14-12 shows the function control procedure, it indicates the execution time and voltage level. In order to make the screen visible, the time axis is not presented in scale. The green lines indicate the time required for voltage rise or drop.

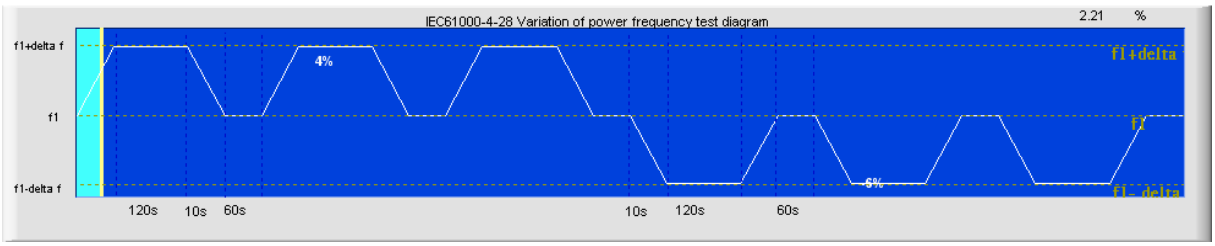


Figure 14-12 IEC1000-4-28 Variation of Power Frequency Immunity Test Control Procedure

Figure 14-13 shows the f1, tp and f1+Δf frequency variation.

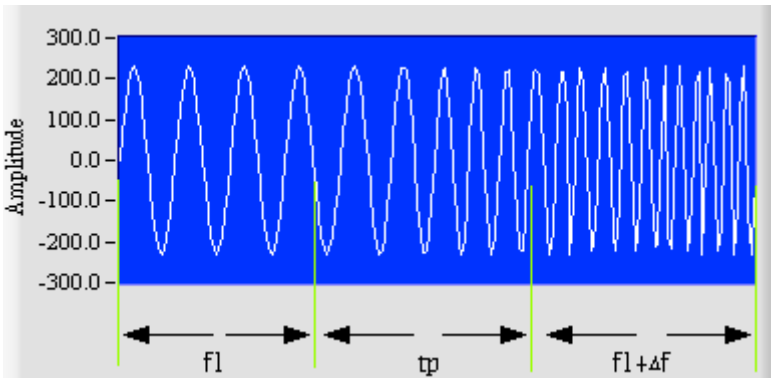


Figure 14-13 Variation of Frequency Rise

Figure 14-14 shows the f1-Δf, tp, f1 frequency variation.

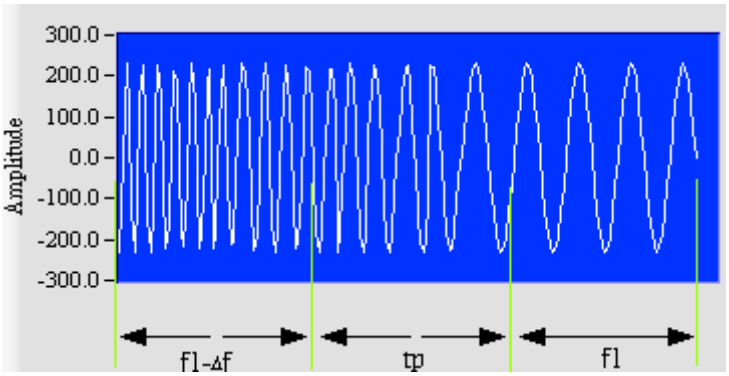


Figure 14-14 Variation of Frequency Drop

14.4 Back

Click this button to exit the present screen and return to the main screen.

Figure 14-15 Back Button

15. Chroma AC Source Waveform Editor

15.1 Function Description

The 616XX Series do not support this function.

This is a software program for Chroma AC Source 615XX Series only. It can use GPIB or RS232 interface to communicate with PC. The main function of it is to input the harmonics to the table and show the simulation waveform in the mapped panel cell. This waveform can be sent to the User Define storage area US1 to US6 of Chroma 615XX AC Source. Later on it can be recalled at any time at 50 or 60Hz, however, the accuracy is less than SYN.

Figure 15-1 shows the Waveform Editor execution screen.

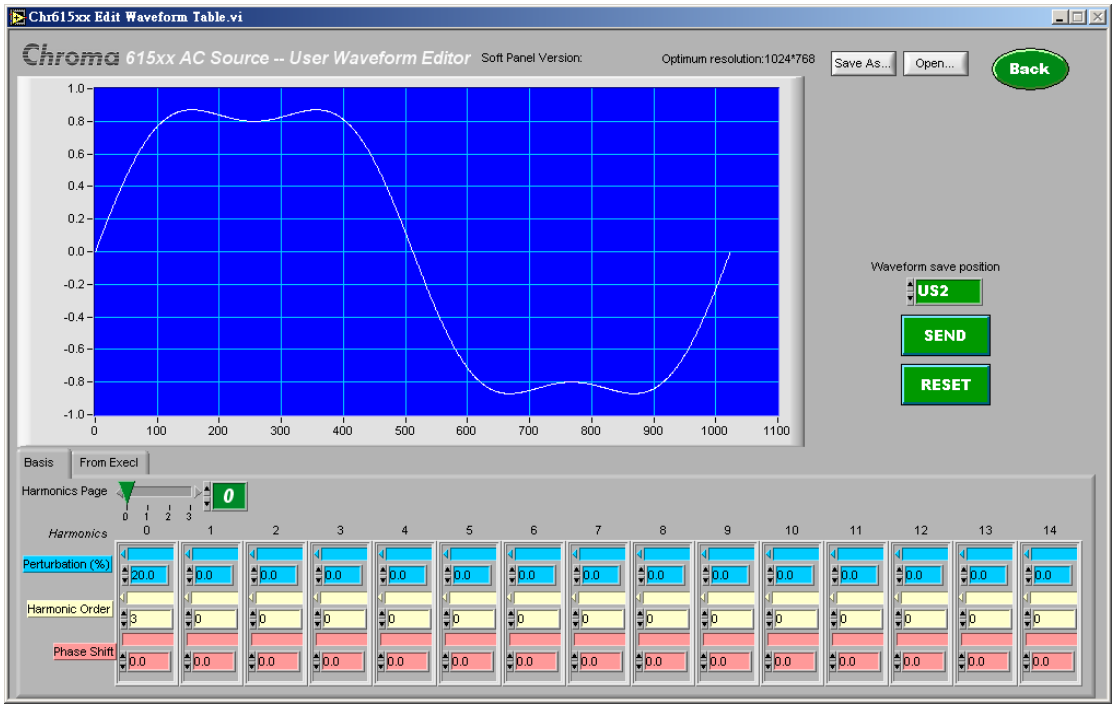


Figure 15-1 Waveform Editor Control Screen

15.2 Description of Basis Input

There are two ways to input the data: Basis and From Excel. They are divided into two tabs. In the Harmonics table, there are 15 harmonic levels for input as Figure 15-2 shows. For instance, level 16% and the 3rd step are entered in the first level in Figure 15-2, and it adds the harmonic of no phase degree to its original waveform.

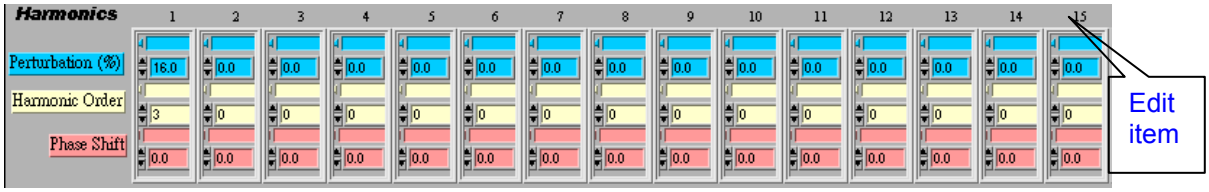
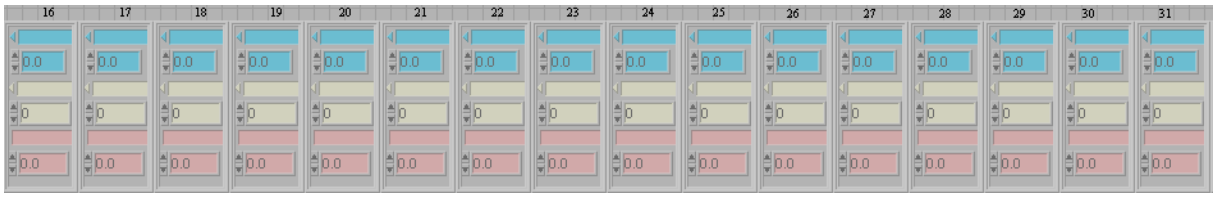


Figure 15-2 Harmonics Input Display

Perturbation (%) : Blue area, it is capable of entering the harmonic level percentage.
Harmonic Order : Yellow area, it is capable of entering the harmonic order.
Phase Shift : Red area, it is capable of entering the harmonic phase degree offset.

Edit item: The first entered window will prompt 15 items for use. If more than 15 items need to be edited, roll the horizontal scroll on screen can edit maximum 40 items as shown below. Users can input the required harmonic level to the gray scale grid directly.



Waveform save position

US2 : Click this button to select the location to be saved. There are US1, US2, US3, US4, US5 and US6 available for User Define. When the setting is done, set Waveform A or Waveform B to the User Define waveform.

SEND : Click this button to convert the set harmonic level to 1024 data and send to AC Source 615XX Series.

RESET : Click this button will clear all parameters in the Harmonics Table to 0.

SAVE : This button saves all parameters to PC's hard disk (or any storable place.) It can save plenty of files as long as the space is enough. The filename extension is .waveform. Do not save the file to "Desktop" and "My Document" folder. It is suggested to create a new folder for access.

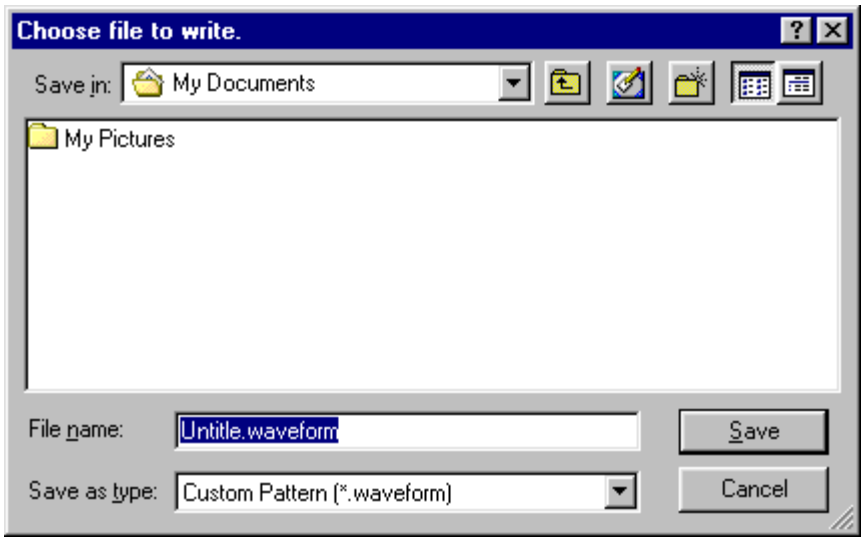


Figure 15-3 Save Screen of Waveform Editor

OPEN: This button opens a .waveform file as Figure 15-4 shows.

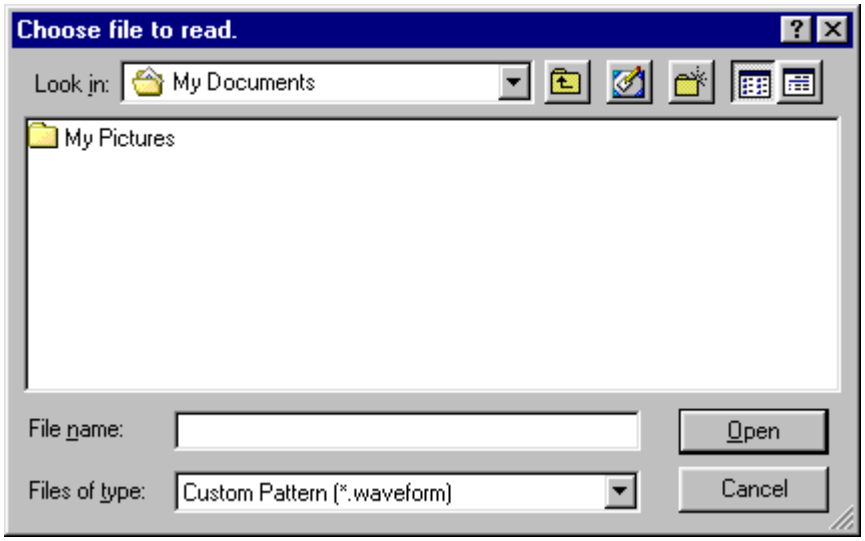


Figure 15-4 Open Screen of Waveform Editor

Back : This button exits the Waveform Editor.

During transmission, it requires about 6 seconds to load the data to AC Source, so the screen will show the time that remains.

Figure 15-5 Waveform Editor Load Processing Screen

15.3 Description of Inputting From Excel

The way of inputting From Excel is to create an Excel file that includes 1024 entries data and then imports them for waveform perturbations conversion and waveform simulation by software. When the simulated waveform is confirmed OK, follow the steps as performed in Basis to send the perturbations to Waveform User1 to User6 as the Note described in Figure 15-6.

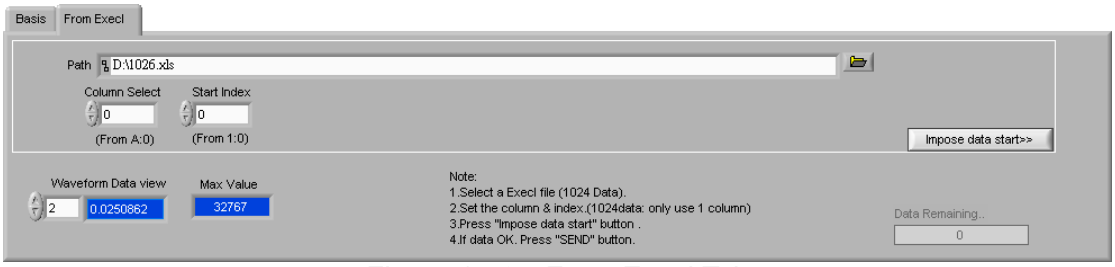


Figure 15-6 From Excel Tab

Path:
It specifies the Excel file to be converted and its located path. Click the browse button at right can specify the path with less error.

Column Select and Start Index:
They specify the start column and row of the present 1024 entries of data. Be noted that only one column can be used to define the 1024 entries of data not row number. Correct position needs to be specified before the conversion starts.

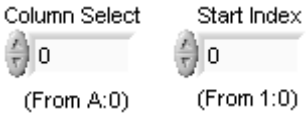


Figure 15-7 Column Select and Start Index

Impose Data Start:
It opens an Excel File and imports the specified column data to software. The software will draw the data read in a Waveform simulation graph for users to confirm its correctness. It will require some time for conversion and Data Remaining will show how many entries of data are left.

Figure 15-8 Impose Data Start

Waveform Data View and Max Value:
They confirm if the converted data meet the internal code conversion. Map the searched Max Value relative to 1 and divide the imposed value by Max Value to ensure the values all 1024 entries are within 1. The value of will show on Waveform Data view for observation.

Max Value is an indicator that shows the maximum value found from the Imposed data. Waveform Data view shows the data of 1024 entries that is divided by Max Value.

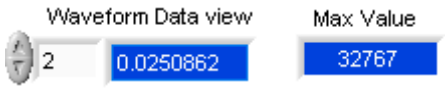


Figure 15-9 Waveform Data View and Max Value

16. Chroma AC Source Auto Run

Auto Run is a function structured under Fixed Mode similar to List Mode. It is suitable for long time test (1 second at least) and is different from the short time (mSec) in List Mode. Moreover the setting of Voltage Range is unable to change under List Mode. Auto Run can change the Voltage Range according to the process to meet the requirements.

Figure 16-1 Auto Run Start Window

16.1 Output Control Element

There are functions of Vac(V), Frequency(Hz), Vdc(V), I_Limit, Vrange, Waveform (615XX Series only), Time(Sec) and Sequence.

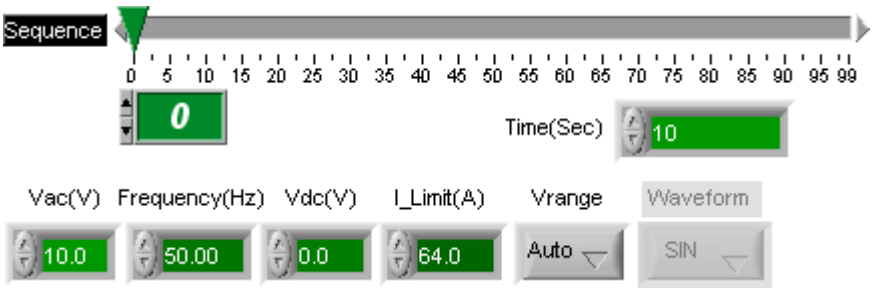


Figure 16-2 Voltage & Frequency Parameter Setting

16.1.1 Vac

Each sequence can set the start AC voltage. The initial voltage setting is 0V and will adjust according to the Voltage Range. If the range is set to 150, the maximum input is 150V; and if the range is set to 300 or Auto, the maximum input is 300V. (The 3 phases can be set separately.)

Figure 16-3 Vac (V)

16.1.2 Frequency

Each sequence can set the start frequency. The initial setting is 50Hz, the maximum input is 1000 Hz (1500Hz for 61512) and minimum is 15Hz. (The 3 phases can be set separately.)

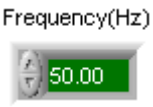


Figure 16-4 Frequency (Hz)

16.1.3 Vdc

Each sequence can set DC voltage. The initial voltage setting is 0 and will adjust according to the Voltage Range. If the range is set to 150, the maximum input is 212.1 V; and if the range is set to 300 or Auto, the maximum input is 424.2V. (The 3 phases can be set separately.)

Figure 16-5 Vdc (V)

16.1.4 I_Limit (A)

Each sequence can set current limit. The initial setting is 8A. (The 3 phases can be set separately.)

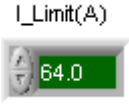


Figure 16-6 I_Limit (A)

16.1.5 Vrange

The voltage range setting includes AUTO, 300V and 150V.

Figure 16-7 Voltage Range

16.1.6 Waveform

Each sequence can set the Waveform output. See the detail description of Waveform in Fixed Mode. (The 3 phases can be set separately.)

Figure 16-8 Waveform

16.1.7 Time

Each sequence can set the execution time. The initial setting is 0 that is the sequence execution time. If the Time of Sequence Index is set to 0, the following Sequence setting will be invalid no matter if it is set.

Figure 16-9 Time (Sec)

16.1.8 Sequence

There are 100 sequences in Auto Run Mode. The function of sequence is to set the output waveform features. Number 1-100 can be entered to the numeric display area or clicking the Slider Bar at right to switch to the sequence to be set. If it is necessary to fine tune 1 sequence, use the up/down button on the numeric display area or the left/right arrow of slider bar to adjust it. The parameters at the lower layer include Vac, Frequency, Vdc, I_limit, Vrange, Waveform Type & Time. The “The final active sequence” indicates the sequence to be set and 0 is the value set for the Sequence Index.

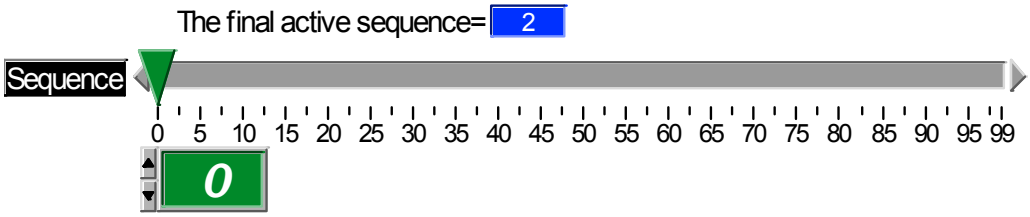


Figure 16-10 Sequence Selection Slider Bar

16.2 Loop Control

It is composed of Step Page, Step Start, Sequence Start, Sequence End, Loop and Count that are parameter settings for Sequence. This control not only can do small loop in sequence but also big loop count for the outmost Step.

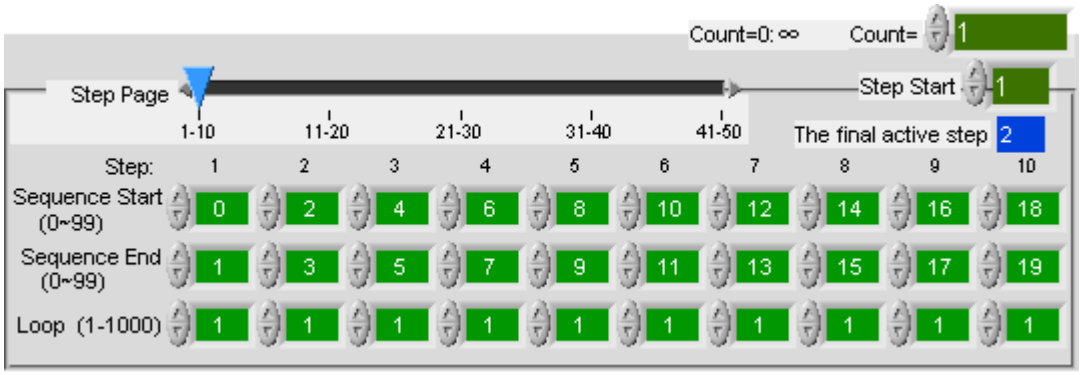


Figure 16-11 Loop Control

16.2.1 Step Page

Step Page is the Step position controller and there are total 50 Steps. Since the indicators in the window screen are not enough, each page can only show 10 Steps and Step Page will show the current used Step Index when switches. "The final active step" at right indicates the Step that is setting currently as well as which Step Index "The final active sequence" is in.

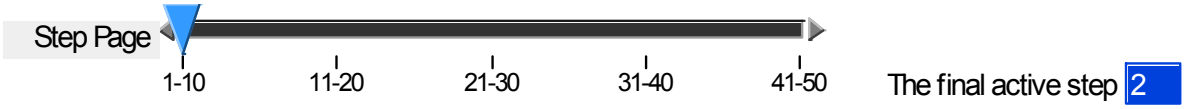


Figure 16-12 Step Page

16.2.2 Step Start

Step Start is a flexible application that can decide the sequence to begin the execution after edited the parameters in Step. It will ignore the previous Step settings.

Figure 16-13 Step Start

16.2.3 Sequence Start

Sequence Start is able to set the initial Sequence Number of each step. Users can decide which Sequence to start; however the latter number has to be larger than the previous one.

Figure 16-14 Sequence Start

16.2.4 Sequence End

Sequence End sets the end sequence number of each step. Users can decide the sequence to be ended; however the latter number has to be larger than the previous one. The Sequence Start Number in same step has to be smaller than the Sequence End Number. The latter sequence Start Number has to be larger than previous Sequence End Number.

Figure 16-15 Sequence End

16.2.5 Loop

This element sets how many times it will loop from Sequence Start to Sequence End in the Step.

Figure 16-16 Loop

16.2.6 Count

This element sets the re-run times after all valid steps are executed.

Figure 16-17 Count

16.3 Elements

It is same as List Mode. Please refer to the total execution time of Execute Time element.

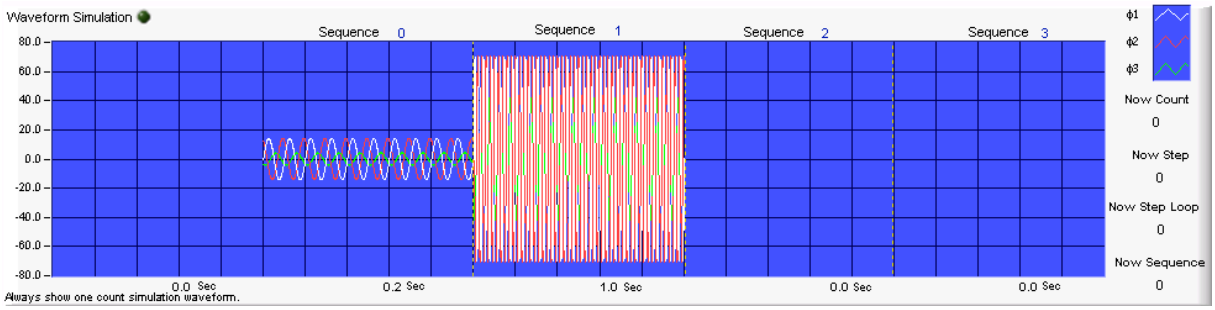


Figure 16-18 Setting Elements

16.4 Execution Elements

There are Remaining Time, Now Count, Now Step, Now Step Loop, Now Sequence & Run Progress elements.

Figure 16-19 Execution Elements

16.4.1 Remaining Time

It is at the right of Execute Time. Its main function is to count down after Trig On is executed to inform users the remaining time.

Figure 16-20 Remaining Time

16.4.2 Now Count

This element is to show how many times it has been counted for the outmost loop.

Figure 16-21 Now Count

16.4.3 Now Step

This element is the Step Index that will point to the present Step according to the settings.

Figure 16-22 Now Step

16.4.4 Now Step Loop

This element indicates how many loops have been executed in Step.

Figure 16-23 Now Step Loop

16.4.5 Now Sequence

This element shows the Sequence Number processed in a Step from Sequence Start to Sequence End.

Figure 16-24 Now Sequence

16.4.6 Run Progress

This element shows the percentage of total execution time.

Figure 16-25 Run Progress

16.5 Back

Click this button to exit the present screen and return to main screen. It will disappear during execution.

Figure 16-26 Back Button

16.6 Save As…

Press this button to save the parameters set on the present screen to an .Auto file. Do not save the file to “Desktop” and “My Document” folder. It is suggested to create a new folder for access.

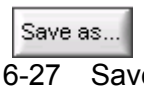


Figure 16-27 Save Button

16.7 OPEN…

Click this button can open an existed .Auto file in the hard disk. This reduces the action of parameter input and avoids errors from occurring.

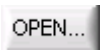


Figure 16-28 OPEN… Button

16.8 Reading Display Screen

The display and operation are same as in Fixed Mode.

17. Report Generator

Report Generator is a tool to record the readings. When the access path is selected by user, click “Record Start” will log each reading.

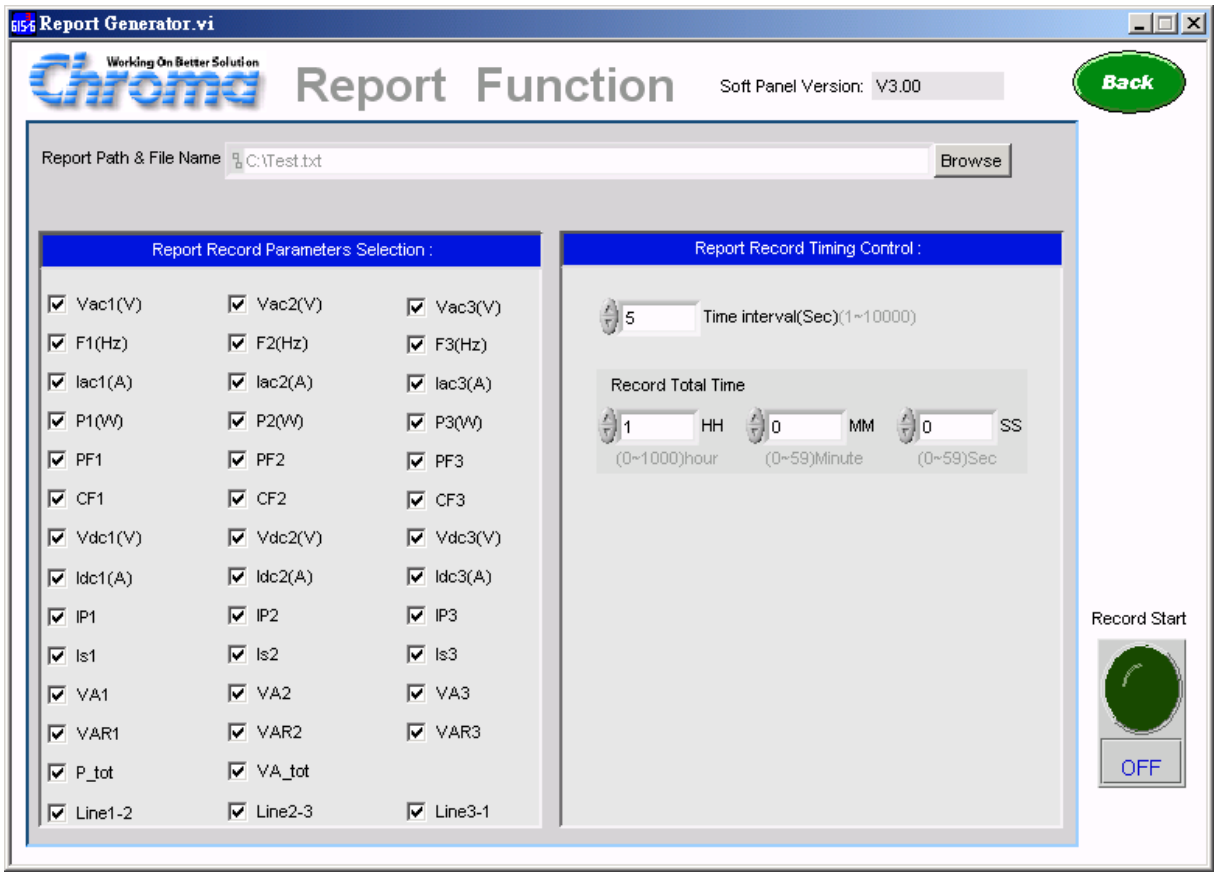


Figure 17-1 Startup Screen of Report

17.1 Setting Elements

The setting elements include Report Path & File Name, record parameters: Voltage (V) RMS, Frequency (Hz), Current (A), Power (W), PF, CF, Vdc (V), Idc (A), IP, IS, VA, VAR (support 3 phases selection), and time control parameters: Time interval (Sec), Record Total Time (HH, MM, SS).

17.1.1 Report Path & File Name

This element enables users to select the path and set the filename for a file. Click **Browse** to prompt a dialog box for users to select the path while filename needs to be inputted by user. It will check for the repeated filename. Do not save the file to “Desktop” and “My Document” folder. It is suggested to create a new folder for access.

Figure 17-2 Report Path & File Name

17.1.2 Record Parameter Selection

There are Voltage (V), RMS, Frequency (Hz), Current (A), Power (W), PF, CF, Vdc (V), Idc (A), IP, IS, VA, VAR 12 elements and their 3 phases can be recorded separately. In addition, there are P_tot, VA_tot, Line1-2, Line2-3, Line3-1 selection in 3 phases. The user can select if recording them.

Figure 17-3 Record Parameter Selection

17.1.3 Time Control Parameters

The parameters are Time interval (Sec) and Record Total Time (HH, MM, SS). Time interval (Sec) is to set the time in-between measurement and Record Total Time (HH, MM, SS) is to set the time for measurement where HH indicates hour with setting range 0-1000, MM indicates minute with setting range 0-59 and SS indicates second with setting range 0-59.

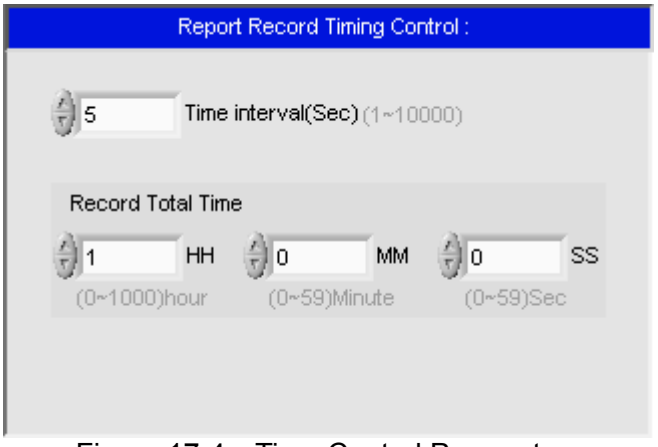


Figure 17-4 Time Control Parameters

17.2 Record Start

Click this button to start recording. No matter it is in Fixed Mode or other Function, once the time set is reached it will read the set parameters from machine and users can turn it Off to stop the recording function.

Figure 17-5 Record Start

There is an indicator in the Fixed Mode main window to let users know the Report function is active that is a light on the Report Generator button, and it is recording when on.

Figure 17-6 When Report Generator is On in Fixed Mode Window

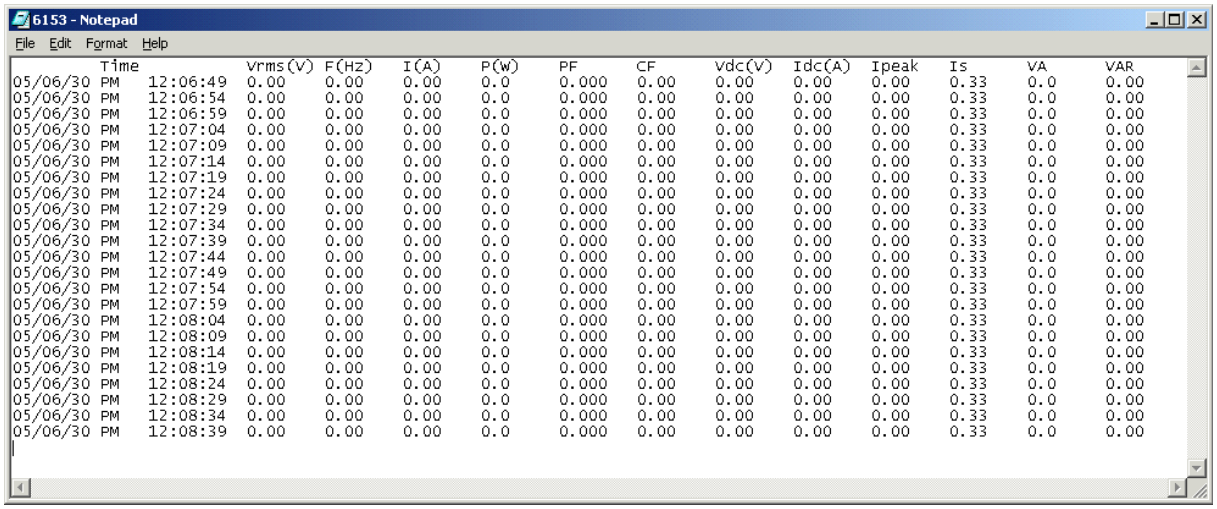
17.3 Back

Click this button to exit the present screen and return the main screen.

Figure 17-7 Back Button

17.4 Report Example

The following example records the output measurement data of Chroma 61502 for every 5 seconds.



6153 - Notepad

File Edit Format Help

Time		vrms(V)	F(Hz)	I(A)	P(W)	PF	CF	Vdc(V)	Idc(A)	Ipeak	Is	VA	VAR
05/06/30 PM	12:06:49	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:06:54	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:06:59	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:04	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:09	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:14	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:19	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:24	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:29	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:34	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:39	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:44	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:49	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:54	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:07:59	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:08:04	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:08:09	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:08:14	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:08:19	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:08:24	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:08:29	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:08:34	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00
05/06/30 PM	12:08:39	0.00	0.00	0.00	0.0	0.000	0.00	0.00	0.00	0.00	0.33	0.0	0.00

Figure 17-8 Example of Report

Headquarters 總公司

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