

TEKON[®] 570

Power Analyzer

USER MANUAL



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2019,01 Ver 4

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1. General

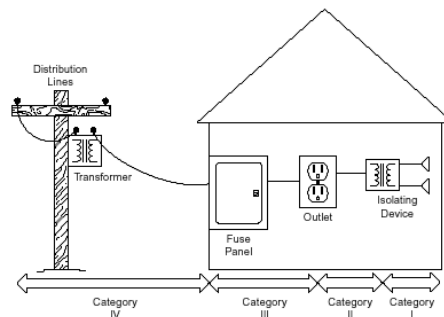
1.1. International Standard Safety Symbol

기호	설명
	Double insulated protection
	Warning. User should read  marking area in the manual and need pay attention. If user does not follow the Warning -safety information, user may have physical injury and the Unit, system may be damaged
	Disposal information

1.2. Measurement Range (Over voltage range) definition

Higher Category indicates Higher Over Voltage Electric environment. Tester designed for CAT III environment can withstand higher voltage than the tester designed for CAT II

To avoid any serious accident while measurement, better to use Tester higher category for the testing environment. For example, do not use Tester with CAT at testing environment CAT II, III, or IV



Category	Description
CAT I	2 nd electric circuit connecting Transformer example : protected electric circuit
CAT II	Basic circuit of things which electric code is connected to AC consent /Outlet. example : equipments, portable tool, home apparatus etc.
CAT III	Electric circuit of fixed facilities which directly connected to Consent and distribution board / Switching board. example : fixed facility Switch or industrial equipment firmly connected to fixed facility
CAT IV	Electric circuit from Entrance to Overvoltage protection system (Distribution board/Switch board) and Wattage Meter Example : Electric meter and primary Over- current protector

1.3. Safety precautions

This instrument is designed and manufactured to be compliant with IEC 61010-1, an international standard on safety requirements for electrical equipment for measurement, control and laboratory use, and has been thoroughly tested prior to shipment to ensure it performs at its best. This user's manual contains general safety precautions to prevent danger to the user as well as information on how best to use the instrument for a longer service life. Be certain that, prior to use, you get familiarized with this manual.

1.3.1. User Manual

- Before using the instrument, make sure to read this User's Manual thoroughly and fully understand.
- Keep this User's Manual in an easily accessible location for quick reference whenever needed.
- Ensure that the product is used in a manner not deviating its intended use and following operating instructions specified in User's Manual.
- Carefully read, understand and observe the safety instructions described in this manual, including safety precautions indicated by symbols.
- With regard to the use of clamp sensor, it is also required to carefully read and understand the operating instructions on the clamp sensor.

The safety instructions described herein shall be observed during all phases of operation; if not, it may lead to injury or safety accident. The Manufacturer assumes no responsibility and liability for any loss or damage caused by the customer's failure to comply with these safety precautions including those as indicated by Danger, Warning and Caution.

Danger

- Improper use in a manner not following correct operations and conditions may lead to accidents causing damage to the product or serious bodily injuries due to electrical shock as the protection provided by the instrument can be compromised. Before using the instrument, make sure to check the product works properly.
- Never clamp the probe onto circuits with voltage greater than 300 VAC Measurement Category CAT IV, 600 VAC CAT III and 1000 VAC CAT II.
- Do not use the instrument in an environment where combustible gas, explosive gas or steam is present, because it is dangerous.
- Never use the instrument if the instrument or your hands are wet, or when moisture or beads of water have formed on the surface of the instrument.

- Measurement

- Do not exceed the maximum allowable input of any measuring range.
- Never disassemble the instrument during taking measurements.

- Battery

- Use the battery specifically dedicated to the instrument. Do not use a battery other than that.
- Charge the battery using an adapter specifically dedicated to the instrument.

- Measurement leads for measuring voltage

- Use the measurement lead provided with the product as standard.
- If electrical measurement category ratings are different between the measurement lead and the main body, the rating whichever lower shall prevail.
- Check ensuring that allowable measurement voltage is within rated voltage.
- Never connect a voltage measuring lead not needed for the measurement.
- First plug one end of the measurement lead into the main body and then connect the other end to the voltage source line being measured.
- Be careful that your fingertip is not on or near the contact area when measuring current with the instrument.
- Never remove the lead from the main body terminal during the measurement (while energized from the voltage source line).
- Do not allow the metal part at the end of the measurement lead to short between two lines of the measurement line.
- Do not touch the metal part at the end of the measurement lead.

- Clamp sensor

- Make sure to use a clamp sensor specifically dedicated to the power analyzer.
- Never fail to check that allowable measurement current is within rated current. Use the analyzer in an electrical circuit not exceeding the maximum rated voltage.
- Never connect a sensor not needed for the measurement.
- First connect the sensor to the main body and then connect it to the voltage source line being measured.
- Never remove the sensor from the main body terminal during the measurement (while energized from the voltage source line).
- Make sure to connect the instrument to the secondary side of a circuit breaker; do not make measurements at the primary side because current capacitance at the primary side is quite big.



Warning

- Pay attention to the possibility that the voltage source line under measurement is at high temperature.
- Never apply the current or voltage exceeding each measurement range for a long period of time.
- Do not apply voltage and current to the measurement lead for voltage or clamp sensor in the state where the power is turned Off.
- Do not use the instrument in an especially dusty environment, nor where it might be splashed with liquid.
- Do not use the instrument near a source of strong electromagnetic radiation, or near a highly electrically charged object.
- Be careful to avoid dropping the instrument or otherwise subjecting it to mechanical shock or vibration.
- Insert a SD card securely in the correct direction until it clicks. Inserting it incorrectly or with excessive force may result in damage in SD card itself or the main body of the instrument.
- Inserting and removing an SD card should be done to the extent as practicably possible in the state of the instrument switched off. If the card is removed while in use with the instrument, some data stored may be lost or the main body may be damaged.

- Clamp sensor

- Do not excessively bend or pull the cable of the clamp sensor.
- - Storage after use -
- Make sure to remove the measurement lead for voltage and the clamp sensor only after turning the power off.
- When not in use for a long period of time, store the instrument with the battery charged around 50% full.
- Do not give shocks, such as vibration or drop, which may damage the instrument, during transit or use.
- Do not expose the instrument to high temperatures, humidity or dew, or direct sunlight.
- Use a damp cloth with neutral detergent or water for cleaning the instrument; do not use abrasives or solvents.
- If the outer surface is wet, store the instrument after drying it.

1.4. Unpacking

When you receive the product, inspect the package content right away to make sure it matches the description in the seller's listing. If the package is missing a part or there is a damaged component, immediately notify to the supplier without use. In this case, the shipping container needs to be stored to track the product as evidence for your claim. It is recommended to recharge the battery before using the instrument as it is run down to empty during transport.

1.4.1. Accessories as standard

Description	Pieces
Flexible current clamp 3000 A(T200F)	3
Colour test probe	4
Colour test clip	4
Colour voltage test pin	4
USB cable	1
SD Memory(8GB)	1
12 V / 2.5A Power supply adapter	1
Li-Ion rechargeable battery Pack(7.2V/5.2Ah)	1
Soft carrying bag	1
Compact disc (CD) with PC Program and manuals	1

2. Overview and specifications

2.1. Product overview

- TEKON 570 is a lightweight but robust handheld power analyzer designed for routine and diagnostic testing on-site of power. It incorporates 7-inch wide view touchscreen and uses rechargeable batteries.
- Allows you to monitor a variety of power parameters such as power, voltage, current, harmonics, signal waveforms and phase diagram with added convenience of being able to read the large LED screen

2.1.1. Features

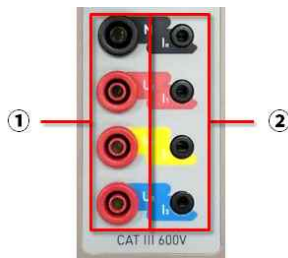
- Captures three-phase power quality measurements
- Simultaneously measures active/reactive/apparent power, power factor, RMS voltage/current, phase angle and neutral line current
- Supports a variety of wiring such as single-phase 2-wire, single-phase 3-wire, three-phase 3-wire and three-phase 4-wire
- Displays voltage and current in waveforms and phase diagram
- Selectable excitation voltages: 5V, 10V, 40V
- Lightweight and sturdy handheld device that is easy to install and carry
- Easy-to-read 7-inch widescreen
- Touchscreen with user-friendly UIs
- Rechargeable batteries
- Facilitates a micro SD memory card slot (to 8GB capacity as standard) that allows you to backup large volume of power survey data

2.2. Nomenclature and functions

2.2.1. Appearance



No.	Function	Description
①	Power Button	Power On/Off Button
②	Adaptor socket	Socket used to be plugged into power outlet for charging
③	Terminal for line input	A power input terminal used to house the measurement cable
④	SD socket USB socket	A slot into which SD card is inserted to save data Used to connect USB cable for communications
⑤	Display screen	LCD readout of the measurements (7-inch, 1024*600 pixels)



No.	Function	Description
①	Voltage input terminal	A terminal for connection with the lead for voltage testing
②	Clamp sensor input terminal	A terminal for connection with current clamp

2.3. Specifications of the product

2.3.1. Power supply

- AC power adaptor

Input range : AC 100V ~ 240V @ 50Hz/60Hz

Output : DC 12V 2.5A

- Battery

Type	Rechargeable Li-ion battery pack, 5.2Ah
Rated voltage	7.4V
Charging current	2.5A
Charging time	hour
Battery life	> 8 hours 300 charging/discharging cycles

2.3.2. Mechanical specifications

- Size: 270 X 246 X 124mm
- Weight: 2.3kg
- Shock and vibration: Latest edition of EN 61010-1
- Waterproof: IP 54, latest edition of EN 60529 (electrical IP2X terminal)

2.3.3. Requirements for operating environment

Operating temperature	0 ~ 50°C / 32 ~ 122°F
Storage temperature	-20 ~ 50°C / -4 ~ 122°F (<30 days)
Charging temperature	(from 40 ° C to 10 °) 104 ° F ~ 50 °
Altitude	Operating: 0~2,000m (6,560 feet) Non-operating: 0 ~ 10,000 m (32,800 feet)
Relative humidity	10~85%

2.3.4. Safety compliance

○ Safety directives

500V CAT III, Pollution Degree 2



IEC 61010-1:2010(3rd Edi.)

EN 61010-1:2010(3rd Edi.)

○ EMC

IEN 61326-1:2013

EN 55011/A1:2010 (Class A)

EN 61000-3-2:2014

EN 61000-3-3:2013

2.3.5. Storage capacity

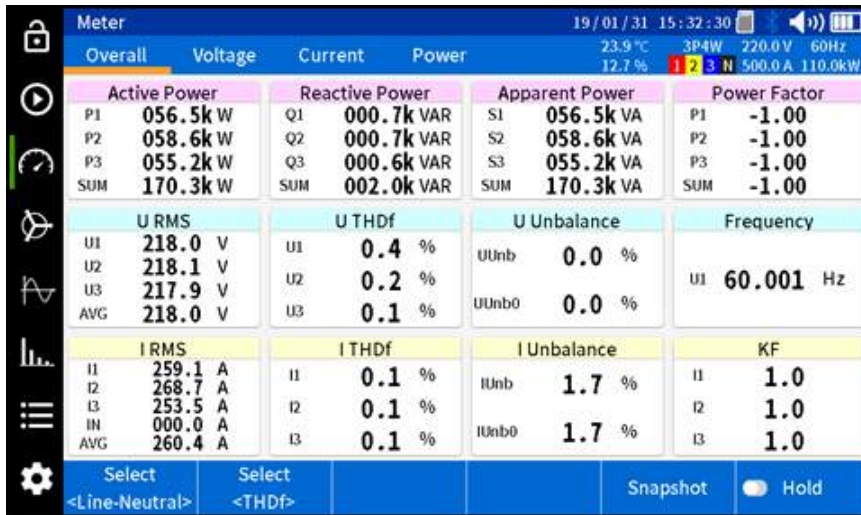
External 8G MicroSD storage

3. Using power analyzer

3.1. Getting started

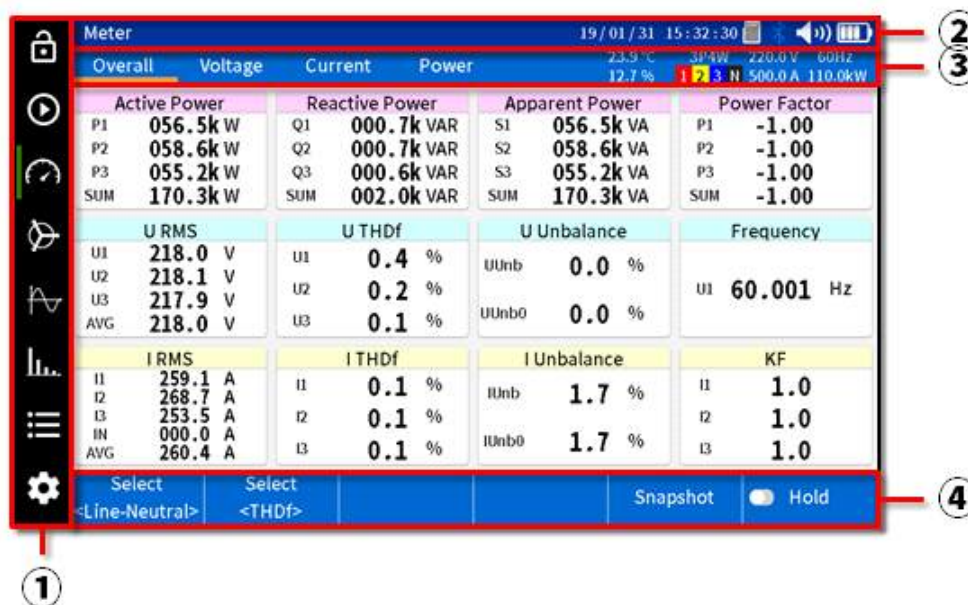
Press and hold the button Power to turn the power On.

The power analyzer's initial screen will appear as shown below.



3.2. Screen

A screen that appears differs with individual measuring functions. Hereunder is the description of screens configured for the most common functions.

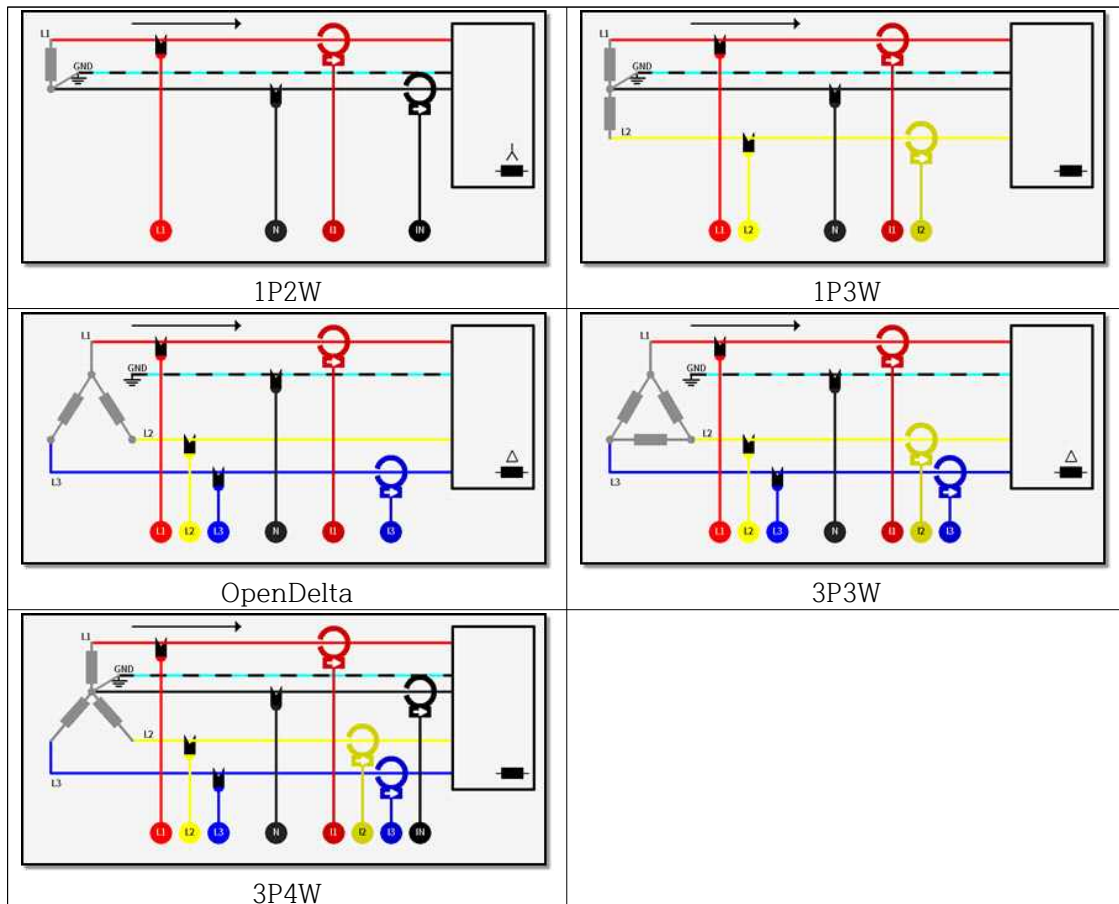


No.	Name	Description		
①	Function keys	Buttons used to convert to different functions		
		Common		Used to return to the previous screen
				Locks the touchscreen; tap once more to unlock
				Screen for settings
		Power analyzer		Screen for power meter
				Screen for phase diagram
				Screen for waveforms
				Screen for harmonics
TTR		Screen for TTR record		
②	Status bar	Displays the current status of the instrument		
		time	Displays present time	
		Bluetooth	.Displays whether bluetooth is activated	
		Buzzer	Displays volume of buzzer sound	
		Battery	Displays how much battery power remains	
③	Screen tab	If there is a lower-level screen below the current function, such information as currently set wiring and range is displayed on the right hand pane.		
④	Soft key	Displays functional buttons necessarily for the current screen, where labels are displayed depending on the function under current processing and item selected		

3.3. Wiring

3.3.1. Type of wiring

The power analyzer supports a variety of wiring such as 1P3W, 2P4W, OpenDelta, 3P3W, and 3P4W.



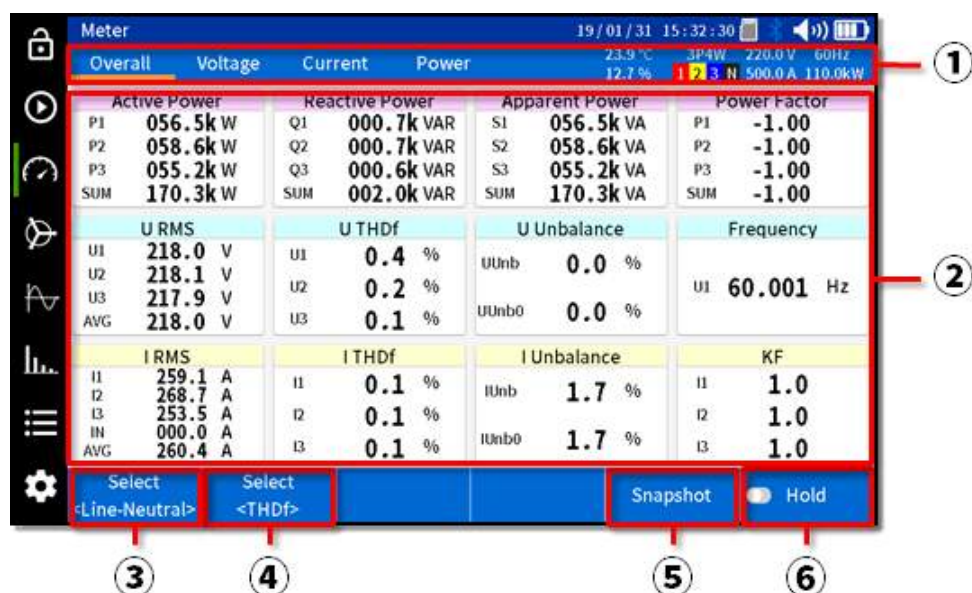
Wiring configuration	Voltage Input	Current Input
1P2W	UN, U1	IN, I1
1P3W	UN, U1, U2	IN, I1, I2
OpenDelta	UN, U1, U2, U3	I1, I3
3P3W	UN, U1, U2, U3	I1, I2, I3
3P4W	UN, U1, U2, U3	IN, I1, I2, I3

3.4. Metering functions of Power Analyzer

3.4.1. Screen involving power meter

This is a screen enabled to check instantaneous power measurement values.

Tap the icon  on the left to pop you into this screen. Then, various power parameters are measured and displayed.



No.	Name	Description
①	Tab	Select to go into the screen you wish among four modes; Overall Voltage Current Power
②	Meter	선택된 탭의 전력 파라미터 값이 표시 됩니다.
③	L-N / L-L	상전압 / 선간 전압을 선택합니다.
	Voltage	3P4W : 상전압, 3P3W : 선간전압이 기본값입니다.
④	THD type	THD의 기준을 기본파 크기(THDf)와 RMS(THDr)에서 선택합니다. 기본값 THDf
⑤	Snapshot	Used to save the currently displayed image to SD card in bmp file
⑥	Hold	Used to 'hold' the currently displayed measurement value; press once more to release Hold in which case it is updated to the latest measurement value.

3.4.2. Metering - Overall

Meter				19/01/31 15:32:30	23.9 °C 12.7 %	3P4W 220.0 V 60Hz
Overall				1 2 3 N 500.0 A 110.0kW		
Active Power		Reactive Power		Apparent Power		Power Factor
P1	056.5k W	Q1	000.7k VAR	S1	056.5k VA	P1 -1.00
P2	058.6k W	Q2	000.7k VAR	S2	058.6k VA	P2 -1.00
P3	055.2k W	Q3	000.6k VAR	S3	055.2k VA	P3 -1.00
SUM	170.3k W	SUM	002.0k VAR	SUM	170.3k VA	SUM -1.00
U RMS		U THDf		U Unbalance		Frequency
U1	218.0 V	U1	0.4 %	UUnb	0.0 %	U1 60.001 Hz
U2	218.1 V	U2	0.2 %	UUnb0	0.0 %	
U3	217.9 V	U3	0.1 %			
AVG	218.0 V					
I RMS		I THDf		I Unbalance		KF
I1	259.1 A	I1	0.1 %	IUnb	1.7 %	I1 1.0
I2	268.7 A	I2	0.1 %	IUnb0	1.7 %	I2 1.0
I3	253.5 A	I3	0.1 %			I3 1.0
IIN	000.0 A					
AVG	260.4 A					
Select <Line-Neutral>		Select <THDf>		Snapshot		Hold

Display item			
Active power	Reactive power	Apparent power	Power factor
RMS voltage	Voltage THD	Voltage Unbalance	Voltage (U1) frequency
RMS current	Current THD	Current Unbalance	K-Factor

3.4.3. Metering - Voltage

Meter				19/01/31 15:32:39	23.9 °C 14.8 %	3P4W 220.0 V 60Hz
Voltage				1 2 3 N 500.0 A 110.0kW		
U RMS		U THDf		U Unbalance		Frequency
U1	218.1 V	U1	0.5 %	UUnb	0.0 %	U1 60.001 Hz
U2	218.1 V	U2	0.2 %	UUnb0	0.0 %	
U3	217.9 V	U3	0.1 %			
AVG	218.0 V					
U DC		U Peak+		U Peak-		U CF
U1	-000.0 V	U1	309.1 V	U1	-309.2 V	U1 1.42
U2	-000.2 V	U2	308.7 V	U2	-309.2 V	U2 1.42
U3	-000.2 V	U3	308.6 V	U3	-309.0 V	U3 1.42
Pst(1min)		Pst		Plt		
U1	0.00	U1	0.00	U1	0.00	
U2	0.00	U2	0.00	U2	0.00	
U3	0.00	U3	0.00	U3	0.00	
	1:21		10:21		120:21	
Select <Line-Neutral>		Select <THDf>		Reset Flicker		Snapshot Hold

Display item			
RMS voltage	Voltage THD	Voltage Unbalance	Voltage (U1) frequency
Voltage DC value	Voltage peak +	Voltage peak -	Voltage peak factor
Flicker Pst(1min)	Flicker Pst (10min)	Flicker Plt (120min)	

3.4.4. Metering - Current

Meter			
Overall	Voltage	Current	Power
19 / 01 / 31 15:32:43 23.9 °C 3P4W 220.0 V 60Hz 14.9 % 1 2 3 N 500.0 A 110.0kW			
I RMS			
I1	259.0 A		
I2	268.6 A		
I3	253.4 A		
IN	000.0 A		
AVG	260.4 A		
I THDf			
I1	0.1 %		
I2	0.1 %		
I3	0.1 %		
I Unbalance			
IUnb	1.7 %		
IUnb0	1.7 %		
Kf			
I1	1.0		
I2	1.0		
I3	1.0		
I DC			
I1	-000.4 A		
I2	-000.4 A		
I3	000.4 A		
IN	000.0 A		
I Peak+			
I1	367.5 A		
I2	381.2 A		
I3	360.3 A		
IN	001.2 A		
I Peak-			
I1	-368.1 A		
I2	-381.9 A		
I3	-359.9 A		
IN	-001.2 A		
ICF			
I1	1.42		
I2	1.42		
I3	1.42		
IN	>10.0		
Select <THDf>		Snapshot	Hold

Display item			
RMS Current	Current THD	Current Unbalance	K-Factor
Current DC value	Current peak +	Current peak -	Current peak factor

3.4.5. Metering - Power

Meter			
Overall	Voltage	Current	Power
19 / 01 / 31 15:32:50 23.9 °C 3P4W 220.0 V 60Hz 13.9 % 1 2 3 N 500.0 A 110.0kW			
Active Power			
P1	056.5k W		
P2	058.6k W		
P3	055.2k W		
SUM	170.3k W		
Reactive Power			
Q1	000.7k VAR		
Q2	000.8k VAR		
Q3	000.6k VAR		
SUM	002.1k VAR		
Apparent Power			
S1	056.5k VA		
S2	058.6k VA		
S3	055.2k VA		
SUM	170.3k VA		
Power Factor			
P1	-1.00		
P2	-1.00		
P3	-1.00		
SUM	-1.00		
DPF			
P1	-1.00		
P2	-1.00		
P3	-1.00		
SUM	-1.00		
		Snapshot	Hold

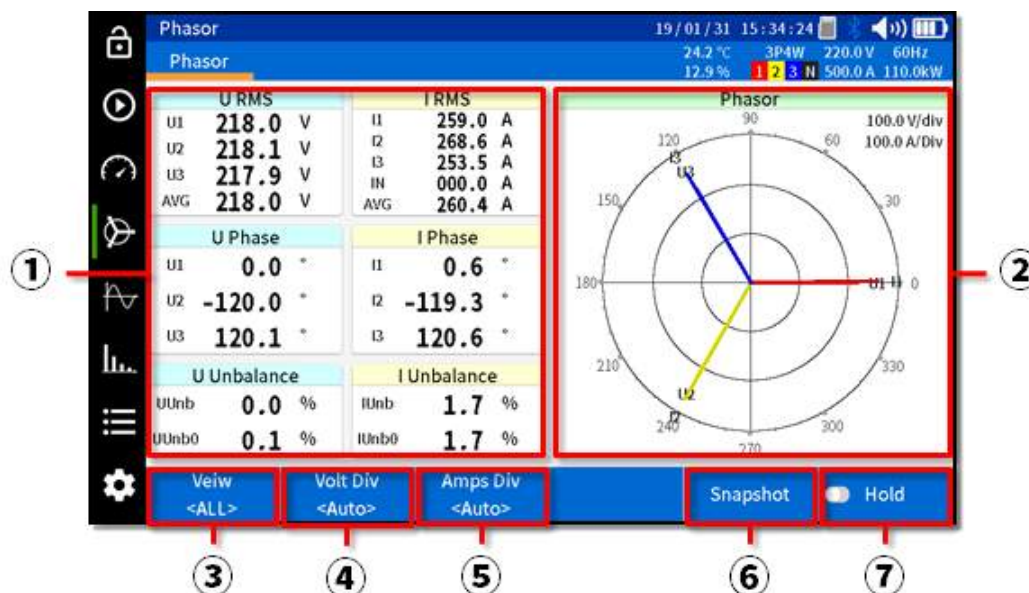
Display item		
Active power	Reactive power	Apparent power
Power factor	Displacement power factor	

3.5. Phase diagram of Power Analyzer

3.5.1. Phase diagram

This is a screen enabled to check phase of the power.

Tap the icon  on the left to move to this screen.

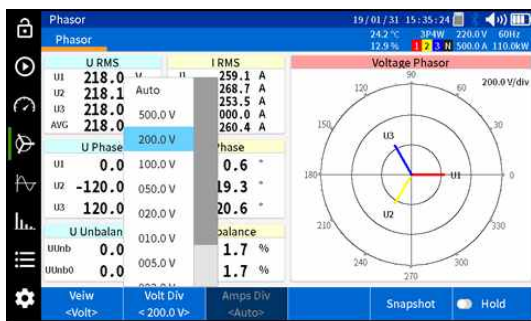


No.	Name	Description
①	Meter	Display voltage/current RMS, phase, unbalance value.
②	Phasor	Phase Diagram
③	View	Select Voltage & Current, Voltage or Current whichever you wish to view.
④	Voltage Div	Used to set the magnification of voltage displayed; if preset to Auto, the magnitude of Div is automatically set depending on the value of voltage. The present Div value is displayed on the upper right side of the diagram.
⑤	Current Div	Used to set the magnification of current displayed; if preset to Auto, the magnitude of Div is automatically set depending on the value of current. The present Div value is displayed on the upper right side of the diagram.
⑥	Snapshot	Used to save the currently displayed image to SD card in bmp file
⑦	Hold	Used to 'hold' the currently displayed measurement value; press once more to release Hold in which case it is updated to the latest measurement value.

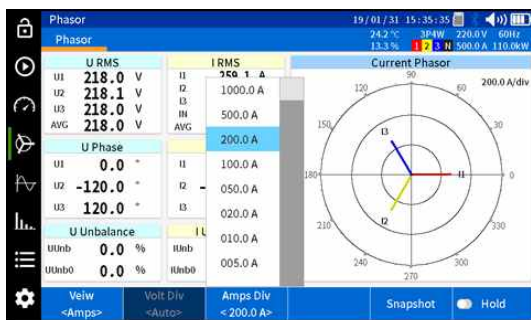
- **F1** Select and display only the voltage or current phase.



- **F2** Adjust the div of the voltage.



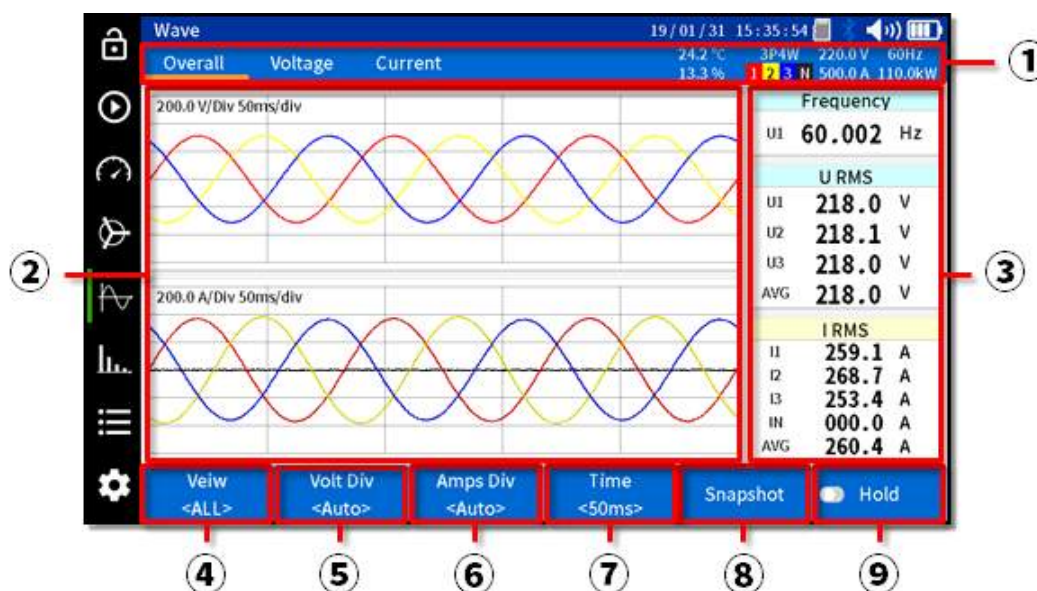
- **F3** Adjust the div of the current.



3.6. Waveforms functions of Power Analyzer

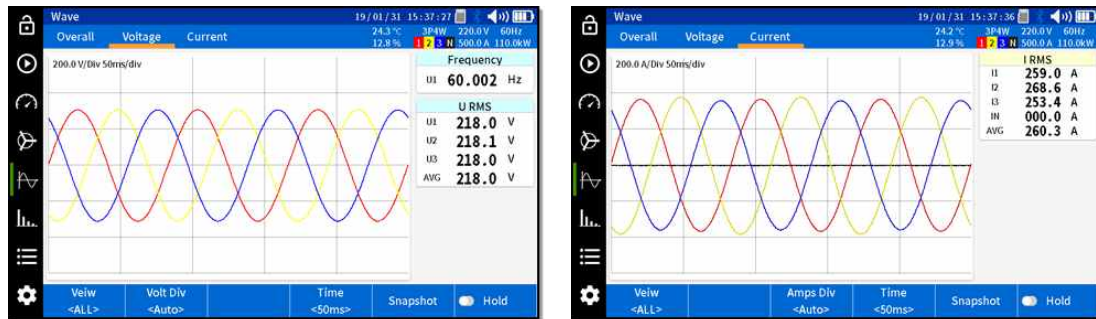
3.6.1. Waveforms functions of Power Analyzer

This is a screen enabled to check waveforms of voltage and current in real time. Tap the corresponding icon on the left to enter into this screen.

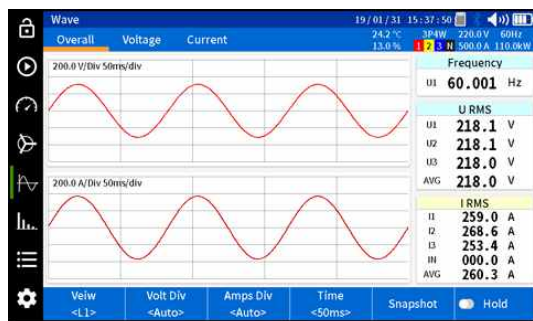


No.	Name	Description
①	Tab	Select waveform. Overall Voltage Current
②	Waveform	Display waveform.
③	Meter	Display V/A RMS, Frequency.
④	View	Select Voltage & Current, Voltage or Current whichever you wish to view.
⑤	Voltage Div	Used to set the magnification of voltage displayed; if preset to Auto, the magnitude of Div is automatically set depending on the value of voltage. The present Div value is displayed on the upper left side of the diagram.
⑥	Current Div	Used to set the magnification of current displayed; if preset to Auto, the magnitude of Div is automatically set depending on the value of current. The present Div value is displayed on the upper left side of the diagram.
⑦	Time Div	Used to set the magnification of time displayed <20ms/50ms>; The present Div value is displayed on the upper left side of the diagram.
⑧	Snapshot	Used to save the currently displayed image to SD card in bmp file
⑨	Hold	Used to 'hold' the currently displayed measurement value; press once more to release Hold in which case it is updated to the latest measurement value.

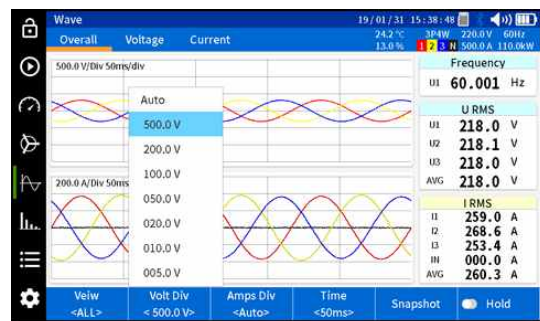
■ 탭에서 전압이나 전류를 누르면 선택된 파형만을 표시합니다.



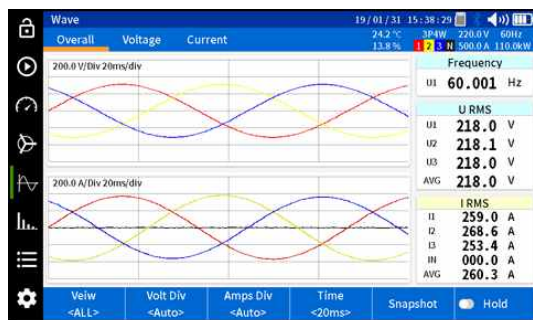
■ [F1] 으로 상을 선택하여 표시합니다.



■ [F2] , [F3] 으로 DIV를 조절합니다.



■ [F4] 으로 시간 축 길이를 선택합니다.



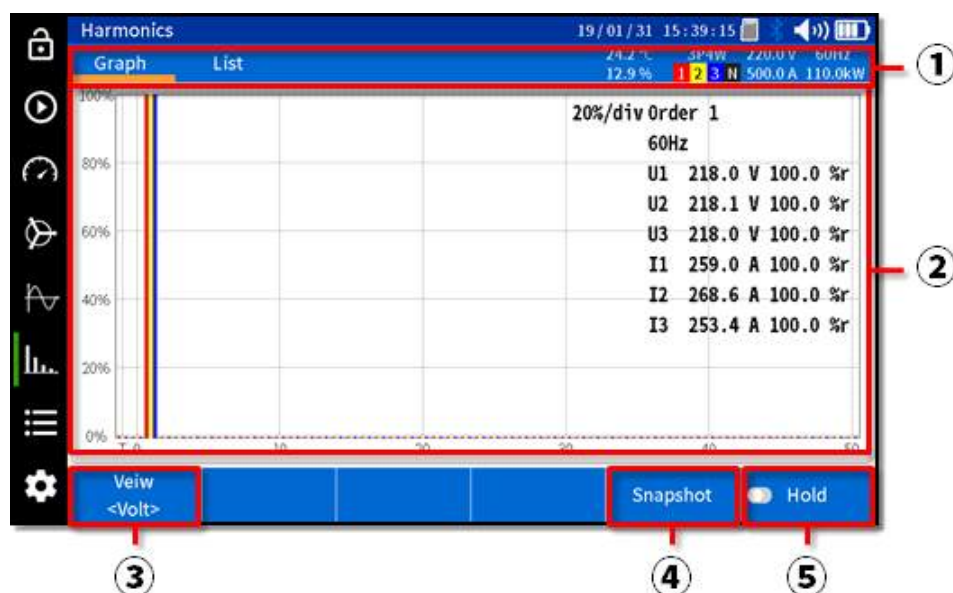
3.7. Harmonics functions of Power Analyzer

3.7.1. Function of Power Analyzer that displays harmonic data in graphs

This is a screen enabled to check harmonic data of voltage and current as bar graphs.

Tap the corresponding icon on the left to enter into this screen.

Select Graphs on the upper tab.



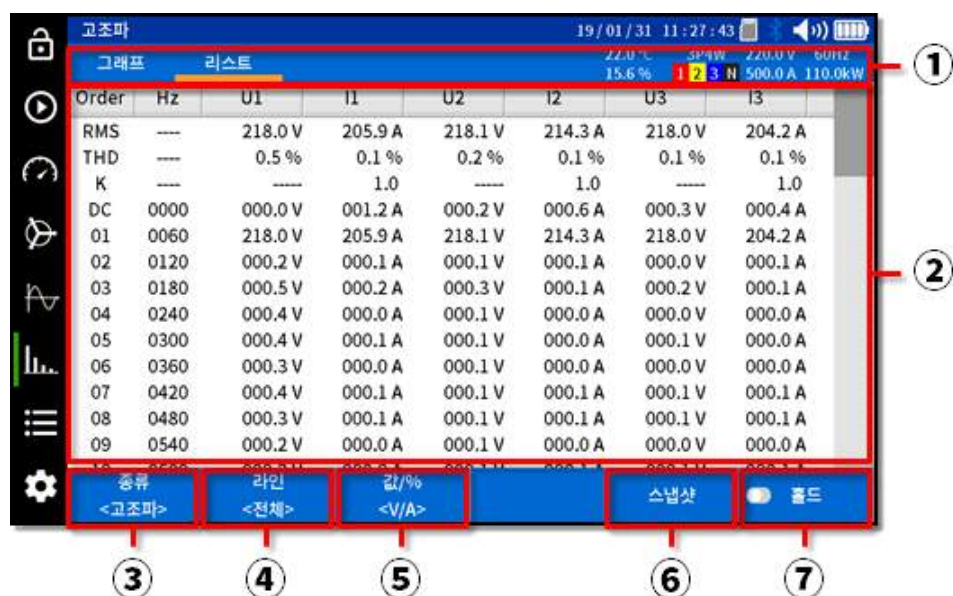
No.	Name	Description
①	Tab	Select the display method of harmonics. Graph List
②	Graph	Harmonics graph.
③	Type	Select voltage and/or current. <Voltage & Current, Voltage, Current>
④	Snapshot	Used to save the currently displayed image to SD card in bmp file
⑤	Hold	Used to 'hold' the currently displayed measurement value; press once more to release Hold in which case it is updated to the latest measurement value.

3.7.2. Function of Power Analyzer that displays a list of harmonic measurements

This is a screen enabled to check harmonic measurements of voltage and current in a form of graphs.

Tap the corresponding icon on the left to enter into this screen.

Select List on the upper tab. Then, harmonic numbers, frequency and values of individual phases are displayed as graphs.



No.	Name	Description
①	Tab	Select the display method of harmonics. Graph List
②	list	Harmonics list.
③	Type	Select Harmonic or Interharmonic.
④	Phase	Select phase. <All, L1, L2, L3>
⑤	Voltage / Current	Select voltage and/or current. <Voltage & Current, Voltage, Current>
⑥	Snapshot	Used to save the currently displayed image to SD card in bmp file
⑦	Hold	Used to 'hold' the currently displayed measurement value; press once more to release Hold in which case it is updated to the latest measurement value.

■ **F1** Select Harmonics / Interharmonics

Order	Hz	U1	I1	U2	I2	U3	I3
RMS	---	218.1 V	259.0 A	218.1 V	268.7 A	217.9 V	253.4 A
THD	---	0.5 %	0.1 %	0.2 %	0.1 %	0.1 %	0.1 %
K	---	---	1.0	---	1.0	---	1.0
DC	0000	000.0 V	000.5 A	000.2 V	000.9 A	000.2 V	000.7 A
01	0060	218.1 V	259.0 A	218.1 V	268.7 A	217.9 V	253.4 A
02	0120	000.2 V	000.1 A	000.1 V	000.1 A	000.0 V	000.1 A
03	0180	000.5 V	000.1 A	000.3 V	000.2 A	000.2 V	000.1 A
04	0240	000.3 V	000.0 A	000.1 V	000.0 A	000.0 V	000.0 A
05	0300	000.4 V	000.0 A	000.1 V	000.0 A	000.0 V	000.0 A
06	0360	000.3 V	000.0 A	000.1 V	000.0 A	000.0 V	000.0 A
Harmonics	00.3 V	000.1 A	000.1 V	000.1 A	000.0 V	000.0 A	000.0 A
Inter Harmonics	00.3 V	000.0 A	000.1 V	000.0 A	000.0 V	000.0 A	000.0 A

Order	Hz	U1	I1	U2	I2	U3	I3
RMS	---	218.0 V	259.0 A	218.1 V	268.6 A	217.9 V	253.4 A
THD	---	0.5 %	0.1 %	0.2 %	0.1 %	0.1 %	0.1 %
K	---	---	1.0	---	1.0	---	1.0
DC	0000	000.0 V	000.1 A	000.0 V	000.1 A	000.0 V	000.1 A
01	0090	000.0 V	000.0 A	000.0 V	000.1 A	000.0 V	000.1 A
02	0150	000.0 V	000.0 A	000.0 V	000.0 A	000.0 V	000.0 A
03	0210	000.0 V	000.0 A	000.0 V	000.0 A	000.0 V	000.0 A
04	0270	000.0 V	000.0 A	000.0 V	000.0 A	000.0 V	000.0 A
05	0330	000.0 V	000.0 A	000.0 V	000.0 A	000.0 V	000.0 A
06	0390	000.0 V	000.0 A	000.0 V	000.0 A	000.0 V	000.0 A
07	0450	000.0 V	000.0 A	000.0 V	000.0 A	000.0 V	000.0 A
08	0510	000.0 V	000.0 A	000.0 V	000.0 A	000.0 V	000.0 A
09	0570	000.0 V	000.0 A	000.0 V	000.0 A	000.0 V	000.0 A

■ **F2** Select phase.

Order	Hz	U1	I1	U1 %r	I1 %r	U1 Phase	I1 Phase
RMS	---	218.0 V	259.0 A	---	---	---	---
THD	---	0.4 %	0.1 %	---	---	---	---
K	---	---	1.0	---	---	---	---
DC	0000	000.0 V	000.6 A	0.0 %	0.2 %	0.0 °	0.0 °
01	0060	218.0 V	259.0 A	100.0 %	100.0 %	0.0 °	0.6 °
02	0120	000.2 V	000.1 A	0.1 %	0.0 %	167.7 °	-161.5 °
03	0180	000.5 V	000.2 A	0.2 %	0.1 %	129.1 °	119.4 °
04	0240	000.1 A	0.2 %	0.0 %	104.2 °	-51.1 °	---
05	0300	000.0 A	0.2 %	0.0 %	73.1 °	72.8 °	---
06	0360	000.0 A	0.2 %	0.0 %	41.3 °	-27.5 °	---
07	0420	000.1 A	0.2 %	0.0 %	6.7 °	12.6 °	---
08	0480	000.0 A	0.1 %	0.0 %	-20.1 °	-109.3 °	---
09	0540	000.0 A	0.1 %	0.0 %	-53.6 °	167.4 °	---

■ **F3** Select value type

Order	Hz	U1	I1	U2	I2	U3	I3
RMS	---	218.0 V	206.0 A	218.1 V	214.4 A	218.0 V	204.2 A
THD	---	0.5 %	0.1 %	0.2 %	0.1 %	0.1 %	0.1 %
K	---	---	1.0	---	1.0	---	1.0
DC	0000	000.0 V	000.4 A	000.2 V	001.2 A	000.3 V	000.3 A
01	0060	218.0 V	206.0 A	218.1 V	214.4 A	218.0 V	204.2 A
02	0120	000.2 V	000.0 A	000.1 V	000.1 A	000.0 V	000.0 A
03	0180	000.5 V	000.1 A	000.3 V	000.1 A	000.2 V	000.1 A
04	0240	000.3 V	000.0 A	000.1 V	000.0 A	000.0 V	000.0 A
05	0300	000.4 V	000.0 A	000.1 V	000.0 A	000.1 V	000.0 A
06	0360	000.3 V	000.0 A	000.1 V	000.0 A	000.0 V	000.0 A
07	0420	000.3 V	000.0 A	000.1 V	000.1 A	000.1 V	000.1 A
08	0480	000.3 V	000.0 A	000.1 V	000.0 A	000.0 V	000.0 A
09	0540	000.2 V	000.0 A	000.1 V	000.0 A	000.0 V	000.0 A

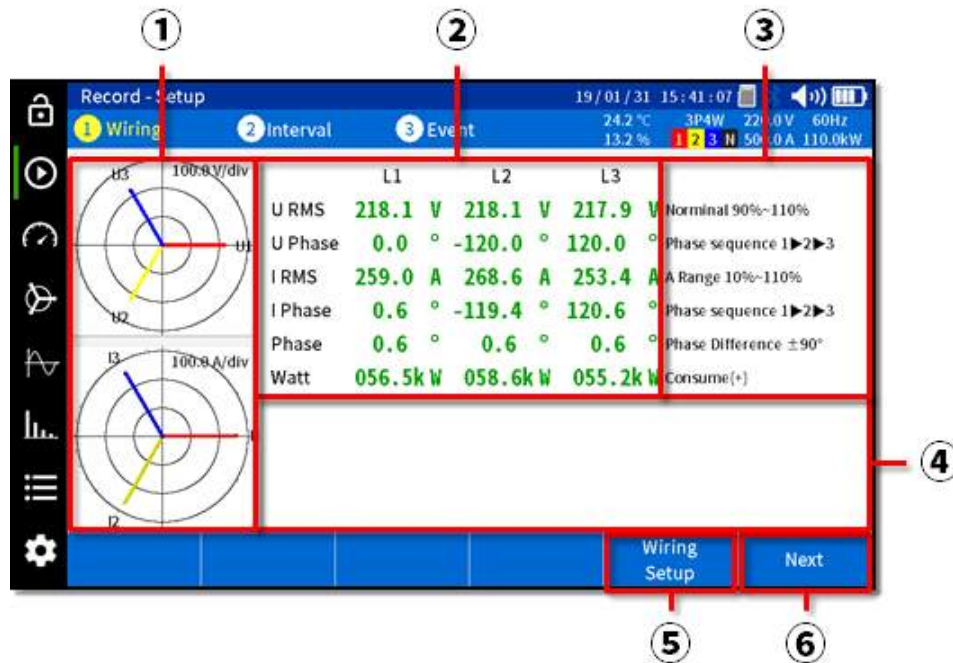
Order	Hz	U1 %r	I1 %r	U2 %r	I2 %r	U3 %r	I3 %r
RMS	---	218.0 V	206.0 A	218.1 V	214.4 A	218.0 V	204.2 A
THD	---	0.5 %	0.1 %	0.2 %	0.1 %	0.1 %	0.1 %
K	---	---	1.0	---	1.0	---	1.0
DC	0000	0.0 %	0.4 %	0.1 %	0.3 %	0.1 %	0.3 %
01	0060	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
02	0120	0.1 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
03	0180	0.2 %	0.1 %	0.1 %	0.1 %	0.1 %	0.1 %
04	0240	0.2 %	0.0 %	0.1 %	0.0 %	0.0 %	0.0 %
05	0300	0.2 %	0.0 %	0.1 %	0.0 %	0.0 %	0.0 %
06	0360	0.2 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
07	0420	0.2 %	0.0 %	0.1 %	0.0 %	0.0 %	0.0 %
08	0480	0.1 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
09	0540	0.1 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %

4. RECORD

4.1. Record preparation

4.1.1. Wiring confirm

If you press the button on the left of the screen, the following screen appears.



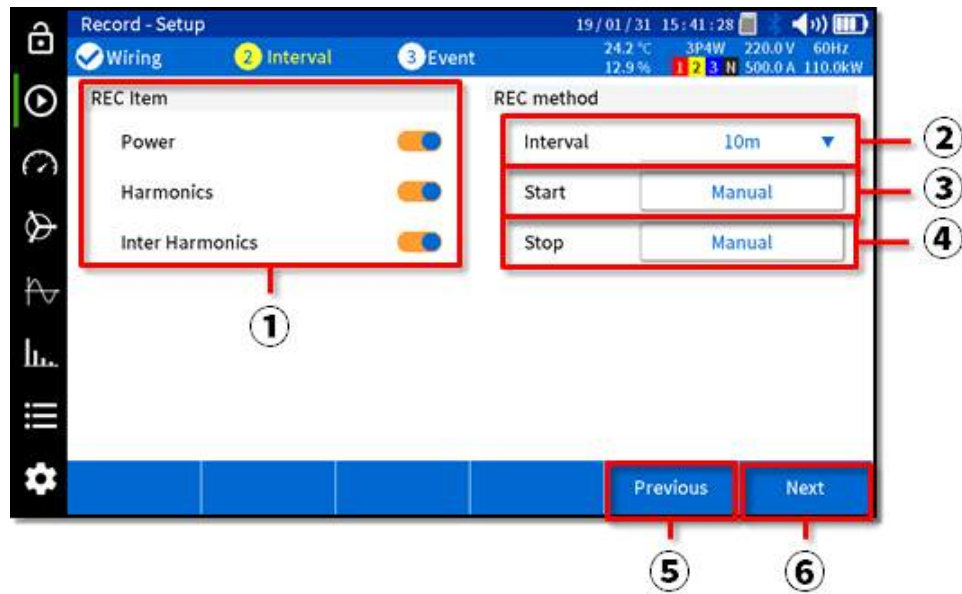
No	Name	Description
①	Phase	Displays the phase of the current voltage current.
②	Measures	Displays the current measurement value.
③	Judgment	If the judgment value is satisfied, it is displayed in green, otherwise it is displayed in red.
④	도움말	This criterion is used to judge whether the measured value is appropriate.
⑤	Wiring	현재 결선 상태에 따라 도움말이 표시 됩니다.
⑥	Next	Go to Settings and change the wiring.
⑥	Next	After confirming the wiring, proceed to the next step.

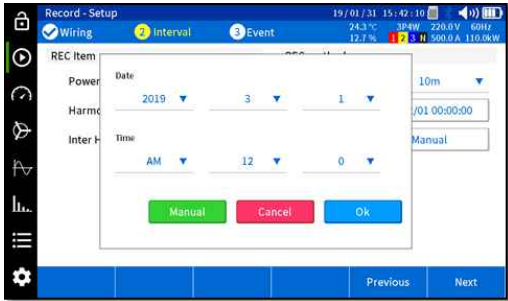
The result of the judgment can be used to confirm that the instrument settings are suitable for the measurement.

If you have confirmed that the wiring is correct, you can press 'continue' in the warning message even if there is an item marked in red.

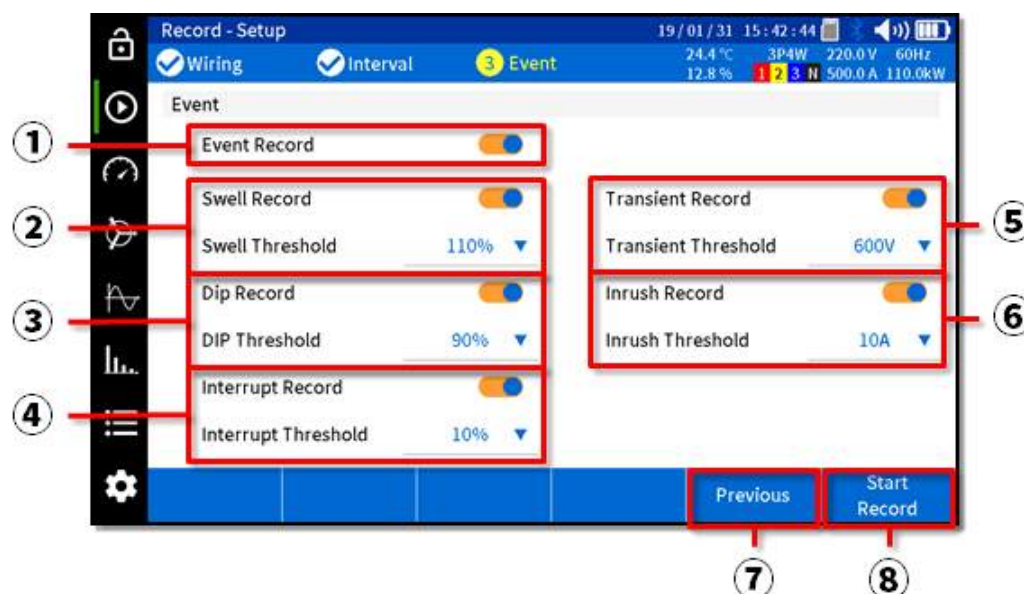
4.1.2. Interval record setting

Set the interval record.



No	Name	Description
①	R/Item	Sets the items to be included in the interval record
		Power Voltage, current, and power parameters. It is an essential choice.
		Harmonic Contains the RMS and phase of harmonics.
		Interharmonic Includes the RMS and phase of the interharmonic.
The more items you select, the larger the record size and the less time you can store in the same capacity.		
②	R/Interval	Sets the interval of each interval sample. The max/avg/min value of each parameter is saved for each set time. The shorter the interval, the larger the size of the recording and the less time it can be stored in the same capacity.
		Button to set recording start / end time.
③	Start/End	
④	Previous	Returns to the previous screen.
⑤	Next	After setting is completed, proceed to the next step.

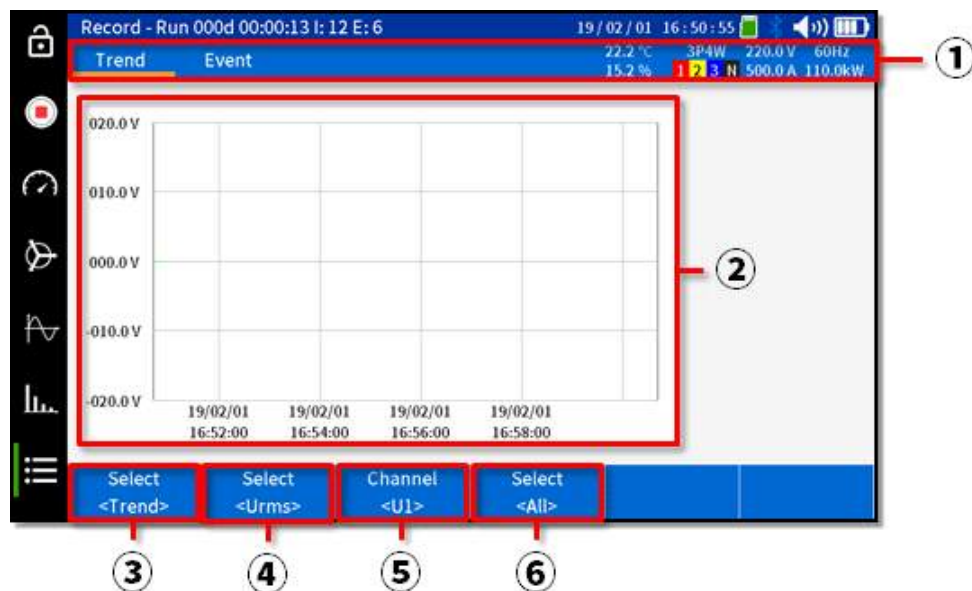
4.1.3. Event record setting



No	Name	Description
①	Event	Enable / Disable event record
②	Swell	Enable voltage swell event recording Threshold to determine the voltage rise event. Set to % of nominal voltage.
③	Dip	Enable voltage dip event recording Threshold to determine the voltage dip event. Set to % of nominal voltage.
④	Interrupt	Enable voltage interrupt event recording Threshold to determine the voltage interrupt event. Set to % of nominal voltage.
⑤	Transient	Enable transient voltage event recording Threshold to determine the Transient voltage event. Set the voltage(V).
⑥	Inrush	Enable inrush current Recording Threshold to determine the Transient current event. Set the current(I).
⑦	Previous	Returns to the previous screen.
⑧	Next	After setting is completed, proceed to the next step.

4.2. Record

4.2.1. Trend Screen



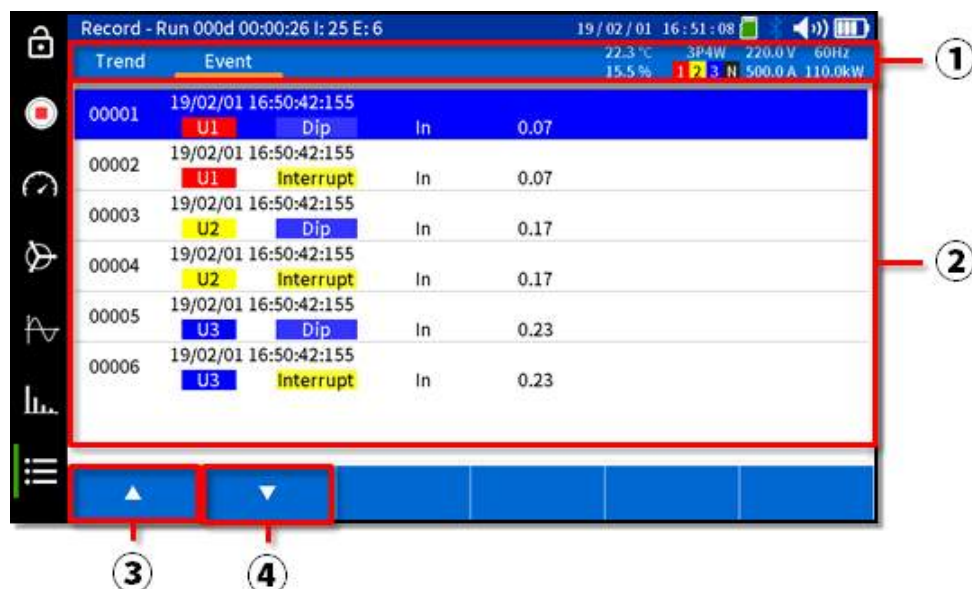
No	Name	Description
①	Tab	Select trend / event screen Trend Event
②	Time series chart	A time-series chart that displays interval data.
③	Select1	Select chart data Trend, Dip/Swell, Power, Harmonic
④	Select2	Select the power parameters to display on the chart.
⑤	Channel	Select a channel to display on the chart.
⑥	Select3	Min / Max / Avg / All, Select the data to be displayed.

The DIVs on the X and Y axes are automatically adjusted to the maximum and minimum values.

If you change the data to be displayed using the menu, the graph will be re-read from the beginning and newly drawn. It may take some time to display the whole.

'Loading ...' will appear until the full length of data is read.

4.2.2. Event Screen



No	Name	Description
①	Tab	Select trend / event screen Trend Event
②	Event List	List of events that occurred.
③	Page Up	Displays the previous page.
④	Page Down	Displays the next page.

Each event is displayed in the following format.

No	Start Time ~ End Time			Duration	
	Channel	Event type	In/Out	Trigger Value	최악값

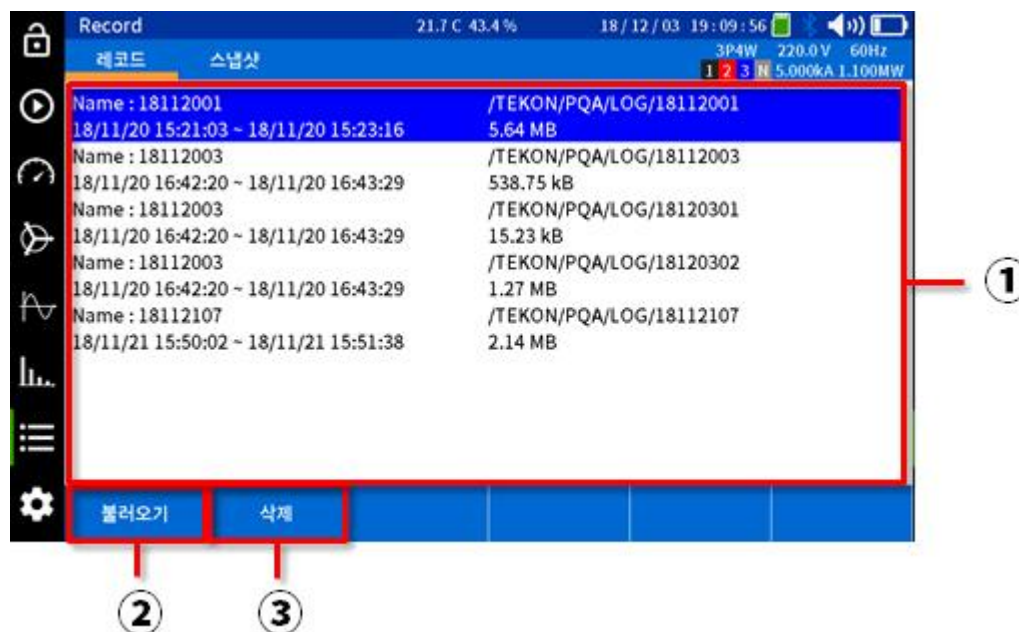
4.2.3. Record Stop

If you press "⏏" in the upper left corner of the screen during recording, a message to stop recording will be displayed.



Press "Yes" to stop recording and switch to the record list screen.

4.2.4. Record Loading



No	Name	Description	
①	Record List	List of stored records.	
		Represents information for each record	
		Session Name[YYMMDDNN]	Storage path on SD
		Recording Time	Record Size
②	Loading	The selected record is loaded.	
		When the record is loaded, the trend of the recording and the event screen are displayed.	
③	Erase	Deletes the selected record. Press to display the confirmation message and press "Yes" to delete the selected record.	

5. Function Setting

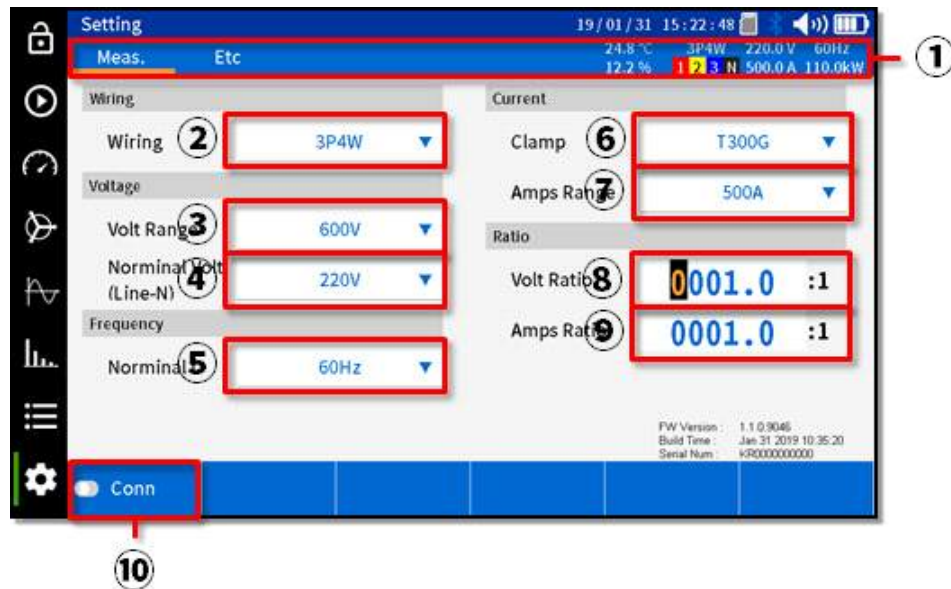
5.1. Settings for Power Analyzer

5.1.1. Settings for Power Analyzer - Basic

This is a screen enabling you to set configuration of the power analyzer.

Tap the corresponding icon on the left to enter into this screen.

Select Basic on the upper tab.



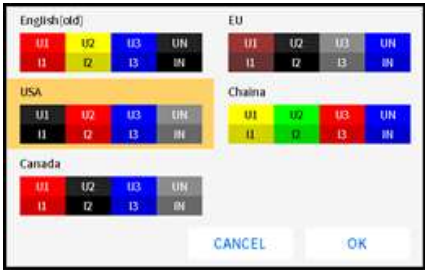
No.	Name	Description
①	Tab	Select setting category
②	Wiring	Select Wiring.
③	Voltage range	Select the voltage range you wish to set. <300V, 600V, 1000V>
④	Nominal voltage	Select the nominal voltage of the object being measured. <100V, 101V, 110V, 120V, 200V, 202V, 208V, 220V, 230V, 240V, 277V, 346V, 380V, 400V, 415V, 480V, 600V>
⑤	Nominal frequency	Select the nominal frequency of the object being measured. <50Hz, 60Hz>
⑥	Current clamp	Select the current clamp.
⑦	Current range	Select the range of the current clamp.
⑧	PT	Sets the PT ratio touch a number, keypad appears.
⑨	CT	Sets the CT ratio.
⑩	Wiring diagram	Press to display the wiring diagram of the currently selected wiring.

5.1.2. Settings for Power Analyzer - Other

Tap the corresponding icon on the left to enter into this screen.

Select Etc on the upper tab.



No.	Name	Description
①	Phase color	Select the preset value for color that discriminates phases. Once selected, press OK to confirm. <UK (former model), USA, Canada, Europe (IEEE), China> 
②	언어	기기 디스플레이 언어를 설정합니다. 한국어와 영어를 선택할 수 있습니다.
③	Time	Adjust the time for the instrument. Once the date and time have been selected, press OK to confirm.
④	Buzzer	Adjust the volume of buzzer sound for the instrument. < Off, 1, 2, 3 >
⑤	Auto power off	Device turn off if there is no operation for period. This function does not work during recording.
⑥	SDcard Format	Format the SD card. All data stored on the SD card will be erased.
⑦	Reset Settings	Returns the settings of the device to the initial state. The data on the sd card is not erased

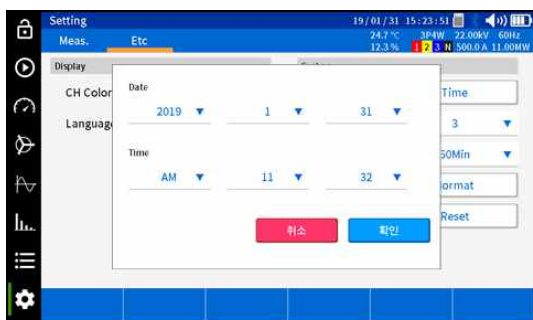
■ Channel Color



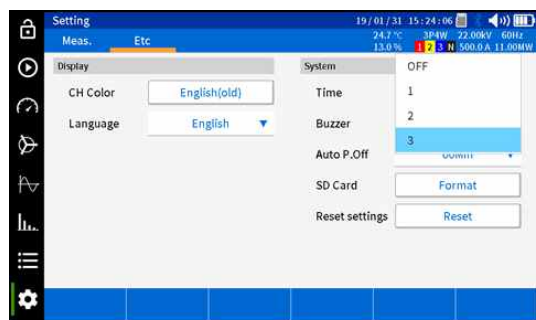
■ Language



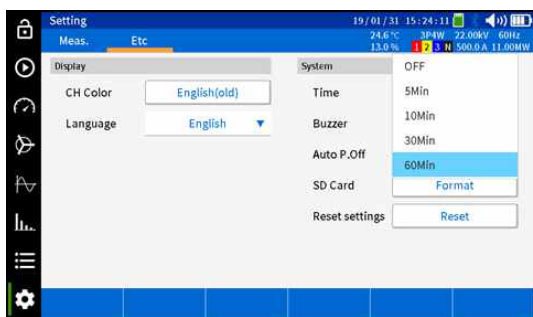
■ Date & Time



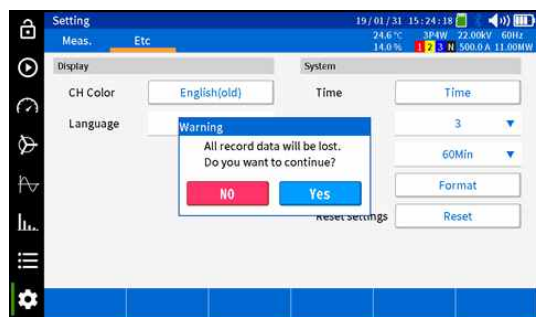
■ Buzzer



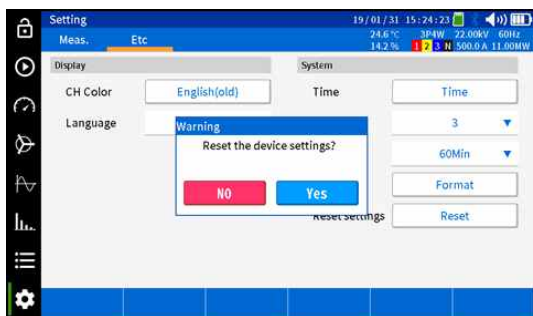
■ Auto Power off



■ Format SD card



■ Reset Settings



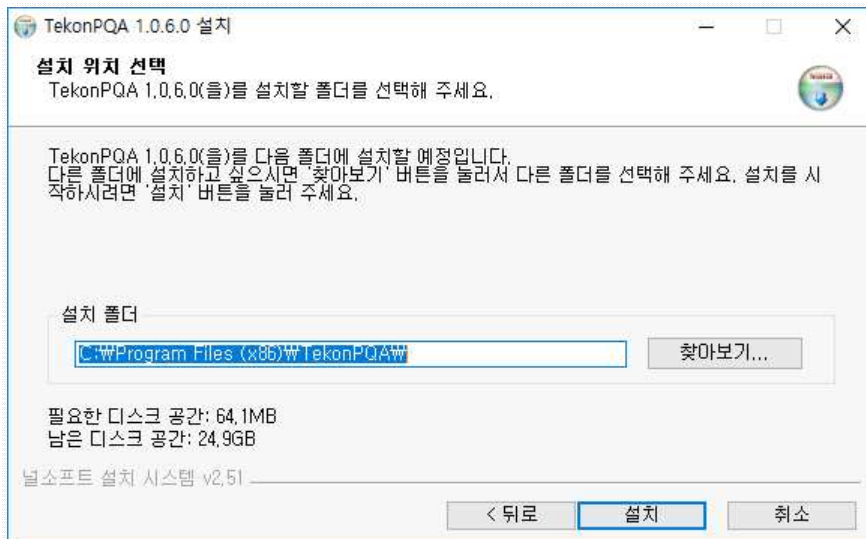
6. PC Program

6.1. Install

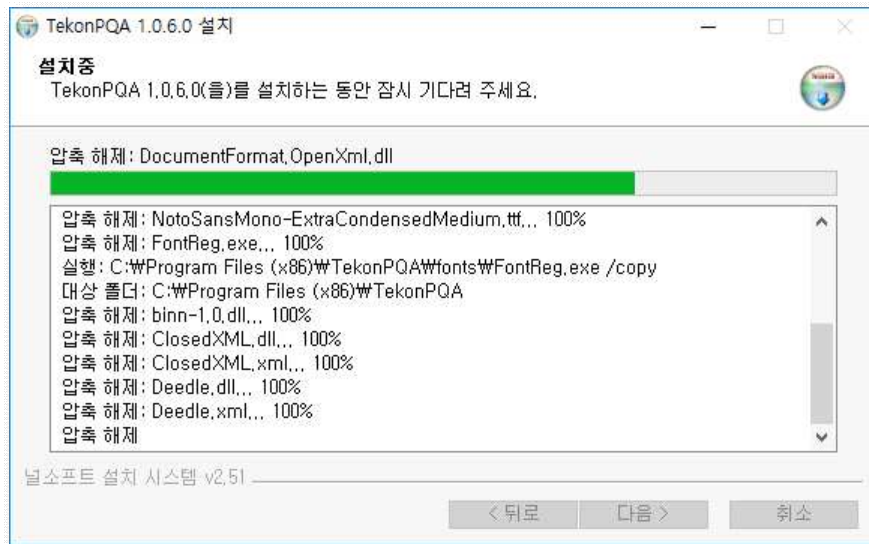
Run the installer.



Klik "Next".



Click "Install".



Click “Finish”.

[Run PC Program]

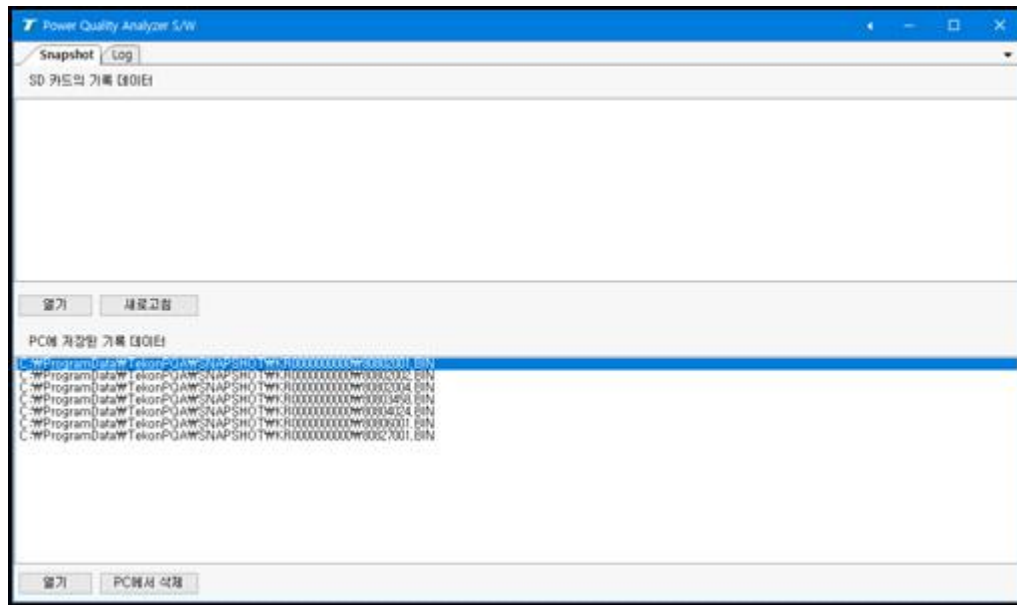
Select 'TekonPQA' from the desktop or start menu to start the program.



6.2. Snapshot

6.2.1. Recall

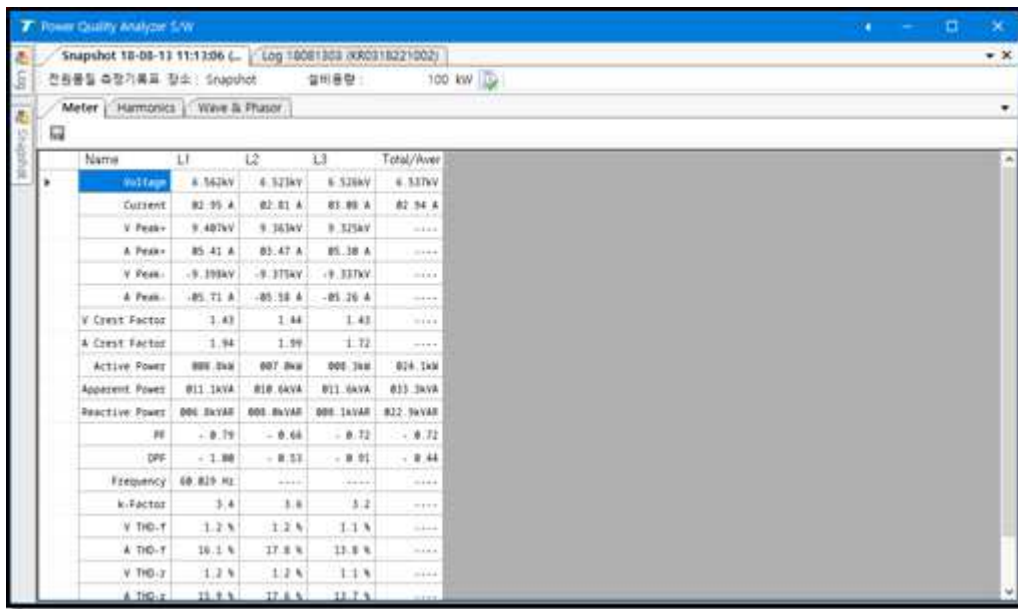
- ① Turn off the device, remove the SD card, and insert it into the PC.
- ② Execute the software.
- ③ Select the Snapshot tab.



- ① The snapshot data saved in 'Record data of SD card' appears.
 - ② If it does not appear, press 'Refresh' to search and display the SD card again.
 - ③ Select the data to be loaded and click Open to display the snapshot data.
- ☞ When you import the snapshot, a new tab with the name 'Snapshot [Time] ([Device serial number])' opens.
 - ☞ Once loaded, the data can be saved to the PC and recalled from the "Recorded data stored on PC".

6.2.2. Instantaneous value

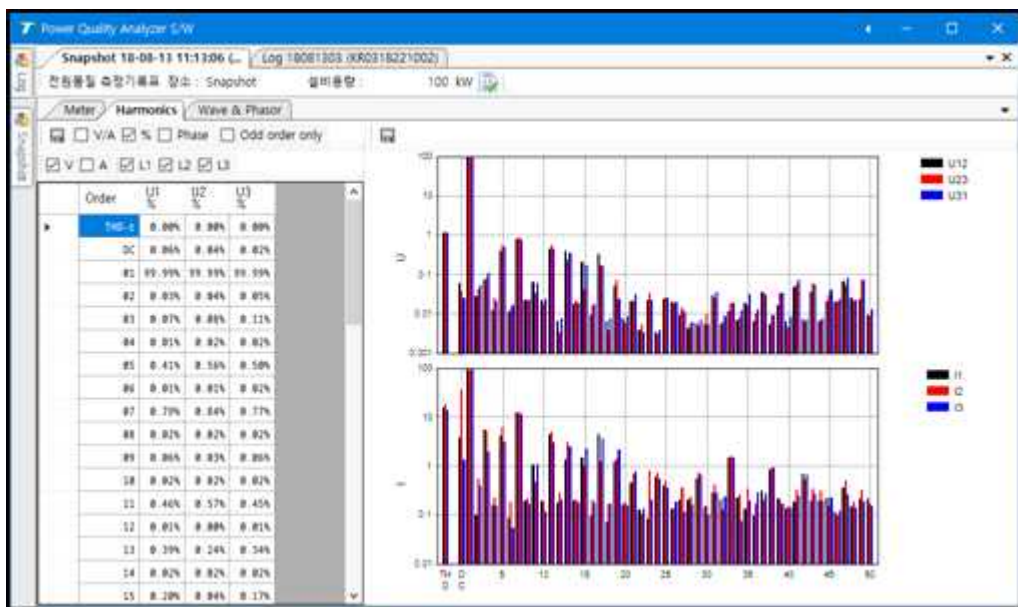
- ① Select the Snapshot tab.
- ② Select the 'Meter' tab.



- ☞ The instantaneous values measured at the time the snapshot was saved are displayed in a table.
- ☞ Press Save button to save in CSV format.

6.2.3. Harmonic

- ① Select the Snapshot tab.
- ② Select the 'Harmonics' tab.

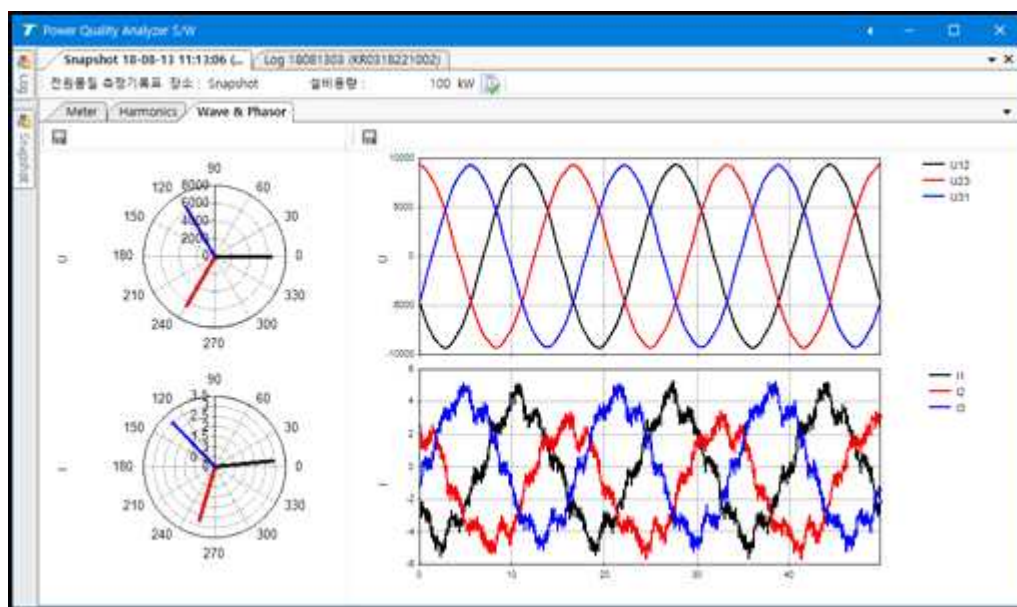


- ☞ Harmonics measured at the time the snapshot was saved are displayed in graphs and tables.
- ☞ In the table, absolute value /%, voltage / current, channel, odd / even order, etc. can be selected and displayed.

- ☞ When you hover your mouse over the chart, the order value corresponding to that position is displayed.
- ☞ You can save in PNG format by pressing the Save button on each graph.

6.2.4. Waveform and Phase diagram

- ① Select the Snapshot tab.
- ② Select 'Wave & Phasor' tab.



- ☞ The waveform and topology measured at the time the snapshot is saved are displayed in graph form.
- ☞ Graphs can be saved in CSV format by pressing the Save button in the table.
- ☞ Press the Save button to save in PNG format.

6.2.5. Output of power quality measurement chart (Korea only)

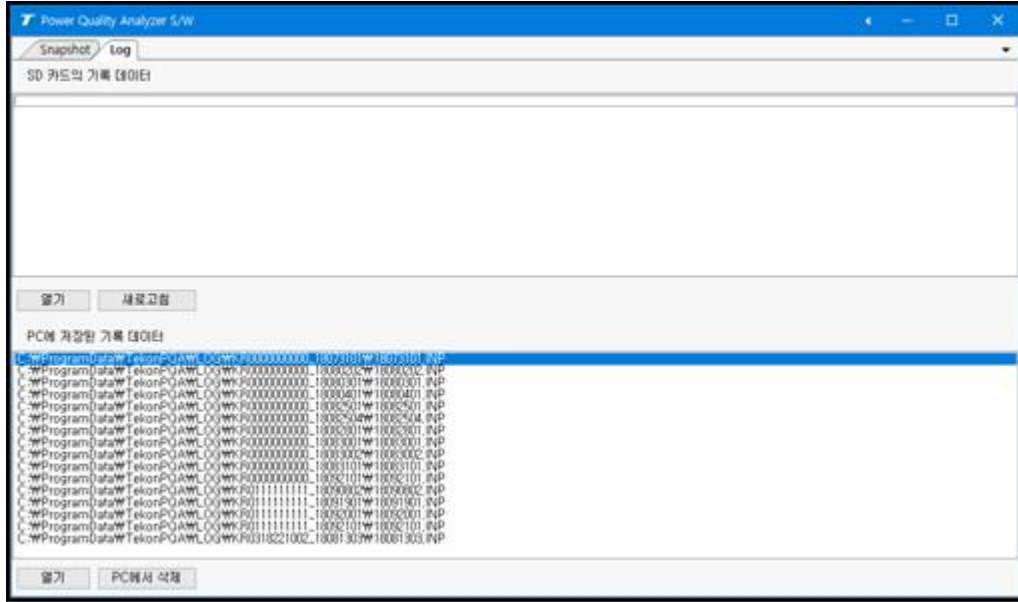


- ① Enter the measurement location.
 - ② Input facility capacity in kW.
 - ③ Press the  button to open a dialog box asking for the storage location.
 - ④ After specifying the path and name and pressing Save, it will be saved in Excel file format.
- ☞ The saved Excel file will open automatically.

6.3. Record

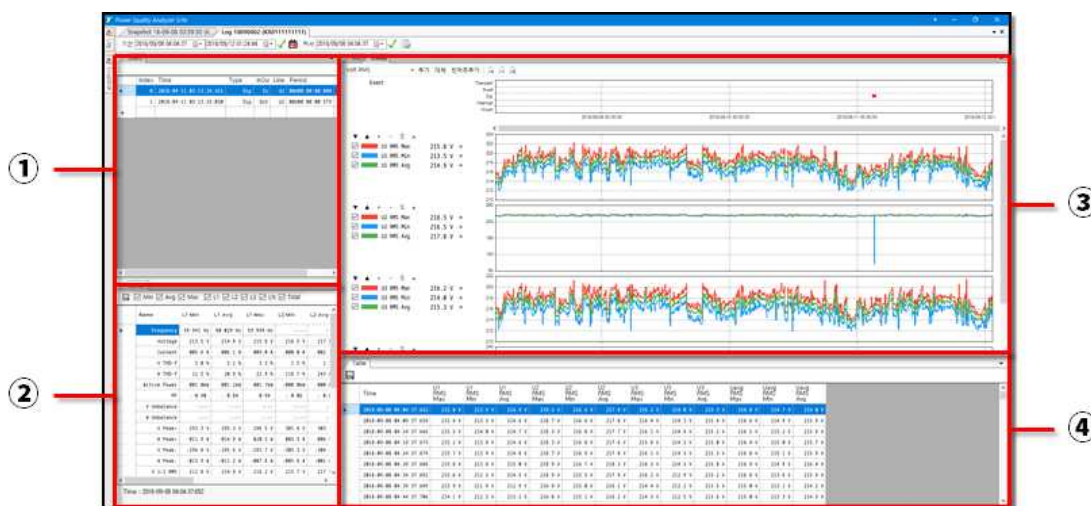
6.3.1. Roading

- ① Turn off the Unit, remove the SD card, and insert it into the PC.
- ② Execute the PC software(TekonPQA).
- ③ Select 'Log' tab.



- ① Record data stored in 'Record data of SD card' appears.
 - ② If it does not appear, press 'Refresh' to search and display the SD card again.
 - ③ Select the data to be loaded and click Open to copy the file to the PC, process it and display the record data. (It may take time if the data is big.)
- ☞ When you load a record, a new tab with the name 'Log [session number] ([device serial number])' opens.
 - ☞ Once loaded, the data can be saved to the PC and recalled from the "Recorded data stored on PC".

6.3.2. Configuring TekonPQA



No	Name	Description
①	Event List	Displays a list of events that occurred during recording.
②	Cursor position instantaneous value	Displays the instantaneous value when the cursor is positioned.
③	Record Info Tab Time Series Chart tab	Displays log session information. The change in power parameter over time is displayed as a chart type.
④	Table	The instantaneous values for each interval are displayed in tabular format.

☞ Drag the name of a tab on the screen to show, hide, or move to a new location in a separate window.

☞ You can change the layout to your preferred layout.



No	Name	Description
①	Display range	Displays the beginning and end of the time range. Modify the time value and press  to apply. Press  to initialize to full range.
②	Cursor position	The time value at which the cursor is positioned. Modify the time value and press  to take effect.
③	EN50160 Report	Press  to output the EN50160 report.

■ Range and cursor

The range and the cursor are linked to the time series chart, the event list, the data table, and the cursor instantaneous value window.

If you change the range or the cursor position of any one of the interval data, the other windows will be adjusted and updated in the same way.

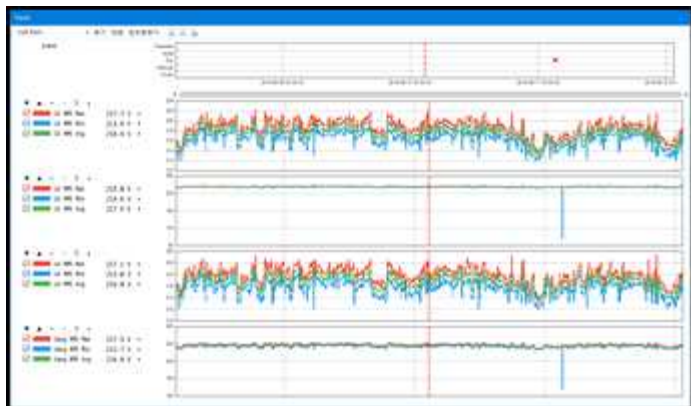
6.3.3. Record information

You can display and enter basic information about a record session.

Measurement Information		Measurement Setting		Record Summary	
Start Time	2018-09-08 04:04:37:652	Connection	3P4W	Harmonics Record	YES
End Time	2018-09-12 01:24:44:849	Nominal Voltage	220.0V (220 V)	Interharmonics Record	YES
Duration	03d 21:20:07:197	Nominal Frequency	60 Hz	Dip Enable	YES
File Version	1.1	Recording interval	00:05:00	Dip Threshold	90 %
Client Information Name: 수권실 Company: 테크온 Address1: 경기도 부천시 송내대로 388 Address2: 부천테크노파크 203-702 Phone: 032-325-6030 E-mail: tekcon@tekcon.co.kr		Clamp	ECTR 200F	Swell Enable	YES
		Clamp Range	500.0A (500 A)	Swell Threshold	110 %
		Voltage Ratio	1	Interrupt Enable	YES
		Current Ratio	1	Interrupt Threshold	10 %
		Instrument Information Model: TEKON 560 Name: TEKON 560 Power Quality Analyzer Firmware Version: 1.0.4.7912 S/N: KR0111111111		Inrush Enable	NO
				Inrush Threshold	-
				Transient Enable	NO
				Transient Threshold	-
				Event Summary Interval Data: 1121 Dip: 2 Swell: 0 Interrupt: 0 Inrush: 0 Transient: 0	

- ☞ Displays the session start, end, length, recorded device information, recording settings, recorded interval and the number of events.
- ☞ Enter and save customer information.
- ☞ The entered information is used for EN50160 report output.
- ☞ To change the input information, click 'Edit', make your changes and press 'Save'.

6.3.4. Time series chart



The top graph shows the time of each event that occurred.

The other graph shows the change over time of the selected power parameter.

■ Preset and chart area manipulation



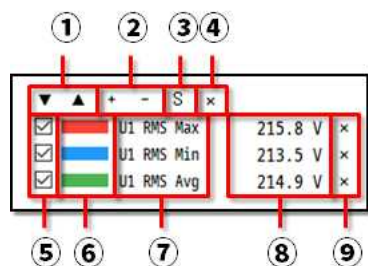
No	Name	Description
①	Select Preset	Select preset power parameters.
②	Add	Adds the selected preset below the existing graph.
③	Substitute	Empty the existing graph and replace it with the selected preset.
④	Add a blank chart	Add an empty graph. Select and add the data to be displayed manually later.
	Zoom in, zoom out	Set the time range.
		Zoom In Zoom in to display half of the time range.
		Zoom Out Zoom out to show a double time range.
		All Show the total time of the session

■ Zooming in and out of time series charts

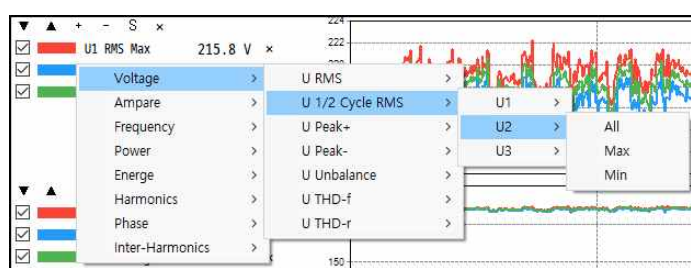
Selecting a range with the mouse in the graph enlarges the selected range.



■ Operation of each time series chart



No	Name	Description
①	Graph Order	Change the order of the graphs.
②	Graph Size	Changes the height of the graph size.
③	Save Image	Save the graph as a PNG image file.
④	Erase graph	Erase the graph.
	Show/Hide	Displays the selected power parameter. If unchecked, it will be hidden.
	Series Color	Displays the color that displays the power parameters in the graph. You can change it to the color you want by clicking on it.
	N	The name of the power parameter being displayed.
	Cursor position value	Displays the value of the cursor position.
	Erase	Click to Erase the power parameter from the graph



If you right-click on a control in the graph, you can add it by selecting the required power parameter directly from the pop-up menu.

Event								
	Index	Time	Type	In	Out	Line	Period	Worst
+	0	2018-09-11 07:15:24.451	Dip	Sat	U1	00000	00:00:000	
-	1	2018-09-11 03:12:25.638	Dip	Ost	U2	00000	00:00:579	079.7 Y

Displays information about each event.

- Number
- Time of occurrence
- Event type
- Event Start (In)/End (Out)
- Length of event (displayed only when ending)
- Worst value (displayed only when ending)

Displays the instantaneous value data of the current cursor position.

Displays the instantaneous value data of the current cursor position.

[illegible]

☒ Min ☒ Avg ☒ Max ☒ L1 ☒ L2 ☒ L3 ☒ LN ☒ Total

①

②

③

No	Name	Description
①	CSV save	Saves the displayed instant value as a CSV file.
②	Min, Avg, Max	Minimum, Maximum, Average value Shows or hides
③	Channel select	Shows or hides the value of each channel.

6.3.7. Table

Time	U1 RMS Max	U1 RMS Min	U1 RMS Avg	U2 RMS Max	U2 RMS Min	U2 RMS Avg	U3 RMS Max	U3 RMS Min	U3 RMS Avg	Uavg RMS Max	Uavg RMS Min	Uavg RMS Avg
2018-09-08 04:04:37.652	215.8 V	213.5 V	214.3 V	218.5 V	216.5 V	217.8 V	216.2 V	214.8 V	215.3 V	216.8 V	214.7 V	216.8 V
2018-09-08 04:09:37.659	215.4 V	213.3 V	214.6 V	218.7 V	216.6 V	217.8 V	216.4 V	214.3 V	215.4 V	216.6 V	214.9 V	215.9 V
2018-09-08 04:14:37.666	215.5 V	214.0 V	214.7 V	218.3 V	216.8 V	217.7 V	216.1 V	214.4 V	215.2 V	216.5 V	215.2 V	215.8 V
2018-09-08 04:19:37.673	215.2 V	213.8 V	214.6 V	218.9 V	216.8 V	217.6 V	215.8 V	214.3 V	215.0 V	216.4 V	215.0 V	215.7 V
2018-09-08 04:24:37.679	215.7 V	213.9 V	214.8 V	218.7 V	216.9 V	217.8 V	216.1 V	214.3 V	215.3 V	216.8 V	215.1 V	215.9 V
2018-09-08 04:29:37.686	215.8 V	213.8 V	215.0 V	218.9 V	216.7 V	218.3 V	216.3 V	214.3 V	215.8 V	216.9 V	214.9 V	216.4 V
2018-09-08 04:34:37.692	215.6 V	212.2 V	214.5 V	218.9 V	215.5 V	217.9 V	216.2 V	212.9 V	215.2 V	216.8 V	213.6 V	215.9 V
2018-09-08 04:39:37.699	213.9 V	211.9 V	212.9 V	216.9 V	215.0 V	216.1 V	214.4 V	212.2 V	213.5 V	215.0 V	213.1 V	214.2 V
2018-09-08 04:44:37.706	214.1 V	212.2 V	213.2 V	216.8 V	215.1 V	216.2 V	214.3 V	212.5 V	213.6 V	215.0 V	213.3 V	214.3 V
2018-09-08 04:49:37.712	214.4 V	212.0 V	213.2 V	217.5 V	215.6 V	216.6 V	214.9 V	212.9 V	214.0 V	215.6 V	213.5 V	214.6 V
2018-09-08 04:54:37.718	214.6 V	212.4 V	213.8 V	217.9 V	215.5 V	216.9 V	215.2 V	213.1 V	214.3 V	215.9 V	213.7 V	215.0 V
2018-09-08 04:59:37.725	214.9 V	212.6 V	214.2 V	217.9 V	215.9 V	217.2 V	215.6 V	213.3 V	214.8 V	216.0 V	214.0 V	215.4 V
2018-09-08 05:04:37.731	214.6 V	212.7 V	213.7 V	217.3 V	215.8 V	216.5 V	215.0 V	213.4 V	214.1 V	215.6 V	214.0 V	214.8 V
2018-09-08 05:09:37.737	214.3 V	212.5 V	213.4 V	217.6 V	216.3 V	216.8 V	214.8 V	213.5 V	214.2 V	215.5 V	214.1 V	214.8 V
2018-09-08 05:14:37.744	215.1 V	213.5 V	214.4 V	218.0 V	216.5 V	217.3 V	215.4 V	214.0 V	214.7 V	216.1 V	214.7 V	215.4 V
2018-09-08 05:19:37.750	215.8 V	213.9 V	214.9 V	218.3 V	216.8 V	217.6 V	215.9 V	214.1 V	215.1 V	216.6 V	215.0 V	215.9 V
2018-09-08 05:24:37.756	216.6 V	214.3 V	215.6 V	219.5 V	217.7 V	218.7 V	216.7 V	214.8 V	216.0 V	217.5 V	215.6 V	216.7 V
2018-09-08 05:29:37.763	217.0 V	215.1 V	216.1 V	219.9 V	217.9 V	218.9 V	217.2 V	215.4 V	216.3 V	218.0 V	216.1 V	217.1 V
2018-09-08 05:34:37.770	217.6 V	215.8 V	216.6 V	220.5 V	218.8 V	219.5 V	217.7 V	216.0 V	216.8 V	218.6 V	217.0 V	217.6 V
2018-09-08 05:39:37.776	218.0 V	215.5 V	216.9 V	221.2 V	219.2 V	220.3 V	218.3 V	216.2 V	217.5 V	219.0 V	217.0 V	218.2 V
2018-09-08 05:44:37.783	218.7 V	214.9 V	217.2 V	222.0 V	219.0 V	220.2 V	218.9 V	215.2 V	217.5 V	219.8 V	216.0 V	218.3 V
2018-09-08 05:49:37.789	216.4 V	214.6 V	215.7 V	219.6 V	217.6 V	218.8 V	216.8 V	215.1 V	216.1 V	217.6 V	215.8 V	216.9 V
2018-09-08 05:54:37.795	216.8 V	215.0 V	216.1 V	220.4 V	218.3 V	219.6 V	217.7 V	215.5 V	216.8 V	218.2 V	216.3 V	217.5 V
2018-09-08 05:59:37.802	217.3 V	216.0 V	216.6 V	220.3 V	219.0 V	219.7 V	217.7 V	216.3 V	217.1 V	218.4 V	217.2 V	217.8 V
2018-09-08 06:04:37.809	217.7 V	216.3 V	217.0 V	220.6 V	219.2 V	219.9 V	218.2 V	216.8 V	217.5 V	218.8 V	217.5 V	218.1 V

- ☞ Displays the power parameter value for each interval period.
- ☞ The power parameters selected in the time-series chart are selected and displayed identically.
- ☞ The displayed data can be saved as a CSV file.

7. Specification

7.1. Measurement Specification

■ General

Max Input voltage(Phase-Neutral):	1000Vrms
Max Input voltage(Phase-Phase):	1730Vrms
Phase-Neutral 입력 임피던스:	6 MΩ
Phase-Phase 입력 임피던스:	6 MΩ
AD converter	16 bit 8 ch, Simultaneous sampling
Sampling Frequency	10.24k Sample/sec
Temperature	23°C±2°C
Temperature effect	25ppm/°C

■ Voltage & Frequency

Voltage/Frequency	Range	Resolution	Accuracy
Vrms (AC+DC)	1 ~ 300 V	0.1 V	± 0.25% rdg ± 0.2fs
	1 ~ 600 V	0.1 V	± 0.25% rdg ± 0.2fs
	1 ~ 1000 V	1 V	± 0.3% rdg ± 0.2fs
Vpk	1 ~ 300 V	0.1 V	± 5%
	1 ~ 600 V	0.1 V	
	1 ~ 1000 V	1 V	
Vrms ^{1/2}	1 ~ 300 V	0.1 V	± 0.5%
	1 ~ 600 V	0.1 V	± 0.5%
	1 ~ 1000 V	1 V	± 0.6%
Vfund	1 ~ 300 V	0.1 V	± 0.25% rdg ± 0.2fs
	1 ~ 600 V	0.1 V	± 0.25% rdg ± 0.2fs
	1 ~ 1000 V	1 V	± 0.3% rdg ± 0.2fs
V Crest Factor	1.0 ~ > 2.5	0.01	± 5%
Hz	42.5 ~ 69 Hz	0.001 Hz	± 0.01 Hz

■ Current

Current		Range	Resolution	Accuracy
Arms	200G 300G	300A~5000 A (AC)	1 A	± 1.5% ± 5
		30A~500 A (AC)	0.1 A	± 1.5% ± 5
		3A~50 A (AC)	0.1 A	± 1.5% ± 5
	CT130 CT108	0~50A (AC)	0.1A	± 1.5% ± 5
		0~5A (AC)	0.01A	± 1.5% ± 5
Apk	300F 400F	300A~5000 A (AC)	1 A	± 5%
		30A~500 A (AC)	0.1 A	± 5%
		3A~50 A (AC)	0.1 A	± 5%
	CT130 CT108	0~50A (AC)	0.1A	± 5%
		0~5A (AC)	0.01A	± 5%
A Crest Factor		1 ~ 10	0.01	± 5%
Arms½		300A~5000 A (AC)	1 A	± 2% ± 10
		30A~500 A (AC)	0.1 A	± 2% ± 10
		3A~50 A (AC)	0.1 A	± 2% ± 10
Afund		300A~5000 A (AC)	1 A	± 1.5% ± 5
		30A~500 A (AC)	0.1 A	± 1.5% ± 5
		3A~50 A (AC)	0.1 A	± 1.5% ± 5

■ Power

Power	Range	Resolution	Resolution
Watt	Max 999.9MW	0.1 W ~ 0.1 MW	± 0.3% rdg ± 0.2fs + Clamp Accuracy
Power factor Cos ϕ / DPF	-1 ~ 1	0.01	± 0.1%

■ Energy

Energy	Range, Resolution	Accuracy
kWh (kVAh, kvarh)	Changed by V or I range	± 1% ± 10 digit

■ Harmonic

Harmonic	Range	Resolution	Accuracy
Harmonics order (n)	DC, 1~50 Harmonic groups		
Inter-Harmonics order	Off, 1~50 Harmonic & Inter-Harmonic subgroups		
V %f	0.0 ~ 100.0%	0.1%	$\pm 0.25\% \pm n \times 0.1\%$
V %r	0.0 ~ 100.0%	0.1%	$\pm 0.25\% \pm n \times 0.4\%$
V Absolute	0.0 ~ 1000 V	0.1 V	$\pm 5\% (*)$
V THD	0.0 ~ 100.0%	0.1%	$\pm 2.5\%$
A %f	0.0 ~ 100.0%	0.1%	$\pm 0.25\% \pm n \times 0.1\%$
A %r	0.0 ~ 100.0%	0.1%	$\pm 0.25\% \pm n \times 0.4\%$
A Absolute	0.0 ~ 600 A	0.1 A	$\pm 5\% \pm 5 \text{ digit}$
A THD	0.0 ~ 100.0%	0.1%	$\pm 2.5\%$
W %f또는 %r	0.0 ~ 100.0%	0.1%	$\pm n \times 2\%$
W Absolute	Depends V nominal & Clamp Range		$\pm 5\% \pm n \times 2\%$ $\pm 10 \text{ digit}$
W THD	0.0 ~ 100.0%	0.1%	$\pm 5\%$
Phase angle	$-180^\circ \sim +180^\circ$	1°	$\pm n \times 1^\circ$

7.2. Current probe specification



T200G (Φ100mm)

Ratio

0.41μV/A

AC Amps

0-5,000A

± 1.0% FS



T300G (Φ200mm)

Ratio

0.39μV/A

AC Amps

0A~5000A

± 1.0% FS



T068 (Φ68mm)

Ratio

1mV/A

AC Amps

0-1,000A

± 2.0% FS



T130 (Φ30mm)

Ratio

10mV/A

AC Amps

0-50A

± 1.0% FS



T108 (Φ8mm)

Ratio

100mV/A

AC Amps

0-5A

± 1.0%

7.3. Snapshot

7.3.1. Snapshot record

When you save the snapshot, the following data is saved.

- Screen image
- Voltage, Current Waveform
- Measurement setting
- 200ms (10/12 cycle) instantaneous value
- Harmonic amplitude and phase values
- Interharmonic size and phase values

☞ When the snapshot is recalled, the stored data is recalled and HOLD

☞ Release HOLD to end loading.

7.4. Record

7.4.1. Interval Record

Each power parameter calculates and records the maximum, minimum, and average over the interval length time using the measured value every 200 ms (10/12 cycles).

For example, for RMS values:

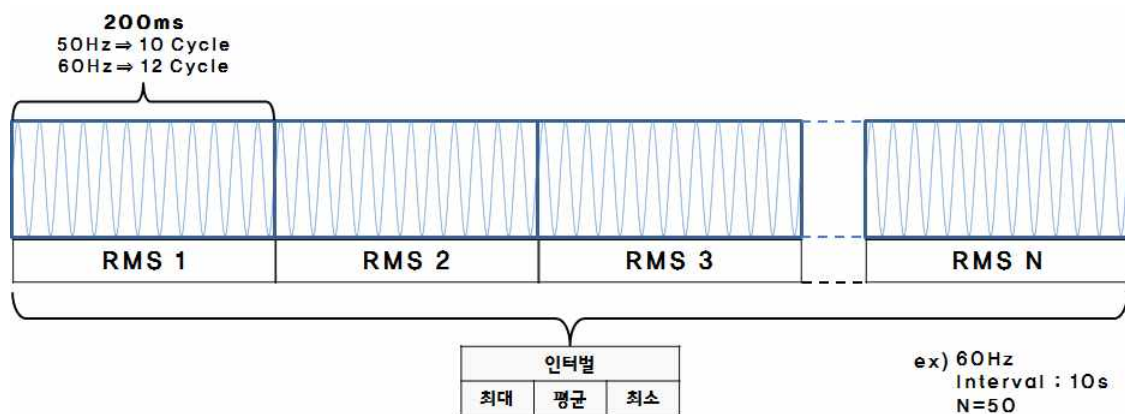
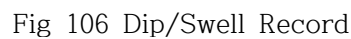


Fig 90 Interval Record

For example, if you measure 200ms (12 cycles) at 60Hz, 24 half-period RMS values are calculated.



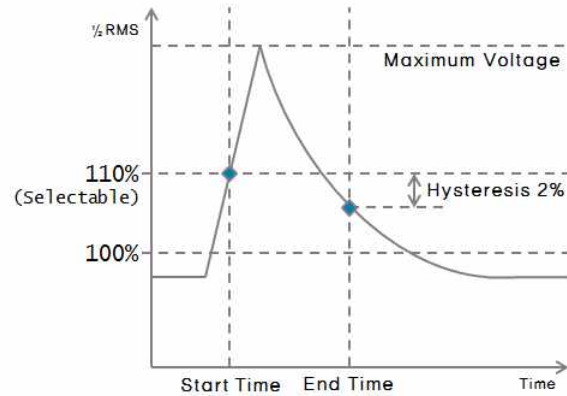
200ms
50Hz $\Rightarrow$ 10 Cycle
60Hz $\Rightarrow$ 12 Cycle



7.4.3. Event

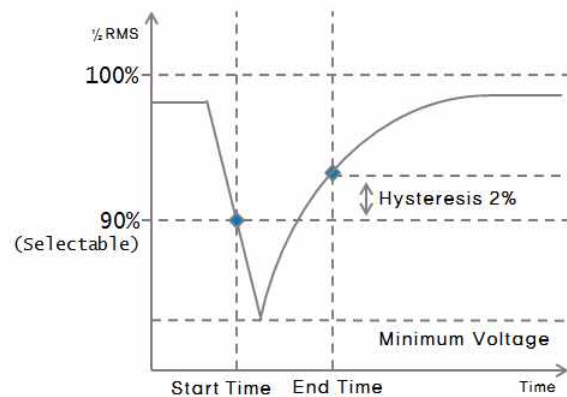
■ Swell(Voltage Rise)

- Detect using half cycle RMS.
- The standard can be set by the ratio of the rated voltage
- Setting range: 100% ~ 150%, default value 110%
- An event occurs when the voltage above the set reference is measured.
- Setting Reference - The event is terminated when a voltage below Hysteresis (2%) is measured.
- The highest measured value during the event period is recorded.



■ Dip(Voltage Drop)

- Detect using half cycle RMS.
- The standard can be set by the ratio of the rated voltage
- Setting range: 0% to 100%, Default is 90%
- When the voltage below the set reference is measured, an event is generated.
- Setting criterion - The event is terminated when a voltage above hysteresis (2%) is measured.
- The most familiar measurement value is recorded during the event period.



■ Interrupt(Instant power failure)

- Detect using half cycle RMS.
- The standard can be set by the ratio of the rated voltage
- Setting range: 0% to 100%, default 10%
- When the voltage below the set reference is measured, an event is generated.
- Setting criterion - The event is terminated when a voltage above hysteresis (2%) is measured.
- The most familiar measurement value is recorded during the event period.

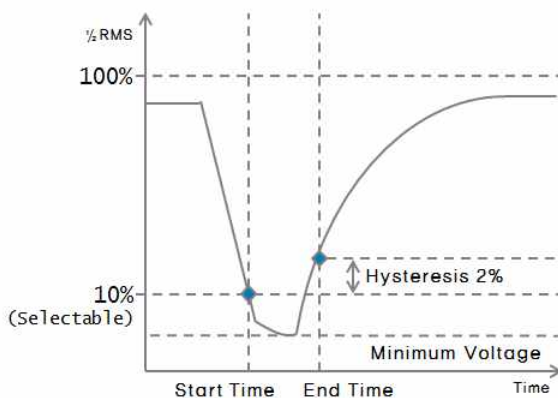


Fig 109 Interrupt Event

■ Transient(Transient Voltage)

- Detect using the signal from which the low frequency component is removed from the input signal.
- The reference voltage can be set by the size
- Setting range: 400V ~
- If an absolute voltage above the set reference is measured, an event is generated.
- The highest measured value during the event period is recorded.

■ Event recording

When an event occurs, the following information is stored.

- Event type (Dip, Swell, Interrupt)
- Event start / end
- Event length (if ending)
- Time of occurrence
- Voltage - The maximum (voltage rise) or minimum (voltage drop, instantaneous power failure) of the half cycle RMS from start to end.
- RMS recording, presence / absence of waveform recording.

7.4.4. Interval record item

Depending on the selection, the maximum, average, and minimum values of the measurements are stored for each interval.

Power	Frequency, Voltage/Current RMS, Voltage/Current Half RMS, Voltage/Current Peak, Voltage/Current imbalance rate, Voltage/Current THD, Active power, Reactive power, Apparent power, Power factor, Phase power factor, k-factor, Flicker, Active power (regeneration/consumption), Reactive power (regeneration/consumption).
Harmonics	The magnitude and phase (~ 50th order) of harmonics by voltage/current order.
Inter-harmonics	The magnitude and phase (~ 50th order) of mutual harmonics by voltage/current order.

7.4.5. Interval record length

The maximum number of interval samples per session in a session is 64,800.

The maximum recordable time according to the interval interval is as follows.

Interval	Max recording time
1 s	18 Hour
3 s	54 Hour
5 s	90 Hour
10s	7.5 Day
15s	11.25 Day
20s	15 Day
30s	22.5 Day
1 m	45 Day
2 m	90 Day
5 m	225 Day
10m	> 1 Year
15m	> 1 Year
20m	> 1 Year
30m	> 1 Year
1 h	> 1 Year
2 h	> 1 Year

The maximum number of events per session in the record is 10,000.

7.4.6. Save the record

The recorded data is stored on the SD card in the following path.

SD:\\TEKON\\PQA\\LOG\\YYMMDDNN	
YYMMDD	Year Month day
NN	Serial number of the logging session 01~99

8. Maintenance

Use replacement part designated by manufacturer . Otherwise Manufacturer is not liable from Safety Accident, Unit Failure . For safety, do not use Unit if Unit or its accessory is damaged or mal function and send to Service center .

8.1. Battery Charging

Unit is installed with Rechargeable Li-Ion battery. Battery Recharge should be only through supplied Power Adapter.

Battery Charging starts once Power Code is connected. Full Charging time from complete drain out battery takes approx. 4 hours. While charging, unit does not use battery and use power through Adapter. If use unit while charging, charging time may take longer

Even though Unit is connected with Charger for a long time, the charging system in the unit turned to streamlet charging mode after complete charging which protect from any damage on unit.

※ To avoid Battery Capacity decrease, minimum 2 time/year charging required.

When adapter is separated, upper right LCD of unit display charging status level as below icon table.

ICON	Description
	Battery charging amount more than 85%.
	Battery charging amount more than 70%.
	Battery charging amount more than 50%.
	Battery charging amount more than 25%.
	Battery is fully discharged. After Warning sounds for 30 seconds, Power Circuit will shut off.
	Adapter connected, under charging.

☞ To avoid degrading battery capacity, it is recommended that you avoid full discharge and charge as often as possible.

☞ When storing for a long period of time, it is recommended to charge the battery in half. Also, please charge once every 6 months to prevent the discharge completely.

8.2. Cleaning and Storage



To prevent any Accident , please separate any Test Probe or Testing Zig. Terminal from unit.

8.2.1. Unit Cleaning

Clean with wet cloth and Soft Soap. Do not use Cutter, Organic Solvent or Alcohol. Letter printed on Analyzer can be erased.

8.2.2. Storage

Even though Unit needs to store long period, separation of Battery Pack is not required. However, Battery may drain out naturally and gradually and Battery Life can be reduced if store the unit for a long period.

To manage the Battery at best condition, suggest to recharge the battery periodically (1~2 times/month)

8.2.3. Cleaning of Probe

Clean with wet cloth and Soft Soap. Do not use Cutter, Organic Solvent or Alcohol. Open Clamp and Clean the Pole of Magnet with little bit - oil wet cloth. Be careful not to have Rust or Corrosion on end of magnetic core.

Limited warranty and limitation of liability

[Content of warranty]

TEKON warrants the product to be free from defects in workmanship and materials for the Warranty Period. Upon discovery of a defect in the product or parts provided therewith under normal use and service during the Warranty Period, TEKON's sole obligation and entire liability under this warranty shall be either the repair or replacement of the defective product or parts thereof, where in the case of the latter the replacement product or parts thereof may, at TEKON's discretion, be new, refurbished or serviceable, which is at least functionally equivalent to or higher than the original one.

[Warranty Period]

The Warranty Period shall continue to one (1) year from the date of purchase; provided, however, that a copy of the receipt or proof of purchase is lost or cannot be submitted, the warranty duration for serviceability shall be calculated from the manufacture date (year/month/date) evidenced by the serial number labelled on the product.

[Warranty obligations]

Insofar as a claimed product is returned to the Manufacturer's service center within the Warranty Period and the warranty therefor cannot be disclaimed, TEKON, at its option, limits the extent to which the claimed product is remedied, such as refund with the purchase price, free of charge repair or replacement with the same or substantially equivalent product. To obtain any warranty service, please contact an authorized TEKON service center near you, or return the defective product, with freight and insurance for full value born to the sender, to your nearest TEKON service center with details of what the problem is.

If the failure of the product is judged by TEKON at its discretion attributable to misuse, unauthorized modification, the result of force majeure (including but not limited to accident) or usage or handling in a fashion other than as explained in the user's manual, TEKON will issue an invoice for the repair cost and get permission before starting repair. The corresponding product once repaired will be sent back to you with freight incurred by the sender.

[Limitation of liability]

TEKON shall have no responsibility of any damage that may occur during transportation. Neither TEKON nor any contributor to the product shall be liable for any of those types of damages known as special, indirect, consequential or incidental related to the product, no matter what the cause or legal theory it's based on. This express warranty shall apply only to new Product purchased by the customer and shall not apply to any other goods used, refurbished or reproduced. Please keep proof of purchase for future service request. TEKON cannot guarantee you disposable battery, intentional or accidental abuse, unauthorized modification, negligence, accident, operation or handling under abnormal condition.

[Legal rights of customer]

The benefits under this warranty are in addition to other rights and remedies that you may have at law. TEKON does not exclude, limit or suspend such other rights as ensured and conferred under statute.

MEMO

MEMO



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