



# Power Quality Analyzer

## 전력분석기

TPA2100

- 입력 채널 3상 4선 DC Coupling
- 측정전압 : 1400Vpk
- 전류 / 주파수 : 4000Apk / (42.5~69Hz)
- Power System Quality 분석
- 50차 고조파(harmonic) 분석
- Flicker / Unbalance / Transient / Energy
- Power Quality Data 분석
- 8GB 대용량 Memory(TF 카드)
- Flash Memory(128MB)
- Monitoring(2시간에서 최대 7일)
- PC software 제공
- CT(3000A x 4ea) 기본 제공
- Battery 동작시간(약 7시간)
- IEC61000-4-30 / IEC61010-1 / EN50160



■ Measurement Modes(측정 모드)



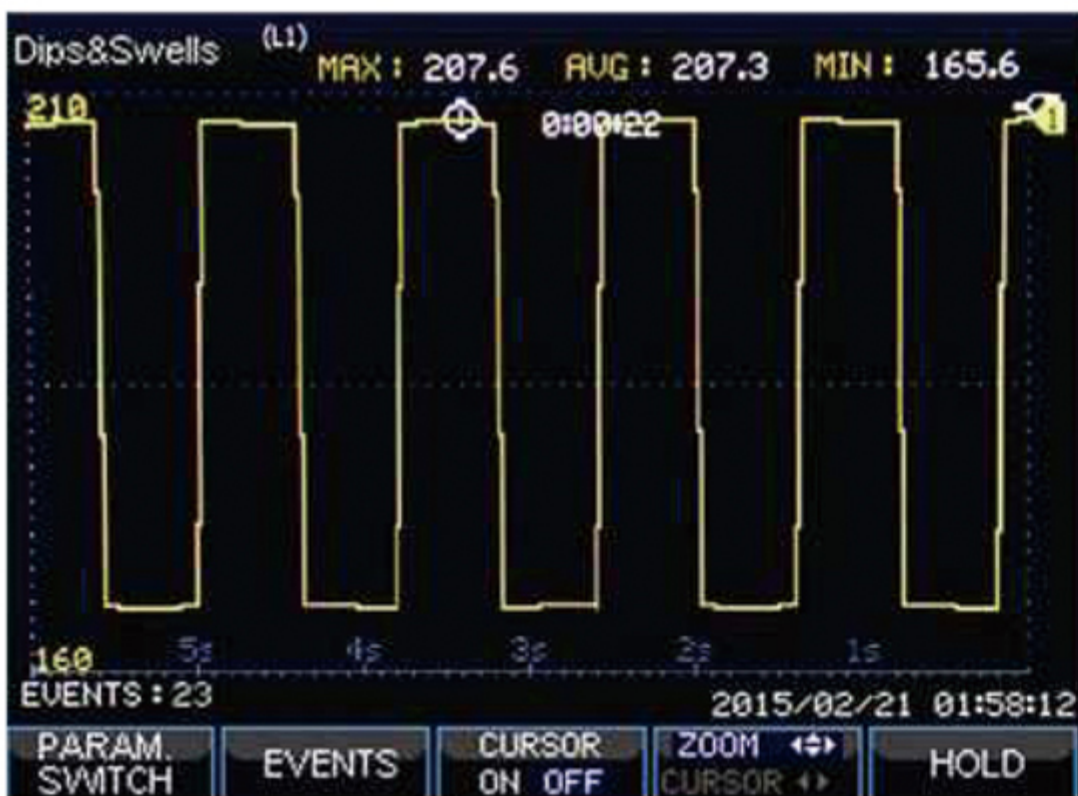
**1 스코프 (Scope)**  
전압/전류 파형 보기와 읽기 (커서 및 줌 기능)

**2 전압/전류/주파수 (Voltage/Current/Frequency)**  
전압/전류/주파수/Crest Factor 측정

Volts/Amps/Hertz

	L1	L2	L3	N
Urms	238.7	238.7	238.7	4.842
Upk	315.2	315.2	315.2	8.518
CF	1.32	1.32	1.32	1.76
Irms	43.60	6.335	6.346	0.814
Ipk	60.33	7.630	7.901	1.113
CF	1.38	1.20	1.25	1.37

Freq = 50.00 Hz



**3 전압강하 & 과전압 (Dips & Swells)**  
비정상적인 이벤트(과전압 팽창, 정전, 전압강하와 같은 급격한 전압 변화) 포착

**4 하모닉 (Harmonics)**  
하모닉(고조파)과 상호(inter)하모닉을 50차수까지 측정, DC Component, THD, K-Factor 파라미터



Power & Energy

	L1	L2	L3	Total
P(kW)	3.311	1.472	1.482	6.265
S(kVA)	10.39	1.501	1.500	13.39
Q(kVAR)	9.845	0.293	0.234	10.37
TPF	0.32	0.98	0.99	0.47
KWh	0.048	0.037	0.038	0.123
KVAh	0.262	0.038	0.038	0.338
KVARh	0.248	0.008	0.006	0.000

**5 전력과 에너지 (Power and Energy)**  
모든 전력에 대한 파라미터 측정  
Vrms/Arms/KW/KVA/KVAR/TPF/DPF/kWh/kVAh/kVARh

**6 플리커 측정 (Flicker)**  
Pst(<10분), Plt(<2시간), Pst(1분)

Flicker

	L1	L2	L3
Pst(1min)	0.00	0.00	0.00
Pst	0.00	0.00	0.00
Plt	0.00	0.00	0.00



**7 불평형 (Unbalance)**  
IEC61000-4-30 표준 규격기준 3상에서 불평형 체크

**8 과도현상 (Transients)**  
다양한 교란이 발생하는 동안 고해상도의 파형을 포착. 최대 100개의 이벤트, 샘플링율 20Ks/s







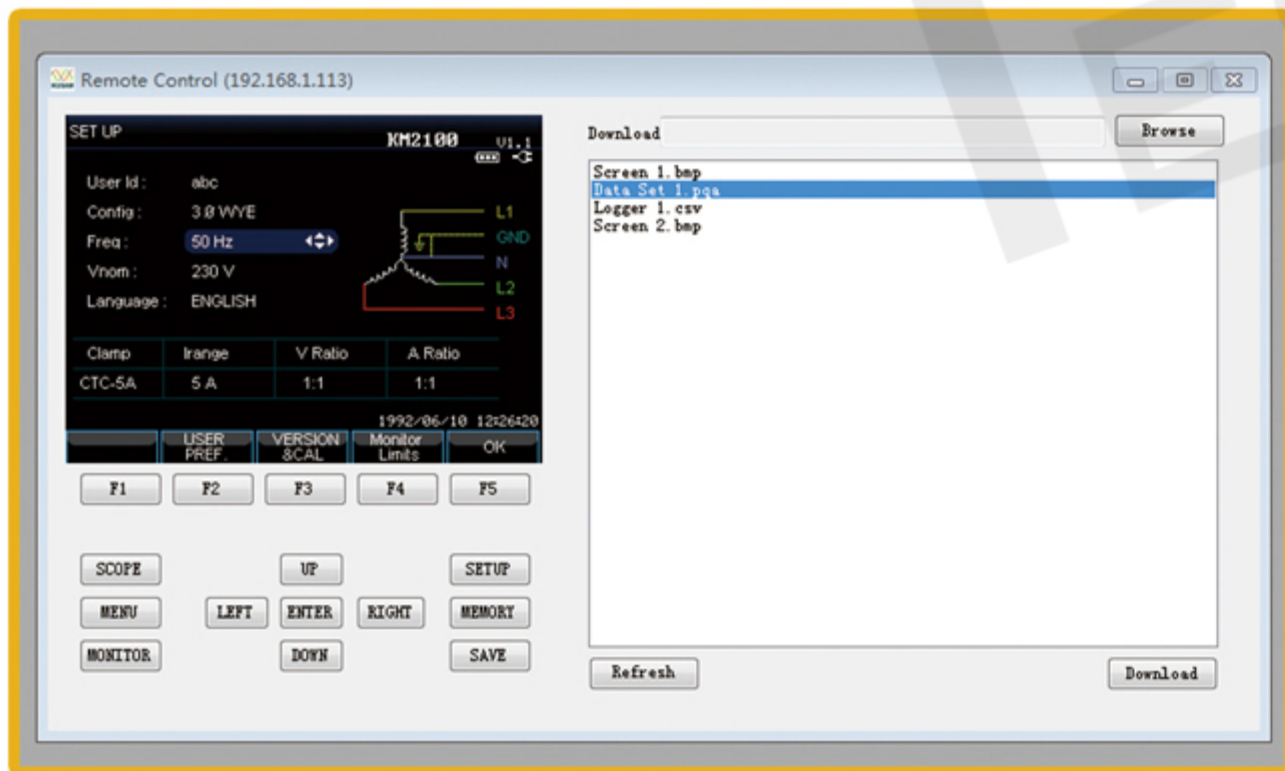
- 9 **돌입전류 (Inrush Current)**  
라인에 높거나 낮은 임피던스 부하가 유입되어 발생하는 서지 전류 포착
- 10 **로거 (Logger)**  
파라미터, Interval, Duration 선택 및 측정 데이터 레코드  
TF card 에 저장 및 USB 인터페이스를 이용한 PC software로 저장



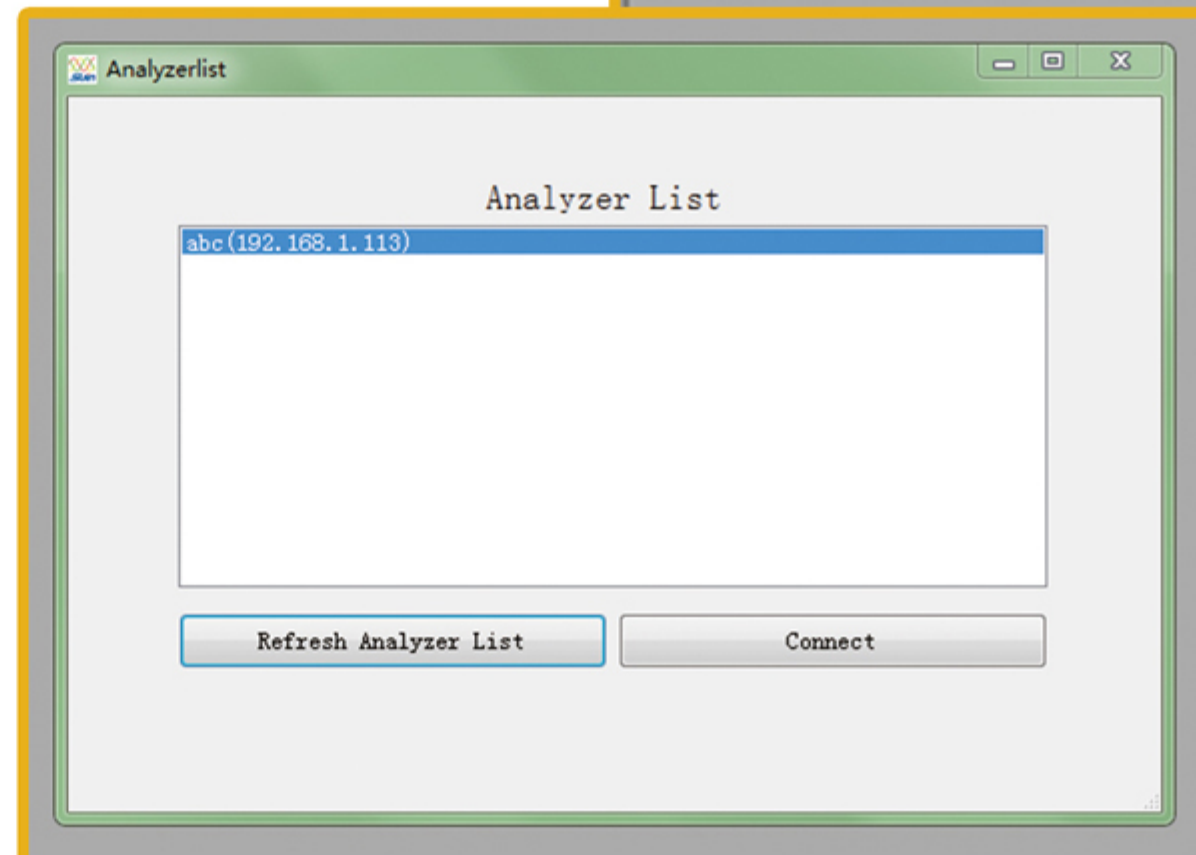
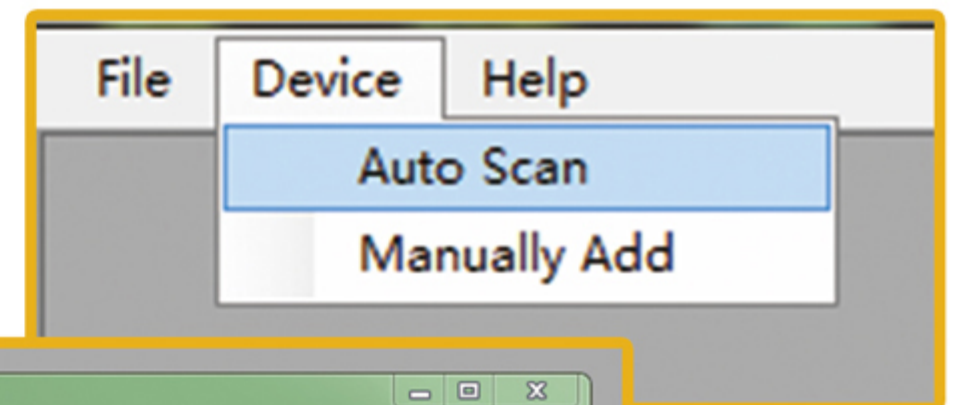
- 11 **모니터 (Monitor)**  
Vrms, Arms, Harmonics, Flicker, 전압강하(Dip), 과전압(Swell), 급격한 전압변화(Rapid Voltage Change), 정전(Interruption), 불균형(Unbalance), Frequency 등을 동시에 측정하고 사용자 요구 조건 혹은 EN50160 표준에 부합 여부 확인  
모니터링 시간은 2시간에서 7일까지 가능

### Power View Software

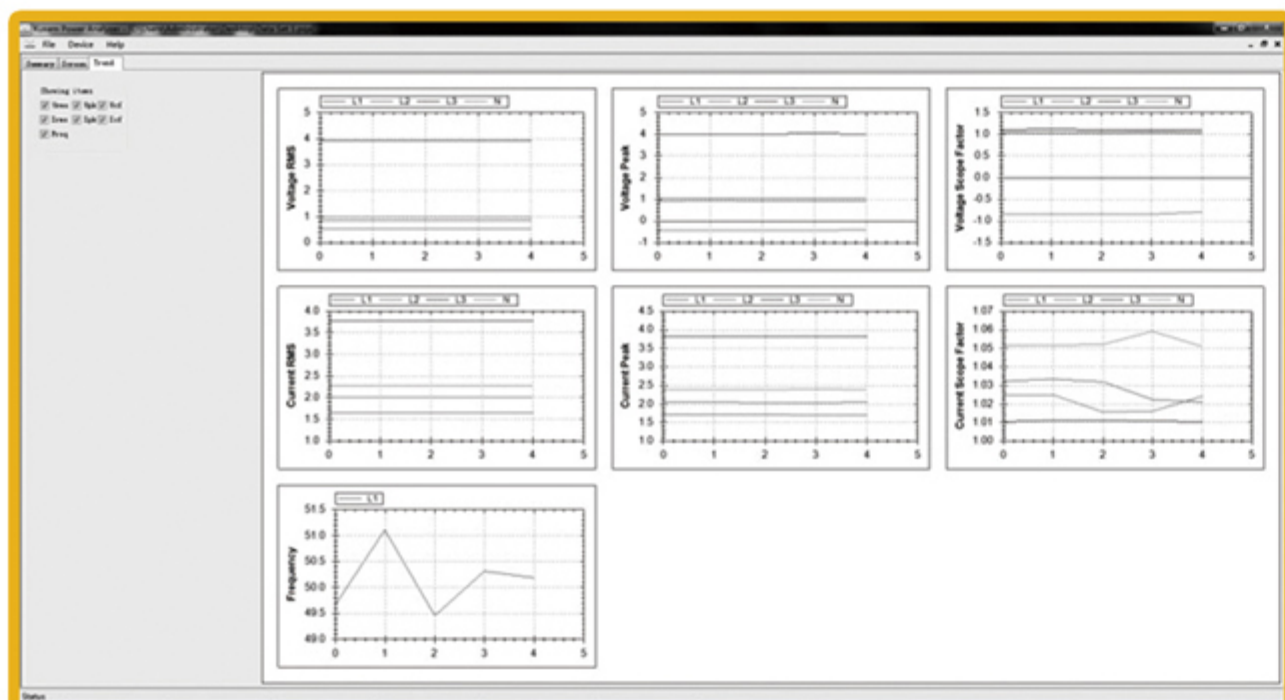
Power View Software는 전력분석기를 원격제어하고 다운로드 데이터를 보는데 유용하고 편리합니다.



원격제어 화면



Auto Scan 을 선택하면 LAN 인터페이스를 사용하여 PC에 자동으로 연결 될 수 있도록 합니다.



사용자 지정 파라미터들에 대한 모니터 데이터 추이(Max, Min, Average) 관측



## Input







Voltage Input			
Input Channels	4 (3 phase + neutral) DC coupling		
Max. Input Voltage	1000Vrms		
Range of nominal voltage	50 to 500V		
Max pulse peak voltage	6kV		
Bandwidth	>3kHz		
Input Impedance	4M $\Omega$ /5pF		
Current Input			
Numbers of Input	4 (3 phase + neutral) DC coupling		
Type	Clamp Current Sensor with mV output		
Input Range	1 to 3000Arms with supplied current clamp		
Input Impedance	50k $\Omega$		
Bandwidth	>3kHz		
Sampling System			
Resolution	8 channels 16 bits AD		
Sampling Rate	20kS/s for each channel, 8 channels sample synchronously		
RMS Sampling	5000 points for 10/12 cycles (according to IEC 61000-4-30)		
PLL Sync	4096 points for 10/12 cycles (according to IEC 61000-4-7)		
Measurement	Measurement Range	Resolution	Accuracy
Voltage/Current/Frequency			
Vrms(AC+DC)	1 ~ 1000Vrms	0.1Vrms	$\pm 0.5\%$ of nominal voltage
Vpk	1 ~ 1400Vpk	0.1Vpk	$\pm 0.5\%$ of nominal voltage
V(Crest Factor)	1.0 ~ > 2.8	0.01	$\pm 5\%$
Arms(AC)	10mV/A	0 ~ 100A	$\pm 0.5\% \pm 0.2A$
	1mV/A	1 ~ 1000A	$\pm 0.5\% \pm 0.2A$
	50mV(65mV)/1000A	15 ~ 5000A	$\pm 1\% \pm 2A$
A(Crest Factor)	1 ~ 10	0.01	$\pm 5\%$
Frequency	42.5 ~ 57.5Hz (50Hz nominal)	0.01Hz	$\pm 0.01Hz$
	51 ~ 69Hz (60Hz nominal)	0.01Hz	$\pm 0.01Hz$
	340 ~ 460Hz (400Hz nominal)	0.01Hz	$\pm 0.1Hz$
Dips & Swells			
Vrms1/2	0 ~ 200% of nominal voltage	0.1Vrms	$\pm 1\%$
Arms1/2	1 ~ 3000A	1A	$\pm 1\% \pm 2A$
Threshold levels	Threshold is settable according to nominal voltage percentage Detectable events type : Dips, Swells, Interruption, Voltage Rapid Change		
Duration	hour-minute-second-microsecond	0.5 cycle	1 cycle
Harmonic			
Harmonic Number	1 ~ 50		
Inter-Harmonic	1 ~ 49		
Harmonic Voltage	0.0 ~ 100.0%	0.1%	$\pm 0.1\% \pm nx0.1\%$
Harmonic Current	0.0 ~ 100.0%	0.1%	$\pm 0.1\% \pm nx0.1\%$
THD	0.0 ~ 100.0%	0.1%	$\pm 2.5\%$
DC Relative	0.0 ~ 100.0%	0.1%	$\pm 0.2\%$
Frequency	0 ~ 3500Hz	1Hz	1Hz
Phase	-360 $^{\circ}$ ~ 0 $^{\circ}$	1 $^{\circ}$	$\pm nx1.5^{\circ}$
Power and Energy			
Active Power/Apparent Power/Reactive Power	1.0 ~ 20.00MW	0.1kW	$\pm 1.5 \pm 10$ counts
kWh	0.00kWh ~ 200GWh	10Wh	$\pm 1.5 \pm 10$ counts
Power Factor	0 ~ 1	0.01	$\pm 0.03$
Flicker			
Pst(1min), Pst, Plt, PF5	0.00 ~ 20.00	0.01	$\pm 5\%$
Unbalance			
Voltage	0.0 ~ 5.0%	0.1%	$\pm 0.5\%$
Current	0.0 ~ 20.0%	0.1%	$\pm 1\%$
Voltage Phase	-360 $^{\circ}$ ~ 0 $^{\circ}$	1 $^{\circ}$	$\pm 2$ counts
Current Phase	-360 $^{\circ}$ ~ 0 $^{\circ}$	1 $^{\circ}$	$\pm 5$ counts
Voltage Transient			
Vpk	6000Vpk	1V	$\pm 15\%$
Vrms	10 ~ 1000Vrms	1V	$\pm 2.5\%$
Min. Test Time	50us		
Sampling Rate	20kS/s		



Measurement	Measurement Range	Resolution	Accuracy
<b>Inrush Current</b>			
Arms(AC+DC)	0 ~ 3000Arms	0.1	±1% ±5counts
Inrush Duration	6s ~ 32min selectable	10ms	±20ms
<b>Logger</b>			
Recording	user-defined parameters for 4 phases at the same time		
Memory	Data stored in TF card, 8GB		
Duration Time	2 hrs to 1 year		
Interval	1s to 1hrs		
<b>Wire Combinations</b>			
1Ø+NEUTRAL	Single phase with neutral		
1Ø SPLIT PHASE	Split phase		
1Ø IT NO NEUTRAL	Single phase system with two phase voltages without neutral		
3Ø WYE	3-phase 4-wire system, Y type		
3Ø DELTA	3-phase 3-wire system delta (Delta)		
3Ø IT	3-phase Y type without neutral		
3Ø HIGH LEG	4-wire 3-phase delta system (Delta) with center tapped high leg		
3Ø OPEN LEG	Open-delta (Delta) 3-wire system with two transformer windings		
2-ELEMENT	3-phase 3-wire system without current sensor on phase L2/B (2 Watt meter method)		
2 1/2-ELEMENT	3-phase 4-wire system without voltage sensor on phase L2/B		
<b>General Characteristics</b>			
<b>Display</b>			
Screen	Color TFT LCD		
Size	5.6 inch		
Resolution	320x240		
Brightness	Adjustable		
<b>Housing</b>			
Protection	Protection shield, strong		
IP	IP51, accords IEC60529		
<b>Interface</b>			
USB Host	Download file to PC by U disk for analyze with PC software		
LAN	For remote control of the Analyzer and measurement data transmission.		
<b>Memory</b>			
Flash Memory	128MB		
TF Card	Standard 8G		
<b>Mechanical</b>			
Dimension	262x173x66mm		
Weight	1.6kg		
<b>Environment</b>			
Working temperature	0°C ~ 40°C		
Storage temperature	-20°C ~ 60°C		
Humidity	90% relative humidity		
<b>Power</b>			
Adapter input	90 ~ 264V		
Adapter output	12V 2A		
Battery	Rechargeable NI-MH 7.2V 3.8Ah		
Battery Working Time	> 7hours		
Battery Charge Time	6hours		
<b>Standard</b>			
Measurement Method	IEC61000-4-30 Class-S		
Measurement Performance	IEC61000-4-30 Class-S		
Power Quality Monitoring	EN50160		
Flicker	IEC61000-4-15		
Harmonic	IEC61000-4-7		
<b>Electrical Safety</b>			
Comply with	IEC61010-1, Safety Degree : 600V CAT IV 1000V CAT III		
Max. voltage at Voltage Input	600V CAT IV 1000V CAT III		
Max. voltage at Current Input	42Vpk		





## ■ Accessories

Voltage Test Leads Alligator Clips		(2m) x 5pcs	Soft Carry Bag		1pcs
Power Adapter		1pcs	Hang Strap		1pcs
Power Patch Cord		1pcs	CD (Software, Manuals)		1pcs

## ■ CT Clamps

Clamp Mode	KLC8C-5A	CTC0080	CTC0130	CTC1535
Appearance				
Measurement Range	5A	50A	100A	1A ~ 1000A
Output Voltage Ratio	10mV/A	10mV/A	1mV/A	1mV/A
Working Frequency	45Hz ~ 55Hz	50Hz ~ 400Hz	50Hz ~ 400Hz	40Hz ~ 100kHz
Accuracy	0.2%	0.2%	0.2%	1%
Safety				CAT III 600V
Clamp Radius	8mm	8mm	13mm	52mm
Dimension(mm)	158 x 43 x 24	171 x 46 x 27	174 x 52 x 27	111 x 216 x 45

Flexible Probes Mode	PY-3000A	JK-5000A
Appearance		
Primary Current Rating	3000A	5000A
Output Voltage Ratio	65mV/1000A	50mV/1000A
Measurement Range	15A ~ 3000A	20A ~ 5000A
Accuracy	±1% + Position Error	±1% + Position Error
Maximum Allowable Input	100KA	100KA
Phase Error	<±1°	<±1°
Noise	<2mVrms (10Hz ~ 10kHz)	<2mVrms (10Hz ~ 10kHz)
Frequency Characteristic	10Hz ~ 10kHz (-3dB)	10Hz ~ 10kHz (-3dB)
Weight	130g	130g
Length	200cm	200cm
CT Perimeter	50mm	45mm
Measurement Position Error	±2%	±2%