Quick manual



POWER QUALITY ANALYZER





Preface

This Quick manual is a simplified version of the full instruction manual which can be found in the supplied CD-ROM. This manual is intended only as a handy reference guide and should only be used after having read the full instruction manual which contains full details on each function of this instrument and the items contained in the package.

•Safety Warning!

The instruction manual contains warnings and safety procedures which have to be observed to ensure safe operation of the instrument and maintain it in a safe condition. Thus, these operating instructions have to be read prior to using the instrument.

Contents

1.	Instrument Overview	2
2.	Instrument Layout	5
3.	Getting started	7
4.	Setting SET UP	10
5.	Instantaneous (Inst) value Measurement 🖤	15
6.	Integration value Measurement Wh	17
7.	Demand Measurement DEMAND	19
8.	WAVE Range 🔶	23
9.	Harmonic Analysis 💷	25
10.	Power Quality QUALTY	27
	Swell / Dip / Short interruption (Int) Measurement	27
	Transient Measurement	29
	Inrush current Measurement	31
	Unbalance Ratio	33
	Flicker	35
	Capacitance Calculation	37
11.	CF Card / Saved data	39
12.	Wiring check	42

The latest software can be downloaded from our web site. http://www.kew-ltd.co.jp

1. Instrument Overview

Feature

This is a Clamp-type Power Quality Analyzer that can be used for various wiring systems. It can be used for simple measurements of instantaneous/ integration/ demand values, and also for monitoring waveforms and vectors, analyzing harmonics and measuring fluctuations in supply voltages and for the simulation of power factor correction with capacitor banks. Data can be saved either in the internal memory or a CF card, and can be transferred to a PC either via an USB lead or a CF Card reader.

Safety construction

Designed to meet the international safety standard IEC 61010-1 CAT.III 600V/ CAT.II 1000V

Wiring configuration

KEW6310 supports : Single-phase 2-wire, Single-phase 3-wire, Three-phase 3-wire, Three-phase 4-wire.

Measurement and calculation

KEW6310 measures voltage (RMS), current (RMS), and calculates active/reactive/apparent power, power factor, phase angle, frequency, neutral current and active/ reactive/ apparent electric energy. (RMS)

Demand measurment

Electricity consumption can be easily monitored so as not to exceed the target maximum demand values.

Waveform / Vector display

Voltage and current can be displayed by waveform or vector.

Harmonic analysis

Harmonic components of voltage and current can be measured and analyzed.

Power quality analysis

Measuring Swell/ Dip/ Int, Transient, Inrush current, Unbalance ratio and flicker*, moreover, simulating power factor correction with capacitor banks.

* Flicker measurement function is only available with ver.2.00 or later.

Saving data

KEW6310 is endowed with a logging function with a preset recording interval. Data can be saved by manual operation or at pre-set time & date. Screen data can be saved by using Print Screen function.

Dual power supply system

KEW6310 operates either with an AC power supply or with batteries. Both dry-cell batteries (alkaline) and rechargeable batteries (Ni-MH) can be used. Battery charge while rechargeable batteries installed in the instrument is possible. In the event of interruption, while operating with AC power supply, power to the instrument is automatically restored by the batteries in the instrument.

Large display

Color display with large screen

Light & compact design

Clamp sensor type, compact and light weight design

Application

Data in the internal memory or CF card can be saved in a PC via a USB lead or a CF Card reader. As well supplied software facilitates setting, optional analysis software facilitates data analysis.

Input/output function

Analogue signals from thermometers or light sensors can be measured simultaneously with electrical power data via 2 analogue inputs (DC voltage); signals exceeding a preset threshold values at each range can be transmitted to alarms devices via 1 digital output.

Functional Overview







Connector



Power Connector

Side face



Battery Case





*Selector switch is under the Selector switch cover.

-6-

3. Getting Started

The KEW6310 operates with either an AC power supply or batteries. In the event of AC power interruption, power to the instrument is automatically restored by the batteries in the instrument. Drycell batteries (alkaline) and rechargeable ones (Ni-MH); can be both used. It is also possible to charge rechargeable batteries in the instrument.

Remove the Selector Switch Cover, and slide the Selector Switch to left or right depending on the batteries to be used.

	DRY-CELL BATTERY	RECHARGEABLE BATTERY			
Battery can be used	Alkaline dry-cell battery(LR6)	Ni-MH Rechargeable battery (HR-15/51)			
Position of Selector switch	Slide the switch to the left (DRY)	Slide the switch to the right			
		(RE-CHARGEABLE)			
Selector switch cover		RE- DAMOERALE_ MATTERY USE ONLY			

If the AC supply is interrupted and the batteries haven't been installed, the instrument goes off and the measured data may be lost.

Battery Mark on the LCD / Battery Level

	Powered by AC supply		0~100	D% (count by 20%)				
Battei	ch		100%	.00% - approx 2 hours* : with alkaline batteries - approx 5 hours* : with Ni-MH rechargeable batter				
ry Mar	25.0 A 5.07 kW -LOAD-	Batter		Battery is exhausted. (accuracy not guaranteed) Instrument operates as follows automatically.				
'k on t	Powered by Battery*	ry Lev		Weasurement continues, Data				
the I	ch 👘 18-94-2006 8:441:56	<u>e</u>	0%	saved.)				
-CD	24.9 A			Wh Data save (measurement) is				
	3.88 KW			(Measured data is saved.)				
•	mark flashes while charging batteries. * reference time when using the instrument with indications on the LCD hide.							

A continuous measurement with alkaline batteries is limited to 1 hour; use of an ac power supply is recommended. (batteries should be considered and used as a back-up)

Charging the rechargeable Ni-MH batteries

Following message to prompt battery charge appears on the LCD automatically when battery level is 40% or less at starting the instrument. Press the **I Cursor** Keys and **ENTER** Key according to the instructions displayed on the LCD.

- Install rechargeable batteries (Ni-MH)
- · Slide the Selector switch to the right (set to "RE-CHARGEABLE" position)
- Connect the AC Power cord and power on the instrument.
- * Refer to "(4.2.4.) Other Setting" in the full instruction manual to initiate a battery charge anytime it is necessary.



Battery charge doesn't initiate only by installing rechargeable batteries and connecting an AC power cord. Above operation is required to start a battery charge.

How to install batteries:



Install batteries in correct polarity as marked inside.

Battery power is consumed even if the instrument is being off. Remove all the batteries if the instrument is to be stored and will not be in use for a long period.

Cord Connection



Start-up Screen

Model name and software version will be displayed upon powering on the instrument, and self-check routine initiates automatically. The KEW logo will appear. Stop using the instrument if error messages appear on the LCD after the self-check and refer to **(Section 15) Troubleshooting** in the full instruction manual.



4. Setting (SET UP)

The "SET UP" consists of following 4 settings. Basic Setting : Setting of the items common to all measurements Measurement Setting : Setting of each measurement Save Setting : Setting of data save methods Other Setting : Environmental setting



Select any desirable items with $\underline{A} = \overline{A}$ (In Cursor Keys and confirm it with ENTER Key. Using the ESC Key cancels the setting change. Following is an example to select the wiring to be tested at basic setting.

* Cursor will move onto any of the red parameters.

Basic Setting

Setting item	Details of S	Setting					
Wiring	①1P2W×1 ②1P2W×2 ④1P2W×4 ⑤1P3W×1 ⑦1P3W×1+2A ⑧3P3W×1 ⑩3P3W×1+2A ⑪3P3W3A ③3P4W×1+1A ⑩4A	③1P2W×3 ⑥1P3W×2 ⑨3P3W×2 ⑫3P4W×1					
Voltage Range	150V/300V/600V/1000V						
VT Ratio	0.01~9999.99 (1.00)						
Clamp / Current Range	8128:1/5/10/20/50A/AUTO 8127:10/20/50/100A/AUTO 8126:20/50/100/200A/AUTO 8125:50/100/200/500A/AUTO 8124:100/200/500/1000A/AUTO 8129:300/1000/3000A 8141: 8142: 8142: 8146: 8147: 8146: 8147: 500mA/1/5/10A/AUTO 8148:	<pre>Power Clamp sensor Leakage Clamp sensor</pre>					
CT Ratio	0.01~9999.99 (1.00)						
Filter	8141/42/43/46/47/48:ON/OFF 8128/27/26/ 25 /24/29:						
DC V	50mV/500mV/ 5V						
Frequency	50Hz /60Hz						

* Default values are highlighted in gray * Leakage Clamp sensors cannot be used for power measurements but can be used on wiring configurations: ⑦, ⑩, ⑬ and ⓪.

Wiring Configuration

SET UP Basic Setting

Orientation of Clamp sensor

Reverse clamping switches the symbols (+/-) for active power.

Measurement Setting

Setting Item					Details of Setting				
	W Instanta	aneous/avg/ma	x/min values	on / Off					
W/Wh/	WN Detaile	S		1 000mW_999 9TW (300 0kW)					
DEMAND*		Shorter th	an inte	rvals.	3 diffe	rent	cvcles are		
	Demand inspection	available. (10 m	i n)			· , · · · · ·		
WAVE	Save item			ON /OFF					
Range*	A				_	_			
	THD (total harmo	nic distortion) c	aluculation	THD-F (fu THD-R (tota	ndame al RMS	ntal v basis)	wave ba	asis)	/
Harmonic	Allowable range			Default va	alue /	Custo	mizatio	1	
Analysis*	MAX HOLD			ON/OFF					
	Save item A			on /off					
		V_Reference		70~1000	(100)V ()			
		Transient		Selectable	ranges	for th	reshold	vary	<pre>/ depending</pre>
		[[V Reference	on the sele	ted re	anov	ce volta	ges. nov	601~1000V
		-	Transient	50~310	90~6	30	170~1	270	340~2000
	Swell/ Dip/ Int		(selectable range)	Vpeak(210)	Vpeak	(Vpeak	_, 0	Vpeak
	measurment	Swell		100~200% against reference voltage (110%)					e (110%)
		Dip		5~100% against reference voltage (90%)					
		Int		5~98% against reference voltage (10%)					
		Hysteresis		1~10% against reference voltage (5%)					5%)
		Trigger point		Past:0~200, Next:200~0 (100 each)					ach)
		Voltage range		150V	300V	e	500V		1000V
	- · ·	Threshold value		50~310	90~63	30 1	70~12	70	340~2000
	Iransient measurement	(selectable range)		Vpeak	Vpeak	۷	/peak		(1415)
	inoucui cincint	Hysteresis		1~10% against Voltage Range (5%)					
QUALITY		Trigger point		Past:0~200, Next:200~0 (100 each)					
		Clamp		8128/8127/8126/ 8125 /8124/812 /8146/8147/8148/8141/8142/814				124⁄8129 142⁄8143	
		A Range		100.0m/500.0m/1/5/10/20/50/10 200/300/500/1000/3000/AUTO				/50/100 /AUTO	
	Inrush current	Reference curr	ent	Selectable within 10%~100% of Curren					of Current
	measurement	(selectable ran	ge)	Ranges (200A)					
		Filter		ON/OFF					
		Threshold value	e	100~200% against reference current (110%)				nt (110%)	
		Hysteresis		1~10% against reference current (5%)					5%)
		Data trigger po	oint	Past:0~200, Next:200~0 (100 each)					ach)
	Unbalance ratio	Output thresho	ld	1~20% (;	3%)			<u> </u>	
		V Range		150V	k 1			600	V
	Flicker	Cutput item	IL	23UV Ian	וס (D		апір н		
		Output Item	Jd		(1.0)	sι∕ P	IL		
	Canacitance	Target power f	nu	0.5.1.(1	000				
	Capacitance Target power factor		0.5~1 (1.000)						

* Default values are highlighted in gray

Measurement Setting

Setting Item	Details of Setting
Interval	1sec/2sec/5sec/10sec/15sec/20sec/30sec/ 1min/2min/5min/10min/15min/20min/ 30min /1hour

* Interval can be selected at W, Wh, DEMAND, WAVE, Harmonic analysis, Swell/ Dip/ Int, Transient, Inrush current, Unbalance ratio and Capacitance Ranges. At WAVE Range and Harmonic analysis, available intervals depend on the number of save items. At Harmonic analysis, 1 sec tool is not available.

Save Setting

Setting Item	Details of Setting
Recording method	Manual / Timer
Recording starts	Year / Month / Date Hour : Minute : Second
Recording ends	(0000/ 00 / 00 00 : 00 : 00)
Destination to save data	CF Card / Internal Memory
Destination to save screenshot	(CF Card, if it has been inserted)
Formatting CF Card	Format the CF Card.
Deleting data in the CF Card	Delete the data in the CF Card.
Formatting internal memory	Format the internal memory.
Deleting data in the internal memory	Delete the data in the internal memory.
Data transfer	Transfer the data in the internal memory to the CF Card.
Load setting	Load the pre-set setting.
Save setting	Save the settings to the CF Card or the internal memory.

Other Setting

Setting Item	Details of Setting
Language*	日本語/ English / 中文 / Francais / Espanol
Date format	YYYY/MM/DD / MM/DD/YYYY / DD/MM/YYYY
Time and date*	yyyy/mm/dd hh:mm:ss
Buzzer	ON /OFF
CSV File	Decimal point / Separator
ID number	00-001 \sim 99-999(00-001)
LCD contrast	$\begin{array}{l} \text{Light} \Leftrightarrow \textbf{Standard} \\ 10 \Leftrightarrow 0 \Leftrightarrow 10 \end{array} \\ \end{array} $
CH Color*	Default value / Customization
Auto-power-off	ON / OFF
LCD auto-off	ON / OFF
Battery charge	ON/ OFF
System reset	Reset the system.

* Items listed with "*" mark won't restore to default after system reset.

5. Instantaneous (Inst) value measurement Steps for measurement

Ensuring	g your safety			(SET UP) Rai	nge				
↓			Basic Setting	Measurement setting	Save Setting				
Droporation	for moscurement		Wiring	Interval	Recording method				
Freparation			V Range	Save item (W)	Recording start				
			VT Ratio	 Inst value 	Recording termination				
	•	1	Clamp Sensor	 Avg value 	Destination to save data				
S	Setting		A Range	Max value	Destination to save screen shot				
			CT Ratio	 Min value 					
	¥]	Filter						
W	/iring		DC V						
	1		Frequency						
	¥								
Inst value	e measurement	-	W Range						
		•							
	Symbol displayed on the LCD								
V Voltage	A Current		P Active	+ consumption Q	Reactive + lagging				

V	Voltago	Δ	Curront	Ρ				()		00 0
v	voltage		Guirent	'	Power	—	regenerating	Ŷ	Power	 leading
S	Apparent Power	PF	Power + lagging Factor - leading	PA	Phase Angle	+ -	lagging leading	f	Frequency	/
An	Neutral current	DC1	Analogue input voltage at 1ch	DC2	Analogu voltage	e inp at 2	out ch			

Switching Screens / Zoom

	Select a system	LOAD 1.2.3.4	⊲l∥i⊳ Cursor Key	Measured values	112.1, 110.6
	Select an item	Inst Avg Max Min	≜▼ Cursor Key	Total measured values List	107. 0 49. 92 Zoom
▮	Check setting details	374601+18 1201 1011-00 991 2000 / 077 1111-00 2000 / 077 1111-00 2000 / 077 1111-00 2000 / 077 1111-00 2000 / 077 1111-00 2000 / 077	ENTER Key	* Press F3 Key to switch the Zoom Refer to " (Section 6) Instan measurement " for explanation o display.	and List display. taneous (Inst) value n customizing the Zoom

Save data

File ID : 6310-01								
Saved tin	ne & date	ELAPSED TIME	Instantaneous	Average	Max	Min		
DATE TIME ELAPSED TIME INST AVG MAX MIN						MIN		
yyyy/mm/dd	h∶mm∶ss	h∶mm∶ss	(±)x.xxxE±nn					
year/month/ date hour:min:sec hour:min:sec (±) value x 10 ^{±n}								

e.g. 1.234E+02=1.234x10²=123.4

Header of the saved data

 $\underbrace{\mathsf{AVG}}_{(1)} \underbrace{\mathsf{A1}}_{(2)} \underbrace{\mathsf{A1}}_{(2)} \underbrace{\mathsf{A1}}_{(3)} \underbrace{\mathsf{A1}}_{(4)} \underbrace{\mathsf{A1}}_{(5)} \underbrace{\mathsf$

1	INST	:	Instantaneous value
	AVG	:	Average value
	MAX	:	Max value
	MIN	:	Min value
\bigcirc	V	:	Voltage per phase
Ŀ	A	:	Current per phase
	f	:	Frequency
	Р	:	Active power
	Q	:	Reactive power
	S	:	Apparent power
	PF	:	Power factor
	PA	:	Phase angle
	DC	:	Analogue input voltage
3	CH number	:	* 1 ~ 4
4			Unit
(5)			System

* Saved data with no number at this space contains the sum of the measured values.

Saving instantaneous values

1	Press Start \rightarrow Next \rightarrow Next \rightarrow Complete to start recording after checking the settings.						
	Press the Start Button at least 2 sec to	start recording immediat	ely.				
Start	V : 112.1 109.9 106.2 V A : 54.88 45.68 45.68 40.67 P : 56.88 45.98 11.21 109.9 C : 56.88 45.88 40.67 100.07 C : 50.88 45.91 47.30 100.07 C : 50.98 45.91 47.30 100.07 C : 45.98 47.91 47.30 100.07 P : 91.05 45.93 47.30 100.07 P : 91.05 45.93 47.30 100.07 P : 91.05 45.93 47.93 47.93 P : 91.05 45.93 47.93 47.93 P : 91.05 40.00 100.07 100.07 P : 91.05 40.00 100.07 100.07 P : 91.05 40.00 100.07 100.07 P : 91.05 40.07 100.07 100.07 P : 91.05	≪Manual≫ File name for s ▼ Data saving starts.	<timer≫ aving data is displayed. appears and flashes Status indicator LED flashes. Stand-by until preset time comes.</timer≫ 				
2 Saving	V: 112.2 102.7 167.3 V V: 112.2 102.7 167.3 V P: 501.27 32.15 45.26 V 0: 0.007 22.25 0.00 V 0: 0.000 0.000 V V 0: 23.00 0.000 V V 0: 23.00 0.000 V V 0: 23.000 0.000 V V 0: 23.000 0.000 V V 0: 23.000 V 0.0000 V 0: 23.000 V 1.0000 V 0: <t< th=""><th colspan="3">Preset start time con Status indicator LED is ON. (flashes and CF) or (EB) is display (flashes in red according to the preset interval) No setting change can be made during data s</th></t<>	Preset start time con Status indicator LED is ON. (flashes and CF) or (EB) is display (flashes in red according to the preset interval) No setting change can be made during data s					
з Stop	V 112 7 103.5 106.7 V V 112.7 103.5 106.7 V V 113.7 45.6 440.9 455.7 A V 0.00 0.00 0.00 0.00 0.00 V V 0.00 0.00 0.00 0.00 V V V 0.00 0.00 0.00 V V V V 0.00 0.00 0.00 V V V V 0.00 0.00 0.00 V V V V 0.00 0.00 V V V V V <th>Press Stop. File name for s Status indi</th> <th>Preset termination time comes. aving data is displayed. cator LED goes off. CF or WEW goes off.</th>	Press Stop . File name for s Status indi	Preset termination time comes. aving data is displayed. cator LED goes off. CF or WEW goes off.				

6. Integration value measurement (Wh) Steps for measurement

* Readings are displayed right after the recording of integration value measurement starts.

	Symbol displayed on the LCD								
WP+	Active electric energy (consumption)	WS+	Apparent electric energy (consumption)	WQi+	Reactive electric energy (lagging)				
WP-	Active electric energy (regenerating)	WS-	Apparent electric energy (regenerating)	WQc+	Reactive electric energy (leading)				

Switching displays / Viewing W Range

* Press F2 Key to switch on the displays for Wh Range and W Range.

Save data

File ID : 6310-02								
Saved time	& date	ELAPSED TIME	Active Power energy (consumption / regenerating)	Apparent Power energy (consumption / regenerating)	Reactive Power energy (consumption / regenerating)			
DATE	DATE TIME		INTEG_WP INTEG_WS		INTEG_WQ			
yyyy/mm/dd	h:mm:ss	h∶mm∶ss		(±)x.xxxxxE±nn				
year/month/ date	hour:min:sec	hour:min:sec						

* Reactive power (consumption :+ / regenerating :-) will be recorded with phase information: lagging (i) or leading (c).

* At Wh Range, data measured at W Range and above measurement data are recorded at the same time.

INTEG_WP+[Wh]_1 ① ② ③ ④	Header of t	the save	ed data			
	INTEG_	_WP+	[Wh]	_1	1	IN W
v v v v	1	2	3	}	E)	W W W
v v						w w
v						W
(3)					3	W

① INTEG Integration value ② WP+ Active power energy (consumption) WP- Active power energy (regenerating) WS+ Apparent power energy (regenerating) WS- Apparent power energy (regenerating) WQi+ Reactive power energy (consumption) WQc+ Reactive power energy (consumption) : lagging WQi- Reactive power energy (consumption) : lagging WQi- Reactive power energy (consumption) : lagging WQi- Reactive power energy (regenerating): lagging WQi- Reactive power energy (regenerating): lagging					
② WP+ Active power energy (consumption) WP- Active power energy (regenerating) WS+ Apparent power energy (consumption) WS- Apparent power energy (regenerating) WQi+ Reactive power energy (regenerating) WQc+ Reactive power energy (consumption) : lagging WQi- Reactive power energy (consumption) : lagging WQi- Reactive power energy (consumption) : leading WQi- Reactive power energy (consumption) : leading WQi- Reactive power energy (regenerating): lagging WOr- Reactive power energy (regenerating): lagging	1	INTEG	:	Integration value	
WP- Active power energy (regenerating) WS+ Apparent power energy (consumption) WS- Apparent power energy (regenerating) WQi+ Reactive power energy (consumption) : lagging WQc+ Reactive power energy (consumption) : lagging WQi- Reactive power energy (consumption) : lagging WQi- Reactive power energy (consumption) : lagging WQi- Reactive power energy (regenerating) : lagging WQi- Reactive power energy (regenerating) : lagging WOr- Reactive power energy (regenerating) : lagging	2	WP+	:	Active power energy (consumption)	
WS+ Apparent power energy (consumption) WS- Apparent power energy (regenerating) WQi+ Reactive power energy (consumption) : lagging WQc+ Reactive power energy (consumption) : lagging WQi- Reactive power energy (consumption) : leading WQi- Reactive power energy (regenerating): lagging WQi- Reactive power energy (regenerating): lagging WQi- Reactive power energy (regenerating): lagging WOr- Reactive power energy (regenerating): lagging	Ũ	WP-	:	Active power energy (regenerating)	
WS- Apparent power energy (regenerating) WQi+ Reactive power energy (consumption) : lagging WQc+ Reactive power energy (consumption) : leading WQi- Reactive power energy (regenerating): lagging		WS+	:	Apparent power energy (consumption)	
WQi+ Reactive power energy (consumption) : lagging WQc+ Reactive power energy (consumption) : leading WQi- Reactive power energy (regenerating): lagging WQr- Reactive power energy		WS- : Apparent power energy (regene			
WQc+ Reactive power energy (consumption) : leading WQi- Reactive power energy (regenerating): lagging WQc- Reactive power energy (regenerating): lagging		WQi+	:	Reactive power energy (consumption) : lagging	
WQi- Reactive power energy (regenerating): lagging WOr- Reactive power energy		WQc+	:	Reactive power energy (consumption) : leading	
WOc- Reactive power energy		WQi-	:	Reactive power energy (regenerating): lagging	
(regenerating): leading		WQc-	:	Reactive power energy (regenerating): leading	
③ Unit	3			Unit	
④ System	4	System			

Saving integration values

1	Press Start \rightarrow Next \rightarrow Next \rightarrow Cor	nplete to s	tart recording after checking the ings.		
	Press the Start Button at least 2 sec to	start recording immediat	ely.		
Start	Elarsed Time 00000:00:00 Active WP+ : 0.00000 Wh -LOVO- Active 01-07-000.COV Active 02-07-000.COV	≪Manual≫ File name for s ▼ Data saving starts.	≪Timer≫ aving data is displayed. Image: appears and flashes Status indicator LED flashes.		
	Reactive Wet2 0.0000 with Interval 15sc. Stop Wet2 0.0000 with 15sc.		Stand-by until preset time comes.		
2	Wii (116) (14 ****		Preset start time comes.		
Saving	Financed Time 00000:01:30 Active MP+ : 0.05104 kmh MP- : -0.050181 kMh Arparent MS- : -1.85148 kMh Reactive MC+: 0.45008 kmh Reactive MC+: 0.45008 kmh Non-: 1.55148 kMh Reactive MC+: 0.45008 kmh	Status indicator LED is ON. flashes and C or C is displayed. (flashes in red according to the preset interval) No setting change can be made during data saving.			
	Stop W Setup M				
3	())) Elapsed Time (00000-01:49	Press Stop .	▼ Preset termination time comes.		
Stop	Best five BP+ :: 0.99023 (sim) COID Start 01-03-000, CoV 01 01 01 Readtive 02+03-000, CoV 01 01 01 01 Readtive 02+12 0, 52024 (such lineh) 1 1 1 1 5 1	File name for saving data is displayed. Status indicator LED goes off.			

7. Demand measurement (DEMAND) Steps for measurement

Ensuring your safety			(SET UP) Ra	nge
		Basic Setting	Measurement setting	Save Setting
↓		Wiring	Interval	Recording method
Preparation for measurement		V Range	Save item (W)	Recording start
		VT Ratio	 Inst value 	Recording termination
*	Ι.	Clamp Sensor	 Avg value 	Destination to save data
Setting	-	A Range	 Max value 	Destination to save screen shot
↓		CT Ratio	 Min value 	
Wiring		Filter	• Details	
wining		DC V	Target demand	
\downarrow		Frequency	Demand inspection cycle	
Demand measurement	-	DEMAND Range	9	

* Readings are displayed right after the recording of demand measurement starts.

Switching displays / Viewing W Range and Wh Range

* Press F2 Key to switch the displays for DEMAND, Wh Range and W Range.

Save data

			File ID	: 6310-03				
Saved time	& date	elapsed Time		Active power energy (consumption/ regenerating)	Apparent power energy (consumption/ regenerating)	Reactive power energy (consumption/ regenerating)	DEMAND	TARGET
			Integration	INTEG_WP	INTEG_WS	INTEG_WQ		
DATE	TIME	ELAPSED TIME	Variation in interval	INTVL_WP	INTVL_WS	INTVL_WQ	DEM	TARGET
yyyy/mm/dd	h:mm:ss	h:mm:ss		(±)x.xxxxE±nn			(±)x.xx	xE±nn
year/month/ date	hour:min:sec	hour:min:sec		(±) value x 10 ^{±n}				

* At DEMAND Range, data measured at W Range and above measurement data are recorded at the same time.

Header of t	the save	d data	
INTVL_	_WP+I	[Wh]_	_1
			$\overline{}$
(1)	(2)	(3)	(4)

1	INTEG	:	Integration value			
	INTVL	:	Variation in interval			
	DEM	:	Sum of demand value			
	TARGET	:	Target value			
	WP+	:	Active power energy (consumption)			
	WP-	:	Active power energy (regenerating)			
0	WS+	:	Apparent power energy (consumption)			
Ľ	WS-	:	Apparent power energy (regenerating)			
	WQi+	:	Reactive power energy (consumption) : lagging			
	WQc+	:	Reactive power energy (consumption) : leading			
	WQi-	:	Reactive power energy (regenerating): lagging			
	WQc-	:	Reactive power energy (regenerating): leading			
3			Unit			
4			System			

* 2,3,4 will be blank if 1 is DEM or TARGET.

Saving of demand values

-20 -

	Ensuring your safety				(SET	UP) R	lange	
	Ļ		Basic Setting	Measu	irement s	etting	Save Setting	
	Dreparation for measurement		Wiring	Interva	al		Recording method	
	Preparation for measurement		V Range	Save if	tem		Recording start	
	Ļ		VT Ratio				Recording termination	
	· ·		Clamp Sensor				Destination to save data	
	Setting	-	A Range				Destination to save screen s	shot
	.L.		CT Ratio					
	•		Filter					
	Wiring		DC V					
	Ļ		Frequency					
	Measurement	-	Ran	ge				
		Sy	Symbol displayed on the LCD					
		V	Voltage A	A C	Current			
S	Switching displays : Vector / Waveform (switching CH)							
					Switching CH	V ALL A ALL Ich Ich Ich Ich	≜▼ Cursor Key	

Vector Display

ector Display

* Press the F3 Key to switch the Waveform and Vector display.

* Press the F2 Key to check whether the wiring configuration is correct or not.

* Pressing the **F1** or **F2** Keys at Waveform display changes the magnification of vertical axis (voltage/current).

Waveform Display

Save data

File ID : 6310-04 (Waveform data)							
Saved time	& date	ELAPSED TIME	Channel	Instantaneous value			
DATE	1/128~129/256						
yyyy/mm/dd h:mm:ss h:mm:ss Ai/Vi (±)x.xxxE±nn							
year/month/ date	hour:min:sec	hour:min:sec	(±)	value x 10 ^{±n}			

 $1^{st} \sim 128^{th}$ measured instantaneous values are saved to Line 1, $129^{th} \sim 256^{th}$ are to Line 2.

File ID : 6310-05 (Vector data)								
Saved time & date ELAPSED TIME Instantaneous Average Max Min								
DATE	TIME	ELAPSED TIME	INST	AVG	MAX	MIN		
yyyy/mm/dd	yyyy/mm/dd h:mm:ss h:mm:ss (±)x.xxxE±nn							
year/month/ date	year/month/ date hour:min:sec hour:min:sec (±) value x 10 ^{±n}							

(1)

Header of the saved data

File ID: 6310-04 (Waveform data) 5/133 1 0

File ID: 6310-05 (Vector data) A1[deg] INST

(2) (3)

(4)

1	$1 \sim 128$:	Sampling sequence
2	$129\sim256$:	ditto (① + 128)

1	INST	:	Instantaneous value
	AVG	:	Average value
	MAX	:	Max value
	MIN	:	Min value
2	V	:	Voltage per phase
	A	:	Current per phase
3	CH No.	:	$1 \sim 4$
4			Unit

* when [deg] is displayed at space ④, it means phase angle

Saving at WAVE Range

9. Harmonic Analysis Steps for measurement

		(1) Measured value		
TOTAL	sum	V⁄A	RMS value per CH	%	THD per CH

② Measured value (values of each order pointed by cursor)						
$1{\sim}63$ Harmonic order	V∕A	RMS	%	Percentage of the fundamental wave (1 st)	o	Phase angle

Save data

File ID : 6310-06								
Saved time	& date	ELAPSED TIME	Channel	RMS	Total THD	Inst at ea	ach order	
DATE	TIME	ELAPSED TIME	СН	TOTAL	THD	$1_{V/A} \sim 63_{V/A}$	$\begin{array}{c} 1_[\text{deg}] \sim \\ 63_[\text{deg}] \end{array}$	
yyyy/mm/dd	h:mm:ss	Vi 🖊 Ai		(±)x.x	xxE ± nn			
year/month/ date	hour:min:sec	hour:min:sec	V / A		(±)val	ue x 10 ^{±n}		

Header of the saved data

1	$1\sim 63$:	Order
0	V/A	:	Voltage / Current
Q	deg	:	Phase angle

Saving Harmonic analysis results

Swell / Dip / Int measurement QUALTY

10. Power Quality (QUALTY) Swell / Dip / Int measurement

	1						
Steps for measurement			SET UP Range				
	Ensuring your safety		Measurement setting	Save Setting			
			Swell / Dip / Int Measurement	Recording method			
	↓		Interval	Recording start			
	Preparation for measurement		Reference voltage	Recording termination			
			Transient	Destination to save data			
	Setting		Swell	Destination to save screen shot			
	Octiling		Dip				
	↓		Int				
	Wiring		Hysteresis				
	\downarrow		Trigger point				
	Swell / Dip / Int Measurement	-	QUALTY Range				

* Readings are displayed right after the recording of swell/ dip/ int measurement starts.

Timing of data recording

Measured data will be saved when an event occur or at the preset interval during measurement.

Inst value : Avg of 100 data (@50Hz) obtained 1 sec before the preset interval comes (rms)

- Avg value : Avg of rms values obtained in the preset inst interval
- Max value : Max rms values obtained in the preset inst interval

Min value : Min rms values obtained in the preset inst interval

Save data

File ID : 6310-07							
Saved time & date Item Start / End							End
DATE	TIME		ITEM*				C
yyyy/mm/dd	h∶mm∶ss.ss	SWELL	SWELL DIP INT				1/0
year/ month/ date	hour:min:sec	swell	dip	short-interruption	start	end	Start to end

(QUALTY) Swell / Dip / Int measurement

Du	Ν	/lax / l	Min		Data			
DUF	RATION	1	//AX/MIN				201	
-:-:	h:mm:ss.s	iS		(±)X.XX	xE±nn			
start	end	max(Swell)		min(Dip/	'Int)		(±) value x 10 ^{±10}	
		File ID : 631	0-13					
Saved tim	ne & date	ELAPSED TIME	Insta	antaneous	Averag	ge	Max	Min
DATE	TIME	ELAPSED TIME		INST AVG			MAX	MIN
yyyy/mm/dd	h:mm:ss	h:mm:ss		(±)X.>		ххЕ	±nn	
year/month/ date	hour:min:sec	hour:min:sec		(±) value x 1			10 ^{±n}	

Header of the saved data $50 \sim 1_{-}1 \sim 150$

1 201 data in total :

Data No.

e.g. Trigger point is set to Past: 50 / Next: 150.

(1)

Saving Swell / Dip / Int

1	Press Start \rightarrow Next \rightarrow Next \rightarrow Cor	nplete	plete to start recording after checking the settings.				
	Press the Start Button at least 2 sec to	start re	cording immediat	ely.			
		4	≪Manual≫	≪Timer≫			
	100.1V SHELL DOP INT Bandent		File name for s	saving data is displayed.			
	Occurrence a official		V				
Sta	58ve to: 67-07.001, C9V	Data	saving starts.	appears and flashes.			
구	13-GT001, CSV			Statist fulcator LED hashes.			
				Stand-by until preset time comes			
	Stop Setup						
2				Preset start time comes.			
	100.1V SHELL DOP INT Transient			▼			
	MI (10 STime) Br Partial	-	Status in	dicator LED is ON.			
Sav	03/05/03:00:22,38 4 9/05:00:05,800 03/05/03:00:19,68 4 9.9/05:00:05,800	Mathematical Flashes and Call or Well is displayed.					
ing	03/05/09:00:272 81 V 03/05/09:00:31, 87 V 1, 29/00:00:40, 620	ANo setting change can be made during data saving.					
	05/05 09:00:35, 70 200, 07 00:00:02, 400						
	and and a						
3	dikting and a second	_		•			
	100.1V SHELL DBP INT Dianskent	Pro	ess Stop .	Preset termination time comes.			
	18 24 24 12	File name for saving data is displayed					
Sto	07-07-08L.CSV 13-07-001.CSV		Status indi	icator LED goes off.			
ō	03/05/03:02:18:24		and	CF or TT goes off.			
	03/05/05/02:27 5						
	Start to End Start End						
	Swell 📑 📑 (Red))					
	Dip 🛃 🔄 (Blue)					
	Int 🛃 🚮 (Yello	w)					
		ят <i>)</i>					
KF\	N6310	_ 20	_				

KEW6310

28

Transient measurement Steps for measurement

* Readings are displayed right after the recording of Transient measurement starts.

Timing of data recording

Measured data will be saved when an event occur or at the preset interval during measurement.

Inst value : max value of 10,000 data obtained at 100us 1 sec before the preset interval comes

Avg value : Avg of inst values obtained in the preset inst interval

Max value : Max inst values obtained in the preset inst interval Min value : Min inst values obtained in the preset inst interval

Save data

File ID : 6310-08								
Saved time & date				Max Data				
DATE	TIME		MAX			201 data		
yyyy/mm/dd	h : mm :	h:mm:ss.ss		(±)	x.xxxE±nr	1		
year/month/ date	e hour:min	hour:min:sec		Max (Peak)		(±) value x 10 [±]		
		File ID :	6310-1	4				
Saved tim	ne & date	ELAPSED) TIME	Instantaneous	Average	Max	Min	
DATE	TIME	ELAPSED) TIME	INST	AVG	MAX	MIN	
yyyy/mm/dd	h:mm:ss	h:mm:ss		(±)x.xxxE±nn				
year/month/ date	hour:min:sec	hour:mii	n:sec		(±) value >	(10 ^{±n}		

Header of the saved data

e.g. Trigger point is set to Past: 50 / Next: 150.

Saving Transient Measurement

Inrush Current Measurement

* Readings are displayed right after the inrush current measurement starts.

Timing of data recording

Measured data will be saved when an event occur or at the preset interval during measurement.

Inst value : Avg of 100 data (@50Hz) obtained 1 sec before the preset interval comes (rms Avg value : Avg of rms values obtained in the preset inst interval

Max value : Max rms values obtained in the preset inst interval

Min value : Min rms values obtained in the preset inst interval

Save data

File ID : 6310-09								
Saved time a	& date	Sta	rt / End		Duration	Max / M	/lin [Data
DATE	TIME		I/0		DURATION	MAX/N	IIN 20	1 data
yyyy/mm/dd	h:mm:ss.ss	1 0	1/0	-:-	: h:mm:ss.s	S	(±)x.xxxE±	nn:
year/month/ date	hour:min:sec	Start Enc	Start to End	St	art End	Max / M	/lin (±) va	lue x 10 [≞]
File ID : 6310-15								
Saved t	ime & date		ELAPSED T	IME	Instantaneous	Avarage	Max	Min
DATE	TIN	1E	ELAPSED T	IME	INST	AVG	MAX	MIN
yyyy/mm/dd	h:mn	n:ss	h:mm:ss	5		(±)x.xxxE	E±nn	
year/month/ date	hour:m	in:sec	hour:min:s	ес	(±) value x 10±n			
Header of the saved data								
$50 \sim 1_1 \sim 150$ (1) 201 data in total : Data No.								

. e.g. Trigger point is set to Past: 50 / Next: 150.

Saving Inrush Current Measurement

1	Press Start \rightarrow Next \rightarrow Next \rightarrow Cor	nplete to start reconstructions.	ording after checking the		
	Press the Start Button at least 2 sec to	start recording immediat	ely.		
Start	Operation Two Contractions Operation A Occurrence 0 A Occurrence 0	≪Manual≫ File name for s ▼ Data saving starts.			
	Stor Setur		Stand-by until preset time comes.		
2			Preset start time comes.		
Saving	MM / 100 & 11 mm R45 Feb 100 00/05/16/17/21 000 A 400:00:00,00 00/05/16/17/20 100 A 100 00/05/16/17/20 100 A 100 00/05/16/17/20 100 00/05/16/17/20 100 150.06/00:00:00.05 00/05/16/17/20 100 150.06/00:00:00.05 00/05/16/17/20 100 150.06/00:00:00.05 00/05/16/17/20 100 150.06/00:00:00.05 00/05/16/17/20 100 150.06/00:00:00.05 00/05/16/17/20 100 150.06/00:00:00.05 00/05/16/17/20 100 150.06/00:00:00:00 00/05/16/17/20 100 150.06/00:00:00 00/05/16/17/20 100 150.06/00:00:00 00/05/16/17/20 100 150.06/00:00:00 00/05/16/17/20 100 150.06/00:00:00 00/05/16/17/20 100 150.06/00:00 00/05/16/17/20 100 150.06/00 00/05/16/17/20 100 150.06/00 150.06/00 00/05/16/17/20 100 150.06/00	Status indicator LED is ON.			
	05/06/10:17:27.43 10 166.94/00:00:05.62 Shap	No setting change of	can be made during data saving.		
3	(ALLAN) Invian current Contract (COL. ON, Construction 2001 (COL. ON, Construction 2001 (COL. ON, Construction 2001	Press Stop .	Preset termination time comes.		
Stop		File name for s Status indi	aving data is displayed. cator LED goes off. CF or T goes off.		
	Start to End Start End				

Unbalance Ratio Steps for measurement

Unbalance Ratio

_									
	Symbol displayed on the LCD								
V Voltago A (A Current		Active	+	consumption	0	Reactive	+ lagging	
v	v voltage A Current	Г	Power	-	regenerating	Q	Q Power	 leading 	
S	Apparent Power	PF	Power + lagging Factor – leading	PA	PA Phase angle		f	Frequency	
An	Neutral current	DC1	Analogue input Voltage at 1ch	DC2 Analogue input Voltage at 2ch					

QUALTY) Range

Switching displays / Viewing Vector W Range display

Press the **F2** Key to switch the Vector and W Range displays.

Save data

File ID : 6310-10								
Saved time & date		ELAPSED TIME Instantaneous		Average	Max	Min		
DATE	TIME	ELAPSED TIME	INST	AVG	MAX	MIN		
yyyy/mm/dd	h:mm:ss	h:mm:ss	(±)x.xxxE±nn					
year/month/ date	hour:min:sec	hour:min:sec	(±) value x 10 ^{±n}					

Header of the saved data

AVG_A1[A]_1

1	23	4	(5)

1)	INST	:	Instantaneous value		
	AVG	:	Average value		
	MAX	:	Max value		
	MIN	:	Min value		
\bigcirc	UV	:	Voltage unbalance ratio		
Ű	UA	:	Current unbalance ratio		
	V	:	Voltage of each phase		
	A	:	Current of each phase		
	f	:	Frequency		
	Р	:	Active power		
	Q	:	Reactive power		
	S	:	Apparent power		
	PF	:	Power factor		
	PA	:	Phase angle		
	DC	:	Analogue input voltage		
3	CH number	:	*1~4		
4			Unit		
5	System				

*Saved data with no number at this space contains the sum of the measured values.

Saving PFC calculation results

Flicker (QUALTY

Flicker

* An optional voltage sensor KEW8325F is required for Flicker measurement.

Steps for measurement

		(SET UP) Range					
		Measurement setting	Save Setting				
¥		Flicker	Recording method				
Preparation for measurement		V Range	Recording start				
Ļ	L .	Filter	Recording termination				
Setting	-	Output item	Destination to save data				
↓		Output Threshold	Destination to save screen shot				
Wiring							
\downarrow							
Flicker	-	QUALTY Range					

* Preliminary measurement (for 10 sec) will be done automatically prior to Flicker measurement.

Save data

File ID : 6310-12									
		FI APSED		Voltage			Short time	Short time	l ong time
Saved tin	ne & date	TIME	Frequency	Average	Max	Min	intensity (for 1 min)	intensity	intensity
DATE	TIME	ELAPSED TIME	f	AVG_V	MAX_V	MIN_V	Pst (1min)	Pst	Plt
yyyy/mm/dd	h:mm:ss	h:mm:ss	(±)x.xxxE±nn	±)x.xxxE±nn (±)x.xxxxxE±nn		(;	±)x.xxxE±n	n	
year/month/ date	hour:min:sec	hour:min:sec	(±) value x 10 ^{±n}						

* Data is saved at every 1 min, but Pst is saved at every 10 min and Plt is at every 10 min in 2 hours later.

Saving Flicker data

The saving procedure is same to the one for the other measurements. See the previous corresponding pages.

V	Voltage Avg voltage in 1 sec.	Pst calc 00: St calc 00: St calc 00:	07 0V	Time left Counted down until a Pst calculation completes.
	/	Pst(1min.): 0.0 Pst 0.4 Plt 0.4 Plt 0.4 Max Pst 0.6 evide case of Max Plt 1.0	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Frequency Refreshed at every 1 min.
	Pst(1min) Pst is displayed at every calculate Pst. The value calculation completes Pst Pst is calculated and Pit Calculated cased on (data in 2 hours)	ery 1 min. It takes time to lue displayed here before a s is just for reference. displayed at every 10 min. the latest 12 Pst values.	Max Pst Max Pst (short tim the end of measu every time when t Max Pit Max Pit (long time the end of measu every time when t	e intensity) through a beginning to rement is displayed. It is refreshed he max value is exceeded. intensity) through a beginning to rement is displayed. It is refreshed he max value is exceeded.
Pst (1min)	Threshold	Image: Weilfill Flicker Pst calc. 00:07 Pst(lmin.):0 Pst(lmin.):0 120 90 60 30 Start	Co Co Co Co Co Co Co Co Co Co	me left punted down until a Pst lculation completes. st(1min.) e latest Pst (1min.)
		Trend gra Change of Pst(1min.)	aph the latest 120 data can be observed.	
Plt	Pit value Pit value with recorded da & time info at where the cursor locates.	Pit 0, 98 mission 1930e	V Pst	Cursor Press the Cursor Keys
	Threshold value		PIL	Recording period

Capacitance Calculation - Sizing of capacitor banks for Power factor correction (PFC) Steps for measurement

(SET UP) Range							
Basic Setting	Measurement setting	Save Setting					
Wiring	Capacitance	Recording method					
V Range	Interval	Recording start					
VT Ratio	Target power factor	Recording termination					
Clamp sensor		Destination to save data					
A Range		Destination to save screen shot					
CT Ratio							
Filter							
DC V							
Frequency							

Symbol displayed on the LCD Active + consumption + lagging Reactive Ρ V Voltage Current 0 А Power – regenerating Power leading Power + lagging Apparent PF S С Capacitance Frequency f Power Factor – leading Neutral Analogue input Analogue input DC1 DC2 An Voltage at 1ch Voltage at 2ch current

OUALTY) Range

Switching displays / Zoom

Select a system	LOAD	⊲∥∥⊳ Cursor Key
Select an item	İnst Avg Max Min	≜ ▼ Cursor Key

* Press **F3** Key to switch on the Zoom and List display. Refer to **"(Section 6) Instantaneous measurement"** for an explanation on customizing the Zoom display.

Save data

File ID : 6310-11						
Saved time & date ELAPSED			Instantaneous	Average	Max	Min
DATE	TIME	ELAPSED TIME	INST	AVG	MAX	MIN
yyyy/mm/dd h:mm:ss		h:mm:ss	(±)x.xxxE±nn			
year/month/ date	hour:minute:second	r:minute:second hour:minute:second (±) value x 10 ^{±n}				

Header of the saved data

1	INST	:	Instantaneous value		
_	AVG	:	Average value		
	MAX	:	Max value		
	MIN	:	Min value		
(2)	V	:	Voltage of each phase		
e	A	:	Current of each phase		
	f	:	Frequency		
	Р	:	Active power		
	Q : Reactive power		Reactive power		
	S	S : Apparent power			
	PF : Power factor		Power factor		
	C : Capacitance		Capacitance		
	DC	: Analogue input voltage			
3	CH number $* 1 \sim 4$				
4	Unit				
5	System				

* Saved data with no number at this space contains the sum of the measured values.

Saving PFC calculation results

1	Press Start \rightarrow Next \rightarrow Next \rightarrow Completeto start recording after checking the settings.						
	Press the Start Button at least 2 sec to	start recording immediat	diately.				
Start	Image: Second	≪Manual≫ File name for s ▼ Data saving starts.					
2 Saving	V 201	Status ind flashes an (flashes in red acco No setting change of	Preset start time comes. dicator LED is ON. id CF or CF is displayed. ording to the preset interval) can be made during data saving.				
з Stop	C 1Ch Xeh Sch Sch Y 201,1 203,4 201,5 Y A 600,8 452,0 501,5 Y P 94,81 97,31 100,30 Y Y Q 96,81 97,31 100,30 Y Y Q 96,81 97,31 100,30 Y Y Q 96,81 97,31 100,30 Y Y Y Q 96,81 97,31 100,30 Y Y Y Y Q 96,81 97,81 97,31 90,30 Y Y Y Q 96,90 97,91 Y 90,30 Y <t< th=""><th>Press Stop. File name for s Status indi</th><th>Preset termination time comes. aving data is displayed. cator LED goes off. CF or EE goes off.</th></t<>	Press Stop . File name for s Status indi	Preset termination time comes. aving data is displayed. cator LED goes off. CF or EE goes off.				

- 38 -

11. CF Card / Saved data CF Card (operation check has completed)

Capacity	32MB	64MB	128MB	256MB	512MB	1GB
SanDisk Corp.*	SDCFB-32	SDCFB-64	SDCFB-128	SDCFB-256	SDCFB-512	SDCFG-1
Adtec co., Ltd.	AD-CFG32	AD-CFG64	AD-CFG128	AD-CFG256		AD-CFX 40T1G
BUFFALO INC.			RCF-X128MY	RCF-X256MY		RCF-X1GY

* CF Card with more or less capacity other than listed above cannot be used with this instrument.

* Company name and model name are the trademark or the registered trademark.

A CF Card may not operate properly even if any of the following cards are used due to manufacture's specification change, etc. Please be aware above issue when purchasing commercially available CF Cards. We can offer following CF Cards (proper operation has been verified) as optional parts. Please feel free to inquire.

Max number of saved data / Possible recoding time

Destination to save data		CF Card					Internal Memory	
Caiacity		32MB	64MB	128MB	256MB	512MB	1GB	1.8MB
	1sec	15H	1D	2D	5D	10D	20D	7min
Instantaneous value	1min	10D	20D	1M	2M	5M	10M	2H
measurement	30min	10M	1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	2D
	1sec	6H	13H	1D	2D	4D	8D	3min
Integration value	1min	7D	15D	1M	2M	4M	8M	1H
Measurement	30min	7M	1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	1D
	1sec	4H	8H	17H	1D	2D	5D	2min
DEMAND measurement	1min	6D	12D	24D	1M	ЗM	6M	1H
	30min	6M	1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	1D
	10sec	1D	3D	7D	14D	28D	1M	20min
WAVE Range	1min	10D	21D	1M	2M	5M	11M	2H
	30min	10M	1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	2D
	15sec	3D	7D	15D	1M	2M	4M	44min
Harmonic anaysis	1min	15D	1M	2M	4M	8M	1Y	2H
-	30min	1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	3D
	1sec	2D	5D	11D	22D	1M	2M	32min
Swell / Dip / Int measurement*1	1min	5M	11M	1Y	Over 1Y	Over 1Y	Over 1Y	1D
	30min	Over 1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	1M
	1sec	3D	6D	12D	24D	1M	3M	35min
Transient measurement*1	1min	6M	1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	1D
	30min	Over 1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	1M
	1sec	2D	5D	11D	22D	1M	2M	32min
Inrush Current measurement*1	1min	5M	11M	1Y	Over 1Y	Over 1Y	Over 1Y	1D
	30min	Over 1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	1M
	1sec	21H	1D	3D	7D	14D	27D	10min
Unbalance Ratio	1min	14D	29D	1M	3M	7M	1Y	2H
	30min	1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	3D
Flicker*1	1min	7M	1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	1D
	1sec	15H	1D	2D	5D	10D	19D	7min
Capacitance	1min	10D	20D	1M	2M	5M	10M	1H
	30min	10M	1Y	Over 1Y	Over 1Y	Over 1Y	Over 1Y	2D
	Measur	Measurement data file (CSV)						6
Max number of file	Graphic	raphics file (BMP)		512				7
	Configu	Configuration file (KAS)						20

*In case that no file exist in the CF card or the Internal memory. where : H= hour(s), D=day(s), M=month(s), Y=year(s) Numbers and time listed above are the minimum ones.

*1 Assumed one event occur per minute and calculated.

Data transfer

Data in the CF card or internal memory can be transferred to a PC via USB connection or CF card reader.

	Transfer to PC via:			
	USB	Card reader		
CF card data (file)	\triangle^{*1}	0		
Internal memory data (file)	0	*2		

- *1 It is reccomended to transfer the data with big size by a use of CF card reader since trasfer of such data via USB takes time. (transfer time : approx 4MB/ hour)
- *2 Data in the internal memory can be tranferred to a CF card.

*As to the manipulation of the CF card, please refer to the instruction manual attached to the card. *In order to save the data without any problem, make sure to delete the file other than the data measured with this instrument in the CF card.

Configuration file

_		
(1	Sava in	CF : CF card
U Save III		ME : Internal memory
2	File No	$000000 \sim 999999$
3	Extension	KAS
1	Save item	PS : Print screen
0	Savoin	CF : CF card
Ľ	Jave III	ME : Internal memory
3	File No	$001 \sim 999$
(4	Extension	BMP
	1 2 3 1 2 3 4	 Save in File No Extension Save item Save in File No File No Extension

Backup Memory In case one CF card is removed and inserted while saving data:

12. Wiring check

Proper wirings can be checked at \frown WAVE Range.

* Check results may by affected if great power factors exist at the measurement sites.

Criteria of Judgment and cause

Check	Criteria of Judgment	Cause
Frequency	Frequency of V1 is between 42 and 68Hz.	 Voltage clip is firmly connected to the DUT? Measuring too high harmonic components?
Voltage input	Voltage input is 10% or more of (Voltage Range x VT).	 Voltage clip is firmly connected to the DUT? Voltage test leads are firmly connected to the Voltage input terminals on the instrument?
Voltage balance	Voltage input is within ±30° of reference voltage (V1) * (not judged by single-phase wiring)	 Setting against the wiring under test are matched? Voltage clip is firmly connected to the DUT? Voltage test leads are firmly connected to the Voltage input terminals on the instrument?
Voltage phase	Phase of voltage input is within $\pm 10^{\circ}$ of reference value (proper vector).	 Voltage test leads are properly connected? (Connected to proper channels?)
Current input	Current input is 5% or more of (Current Range x CT).	 Clamp sensors are firmly connected to the Power input terminals on the instrument? Setting for Current Range is appropriate for input levels?
Current phase	Current input is within $\pm 60^{\circ}$ of reference value (proper vector).	 Arrow mark on a Clamp sensor and the orientation of flowing current is matched? (Power supply to Load) Clamp sensors are connected properly?

DISTRIBUTOR

KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.

No.5-20,Nakane 2-chome, Meguro-ku, Tokyo, 152-0031 Japan Phone: +81-3-3723-0131 Fax: +81-3-3723-0152 Factory: Ehime

www.kew-ltd.co.jp