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# **SOFTWARE MANUAL**

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# 1. Software startup



Double-click desktop icon to access PC software main interface, as shown in Figure 1-1. 1 is software version number, 2 is the menu bar, 3 is quick bar to scan each measurement parameters, 4 is the data area, 5 is the data reading and parameter settings switching area.

GFUVE PowerMeter Management System - [Yer3.1.232]								
[	<u> Uperation Setting Lools</u>	Mindow Melp 2				_ 8 ×		
ſ		Readings		5	Parameters			
	Real Time Metering Energy Harmonic Wave & Vector Max & Min DataLog Block1 Block2 Block3 Block4 DeviceInfo 3	Real Time Petering	4					
	Read							
ŀ	Status	Tx		Rx	CLOSE	2014-10-09 15:40:43		

Figure 1-1

# 2. Software connection

Click setting, pop-up connection manager, as shown in Figure 2-1. Click connection manager, pop-up the window in Figure 2-2, then you can set the connection parameters in this window. FU2200A has two connections, the first is RS485 connection, second is the Ethernet connection.







	Address Password	1	
æ	COM1 -	38400 💌	1
	IP Address	192.168.1.16	
C	Port	9999	2

Figure 2-2

### A. RS485 connection

View FU2200A table address, password, baud rate and 485 serial port number manually. Select a window shown in Figure 2-2, click close (the default address table for experiments is 1, the password is 000000, serial port number is COM1, baud rate is 38400). Click operation in the menu bar, then click connect

Connect Success on the lower left window indicates that the connection is successful, FU2200A display can communicate the 485 with the computer properly at this time.





### **B.** Ethernet connection

View FU2200A Port and IP address manually by 485 (View mode: normal connection of 485 communication, click **parameters** in figure1-1, frame 5, the net parameter will appear in quick bar to scan each measurement parameters, click **net parameter**, then click **upload** to view FU2200A **IP address**. FU2200A factory default **IP address** is 192.168.1.16, **port** is 9999, and **mask address** is 255.255.255.0). Select frame 2 shown in Figure 2-2; click **close** (experimental table **IPAddress** is 192.168.1.16, **port** is

9999). Click **operation** in the menu bar, then click connect display

on the lower left

window indicates that the connection is successful, FU2200A can communicate the 485 with the computer properly at this time.

Note: IP address does not suggest changing unless have multiple power meters to organize in LAN.

# 3. Parameters setting

Click parameters as shown in Figure 3-1, frame 1.



Figure 3-1

### A. General parameter setting

As shown in figure 3-1, click **General Parameter** in quick bar to scan each measurement parameters, click **upload** in frame 3, it will appear as shown in Figure 3-2, Figure 3-2 shows the parameters corresponding with FU2200A, every parameter can be changed, every parameter has the automatic check box, check indicates this parameter is selected, on the contrary it is not selected. **Un / Select All** in frame 3 indicates selected all or not selected, **Download** indicates that users transmit the modified parameters into power meter FU2200A.



### Note:

Download and Upload button, the parameters transmission direction are below as reference: **Download**: Software-->Power meter; **Upload**: Power meter-->Software

**LCDBLight** <u>cannot</u> set as 0. As it means LCD backlight will be black all the time.

GFUVE PowerNeter Management System - [Ver3.1.232]								
<u>Operation</u> Setting Tools	<u>W</u> indow <u>H</u> elp				- 8 ×			
	Readings	ĭ		Parameters	1			
General Parameter DataLog Parameter ——DataLog Block1 ——DataLog Block2	General Parameter ✓ Password 000000	Ad	dress 1	🔽 Baudrate	38400 bps			
DataLog Block3 DataLog Block4 TOU Parameter	₽Twire 3LN	PT	1 220	V 🔽 PT2	220 V			
Season Schedule 1st Day'Schedule 2nd Day'Schedule	☞ CTwire 3CT	Г ст	1 5	А 🔽 СТ2	5 A			
4th Day'Schedule 5th Day'Schedule 6th Day'Schedule	✓ DOmode energy p	ouls 🔽 DO	1pulse Ep pulse	✓ D02pulse	Eq pulse			
Clock Net Parameter <b>2</b>	₩ PulseWidt 80	ms 🔽 t	lseCons 8000	imp/kWh				
	Relay1mod level lev	₩ Re th	lay1wid 0	ms				
Download 3	▼ e Relay2mod level	₩ Re th	lay2wid 0	ms	4			
un/SelectAll	☑ LCDBLight 60	sec 🔽 do	mandWin 15 W	min				
Upload General Parameter	Success Tx:01 03	08 00 00 17 07 A	4 Rx:01 03 2E 00 0	0 00 00 00 COMM	2014-10-09 15:49:08			

### Figure 3-2

In frame 4, the main parameters have password, table address, baudrate, rated voltage wiring mode PTwire, primary side voltage PT1, secondary side voltage PT2, rated current wiring mode CTwire, primary side current CT1, secondary side current CT2, DO total output mode DOmode, DO1 pulse output mode DO1pules, DO2 pulse output mode DO2pules, Pulsewidth, pulseconst, relay mode (temporarily involved), LCD backlight time LCDBlight, demand window time Demandwindow etc. in figure 3-2.

### B. Datalog parameter setting

Click the first item in submenu **Datalog block1** of **Datalog parameter** in quick bar to scan each measurement parameters, it will appear as shown in Figure 3-3, no checking in frame 3 by default. Users only need to edit some parameters in frame 3 (Record Mask, Record Size, Address Start, Address End, Actual Size without editing, you can use default values. But you can edit the remaining parameters 3 according to your needs). It is worth noting that the Record Size should not exceed 256Bytes, that is, when you have checked the every parameter, you should notice if Record Size exceed 256Bytes.



GFUVE Powerleter Hanagement System - [Ver3.1.232]							
<u>Operation</u> Setting Tools	<u>W</u> indow <u>H</u> elp	- 8 ×					
	Readings Parameters						
General Parameter DataLog Parameter DataLog Block1	DataLog Block1 Parameter Record 00000000 H						
DataLog Block2 DataLog Block3	「Uln 「Ull 「I 「P						
TOU Parameter Season Schedule	□Q □S □Pf □Freq						
1st Day'Schedule 2nd Day'Schedule	☐ unbalance ☐ Demand ☐ EP ☐ EQ						
4th Day'Schedule	🗆 ES 🦳 Angle 🦵 EPrate 🦵 EQrate						
Gth Day'Schedule Clock Net Parameter 1	☐ ESrate 3						
	♥ interval 0 min ♥ Stamp 00-00-00 00 ♥ Stamp End 00-00-00 00						
Upload Download	र Record 0 Bytes र Address 00000000 H र Address 00000000 H र End						
FormatLog	Actual Ø Bytes Size Ø Bytes						
Upload General Parameter Success Tx:01 03 08 80 00 0F 06 46 Rx:01 03 1E 00 00 00 00 00 CONV 2014-10-09 15:50:16							

### Figure 3-3

For example: Checked the experimental setting parameters in frame 1 phase voltage Uln, line voltage Ull, current I, and power P. Setting stamp interval for 1 minute in frame 3, the stamp start is at 14:54:00 on August 27, the stamp stop time is at 00:00 on August 28, 2014. Note parameters does not exceed 256Bytes in

frame 4. Then click Download in frame 2, display Download Stamp End Success on the lower left, it indicates that the parameter download is successful, then must click Formatlog in frame 2, display

maybe take a long time, please wait... on the lower left, it may take ten seconds, and then display

FormatLog Success on the lower left, it indicates the formatlog succeed. Then all the data that

existing in the datalog are cleared. Remember that the user must click formatlog after setting a datalog block finished downloading. To know whether the measuring parameters to download in FU2200A, you can click Upload in frame 2 to see if the setting parameters window is consistent with our settings. Read data will be described in the next chapter. The rest datalog block, users can set according to your own needs, the setting mode as above.

Note: When set the datalog with the network communications, it will display the formatlog failing on the lower left, it does not affect setting parameters. In fact, it has been set up successfully, just formatlog need take some time, probably about 15 seconds, according to the flashing lights on the upper left of FU2200A.(Note: Stamp Start and Stamp End: yy-mm-dd hh:mm:ss)



GFUVE PowerNeter Management System - [Yer2.6.163]										
Operation Setting Mindow	Help			_ @ ×						
	Readings	<u> </u>	Para	neters						
General Parameter DataLog Parameter — DataLog Block1	DataLog Block1 Parameter-	H								
DataLog Block2	<b>₩</b> Uln	V11	<b>⊽</b> I 1	₽ V						
TOU Parameter Season Schedule	<b>۲</b> و	∏ S	☐ Pf	🗍 Freq						
	🖵 unbalance	🗍 Demand	☐ EP	☐ EQ						
4th Day'Schedule	∏ ES	🦳 Angle	🔽 EPrate	🗍 EQrate						
Gth Day'Schedule	🖵 ESrate									
Net Parameter										
	🔽 interval 🛛	min <mark>3</mark> ⊠ <sup>Stamp</sup> Start	14-08-27 14	Stamp End 14-08-28 00						
Upload 2 Download	Record G4 4	Bytes 🔽 Address Start	00000000 H	Address 0007FFFF H						
FormatLog	☑ Actual 40	Bytes								
Upload General Parameter	Success Tx:01 03 08	80 00 0F 06 46	Rx:01 03 1E 00 00 00 0F	· 00 0. 2014-08-27 14:25:41						

Figure 3-4

# C. TOU parameter setting

Click **Season Schedule** of TOU Parameter in quick bar to scan each measurement parameters, then click Upload, pop-up the window as shown in Figure 3-5. By default, the each parameter is checked in frame 2 and each parameter value is 0. Among, Season1 (MM-DD) indicates the first season is begin, such as setting 01-10 indicates the beginning is on January 10, a total of 6 seasons can be set. Schedule No can be represented from 1 to 6, and 1-6 represent the each parameter in frame 3 in figure 3-5. Click Download in frame 1 after

setting, display the **Download Schedulello Success** on the lower left after downloading, then the download is successful. As the same you can see whether the setup is successful by Upload in frame 1.



GFUVE Powerleter Lanagement System - [Ver3.1.232]								
<u>Operation</u> Setting Tools	: <u>W</u> indow <u>H</u> elp		_ & ×					
	Readings	Parameters						
General Parameter	-TOU:Season Schedule							
DataLog Parameter TOU Parameter	🔽 Season1(MM-DD) 00-00	✓ ScheduleNo	(1~6)					
Season Schedule								
3rd Day Schedule 3rd Day'Schedule 4th Day'Schedule	☑ Season2(MM-DD) 00-00	✓ ScheduleNo	(1~6)					
5th Day'Schedule 6th Day'Schedule								
Clock Net Parameter	▼ Season3(MM-DD) 00-00	✓ ScheduleNo Ø	(1~6)					
3	✓ Season4(IMI-DD) 00-00	☑ ScheduleNo Ø	(1~6)					
		2						
Upload	▼ Season5(MM-DD) 00-00	✓ ScheduleNo Ø	(1~6)					
Download 1	🔽 Season6(№-DD) 00-00	✓ ScheduleNo	(1~6)					
Upload Season Parameter	Success Tx:01 03 09 00 00 0C 46	53 Rx:01 03 18 00 00 00 00 00 COMM	2014-10-09 15:54:17					

### Figure 3-5

Click Season Schedule of TOU Parameter in quick bar to scan each measurement parameters, then click Upload, pop-up the window as shown in Figure 3-6. By default, the each parameter is checked in frame 2 and each parameter value is 0. Among, time1 indicates when the first start time, such as setting 01: 00 indicates the beginning is at one o'clock, a total of 14 time periods can be set. RateNo can be represented from 1 to 4, and 1-4 represent the sharp, peak, flat and valley. Click Download in frame 1 after setting,

display the **Download Schedulello Success** on the lower left after downloading, then the download is

successful. As the same you can see whether the setup is successful by Upload in frame 1.



GFUVE PowerTeter Management System - [Ver3.1.232]							
Operation Setting Tools	Window Melp	_ 7 ×					
	Readings Parameters						
General Parameter DataLog Parameter TOU Parameter Ist Day'Schedule 2nd Day'Schedule 3rd Day'Schedule 4th Day'Schedule 5th Day'Schedule 6th Day'Schedule Clock Net Parameter	Readings   Parameters     TOU:1st Day'Schedule     IF time1 00:00 hh:mm   IF RateN     0   (1~4)   IF time2 00:00 hh:mm   IF RateN     IF time3 00:00 hh:mm   IF RateN   0   (1~4)   IF time4 00:00 hh:mm   IF RateN     IF time5 00:00 hh:mm   IF RateN   0   (1~4)   IF time6 00:00 hh:mm   IF RateN     IF time5 00:00 hh:mm   IF RateN   0   (1~4)   IF time6 00:00 hh:mm   IF RateN     IF time7 00:00 hh:mm   IF RateN   0   (1~4)   IF time8 00:00 hh:mm   IF RateN     IF time9 00:00 hh:mm   IF RateN   0   (1~4)   IF time8 00:00 hh:mm   IF RateN	(1~4) (1~4) (1~4) (1~4) (1~4)					
Upload Download 1	$[\overrightarrow{r} ]_{1}^{\text{timel}} [00:00] \text{ hh:mm} [\overrightarrow{r} ]_{0}^{\text{RateN}} [0] (1\sim4) [\overrightarrow{r} ]_{2}^{\text{timel}} [00:00] \text{ hh:mm} [\overrightarrow{r} ]_{0}^{\text{RateN}} [0] [\overrightarrow{r} ]_{3}^{\text{timel}} [00:00] \text{ hh:mm} [\overrightarrow{r} ]_{0}^{\text{RateN}} [0] (1\sim4) [\overrightarrow{r} ]_{4}^{\text{timel}} [00:00] \text{ hh:mm} [\overrightarrow{r} ]_{0}^{\text{RateN}} [0] [\overrightarrow{r} ]_{0}^{\text{RateN}} [0] [\overrightarrow{r} ]_{1}^{\text{timel}} [0] (1\sim4) [\overrightarrow{r} ]_{4}^{\text{timel}} [0] (1\sim4) [\overrightarrow{r} ]_{4}^{ti$	(1~4)					
Upload Day Schedule Succe	ess Tx:01 03 09 18 00 1C C7 98 Rx:01 03 38 00 00 00 00 00 COMM 2014-10-	09 15:55:01					

Figure 3-6

#### Clock setting D.

Click Clock in quick bar to scan each measurement parameters, then click GetClock in frame 1, pop-up the window as shown in Figure 3-7. At this point display the FU2200A real-time clock in figure 3-7, frame 2. Click SynClock in frame 1, if it display Download Clock Success on the lower left that is the synchronous clock is successful, the time is consistent with your computer time. As the same you can see whether the synchronization is successful by GetClock in frame 1.



GFUVE PowerLeter Lan	agement Sys	tem - [Ver3.1.232]			
<u>Operation</u> Setting Tools	<u>W</u> indow <u>H</u> elp				_ 8 ×
	Readings		Ť	Paramete	rs
General Parameter DataLog Parameter TOU Parameter Clock Net Parameter	-Clock ☑ year	2014			
	🔽 month	10			
	l <b>⊽</b> day	09			
	<b>⊽</b> hour	15			
GetClock	<b>⊽</b> minute	57			
1	<b>∀</b> second	28	2		
Upload Clock Success		Tx:01 03 07 80 00 00	6 C5 54 Rx:01 0	3 0C 00 0E 00 0A 00 0	COMM 2014-10-09 15:57:30

Figure 3-7

#### **Network parameter setting** Ε.

Click Net Parameter in quick bar to scan each measurement parameters, then click Upload in frame 1, pop-up the window as shown in Figure 3-8. At this point display the FU2200A real-time network parameters in figure 3-8, frame 2. Users can change different parameters according to your different needs, it is worth noting that the changed parameters is used to connect to the network, it must be corresponding, the

connection will be successful. Click the **Download** in frame 1, if it display Upload Het Parameter Success

on the lower left after downloading, then the download is successful. As the same you can see whether the setting is successful by Upload in frame 1, Un/SelectAll in frame 1 indicates selected all or anti-selection buttons.(Note: Mac Address can not be modify.)



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GFUVE PowerNeter Management System - [Ver3.1.232]							
<u>Operation</u> Setting Tools	<u>W</u> indow <u>H</u> elp					_ 8 ×	
	Readings	ľ		Paramet	ters		
General Parameter DataLog Parameter TOU Parameter Clock	-Net Parameter	Yes					
Net Parameter	I DHCP	No					
	✓ ListenPort	9999					
	I♥ IPAddress	192.168.1.16					
	Gateway	192.168.1.1				-	
Upload	₩ NETID	0000008	2				
Download 1 un/SelectAll	₩ MACAddress	510F67AE611B	2			-	
Upload Net Parameter Suc	cess Tx:01	03 0C 00 00 18 46 9	00 Rx:01 03 30 00	01 00 00 27	COMM 2014-10-09	15:59:17	

Figure 3-8

#### 4. Data reading

As requesting, connecting FU2200A to the measuring circuit to power-on (This article is an example of A-phase, three-phase wiring is different, but the same operation), As described in chapter1, 2, connect FU2200A to software (For example 485 communication, the difference of the network communications will describe later). Click Readings, as shown in Figure 4-1.

# A. Real-time metering

Click Real Time Metering in quick bar to scan each measurement parameters, click read in frame 2, the real-time measuring data will appear, including phase voltage, phase voltage average, line voltage, line voltage average, current, current average, active power, total active power, reactive power, total reactive power, apparent power, total apparent power, all power factor, frequency, load, voltage unbalance, current unbalance, every phase voltage angle, every phase current angle, active demand, reactive demand, apparent demand in frame 3.



GFUVE PowerNeter Management System - [Ver3.1.232]									
<u>Operation</u> Setting Tools	<u>W</u> indow <u>H</u> elp						- 8 ×		
		Parameters							
Deal Time Materian	Real Time Met	tering							
Energy	U1	0.00V		U12	0.00V	I1	0.0000A		
Harmonic	U2	0.00V	3	U23	0.00V	12	0.0000A		
Wave & Vector	113	0.001		1121	0.001	73	0.00001		
DataLog	05	0.000		051	0.000	15	0.0000A		
Block1	Ulnavg	0.00V		Ullavg	0.00V	Iavg	0.0000A		
Block2 Block3	P1	0.0000kW		Q1	0.0000kvar	51	0.0000kVA		
Block4	P2	0.0000kW		Q2	0.0000kvar	S2	0.0000kVA		
Deviceinto	P3	0.0000kW		Q3	0.0000kvar	53	0.0000kVA		
	Psum	0.0000kW		Qsum	0.0000kvar	Ssum	0.0000kVA		
	Pf1	1.0000		Freq	51.996Hz	LoadType	R		
	Pf2	1.0000		In	0.0000A				
	Pf3	1.0000		Uunbalance	0.00%	Iunbalance	0.00%		
Read	Pfsum	1.0000							
Stop	AngleU1	0.00°		AngleU2	0.00°	AngleU3	0.00°		
	AngleI1	0.00°		AngleI2	0.00°	AngleI3	0.00°		
	DemandP	0.0000kW		DemandQ	0.0000kvar	DemandS	0.0000kVA		
Upload Net Parameter Succ	Upload Net Parameter Success Tx:01 04 00 04 00 2A 30 14 Rx:01 04 54 00 00 00 00 00 COMM 2014-10-09 16:08:11								

### Figure 4-1

For example: As shown in Figure 4-2, only add 100V and 1.5A load on A-phase, the data will as shown: phase voltage U1 = 99.96V, phase voltage average Ulnavg = 33.32V, line voltage U12 = U31 = 99.96V, line voltage average Ullavg = 66.64V, current I1 = 1500.1MA, current average lavg = 500.0MA, active power: 149.8W, total active power Psum = 149.8W. Apparent power is 149.8W, total apparent power Psum = 149.8W. Power factor Pf1 = Pfsum = 0.9999, frequency Freq = 50.001Hz, load type: R, voltage Uunbalance = 300.00%, lunbalance = 300.02%, phase voltage angle: 0°, every current angle: 0° (0° that is 360°), every demand is 0 (the default is 15 minutes, which means it will calculate the demand after 16 minutes).

GFUVE PowerNeter Management System - [Ver2.6.163]									
Operation Setting Window	Help					_ 8 ×			
	Readings		ľ	P	arameters				
Paul Time Nature	Real Time Met	ering							
Energy	UI	99.96/	U12	99.96/	11	1500.1mA			
EnergyTotal EnergySharp	U2	0.00	U23	0.00V	12	Ø.OmA			
EnergyPeak	UB	0.00V	UB1	99.96/	13	Ø.OmA			
EnergyValley	Ulna∨g	33.32V	Ulla∨g	66.64∨	Ia∨g	500.0mA			
Max & Min DataLog	P1	149.8₩	Q1	0.0var	51	149.8VA			
Block1	P2	0.0W	Q2	0.0var	52	0.0VA			
Block3	P3	0.0W	Q3	0.0var	53	0.0VA			
Block4 DeviceInfo	Psum	149.8₩	Qsum	0.0var	Ssum	149.8VA			
	Pf1	0.9999	Freq	50.001Hz	LoadType	R			
	Pf2	1.0000	In	500.1mA					
	Pf3	1.0000	Uunbalance	300.00	Iunbalance	300.02			
Read	Pfsum	0.9999							
Stop	AngleU1	0.00°	AngleU2	0.00°	AngleU3	0.00°			
	AngleI1	359.97°	AngleI2	0.00°	AngleI3	0.00°			
	DemandP	0.0W	DemandQ	0.0var	DemandS	0.0VA			
Connect Success		Tx:01 04 00 04 00	2A 30 14 R	x:01 04 54 27 0C 00	00 00 0 201	4-08-27 10:48:41			

Figure 4-2

### **B.** Energy Measurement

Click **Energy** in quick bar to scan each measurement parameters, click read in frame 1, then the real-time data of energy measuring will appear, including consumption active energy EPimp, issued active energy EPexp, absolute value of active energy EPtotal , net active energy EPnet. Consumption reactive energy EPimp, issued reactive energy EPexp, absolute value of reactive energy EPtotal, net reactive energy EPnet. Consumption apparent energy EPimp, issued apparent energy EPexp, absolute value of apparent energy EPtotal, net apparent energy EPnet, as well as the energy on sharp, peak, flat and vally in frame 2.

GFUVE PowerNeter Management System - [Ver2.6.163]											
Operation Setting Window	Help			_ # X							
	Readings		ľ	Parameters							
Real Time Metering Energy Max & Min DataLog DeviceInfo	Energy inclu EPimp EQimp ESimp sharpEPimp sharpEQimp sharpESimp peakEPimp peakEQimp peakESimp flatEPimp	de TOU 5.110kt/h 0.016kvarh 5.177kVAh 0.000kt/h 0.000kvarh 0.000kvAh 0.000kvarh 0.000kvAh 5.110kt/h	EPexp EQexp 2 ESexp 2 sharpEPexp sharpEQexp sharpESexp peakEPexp peakEQexp peakEQexp flatEPexp flatEPexp flatEPexp	0.009kt/h 5.741kvarh 0.009kVAh 0.000kt/h 0.000kvarh 0.000kVAh 0.000kvarh 0.000kvAh 0.000kvAh	EPtotal EQtotal EStotal sharpEPtotal sharpEStotal peakEPtotal peakEQtotal flatEPtotal	5.119kkh 5.757kvarh 5.186kVAh 10.000kVah 10.000kVah 0.000kVAh 0.000kVah 0.000kVAh 5.119kWh	EPnet EQnet ESnet SharpEPnet sharpEQnet sharpESnet peakEPnet peakESnet flatEPnet	5.101kH -5.725kvarh 5.168kVAh 0.000kVAh 0.000kVAh 0.000kVAh 0.000kVAh 5.101kH			
Read 1	flatEQimp flatESimp valleyEPimp valleyEQimp valleyESimp	0.016kvarh 5.177kVAh 0.000kUh 0.000kvarh 0.000kvAh	flatEQexp flatESexp valleyEPexp valleyEQexp valleyESexp	5.741kvarh 0.009kvAh 0.000kUh 0.000kvarh 0.000kvAh	flatEQtotal flatEStotal valleyEPtota valleyEQtota valleyEStota	5.757kvarh 5.186kVAh a0.000kUh a0.000kvarh a0.000kVAh	flatEQnet flatESnet valleyEPnet valleyEQnet valleyESnet	-5.725kvanh 5.168kVAh 0.000kWh 0.000kvanh 0.000kVAh			
Upload Day Schedule Succe	ss	Tx:01 04 0	10 80 00 78 F.	1 CØ Rx:0	1 04 F0 00 00	0 13 F6 00 0	2014-08-27	16:13:03			

### Figure 4-3

For example: The Season Schedule of TOU Parameter in the experimental setting (refer to the settings of sharp, peak, flat, vally in different seasons at part C), Season1 (MM-DD) is 01-10, ScheduleNo is 1, click **Download**, which the download is successful. Then set time1 to 00: 10, RateNo to 3, time2 to 20: 10, RateNo is 1 in 1st Day'Schedule , click **Download**, then the download is successful. It means the parameter is set according to 1st Day'Schedule after Jan 10<sup>th</sup>. The 1st Day'Schedule including, it will be flat after 0:10 and sharp after 20:10 every day. As shown in Figure 4-4, add a certain voltage and current, set the above parameters, the frame 1 and frame 2 of figure 4-4 will changes compared with Figure 4-3 after a while (Note: the time is 16:23:21 August 27, 2014 on the lower right ).



	Readings		Ì			Parameters	;	
	Energy inclu	ide TOU						
eal Time Metering nergy	EPimp	5.153kWh	EPexp 1	0.009kWh	EPtotal	5.162kWh	EPnet	5.144kWh
EnergyTotal	EQimp	0.016kvarh	EQexp	5.741kvarh	EQtotal	5.757kvarh	EQnet	-5.725kva
EnergyPeak	ESimp	5.220kVAh	ESexp	0.009kVAh	EStotal	5.229kVAh	ESnet	5.211kVAh
EnergyFlat EnergyValley	sharpEPimp	0.000k⊌h	sharpEPexp	0.000kWh	sharpEPtota	L0, 000kWh	sharpEPnet	0.000k⊍h
ax & Min ataLog	sharpEQimp	0.000kvarh	sharpEQexp	0.000kvarh	sharpEQtota	LO.000kvarh	sharpEQnet	0.000kvar
DeviceInfo	sharpESimp	0.000kVAh	sharpESexp	0,000kVAh	sharpEStota	L0.000k∨Ah	sharpESnet	0.000kvah
	peakEPimp	0.000k⊌h	peakEPexp	0.000k⊎h	peakEPtotal	0.000k⊌h	peakEPnet	0.000kWh
	peakEQimp	0.000kvarh	peakEQexp	0.000kvarh	peakEQtotal	0.000kvarh	peakEQnet	0.000kvar
	peakESimp	0.000kVAh	peakESexp	0.000kVAh	peakEStotal	0.000kVAh	peakESnet	0.000kvał
	flatEPimp	5.153kWh	flatEPexp	0.009kWh	flatEPtotal	5.162k⊎h	flatEPnet	5.144kWh
	flatEQimp	0.016kvarh	flatEQexp	5.741kvarh	flatEQtotal	5.757kvarh	flatEQnet	-5.725kva
Read	flatESimp	5.220kVAh	flatESexp	0.009kVAh	flatEStotal	5.229kVAh	flatESnet	5.211kVAh
Stop	valleyEPimp	0.000k⊌h	valleyEPexp	0.000k⊎h	valleyEPtota	a0.000k⊌h	valleyEPnet	0.000k⊍h
	valleyEQimp	0.000kvarh	valleyEQexp	0.000kvarh	valleyEQtota	a0.000kvarh	valleyEQnet	0.000kvar
	valleyESimp	0.000kVAh	valleyESexp	0.000kVAh	valleyEStota	10.000kVAh	valleyESnet	0.000kVA

Figure 4-4

# C. THD (Total Harmonic Distortion)

Click **Harmonic** in quick bar to scan each measurement parameters, click **read** in frame 1, it will appear the window as shown in Figure 4-5. THD window in frame 2, it can totally measure 49<sup>th</sup> voltage and current THD, the THD is total harmonic distortion, the 1<sup>st</sup> harmonic is the fundamental harmonic.

GFUVE PowerNeter Management System - [Ver3.1.232]														
_ Operation Setting Tools Window Help ×														
Readings Parameters														
	Harmonic-													
Real Time Metering	No	U1	U2	U3	I1	12	I3	No	U1	U2	U3	I1	12	I3
Energy	THD	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Harmonic	2 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Wave & Vector	4 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Max & Min	6 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DataLog	8 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Block1	10 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Block2	12 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Block3	14 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Block4	16 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Deviceinto	18 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	19	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	20 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	21	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	22 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	23	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	24 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	26 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	27	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	28 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	29	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	30 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	31	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	32 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	33	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	34 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	35	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	36 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	37	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	38 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	39	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	40 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	41	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Read	42 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	43	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	44 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	45	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1	46 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	47	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Stop	48 (	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	49	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
								-						
Export2Excel	•							2						▶
		_	_	_	_	_	_	_	_	_	_	_	_	

Figure 4-5



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#### Every phase of the analog waveform and vector graphics D.

Click Wave & Vector in quick bar to scan each measurement parameters, click read in frame 1, it will appear the window as shown in Figure 4-6. Display every phase of the analog waveform, vector graphics and every phase valued of voltage and current in frame 2. Where the yellow line represents A-phase voltage, the blue line represents B-phase voltage, the red line represents C-phase voltage, a light yellow line represents A-phase current, light blue line represents B-phase current, light red lines represent C-phase current. Each square represents the 45 °angle, we can observe visually the real time angle difference from the waveform diagram and vector graphics. Notably Instructions analog waveforms of every waveform displaying, not show the amplitude.





#### Maximum and minimum measuring Ε.

Click Max & Min in quick bar to scan each measurement parameters, click read in frame 1, it will appear the window as shown in Figure 4-7. Display the maximum and minimum of the real time and the date of their appear in the metering process, including the maximum of every phase voltage and the date of their appear maxU1, maxU2, maxU3, the minimum of every phase voltage and the date of their appear minU1, minU2, minU3, the maximum of every line voltage and the date of their appear maxU12, maxU23, maxU31, the minimum of every line voltage and the date of their appear minU12, minU23, minU31, and the maximum of every current and the date of their appear max1, max12, max13, the minimum of every current and the date of their appear minl1, minl2, minl3, the maximum of every active, reactive, apparent power and the date of their appear maxP, maxQ, maxS, the minimum of every active, reactive, apparent power and the date of their appear minP, minQ, minS, the maximum power factor and the date of its appear maxPf, the minimum power factor and the date of its appear minPf, the maximum frequency and the date of its appear maxFreq, the minimum frequency and the date of its appear



minFreq, the maximum of every active, reactive, apparent power demand and the date of their appear maxDemandP, maxDemandQ, maxDemandS, the minimum of every active, reactive, apparent power demand and the date of their appear minDemandP, minDemandQ, minDemandS and so on in frame 2. Click **ClrMaxMin** in frame 1, then all the minimum and maximum values and the date of theirs will be cleared.

E	GFUVE PowerMeter Man	agement Syst	em = [Ver3.1.232]				
	<u>Operation</u> Setting Tools	<u>W</u> indow <u>H</u> elp					_ & ×
ľ		Readings				Parameters	
	Real Time Metering	Max & Min Da	ta				
	Energy Harmonic	maxU1	2014-10-09 14:52:07	maxU2	2014-10-09 15:0	0:25 maxU3	2014-10-09 15:08:57
	Wave & Vector	minU1	2014-10-09 14:54:01	minU2	2014-10-09 14:5	4:01 minU3	2014-10-09 14:54:01
	DataLog	maxU12	2014-10-09 14:52:07	maxU23	2014-10-09 15:0	8:57 maxU31	2014-10-09 15:08:57
	Block1 Block2	minU12	2014-10-09 14:54:01	minU23	2014-10-09 14:5	4:01 minU31	2014-10-09 14:54:01
	Block3	maxI1	2014-10-09 14:51:39	maxI2	2014-10-09 14:5	9:47 maxI3	2014-10-09 15:08:08
	DeviceInfo	minI1	2014-10-09 14:54:01	minI2	2014-10-09 14:5	4:01 minI3	2014-10-09 14:54:01
		maxP	2014-10-09 15:08:28	maxQ	2014-10-09 15:1	0:47 maxS	2014-10-09 14:56:56
		minP	2014-10-09 14:54:01	minQ	2014-10-09 14:5	4:01 minS	2014-10-09 14:54:01
		maxPf	2014-10-09 14:54:01	maxFreq	2014-10-09 14:5	9:44 <b>2</b>	
		minPf	2014-10-09 15:03:03	minFreq	2014-10-09 15:1	6:39	
		maxDemandP	2014-10-09 15:06:01	maxDemandQ	2014-10-09 15:0	8:01 maxDemandS	2014-10-09 15:06:01
		minDemandP	2014-10-09 15:32:01	minDemandQ	2014-10-09 15:3	2:01 minDemandS	2014-10-09 15:32:01
	Read	maxU1THD	2014-10-09 14:54:38	maxU2THD	2014-10-09 15:0	0:50 maxU3THD	2014-10-09 15:08:10
	1 Stop	maxI1THD	2014-10-09 14:52:10	maxI2THD	2014-10-09 15:0	0:50 maxI3THD	2014-10-09 15:12:54
		minU1THD	2014-10-09 14:54:01	minU2THD	2014-10-09 14:5	4:01 minU3THD	2014-10-09 14:54:01
	ClrMaxMin	minI1THD	2014-10-09 14:54:01	minI2THD	2014-10-09 14:5	4:01 minI3THD	2014-10-09 14:54:01
F	Upload Net Parameter Succ	ess	Tx:01 04 04 48 00 40	0 70 DC R×	:01 04 80 07 07 0	E 0A 09 0 COMM	2014-10-09 16:14:18

Figure 4-7

# F. DataLog Measurement

Click **DataLog** in quick bar to scan each measurement parameters, click the four block of its sub-menu (Block1, Block2, Block3, Block4), click **read** in frame 1, the parameters set by the users can be extracted from the table. Meanwhile users can extract the data in the form of Excel, simply click **Export2Exce** in Figure 4-8, frame 1. Example: The Season Schedule of TOU Parameter in the experimental setting (refer to the rate setting at part C), check **DataLogBlock1**, set **interval** to 1min, the stamp start is at 16:16:00 on October 9, 2014, the stamp end is at 00:00 on August 28, 2014, it will appear formatlog after download successful, the window as shown in Figure 4-8 will appear after formatlog successful. Click **read** in Figure 4-8 after 5 minutes, it will appear every current data and the extracted in the metering process in frame 2.



GFUVE Powerleter Lana	gement System - [Ver3.1.]	232]		
<u> </u>	indow <u>H</u> elp			_ @ ×
í l	Readings	ſ	Parameters	
Real Time Metering Energy Harmonic Wave & Vector Max & Min Datalog Block1 Block2 Block3 Block4 DeviceInfo	DataLog1       No     YYYY-MM-DD     hh:mm:ss       1     2014-10-09     16:17:00       2     2014-10-09     16:18:00       3     2014-10-09     16:19:00       4     2014-10-09     16:20:00       2     2014-10-09     16:20:00       2     2014-10-09     16:20:00       2     2014-10-09     16:20:00	U1(V) U2(V) U3(V) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	Ulnavg(V) 0.00 0.00 0.00 0.00	
Read 1 Stop Export2Excel				
FormatLog Success	Tx:01 14 69 06	5 00 01 00 0F 0 Rx:01	83 02 C0 F1 COMM	2014-10-09 16:20:11

Figure 4-8

#### Reading the meters information G.

Click DeviceInfo in quick bar to scan each measurement parameters, we can read the basic information, including the software Version, table Address, Baudrate, rated voltage wiring PTwiremode, primary side voltage PT1, secondary side voltage PT2, rated current wiring CTwiremode, primary side current CT1, secondary side current CT2. As shown in Figure 4-9.



GFUVE PowerNeter Management System - [Ver3.1.232]										
Uperation Setting Tools	Mindow Help		Y		Panamatons	*				
	Device Infor	ation			Parameters					
Real Time Metering Energy Harmonic Wave & Vector Max & Min Datalog — Block1 — Block2	Version	HW21 SW32	Address	2	Baudrate	38400				
Block3 Block4 DeviceInfo	PTwiremode	3LN	PT1	220V	PT2	220V				
	CTwiremode	зст	CT1	5A	CT2	5A				
Read Stop 1										
FormatLog Success		Tx:01 03 08 02 00	0A 66 6D R	x:01 03 14 00 01 9	6 00 96 0 COMM	2014-10-09 16:20:47				

Figure 4-9