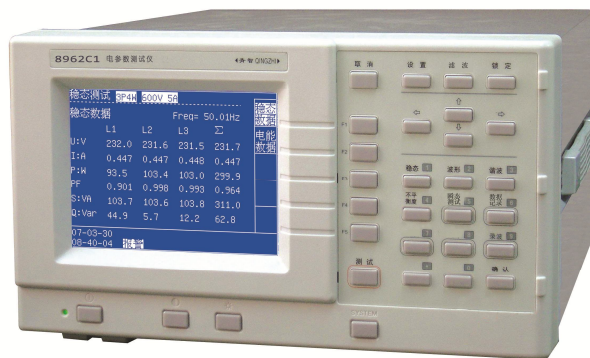




8962C1 Digital Power Meter User's Manual

(Ver 1.10)



鲁制02000135



高新技术企业



ISO 9001



CE MARK



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Chapter 1: Features

Note:

1. The copyright of the manual belongs to Qingdao QINGZHI Instruments Co., Ltd. Copying, sending or saving the manual without our written permit is strictly prohibited.
2. Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, if you have any questions or find any errors, please contact your dealer or QINGZHI sales office.
3. The contents of this manual are subject to change without prior note.
4. The product accords with ISO9001. But if there is any errors, please connect with the liaison message at the manual.
5. QINGZHI is the registered trade mark of Qingdao QINGZHI Instruments Co., Ltd.

Limited guarantee and responsibility

★1. Qingdao QINGZHI Instruments Co., Ltd. promises every product is normal during using and amending. The analyzer promises 1.5 years. The accessory, part and amen period is 90 days. The promise day is from the consignment day.

The promise just fits to warranty dealer buyer or final user. It doesn't fit to the fuse, battery, USB flash drive or any unusual operation.

We promise the software can work normally when it accords with capability, but not including interrupt.

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★3. The guarantee is limited. We could select if refund, amend freely or change the product in promise period.

★4. Please connect the dealer of QINGZHI authorize nearby for better service.

★5. We don't have any responsibility beyond the guarantee.

Statement

The statement just fits **8962C1 Digital Power Meter**.

The product is designed and made by Qingdao QINGZHI Instruments Co., Ltd., and measured according to the relative standard.

The intellectual property rights belong to Qingdao QINGZHI.

The measure is finished by standard signal .Please consider the error due to PT and CT.

Packing list

Sequence	Name	Quantity	Remark
1	8962C1 Digital Power Meter	1	
2	Power cord	1	
3	Power fuse	2	0.5A
4	User's manual	1	
5	Qualification	1	
6	Test report	1	1
7	Warranty list	1	1
8	Feedback form of unpack check-up	1	1
9	Communication software CD	1	
10	RS485 communication wire		
11	RS232 communication wire	1	
12	RS485/232 converter	1	

Safe Note: Reading first

1. Please use the analyzer and accessory according to the manual or the protection may invalidate. “**Warning**” means danger; “**care**” means damage.

2. **Warning**

Electric shock and fire avoiding:

- Reading the manual completely before using.
- Don't work alone.
- Never near the explosion gas or steam.
- Only use appointed accessories and check them before. If there is no use, please remove them.
- Don't exceed the rated input voltage.
- Don't use exposed electric connection.

Special note:

The instrument can test AC and DC signal by accessing different terminals. Prohibit accessing wrong test signal.

3. **Care**

- If the protection function invalidates, maybe there is some danger .

Note:

1. The analyzer should work in recommendatory environment.
2. Don't exceed the test limit.
3. Please make sure the electric safety when wiring.



CAUTION

When verifying meter, do as follows:

1. Voltage ratio and current ratio should be set as 1.
2. The wire should be 3 phase 4 wire wiring, referring to 3P4W wiring.

Chapter 2: Function Introduction

Introduction

8962C1 Digital Power Meter is special for Motor. The instrument operation speed is as much as 100MIPS. Meanwhile the AD sampling speed is as much as 200k. There is highgrade cryptosystem chip and 320×240 LCD screen (picture and word).

Test item

Item	Parameter
Normalcy	$3 \times U$, $3 \times I$, active power, reactive power, apparent power, power factor, frequency, energy& accumulation time, voltage unbalance factor
Harmonic	U & I: 128 orders component harmonic& total harmonic, phone harmonic factor, phone interference coefficient, voltage bias coefficient
Record	Save 65536 records of normalcy data at most. 4 voltage, 4 current, 4 power & total power factor and frequency
Protection	Instrument will make alarm output when U&I exceed setup limit value.
Transient test	20ms as sampling interval: voltage, current, power, frequency; Max.&min. of all parameters within 12 seconds of transient test, and make data curve.
Record waveform	4 record mode, 2~17 seconds

Particular data please refer to each chapter.

Chapter 3: Basic Operation

Introduction

- Instrument power supply
- Turning on and off
- Display screen luminance
- Lock function
- Key shift operation
- Menu introduction

Instrument power supply

AC: 220V±10%, 50/60Hz

Turning on and off

AC supply: Access the power switch and the indicator light will shine. The instrument will make prolonged blast. Operate power switch when turning off.

Display screen luminance

Operate liquid luminance key and direction key. Expanding luminance can improve visibility and reduce it can save battery. So is the contrast adjustment.

Hold function

Operate lock key. When it reverses video, the data is locked.

Key introduction

The analyzer panel has 31 operational keys. There is prompt when success. The functions are as follow:

Table 3-1 Key

Number	sign	Function instruction
1	ⓘ	Unused
2	◐	Liquid contrast display. Operate direction key.
3	☀	Liquid luminance display. Operate direction key.
4	SYSTEM	System parameter setup.
5	↑↓	Direction key: increase/decrease
6	←→	Direction key: left/right
7	ESC	Exit the present display and return last one
8	SET	Parameter setup.
9	FILTERING	Press the key to switch filtering mode: close, 500Hz, 5kHz.
10	HOLD	Lock display data.
11	F1-F5	Soft keys .Refer to functions.
12	TEST	Start test item of transient and record.
13	NORM 1	Display normalcy test data. Number key: 1, setup or select
14	WAVE 2	Display test waveform. Number key: 2, setup or select
15	HARM 3	Display harmonics bar graph, data and record. Number key: 3, setup or select
16	UNBAL4	Display three-phase unbalance factor data. Number key: 4
17	TRANSIENT5	Transient test and data&curve Number key: 5

18	DATA RECORD6	Normalcy test and display.	Number key: 6
19	7		Number key: 7
20	8		Number key: 8
21	RECORD 9	Record waveform test and voltage waveform.	Number key: 9
22	•	Radix point key: •	
23	0	Number key: 0	
24	ENTER	Make sure the effective setup.	

Soft key introduction

There are different function soft keys in different screen displays. Each screen can provide five function soft keys at best; including F1, F2, F3, F4 and F5. Please operate according to the prompt.

Shift key operating example: setup system parameter.

1. Operate SYSTEM key, the instrument will respond “di” and display “SYSTEM parameter”.

(Figure 3-1)

2. Enter code “123456” to modify setup: communication address, baud rate and clock.

3. Set up instruction:

Press “↑ ↓” to line feed and press “0-9” to modify.

Communication address: 0-199.

Communication baud rate: 1: 9600, 2: 19200, 3: 38400, 4: 57600. (Suggest 38400)

After setup, press “enter” to confirm and “ESC” to cancel.

4. Operation example:

4.1 Operate SYSTEM key, the instrument will respond “di” and display “SYSTEM parameter”.

4.2 Enter code “123456”.

4.3 “Communication address” reverses video. (Figure 3-2)

4.4 Operate key 001, select communication address 001.

4.5 Press “↓” and “Communication baud rate” reverses video.

4.6 Operate key 3, select communication baud rate 38400Bit/S.

4.9 Operate setup key, save parameter setup.



Figure 3-1 SYSTEM setup

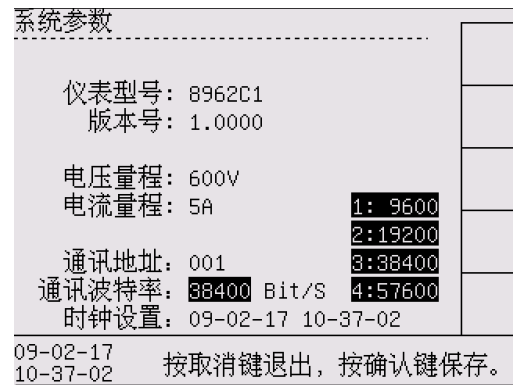


Figure 3-2 SYSTEM---Voltage range

5 Notes

- 5.1 The operation interval time is not more than 1 minute. Or system will exit automatically and can't save the setup.
- 5.2 All setup parameter is effective after saving.

Menu introduction

Most of the functions are operated by menu. Shift key is for the menu and F1 to F5 soft keys are to select. When it reverses video, it means effective. Take normalcy test as example:

1. Open normalcy test: operate "NORM" to open it directly.
2. Normalcy test interface: display present message.
3. Operate F1, F2 to switch.

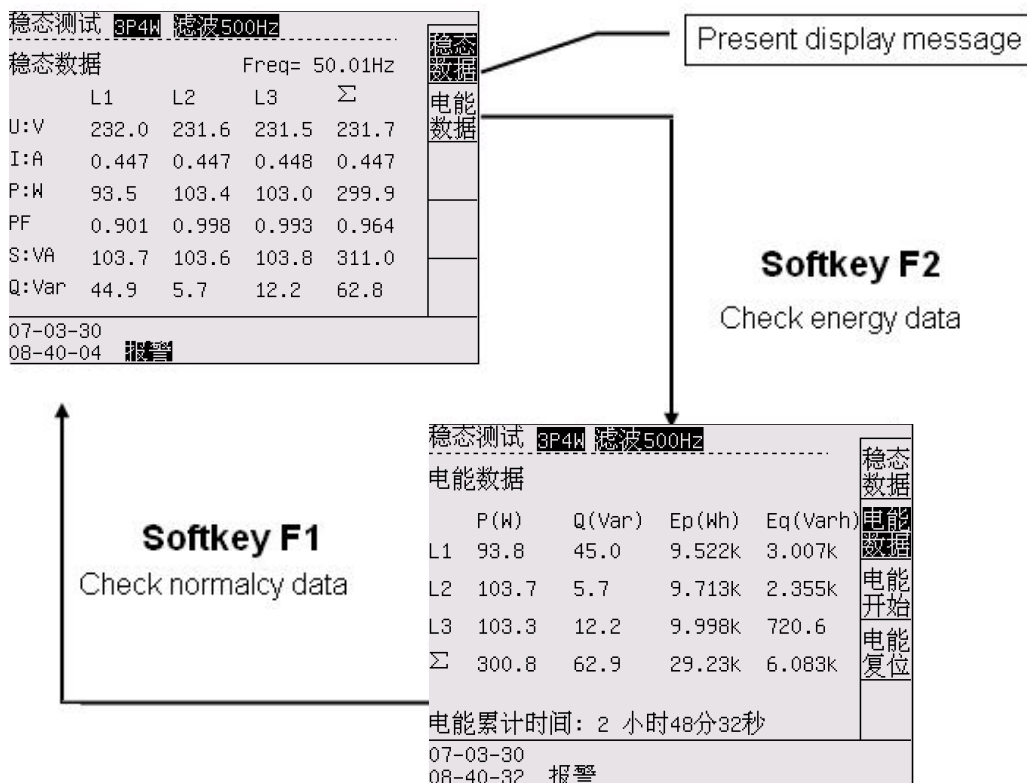


Figure 3-3 Soft key example

Chapter 4: Wiring

Introduction

The chapter mainly explains how to connect measured motor system and adjust the analyzer setup.

Please check out the analyzer setup. Including:

- Input connection and wiring

The setup is effective after affirming. If changing setup, please refer to chapter 14.

Instrument input terminal

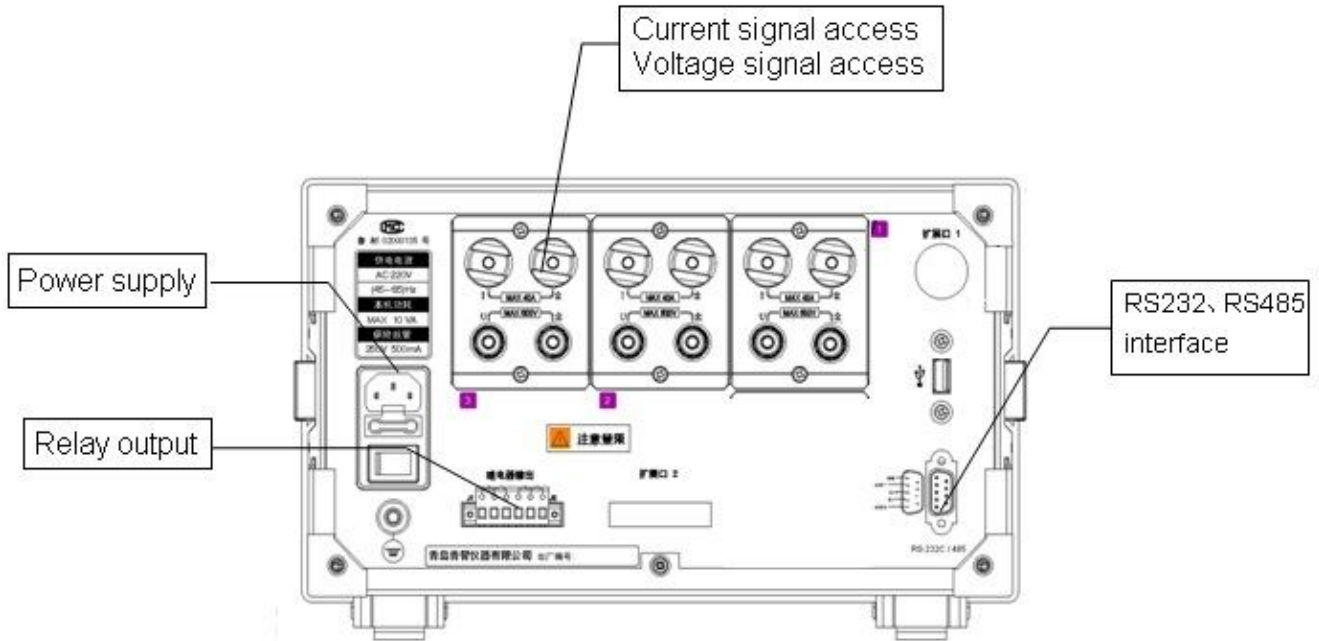


Figure 4-1 Instrument rear panel

Instrument rear panel is as Figure 4-1.

Including: Power supply socket, connector terminal, U&I relay output terminal, transient test terminal and serial port.

Note

1. The power supply should be AC 220V/50Hz. There must be fuse under socket. The fuse is 250V/0.5A.
2. AC connector terminal is for loop. 1~6 terminals are for current and 7~12 terminals are for voltage. The connections are different for different wirings.
3. Relay normal-open & normal-close, common contact: Voltage and Current terminal; transient test terminal. Normal-open (normal-close) is opening (attracting) usually. When testing (alarm, transient test), relay attracts. After test, relay opens. Largest capacity of relay contact is AC 220V/3A. Don't exceed the range or it may destroy.

4. J1 is relay of transient test and J2 is relay of alarm. The left of relay is normal-close contact, the middle is common contact and the right is normal-open contact.

When transient test, J1 normal-open contact attracts. After test, it opens.

Voltage or Current over limit alarm: The screen displays “alarm” and J2 normal-open contact attracts. It opens when end.

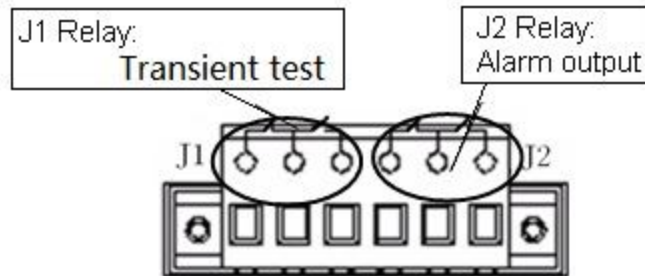


Figure 4-2 Relay output terminal

Wiring

The instrument has 6 current signal terminals and 6 voltage signal terminals.

Connection figure

Typical wirings are as follows:

1. No external instrument transformer (4 types).

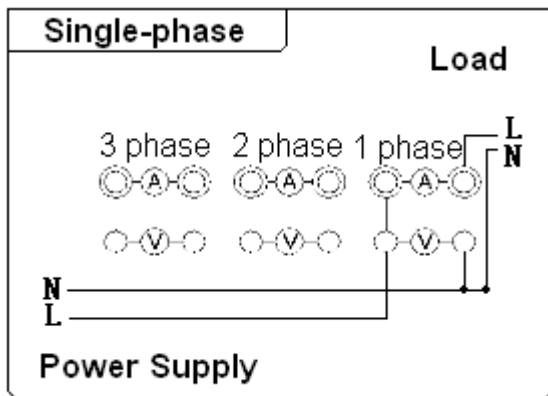


Figure 4-3 Single-phase wiring

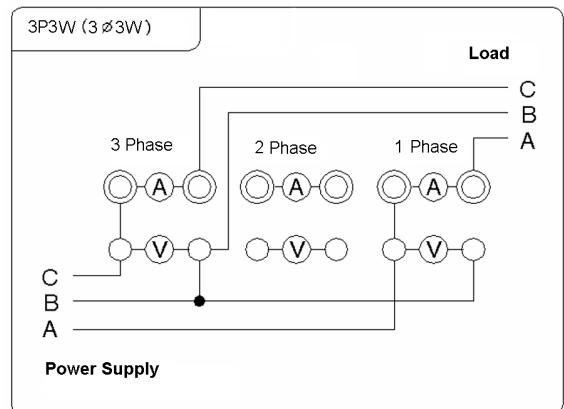


Figure 4-4 3P3W wiring

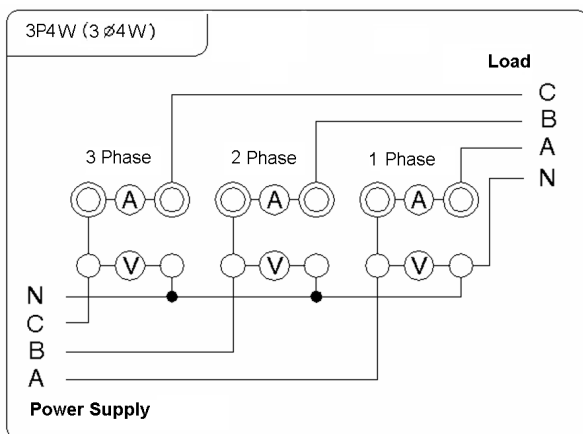


Figure 4-5 3P4W wiring

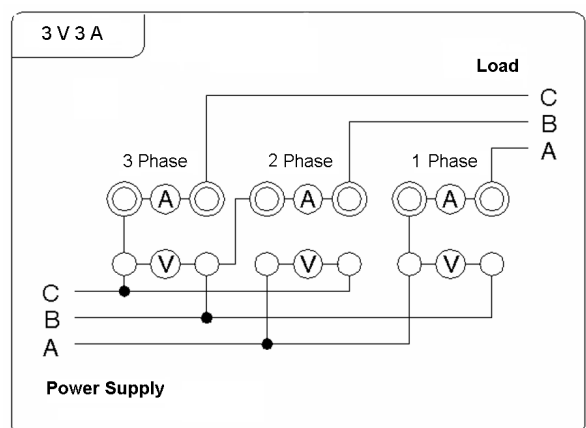


Figure 4-6 3V3A wiring

2. With external instrument transformer (4 types).

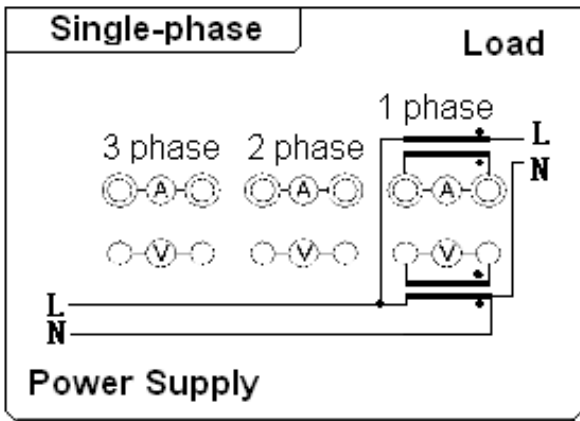


Figure 4-7 Single-phase (PT/CT) wiring

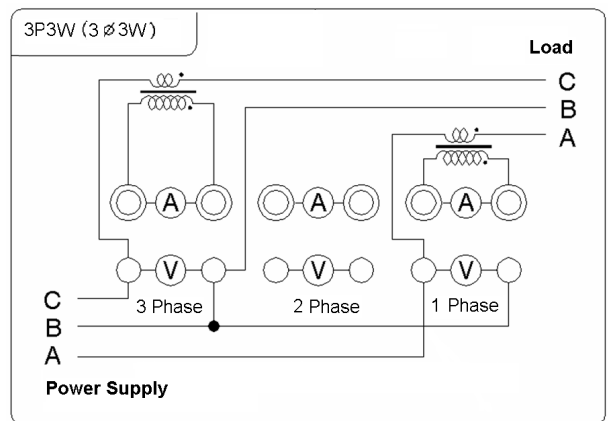


Figure 4-8 3 phase 3 wire (3P3W---CT) wiring

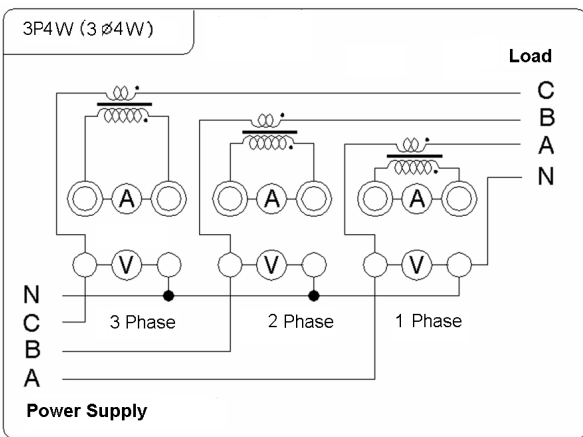


Figure 4-9 3 phase 4 wire (3P4W---CT) wiring

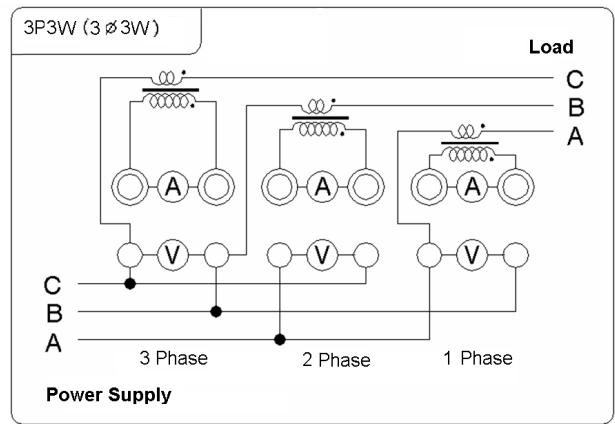


Figure 4-10 3 phase 3 wire (3V3A---CT)

Note

Please note the direction signs when connecting, or it may influence the data validity.

Instruction

1. Set up transformation ratio exactly when accessing PT or CT. (Refer to Chapter 13)
2. Displaying data is the product of true value (test data) and transformation ratio. The formula is as follows:

$$U_o = U * PT; \quad I_o = I * CT; \quad P_o = P * PT * CT; \quad Q_o = Q * PT * CT; \quad S_o = S * PT * CT;$$

Parameter instruction:

Displaying data:

voltage U_o 、 current I_o 、 active power P_o 、 apparent power S_o 、 reactive power Q_o .

Test data:

voltage U、 current I、 active power P、 apparent power S、 reactive power Q.

PT: voltage transformation ratio (Refer to Chapter 13).

CT: current transformation ratio (Refer to Chapter 13).

3. Amounting calculation formula:

Table 4-1 Amounting calculation formula

Wiring	ΣU	ΣI	ΣP	ΣQ	ΣS	ΣPF
1 Φ 2W	U1	I1	P1	Q1	S1	$\Sigma P / \Sigma S$
3 Φ 3W	$(U1+U3)/2$	$(I1+I3)/2$	P1+P3	Q1+Q3	$(S1+S3)*0.866$	
3 Φ 4W	$(U1+U2+U3)/3$	$(I1+I2+I3)/3$	P1+P2+P3	Q1+Q2+Q3	S1+S2+S3	
3V3A	$(U1+U2+U3)/3$	$(I1+I2+I3)/3$	P1+ P3	Q1 +Q3	$(S1+S2+S3)*0.577$	

Chapter 5: Normalcy Test

1. Introduction

Display present test data.

2. Normalcy test

Operate key “Normalcy 1” to enter.

3. Screen instruction

3.1 Normalcy data refers to screen. (Figure 5-1)

Display: Frequency (F), Voltage (U), Current (I),

Active power (P), Power factor (PF),

Apparent power (S: VA), Reactive power (Q: Var)

稳态测试 3P4W 滤波500Hz					稳态数据
稳态数据				Freq= 50.01Hz	
	L1	L2	L3	Σ	电能数据
U:V	232.0	231.6	231.5	231.7	
I:A	0.447	0.447	0.448	0.447	
P:W	93.5	103.4	103.0	299.9	
PF	0.901	0.998	0.993	0.964	
S:VA	103.7	103.6	103.8	311.0	
Q:Var	44.9	5.7	12.2	62.8	
07-03-30					报警
08-40-04					

Figure 5-1 Normalcy test

L1, L2 and L3 show the data of Phase 1, Phase 2 and Phase 3.

Σ : Average U, Average I when U& I,

Amounting data when the others. The following are all the same.

3.2 Energy data refers to screen. (Figure 5-2)

Display: Apparent power (S: VA), Reactive power (Q: Var),

Active energy (Ep: Wh), Reactive energy (Eq: Varh).

Figure 5-2 displays energy accumulation stop.

Press F3 to start energy accumulation;

Press F4 to clear energy data and accumulation time.

Figure 5-3 displays energy accumulation.

Press F3 to stop energy accumulation;

The screen will display “Energy” when energy cumulates.

稳态测试 3P4W 滤波500Hz					稳态数据
电能数据					电能数据
	P(W)	Q(Var)	Ep(Wh)	Eq(Varh)	电能数据
L1	93.8	45.0	9.522k	3.007k	电能数据
L2	103.7	5.7	9.713k	2.355k	电能开始
L3	103.3	12.2	9.998k	720.6	电能复位
Σ	300.8	62.9	29.23k	6.083k	
电能累计时间: 2 小时48分32秒					
07-03-30					
08-40-32 报警					

Figure 5-2 Energy data—Stop

稳态测试 3P4W 滤波500Hz 电能					稳态数据
电能数据					电能数据
	P(W)	Q(Var)	Ep(Wh)	Eq(Varh)	电能数据
L1	93.6	44.9	9.522k	3.007k	电能数据
L2	103.4	5.7	9.714k	2.355k	电能停止
L3	103.1	12.2	9.999k	720.6	
Σ	300.0	62.8	29.23k	6.083k	
电能累计时间: 2 小时48分41秒					
07-03-30					
08-40-49 报警					

Figure 5-3 Energy data—Cumulate

4. Soft key instruction

Screen	Soft key	Soft key function	Remark
Normalcy data	F1	Enter normalcy data.	Operation is invalid when it reverses video.
	F2	Enter energy data.	
Energy data	F1	Enter normalcy data.	
	F2	Reverse video present data.	Operation is invalid when it reverses video.
	F3	Start/ Stop energy	
	F4	Energy reset. (It is effective after energy accumulation stops.)	

Chapter 6: Waveform Display

1. Introduction

Display present signal waveform.

2. Waveform test

Operate key "Waveform 2" to enter.

3. Screen instruction

3.1 Waveform display refers to screen. (Figure 6-1)

Display:

All waveform---all signal waveform;

Voltage waveform---all signal voltage waveform;

Current waveform--- all signal current waveform;

Phase waveform---display each phase signal waveform; switch by direction key.

Waveform data---display peak value, waveform factor and total harmonic value of voltage and current respectively.

3.2 Other screens

3.2.1 Voltage waveform (Figure 6-2)

It displays three-phase voltage waveform meanwhile.

3.2.2 Current waveform (Figure 6-3)

It displays three-phase current waveform meanwhile.

3.2.3 Phase waveform (Figure 6-4)

It displays voltage and current waveform of single-phase meanwhile.

Operate direction key (← →) to select signal.

3.2.4 Waveform data (Figure 6-5)

It displays waveform data of three-phase signal meanwhile.

As follows:

Upk: voltage peak; Ucf: voltage crest factor;

Ipk: current peak; Icf: current crest factor;

THDu: voltage total harmonic THDi: current total harmonic

Umod, s: voltage modulation rate

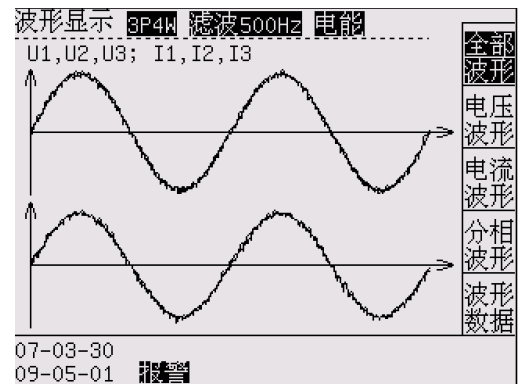


Figure 6-1 Waveform display

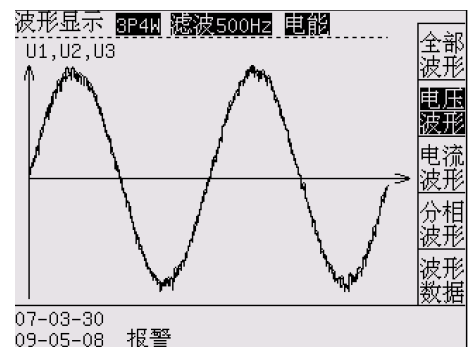


Figure 6-2 voltage waveform

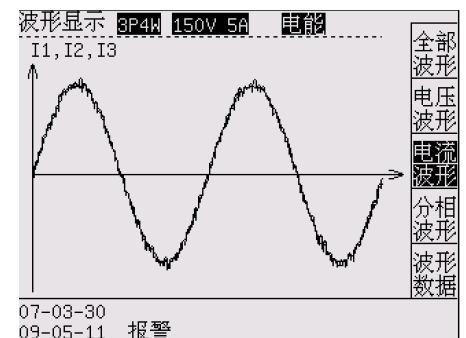


Figure 6-3 current waveform

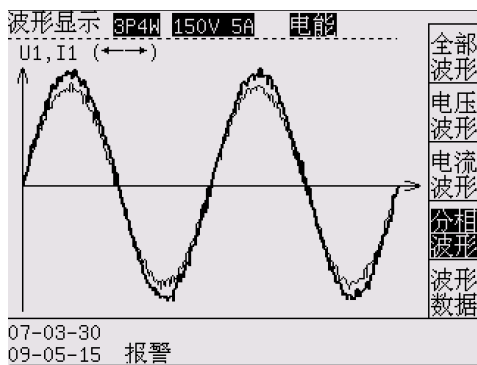


Figure 6-4 each phase waveform

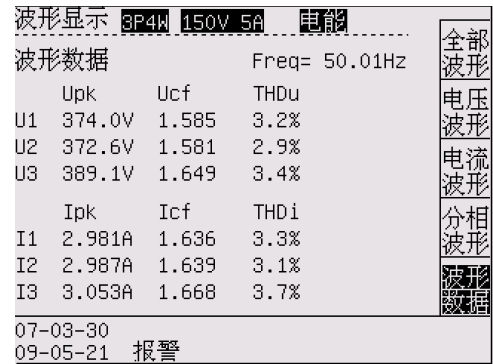


Figure 6-5 waveform data

4. Soft key instruction

Screen	Soft key	Soft key instruction	Soft key function	Remark
Waveform display	F1	All waveform	Operation is invalid when it reverses video.	
	F2	Voltage waveform		
	F3	Current waveform		
	F4	Phase waveform		Direction key is effective.
	F5	Waveform data		

Chapter 7: Harmonic Test

1. Introduction

Display harmonic, bar graph and data of present signal.

2. Harmonic test

Operate key "Harmonic 3" to enter.

3. Screen instruction

3.1 Harmonic display refers to screen. (Figure 7-1)

Display: Harmonic data and bar graph can switch by direction key.

Harmonic data---all signal harmonic data; (Figure 7-1)

Harmonic bar graph---all signal harmonic bar graph; (Figure 7-2)

More data---more harmonic data; (Figure 7-3)

3.2 Harmonic data screen. (Figure 7-1)

3.2.1 Signal instruction:

THD---total harmonic; U---voltage; I---current; %---harmonic content;

RMS---Root-Mean-Square Value.

3.2.2 Operation:

Press “←→” to select harmonic data of 1, 2 and 3 phase.

Press “↑ ↓” to select harmonic display orders.

3.2.3 Harmonic analysis:

It displays 128 orders harmonic at most when frequency is 5-65Hz.

It displays 32 orders harmonic at most when frequency is 65-300Hz.

It displays 16 orders harmonic at most when frequency is 300-800Hz.



Figure 7-1 Harmonic data

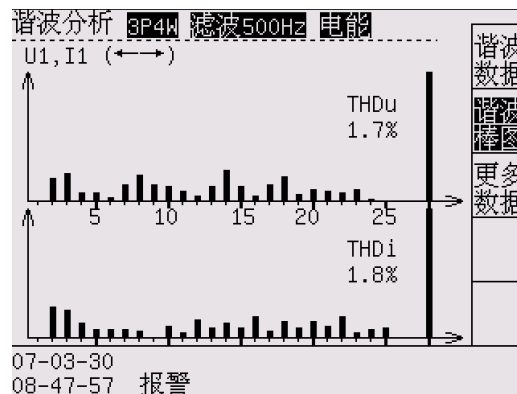


Figure 7-2 Harmonic bar graph

3.3 Harmonic bar graph screen (Figure 7-2):

Operation:

Press “←→” to select harmonic bar graph of 1, 2 and 3 phase.

Press “↑ ↓” to select 2-25 or 26-50 orders harmonic bar graph.

3.4 More data (Figure 7-3). Include:

I virtual value& total harmonic; U virtual value& total harmonic;

Voltage bias coefficient, phone harmonic factor, phone interference coefficient

Note:

Phone harmonic factor and phone interference coefficient are just fit for power frequency.

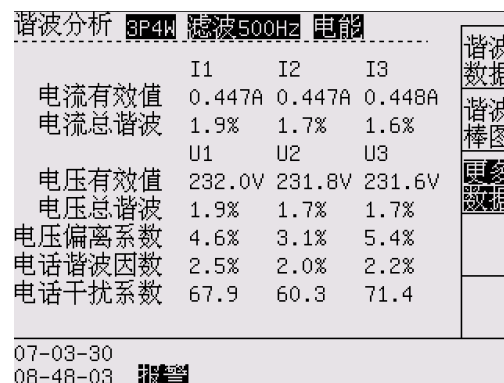


Figure 7-3 More data

4. Soft key instruction

Screen	Soft key	Soft key instruction	Soft key function	Remark
Harmonic analysis	F1	Harmonic data	Operation is invalid when it reverses video.	Direction key is effective.
	F2	Harmonic bar graph		
	F3	More data		

Chapter 8: Unbalance Factor

1. Introduction

Display unbalance factor data and angle phasor of three-phase signal.

2. Unbalance factor display

Operate key “Unbalance factor 4” to enter.

3. Screen instruction

3.1 Unbalance factor display refers to screen. (Figure 8-1)

Unbalance factor data include:

Basic data---unbalance basic data; (Figure 8-1)

Angle phasor---phasor graph and angle. (Figure 8-2)

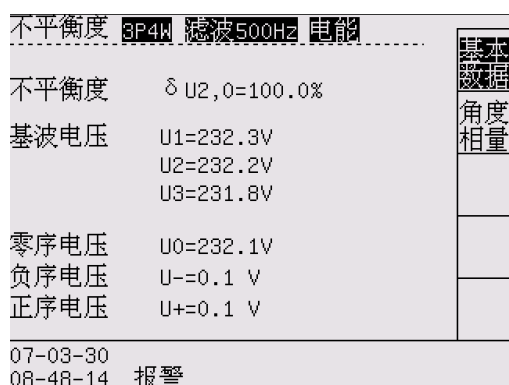


Figure 8-1 Unbalance factor

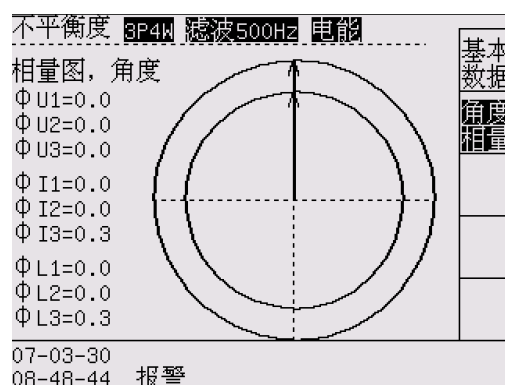


Figure 8-2 Angle phasor

3.2 Unbalance factor basic data screen. (Figure 8-1)

Basic data include:

- Unbalance factor: ratio of negative sequence to positive sequence when unloading.
- Fundamental wave voltage: U1, U2, U3; (three-phase fundamental wave voltage content)
- Zero sequence: U0; (Zero sequence voltage content)
- Negative sequence: U-; (Negative sequence voltage content)
- Positive sequence: U+; (Positive sequence voltage content)

3.3 Angle phasor screen (Figure 8-2)

It displays voltage and current phasor graph.

Angle phasor data include:

- Voltage angle: $\Phi U1$ 、 $\Phi U2$ 、 $\Phi U3$; (angle value of three-phase voltage relative to U1)
- Current angle: $\Phi I1$ 、 $\Phi I2$ 、 $\Phi I3$; (angle value of three-phase current relative to U1)
- Phasor angle: $\Phi L1$ 、 $\Phi L2$ 、 $\Phi L3$; (angle value of each phase current relative to voltage)

4. Soft key instruction

Screen	Soft key	Soft key instruction	Soft key function
Unbalance factor	F1	Basic data	Operation is invalid when it reverses video.
	F2	Angle phasor	

Chapter 9: Normalcy Data Record

1. Introduction

Normalcy data

2. Adjust display

Operate key “Data record 6” to enter.

3. Screen instruction

It contains three-phase U & Σ U, three-phase I & Σ I, three-phase P& Σ P, Σ PF&F, date and time of record.

3. 1.1 After record stop, operate “F1” to start normalcy data record. (Figure 9-1)

3. 1.2 After record stop, operate “F2” to reset. (Figure 9-1)

3. 1.3 After record start, operate “F1” to stop. (Figure 9-2)

3. 1.4 Note: The interval time of record can be set as 1-60 seconds on setup.

There are 65536 groups of data at most. It stops automatically if full.

3. 1.5 Check record by direction key. (\leftarrow \rightarrow : shift \uparrow \downarrow : increase& decrease)

Operate “ $\parallel\leftarrow$ ” to check the 0th record.

Operate “ $\leftarrow\parallel$ ” to check the last one.

数据记录 3P4W 滤波500Hz 电能				记录开始
当前记录条数: 00153				记录复位
U:V =	230.7	230.7	230.7	230.7
I:A =	2.70	2.70	2.70	2.70
P:W =	299.7	301.5	297.9	899.1
F:Hz=	55.0	PF=	0.48	
记录时间: 09-02-17 11-28-57				$\parallel\leftarrow$
查询条数: 00012 (00000-65535) *				$\rightarrow\parallel$
按 ($\leftarrow\rightarrow$ $\uparrow\downarrow$) 选择记录条数				
09-02-17				
11-31-21				

Figure 9-1 Data record (start, reset)

数据记录 3P4W 滤波500Hz 电能				记录停止
当前记录条数: 00150				
U:V =	230.7	230.7	230.7	230.7
I:A =	2.70	2.70	2.70	2.70
P:W =	299.7	301.5	297.9	899.1
F:Hz=	55.0	PF=	0.48	
记录时间: 09-02-17 11-28-57				$\parallel\leftarrow$
查询条数: 00012 (00000-65535) *				$\rightarrow\parallel$
按 ($\leftarrow\rightarrow$ $\uparrow\downarrow$) 选择记录条数				
09-02-17				
11-31-15				

Figure 9-2 Data record (stop)

4. Soft key instruction

Screen	Soft key	Soft key instruction	Soft key function
Data record	F1	Record start Record stop	Record start: Record data before stop. Record stop: Stop record.
Data record	F2	Record reset	Reset when stop record.
Data record	F4	←	Check the 0th record.
Data record	F5	←	Check the last one.

Chapter 10: Transient Test and Quick Sampling

1. Introduction

Display 20ms as sampling interval transient test.

2. Start test

Operate key "Transient test 5" to enter.

3. Screen instruction

3.1 Transient test data refers to screen. (Figure 10-1)

Transient data---extremum data of transient test within 12 seconds;

U_max, U_min ---- voltage maximum, minimum;

I_max, I_min ----current maximum, minimum;

P_max, P_min ---- power maximum, minimum;

F_max, F_min ---- frequency maximum, minimum;

3.2 Transient test curve

L1, L2, L3 curve--- U/I change curve of transient test within 12 seconds;

P-F curve--- frequency and total power change curve of transient test within 12 seconds;

瞬态测试 3P4W 滤波500Hz	L1	L2	L3	Σ	瞬态数据
Umax:V	259.3	259.3	259.3	259.3	L1曲线
Umin:V	212.2	212.3	212.3	212.3	L2曲线
Imax:A	2.728	2.731	2.731	2.730	L3曲线
Imin:A	2.663	2.666	2.666	2.665	P-F曲线
Pmax:W	336.8	338.8	334.8	1.010k	
Pmin:W	274.9	276.6	273.3	824.8	
Fmax:Hz	56.36				
Fmin:Hz	55.00				

按“测试”开始快速采样

Figure 10-1 Transient test data

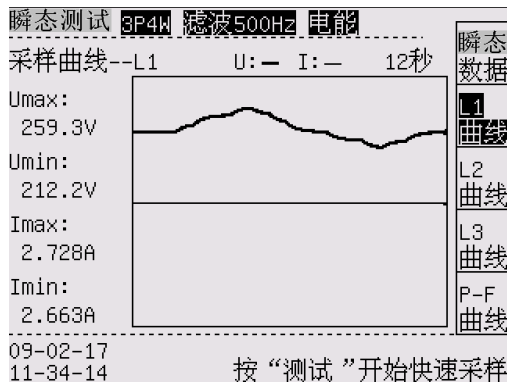


Figure 10-2 L1 Curve

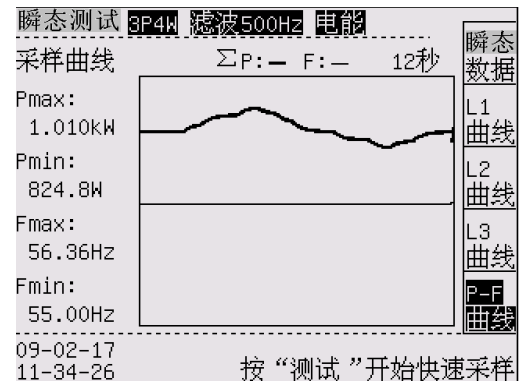


Figure 10-3 P-F Curve

3.3 Test instruction

3.3.1 “Test”: operate “Test” key to start transient test.

3.3.2 “ESC”: operate “ESC” key to end test.

3.3.3 Function instruction

20ms interval is a computational period of transient test. The computer communication will get real-time data all the time after test start. But the meter only saves the data of transient test within 12 seconds. The extremum are all within 12 seconds.

When transient test, it only displays the present data and below is time. When the time reaches 12 seconds, the buzzer will “DI” and stop transient test.

Transient test has relay action:

Transient test starting 1 second, relay J1 attracts. Transient test stopping, relay J1 opens.

4. Quick sampling instruction

The computer software adds quick sampling function to get test data. The computer can control to start and stop test, and make curve after test.

Chapter 11: Record Wave Test

1. Introduction

Record U&I waveform directly.

2. Record test

Operate key “Record 9” to enter.

3. Screen instruction

3.1 Record test display refers to screen. (Figure 11-1) Including:

U 123---display present record waveform of each phase voltage meanwhile;

U1, I2, I3--- display present record waveform of each phase voltage respectively.

I 123---display present record waveform of each phase current meanwhile;

I1, I2, I3--- display present record waveform of each phase current respectively.

3.2 Record test screen (Figure 11-1)

3.2.1 “Test”: operate “Test” key to start. Record data to plot record curve. The data can record 110 pages at most. Different record mode may influence data record time and waveform result.

3.2.2 “ESC”: operate “ESC” key to end test.

3.2.3 Record data instruction

Mode---record mode.

Sampling interval has four modes: 1600 points/second, 3200 points/second, 6400 points/second, 12800 points/second,

Record time is 16 sec, 8 sec, 4 sec and 2 sec.

Record mode can set up on “SET”.

Page---display present page and total pages. Press “ $\uparrow\downarrow$ ” to ± 1 page and “ $\leftarrow\rightarrow$ ” to ± 10 page.

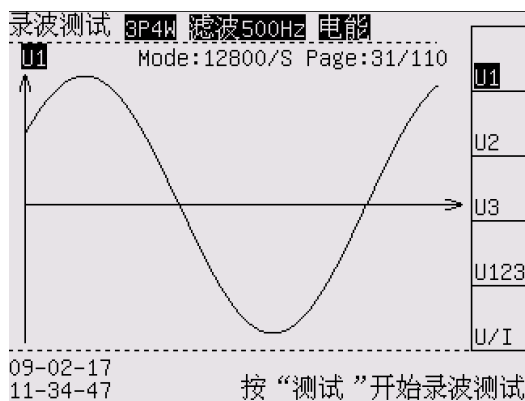


Figure 11-1 Record test

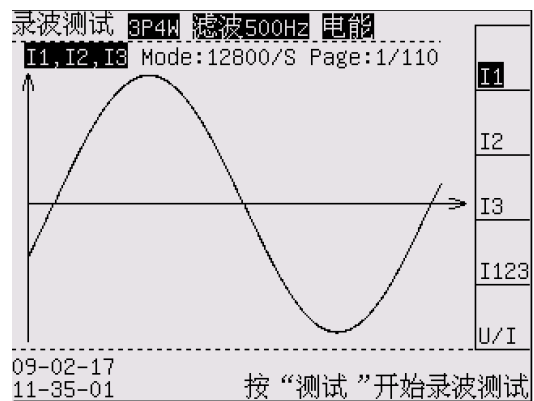


Figure 11-2 I1 record curve

4. Soft key instruction

Screen	Soft key	Soft key instruction	Soft key function	Remark
Record	F1	U1/I1	Operation is invalid when it reverses video.	Operate direction key to \pm page.
	F2	U2/I2		
	F3	U3/I3		
	F4	U123/I123		
	F5	U/I	Switch voltage/current waveform	

Chapter 12: Filtering Function

1. Introduction

Get right test data by switching different filtering mode.

2. Switch filtering mode

Operate key "Filtering" to switching filtering mode: close filtering, 500Hz filtering, 5kHz filtering,

3. Filtering instruction

The instrument has 500Hz and 5kHz filters. It can choose to make U&I filtering when test motor of frequency conversion and poor U signal.

Waveform of frequency converter is modulated. With filtering, the waveform will be better and the data will be stable.

System setup: "U&I filtering": open or close.

Filter will filtrate some high frequency signal to influence high orders harmonic. So if the signal > 300Hz, we suggest choosing 5kHz filter.

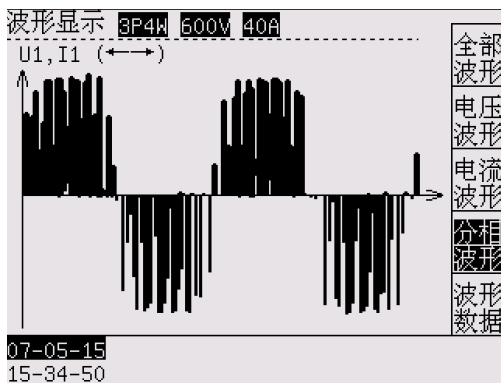


Figure 12-1 U waveform without filtering

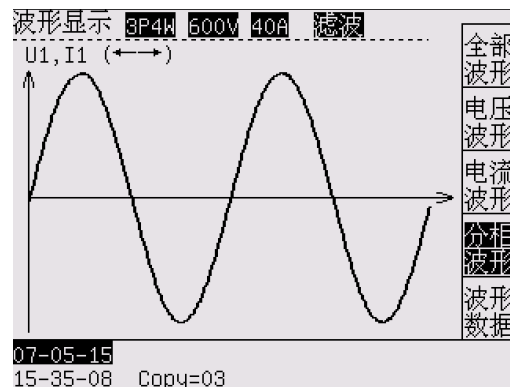


Figure 12-2 U waveform with filtering

稳态测试 3P4W 600V 40A				
稳态数据				
	L1	L2	L3	Σ
U:V	251.9	253.3	252.5	252.6
I:A	0.014	0.016	0.013	0.014
P:W	-0.2	0.6	0.3	0.7
PF	-0.051	0.149	0.094	0.068
S:VA	3.5	4.1	3.3	10.8
Q:Var	3.5	4.0	3.3	10.8

Figure 12-3 Data without filtering

稳态测试 3P4W 600V 40A 滤波				
稳态数据				
	L1	L2	L3	Σ
U:V	152.5	152.4	152.6	152.5
I:A	0.009	0.004	0.008	0.007
P:W	0.1	0.0	0.0	0.2
PF	0.074	0.037	0.036	0.053
S:VA	1.4	0.6	1.2	3.2
Q:Var	1.4	0.6	1.2	3.2

Figure 12-4 Data with filtering

Chapter 13: Parameter setup

1. Introduction

Set up parameters of instrument, including SYSTEM and SET.

2. SYSTEM parameter setup (Figure 13-1)

2.1 SYSTEM is basic data of instrument.

2.2 Enter code "123456" to modify parameter setup.

2.3 User can modify the following setup:



Figure 13-1 SYSTEM parameter setup

Communication address--- data communication address to computer, 0-199;

Communication baud rate--- data communication speed with computer,

4 select: 9600, 19200, 38400, 57600 Bit/S.

Clock setup---clock calibration of present date, format: year-month-day, hour-minute-second.

2.4 Way to change SYSTEM parameter (Refer to page 7)

3. Parameter setup (Figure 13-2)

Press SET to enter parameter setup. Enter code "123456" to modify.

Voltage ratio (PT) --- transformation ratio of voltage instrument transformer PT;

Example: If PT sets up 500V/100V, $PT = 500/100 = 5$.

Current ratio (CT) --- transformation ratio of current instrument transformer CT;

Example: If CT sets up 100A/5A, $CT = 100/5 = 20$.

U upper limit---U upper limit of alarm

U lower limit---U lower limit of alarm

I upper limit---I upper limit of alarm

I lower limit---I lower limit of alarm

Alarm relay---enter or exit alarm relay (0-199 sec)

Record interval---interval time of normalcy data record (1-60 sec)

Note: Upper limit must be set $>$ lower limit, or alarm will be closed.

Alarm: The screen displays "alarm" and J2 attracts. When voltage exceeds limit, it displays "alarm U". When current exceeds limit, it displays "alarm I". When voltage and current both exceed limit, it displays "alarm UI".

4. Parameter setup (Figure 13-3)

Press SET to enter parameter setup. Enter code “123456” to modify.

Wiring: refer to Chapter 4.

Record: refer to Chapter 11.

Language select: 1. Chinese 2. English

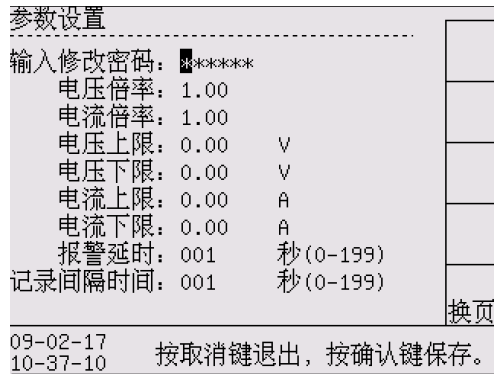


Figure 13-2 Parameter setup –1

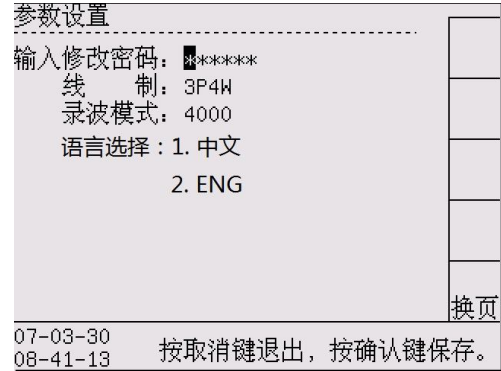


Figure 13-3 Parameter setup –2

5. Others

Lock: Operate “Lock” key to lock and unlock the present data.

Chapter 14: Date Management

1. Introduction

The instrument can send data by computer. There are RS232, RS485 two hardware interfaces.

2. Hardware connection with computer directly

The instrument provides some hardware connection ways to communicate with computer.

★Way 1. RS232 communication

Connect with computer RS232 interface directly by accessory RS232 communication wiring. It is suited that the analyzer and computer are in close quarters (less than 10 meters), and there is no environment disturb on the simple configuration.

★Way 2. RS 485 communication

Chapter 15: Maintenance and Malfunction Disposal

1. Introduction

Introduce the basic maintenance procedure which user can administer. Instruct user to deal with simple trouble.

2. Clean instrument and accessory

2.1 Clean instrument and accessory with wet fabric and mild soap. Don't use corrosive, impregnant or alcohol. They may destroy the words on instrument.

3. Keep analyzer

Note that the environment satisfies specifications if it need exist instrument for a long term.

4. Instrument trouble and eliminate way

(1) Test data appears obvious deviation or power appears minus value.

Please examine if the PT, CT specification is correct. Note the voltage and current signal direction.

(2) The communication of serial interface fails.

Please examine if the interface wiring is correct. Adjust it in accordance with process:

- ① Examine if communication address and baud rating of system setup is the same with computer setup. Amend it if different.
- ② Disconnect computer and measure meter. Measure serial interface signal of meter and upper monitor.

For RS232 port: TXD to GND port voltage of meter and upper monitor should be -8V~-12V.

For RS485 port: A to B port voltage of upper monitor should be +2V~+5V.

If the test signal is not normal, there is error of interface or hardware connection.

(3) Serial interface communication can receive data but there are errors often.

Please examine if the communication connection of meter and computer is OK. Serial interface wire should use shielding conductor and connect shielding layer with ground.

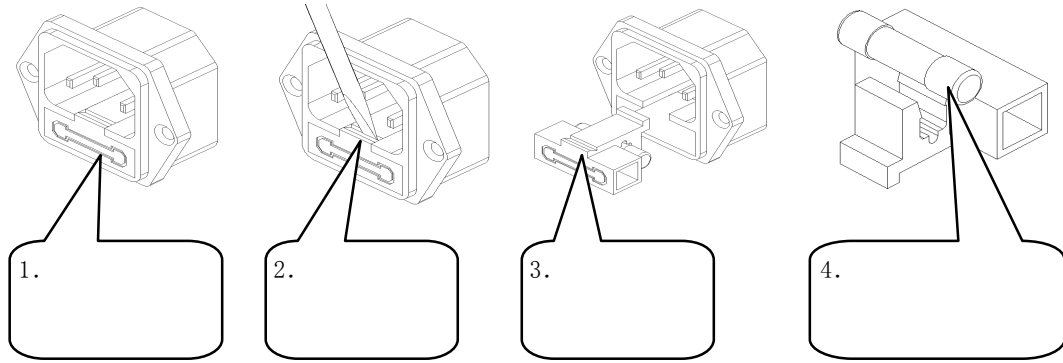
Please examine if the RS232/RS485 converter is OK, shielding conductor is with ground or communication signal sending is effective.

(4) There is no display when meter is turned on.

When use AC power supply: please examine if the meter power supply is connected; if power supply is normal; if it is according to need; if the fuse is OK.

Please examine if luminance, contrast and setup state of LCD screen are all OK.

(5) Way to replace fuse



1. Fuse is under power supply electrical outlet. Please put out plug when change.
2. Pry fuse outlet from power supply electrical outlet with screwdriver.
3. Put out the fuse from outlet when fuse shows.
4. Change new fuse and push fuse outlet back to power supply electrical outlet by hand.

Chapter 16: Specifications

1 Introduction

Instrument index in the form of numerical value are all within regulated tolerance range. Instrument meets regulated accuracy after turning on 30 minutes and 2 complete periods of data gather. Index is basic on one year calibration cycle.

2 Index

2.1 Test parameter and index provided by instrument is as follows. (Figure16-1)

Figure16-1 General range

	General range	Other special range
Voltage range UN	600V	Refer to the meter mark.
Current range IN	5A	

2.2 Others

Test function: Transient test and Record test (Both are three-phase test meanwhile.)

Signal input: voltage and current are both floating input.

Peak value of test signal: voltage and current are both 1.6 times of maximum range.

Sampling time: 8us.

Display time: 1.0 second.

Display way: 320x240 LCD

Consumption: < 10 VA.

Meter weight: about 5 kg.

Meter dimension: width×height ×depth (308×186×407)

Meter Cut-off dimension: width×height (296×166)

2.3 Working condition

Air pressure: (86~106) kPa

Temperature: (0~40)°C

Humidity: (20%~75%)RH

Power supply: AC: 220V±15%, 50/60Hz

There is no preponderant oscillation or electromagnetism disturb.

2.4 The meter technical specifications (Figure16-2)

Figure16-2 Specifications

Parameter	Range	Accuracy	Resolution	Overload
Voltage (V)	1.0%UN~ 100.0%UN	(5~20)Hz: $\pm(0.5\%rdg+0.5\%rng)$ (20~45)Hz: $\pm(0.25\%rdg+0.25\%rng)$ (45~65)Hz: $\pm(0.1\%rdg+0.1\%rng)$ (65~850)Hz: $\pm(0.25\%rdg+0.25\%rng)$	0.1V	120%
Current (A)	1.0%IN~ 100.0%IN		0.001A	120%
Active power	Lie on voltage and current range	(5~20)Hz: PF=1.0: $\pm(0.5\%rdg+0.5\%rng)$ PF=0.5: $\pm(1.0\%rdg+1.0\%rng)$ (20~45)Hz: PF=1.0: $\pm(0.25\%rdg+0.25\%rng)$ PF=0.5: $\pm(0.5\%rdg+0.5\%rng)$ (45~65)Hz: PF=1.0: $\pm(0.1\%rdg+0.1\%rng)$ PF=0.5: $\pm(0.2\%rdg+0.2\%rng)$ (65~800)Hz: PF=1.0: $\pm(0.25\%rdg+0.25\%rng)$ PF=0.5: $\pm(0.5\%rdg+0.5\%rng)$	0.1W	
Power factor	0.20~1.00	(45~65)Hz: ± 0.02	0.001	
Frequency (Hz)	5~800	± 0.05 Hz	0.01Hz	
Energy	999.9 MWh	The same with active power	0.1Wh	
Harmonic	(20~65)Hz: 1-128 harmonic and total of three-phase (65~120)Hz: 1-64 harmonic and total of three-phase (120~420)Hz: 1-32 harmonic and total of three-phase (420~800)Hz: 1-16 harmonic and total of three-phase			