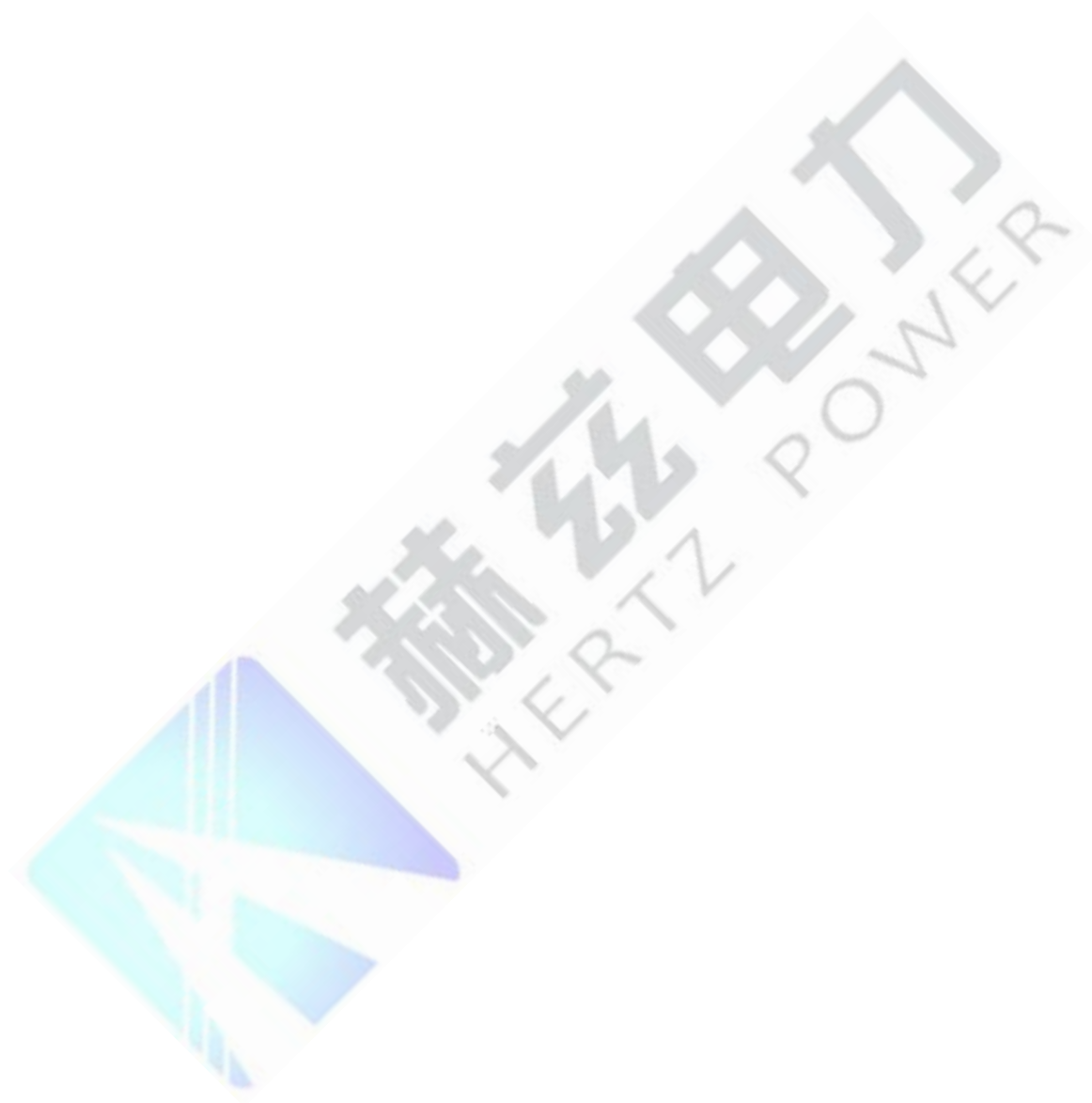




HZJB-330T

赫兹电力  
HERTZ POWER

“ ”

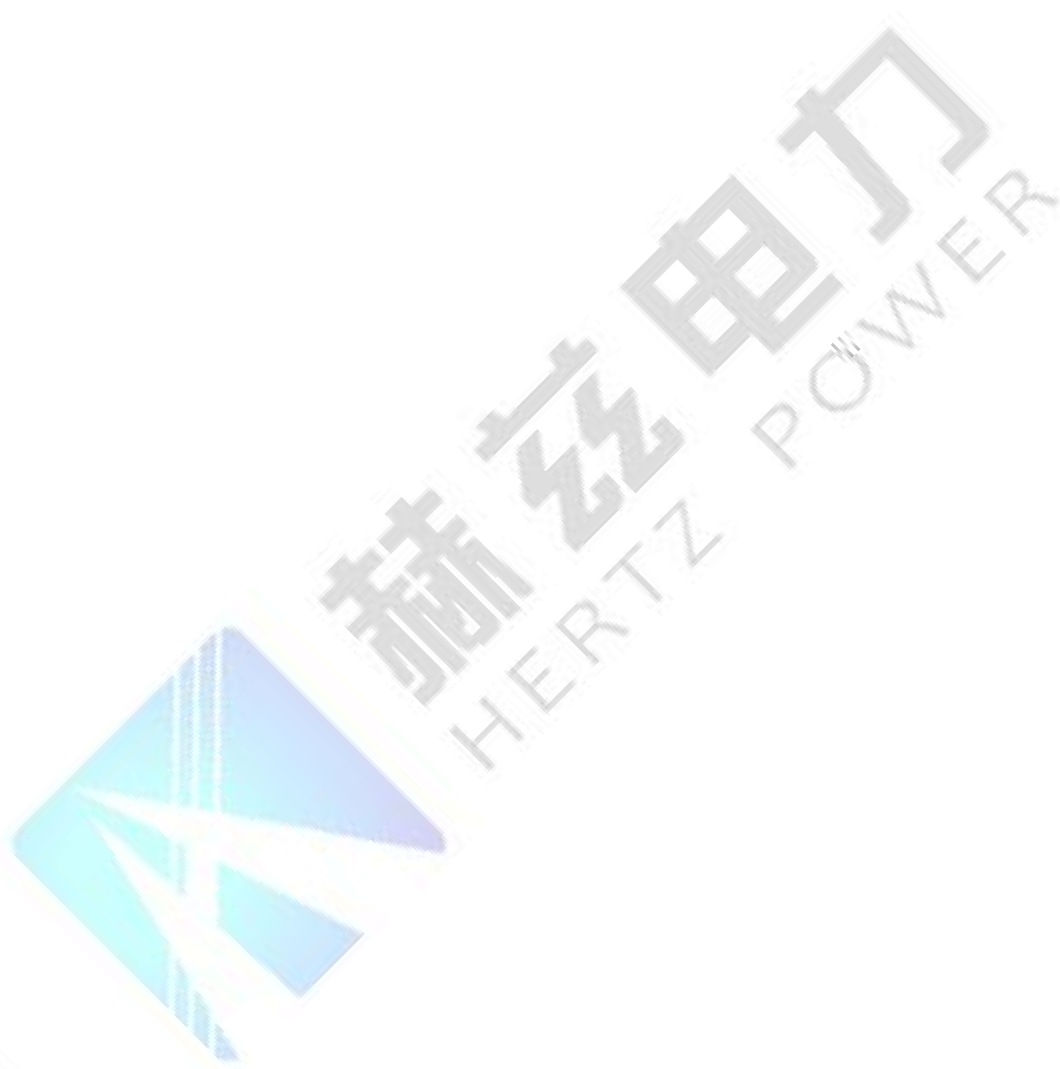
“ ”

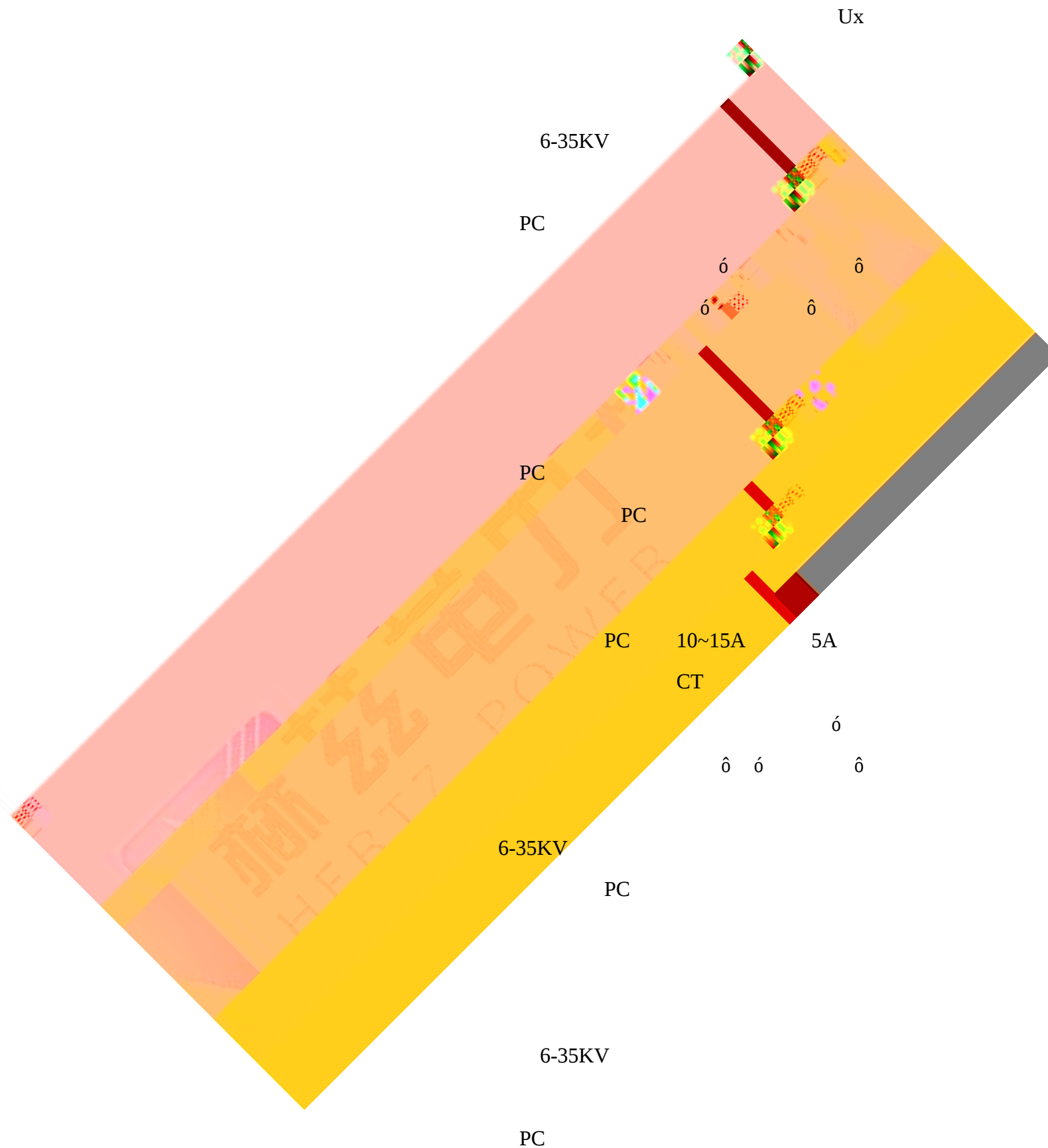
“ PC ” Windows

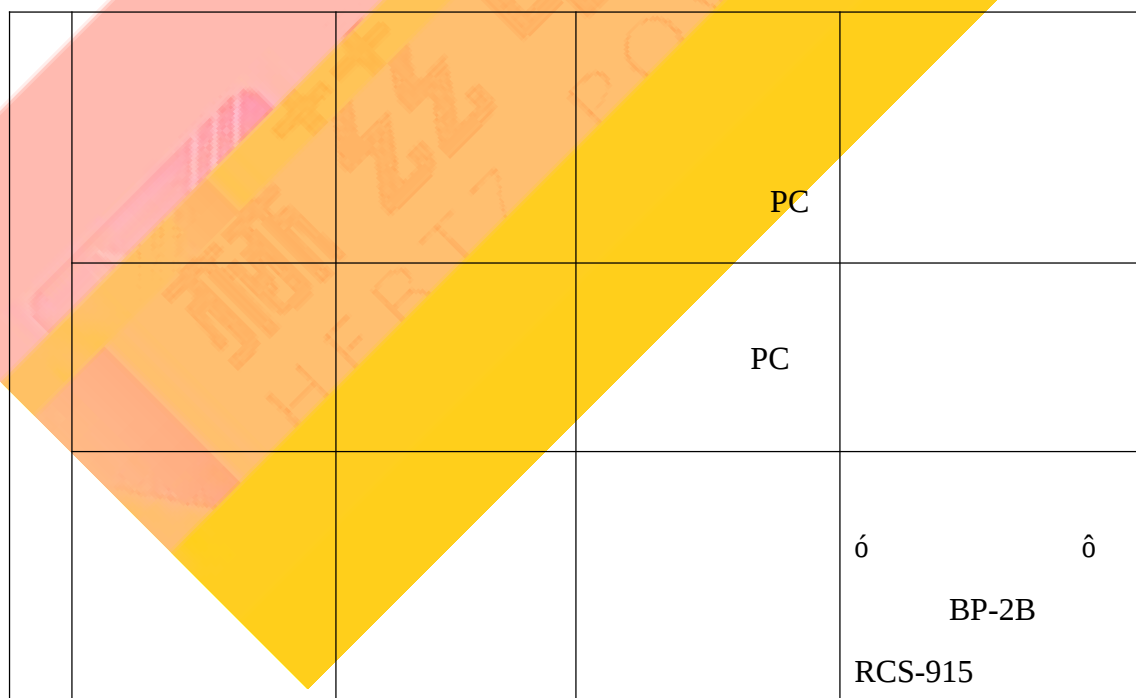
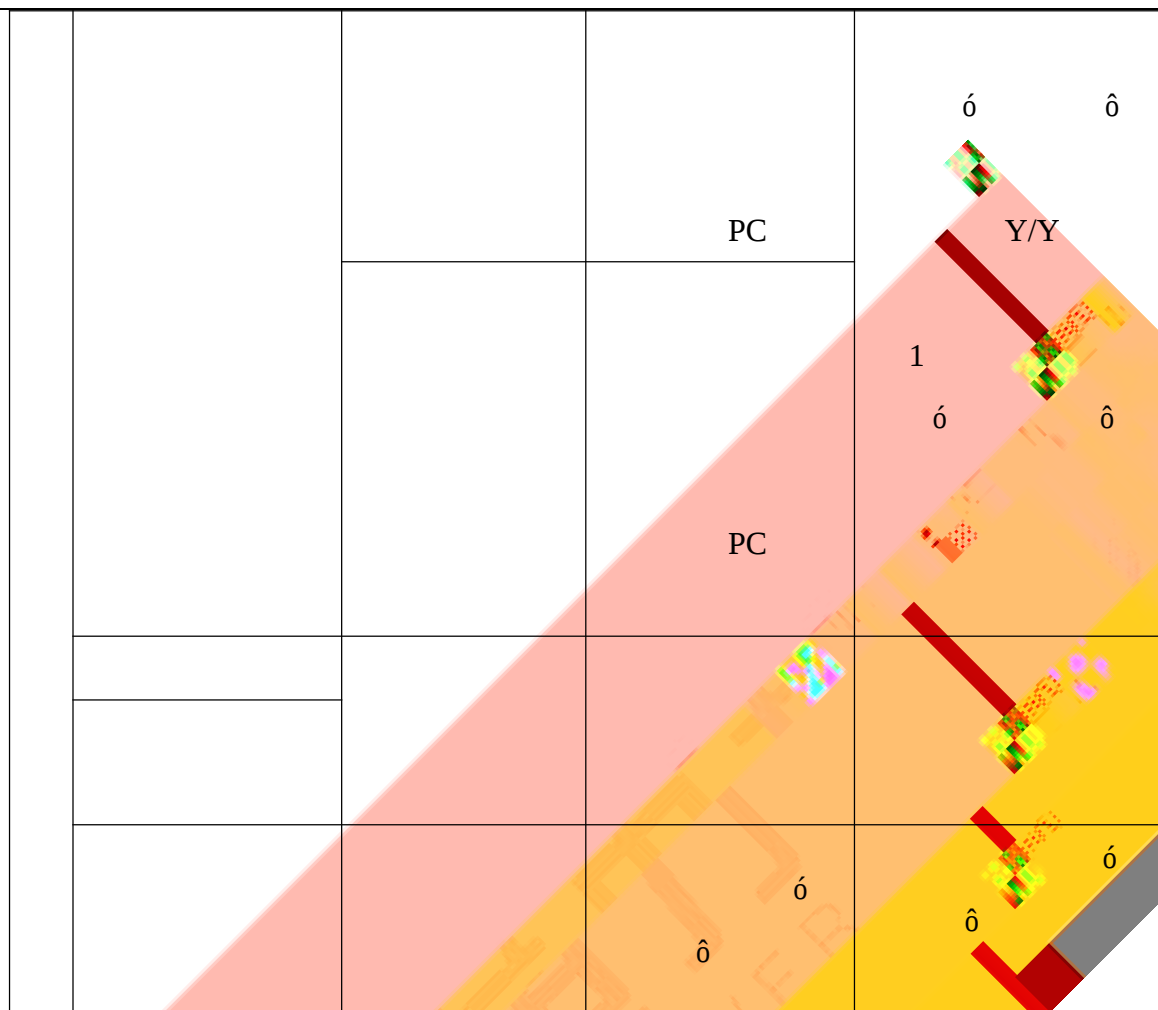
PC

(

|  |  |    |      |
|--|--|----|------|
|  |  |    |      |
|  |  |    | ó ô  |
|  |  |    |      |
|  |  |    |      |
|  |  |    |      |
|  |  |    |      |
|  |  |    |      |
|  |  |    | ó ô  |
|  |  |    |      |
|  |  |    | óI t |
|  |  |    | ô PC |
|  |  |    |      |
|  |  |    |      |
|  |  | PC | ó ô  |

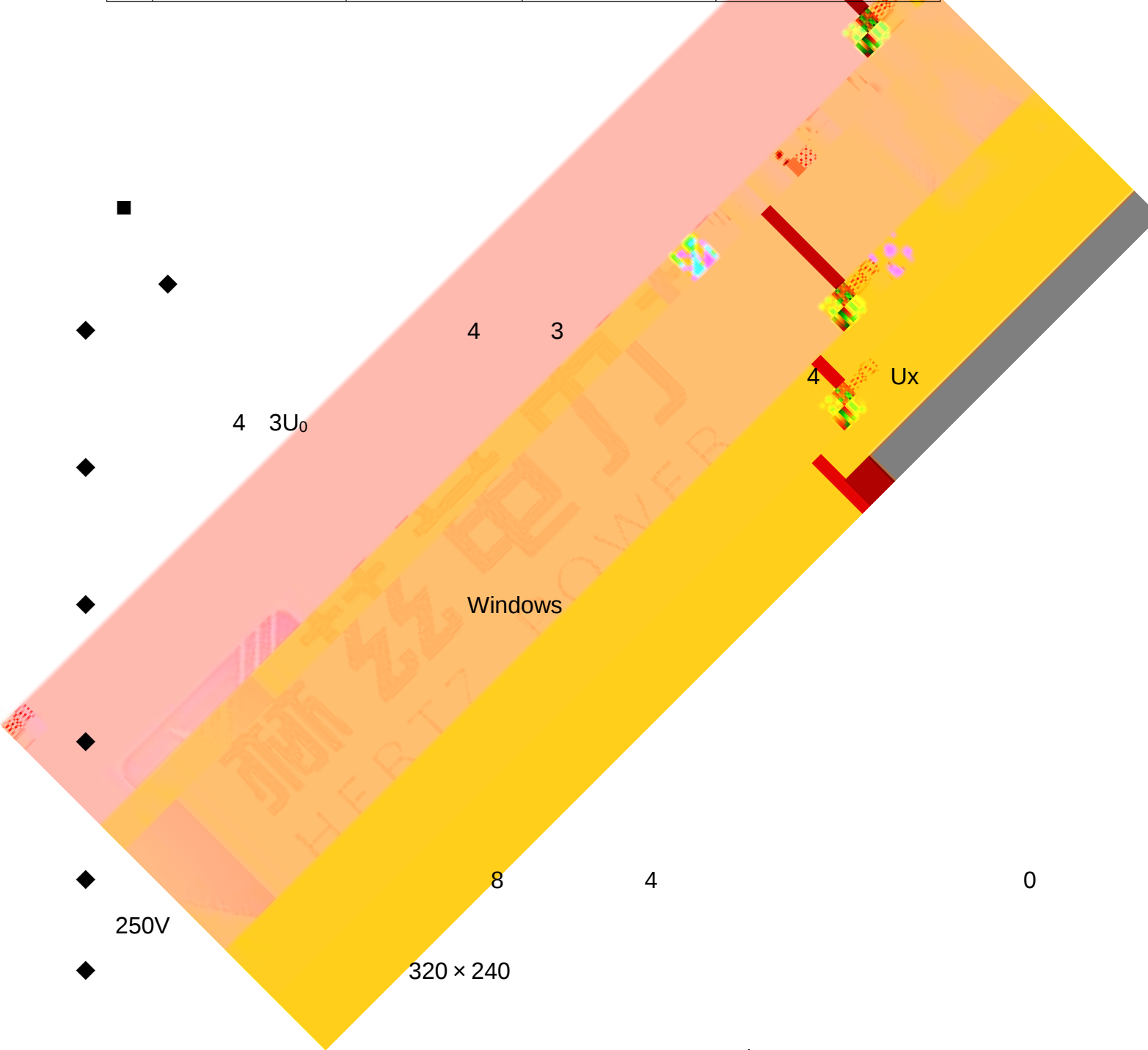








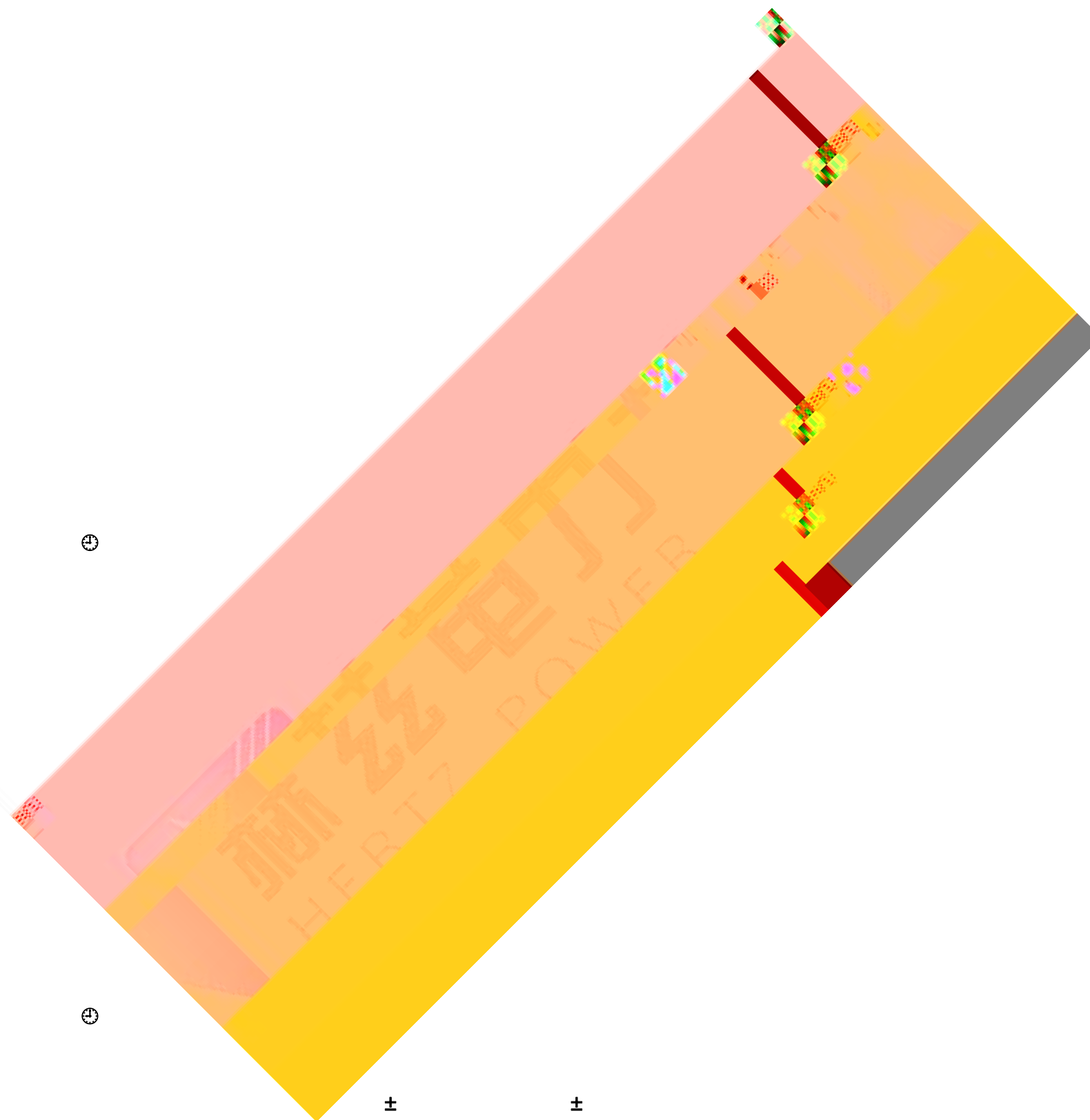
|  |  |  |  |        |        |
|--|--|--|--|--------|--------|
|  |  |  |  | $\phi$ | $\phi$ |
|--|--|--|--|--------|--------|



250V

320 × 240

110V 220V

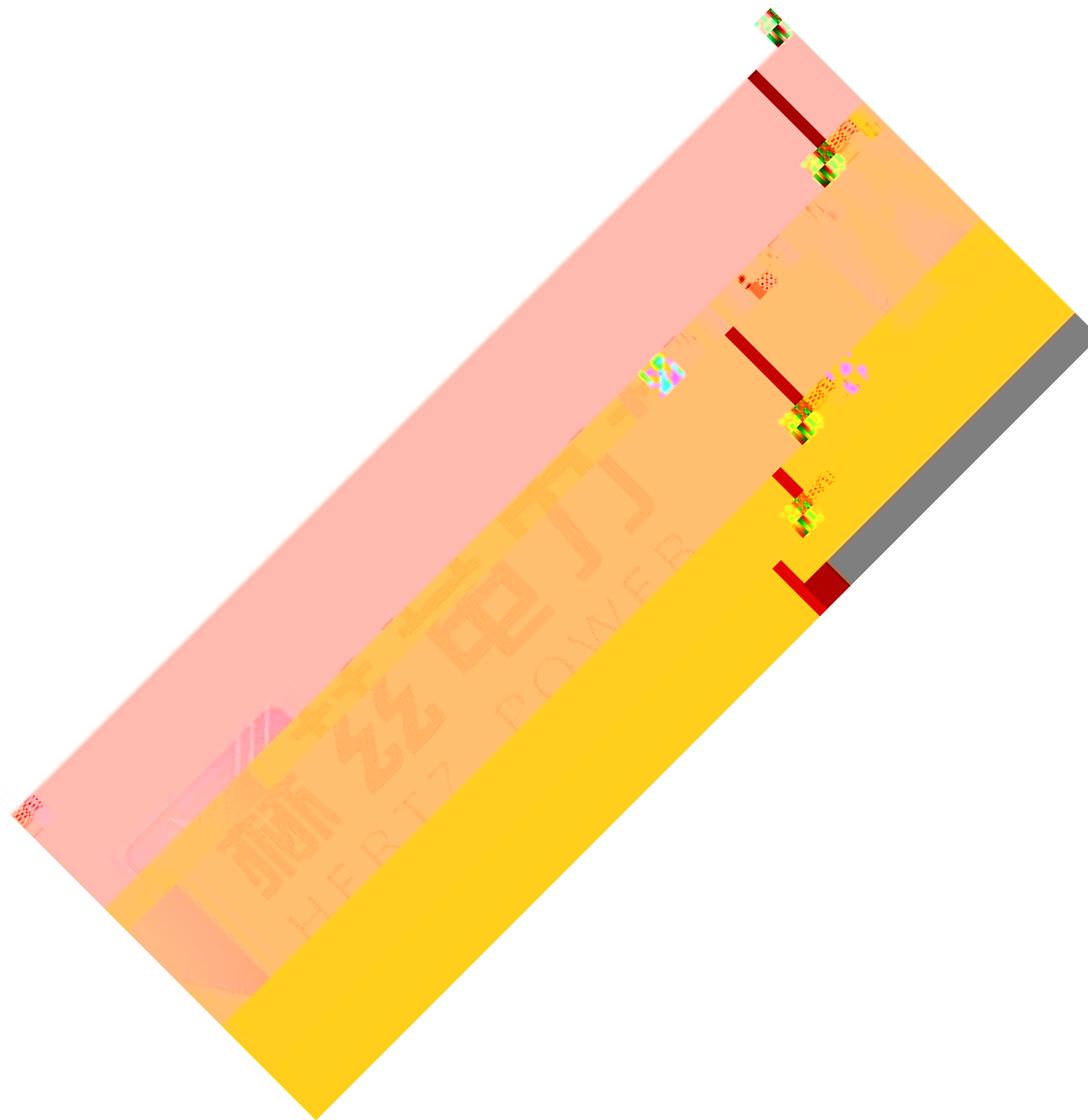


±

±

225

027-83267669



D/A

D/A



10A



0 250V

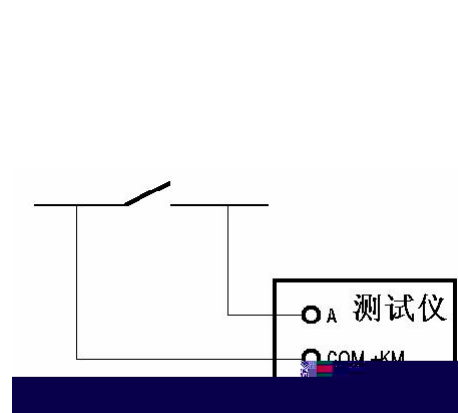
10A

0 6V

11 250V

250 10A 0 2 5 0





320 × 240

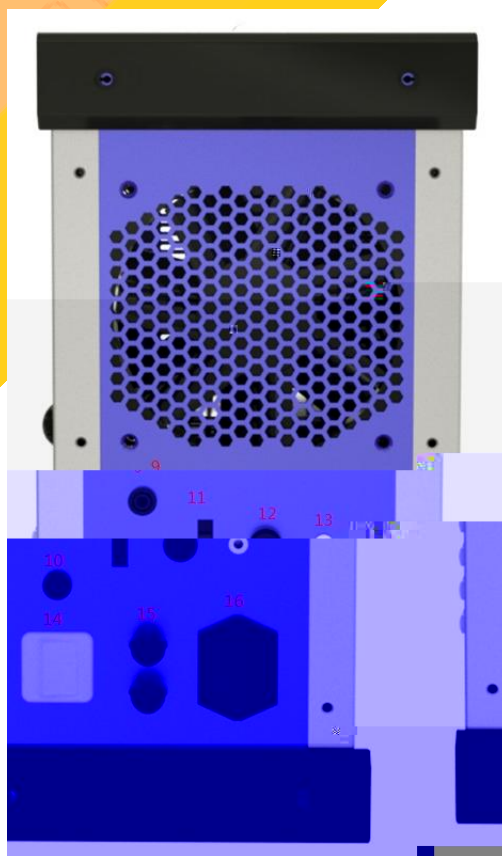
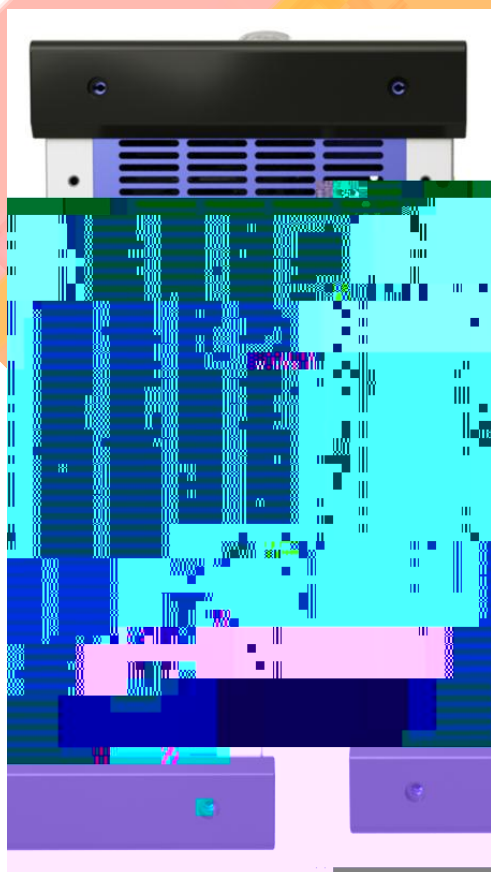


1.5A

110V 220V

2A 250V

2A 250V



5

GPS

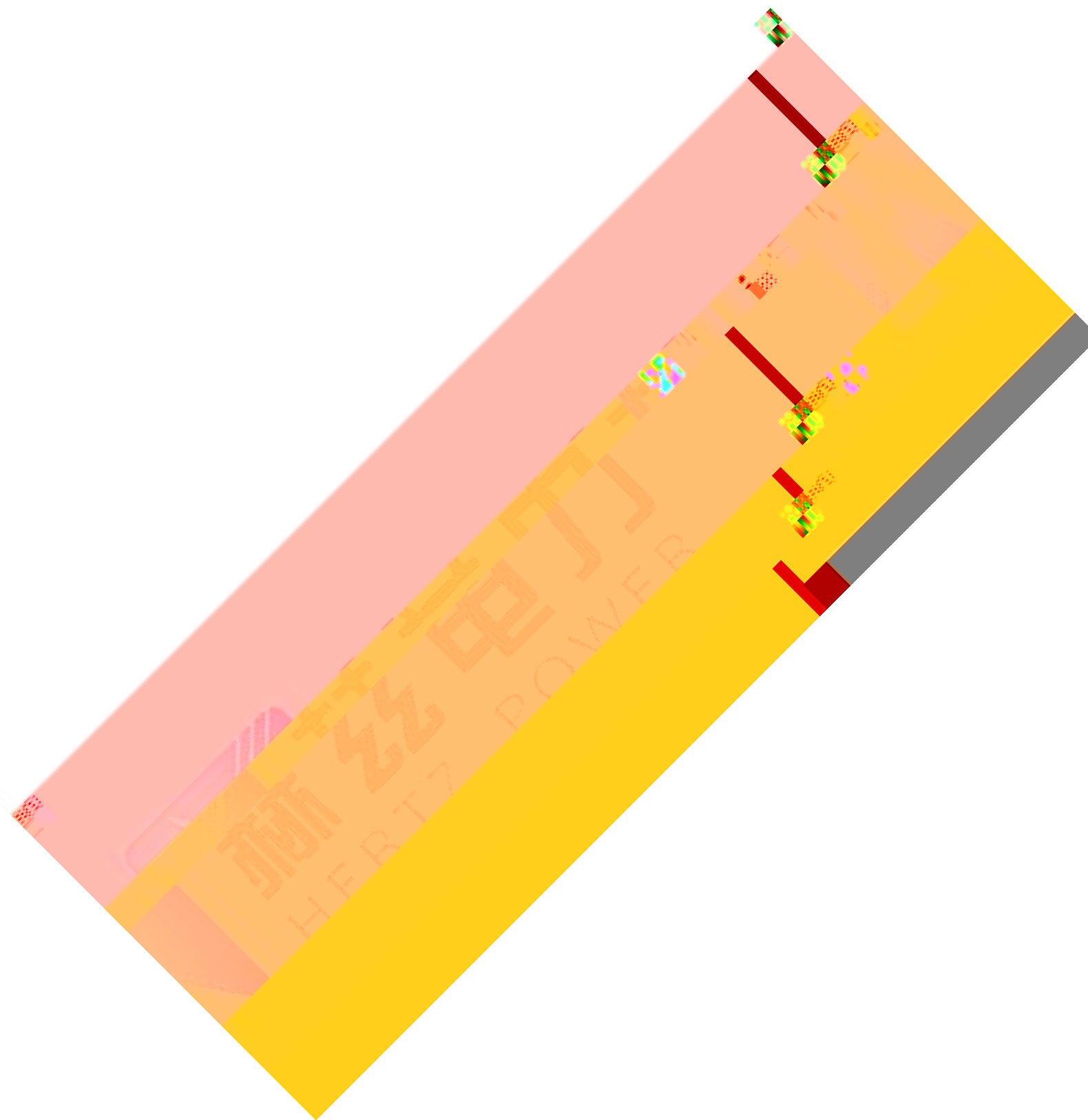
USB

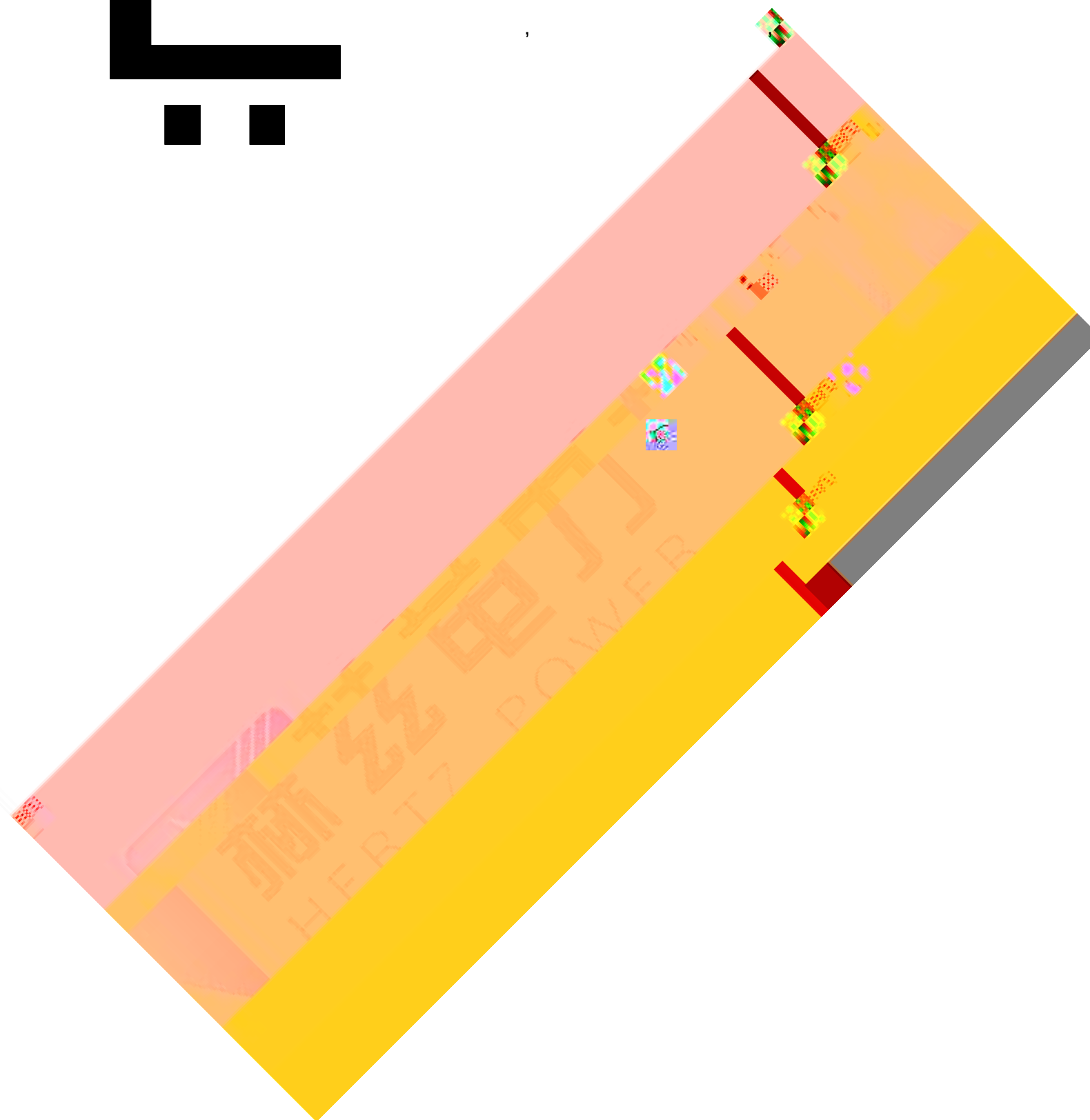
USB

U

220V

220v





， ，

●

Ua

Ub

Uab



g

V<sub>CE</sub>

IA IN

A COM A  
0.1A

8A

U<sub>CE</sub>

E

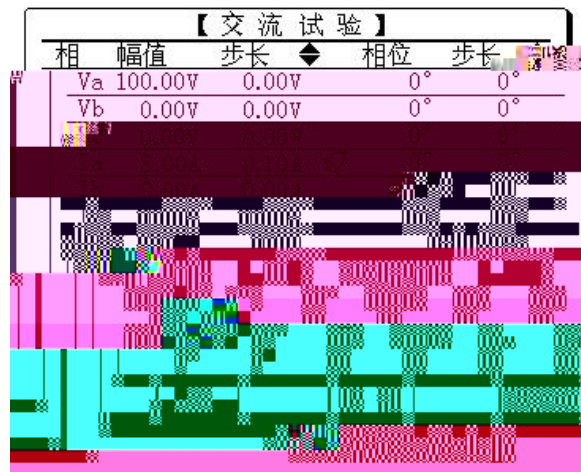
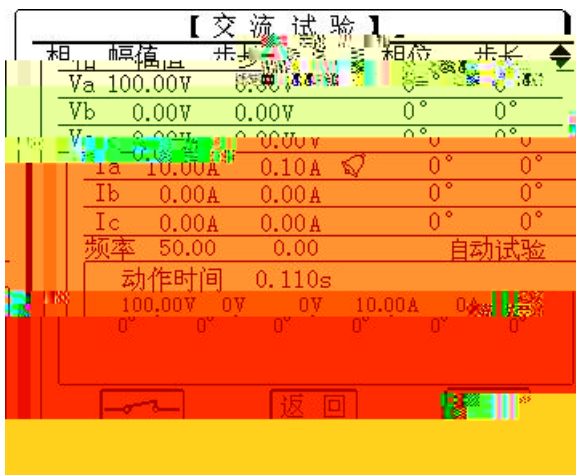
W

1



赫兹电力  
HERTZ POWER

ANDE





”

“ ▲ ” “ ▼ ”

Ua Ub Uc Ia Ib Ic

“ ▲ ” “ ▼ ” “ ” “ ”



“ ” “ ”

“ ▲ ” “ ▼ ”

“ ”



,

Ua Ub Uc Ia Ib Ic



Ua

Ub

Uab



Ua Ub      Uc Ia Ib Ic  
/      Ua Ub Uc      0-120V  
Ua Uc      Ub Uc      Ua Ub      Uc  
Ua Ub Uc Ia Ib Ic

f/ t

“ ▲ ” “ ▼ ”

f/ t

Hz

ó ô ó ô

“ ▲ ”

“ ▼ ”

Ua Uc

“ ▼ ”

“ ▲ ” “ ▼ ”

●

●

“ ” “ ”

“ ▲ ” “ ▼ ”

“ ”

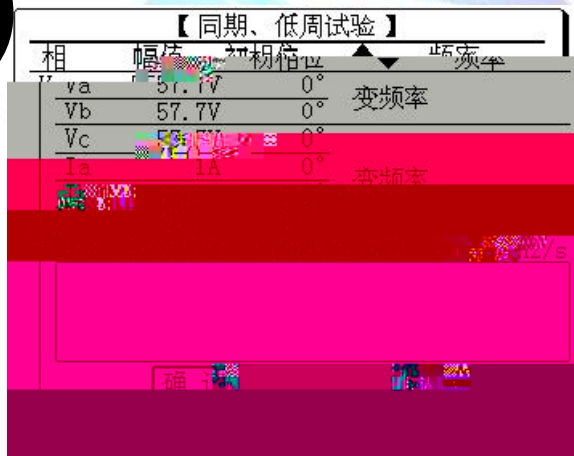
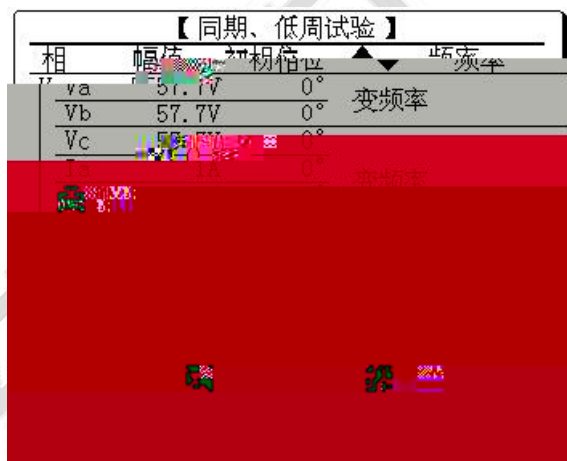
●

Ua Uc

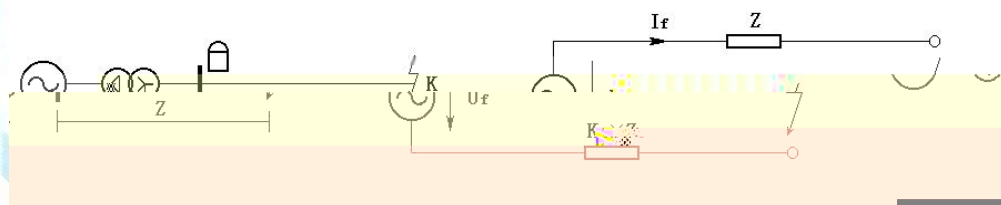


赫兹电力  
HERTZ POWER











“ ”  
“ ”  
57.7V 0A “ ” C

“ ”  
● A B C R C  
●



1

35kv

5A

40V

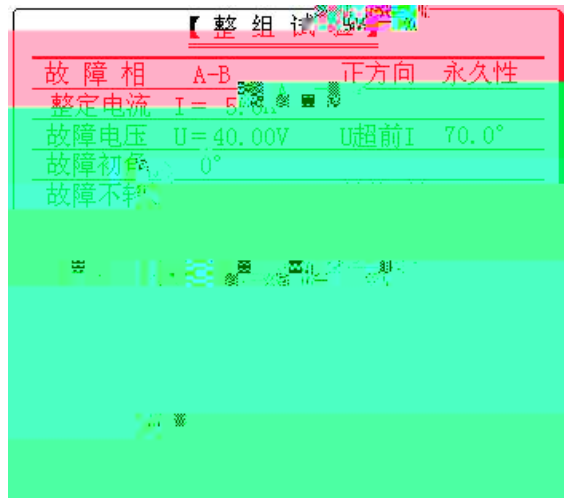
ABC

A C

A

R

COM





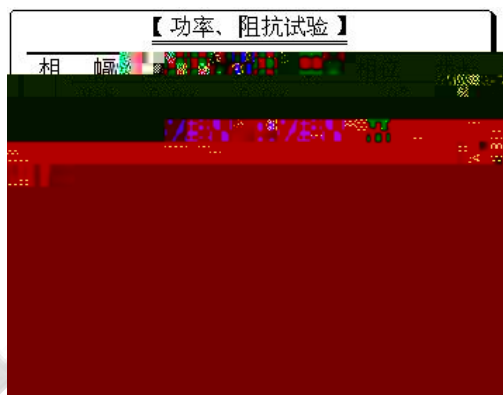
90°

3

57.7V

90°

57.7V



●

●

●

“ ”

“ ”

“ ”

“ ”

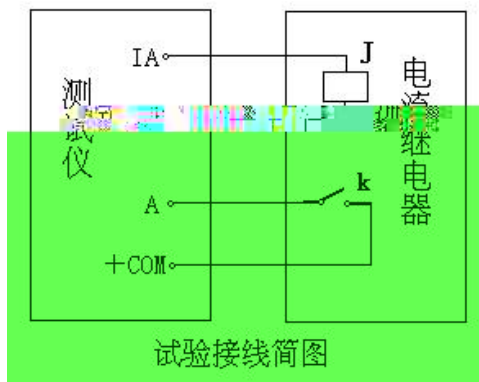
“ ▲ ” “ ▼ ”

,

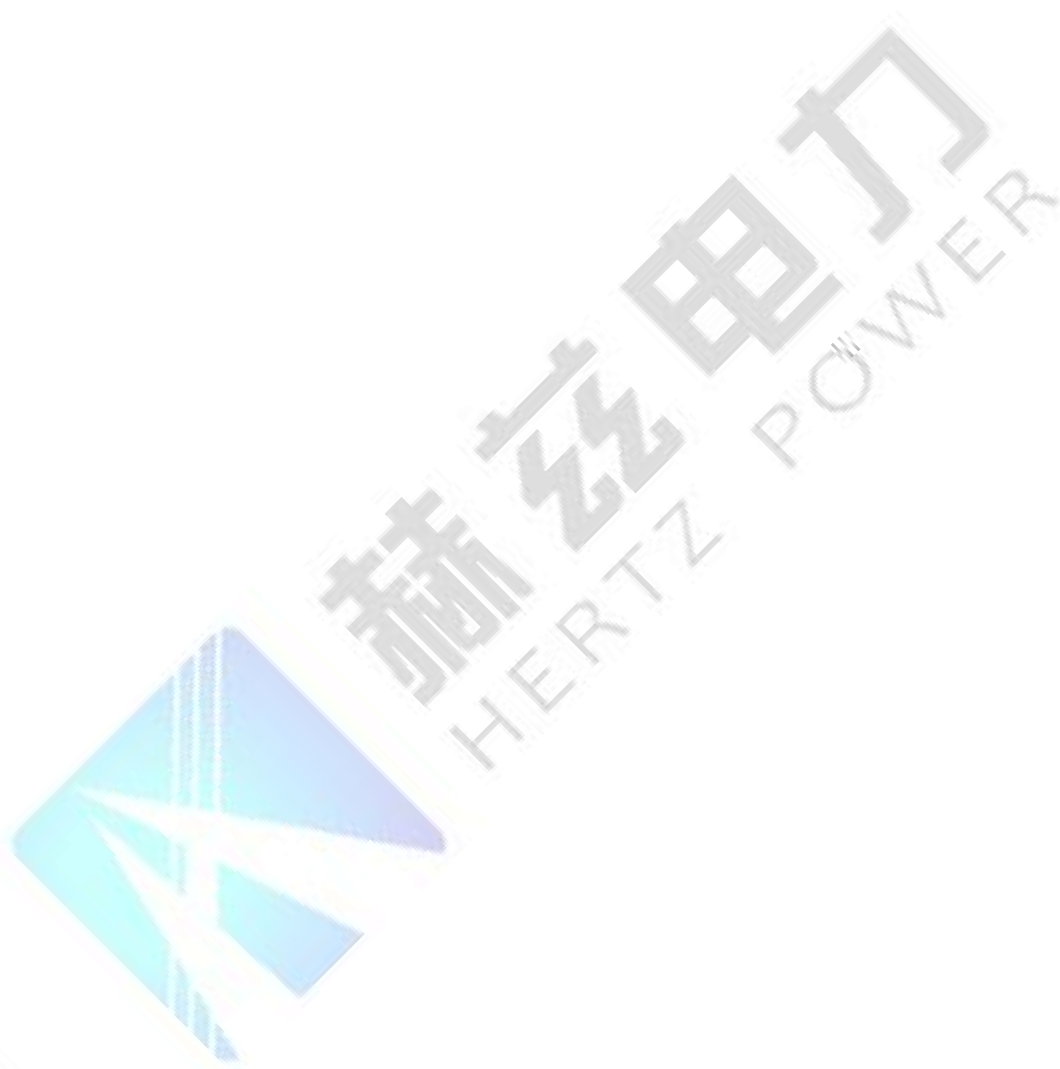
“ ”

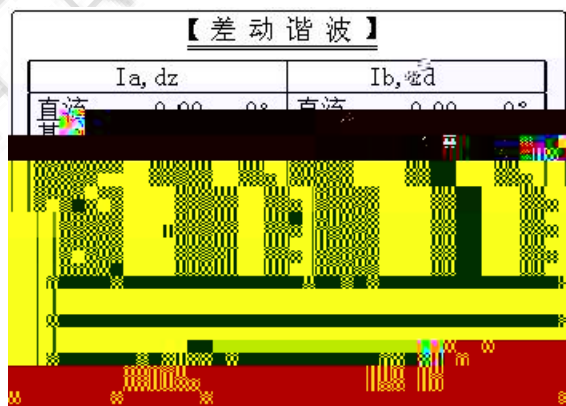
IC IN  
5A  
1 °

UA UB UC UN  
UAB 100V IC  
IC 180 °  
1 °



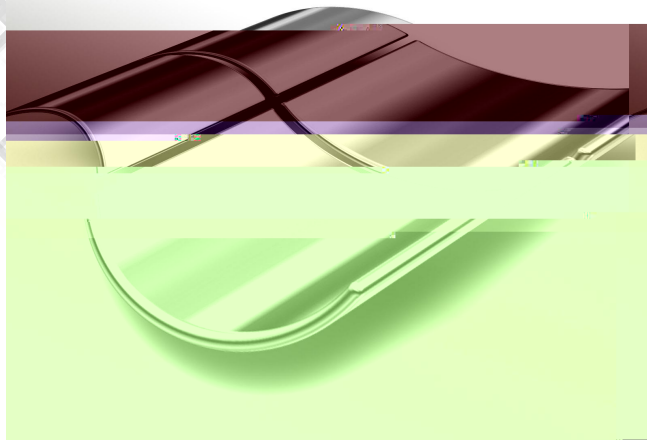












V2.0

“ ” “ ” “ ” “ ” “ ” “ ”

“ | ” “ || ”



ó ô



Ctrl+O

E:\ \Para\ \

Ctrl+S

ó ô

Ctrl+R

E:\ \

Ctrl+X

ESC

225

027-83267669





“ ” “ para ”



1 “ ”

2 “ ” “ — ”



■

“

”

4

3

3P

“

”

“

”

“

”

“

”

“

”

●

4

3



赫兹电力  
HERTZ POWER



“ ”

$\partial \nabla$

V

A

-180~360°

“ -181° ”

“ 179° ”

120V

z

Ua

120V 0° Ub

120V 180°

Uab

240V

40A

“ ”

“ ”

“ √ ”

,

“ ”

“ ”

0.001

0.1

“ ”

“ ”

“ ”



Ux



+3U<sub>o</sub>

-3U<sub>o</sub>

+√3×3U<sub>o</sub>

-√3×3U<sub>o</sub>

U<sub>x</sub>

U<sub>A</sub> U<sub>B</sub>

U<sub>C</sub>

3U<sub>o</sub>

U<sub>A</sub> U<sub>B</sub> U<sub>C</sub>



U<sub>A</sub>

U<sub>x</sub>



“ ”

U<sub>x</sub>

Φ

“ ”

ń

P



赫兹电力  
HERTZ POWER



◆ ○

“

”

20ms

5ms

◆ ○

“

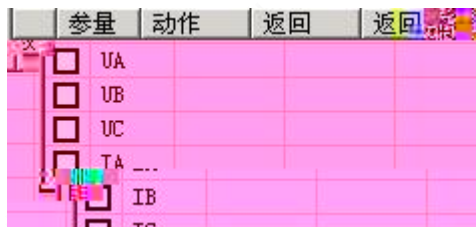
”

“

”

“

”



◆ ○

“

”

“

”



20

0A

20

“

”

”

20

57.735V

20

“ Z /  $\phi$  ” “ R / X ”

225

027-83267669



赫兹电力  
HERTZ POWER

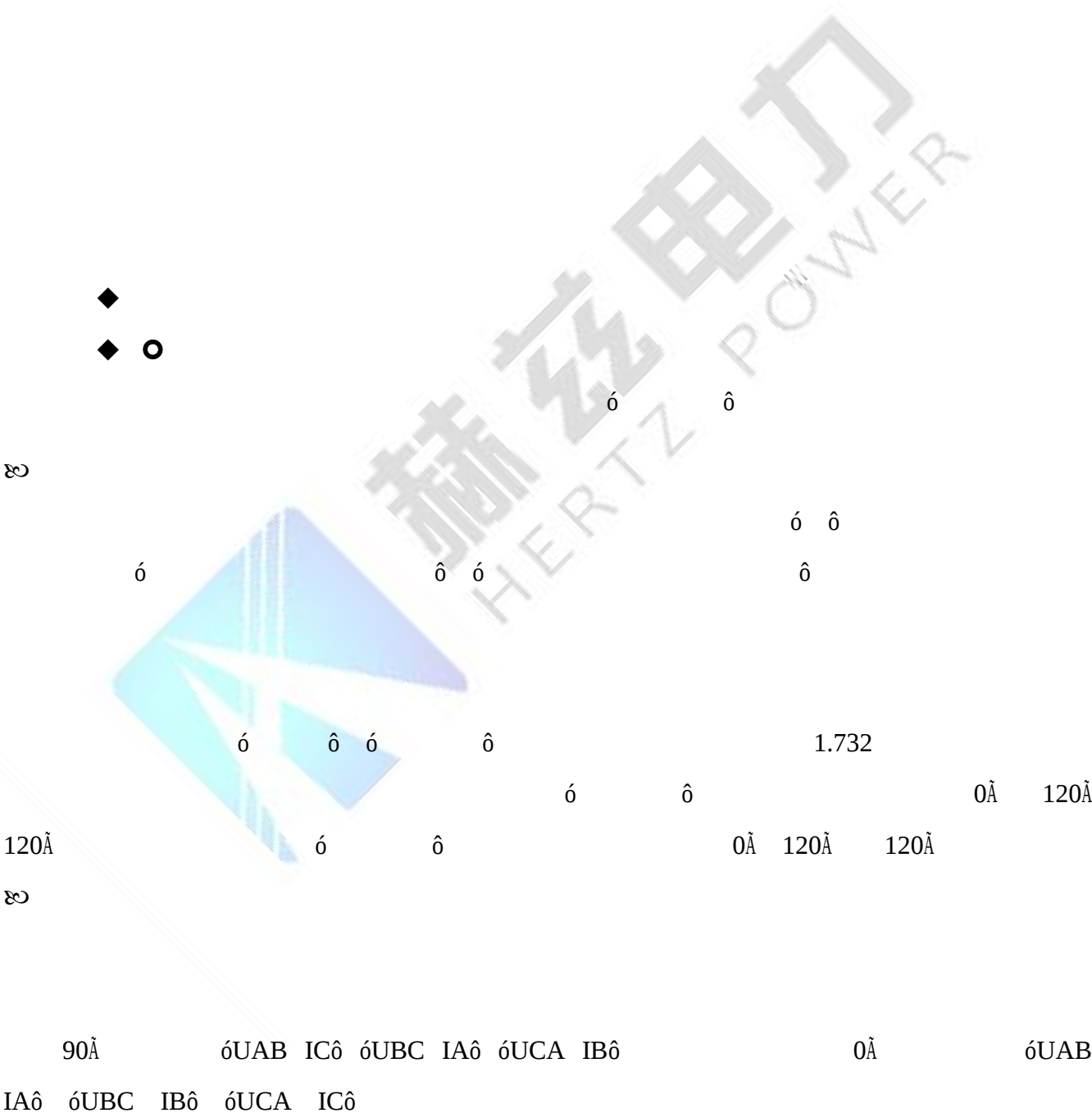
产品宗旨：技术领先，质量可靠，节能环保，应用广泛

服务宗旨：快速响应，客户至上，满意为止，长期合作



赫兹电力  
HERTZ POWER

“ U ”



60V

Ó

 $\hat{O}$  $\tilde{O\tilde{A}}$ 

UAB

60V

 $\tilde{O}\tilde{A}$ 

IC

UAB

 $\tilde{O\tilde{A}}$ 

45Å

45Å

135Å

X

◆ ○

57.735V

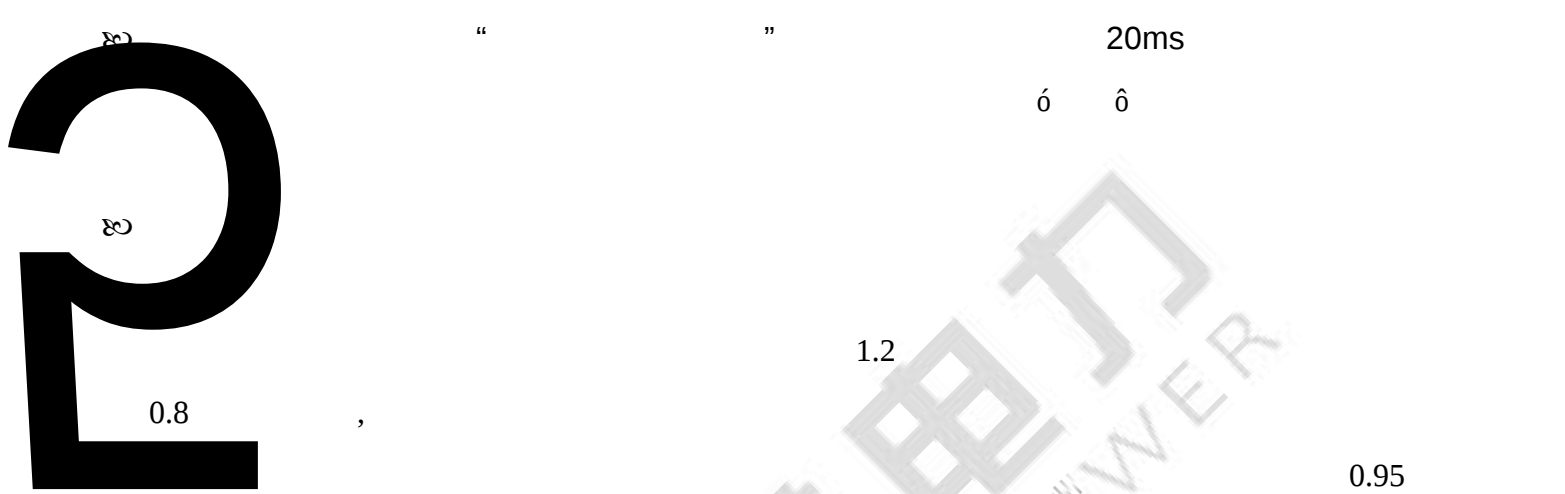
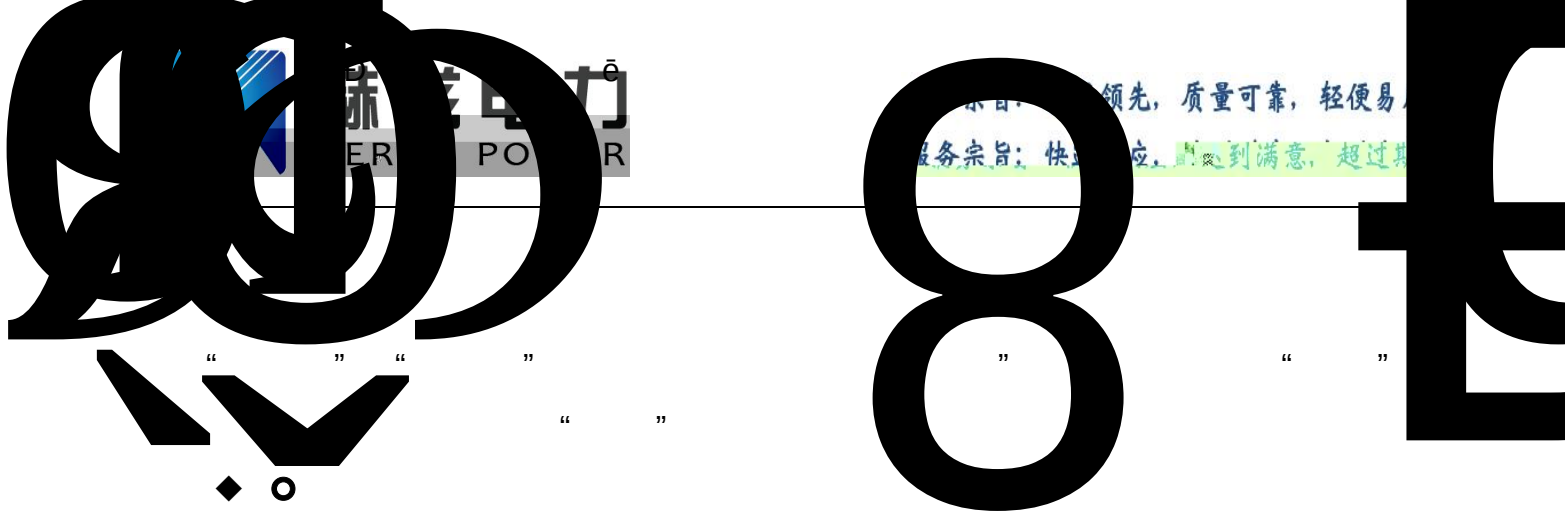
0A

óTV

 $\hat{O}$ 
$$\acute{O} \quad \hat{O}$$

$p \cdot E \cdot \hat{o} \cdot \hat{o}$

ó ô





赫兹电力  
HERTZ POWER



“ ”



110V 220V

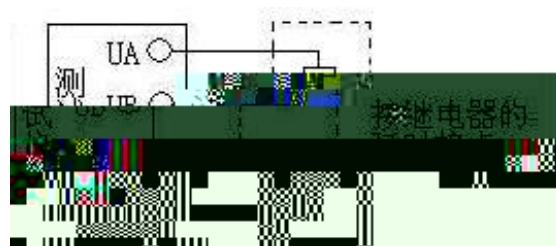
110V 220V



UA=110V UB= 110V

UA UB

225



220V

“ ”

UA UB



■

“ ” 4 3 “ - ”

9

1

●

9

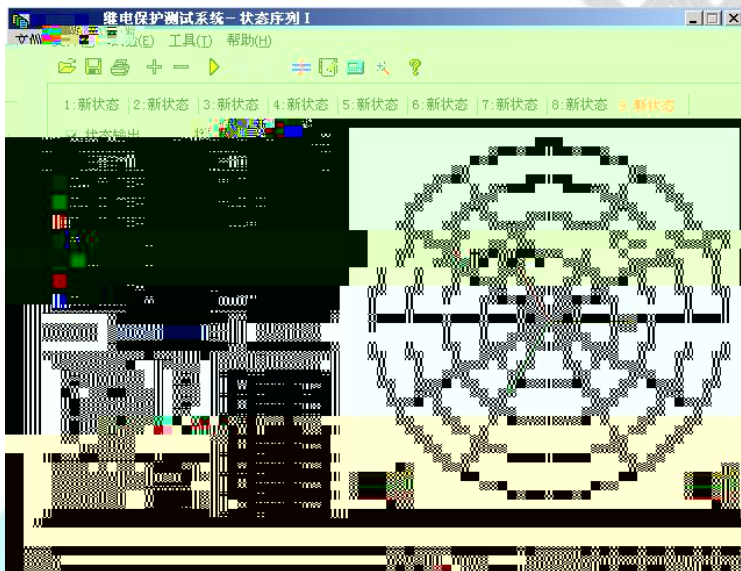
4

3

●

● Ux

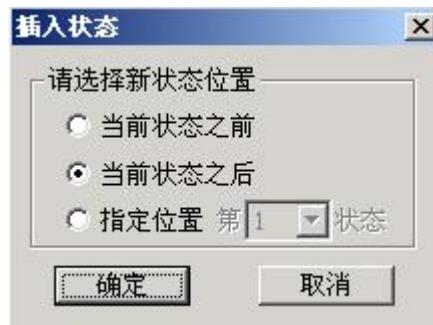
●



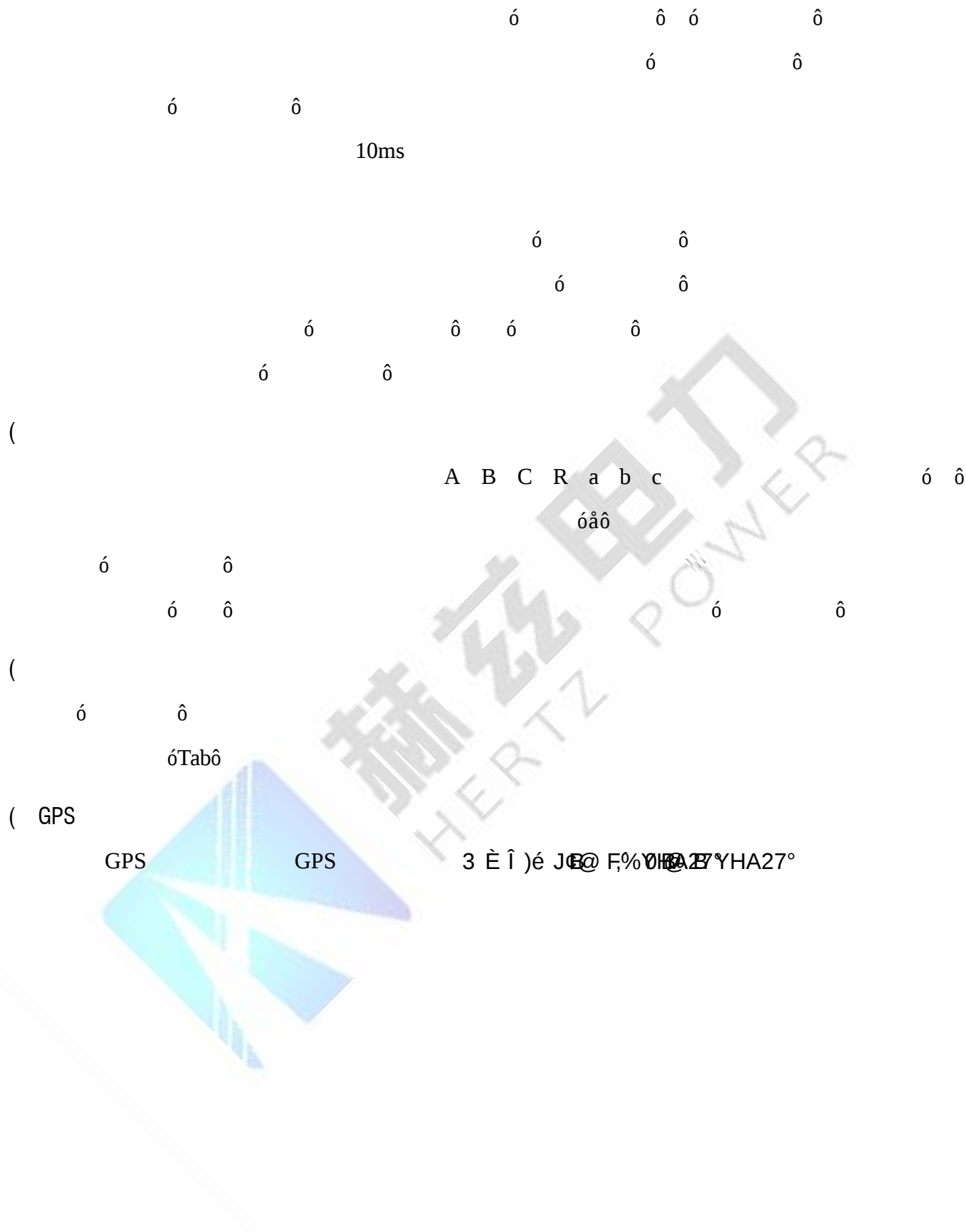
◆

◆ ○

“ ” “ ”









9

9

2



“

”

“

”



“

”

“

”

IA

“

”

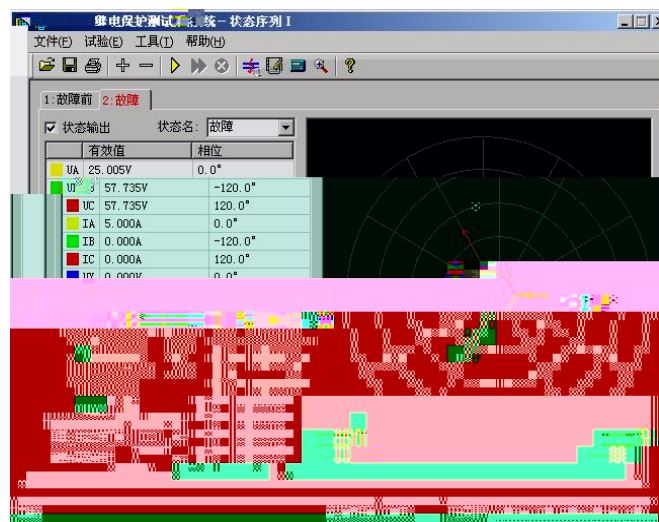
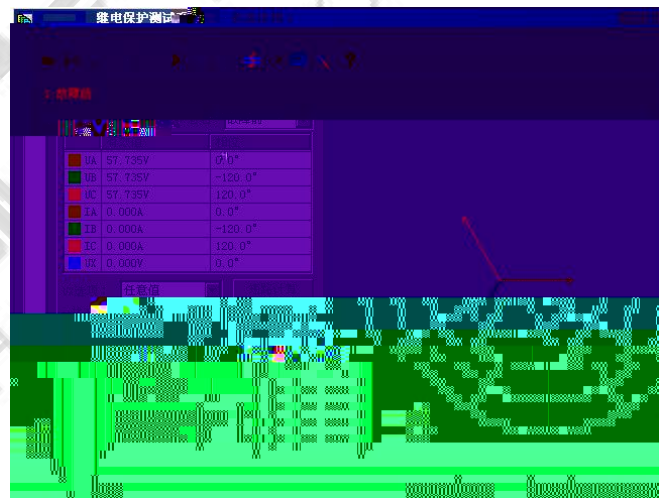
A



“

”

”



“ ”

R

0

⌚ “ ”

“ ” ”



■

“ ”

● UA UB UC IA IB IC 2 20

●

●

●

◆

◆

○

0



刷新

清零

“ ”

“ ”

2~20

A

“ 0 ° ” B

“ 120 ° ”

C

“ 120 ° ”

3

A

-160~160V

0~120V

-10~10A

0~40A

120V 40A/30A

120V

40A/30A

∞

A

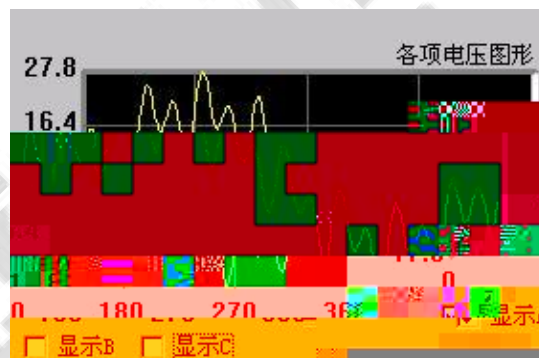
20

“ ”

“ ”

A V

“ ”



| 谐波                                     | 参数        | 开关量 |
|----------------------------------------|-----------|-----|
| <b>变量选择</b>                            |           |     |
| 变量                                     | UA        |     |
| 波形                                     | 2次谐波      |     |
| 幅值步长                                   | 1.000 V   |     |
| 相位步长                                   | 0.000 °   |     |
| <b>变化范围、时间</b>                         |           |     |
| 变化初值                                   | 0.000 V   |     |
| 变化终值                                   | 120.000 V |     |
| 变化时间                                   | 1.000 s   |     |
| <b>谐波表示方法</b>                          |           |     |
| <input checked="" type="radio"/> 以幅值表示 |           |     |
| <input type="radio"/> 以基波的百分比表示        |           |     |
| <b>变化方式</b>                            |           |     |
| <input checked="" type="radio"/> 手动变化  |           |     |
| <input type="radio"/> 自动增加             |           |     |
| <input type="radio"/> 自动减少             |           |     |

8

8

2V

10V

2

20

A B C R a b c

“√”

5ms

A

IB

a

IN

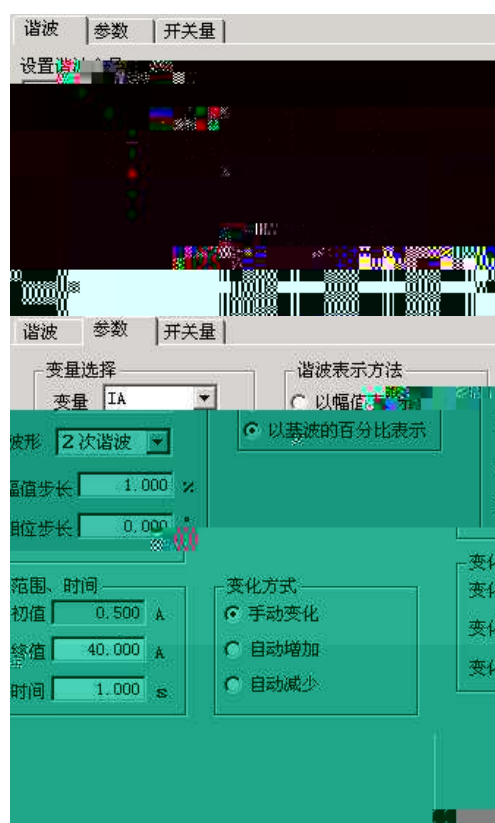
IA

IN

A

20%

225

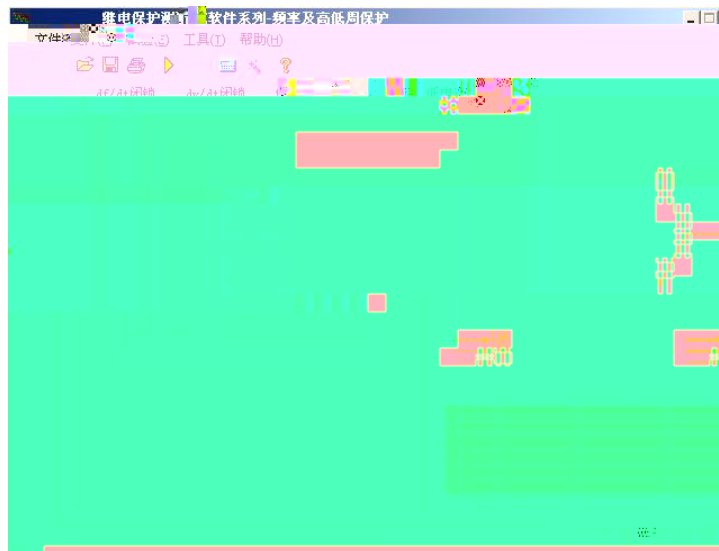




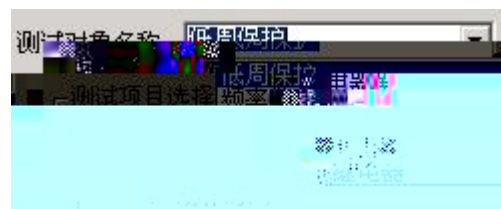


“ ”

•



“ ” “ ”  $df/dt$  ” “  $dv/dt$  ” “ ” “





8

“ ”

◆ ○  $df/dt$

8

“  $df/dt$  ”

$df/dt$

1  $df/dt$

“

$df/dt$

0 1, È X WJ. NÁÁ.

CCM

42 1

0 i., 8 X M

W

q

$d/dt$

赫兹电力  
HERTZ POWER

2

“ ”

“ ”

“

”

0.05Hz

2

df/dt

2

“ ”

2

0.2



Hz ”

“ ”

“ ”

50Hz

df/dt

“

” — “

” “

0.2

■

“ ”

“ ”

●

●

●

●

“ ”



赫兹电力  
HERTZ POWER

whhezi@163.com

Ö

◆ ○

Φ U I

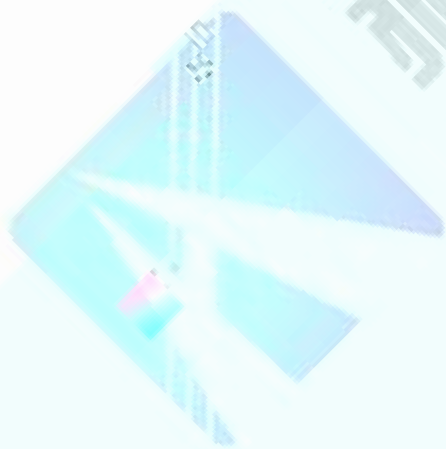
赫兹电力  
HERTZ POWER

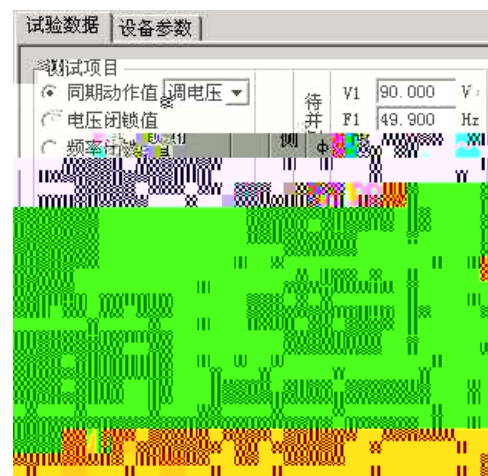
n

I



赫兹电力  
HERTZ POWER





“ ” V1 90V F1  $\Phi 1$   
49.9Hz 50Hz  
0° “ ” “ ”



“

”

“

”

“

”

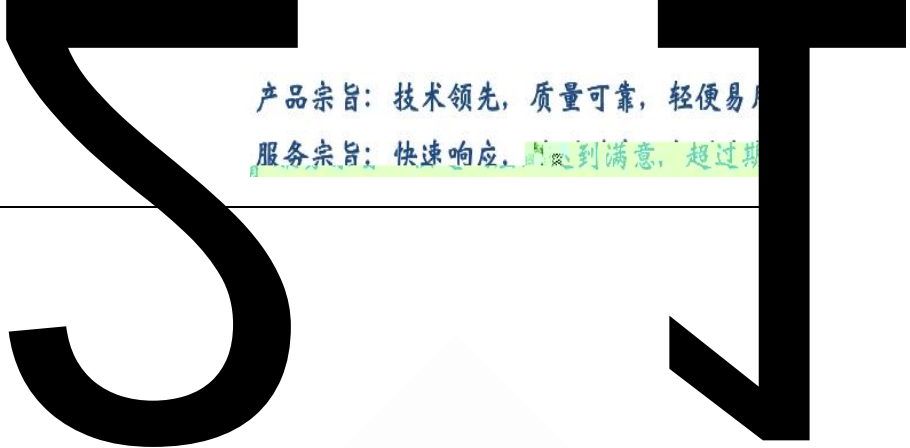


**赫兹电力**  
HERTZ POWER



2

2



8

$$\phi = t / T_w \cdot 360^\circ$$

$$T_w = 1 / |f_1 - f_2|$$

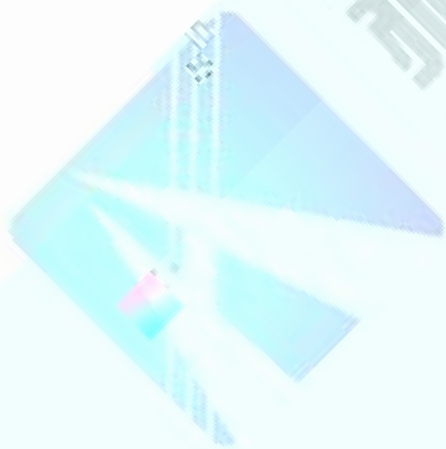
$\phi$

$t$

$f_1$

$f_2$

赫兹电力  
HERTZ POWER



赫兹电力  
HERTZ POWER

20

Y/

20

20

20

5ms



X

U1

UA

U2

UC

UN

UN

X

“ ” “ ” “ ” “ ” “ ”

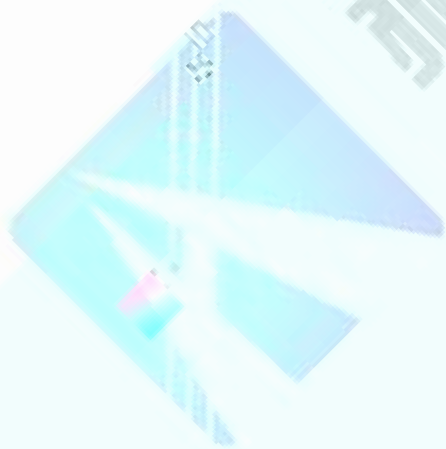
A a B

b

R



**赫兹电力**  
HERTZ POWER



赫兹电力  
HERTZ POWER

SG

$$K_o = (Z_0 / Z_1 \cdot n - 1) / 3$$

$\ddot{u}(Z_1)$  $\ddot{u}(Z_0)$  $K_o$  $K_{or}$  $K_{ox}$

$$K_{or} = (R_0 / R_1 \cdot n - 1) / 3$$
$$K_{ox} = (X_0 / X_1 \cdot n - 1) / 3$$

$(901)$  $K_o$  $\ddot{u}$

$\ddot{u}(Z_1)$  $\ddot{u}(Z_0)$  $PS_1=PS_0$  $K_o$

$K_{or}$  $K_{ox}$  $K_o$

•

•

$\acute{o}$  $\hat{o}$  $\acute{o}$  $\hat{o}$

$\acute{o}$  $\hat{o}$  $\acute{o}$  $\hat{o}$

$\acute{o}$  $\hat{o}$

$\acute{o}$  $\hat{o}$  $\acute{o}$  $\hat{o}$  $\acute{o}$

$\hat{o}$  $\acute{o}$  $\hat{o}$  $\hat{o}$  $\hat{o}$

$\acute{o}$  $\hat{o}$

•



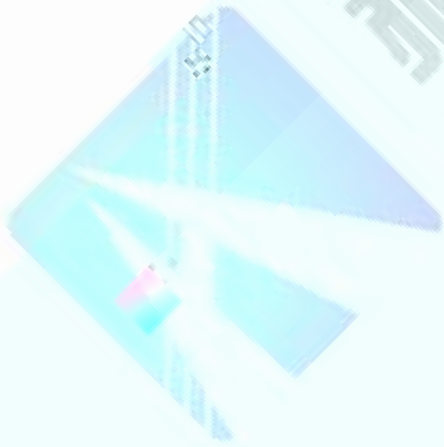
赫兹电力  
HERTZ POWER

赫兹电力  
HERTZ POWER

赫兹电力  
HERTZ POWER



赫兹电力  
HERTZ POWER



赫兹电力  
HERTZ POWER



“

” “

”

“

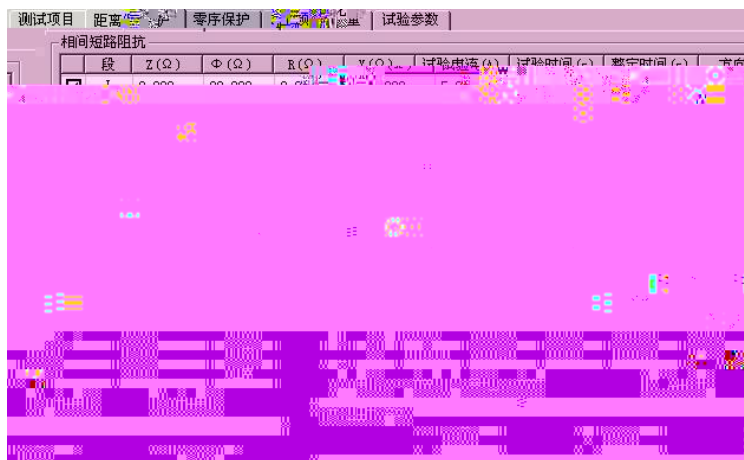
”

2

**赫兹电力**  
HERTZ POWER



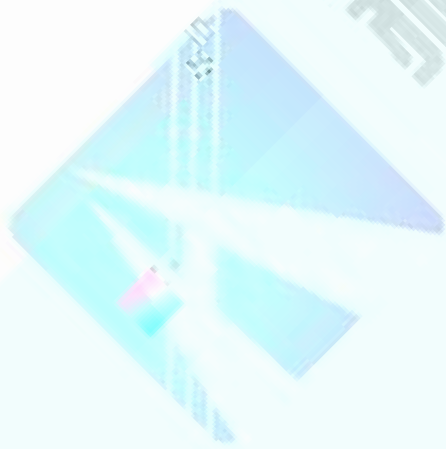
“ ”

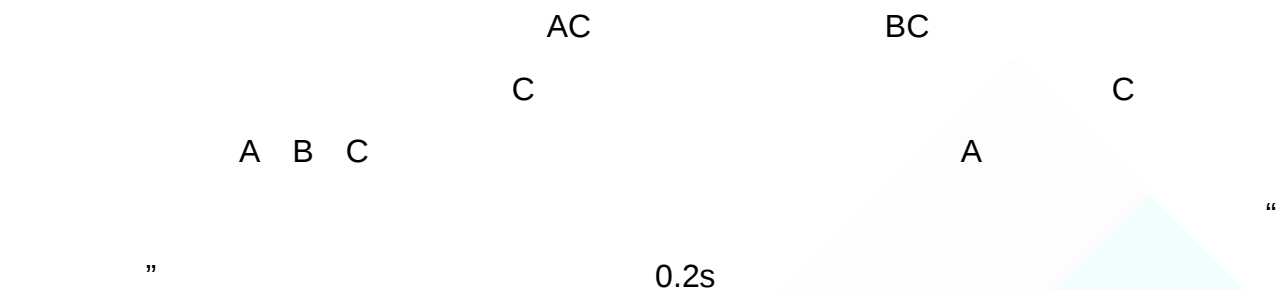


赫兹电力  
HERTZ POWER



**赫兹电力**  
HERTZ POWER





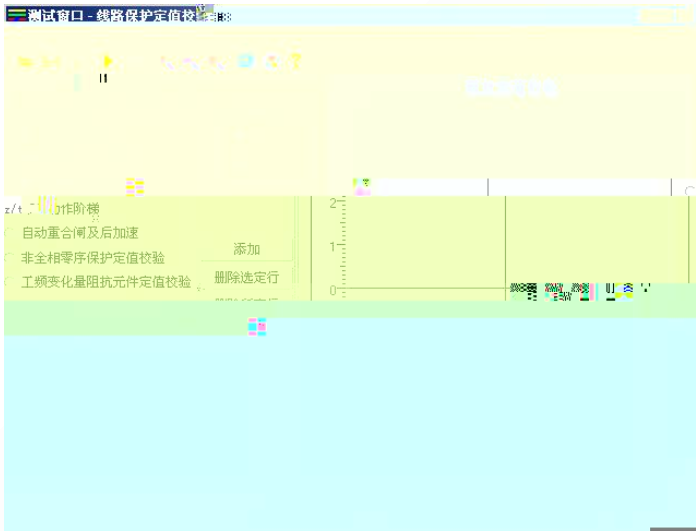
1.

X R 0 XX1 XX4 XD1 XD4

■

z/t

- ●



- ◆

◆ ○

“ ”

“ ”

“ R-X ” “ Z-T ”

- ◆

○

“ ” >

KL ” “ Kx ” “ Z0/Z1 ”

∞

“

”

“

” “

”

“ C ” “ GPS ”

62.70% 19.57% 0A ó ô

ó ô

5 Q+e> P P5 Q P Ý>

ó c ô

ô

∞ BT—CT

PT

PT

“

”

TM

≠ mo

A dPT

“

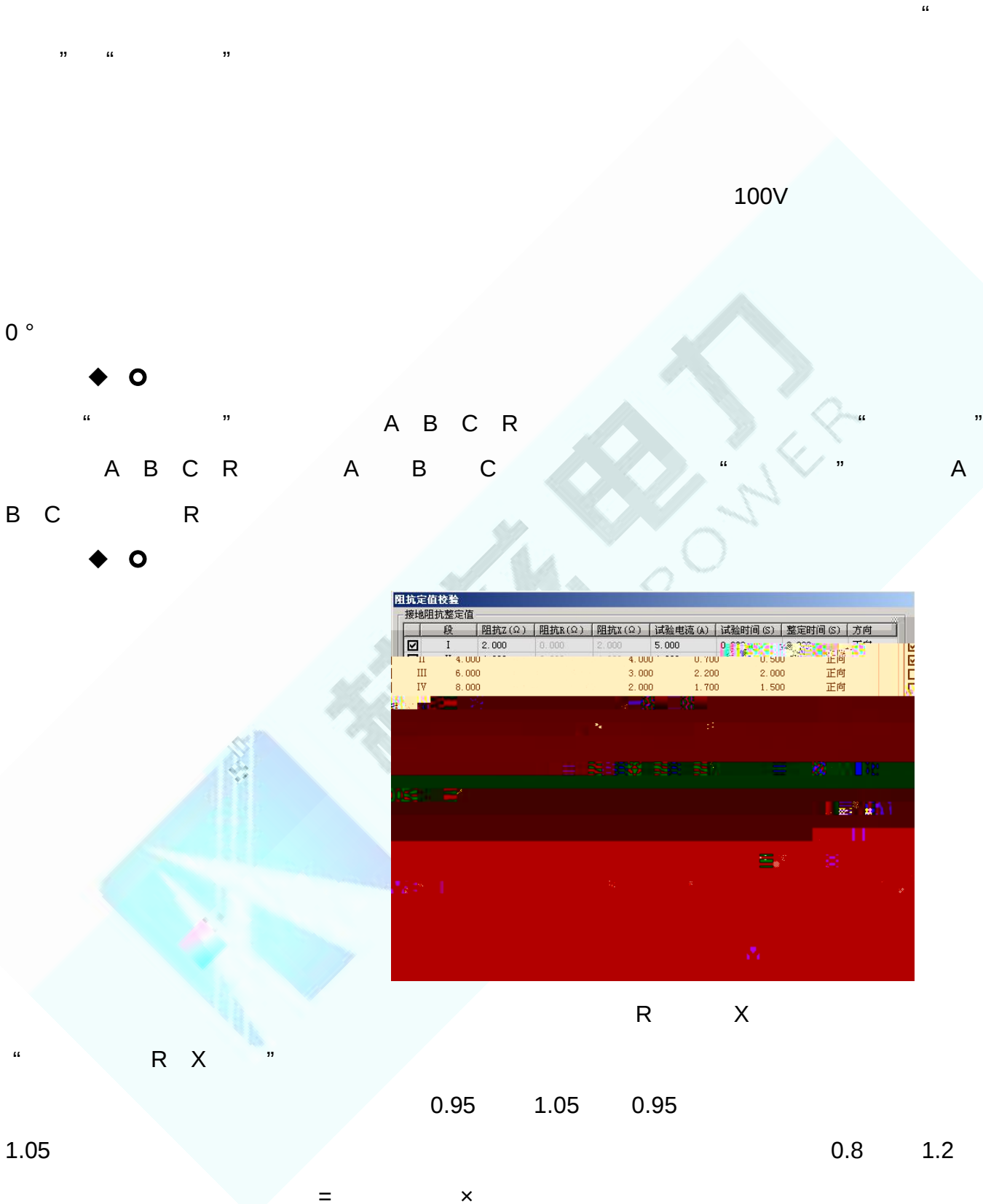
ó

ô

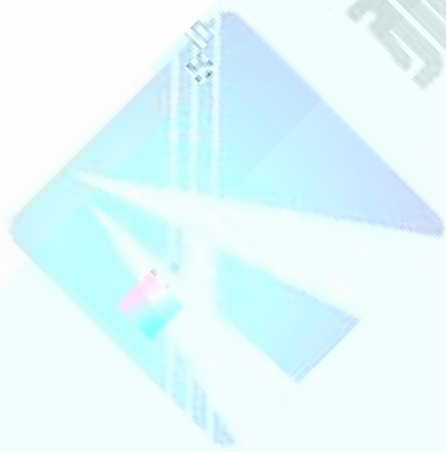
óGPS

ô

ó



赫兹电力  
HERTZ POWER





赫兹电力  
HERTZ POWER

产品种类多，技术领先，质量可靠，轻便易用  
服务宗旨：快速响应，客户满意，超过期望

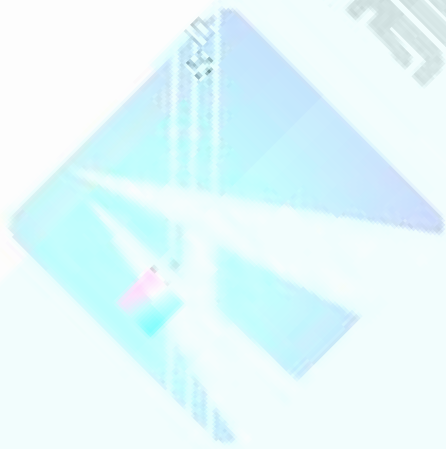
“

”

“

”

赫兹电力  
HERTZ POWER



0.951.05

”

“

”

“

”



M

0.91.1

M=0.9

M=1.1

M=1.2

“

”

1020A

“

”

“

”

“

”



“

”



“

”

“

”

“

”



“

”

“

||

”



0.2s

0.2s

0.2s

3 s

赫兹电力  
HERTZ POWER

■

”

●

●

◆

◆

○

X

X

”

X

“

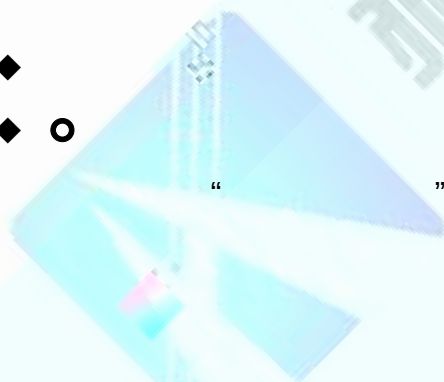
”

225

027-83267669

Φ ”

赫兹电力  
HERTZ POWER



“

”

“ Z

”

“

Z V

”

“

”

“

”

“

”

“

“

”

“

”

“

”

赫兹电力  
HERTZ POWER

80%

X

X



“ ”

“ ”

“ R-X ”

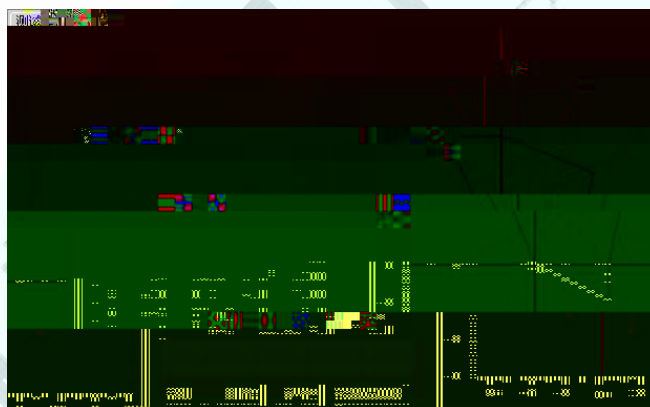
“ Z-φ ”

1

R1 X1

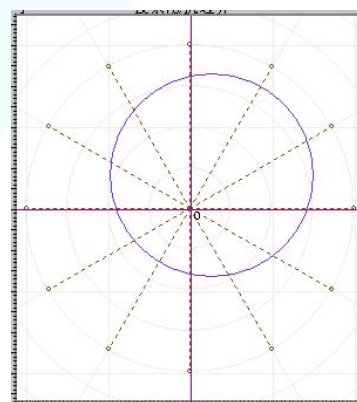
0 0

“ ”



R X

“ ”



“ ”

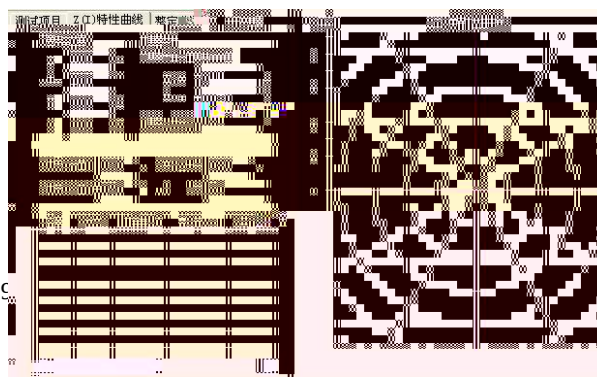


“ ”

“ Z I ”

”

225



“ Z I ”

“ ”

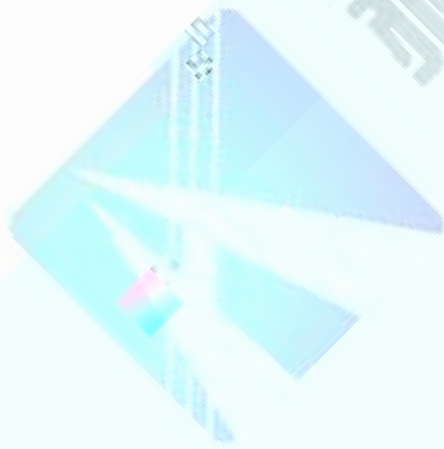
“ ”

0

“ Z V ”

” “ Z I ”

**赫兹电力**  
HERTZ POWER



“

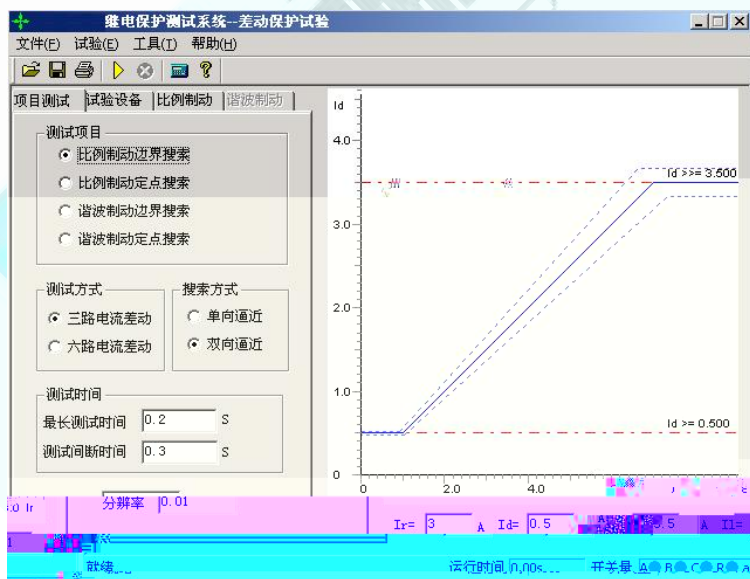
”

TA

”

2 7

3





“

” “

” “

” “

”

“

”

“

”

“

”

“

”



“

”

3



“

”

“

”

**赫兹电力**  
HERTZ POWER

“

”

“

”

“

”





◆ ○

∞

Y Y0

-11 -1 Y

Y0

“ ” “ ”

∞

CT

2

∞

1

Y/Y

TA

Y/Y

2

Y/

TA

Y/Y

RCS-978

TA

∞

1

“ ”

IA

IB

$I_r = I_l \quad I_d = I_h$

$I_d \quad I_r$

2

“ ”

$I_d = I_h + I_l$

$I_r$

Φ



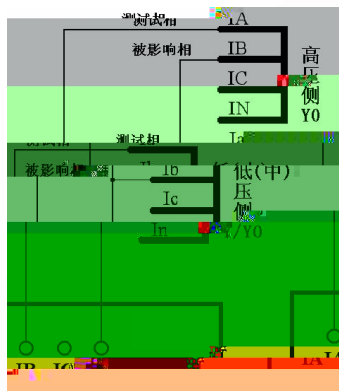
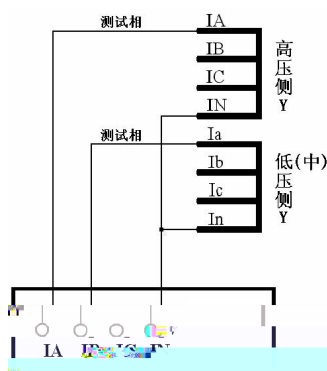
8

赫兹电力  
HERTZ POWER

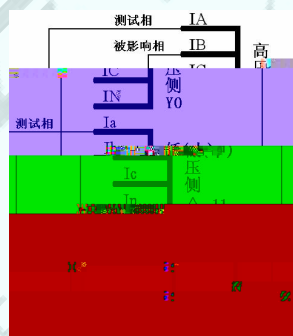
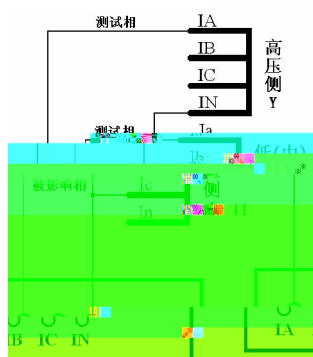
赫兹电力  
HERTZ POWER



## 1 Y Y0 / Y Y0



## 2 Y Y0 / -11



$$Y \quad , \quad , \quad ,$$

$$IA_0 = IA - IB \quad IB_0 = IB - IC \quad IC_0 = IC - IA$$

$$Ia_0 = Ia - Ib \quad Ib_0 = Ib - Ic \quad Ic_0 = Ic - Ia$$

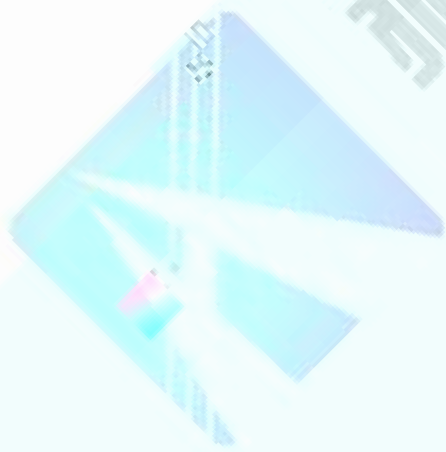
$$Y0 \quad , Y$$



赫兹电力  
HERTZ POWER

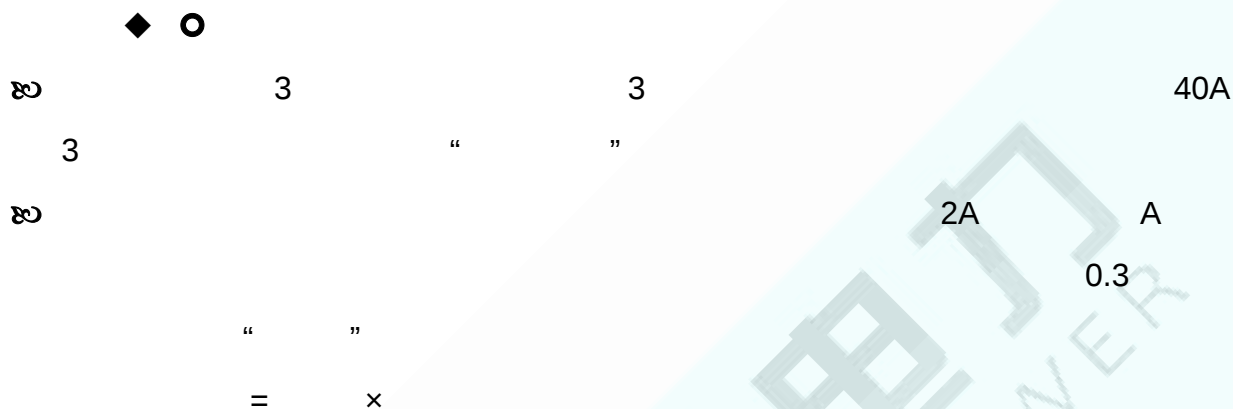
产品特点：技术领先，质量可靠，轻便易用  
服务宗旨：快速反应，客户满意，超过期望

赫兹电力  
HERTZ POWER



2

3



$$I_{e1} = S_n / 1.732 \cdot U_{1n} \cdot CT_1$$

$$I_{e2} = S_n / 1.732 \cdot U_{2n} \cdot CT_2$$

$$\begin{aligned} I_{e1} \quad I_{e2} \quad \text{ò} \quad \text{ò} \quad I \quad II \\ S_n \quad \text{ò} \quad \text{ò} \\ U_{1n} \quad U_{2n} \quad \text{ò} \quad \text{ò} \quad I \quad II \\ CT_1 \quad CT_2 \quad \text{ò} \quad \text{ò} \quad I \quad II \quad CT \end{aligned}$$

$$\begin{aligned} I_{e1} \quad I_{e2} \quad 1.732 \\ I_{e1} \quad I_{e2} \quad 1.732 \\ I_{e1} = S_n / 1.732 \cdot U_{1n} \cdot CT_1 \\ 1.732 \end{aligned}$$

$$Y/Y/ -11 \quad K1 \quad K2 \quad K3$$

$$K1 = 1 / 1.732 = 0.577$$

$$K2 = U_{2n} \cdot CT_2 / 1.732 \cdot U_{1n} \cdot CT_1$$

$$K2 = U_{3n} \cdot CT_3 / U_{1n} \cdot CT_1$$

1

$$K1=1$$

$$K2=U_{2n} \quad CT2/ \quad U_{1n} \quad CT1$$

$$K2=1.732 \quad U_{3n} \quad CT3/ \quad U_{1n} \quad CT1$$

$$K1=1$$

$$K2=I_{e1}/I_{e2}$$

$$K2= I_{e1}/I_{e3}$$

|     |     |     |   |   |   |    |     |    |
|-----|-----|-----|---|---|---|----|-----|----|
| K1  | K2  | K3  | ò | ò | I | II | III |    |
| Ie1 | Ie2 | Ie3 | ò | ò | I | II | III |    |
| U1n | U2n | U3n | ò | ò | I | II | III |    |
| CT1 | CT2 | CT3 | ò | ò | I | II | III | CT |

RCS-978

$$K_{ph}=K_b \cdot I_{2n-min}/ I_{2n}$$

$$K_b=\min \quad I_{2n-max}/I_{2n-min} \quad 4$$

I<sub>2n</sub>

I<sub>2n-min</sub>

I<sub>2n-max</sub>



CST-141B -200B

$$Y/ \quad -11 \quad I_d=|I_1+I_2| \quad I_r=|I_1-I_2|/2$$

$$K1=1 \quad K2=K_{pl}$$

$$Y/Y/ \quad -11 \quad I_d=|I_1+I_2+I_3| \quad I_r=\text{Max}\{|I_1| \quad |I_2| \quad |I_3|\}$$

$$K1=1 \quad K2=K_{pm} \quad K3=K_{pl}$$

I<sub>1</sub> I<sub>2</sub> I<sub>3</sub> ò ò

K<sub>pm</sub> K<sub>pl</sub> ò ò



PST-641

Y/ -11

225

027-83267669

$$I_d = |I_1 + I_2| \quad I_r = |I_1 - I_2|/2$$

$$K_1 = 1.732 \quad K_2 = I_{e1}/I_{e2}$$

$$I_{e1} \quad I_{e2} \rightarrow 0$$

$$\text{PST-621/622} \quad Y/Y/ \quad -11-12$$

$$I_d = |I_1 + I_2 + I_3| \quad I_r = \text{Max}\{|I_1| \quad |I_2| \quad |I_3|\}$$

$$K_1 = 1.732 \quad K_2 = 1.732 \quad U_{2n} \quad CT_2/ \quad U_{1n} \quad CT_1$$

$$K_3 = U_{3n} \quad CT_3/ \quad U_{1n} \quad CT_1$$

$$I_d = |I_1 + I_2 + I_3| \quad I_r = \text{Max}\{|I_1| \quad |I_2| \quad |I_3|\}$$

$$K_1 = 1 \quad K_2 = U_{2n} \quad CT_2/ \quad U_{1n} \quad CT_1$$

$$K_3 = U_{3n} \quad CT_3/ \quad U_{1n} \quad CT_1$$

$$I_d = |I_1 + I_2 + I_3| \quad I_r = ||I_d| - |I_1| - |I_2| - |I_3||$$

$$K_1 = 1.732 \quad K_2 = 1.732 \quad d_{35} \quad K_3 = d_{36}$$

$$\text{RCS-9671} \quad Y/ \quad -11$$

$$I_d = |I_1 + I_2| \quad I_r = |I_1 \rightarrow I_2|/2$$

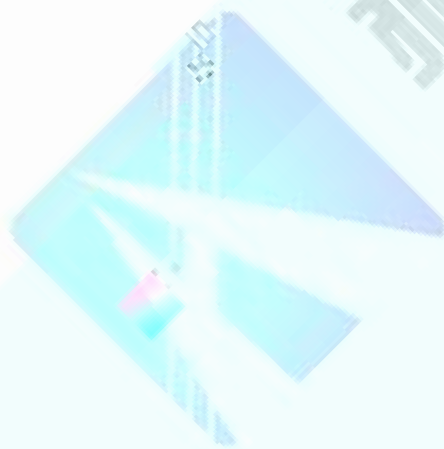
$$K_1 = 1 \quad K_2 = U_{2n} \quad CT_2/ \quad U_{1n} \quad CT_1$$

$$\text{RCS-978} \quad 985 \quad Y/ \quad -11$$



产品宗旨：技术领先，质量可靠，轻便易用  
服务宗旨：快速响应，送到满意，超过期

赫兹电力  
HERTZ POWER



■

”

9

●

“

”

9

●

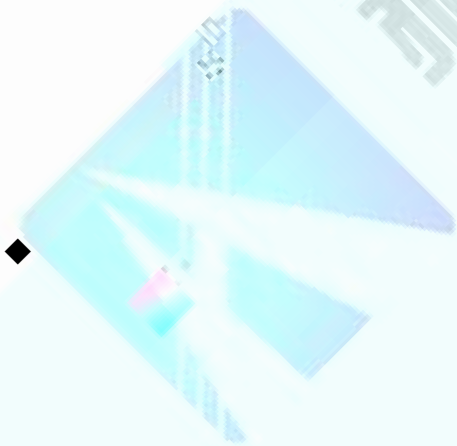
●

●

●

●

赫兹电力  
HERTZ POWER



○

◆

0

IA IB

○

IA IB

IA IB

“ ”

“ ”

“ ”

“ ”

“ ”

○

“ ” “ ”

“ ”

“ ”

”20ms

“ ”

○

“ ”

“ ”

”20ms

7

“ ”

|                                         |                              |
|-----------------------------------------|------------------------------|
| <input checked="" type="checkbox"/> 接点A | <input type="checkbox"/> 接点a |
| <input type="checkbox"/> 接点B            | <input type="checkbox"/> 接点b |
| <input type="checkbox"/> 接点C            | <input type="checkbox"/> 接点c |
| <input type="checkbox"/> 接点B            |                              |

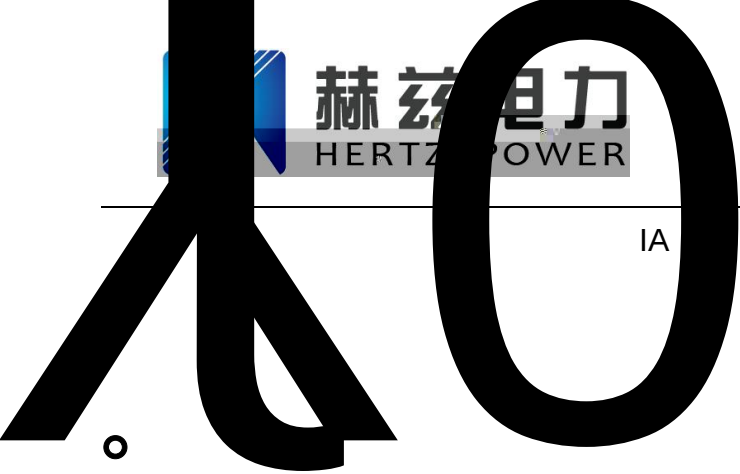
◆

○

∞

IA

IB



IA

IB

Y Y0 Y

1

1

2 =

Y Y0

1

2

2

Kh Kl

Id0

Kxb

赫兹电力  
HERTZ POWER

■ 6-35KV

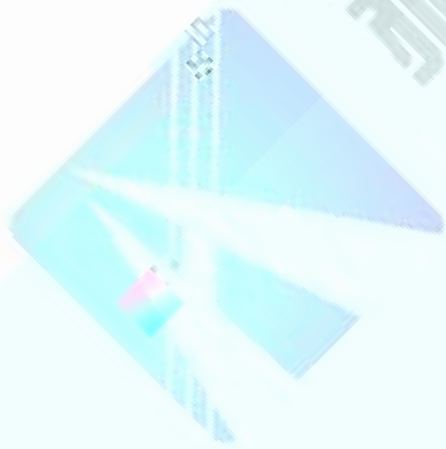
6 35KV

“

”

●

赫兹电力  
HERTZ POWER



赫兹电力  
HERTZ POWER

“ ”

IA

IA



“ ”

15 25

“ ”

8

“ ”

“ ”

“ ”

0.2s

8

15 25s



1

2

3

4



“ ”

2

A B

C

UAB UBC

UCA

UAB

“ ” “ ”

“ ”



∞

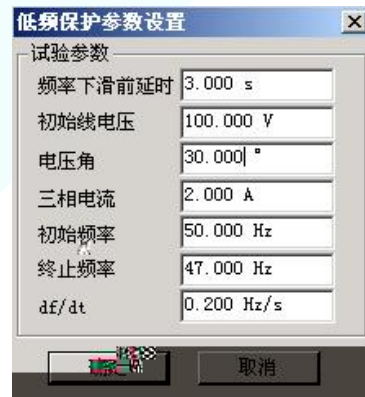
”

∞

“ ” “ ” “ ” “ ”

100V

“ ” “ ”



80

50Hz

0.5Hz

45Hz

80

df/dt

“ 0.1Hz ”

“ 0.01Hz /

0.2s ”

df/dt

df/dt

5s

47Hz

—45 °

45 °

45 °



80

“ ”

0

0

“ ”

“ ”

“

”

“

”

“

”

“

”

80

90 °

A

IA

0

UB UC

0

IA

“ ”

UBC

“ 90 ° ”

80

1 °

“ ”

■ 1

“ ”

RS232

COM1

COM1

COM1

USB

RS232

“ USB → ”

Windows 2000

USB

“ USB → ”

~

赫兹电力  
HERTZ POWER



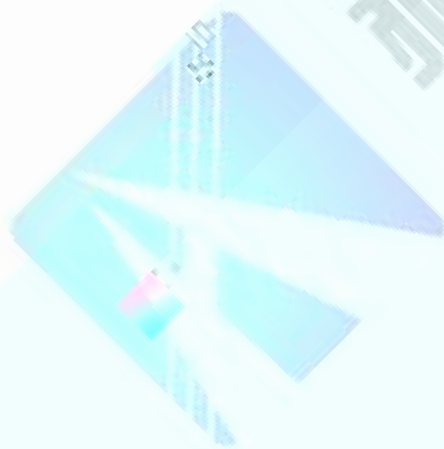
赫兹电力  
HERTZ POWER

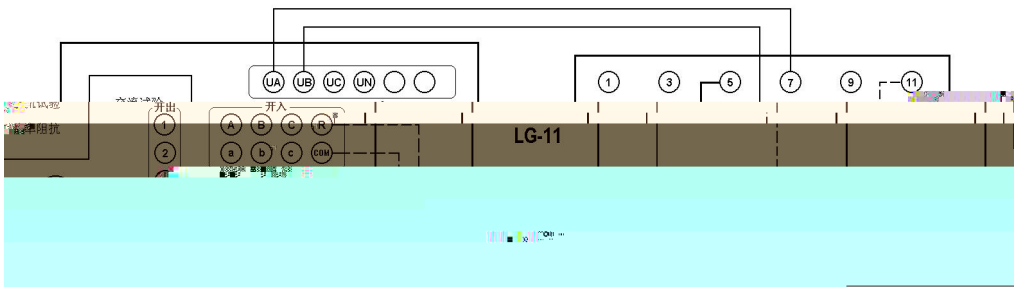
产品宗旨：技术领先，质量可靠，轻便易用

服务宗旨：快速响应，送到满意，超过期



赫兹电力  
HERTZ POWER





Uab
 

la

3

Uab

20

la

4

la 0.5

Uab 100V

◆ 5

1

la 5A( 1A) Uab 0.7

φ 1 φ 2

φ LM ½ φ 1 φ

2

φ LM

UDZ

ZSET UDZ

ZSET

2

φ LM

lab

Uab

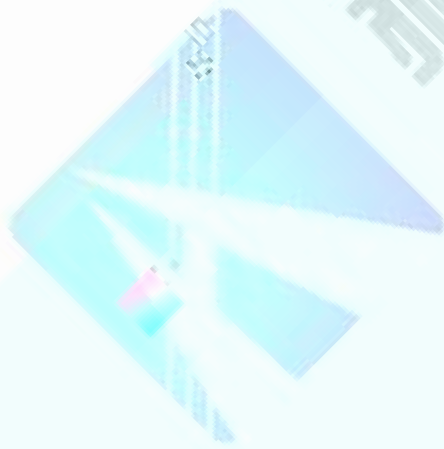
Z=f(I)

3

Uab

◆ 6 , m " q

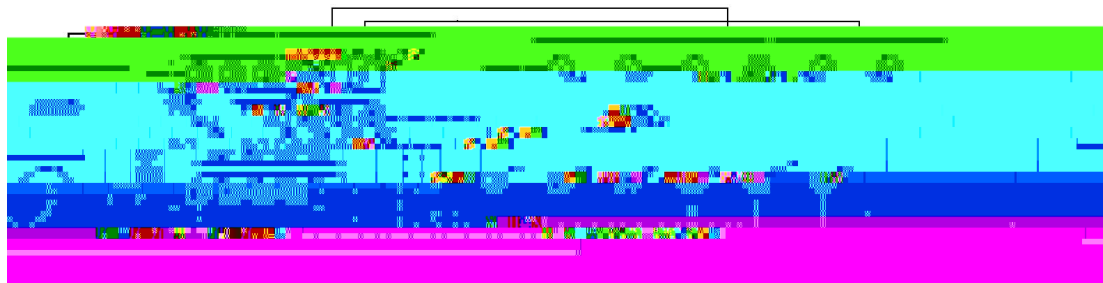
赫兹电力  
HERTZ POWER



◆ 8

1 PC

la



Uab 220V Ua 110V Ub 110V Uc 110V

“ ” “ ” 220V

15 25

Uc 110V

Uc 110

7

2

IA

UAB 220V UA

110V UB 110V

“ ” “ ”

220V 15 25

“ ▲ ”

“ ▼ ”

2 UB 2 7 -110V



9

1

102

lzd

lzd

IDZ

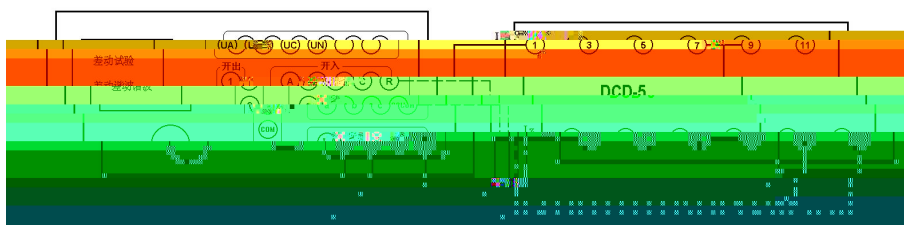
2

lzd

lzd

ldz

IDZ



IDZ



“

”

“

”



赫兹电力  
HERTZ POWER