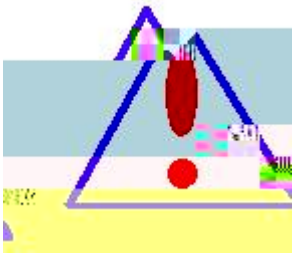


شخ

شخ

قمم

شخ

_____

_____

_____

شخ

_____

1. 1

1.

DC3000V

ڤمم

2.

2.1

15.6" LCD	1366×768
120GB	4GB
1 10/100Mbps 802.3u	2 USB
16	
16	
24	
10K/s,20K/s,50K/s,100K/s	
3000VDC	
220V 50Hz,	-15% +15%
220V	-15% +15%
mm 407 ( ) ×150( ) ×370( )	
10kg( )	
-5 +45	5 95%
-5 +45	95rh%

قمم		
	RMS شخ	
	شخ	
4 20mA	شخ	
	AC150V AC1000V	
		AC10A
		AC1A AC200A
	DC ± 100mV DC ± 2000V	
		DC ± 200mA
		DC ± 100A
	1:1 1:60	

شج " A " " B "

2.4

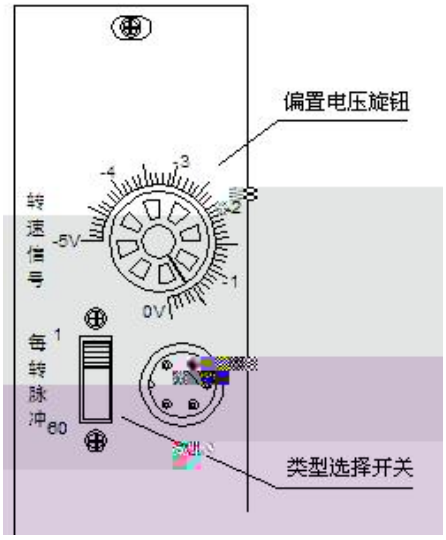
16 2.4

2.4

8	8		DC24 220V
8	4	4	DC24 220V AC220V/5A
16			/

2.5

2.5.0



2.5.0

3 DC-5 0V

1:1

± 300V “ ” Vpp 1 5V

-3 -2V

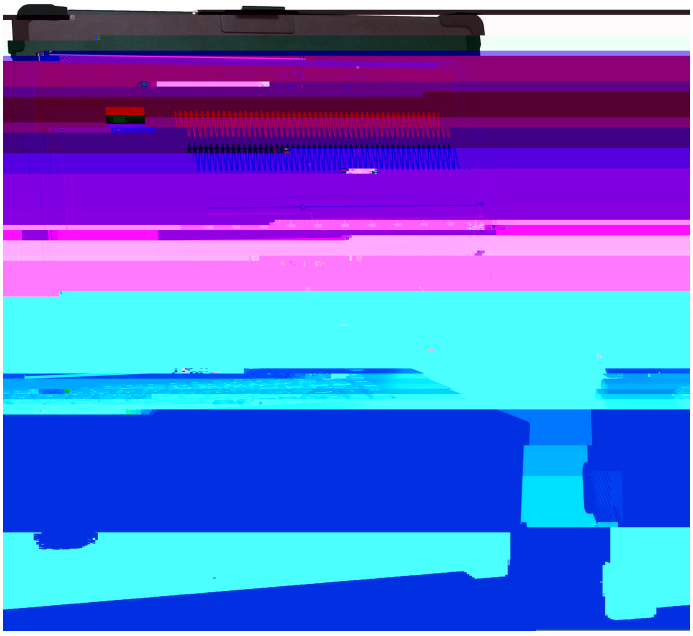
1 60

60 60

0

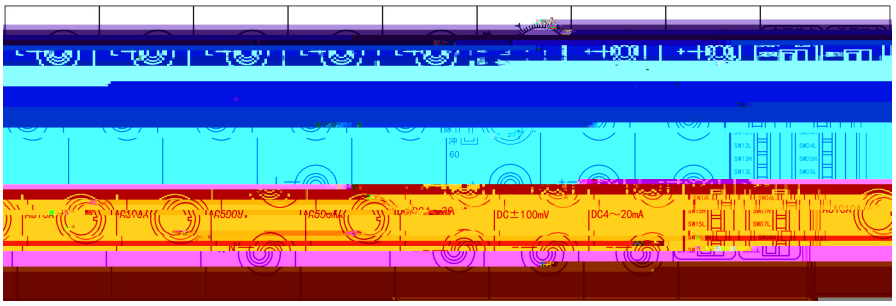
1 1 “ 6.1 -

”



3.2.0

3.2.1



3.2.1

4.

4.1

8 1

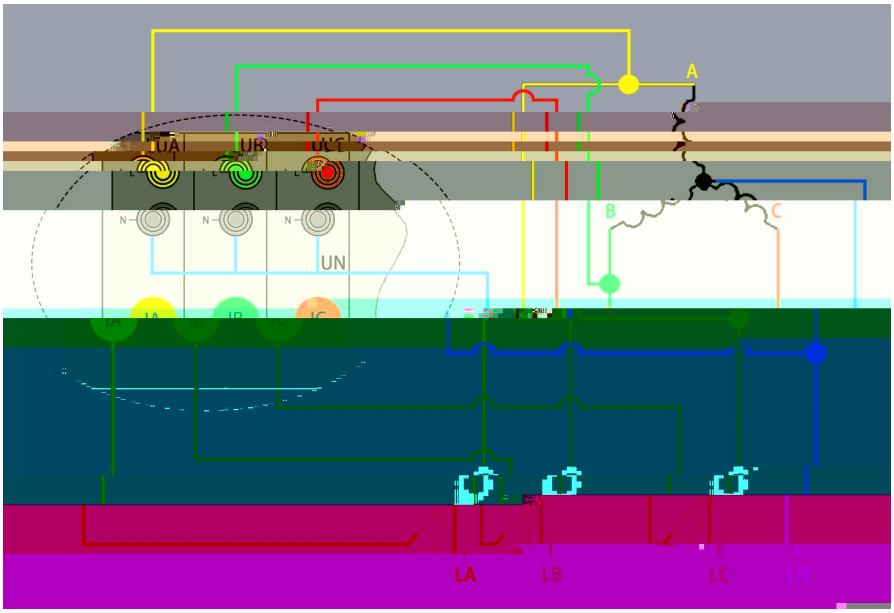
(AC10A) < 0.1Ω

(AC150V) > 80kΩ

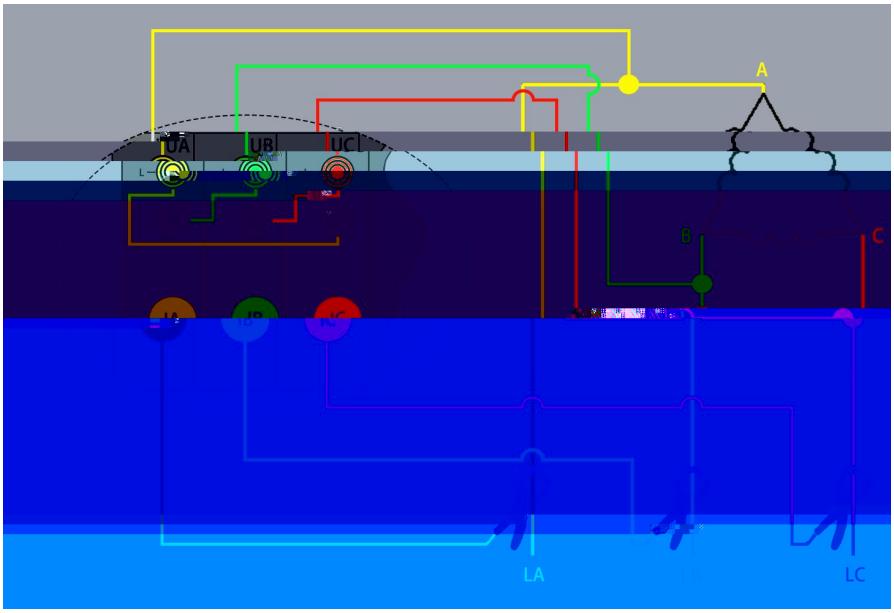
> 1MΩ ±2000V > 400kΩ ±500V

4.2

4.2.1



4.2.0



4.2.1

4.2.2

DC ± 100mV 0 75mV

شخ

2

5.

5.1

5.1

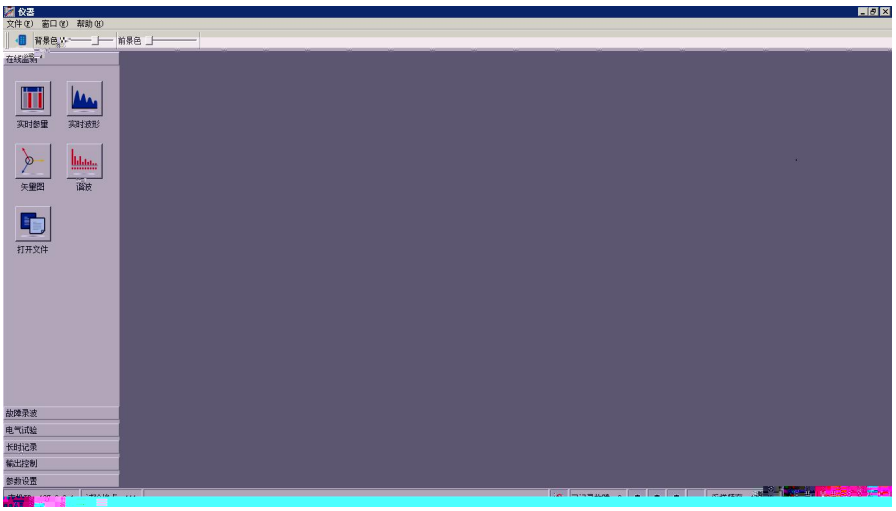
5.1

		20ms
		20ms
		Y X
		- -
		10 100kHz

5.2

“ MR400L ” “ -

-PDM-04 ” 5.2.0

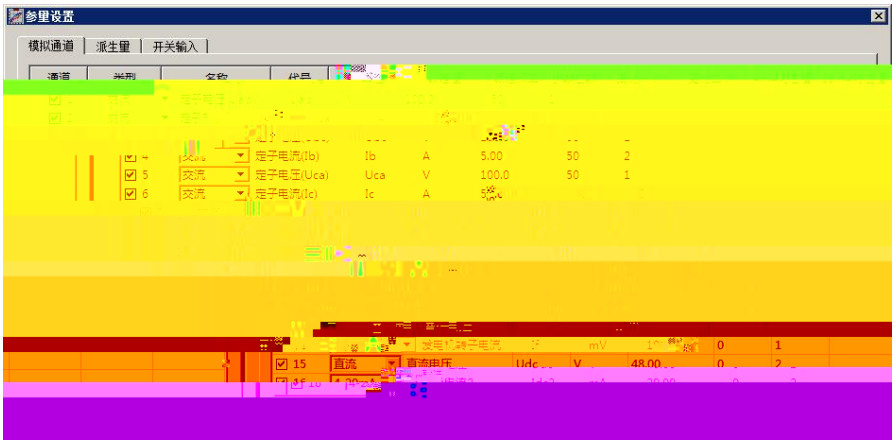


5.2.0

/

شج

א p €



6.1.0

6.1.0

“ √ ” “ □ ”

4 20mA

RMS PT CT

/ / 15kV/100V 12kA/5A

20ms /

/ 1500A/75mV

4 20mA 20ms 4mA

20mA 4mA 20mA 4 20mA

45 55Hz 4mA /20mA 45 55

18

7

5

0

0 3 4

PT CT

PT CT

4mA 4 20mA 4mA

20mA 4 20mA 20mA

“ ” “ ”

28 107.1rpm

28 “ ” 1 “ ” 28

1:1 107.1

×28 = 3000 28 3000 / 28 = 107.1rpm

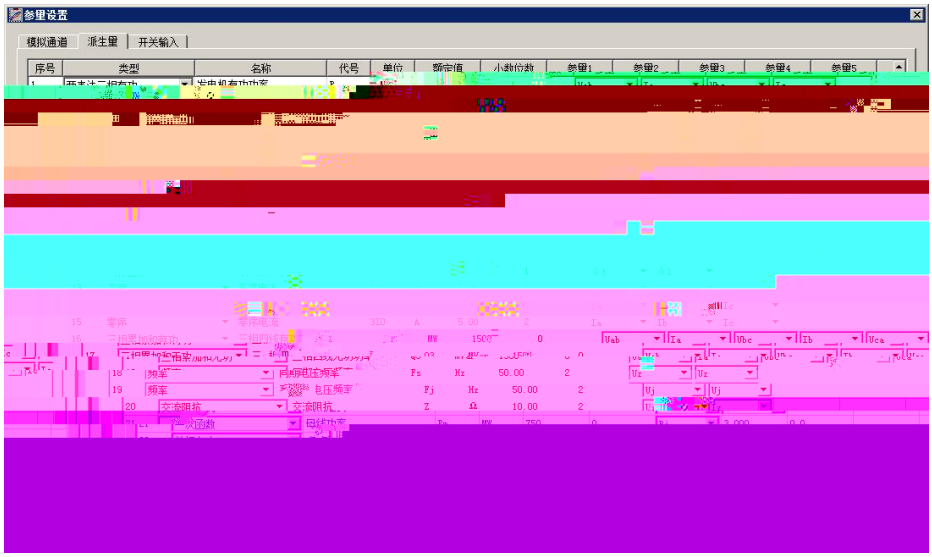
3000rpm “ ” “ ”

10kHz

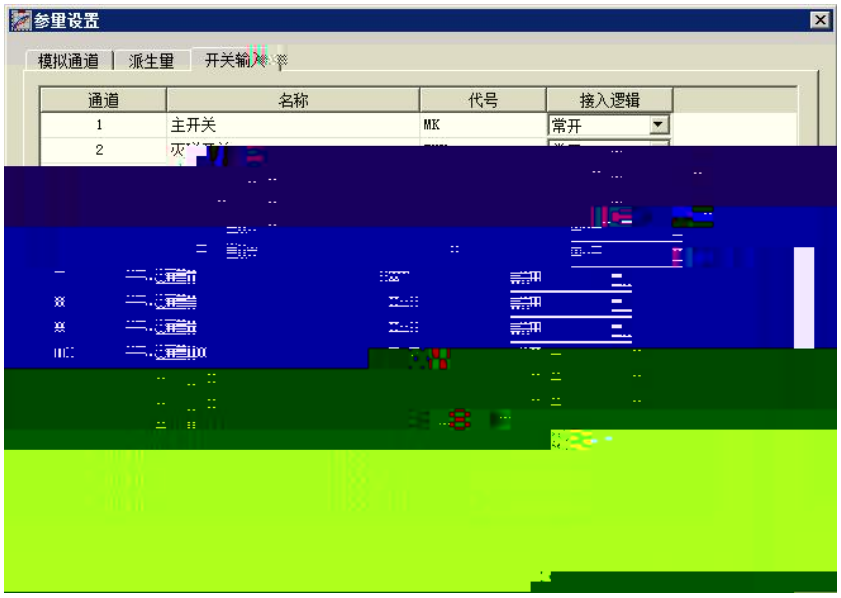
1

2

6.1.1

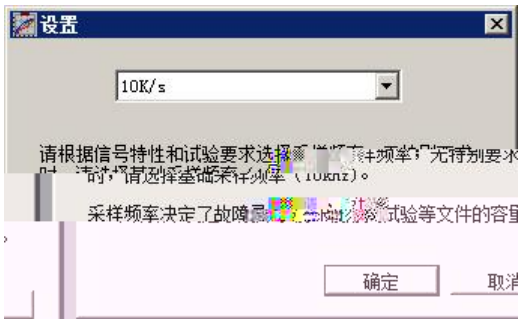


6.1.1


参量设置
模拟通道
派生量
开关输入
通道
名称
代号
接入逻辑
1
主开关
MK
常开
2

6.2

“ / ” 6.2.0



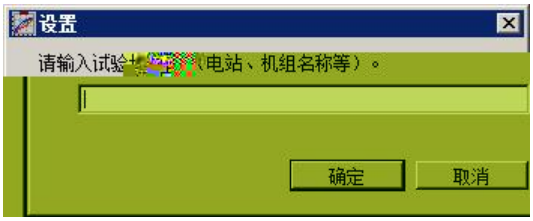
6.2.0

10kHz 20 kHz 50 kHz

100kHz 10kHz

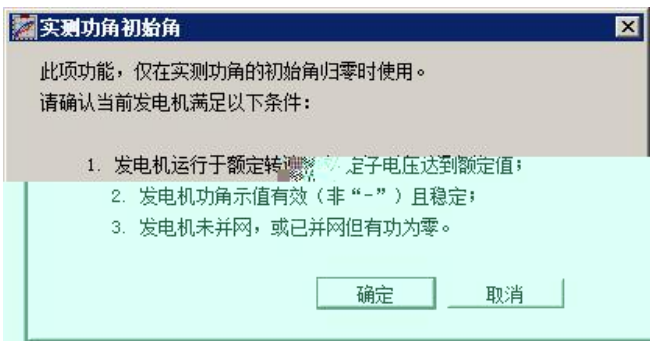
6.3

“ / ” 6.3.0



6.3.0

Xp X



6.4.0

1)

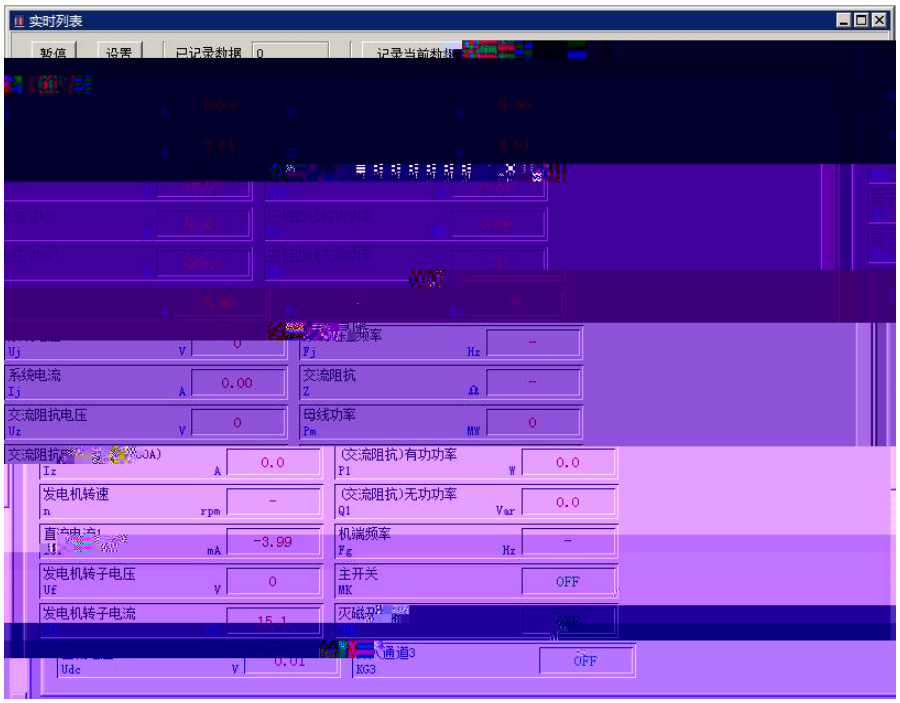
2) “ - ”

3)

7.

7.1

“ / ” 7.1.0



7.1.0

“

/ ”

“ / ” 7.1.1

7.1.1

16 24 16

P “ ” “ ”

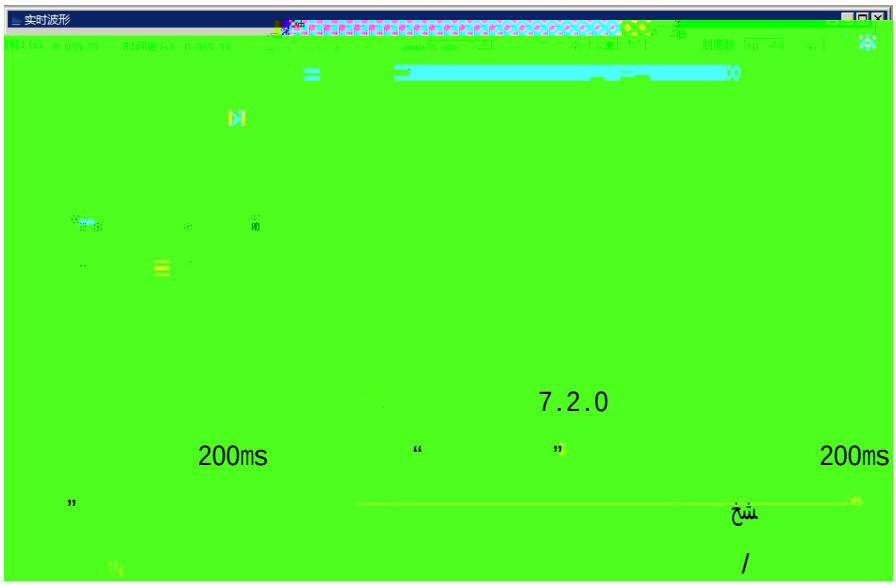
“ ”

“ ”

“ ”

7.2

“ / ” “ ” 7.2.0



7.2.0

200ms “ ” 200ms “

”

/

“ T ”

游标1 (s) 0.333,33 时间差 (s) 0.333,33
游标2 (s) 0.666,67 频率 (Hz) 3.000

“ ”

Y轴
统一纵轴 标幺值 0.000
坐标线 有名值 值格 100.000 应用

“ ”

“ ”

X “X ”

“ ”

X

X

Y

Y

Y ( )

/ شم -1.0 +1.0( )

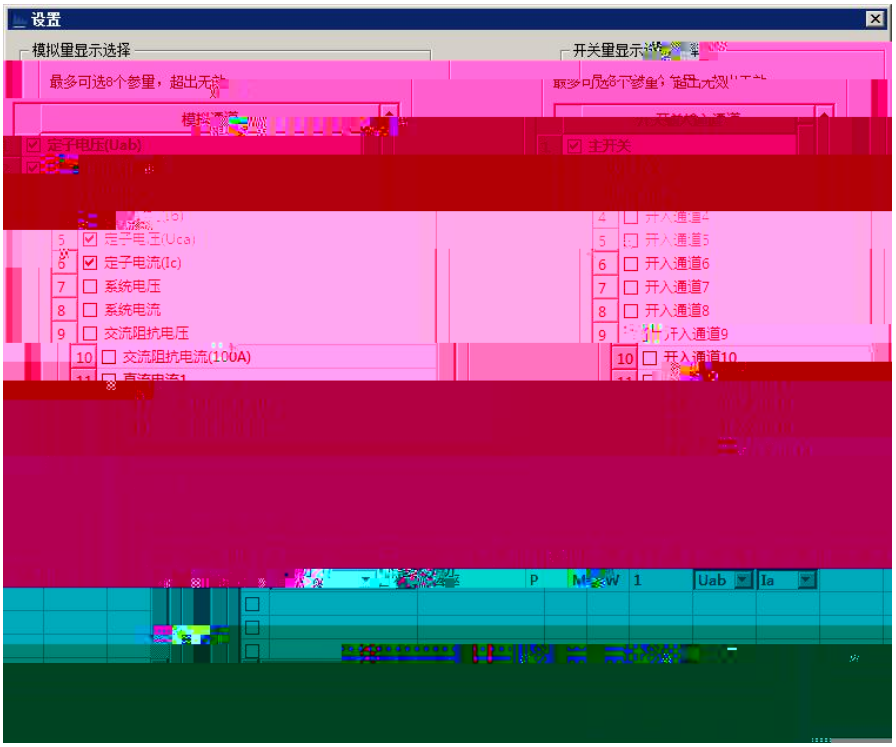
شم

/ ”

/ .wvf

Excel /COMTRADE

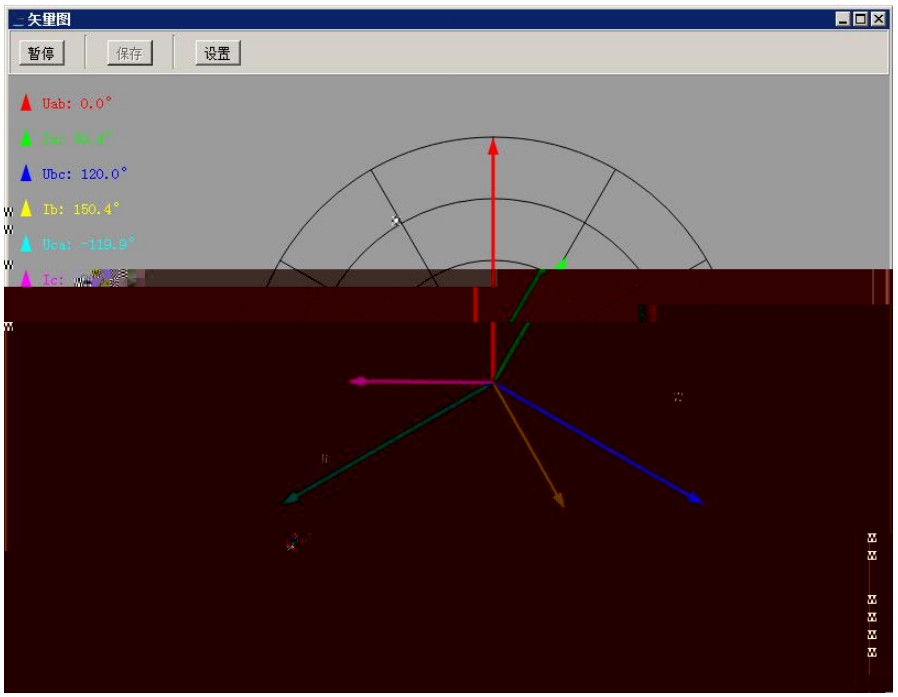
“ ” “ ” 7.2.1



7.2.1

7.3

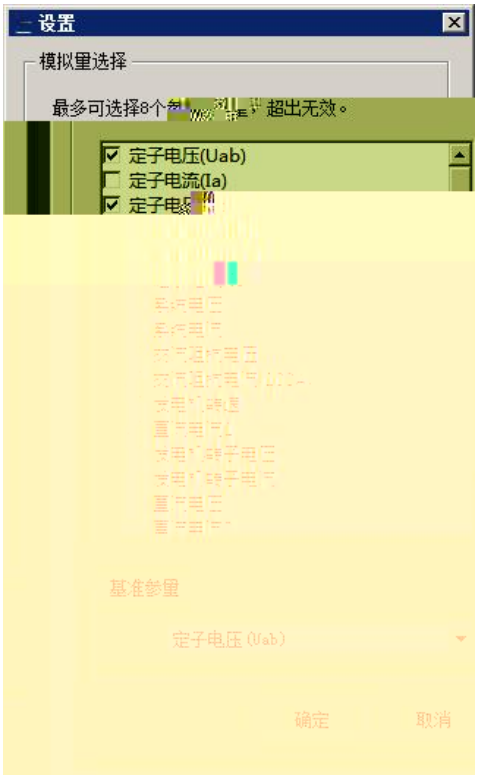
“ / ” “ ” 7.3.0



7.3.0

“ / ”

“ ” “ ”


设置
模拟量选择
最多可选择8个
超出无效。
定子电压(Uab)
定子电流(Ia)
基准参量
定子电压(Uab)
确定
取消

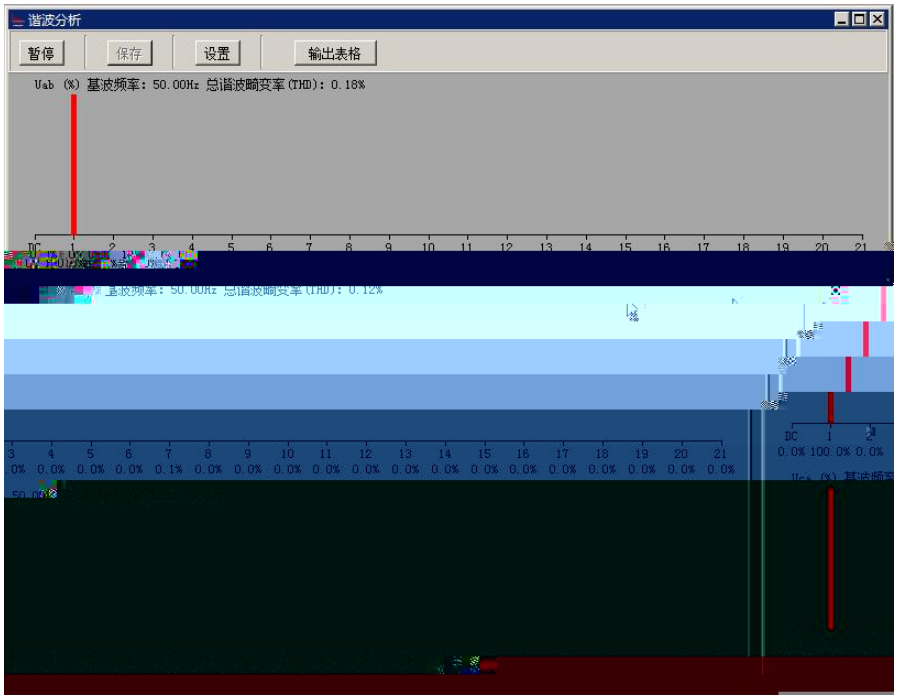
7.4

“ / ” “ ” 7.4.0 harmonic ratio /HR) 100% شخ

شخ

“ ”

“ 9.1 ”



7.4.0

“ / ” “ ”

“ ”

“ / ” “ ” /

3 21 51 7.4.1

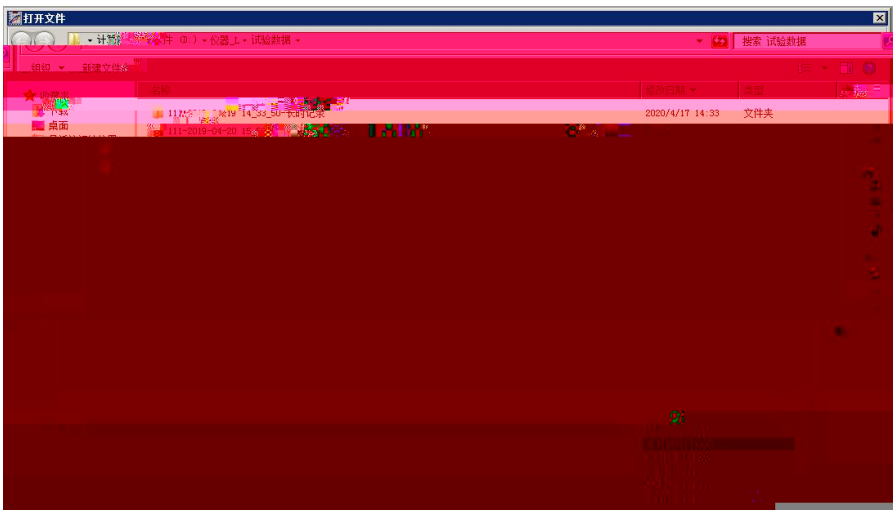
7.4.1

“ / ” -

Excel

7.5

“ / ” “ ” 7.5.0



7.5.0

1000

1000

1000 8.0

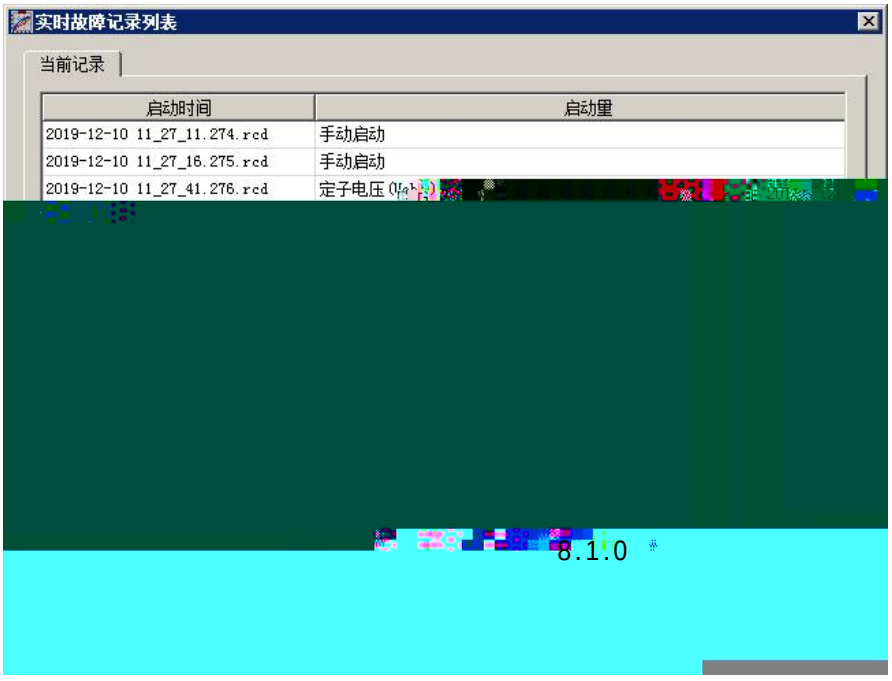
8.0

	: 2% 5%
	≤0.1ms

8.1

“ / ” “

” 8.1.0



8.1.0

4.2

“ / ” “ ” 8.2.0 ‖ oא

8.2.0

16 24 16

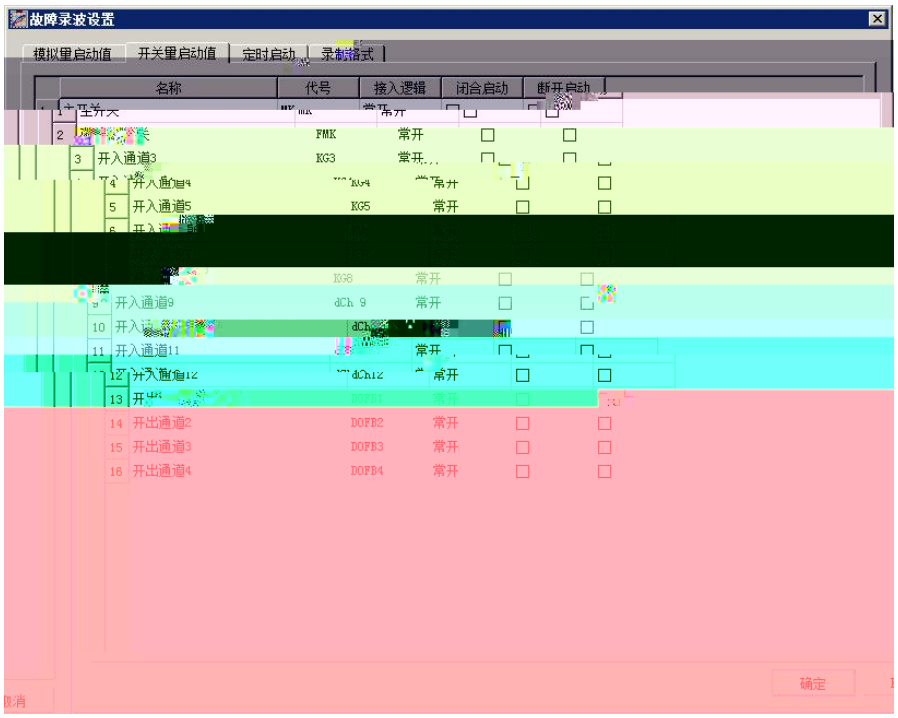
16 24 17

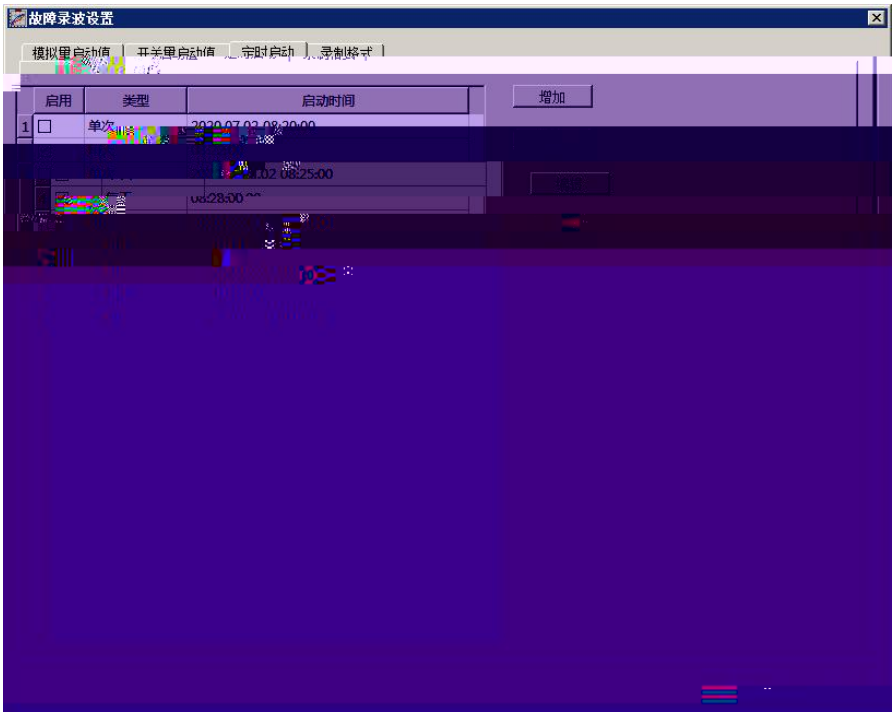
“ ” “ ” “ ”

“ ” Hm

Hm TO

T


故障录波设置
模拟量启动值
开关量启动值
定时启动
录波格式
名称
代号
接入逻辑
闭合启动
断开启动
开入通道3
KG3
常开
开入通道5
KG5
常开
开入通道9
常开
开入通道11
常开
开出通道2
DOFB2
常开
开出通道3
DOFB3
常开
开出通道4
DOFB4
常开
确定



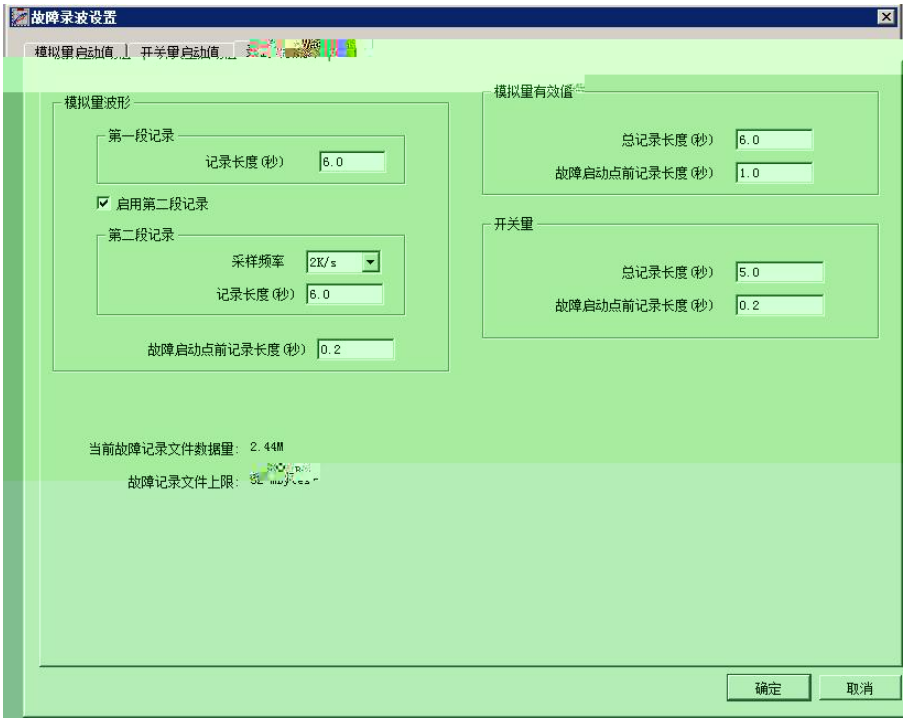
8.2.2

32

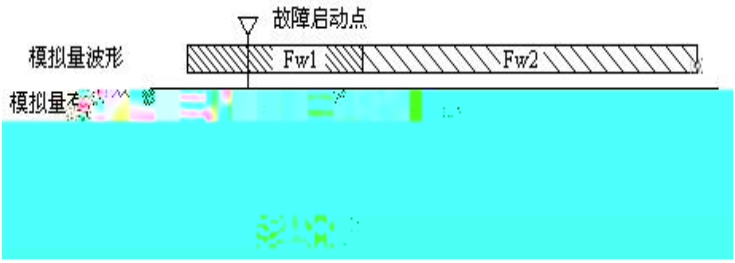
“ - ” 8.2.3

8.2.3

8.2.4


故障录波设置
模拟量波形
第一段记录
记录长度(秒) 6.0
启用第二段记录
第二段记录
采样频率 2K/s
记录长度(秒) 6.0
故障启动点前记录长度(秒) 0.2
模拟量有效值
总记录长度(秒) 6.0
故障启动点前记录长度(秒) 1.0
开关量
总记录长度(秒) 5.0
故障启动点前记录长度(秒) 0.2
当前故障记录文件数据量: 2.44M
确定
取消

8.2.4


故障启动点
模拟量波形
Fw1
Fw2

Fe 1 /20ms

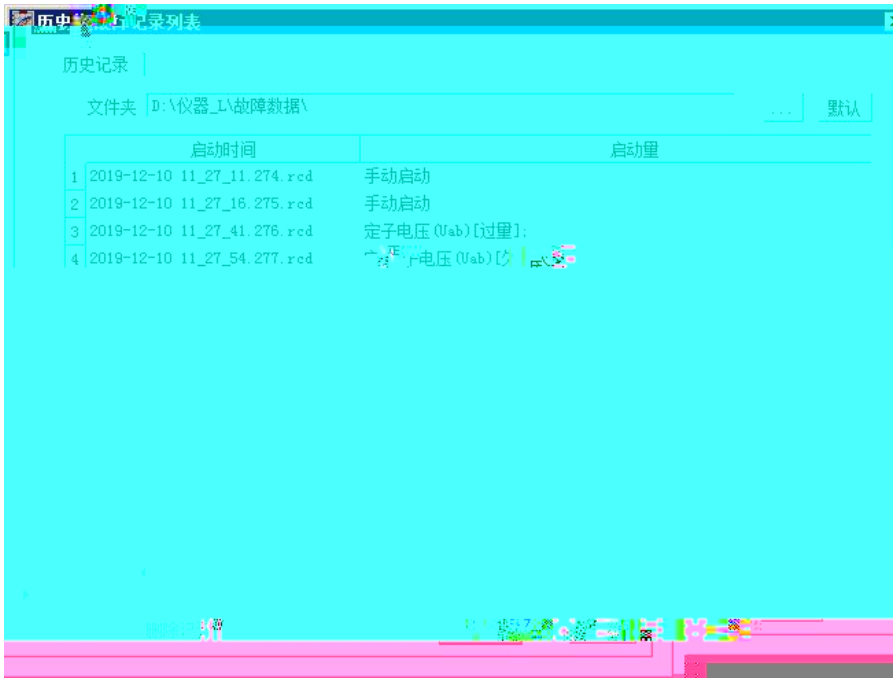
Fd

8.3

“ / ” “ ” 8.1.0

8.4

“ / ” “ ” 8.4.0



8.4.0

8.5

8.5.0

8.5.0

2

“ ” “ / ” “ ”

/ “ √ ” “ □ ”

3

1 2

5 1 2

Excel COMTRADE

9.

1.

“ → → ”

“ ” “ → ”

2.

3.

4.

“ ** ** ”

“ … ” “

. . ”

\

\

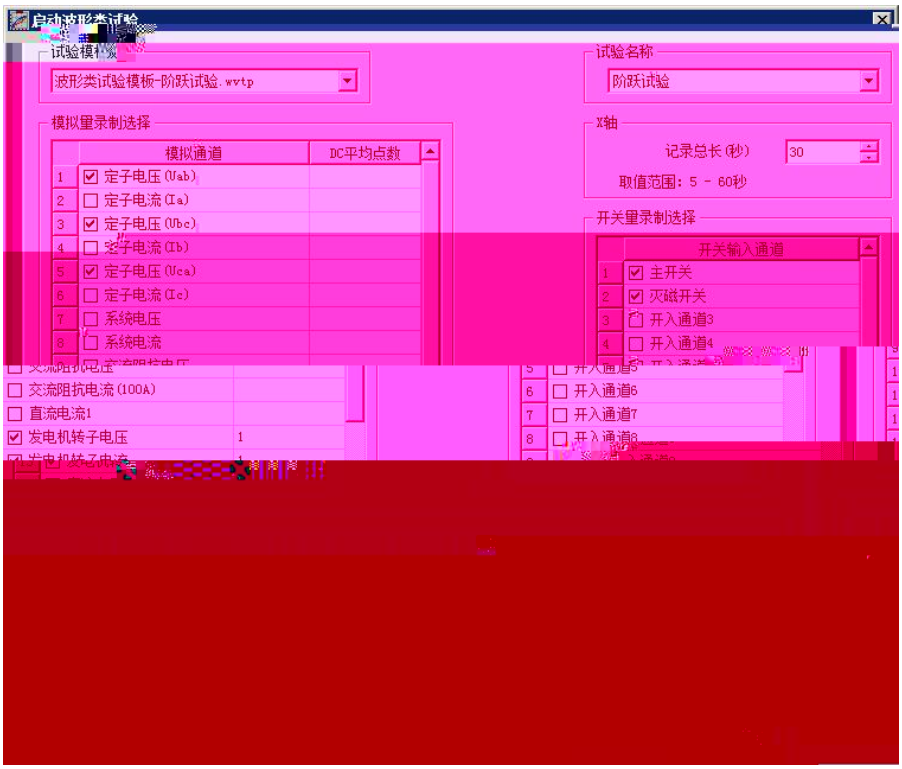
ةمم

9.1

60

ةمم PSS

“ / ” “ אq



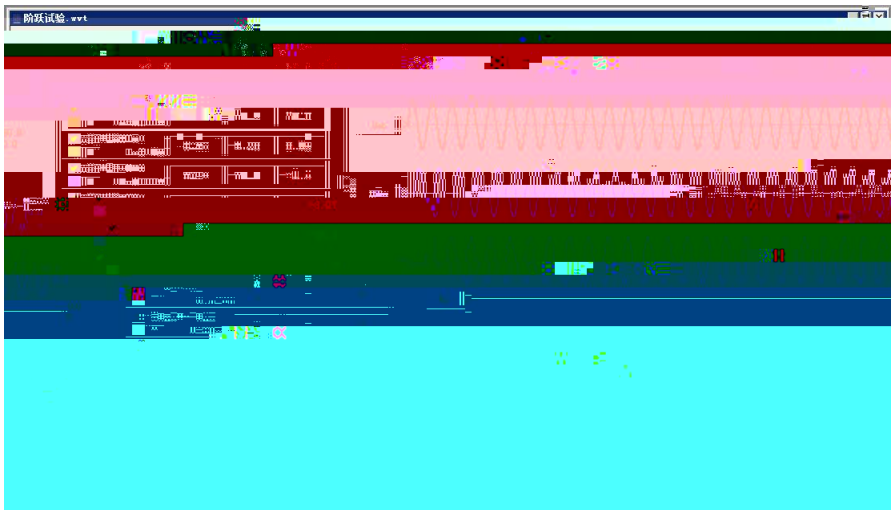
9.1.0

“ ”

	1	2	3	4	5	6
	U	I				
	Uab	Ia	Ubc	Ib	Uca	Ic
	Uab	Ia	Ubc	Ic		
	1					
	1	2				
	1	2	3			
	1	2				
	1	2	3	1~50		

“ ” “ ”

9.1.1



9.1.1

“ 7.2

” E W

Ä

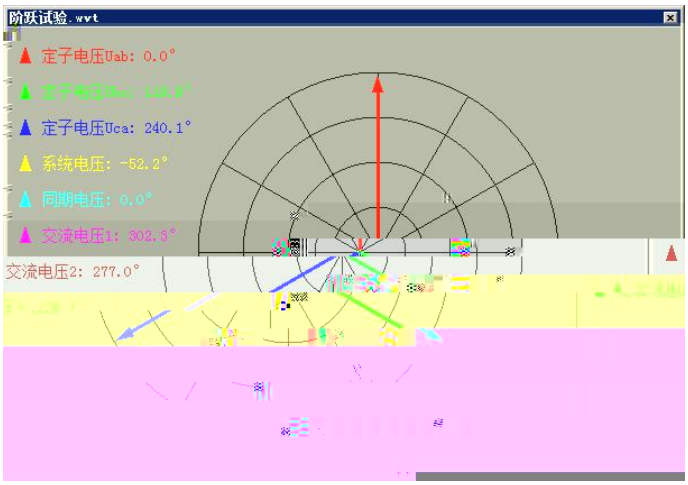
\


启动值设置
模拟量
开关里
代号
单位
额定值
启动量
1 Uab V 100.0
2 Ia A 5.00
3 Uf V 2000
4 If mV 1870.0
Hz 50.00
代号
启动动作
1 MK 变位启动
2 FMK 不启动

9.1.3

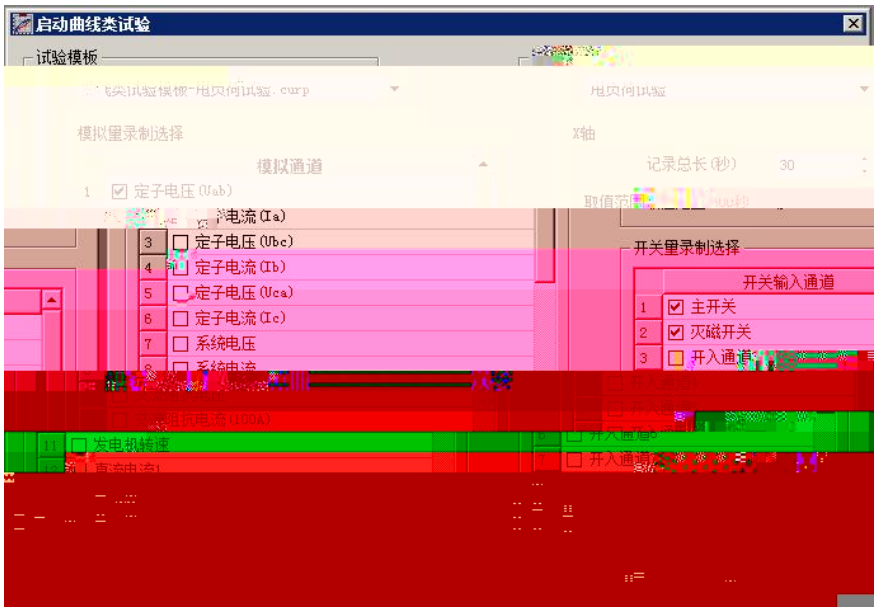
-

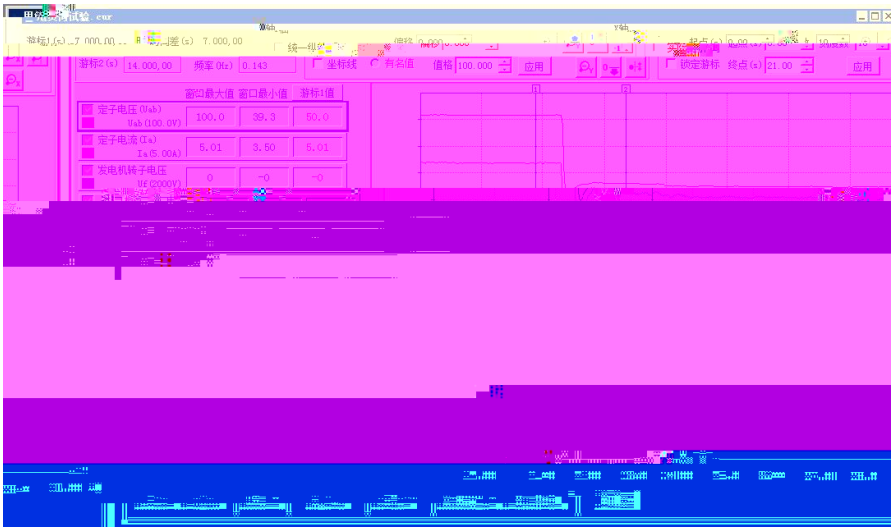
1


阶跃试验.wvt
定子电压Uab: 0.0°
定子电压Uca: 240.1°
系统电压: -52.2°
同期电压: 0.0°
交流电压1: 302.3°
交流电压2: 277.0°

9.2

20ms 10


启动曲线类试验
试验模板
模拟量录制选择
模拟通道
1 定子电压(Uab)
3 定子电压(Ubc)
4 定子电流(Ib)
5 定子电压(Uca)
6 定子电流(Ic)
7 系统电压
11 发电机转速
X轴
记录总长(秒) 30
开关量录制选择
开关输入通道
1 主开关
2 灭磁开关



9.2.1

“ 7.2

”

\

“ ”

“ ”

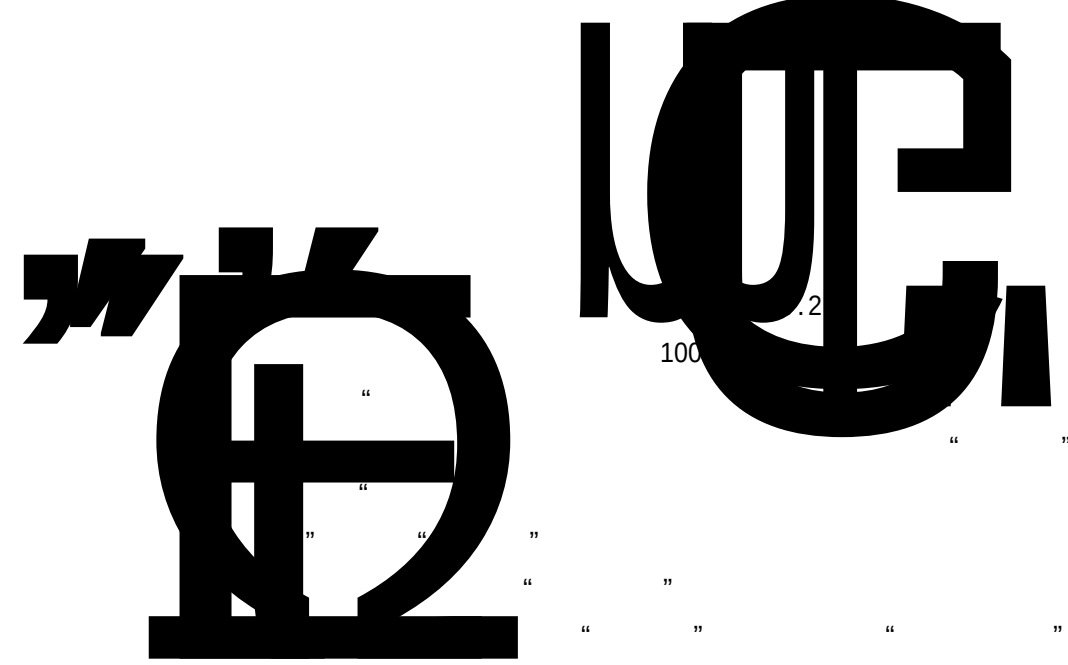
“ ”

“ ”

“ ”

- 9.2.2


启动值设置
模拟量
开关量
代号
启动动作
1 Uab V 100.0
2 Ia A 5.00
3 Uf V 2000
4 If
1 MK 变位启动
2 FMK 不启动



.2

100

“ ”

“ ”

“ ”

“ ”

100ms

“ ” “ ”

“ ”

-

20ms 1 50

1

“ *20ms =

”

Excel COMTRADE

“ ”

“ / ” curp

9.3

1 RMS 20ms شخ

20ms

10kHz

2 20ms

50Hz

3 شخ 20ms

50Hz

4

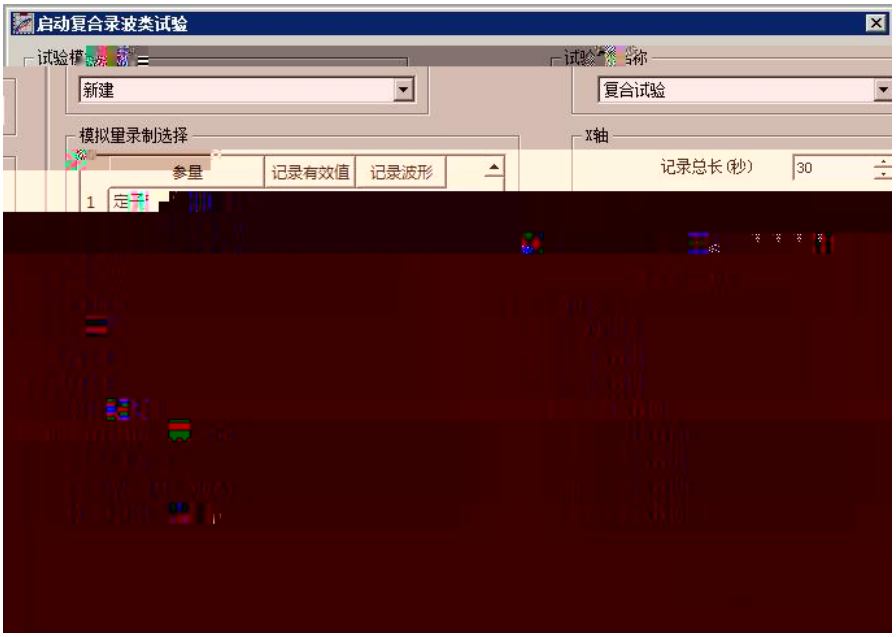
5

9.4

10kHz

50Hz 20ms

“ / ” “ ” 9.4.0

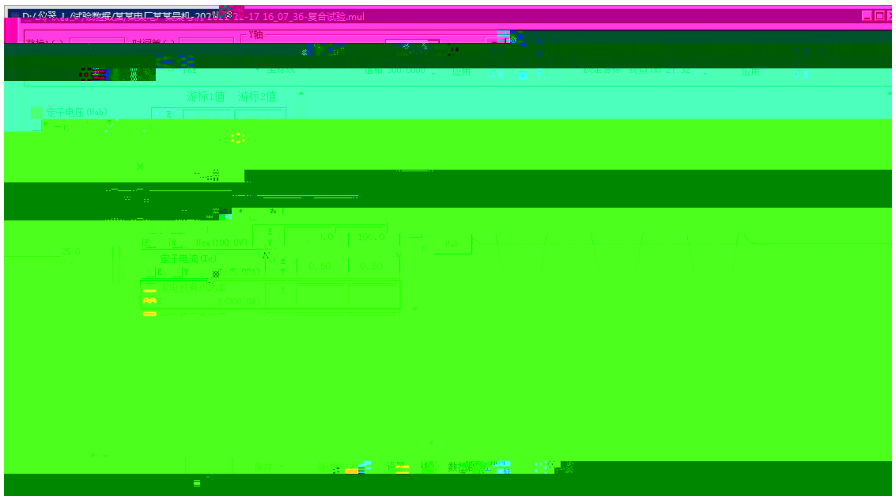


9.4.0

“ ”

“ / ”

“ ” 9.4.1



9.4.1

“9.2 ” E

W

“ ” “9.1 ”

“ C ”

- ,

20ms 1 50

1

“ *20ms =

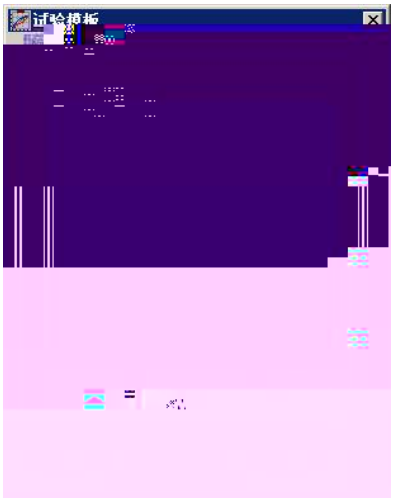
”

9.5

X-Yشم قمم

“ ”

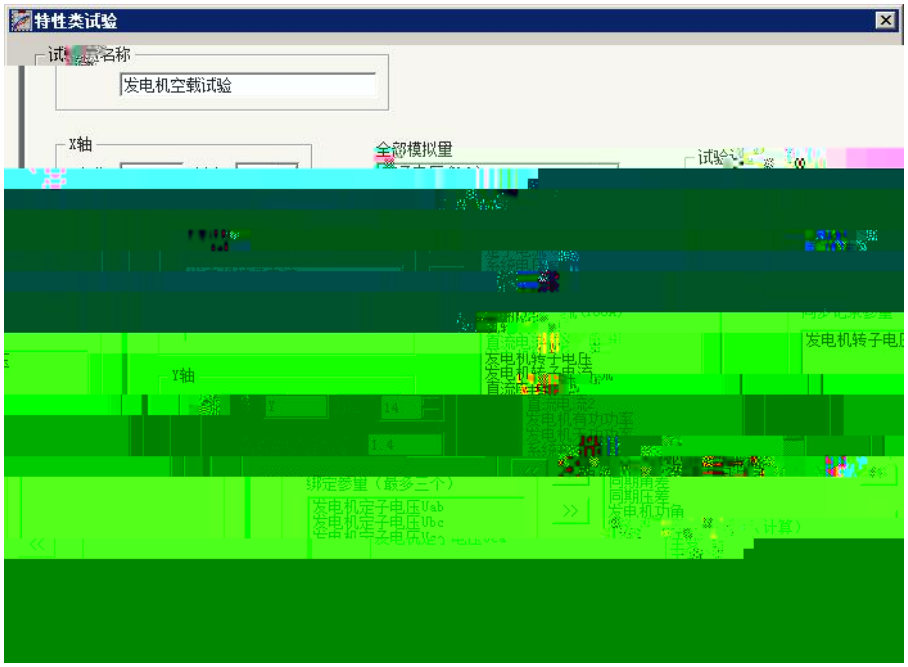
“ / ” “ ” 9.4.0



9.5.0

“ ” “

” 9.5.1



9.5.1

X X X

Y Y Y

X Y شخ X Y 1 3

شخ

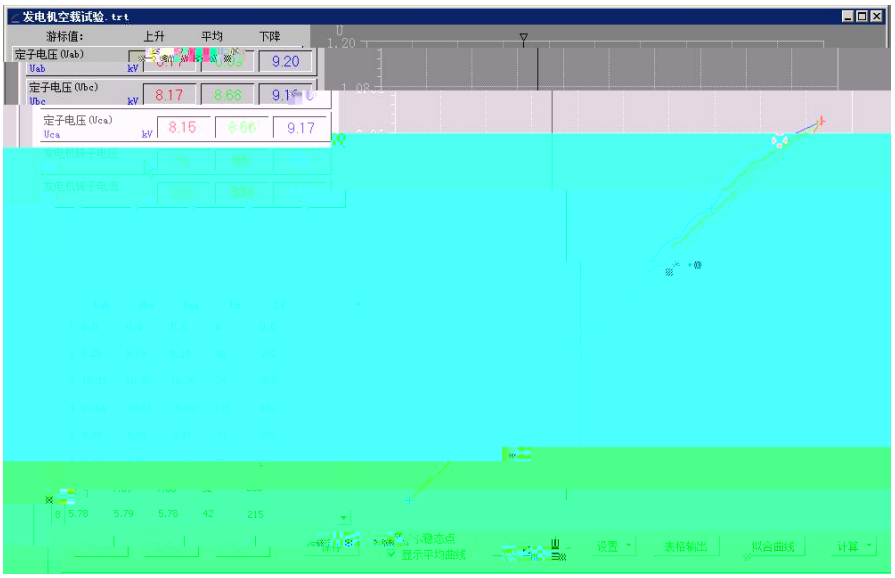
“

” قمم “ ”

X-Y

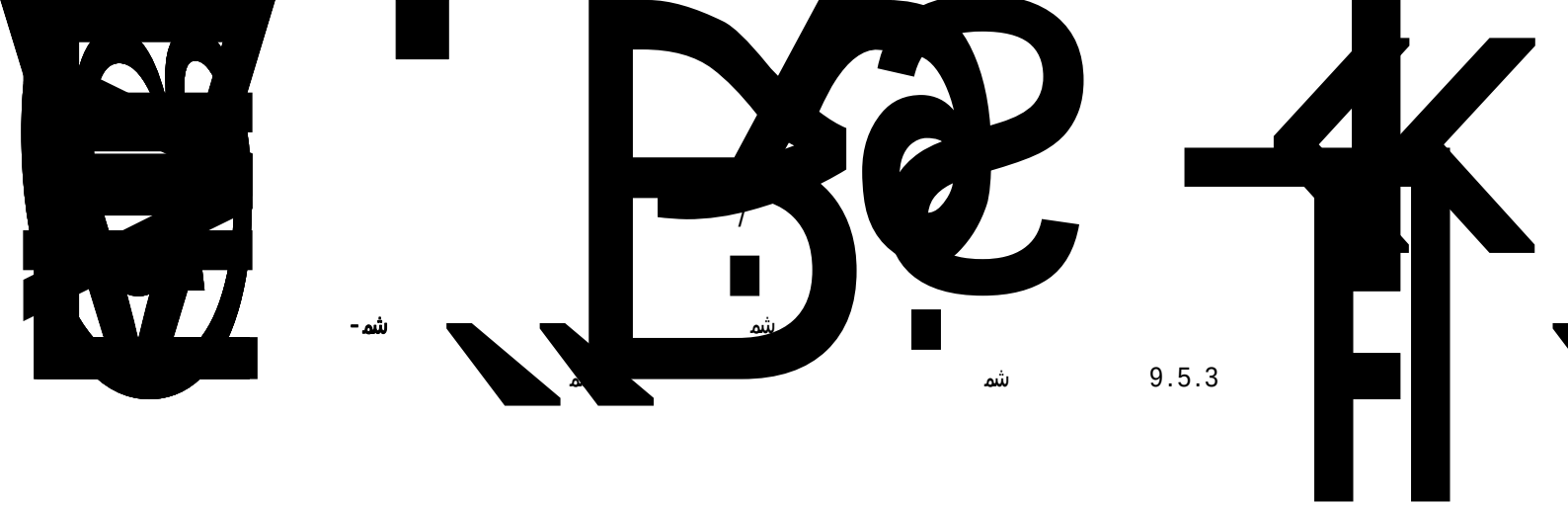
“ / ” “

” 9.5.2



9.5.2

3



9.5.3

9.5.3

-

20ms 1 50

1

“ *20ms =

”

“ - ”

/

“ ”

X Y

A. X Y

“ ”

B. “

1. “ ”

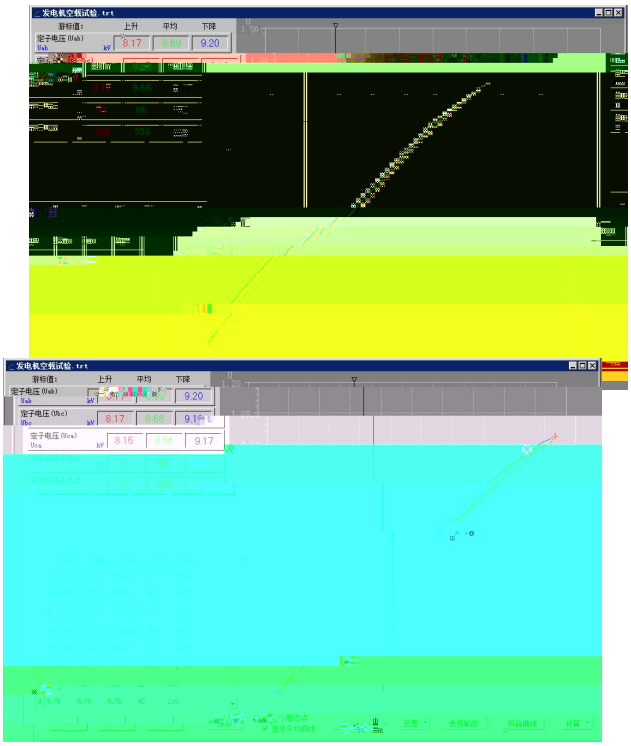
2.

3.

/

10

20 20

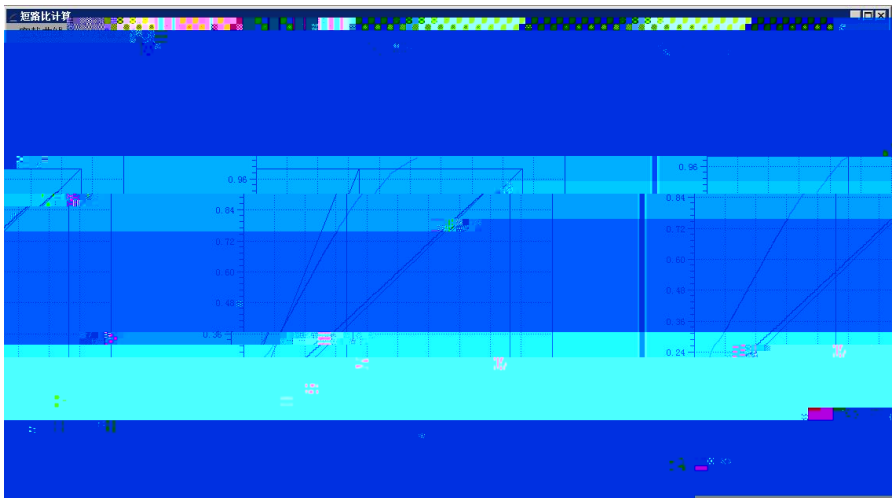


Xd

9.5.4

9.5.4

“ ” “ ” 9.5.5



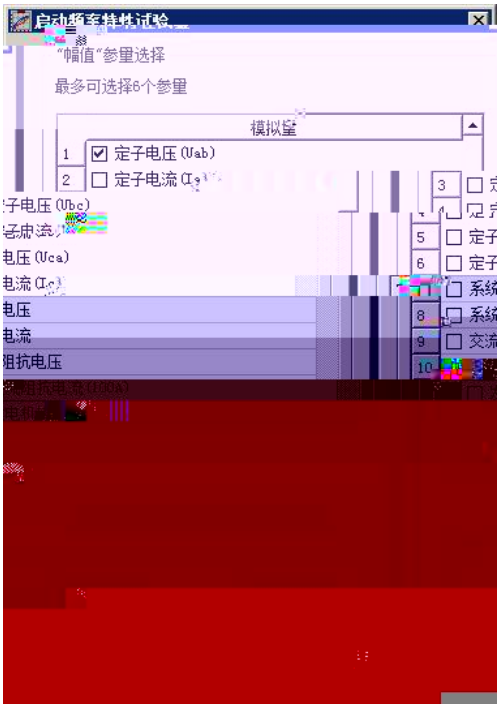
9.5.5

Xd 1.0

9.6

“ ” “ ”

“ / ” “ ” 9.6.0



9.6.0

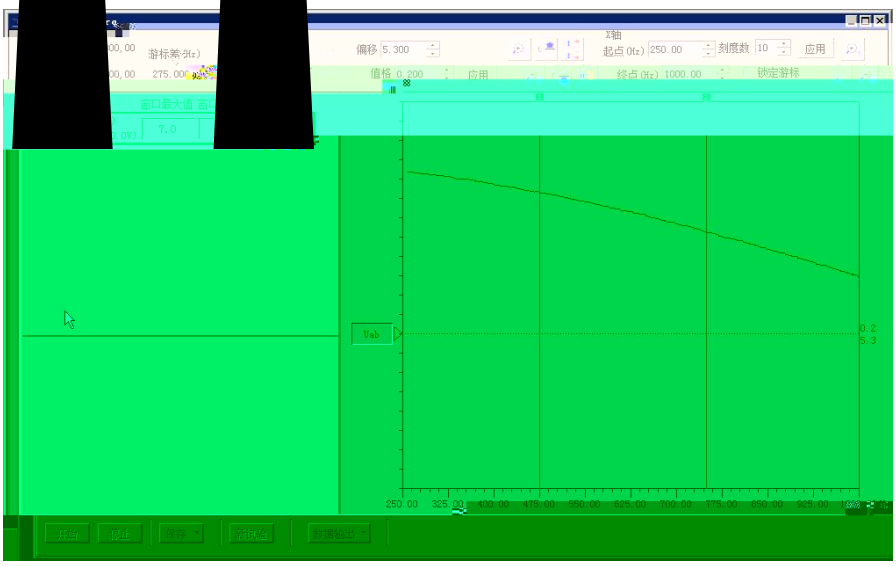
“ ” “ ”

“ ” “ ”

1. “ ” 6

2. “ ” “ ”

6.1


偏移 5.300
起点(Hz) 250.00
刻度数 10
应用
值格 0.200
应用
终点(Hz) 1000.00
锁定游标
7.0
250.00
325.00
开始
停止
保存
清图形
数据输出

9.6.1

“ 7.2

”

\

“ ”

“ ”

“ ”

“

		1	2	3	4	5
				Ubc	Xq	
			Ubc			
				*		
			3	0		

* 1 2

1.

2. Xq Xq Xd*

Xd=Xd* × Zb=Xd* × U( ) / I( ) Xq=0.85 × 0.9 × Xd 0.85 0.9

Xq Xd

3.

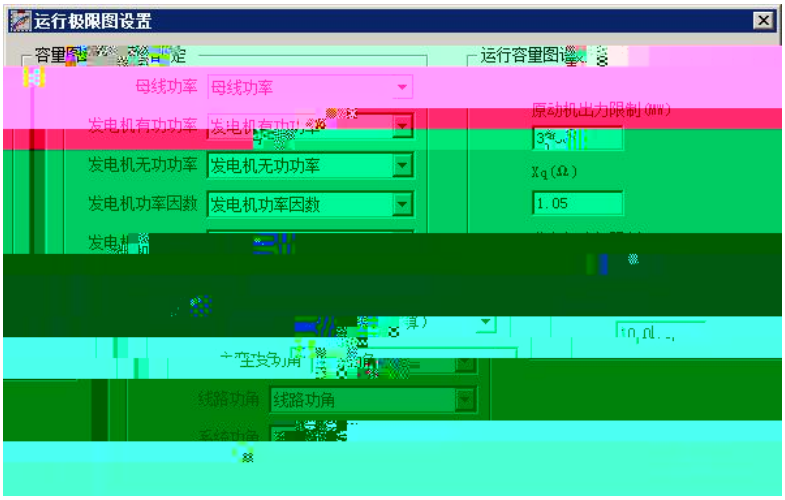
4.

5.

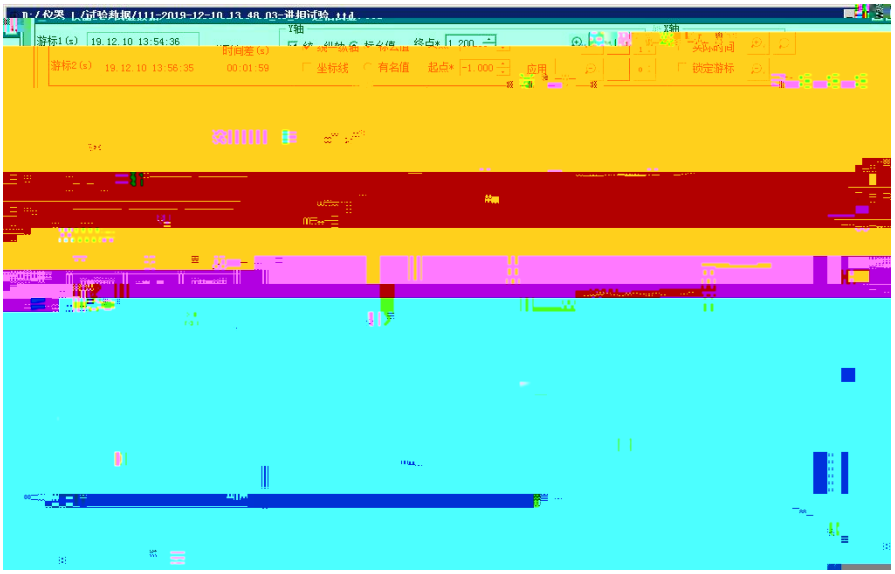
6.

7.

“ / ” “ ” 9.7.0

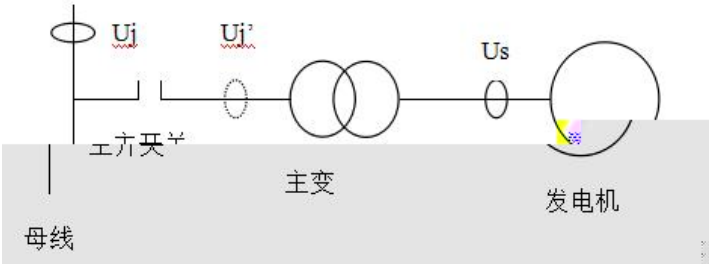


9.7.0


游标1(s)
19.12.10 13:54:36
时间差(s)
游标2(s)
19.12.10 13:56:35
00:01:59
坐标线
有名值
起点*
-1.000
应用
Y轴
X轴
实时时间
锁定游标

شم

9.8



Uj Uj Us Uj

Uj Uj

Us Uj

Uj Us PT 100V

Uj Us 100V ΔU 100V

200V

		ΔU	Us	Uj	Asj

*　　1　　2

24V

“　　”

Us

Uj　Us　PT　　100V

“　　”　　PT　　100V　　100

PT

Uj　PT　　57.735V

= 100　　= 57.735

100V

Us　　Uj

Uj

“　　”　　“

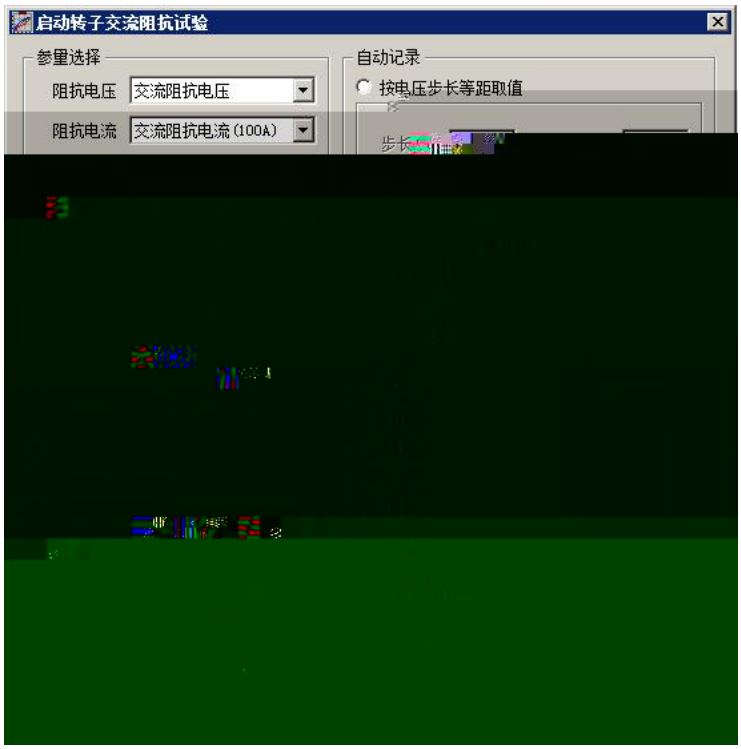
”　“　　3 ”

“　　”　“　　”　　9.8.0

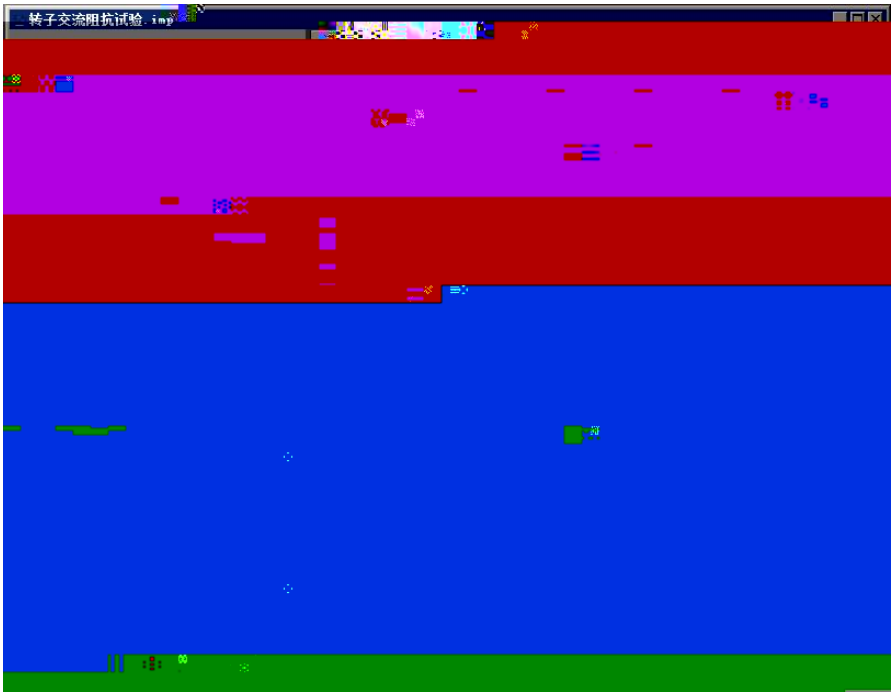
9.8.0

“ ”

9.9


启动转子交流阻抗试验
参里选择
阻抗电压
交流阻抗电压
阻抗电流
交流阻抗电流(100A)
自动记录
按电压步长等距取值
步长

- ” 9.9.1



9.9.1

3

“ 0 ”

-

- Excel Excel

-

“ ”

“ ”

0 “ ”

“ ” “

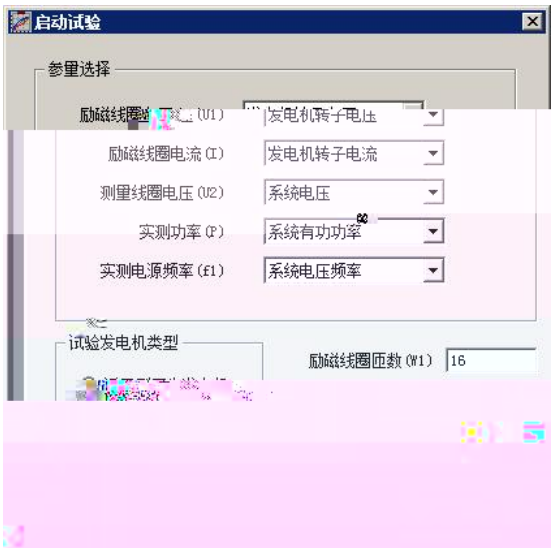
” “ ”

“ - ” 9.9.2

9.9.2

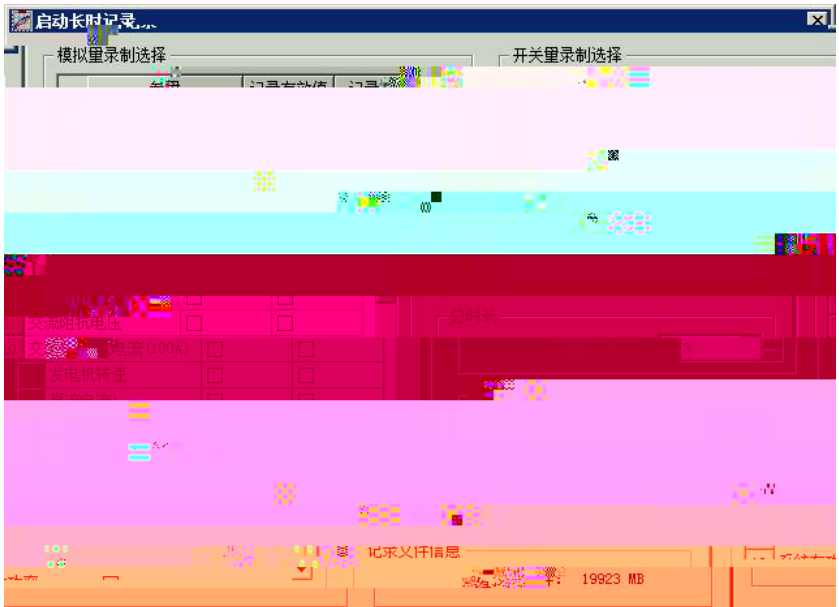
9.10

“ / ” “ ” 9.10.0



9.10.0

9.10.2



10.1.0

1 31

1 10kHz

20ms 1s

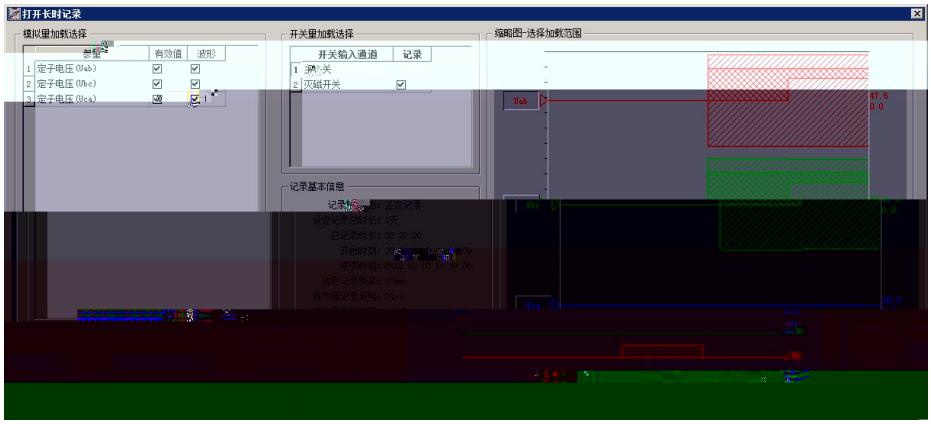
“ Aà ” “ ”

5

10.3

“ ” “ ”

10.3.0

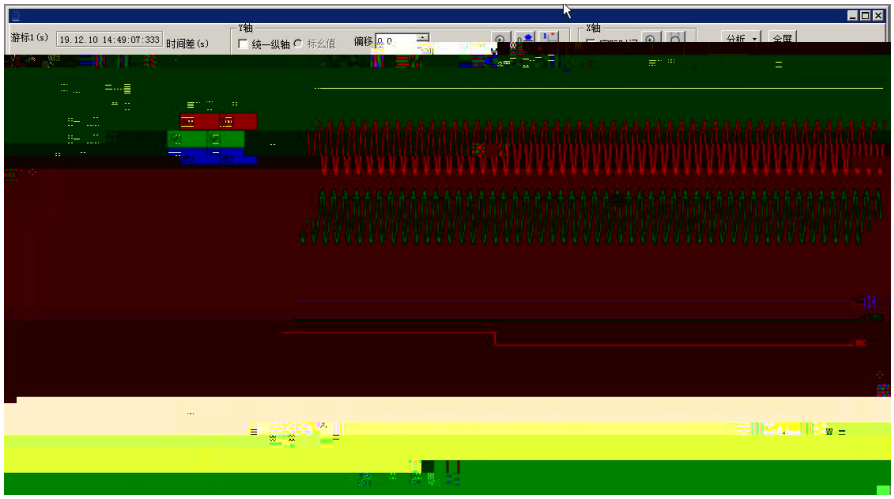


10.3.0

500MB

“ ”

10.3.1



10.3.1

“ 7.2 ” “ ”

11.

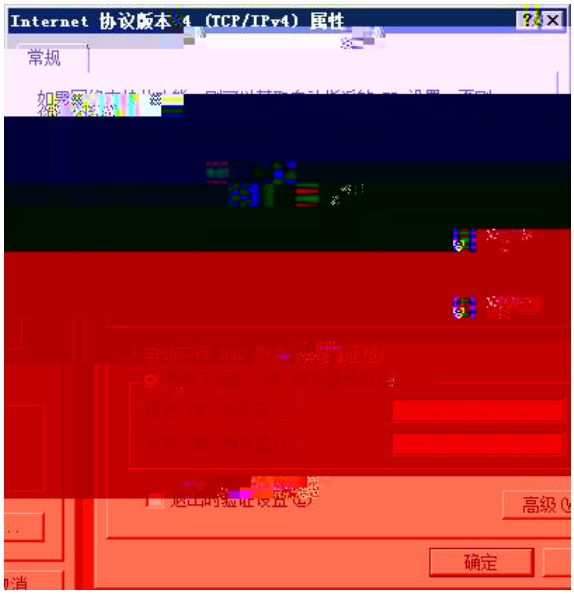
11.1.0

11.1.0

12.

10/100Mbps Windows

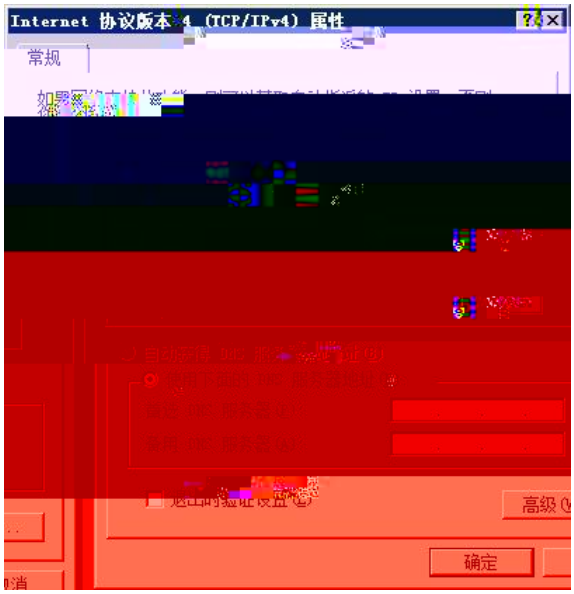
12.1 IP



IP

IP

12.2 IP



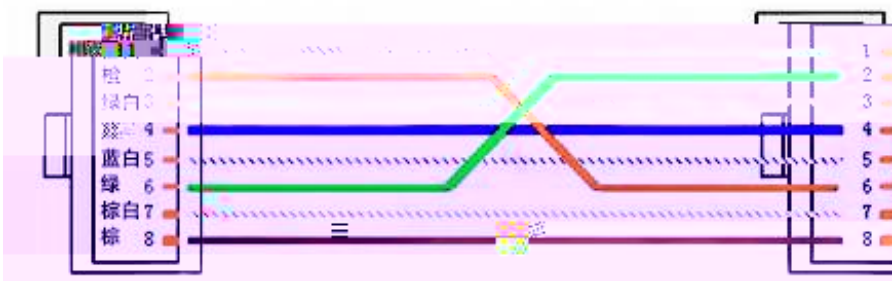
IP IP “IP ” IP TCP/IP

12.3

/ - IP

IP

12.3.0



12.3.0

A شبج

نمم	1	2
PDMM101	AC150V	AC10A
PDMM102	AC500V	AC10A
PDMM103	AC500V	AC100A
PDMM104	AC1000V	AC100A
PDMM105	AC200V	AC10A
PDMM106	AC500V	AC500V
PDMM107	AC500V	AC10A
PDMM108	AC150V	AC150V
PDMM109	AC150V	AC10A
PDMM111	DC ± 2000V	DC ± 100mV
PDMM112	DC ± 32V	DC4 20mA
PDMM113	DC ± 48V	DC4 20mA
PDMM114	DC ± 48V	DC ± 20mA
PDMM115	DC ± 1000V	DC ± 10V
PDMM116	DC0 200mA	DC4 20mA
PDMM117	DC ± 1000V	DC ± 100mV
PDMM118	DC ± 5V	DC ± 20mA
PDMM119	DC4 20mA	DC4 20mA
PDMM120	DC ± 250V	DC ± 100mV
PDMM121	. D	

PDMM131	DC ± 500V	DC4 20mA
PDMM132	AC180V	AC200A
PDMM133	AC/DC ± 600V	AC/DC ± 100mA
PDMM134	AC/DC ± 600V	AC/DC ± 300mV
PDMM135	AC/DC ± 100A	AC/DC ± 100A
PDMM136	AC150V	AC20A
PDMM211	(1:1/1:60)	DC4 20mA

B

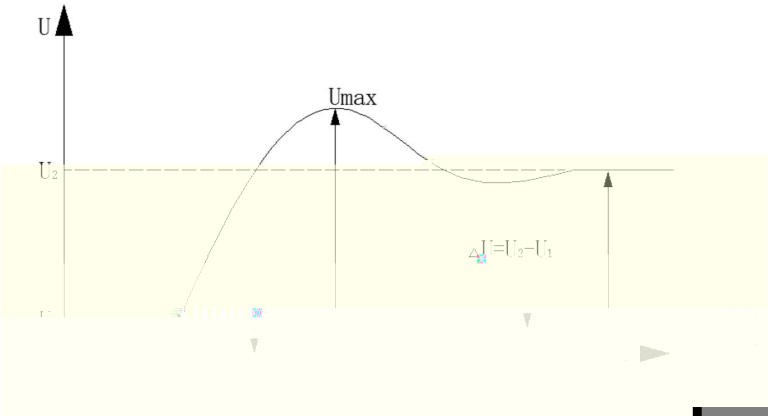
AC150V	> 80kΩ
AC180V AC200V	> 100kΩ
AC400V AC500V	> 300kΩ
AC/DC600V	> 1MΩ
AC1000V	> 500kΩ
AC1A AC10A AC20A AC100A AC200A	< 0.1Ω

DC ± 2000V	> 2.0MΩ
DC ± 1000V	> 1MΩ
DC ± 500V	> 500kΩ
DC ± 250V	> 250kΩ
DC ± 200V	> 200kΩ
DC ± 100V	> 100kΩ
DC ± 48V	> 50kΩ
DC ± 32V	> 30kΩ
DC ± 20V DC ± 16V	> 20kΩ
DC ± 10V	> 15kΩ
DC ± 5V	> 7kΩ
AC/DC300mV DC ± 200mV DC ± 100mV	> 8kΩ
(1:1/1:60)	> 300kΩ (50Hz)
DC0 200mA	12Ω
AC/DC100mA	< 1Ω
DC ± 20mA DC4 20mA DC0 20mA	120Ω

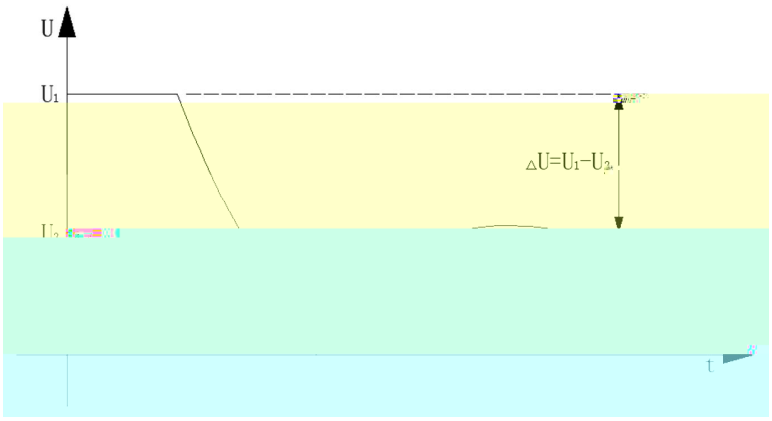
C

1.

- /



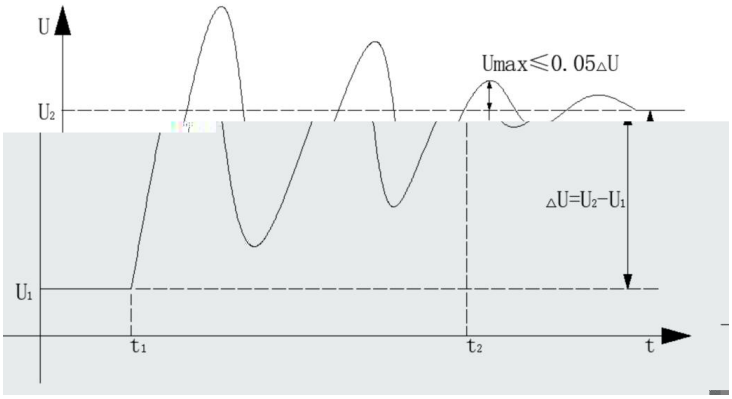
$$\text{正超调量} = \frac{U_{max} - U_2}{\Delta U} \times 100\% = \frac{U_{max} - U_2}{U_2 - U_1} \times 100\%$$



$$\text{负超调量} = \frac{U_1 - U_{max}}{\Delta U} \times 100\% = \frac{U_1 - U_{max}}{U_1 - U_2} \times 100\%$$

2.

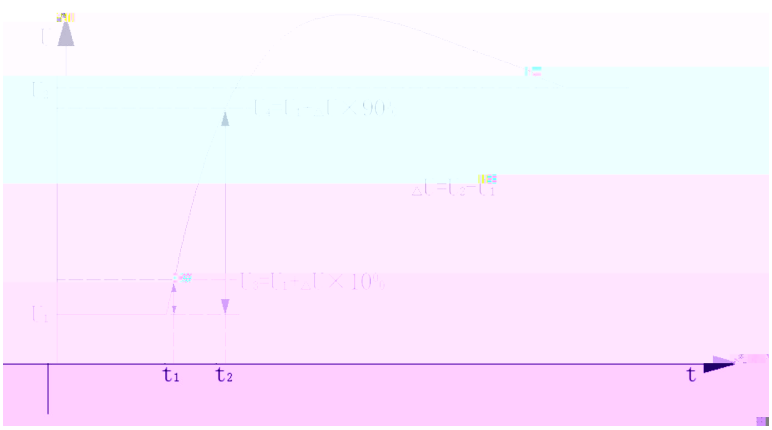
5%



$$\text{调节时间} = t_2 - t_1$$

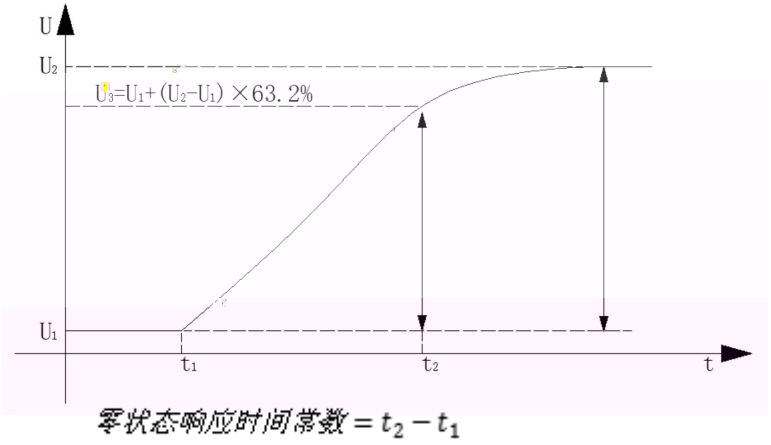
3.

10% 90%



6.

0.632



零状态响应时间常数 $= t_2 - t_1$

7.

PSS (P_1)

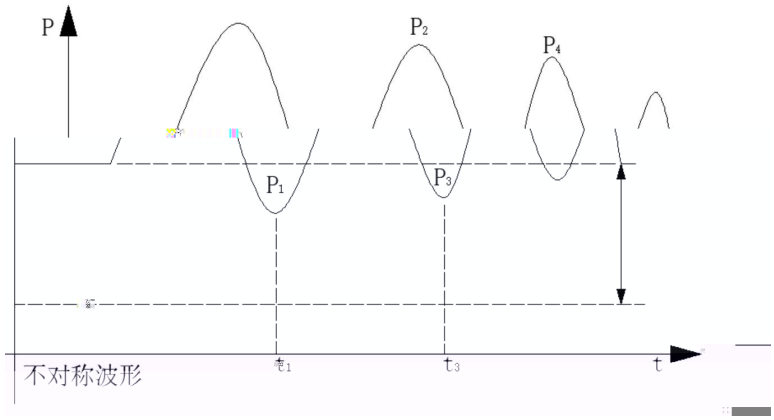
t_1 (P_3) t_3

=———

—π —

$$阻尼比D=\frac{1}{2}\pi ln\frac{P_1}{P_3}$$

—π ———



$$阻尼比D=\frac{1}{2}\pi ln\frac{P_2-P_1}{P_4-P_3}$$

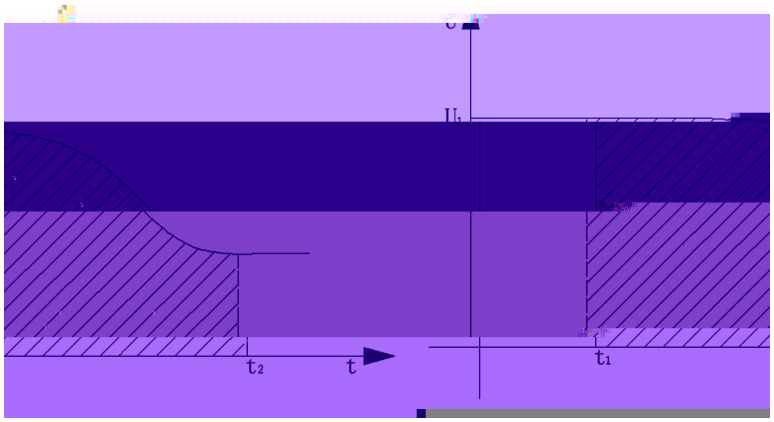
8.

, $(Uf_n)a$ 0.5

cb b c ac ab

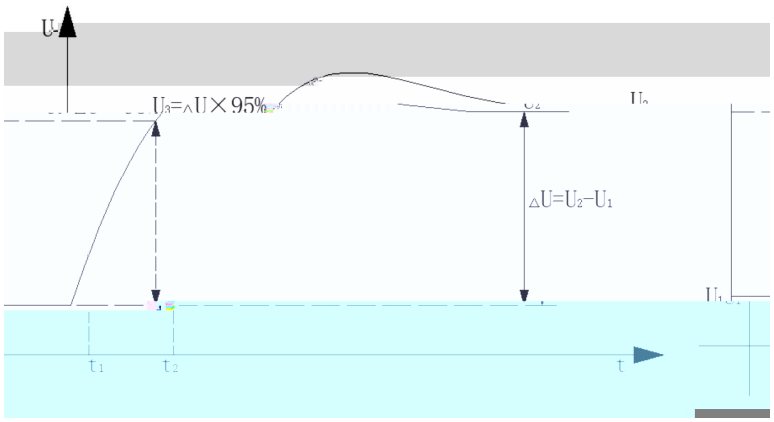
$=cd/0.5\times Uf_n$

9.



10．95%

95%



D -

1 قمم

E¤

		قمم
1	Uab	
2	Ubc	X
3	Uca	
4		
5		Y

		قمم
1	Ia	
	Ib	Y
3	Ic	
4		
5		X

2 قمم

		غمم
1	Uab	
2	Ia	
3	Ubc	
4	Ib	
5	Uca	
6	Ic	
7		
8		

PSS

		غمم
1	Uab	
2	Ia	
3	Ubc	
4	Ib	
5	Uca	
6	Ic	
7		
8		

3

	غمم
1	
2	
3	
4	
5	

~

2	100A	
3		
4		
5		