

—

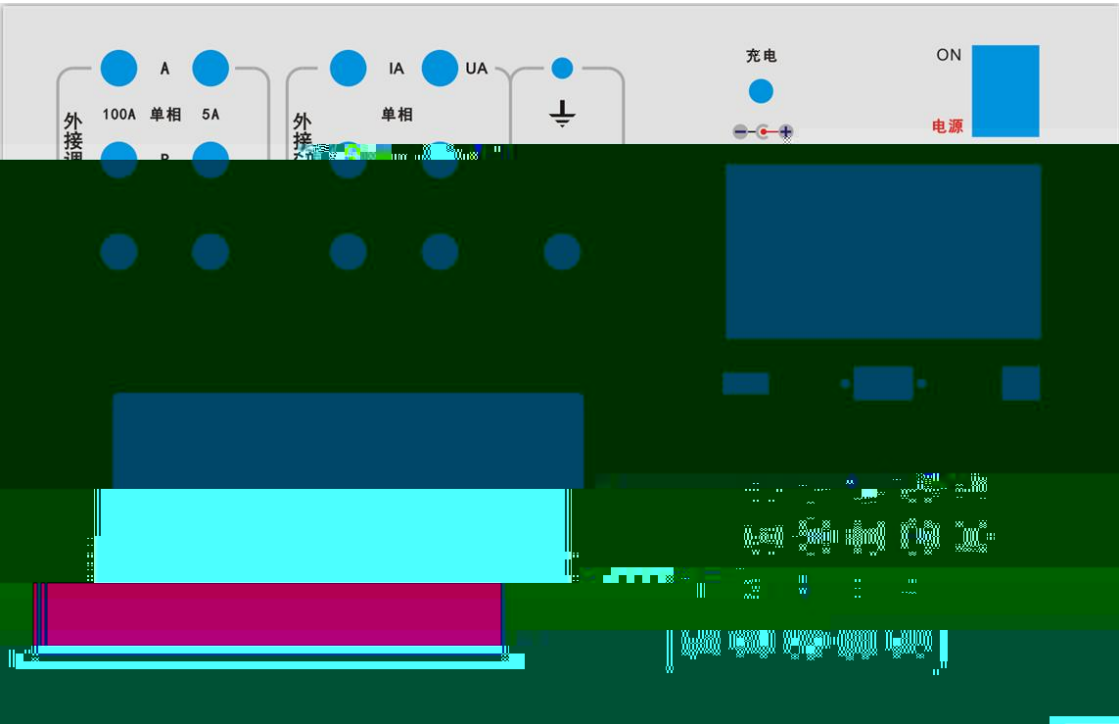
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		4
		5
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1		
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		17
1		
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3		
		28
1		
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		38
		41
1		
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3		
		45
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		48
		49
()		49

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.....	50
.....	50
.....	50
.....	52

-10

10

ABS



- (1) ()
- (2)
- (3)
- (4)
- (5)
- (6)
- (7) USB USB
- (8) USB U U
- (9)
- (10)

1

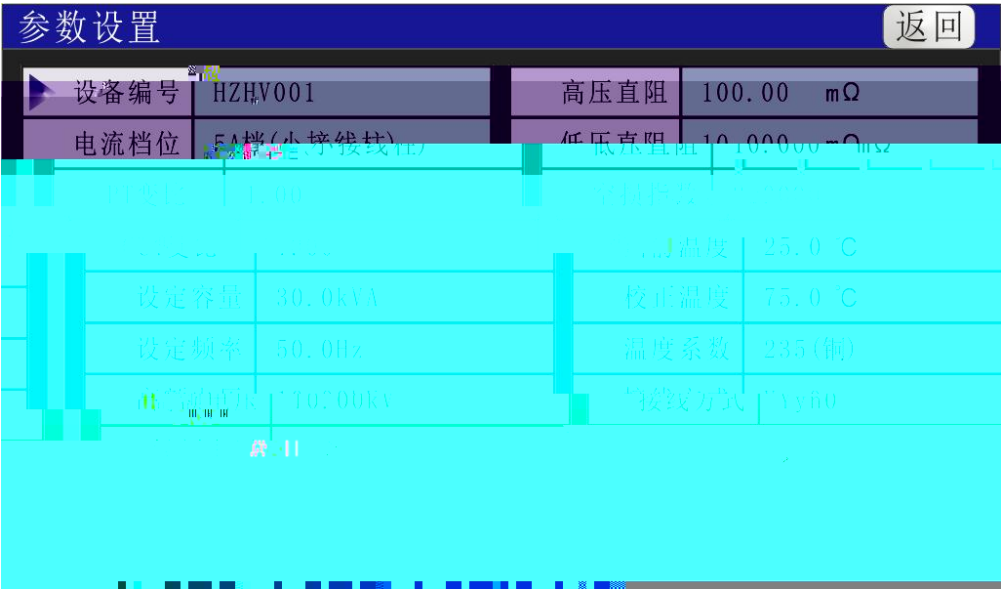


“ ↑ ” “ ↓ ” “ ”

2

“ ↑ ” “ ↓ ” “ → ” “ ← ”

“ ”



2

- (1) 12
- (2) “ 80A ” “ 5A ”
“ 80A ”
- (3) PT
- (4) CT

(5) _____ kVA

(6) Hz

(7) kV

(8) kV

(9) %

$$(10) \quad m_{\Omega}$$
$$(11) \quad m\Omega$$

(12)

(13)

(14)

$$(15) \quad \frac{235+T}{235+t} \quad \frac{225+T}{225+t}$$

(16)

(17)

$$(18) \quad \begin{array}{c} \text{ } \\ \text{ } \\ \text{ } \end{array} \begin{array}{c} \% \\ \\ \end{array} \begin{array}{c} \text{ " 0 " } \\ \\ \end{array}$$

()

GB/T6451

15

30

0.2

10kV

 $10 / 0.4$

1

2

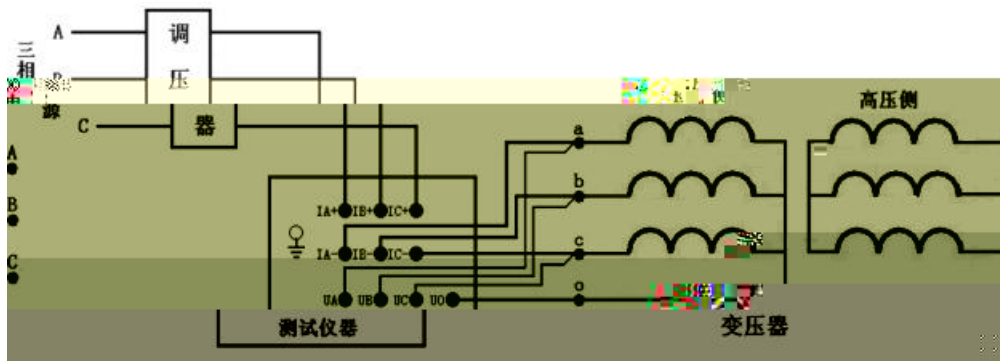
“ Ua ” “ Ub ” “ Uc ”

“ IA+ ” “ IB+ ” “ IC+ ”

“ 1A- ” “ 1B- ” “ 1C- ”

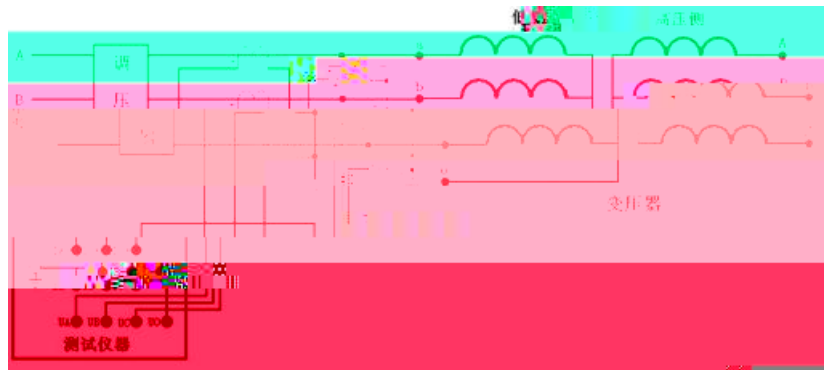
“ UA ” “ UB ” “ UC ”

“ UO ”



3

4



4

“ ” → “ ”

5

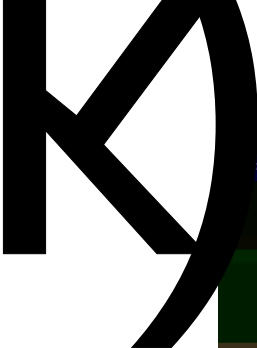
三相空载损耗							返回
设定参数:							
容量: 30.0kVA 锁定电压: 0.400kV 频率: 50.0Hz 空损指数: 2.000							
测试参数:							
电压平均值	方均根值	差值	电流	频率	有功功率		
A 0.000V	0.000V	0.00%	0.000A	0.000Hz	0.000W		
B 0.000V	0.000V	0.00%	0.000A	0.000Hz	0.000W		
C 0.000V	0.000V	0.00%	0.000A	0.000Hz	0.000W		
P 0.000W	0.000W	0.00%	0.000A	0.000Hz	0.000W		

5

“ ”

“ ”

6



- (1)
- (2)
- (3)
- (4)

- (1) A B C A B C
- (2) P
- (3)
- (4)
- (5)

$$U'_{\lambda} < U_{\lambda} \quad 100\% \times (U' - U)$$

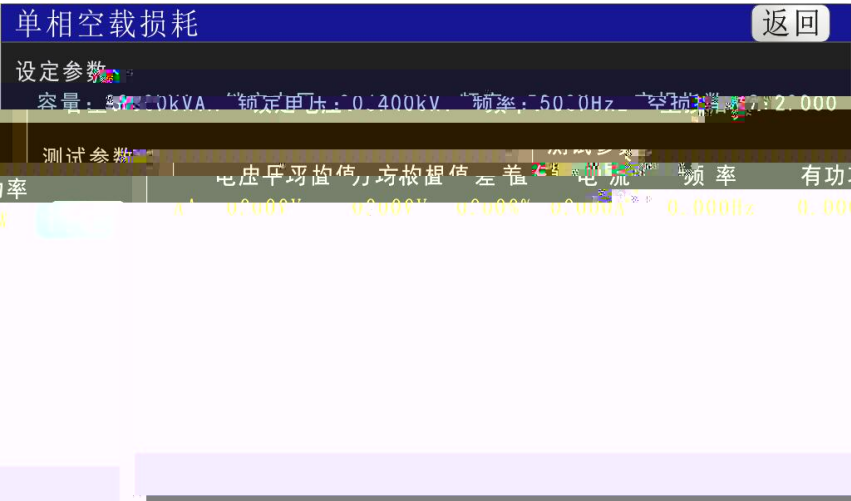
U'

(7)

(8) P_0' P_0 $= (P_0' - P_0) / P_0$

3

a d YN Y D ab bc ca
,
“ U ” “ O ” “ IA+ ” “ IB+ ” “ IA- ” “ UA ” a
“ IB- ” “ UB ” b bc
Ë

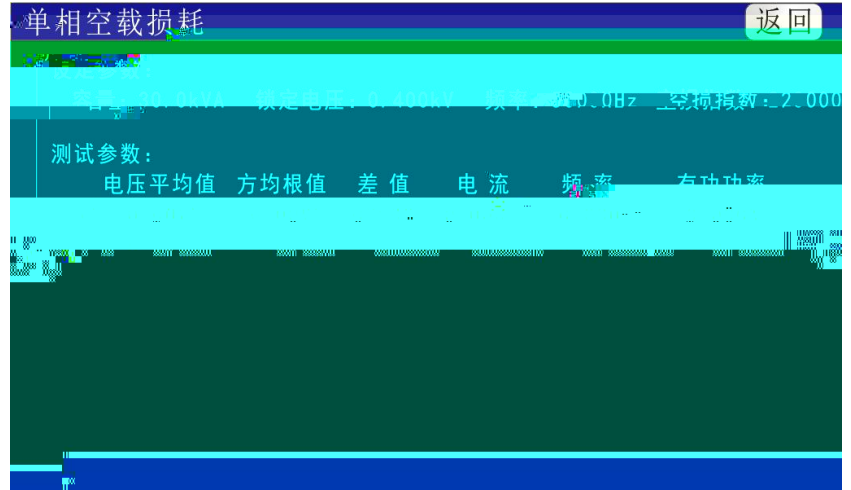


9

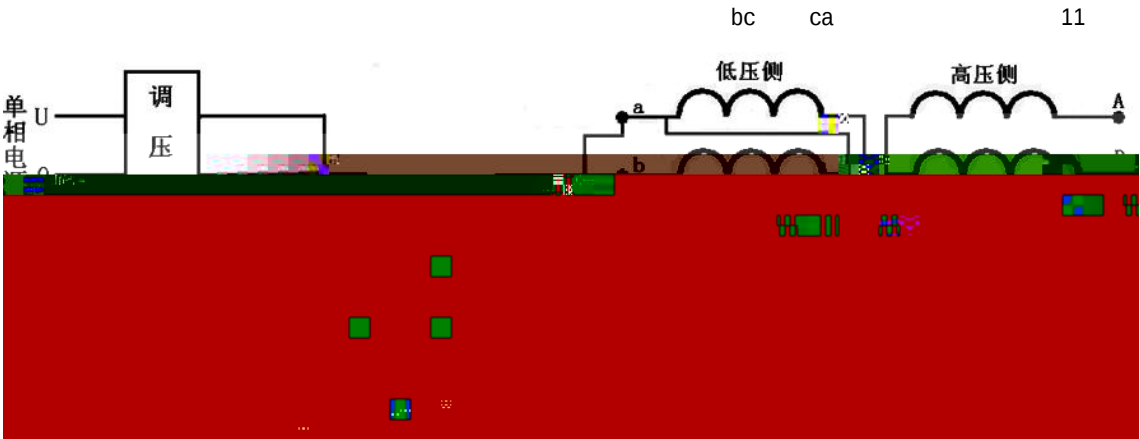
“ ” “ ”

10

bc

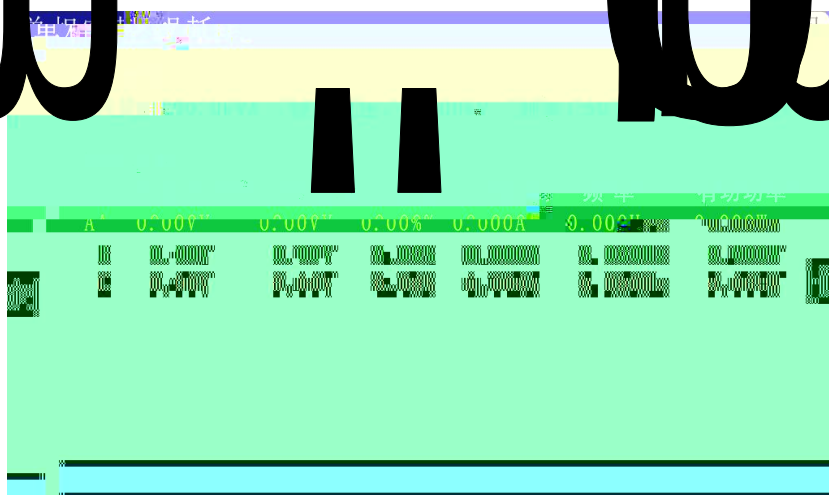


10



11

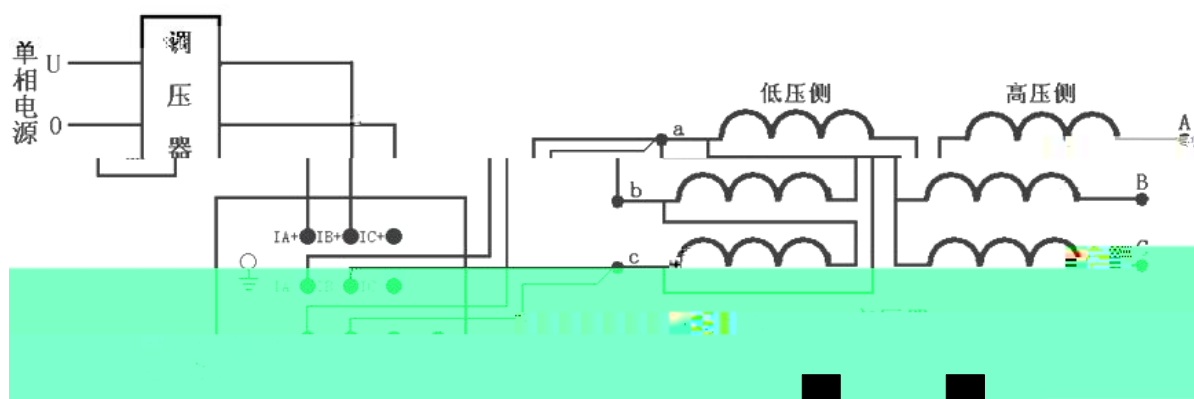
“ ” bc 12 ca “ ”



12

ca ab

13



13

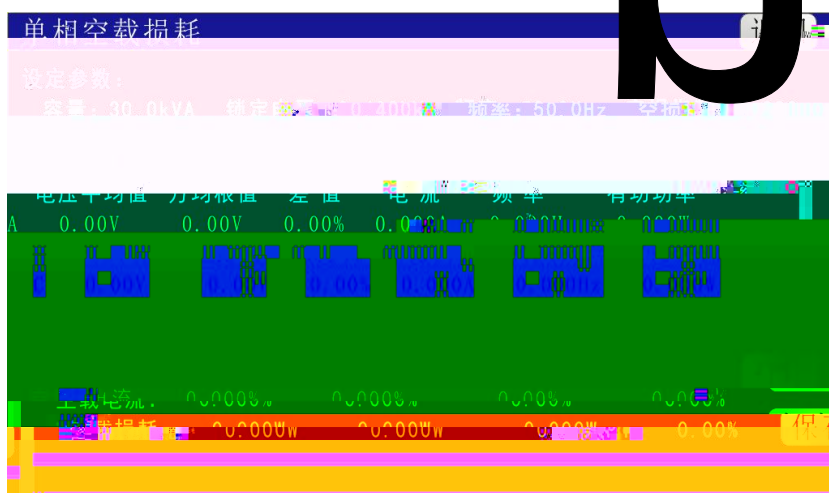
ca

“ ”

“ ”

ca

14



14

“ ”

“ ”

“ ”

b

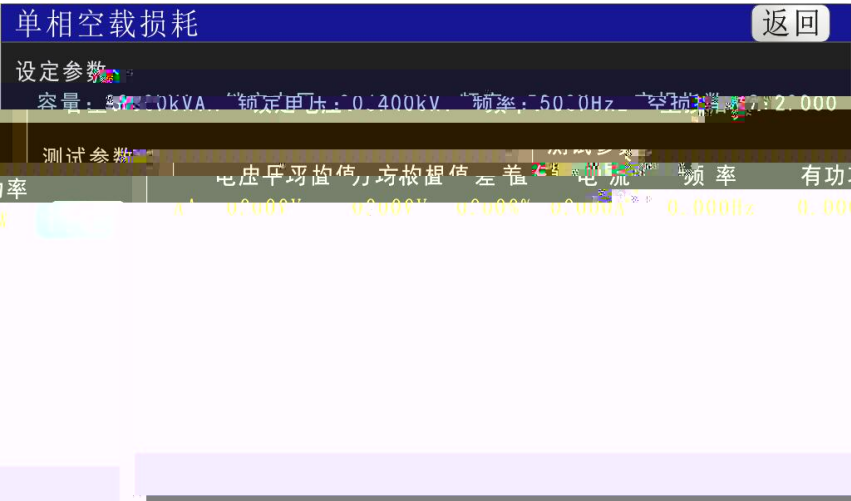
n

4

m'm"

“ IB- ” “ UB ”

b

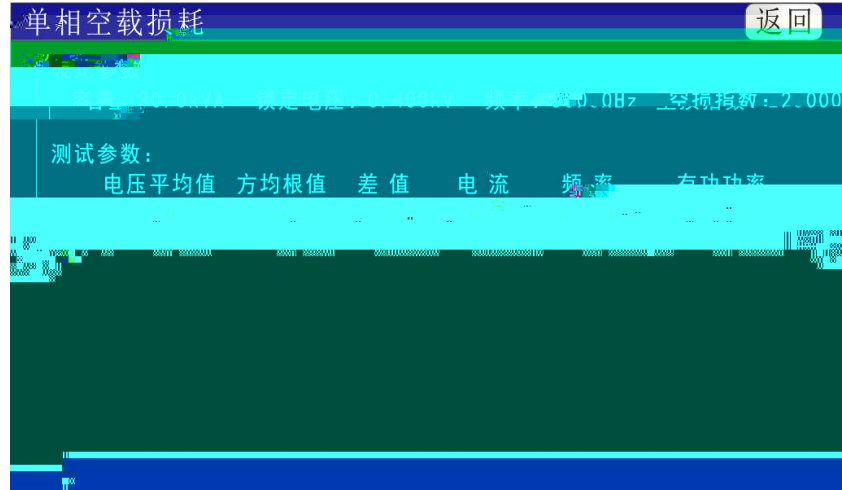


17

$$2I\sqrt{}$$

“ ” “ ”

18

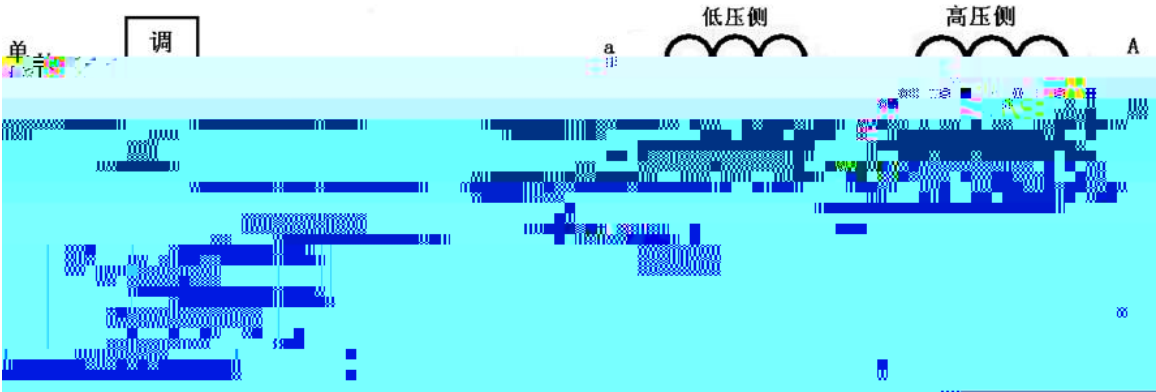


18

bc ao AC

19

20



19

ca

 $2/\sqrt{}$

“ ” “ ”

ca

24



24

“ ”

“ ”

“ ”

4

“ U ” “ 0 ”

“ IA+ ” “ IB+ ”

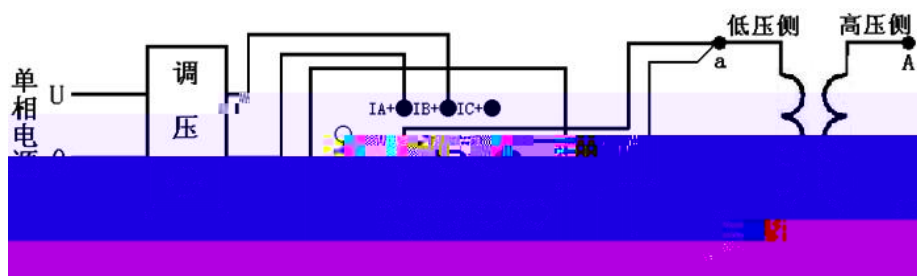
“ IA- ” “ UA ”

a

“ IB- ” “ UB ”

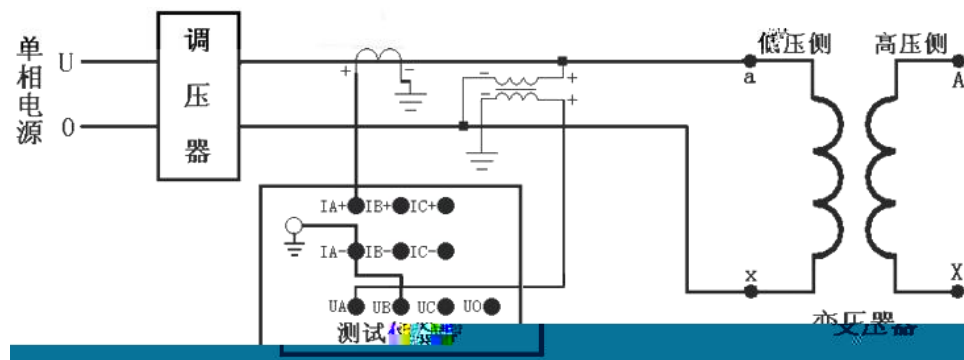
x

25



25

26

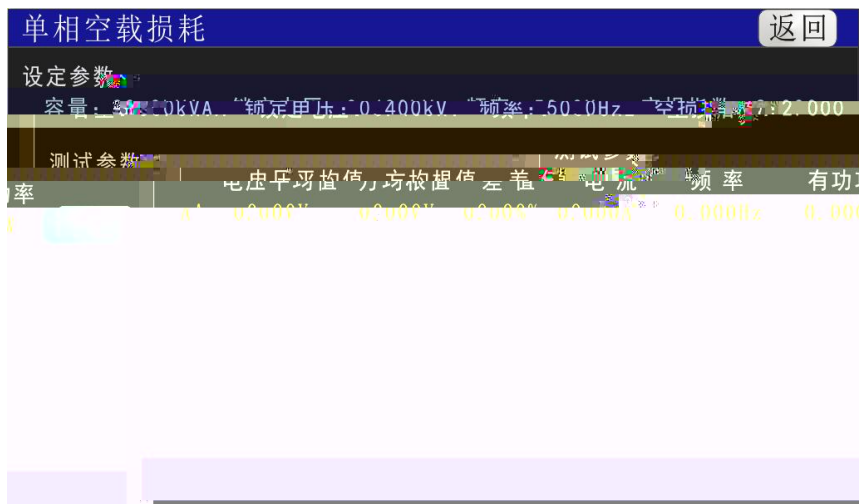


26

“ ” → “ ”

”

27



27

单相空载损耗

28



28

Å “ ”

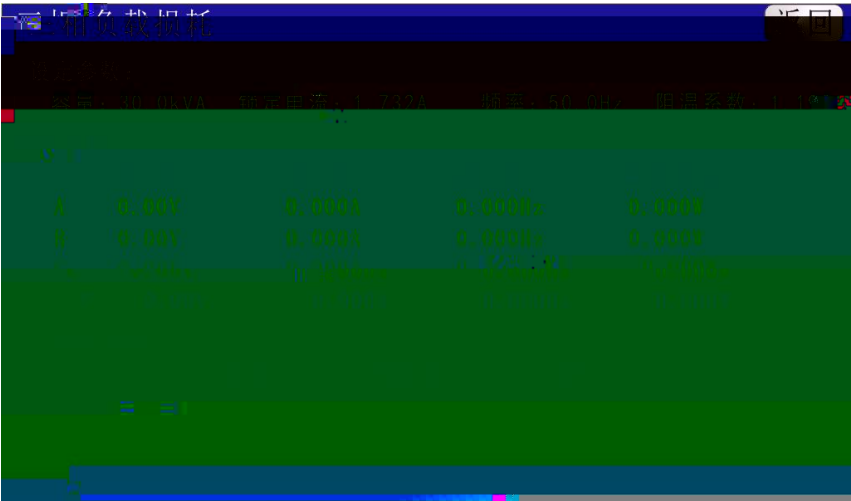
9 “ ”

X

0.9999 50.01Hz

单相空载损耗

YN “UA ” “UC ” “ Uo ” “ Un ” “ IA+ ” “ P+ ” “ IC+ ” “ IA- ” “ IC- ” 2



“ ” “ ”
 “ ” ()

(1)

(2)

$$I_N=S_N/(\sqrt{U_N})$$

(3)

(4)

K

t

T

$$\frac{235+T}{235+t}$$

$$\frac{225+T}{225+t}$$

(1)

A B C

A

B

C

(2)

P

(3)

(4)

(5)

(6)

(1)

U_K

U_N

(2)

(3)

(4)

(5)

(6)

2

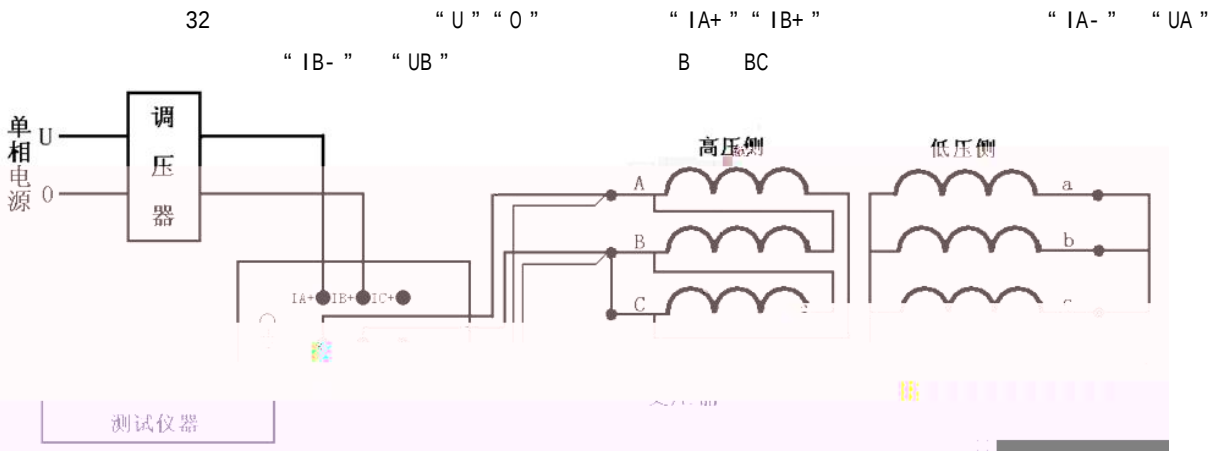
a

D

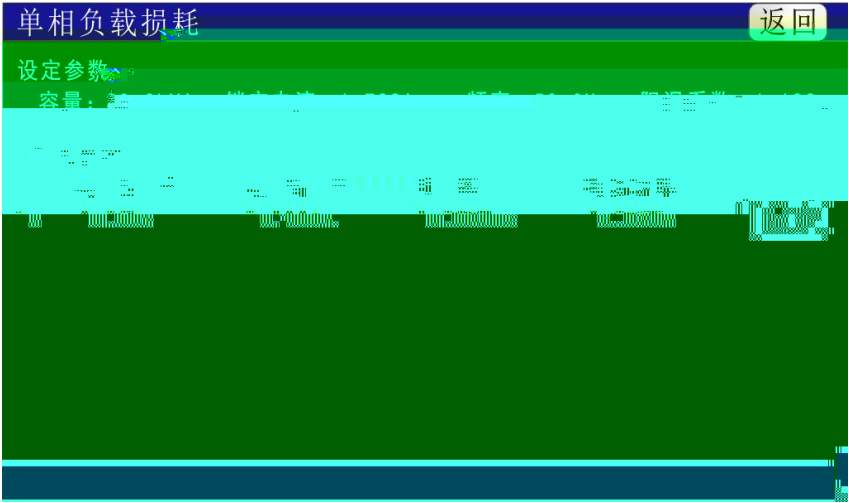
yn y d

AB

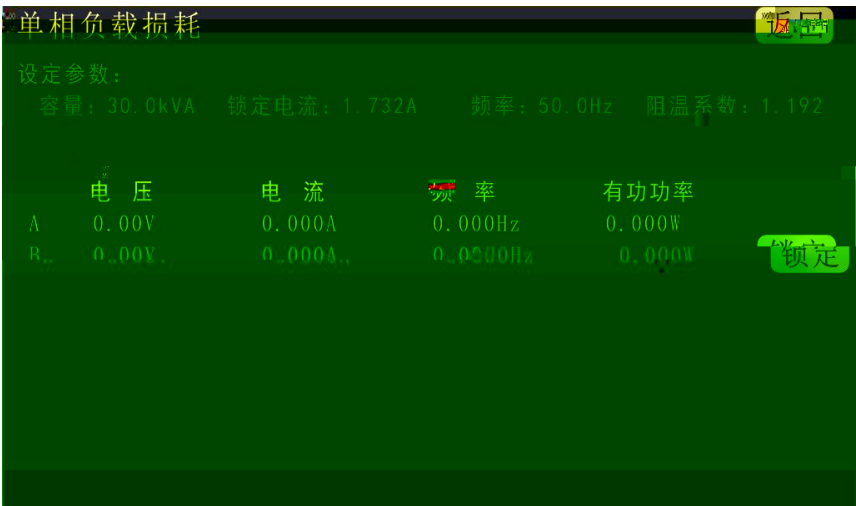
BC CA

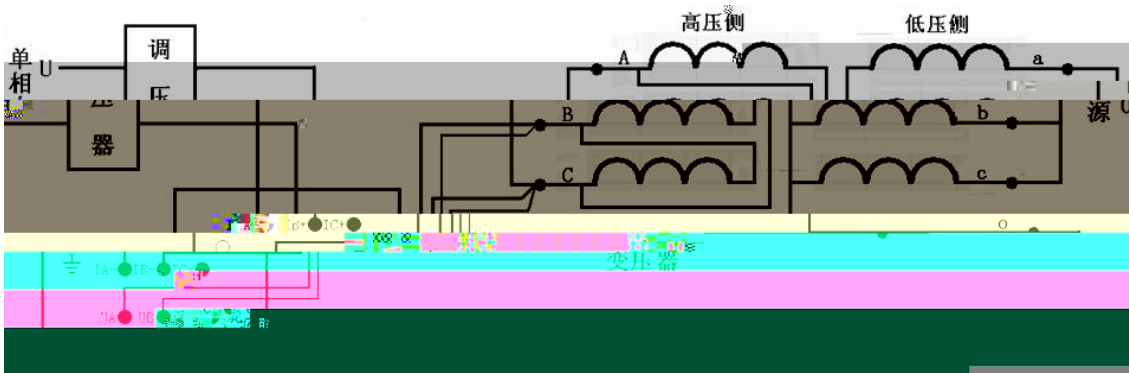


“ ” → “ ”



“ ” “ ” AB



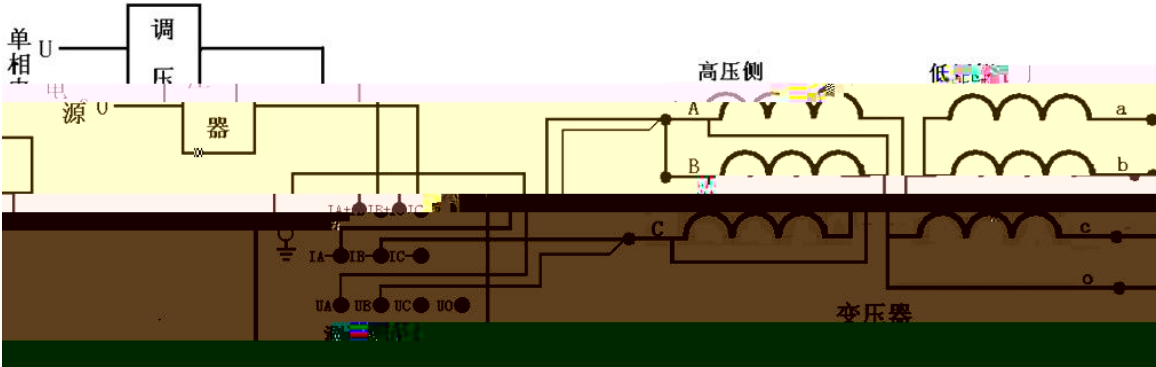


BC “ ” “ ” BC

36 CA

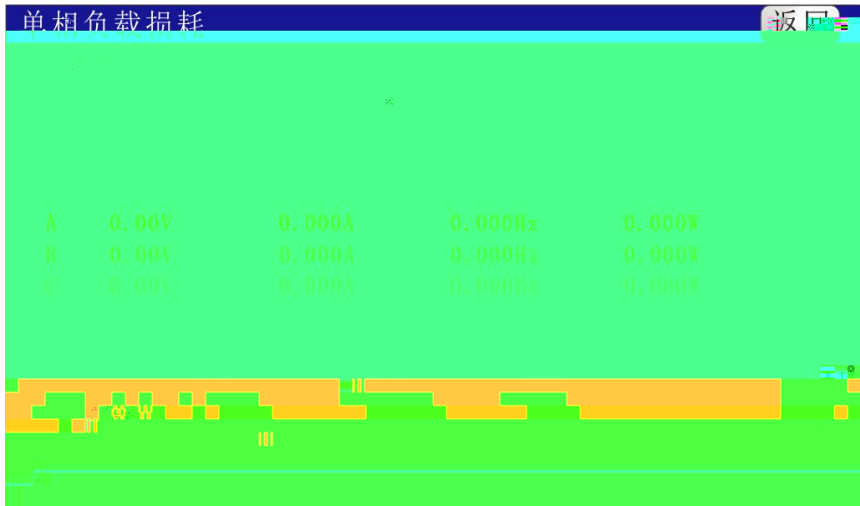
单相负载损耗					返回		
设定参数：							
容量：	30.0kVA	额定电流：	1.732A	频率：	50.0Hz	阻温系数：	1.192
测试参数：							
	电 压	电 流	频 率	有功功率			
A	0.00V	0.000A	0.000Hz	0.000W			
B	0.00V	0.000A	0.000Hz	0.000W			
C	0.00V	0.000A	0.000Hz	0.000W			

CA AB 37



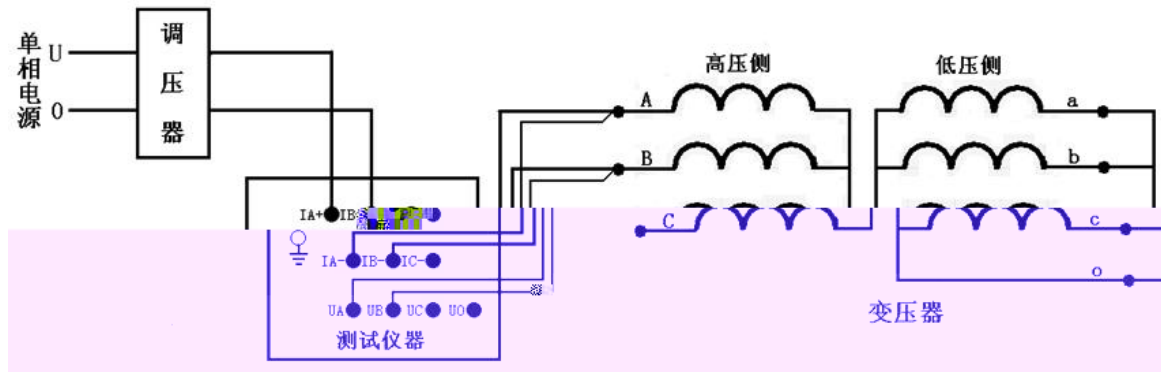
CA “ ” “ ” CA

38



38

“ ” “ ” “ ” “ ”
 “ ”
 ()
)
 b Y yn y d AB BC CA
 39 “ U ” “ 0 ” “ IA+ ” “ IB+ ” “ IA- ” “ UA ”
 “ IB- ” “ UB ” B



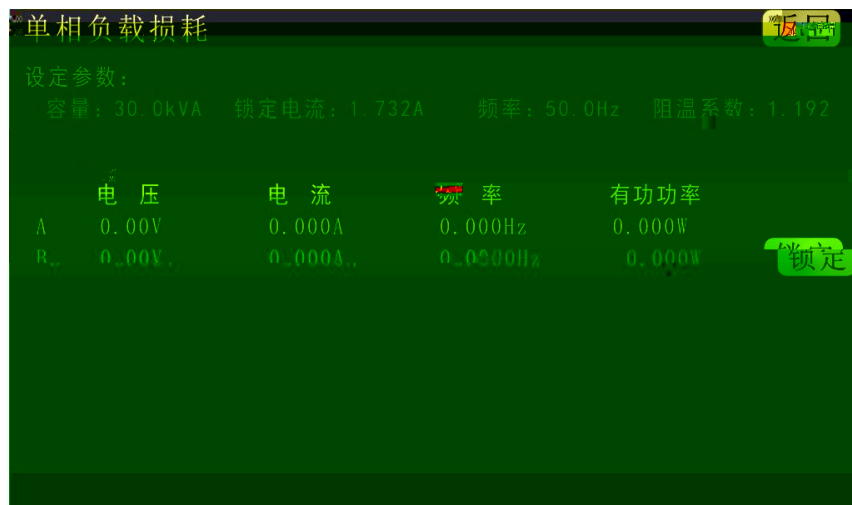
39

”

“

”

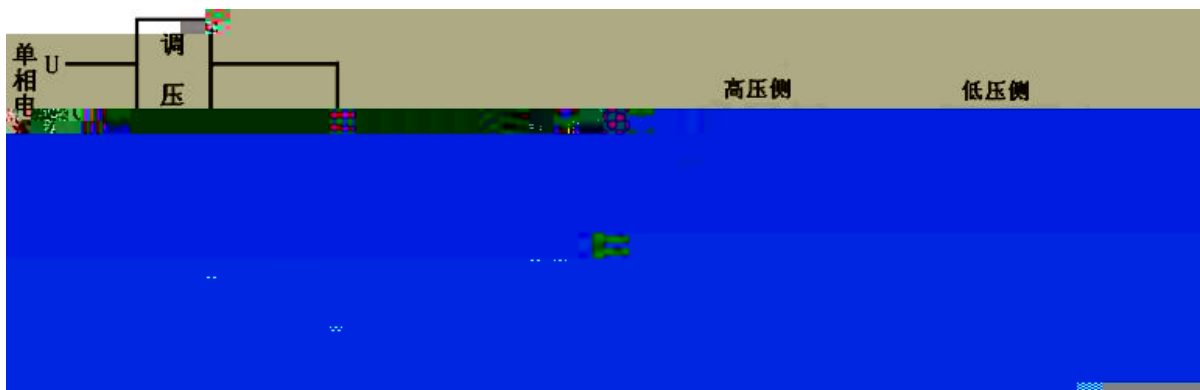
41 BC



41

BC

42

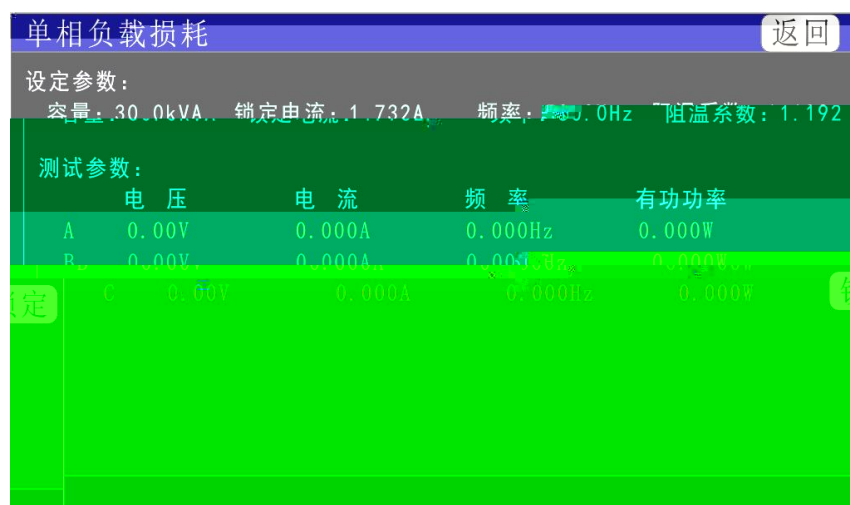


42

BC

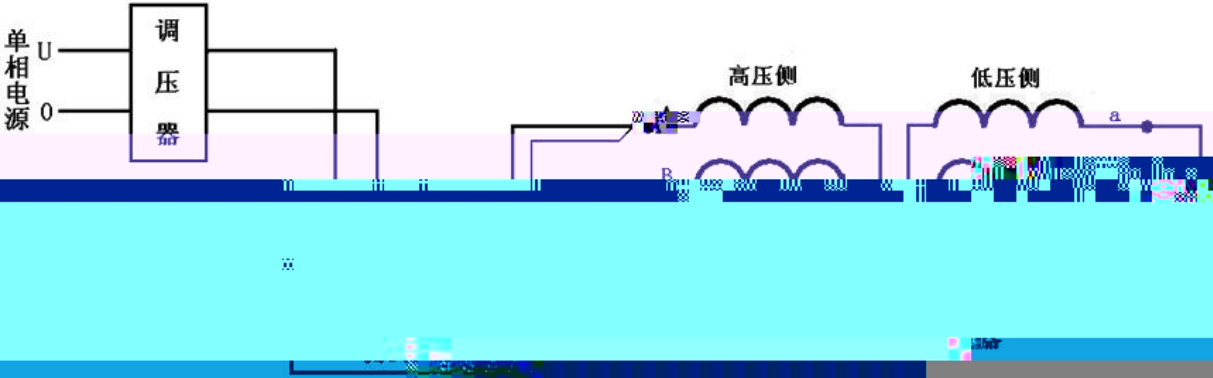
“ ” “ ” BC

43 CA

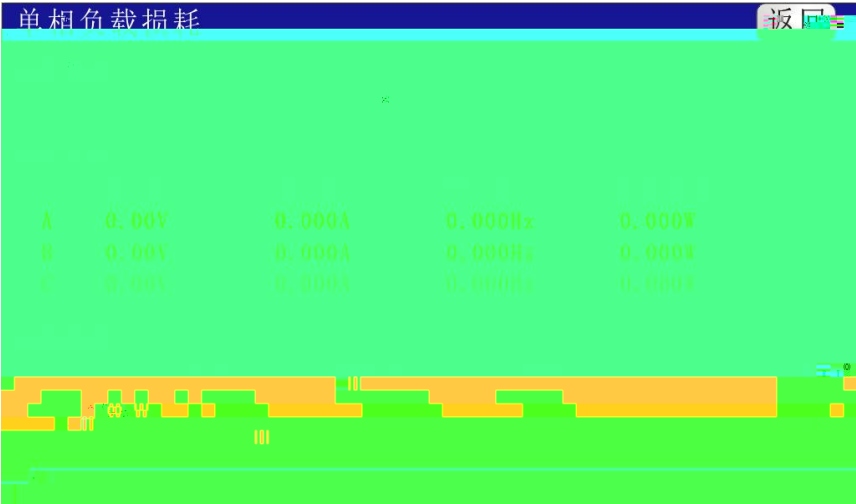


CA

44



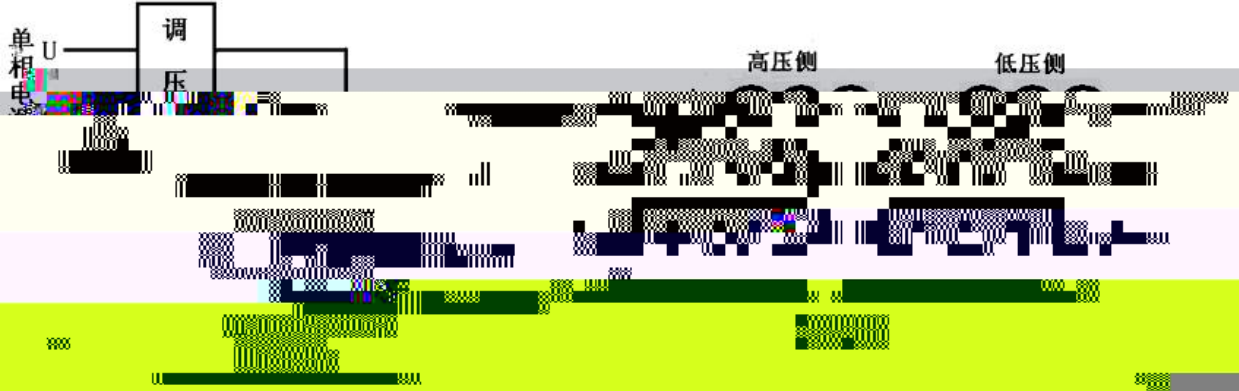
CA “ ” “ ” CA
45



45

“ ” “ ”
“ ” (“ ”
)
c YN yn d A0 B0 C0

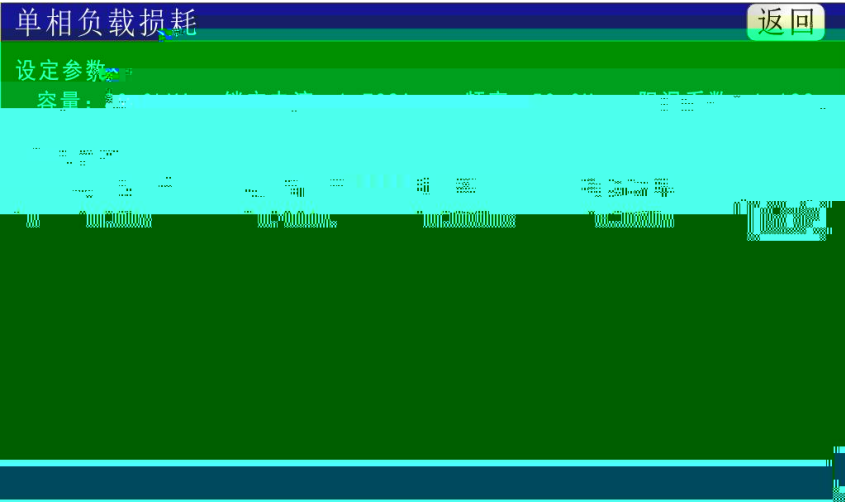
46 “ U ” “ 0 ” “ IA+ ” “ IB+ ” “ IA- ” “ UA ”
“ IB- ” “ UB ” 0



46

“ ” → “ ”

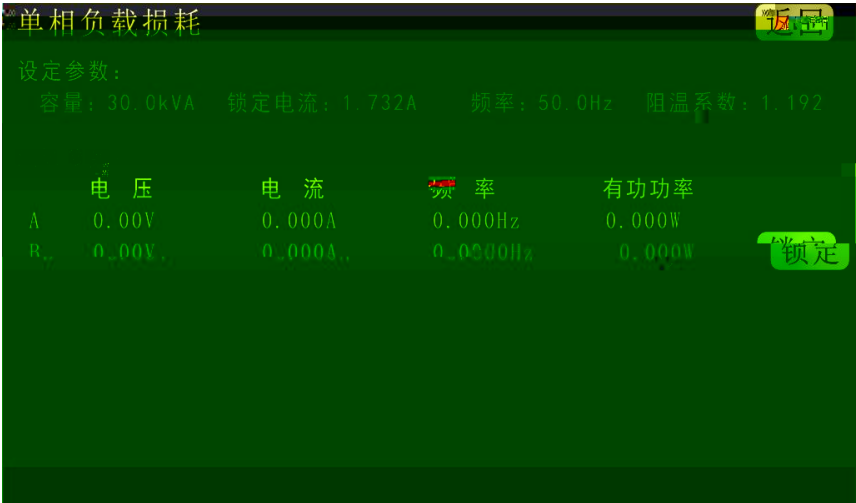
47



“ ” “ ” A

48

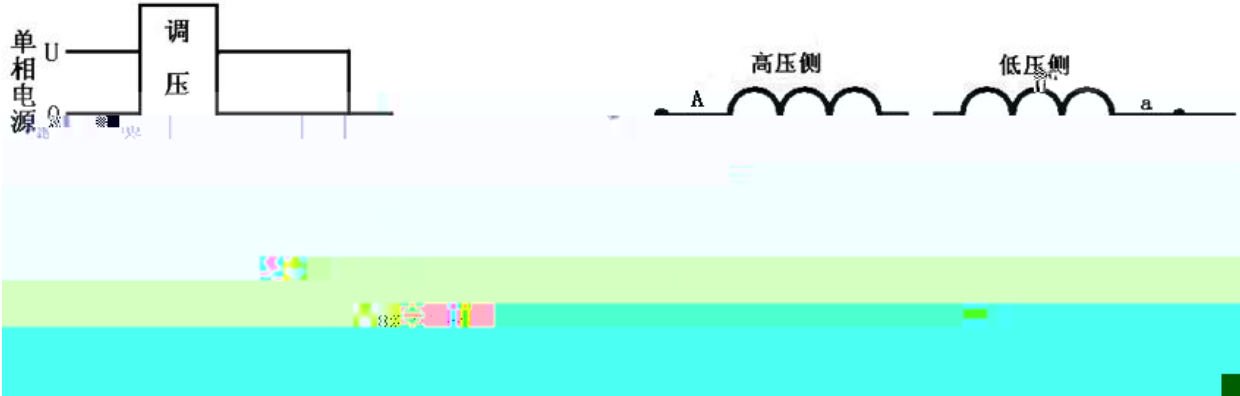
B



48

B0

49



49

B0

“ ” “ ” B0

50

C0

单相负载损耗

返回

设定参数：

容量：30.0kVA

额定电流：1.732A

频率：50.0Hz

阻温系数：1.192

测试参数：

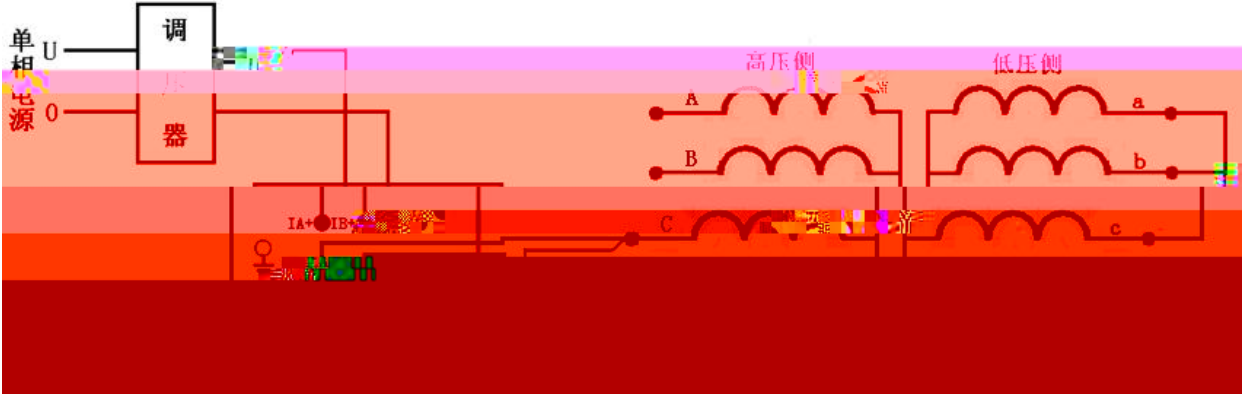
	电 压	电 流	频 率	有功功率
A	0.00V	0.000A	0.000Hz	0.000W
B	0.00V	0.000A	0.000Hz	0.000W
C	0.60V	0.000A	0.000Hz	0.000W

锁定

50

C0

51



51

C0

“

”

“

”

C0

52

单相负载损耗

返回

设定参数：

容量：30.0kVA

额定电流：1.732A

频率：50.0Hz

阻温系数：1.192

测试参数：

	电 压	电 流	频 率	有功功率
A	0.00V	0.000A	0.000Hz	0.000W
B	0.00V	0.000A	0.000Hz	0.000W
C	0.00V	0.000A	0.000Hz	0.000W

锁定

52

“

”

“

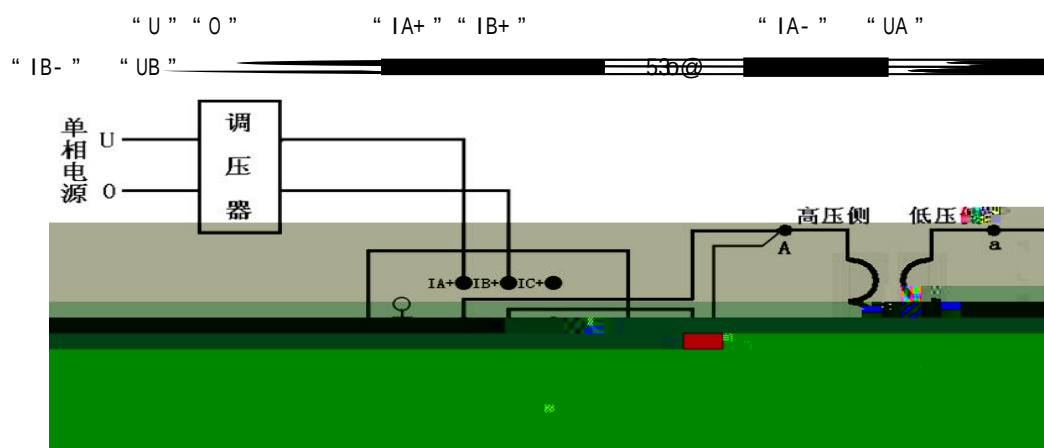
”

“

”

(

)



1

“ Ua ” “ Ub ” “ Uc ”

“ UA ” “ UB ” “ UC ”

YN

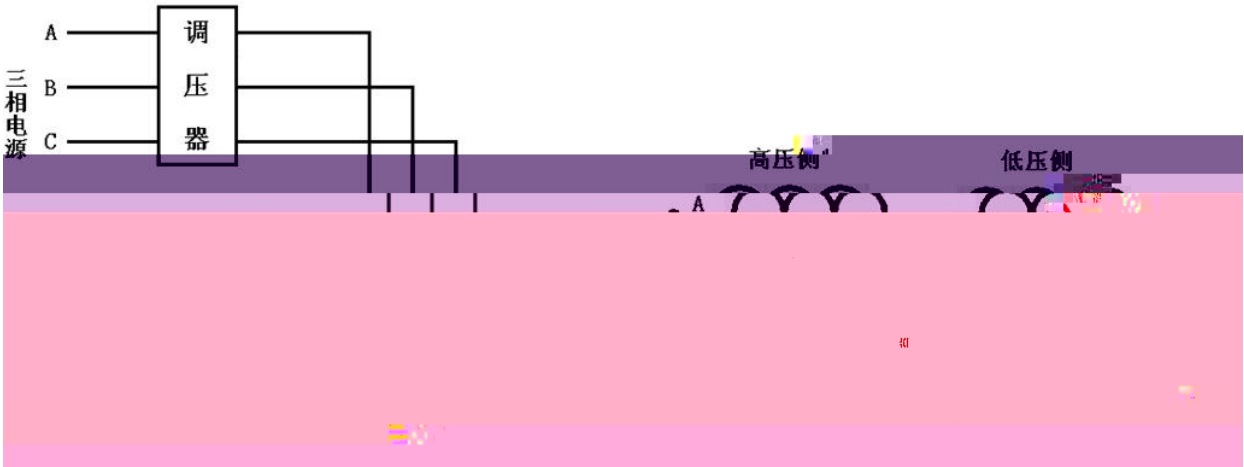
“ IA+ ” “ IB+ ” “ IC+ ”

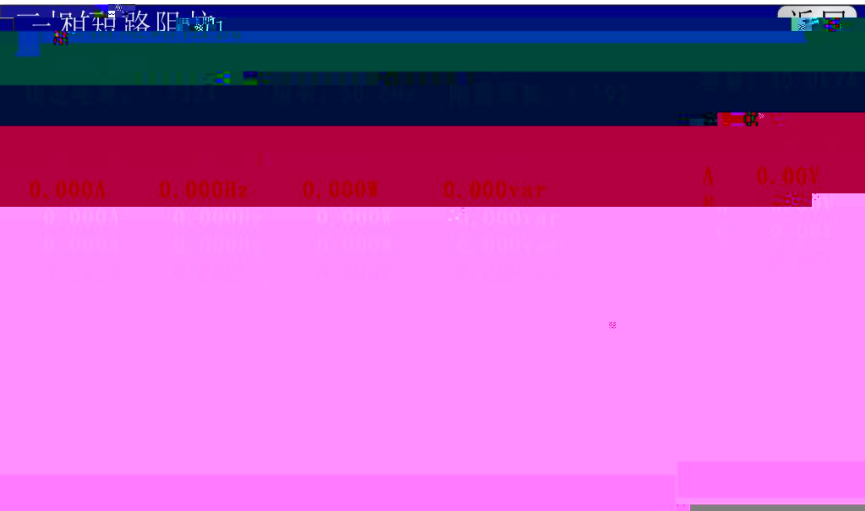
“ Uo ”

“ Un ”

“ IA- ” “ IB- ” “ IC- ”

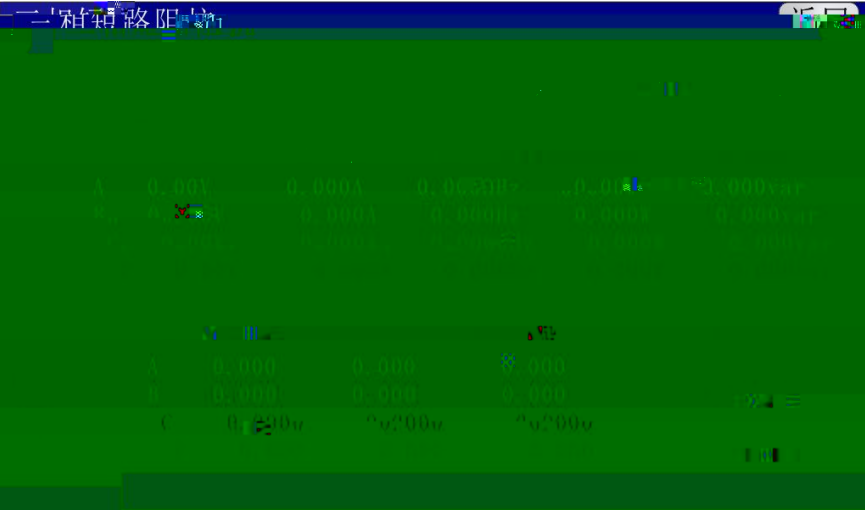
56





“ ” “ ”

58



“ ” “ ” “ ” “ ”

“ ” ()

(1)

(2)

(3)

(4)

K

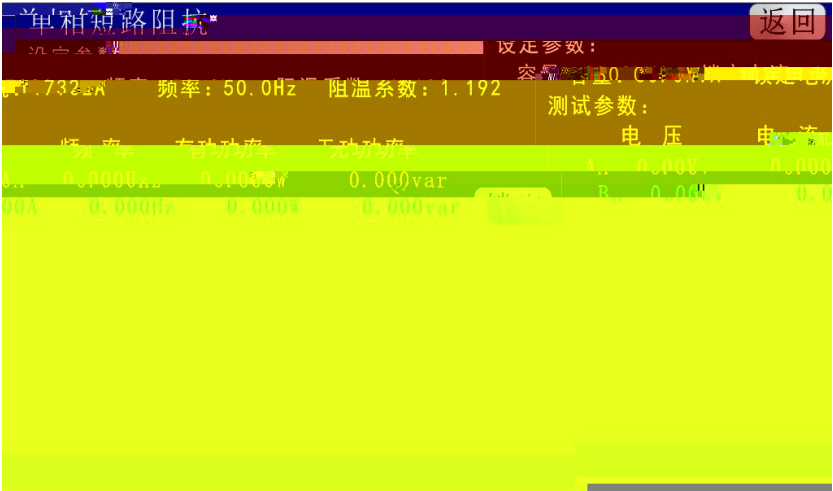
t

T

$$I_N = S_N / (\sqrt{U_N})$$

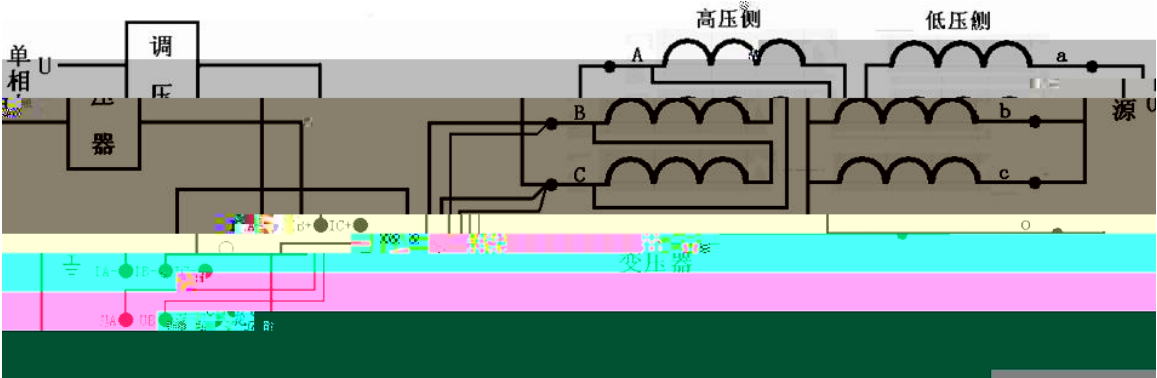
$$\frac{235 + T}{235 + t}$$

61 BC



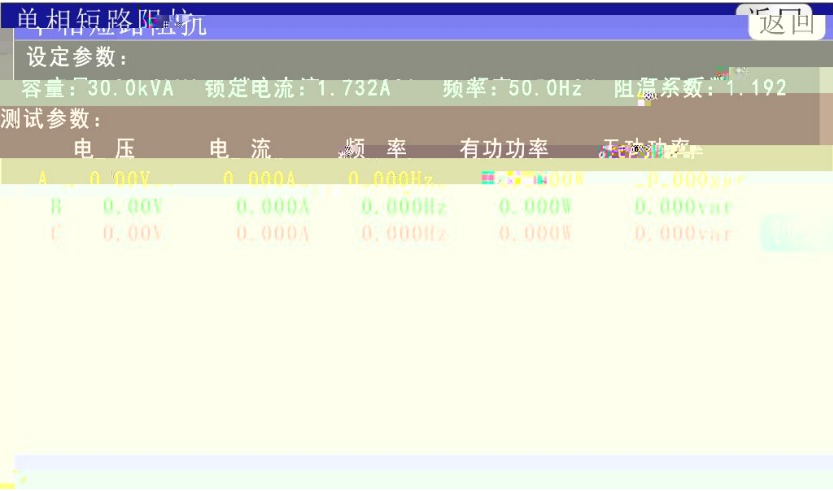
61

BC CA 62

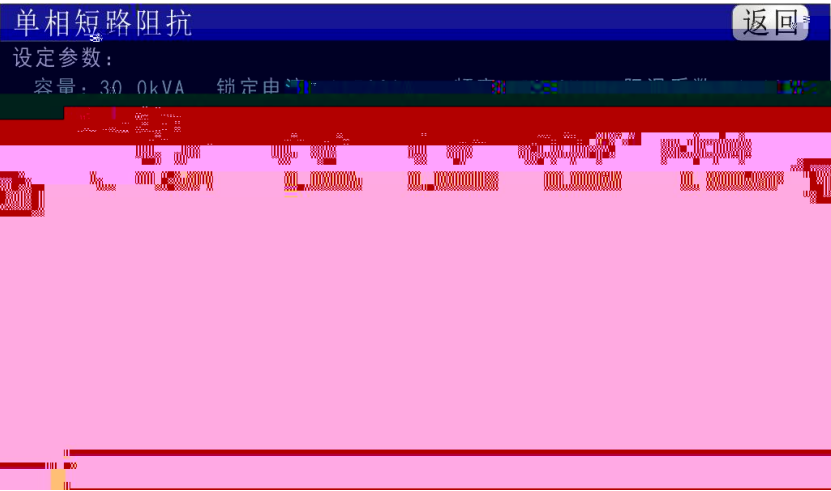


BC “ ” “ ” BC

63 CA



CA AB 64



“ ” Ò ”

“ ”

单相短路阻抗

返回

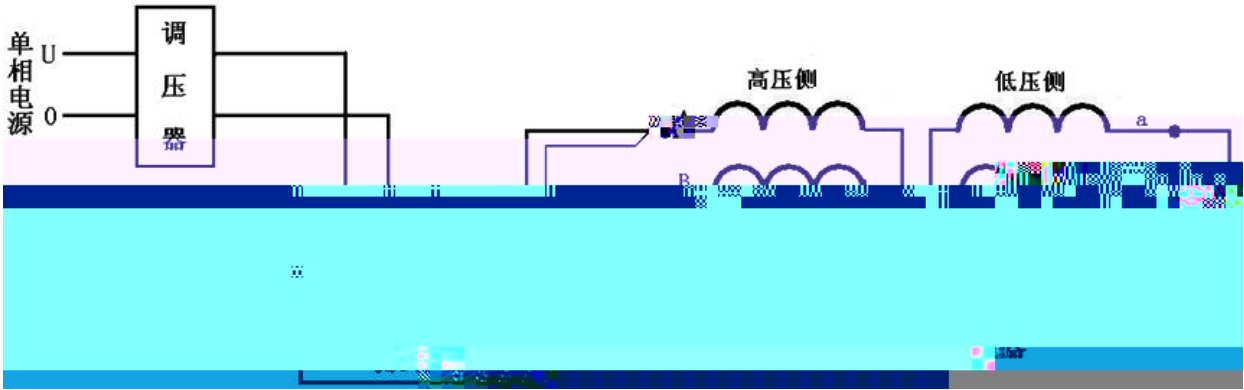
设定参数:

容量: 30.0kVA 额定电流: 1.732A 频率: 50.0Hz 阻温系数: 1.192

测试参数:

	电 压	电 流	频 率	有功功率	无功功率
A	0.00V	0.000A	0.000Hz	0.000W	0.000var
B	0.00V	0.000A	0.000Hz	0.000W	0.000var
C	0.00V	0.000A	0.000Hz	0.000W	0.000var

CA 71



CA “ ” “ ” CA

72

单相短路阻抗

返回

设定参数:

容量: 30.0kVA 额定电流: 1.732A 频率: 50.0Hz 阻温系数: 1.1

测试参数:

	电 压	电 流	频 率	有功功率	无功功率
A	0.00V	0.000A	0.000Hz	0.000W	0.000var
B	0.00V	0.000A	0.000Hz	0.000W	0.000var
C	0.00V	0.000A	0.000Hz	0.000W	0.000var

A	0.000	0.000	0.000	0.000	0.000
B	0.000	0.000	0.000	0.000	0.000
C	0.000	0.000	0.000	0.000	0.000

72

“ ” “ ”

“ ”

(

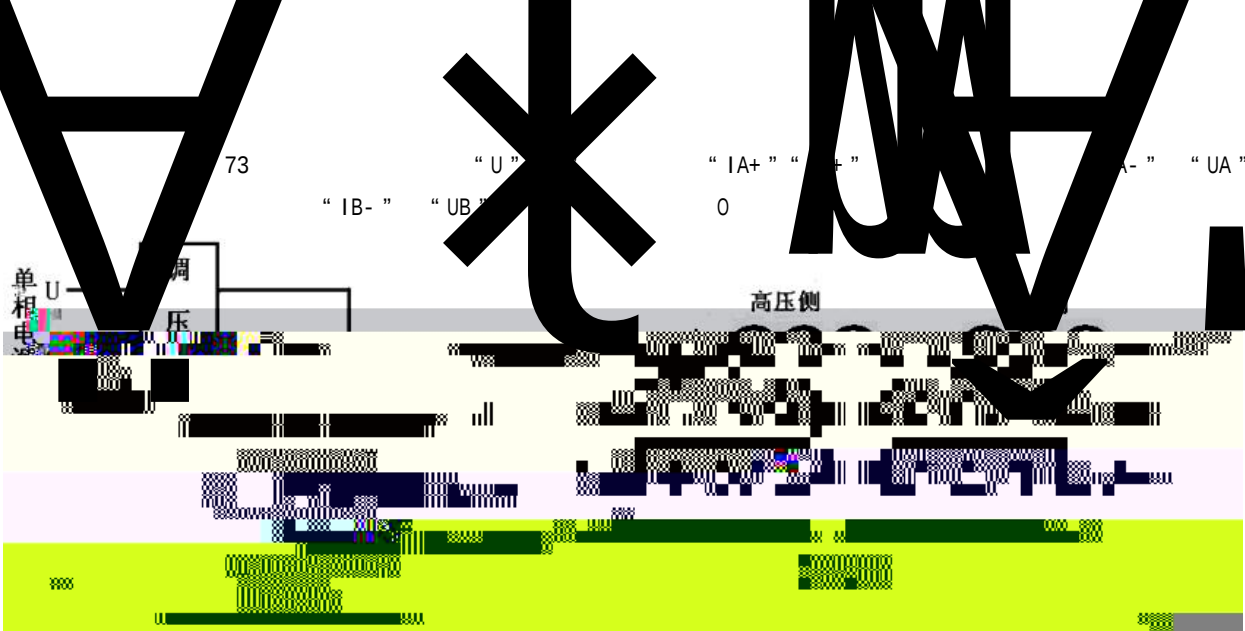
)

c

YN

yn d

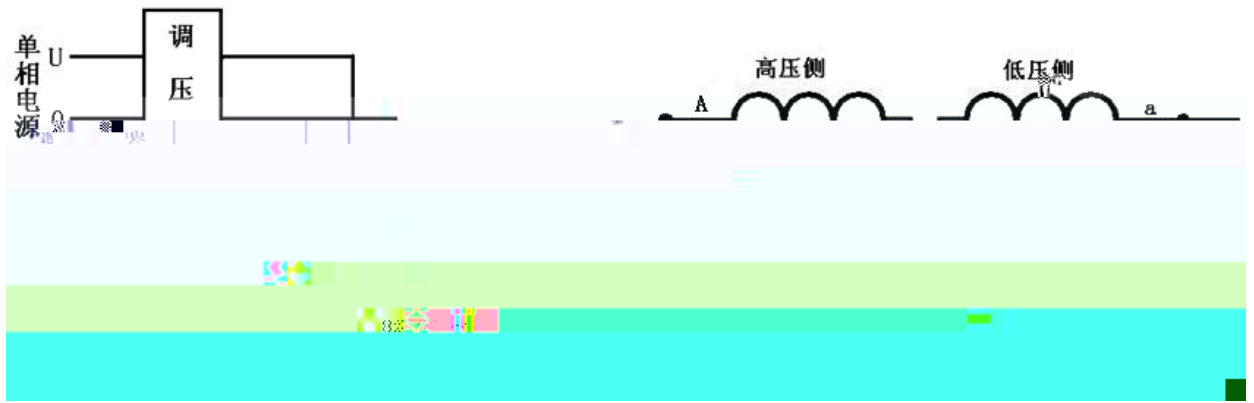
A0 B0 C0



73

“ ” → “ ”

74 y n



76

B0

“ ” “ ” B0

77

C0

单相短路阻抗

返回

设定参数:

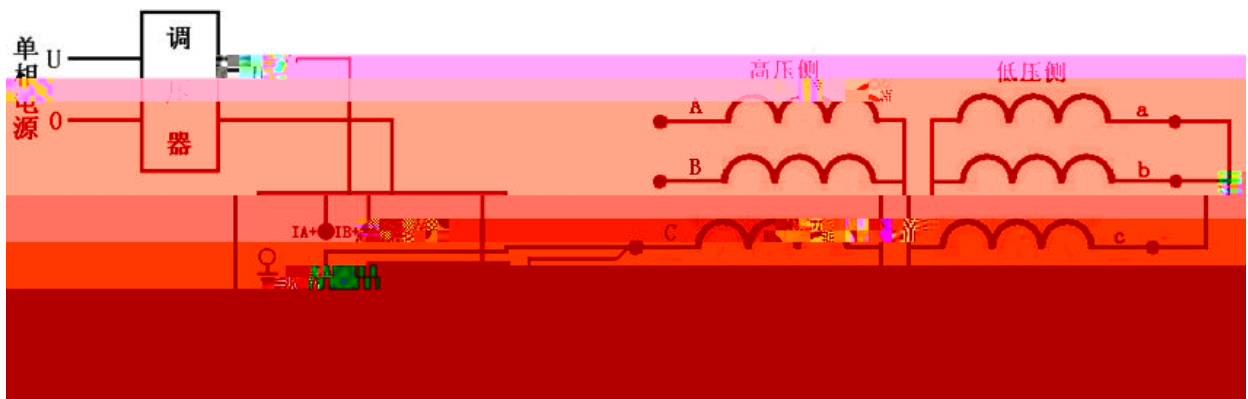
容量: 30.0kVA 额定电流: 1.732A 频率: 50.0Hz 阻感系数: 1.192

测试参数:

	电 压	电 流	频 率	有功功率	无功功率
A	0.00V	0.000A	0.000Hz	0.000W	0.000var
B	0.00V	0.000A	0.000Hz	0.000W	0.000var
C	0.00V	0.000A	0.000Hz	0.000W	0.000var

C0

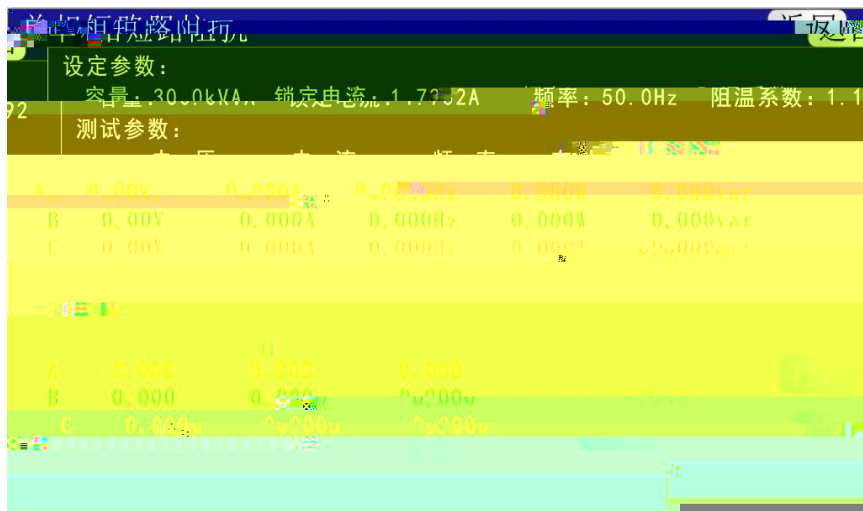
78



C0

“ ” “ ” C0

79



79

“ ” “ ”

(

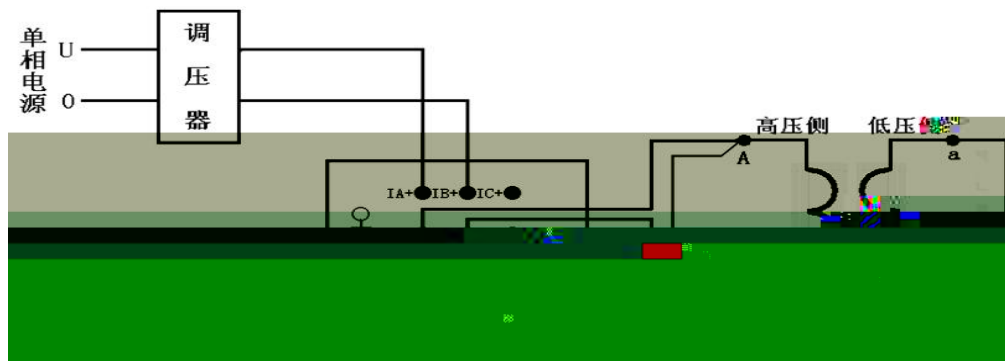
)

3

“ U ” “ 0 ” “ IA+ ” “ IB+ ” “ IA- ” “ UA ”

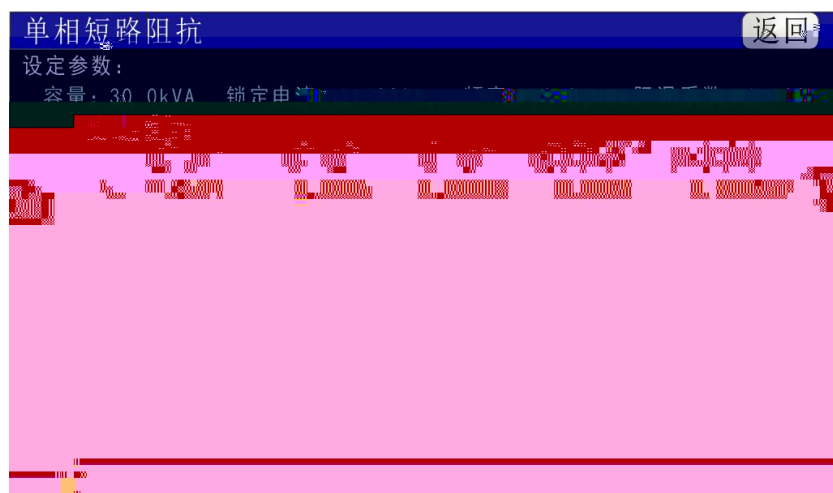
“ IB- ” “ UB ”

80

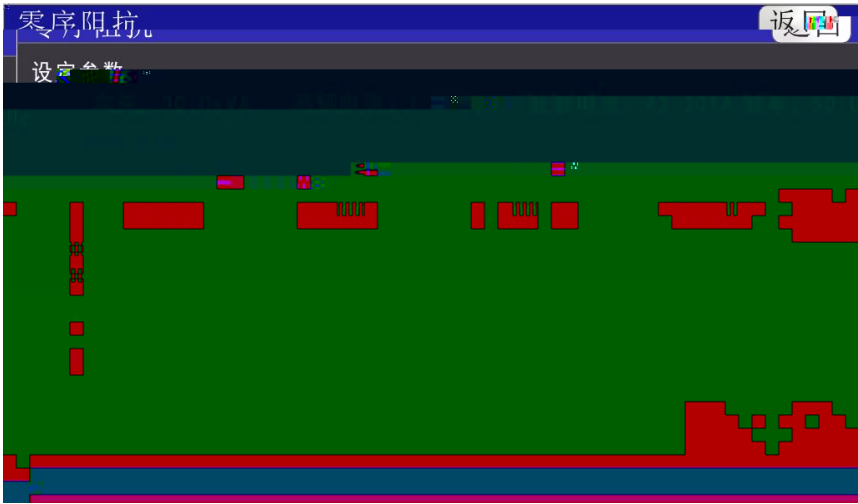


“ ” → “ ”

81



“ ” “ ” “ ” “ ”



84

“ ”

“ ”

b

YNyn0d11

1

ABC—O

A_mB_mC_m—O_m

	—	—	
	—		—
	—	—	
	—		—

c

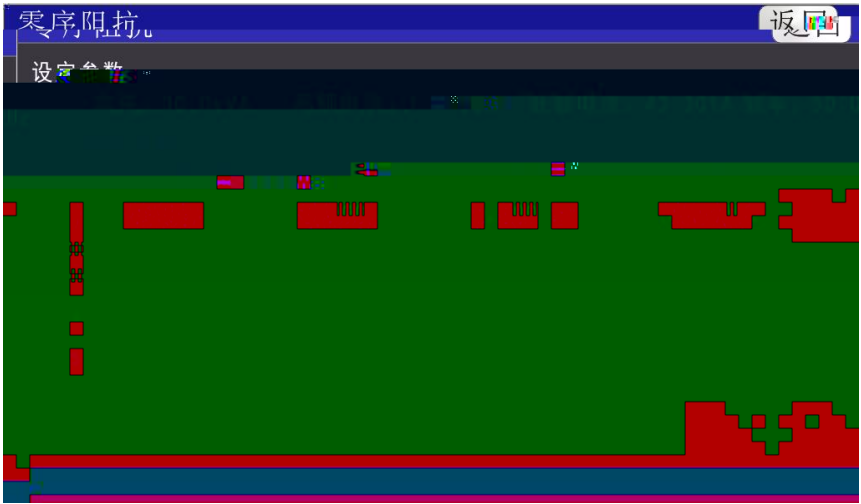
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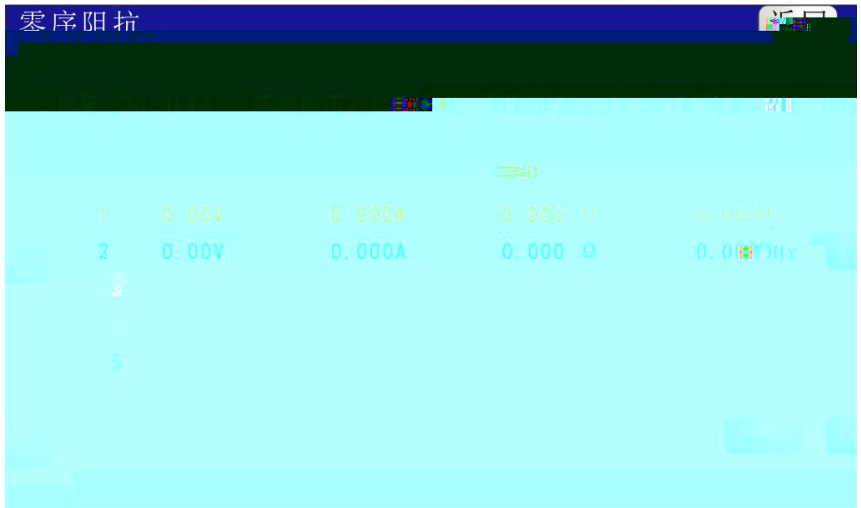
a



86

20%

87

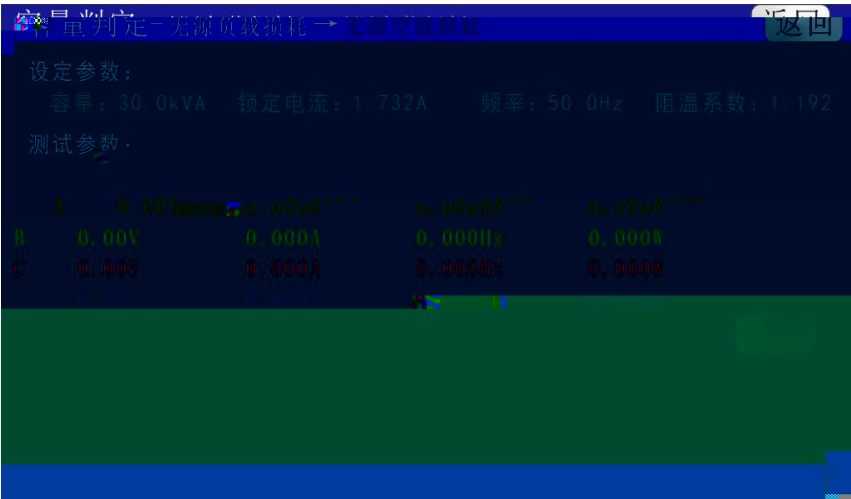


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b YNyn0yn0 2 ABC—O A_mB_mC_m—O_m
abc-o

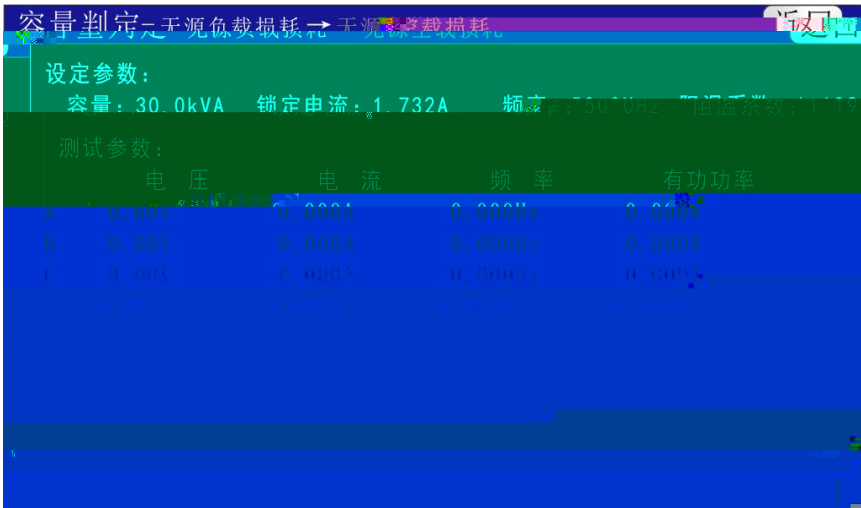
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c



89

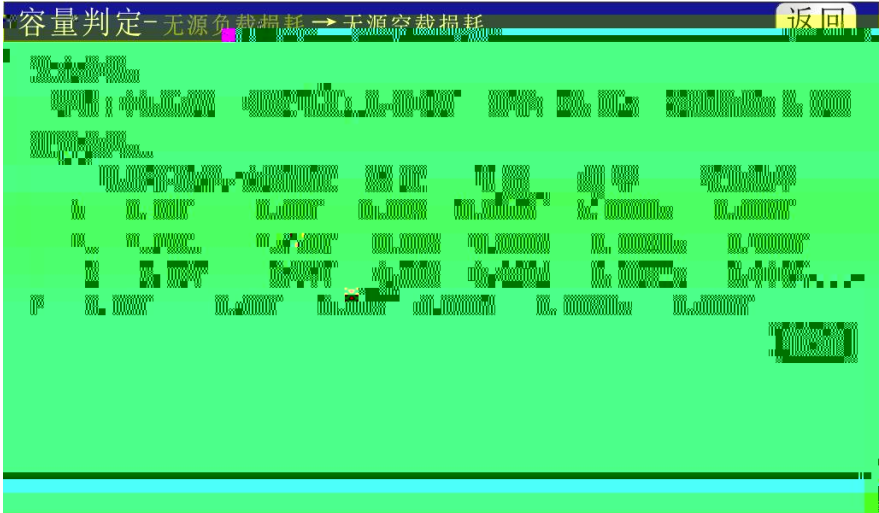
90



90

b

91

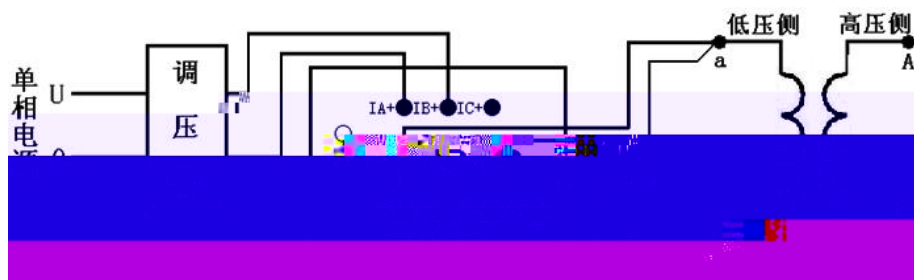


91

“ Ua ” “ Ub ” “ Uc ”

Ua

Ua Ub Uc



95

1% 20%

1

2

“ IA- ” “ IB- ” “ IC- ” “ UA ” “ UB ” “ UC ”

YN

“ Uo ”

“ Un ”

96



96

“ ” → “ ”

97

容量判定-有源负载损耗 → 无源空载损耗

设定参数:

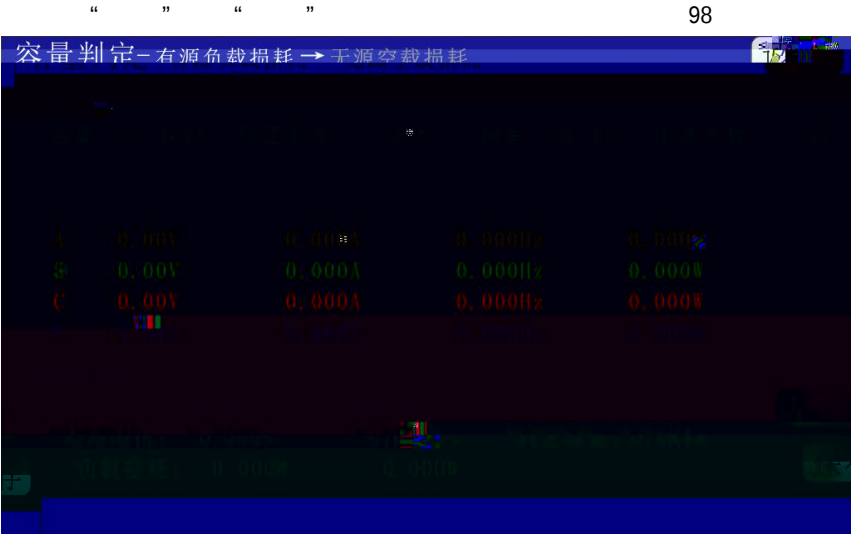
容量: 30.0kVA 额定电流: 173.2A 频率: 50.0Hz 功率因数: 1.192

测试参数:

	电压	电流	频率	有功功率
A	0.00V	0.00A	0.00Hz	0.00W
B	0.00V	0.00A	0.00Hz	0.00W
C	0.00V	0.00A	0.00Hz	0.00W
P	0.00V	0.00A	0.00Hz	0.00W

锁定

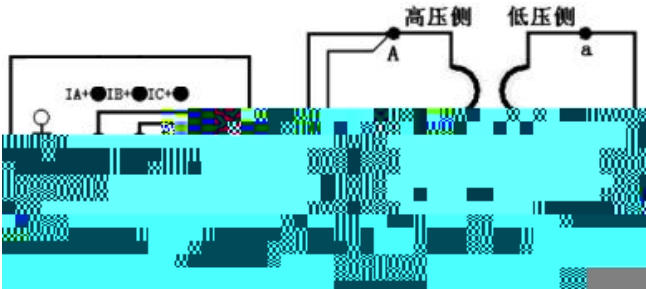
97



98

3

99



“ IA- ” “ UA ” “ IB- ” “ UB ” “ Ua ” “ Ub ” “ Uc ” “ IA+ ” “ IB+ ” “ IC+ ” “ IA- ” “ IB- ” “ IC- ” “ U0 ” “ Ub ” “ U0 ”

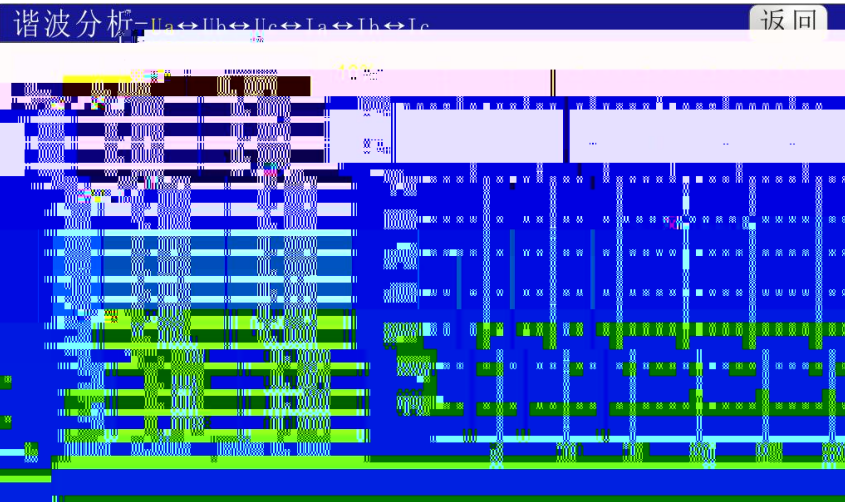


44 ↑ 33 44 ↓ 33 33

44

33

101



101

44 33 44 33

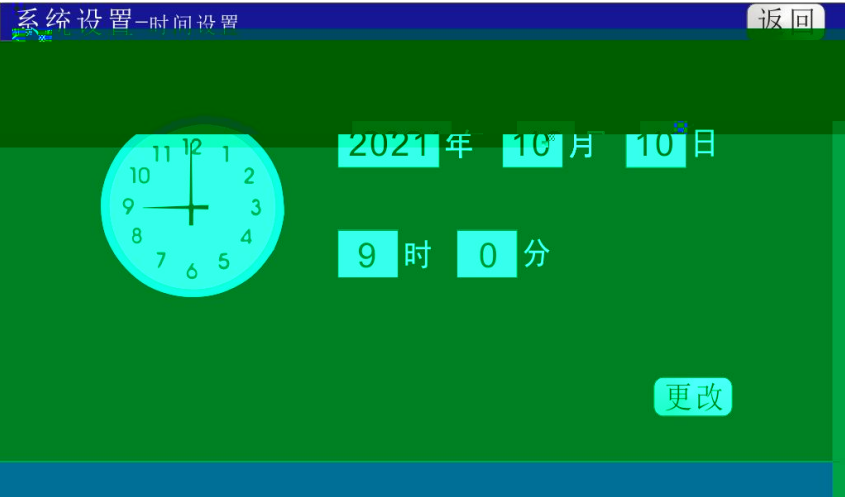
- (1) Ua

A

Ia

A
- (2) HRUh

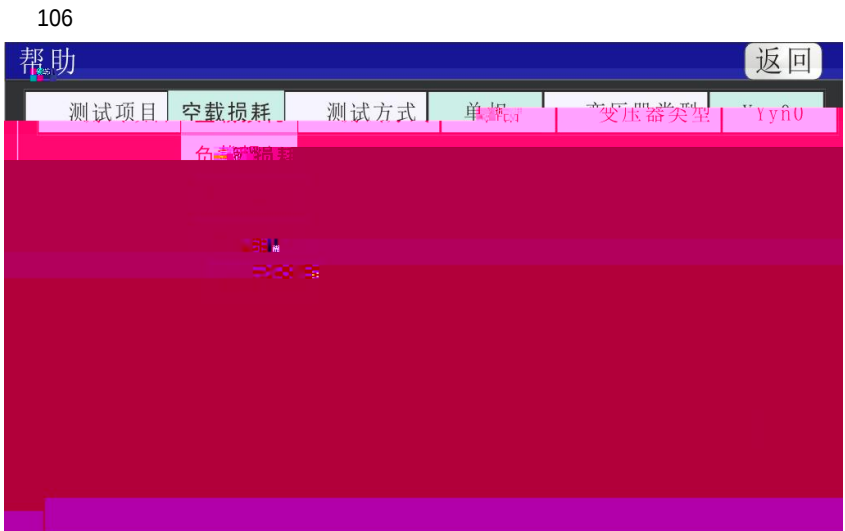
HRUh
- (3) RMSh
- (4)
- (5) THD
- (6) RMS



(4)



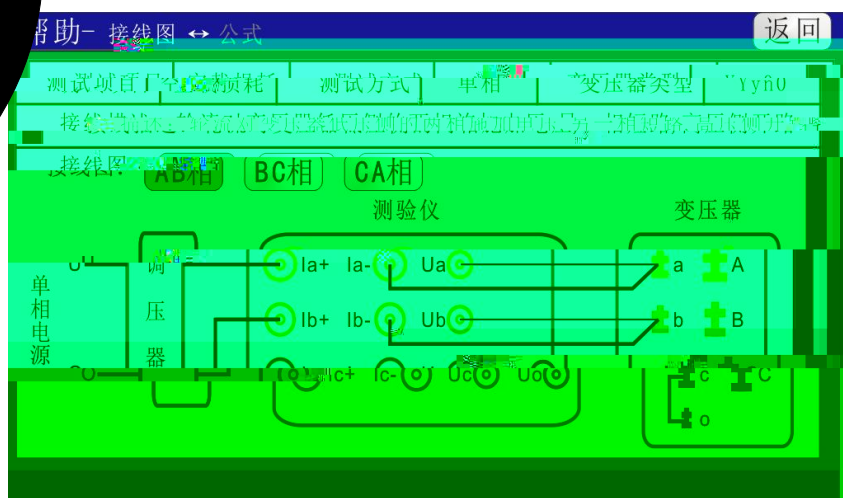
(1)



(2)

“ ”

107



(3)

108

帮助- 接线图 ↔ 公式

测试项目 空载损耗 测试方式 单相 变压器类型 Yyn0

计算公式:

空载电流: $I_0\% = \frac{0.333(I_a + I_b + I_c)}{I_N} \times \left(\frac{U_N}{U}\right)^n \times 100\%$

空载损耗: $P_0\% = \frac{(P_{ab} + P_{bc} + P_{ac})}{2} \times \frac{U_N}{U} \times \left(1 + \frac{U' - U_0}{U'}\right) \times \left[0.5\left(\frac{f}{f_0}\right)^2 + 0.5\left(\frac{f_0}{f}\right)^2\right]$

I_a, I_b, I_c —三相实测电流

U_N, I_N, f_N —绕组额定电压、电流、频率

U' —测试时所加平均值电压

n —空损指数

U —测试时所加均方根值电压

$P_{ab}, P_{bc}, P_{ac}, f$ —实测有功功率、频率

2		1
3		1
5		1
6		2
7		1
8	2	1
9		1
10		3

	1)	2)		
	1)	2)	3)	
	1)	2)	3)	(
	) 4			

N

x

x

x

6-10KV			30kVA-2500kVA															
			W					W		%								
kVA	S9	S10	S11	S12	S13	S9	S13/S13-RL		S10	S13	S9	S13-RL	%					
					S13-RL	Dyn11	Yyn0											
					Yzn11													
30	130	110	100	90	80	630	600		1.5		2.3	0.3						
50	170	150	130	120	100	910	870		1.7									

4.0

6-10KV

30kVA-2500kVA

6-10KV

30kVA-2500kVA

6-10KV																	
	kW					kW					%		%				
	S9	S10	S11	S12	S13	S9	S10	S11	S13	S9	S11	S9	S11				
										S10	S13	S10	S13				
										630kVA-6300kVA							
					6kV					3kV							
630	1.03	0.927	0.82	0.738	0.656	7.29	6.925	6.92	1.1	0.6	4.5						
800	1.26	1.134	1.0	0.9	0.8	8.91	8.464	8.46	1.0	0.6							
1000	1.48	1.332	1.18	1.062	0.944	10.44	9.918	9.91	1.0	0.6							
1250	1.75	1.575	1.4	1.26	1.120	12.42	11.799	11.7	0.9	0.5							
1600	2.11	1.899	1.68	1.512	1.344	14.85	14.107	14.1	0.8	0.4							
2000	2.52	2.268	2.01	1.809	1.608	17.82	16.929	16.9	0.8	0.4	5.5		5.5				
2500	2.97	2.673	2.37	2.133	1.896	20.7	19.665	19.6	0.8	0.4							
3150	3.51	3.159	2.8	2.52	2.24	24.3	23.085	23.0	0.7	0.4							
4000	4.32	3.888	3.45	3.105	2.76	28.8	27.36	27.3	0.7	0.4							
5000	5.13	4.617	4.1	3.69	3.28	33.03	31.378	31.3	0.7	0.4							
6300	6.12	5.508	4.89	4.401	3.912	36.9	35.055	35.0	0.6	0.4							
200kVA-2500kV																	
										0.4kV							
200	0.47 0.29	0.423 0.204	0.38 0.144	0.342 0.166	0.304	3.06	2.907	2.9	1.7	1.0							

20KV

30kVA-2500kVA

kVA	W				W		%	
	S11	S12	S13	SH15	S11 S13/SH15		S11 S13 SH15	S11 S13 SH15
					Dyn11 Yzn11	Yyn0		
30	100	90	80	40	690	660	2.1	5.5
50	130	117	104	55	1010	960	2.0	
63	150	135	120	65	1200	1150	1.9	
80	180	162	144	75	1440	1370	1.8	
100	200	180	160	90	1730	1650	1.6	
125	240	216	192	100	2080	1980	1.5	
160	290	261	232	120	2540	2420	1.4	
200	340	306	272	145	3000	2860	1.3	
250	400	360	320	165	3520	3350	1.2	
315	480	432	384	200	4210	4010	1.1	
400	570	513	456	240	4970	4730	1.0	
500	680	612	544	290	5940	5660	1.0	
630	810	729	648	370	6820	6820	0.9	6.0
800	980	882	784	450	8250	8250	0.8	
1000	1150	1035	920	530	11330	11330	0.7	
1250	1380	1242	1104	620	13200	13200	0.7	
1600	1660	1494	1328	750	15950	15950	0.6	
2000	1950	1755	1560	900	19140	19140	0.6	
2500	2340	2106	1872	1080	22220	22220	0.5	

35KV

50kVA-1600kVA

0

35KV					630kVA-31500kVA								
kW					kW					%		%	
kVA	S9	S10	S11	S12	S13	S9	S10	S11	S13	S9	S11	S9	S11
								S12		S10	S13	S10	S13
630kVA-31500kVA						3-10.5kV							
630	1.04	0.936	0.83	0.747	0.664	8.28	7.866	7.86	7.86	1.1	0.65		
800	1.23	1.107	0.98	0.882	0.784	9.90	9.405	9.40	9.4	1.0	0.65		
1000	1.44	1.296	1.15	1.035	0.92	12.15	11.542	11.50	11.5	1.0	0.65		
1250	1.76	1.584	1.4	1.26	1.12	14.67	13.936	13.90	13.9	0.9	0.55	6.5	6.5
1600	2.12	1.908	1.69	1.521	1.352	17.55	16.672	16.60	16.6	0.8	0.45		
2000	2.72	2.448	2.17	1.953	1.562	19.35	18.382	18.30	18.3	0.7	0.45		
2500	3.20	2.88	2.56	2.304	2.048	20.70	19.665	19.60	19.6	0.6	0.45		
3150	3.80	3.42	3.04	2.736	2.432	24.30	23.085	23.00	21.9	0.56	0.45		
4000	4.52	4.068	3.61	3.249	2.888	28.80	27.36	27.30	25.9	0.56	0.45	7.0	7.0
5000	5.40	4.86	4.32	3.888	3.456	33.03	31.378	31.30	29.7	0.48	0.45		
6300	6.56	5.904	5.24	4.716	4.192	36.90	35.055	35.00	33.3	0.48	0.45		
												7.5	
													8.0

8



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35KV	630kVA-31500kVA				
		kW	kW	%	%
kVA	S20	S22	S20/S22	S20/S22	S20/S22
3150kVA-31500kVA			3-10.5kV		
3150	2.0	1.7	20.7	0.45	
4000	2.3	2.0	24.6	0.45	7.0
5000	2.8	2.4	28.2	0.45	
6300	3.4	2.9	31615		

3M

05

54 12

12

13

2



66KV

66KV

kVA	kW		kW	%	%
	S20	S22	S20/S22	S20/S22	S20/S22
3150kVA-63000kVA			6.3-10.5kV		
3150	2.6	2.2	20.7	0.84	8.0
4000	3.1	2.6	24.6	0.80	
5000	3.7	3.1	27.6	0.68	
6300	4.7	4.0	30.8	0.60	9.0
8000	5.8	4.9	36.5	0.60	
10000	6.8	5.8	43.0	0.56	
12500	8.1	6.8	51.1	0.56	
16000	9.8	8.3	62.8	0.52	
20000	11.4	9.7	76.1	0.52	
25000	13.5	11.4	90.0	0.48	
31500	16.0	13.5	108.0	0.44	
40000	19.1	16.2	126.9	0.44	
50000	22.9	19.4	150.3	0.40	
63000	27.0	22.9	178.2	0.36	
6300kVA-63000kVA			6.3-10.5kV		
3150	5.2	4.4	30.8	0.60	9.0
4000	6.2	5.3	36.5	0.60	
5000	7.3	6.2	43.0	0.56	
6300	8.7	7.4	51.1	0.56	
8000	10.5	8.9	62.8	0.52	
10000	12.5	10.6	76.1	0.52	
12500	14.8	12.5	90.0	0.48	
16000	17.5	14.8	108.0	0.44	
20000	20.9	17.7	126.9	0.44	
25000	24.7	20.9	160.03	0.40	
31500	29.2	24.7	178.2	0.36	

110KV

kVA	kW					kW					%		%	
	S9	S10	S11	S12	S13	S9	S10	S11 S12	S13	S9 S10	S11 S13	S9	S13	
	6300kVA-180000kVA					6.3-21kV								
6300	9.3	8.37	7.4	6.66	5.9	36.0	34.2	35.0	33.0	0.77	0.62			
8000	11.2	10.08	8.9	8.01	7.1	45.0	42.75	42.0	40.0	0.77	0.62			
10000	13.2	11.88	10.5	9.45	8.4	53.0	50.35	50.0	48.0	0.72	0.58			
12500	15.6	14.04	12.4	11.16	9.9	63.0	59.85	59.0	56.0	0.72	0.58			
16000	18.8	16.92	15.0	13.5	12.0	77.0	73.15	73.0	69.0	0.67	0.54			
20000	22.0	19.8	17.6	15.84	14.1	93.0	88.35	88.0	84.0	0.67	0.54	10.5		
25000	26.0	23.4	20.8	18.72	16.6	110.0	104.5	104.0	99.0	0.62	0.50			
31500	30.8	27.72	24.6	22.14	19.7	133.0	126.35	123.0	117.0	0.60	0.48			
40000	36.8	33.12	29.4	26.46	23.5	156.0	148.2	148.0	141.0	0.56	0.45			
50000	44.0	39.6	35.2	31.68	28.2	194.0	184.3	175.0	166.0	0.52				

110KV

kW

kW

%

%

kVA

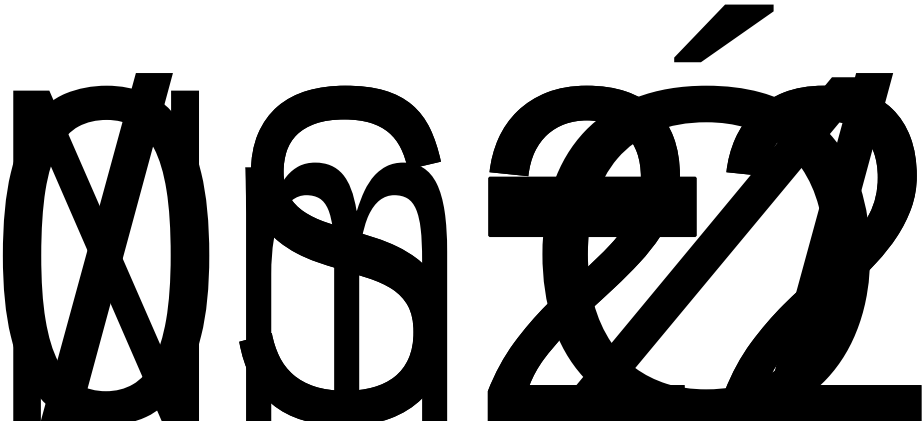
S20

S22

S20/S22

S20/S22

S20/S22



220KV

kW							kW		%		%		
kVA	S9	S10	S11	S12	S13	S9	S10	S11	S13	S9	S11	S9	S13
								S12		S10	S13		
3150kVA-420000kVA							6.3-20kV						
31500	35.0	31.5	28.0	25.2	22.0	135.0							

220KV

kVA	kW		kW	%	%
	S20	S22	S20/S22	S20/S22	S20/S22
3150kVA-420000kVA			6.3-20kV		
31500	18	15	115	0.56	12 14
40000	21	18	134	0.56	
50000	25	21	161	0.52	
63000	30	25	188	0.52	
75000	34	29	213	0.48	
90000	40	34	246	0.44	
120000	49	41	304	0.44	
150000	58	49	360	0.40	
160000	60	51	378	0.39	
180000	66	56	413	0.36	
240000	83	70	484	0.33	
300000	98	83	577	0.30	
360000	112	95	662	0.30	
370000	114	97	675	0.30	
400000	122	103	716	0.28	
420000	125	106	742	0.28	
31500kVA-240000kVA					
31500	20	17	115	0.57	12 14
40000	23	20	134	0.57	
50000	28	24	161	0.53	
63000	33	28	188	0.53	
90000	42	35	246	0.45	
120000	51	43	304	0.45	
150000	60	51	360	0.41	
180000	70	59	413	0.38	
120000	53	45	303	0.45	
150000	62	53	355	0.41	
180000	73	62	406	0.38	
240000	91	77	504	0.30	

220KV

31500kVA-240000kVA

66kV

kVA

6-10KV					5kVA-160kVA									
W					W					%				
kVA	S9	S10	S11	S12	S13	SH15	S9	S10	S11	S13	S9	S11	SH15	S9/S10
									SH15		S10	S13		

6-10KV

30kVA-2500kVA

kVA	kW			kW						%	%
	SCB12	SCB14	SCB18	SCB12			SCB14/SCB18			SCB12 SCB14 SCB18	
				100	120	145	100	120	145		
30	0.15	0.133	0.105	0.67	0.71	0.76	0.605	0.64	0.685	2.0	4.0
50	0.215	0.185	0.155	0.94	1.0	1.07	0.845	0.9	0.965	2.0	
80	0.295	0.25	0.21	1.29	1.38	1.48	1.16	1.24	1.33	1.5	
100	0.32	0.27	0.23	1.48	1.57	1.69	1.33	1.415	1.52	1.5	
125	0.375	0.32	0.27	1.74	1.85	1.98	1.565	1.665	1.78	1.3	
160	0.43	0.365	0.31	2.0	2.13	2.28	1.8	1.915	2.05	1.3	
200	0.495	0.42	0.36	2.37	2.53	2.71	2.135	2.275	2.44	1.1	
250	0.575	0.49	0.415	2.59	2.76	2.96	2.33	2.485	2.665	1.1	
315	0.705	0.6	0.51	3.27	3.47	3.73	2.945	3.125	3.355	1.0	
400	0.785	0.665	0.57	3.75	3.99	4.28	3.375	3.59	3.85	1.0	
500	0.93	0.79	0.67	4.59	4.88	5.23	4.13	4.39	4.705	1.0	
630	1.07	0.91	0.775	5.53	5.88	6.29	4.975	5.29	5.66	0.85	6.0
630	1.04	0.885	0.75	5.61	5.96	6.4	5.05	5.365	5.76	0.85	
800	1.215	1.035	0.875	6.55	6.96	7.46	5.895	6.265	6.715	0.85	
1000	1.415	1.205	1.02	7.65	8.13	8.76	6.885	7.315	7.885	0.85	
1250	1.67	1.42	1.205	9.1	9.69	10.37	8.19	8.72	9.335	0.85	
1600	1.96	1.665	1.415	11.05	11.73	12.58	9.945	10.555	11.32	0.85	
2000	2.44	2.075	1.76	13.6	14.45	15.56	12.24	13.005	14.005	0.7	
2500	2.88	2.45	2.08	16.15	17.17	18.45	14.535	15.445	16.605	0.7	

6-10KV

30kVA-2500kVA

kVA	kW		kW						%	%
	SCB13	SCBH16	SCB13			SCBH16			SCB13 SCBH16	
			100	120	145	100	120	145		
30	0.135	0.07	0.605	0.64	0.685	0.635	0.675	0.72	2.0	4.0
50	0.195	0.09	0.845	0.9	0.965	0.895	0.95	1.01	2.0	
80	0.265	0.12	1.16	1.24	1.33	1.22	1.31	1.4	1.5	
100	0.29	0.13	1.33	1.41	1.52	1.4	1.49	1.6	1.5	
125	0.34	0.15	1.56	1.66	1.78	1.65	1.76	1.88	1.3	
160	0.385	0.17	1.8	1.91	2.05	1.9	2.02	2.16	1.3	
200	0.445	0.2	2.13	2.27	2.44	2.25	2.4	2.57	1.1	
250	0.515	0.23	2.33	2.48	2.66	2.46	2.62	2.81	1.1	
315	0.635	0.28	2.94	3.12	3.35	3.1	3.29	3.54	1.0	
400	0.705	0.31	3.37	3.59	3.85	3.56	3.79	4.06	1.0	
500	0.835	0.36	4.13	4.39	4.7	4.36	4.63	4.97	1.0	
630	0.965	0.42	4.97	5.29	5.66	5.25	5.58	5.97	0.85	6.0
630	0.935	0.41	5.05	5.36	5.76	5.33	5.66	6.08	0.85	
800	1.09	0.48	5.89	6.26	6.71	6.22	6.61	7.08	0.85	
1000	1.27	0.55	6.88	7.31	7.88	7.26	7.72	8.32	0.85	
1250	1.5	0.65	8.19	8.72	9.33	8.64	9.2	9.85	0.85	
1600	1.76	0.76	9.94	10.5	11.3	10.4	11.1	11.9	0.85	
2000	2.19	1.0	12.2	13.0	14.0	12.9	13.7	14.7	0.7	
2500	2.59	1.2	14.5	15.4	16.6	15.3	16.3	17.5	0.7	8.0
1600	1.76	0.76	11.0	11.5	12.5	11.6	12.3	13.2	0.85	
2000	2.19	1.0	13.5	14.3	15.4	14.2	15.1	16.2	0.7	
2500	2.59	1.2	15.9	17.0	18.2	16.8	17.9	19.2	0.7	

	6-10KV	30kVA-2500kVA		
			kW	%
SC				
kVA				%

6-10KV

630kVA-6300kVA

kVA	kW				kW						%		%
	SCB9	SCB10	SCB11	SCB12	SCB9			SCB10/SCB11/SCB12			SCB9	SCB10	
					100	120	145	100	120	145		SCB11 SCB12	
630	1.6	1.44	1.296	1.152	6.3	6.7	7.15	6.0	63.6	6.8	1.2	1.0	6.0
800	1.8	1.62	1.458	1.296	7.4	8.0	8.4	7.17	7.6	8.13	1.2	1.0	
1000	2.16	1.94	1.746	1.552	8.73	9.25	9.9	8.28	8.78	9.39	1.0	0.85	
1250	2.6	2.34	2.106	1.872	10.4	11.0	11.7	9.86	10.4	11.1	1.0	0.85	
1600	3.1	2.79	2.511	2.232	12.6	13.4	14.3	12.0	12.7	13.6	1.0	0.85	
2000	4.0	3.6	3.24	2.88	15.1	16.0	17.05	14.3	15.2	16.2	0.8	0.7	
2500	4.7	4.23	3.807	3.384	17.7	18.8	20.1	16.8	17.8	19.1	0.8	0.7	7.0
3150	5.6	5.04	4.536	4.032	20.8	22.0	23.5	19.7	20.9	22.3	0.7	0.6	
4000	6.7	6.03	5.427	4.824	25.0	26.5	28.3	23.7	25.1	26.9	0.7	0.6	
5000	8.0	7.2	6.48	5.76	29.5	31.3	33.5	28.0	29.7	31.8	0.6	0.5	
6300	9.45	8.5	7.65	6.8	35.1	37.2	39.8	33.3	35.3	37.8	0.6	0.5	

6-10KV

315kVA-2500kVA

kVA	kW					kW					%		
	SCB9	SCB10	SCB11	SCB12	SCB9			SCB10/SCB11/SCB12			SCB10	%	
					100	120	145	100	120	145	SCB9		SCB11
													SCB12
315	1.1	0.99	0.891	0.792	3.6	3.8	4.1	3.4	3.61	3.86	1.4	1.1	
400	1.25	1.12	1.008	0.896	4.25	4.5	4.8	4.02	4.27	4.57	1.4	1.1	
500	1.44	1.29	1.161	1.032	5.15	5.5	5.85	4.92	5.22	5.58	1.4	1.1	
630	1.66	1.49	1.341	1.192	6.1	6.5	6.95	5.82	6.17	6.6	1.2	1.0	
630	1.6	1.44	1.29-										

3

20KV

50kVA-2500kVA

kVA	kW				kW						%		%
	SCB9	SCB10	SCB11	SCB12	SCB9			SCB10/SCB11/SCB12			SCB9	SCB10 SCB11 SCB12	
					100	120	145	100	120	145			
50	0.38	0.34	0.306	0.272	1.23	1.3	1.39	1.16	1.23	1.31	2.4	2.0	6.0
100	0.6	0.54	0.486	0.432	1.98	2.1	2.25	1.87	1.99	2.13	2.2	1.8	
160	0.75	0.67	0.603	0.536	2.47	2.6	2.8	2.33	2.47	2.64	1.8	1.5	
200	0.82	0.73	0.657	0.584	2.95	3.1	3.31	2.77	2.94	3.14	1.8	1.5	
250	0.94	0.84	0.756	0.672	3.44	3.6	3.91	3.22	3.42	3.66	1.6	1.3	
315	1.08	0.97	0.873	0.776	4.1	4.3	4.6	3.85	4.08	4.36	1.6	1.3	
400	1.28	1.15	1.035	0.92	4.9	5.1	5.46	4.65	4.84	5.18	1.4	1.1	
500	1.5	1.35	1.215	1.08	5.8	6.1	6.5	5.46	5.79	6.19	1.4	1.1	
630	1.7	1.53	1.377	1.224	6.88	7.2	7.75	6.45	6.84	7.32	1.2	1.0	
800	1.95	1.75	1.575	1.4	8.23	8.7	9.3	7.79	8.26	8.84	1.2	1.0	
1000	2.3	2.07	1.863	1.656	9.72	10.3	11.0	9.22	9.78	10.4	1.0	0.85	
1250	2.65	2.38	2.142	1.904	11.5	12.15	13.0	10.8	11.5	12.3	1.0	0.85	
1600	3.1	2.79	2.511	2.232	13.78	14.6	15.65	13.0	13.8	14.8	1.0	0.85	
2000	3.6	3.24	2.916	2.592	16.3	17.25	18.5	15.4	16.3	17.5	0.8	0.7	
2500	4.3	3.87	3.483	3.096	19.35	20.4	21.8	18.2	19.3	20.7	0.8	0.7	
2000	3.6	3.24	2.916	2.592	17.8	18.8	20.0	16.8	17.8	19.1	0.8	0.7	8.0
2500	4.3	3.87	3.483	3.096	21.3	22.4	23.9	20.0	21.2	22.7	0.8	0.7	

35KV

50kVA-2500kVA

kVA	kW				kW						%		%
	SCB9	SCB10	SCB11	SCB12	SCB9			SCB10/SCB11/SCB12			SCB9	SCB10 SCB11 SCB12	
					100	120	145	100	120	145			
50	0.5	0.45	0.405	0.36	1.42	1.5	1.6	1.34	1.42	1.52	2.8	2.3	6.0
100	0.7	0.63	0.567	0.504	2.08	2.2	2.35	1.97	2.09	2.23	2.4	2.0	
160	0.88	0.79	0.711	0.632	2.79	2.96	3.17	2.65	2.81	3.0	1.8	1.5	
200	0.98	0.88	0.792	0.704	3.3	3.5	3.75	3.13	3.32	3.55	1.8	1.5	
250	1.1	0.99	0.891	0.792	3.75	4.0	4.28	3.58	3.8	4.06	1.6	1.3	
315	1.31	1.17	1.053	0.936	4.48	4.75	5.08	4.25	4.51	4.82	1.6	1.3	
400	1.53	1.37	1.233	1.096	5.36	5.7	6.08	5.1	5.41	5.79	1.4	1.1	
500	1.8	1.62	1.458	1.296	6.57	7.0	7.45	6.27	6.65	7.11	1.4	1.1	
630	2.07	1.86	1.674	1.488	7.65	8.1	8.7	7.25	7.69	8.23	1.2	1.0	
800	2.4	2.16	1.944	1.728	9.0	9.6	10.25	8.6	9.12	9.76	1.2	1.0	
1000	2.7	2.43	2.187	1.944	10.4	11.0	11.8	9.86	10.4	11.1	1.0	0.75	
1250	3.15	2.83	2.547	2.264	12.7	13.4	14.3	12.0	12.7	13.6	0.9	0.75	
1600	3.6	3.24	2.916	2.592	15.4	16.3	17.4	14.6	15.4	16.5	0.9	0.75	
2000	4.25	3.82	3.438	3.056	18.1	19.2	20.5	17.2	18.2	19.5	0.9	0.75	
2500	4.95	4.45	4.005	0.356	21.7	23.0	24.6	20.6	21.8	23.3	0.9	0.75	

35KV					800kVA-25000kVA							
kW					kW							
					SCB9			SCB10/SCB11/SCB12			%	
kVA	SCB9	SCB10	SCB11	SCB12	100	120	145	100	120	145	SCB9	SCB11
											SCB12	%
800	2.5	2.25	2.025	1.8	9.4	9.9	10.6	8.87	9.4	10.0	1.1	0.95
1000	2.97	2.67	2.403	2.136	10.8	11.5	12.3	10.3	10.9	11.6	1.1	0.95
1250	3.4	3.4										6.0