

Q / CSG

√

≈

Q/CSG1205019-2018

1

2

3

4

5

6

7

8

9

10

11 GIS HGIS GIL

12

13

14

15

16

17

18

19

20

21

22 1KV

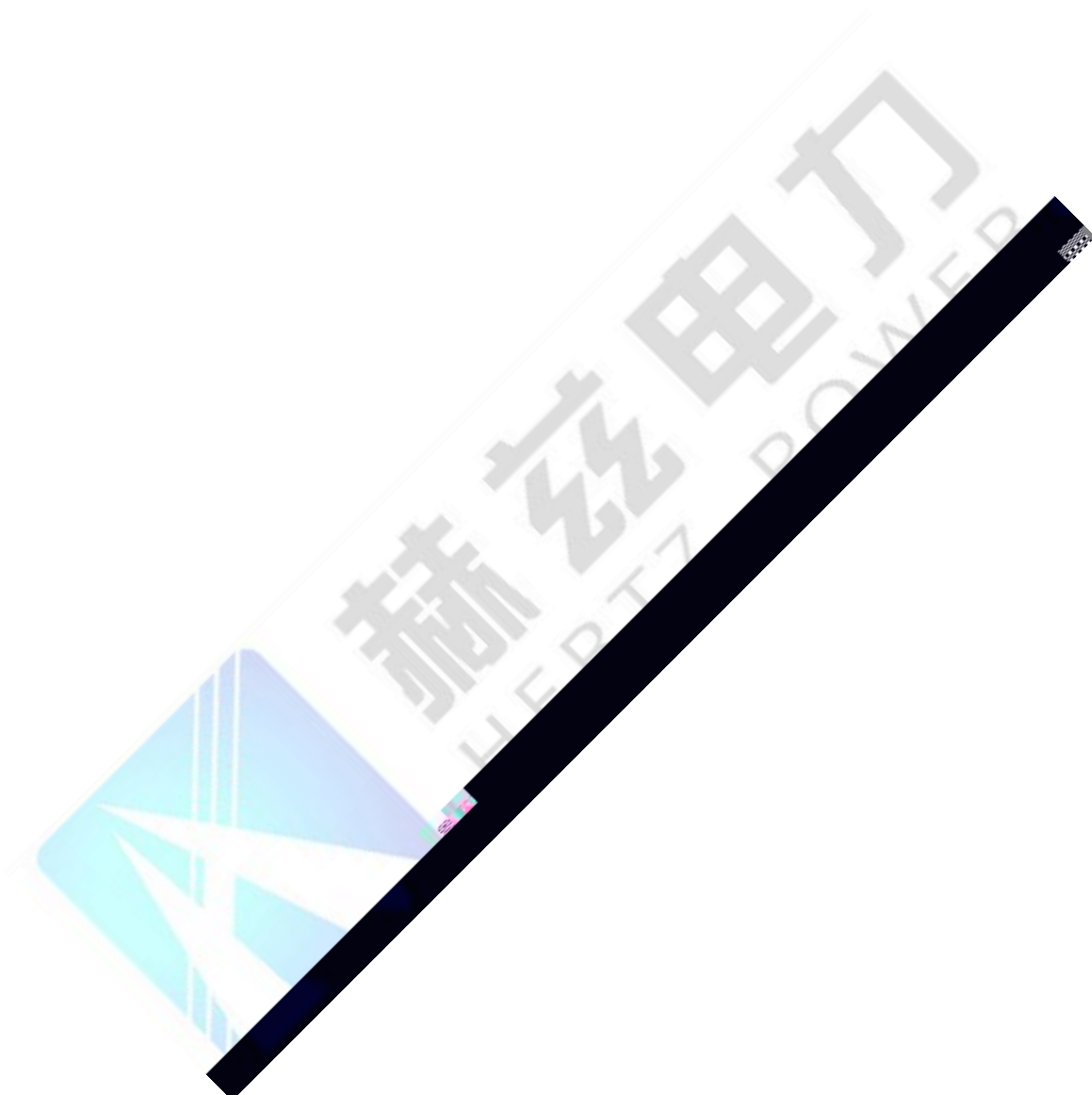
23 1KV

24

A

B SF₆

C



↔

$\frac{5}{8}$

2018

5

Ü

¶

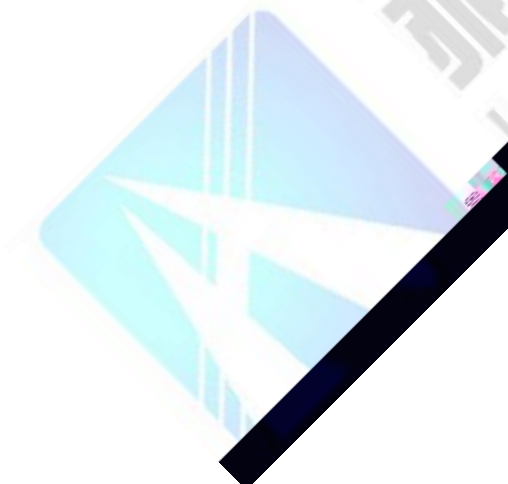
≈

.

¶

¶

≈



赫兹电力
HERTZ POWER

*ZJ f)^p T8rv," ¶

$\dot{\mathbf{i}} \cdot 1$ No ∞ $\updownarrow$

$\dot{\mathbf{i}} \cdot 1$

$\dot{\mathbf{i}} \cdot 1$

$\dot{\mathbf{i}} \cdot 1$

No

$\dot{\mathbf{i}} \cdot 1$

No

1

$\dot{\mathbf{i}}$

.

$\updownarrow$

1

L

1

1

Z

No

$\updownarrow$

$\dot{\mathbf{i}} \cdot 1$

$\updownarrow$

1

No

1

1

Z $\dot{\mathbf{i}} \cdot 1$

$\dot{\mathbf{i}}$

$\dot{\mathbf{i}}$

$\dot{\mathbf{i}}$

$\dot{\mathbf{i}}$

$\dot{\mathbf{i}}$

WIPZ



No 1 No

z i 1

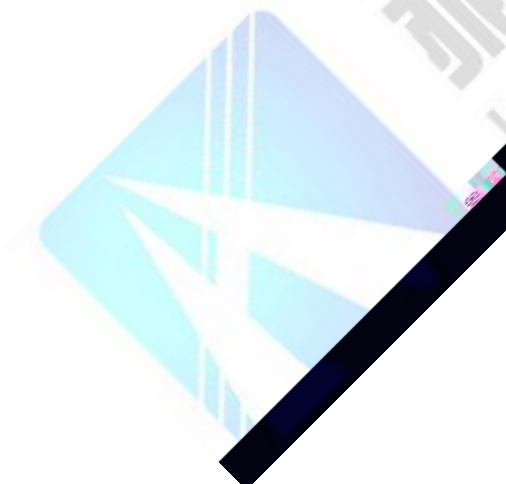
↑

1

z

↓

↑



赫兹电力
HERTZ POWER

$$\begin{array}{ccccccc}
 z_1 & \dot{1} & 1 & & \dot{1} & & \infty & \updownarrow \\
 \dot{1} & 1 & & & & & & \\
 & & & & \ddot{1} & & & \\
 & & & & & & & \updownarrow \\
 & & & & & & D_\rho & \updownarrow \\
 z_1 & & & & & & & \\
 & & & & & & & \updownarrow \\
 \ddot{0} & \vee & \dot{1} & & & & & \\
 & & & & \ddot{1} & & & \\
 z_1 & & & & & & & \\
 \sim & & z_1 & & \vee & & & \\
 z_1 & & & & & & & \\
 \dot{1} & & & & \dot{1} & & \updownarrow & \dot{1} & \text{No} \\
 \vee & & & & & & \updownarrow & & \\
 & & & & \ddot{1} & & \updownarrow & & \\
 & & & & & & & &
 \end{array}$$

3

↓

3.1

$$z_1 \qquad \qquad \qquad z_1 \qquad \qquad \qquad |$$

3.2

$$z_1 \qquad \qquad \qquad \vee \qquad \qquad \qquad z_1$$

$\dot{1}$

3.3

$$\vee \qquad \qquad \qquad z_1$$



3.4

γ

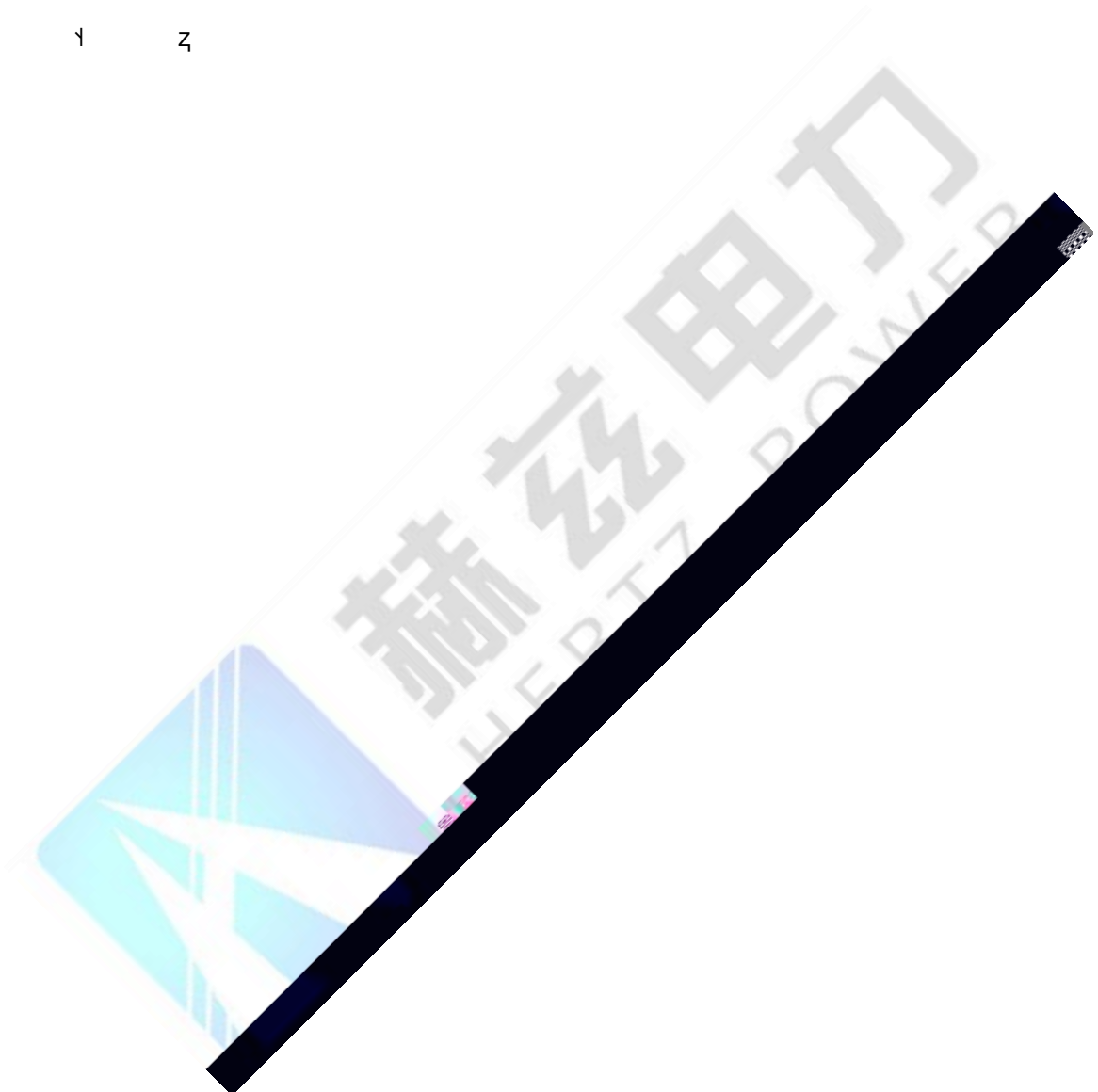
z

w

3.5

γ

z

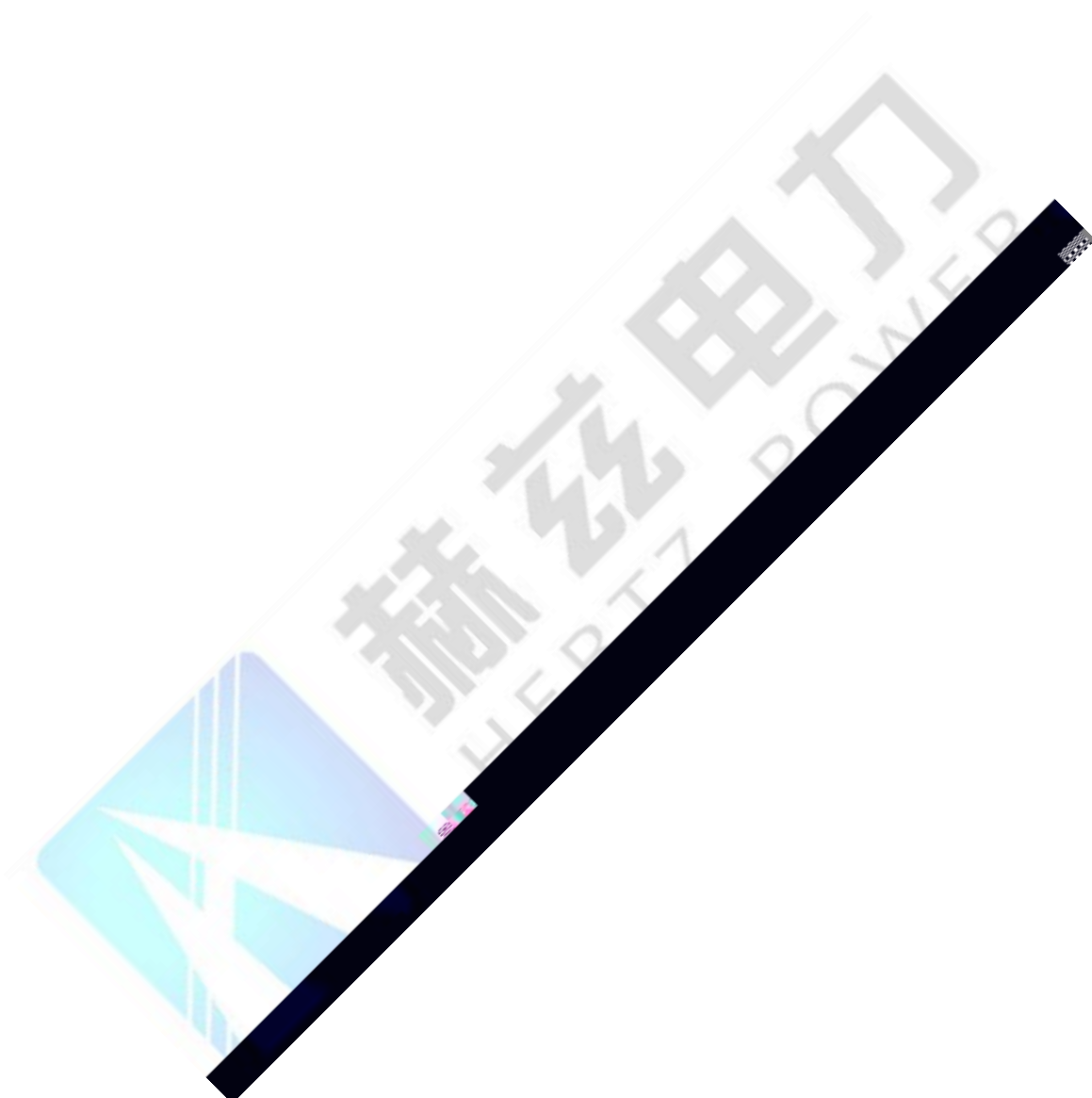


3.13

⌘ ⌘

3.14

Symbol					
U_n	1				
U_m	1				
U_o/U	1 (U_o			1 U	
1)					
U_{ImA}	ImA	$\ddot{\alpha}$	1		
$\tan \delta$					
RTV				Room temperature vulcanized silicone rubber	
anti-pollution coating	RTV	DL/T 627 №	RTV-	∇	RTV-
4					
4.1	z_1		1 ↓ ∇		$\approx$
			∇		z_1
	z_1		№		
4.2	↓				
~					
4.3		┌			1
~	∇	$\ddot{i}$		№	$\approx$
4.4	∞	$\ddot{i}$	∇		
	№				
4.5		$\ddot{i}$			
	$\parallel$ ∇				
4.6	$\dots$				
4.7	$\parallel$ 1	∇	1 Δ ∇		
4.8	'	z_1	$\sim \ddot{\alpha} \nabla$		



2mA

1

№	1 V	1 V	MΩ
1	<100	250	50
2	<500	500	100
3	<3000	1000	2000
4	<10000	2500	10000
5	≥ 10000	2500 5000	10000

4.20 Ĩ 1 Ĩ ~
L ¼ L ¼ Ĩ 1 Ĩ 1
2

2

1 kV	110 66 Ĩ	220	500
h	≥ 24	≥ 48	≥ 72

4.21 ~ /

1 / Ĩ

2

3

4 ¼ № ¼ ~

№ ¼

5

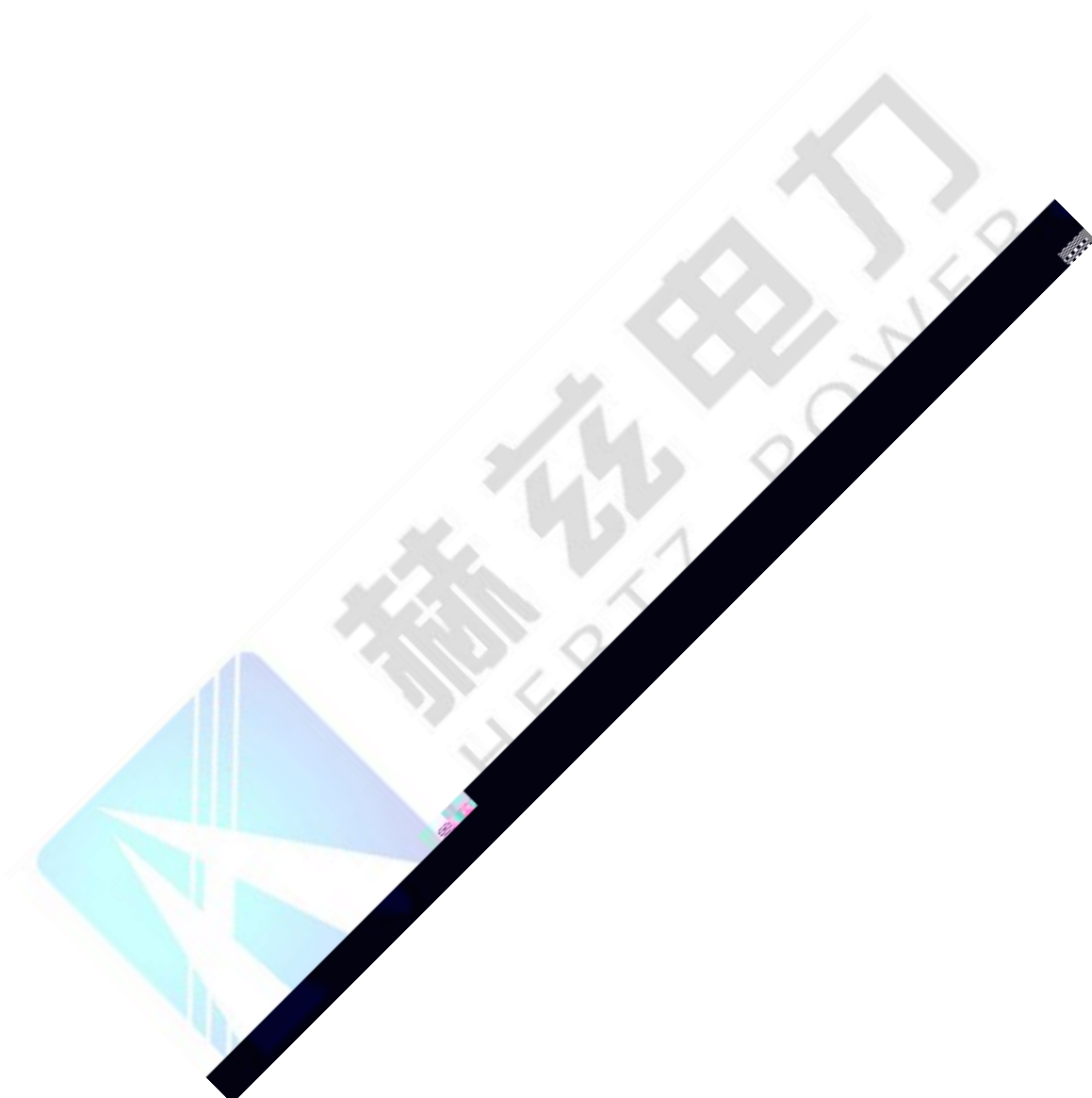
≈ ~

5

5.1

3

№	≠				
1			1 ≠ ~ a b pH >5.4		<i>D_p</i> 1





3

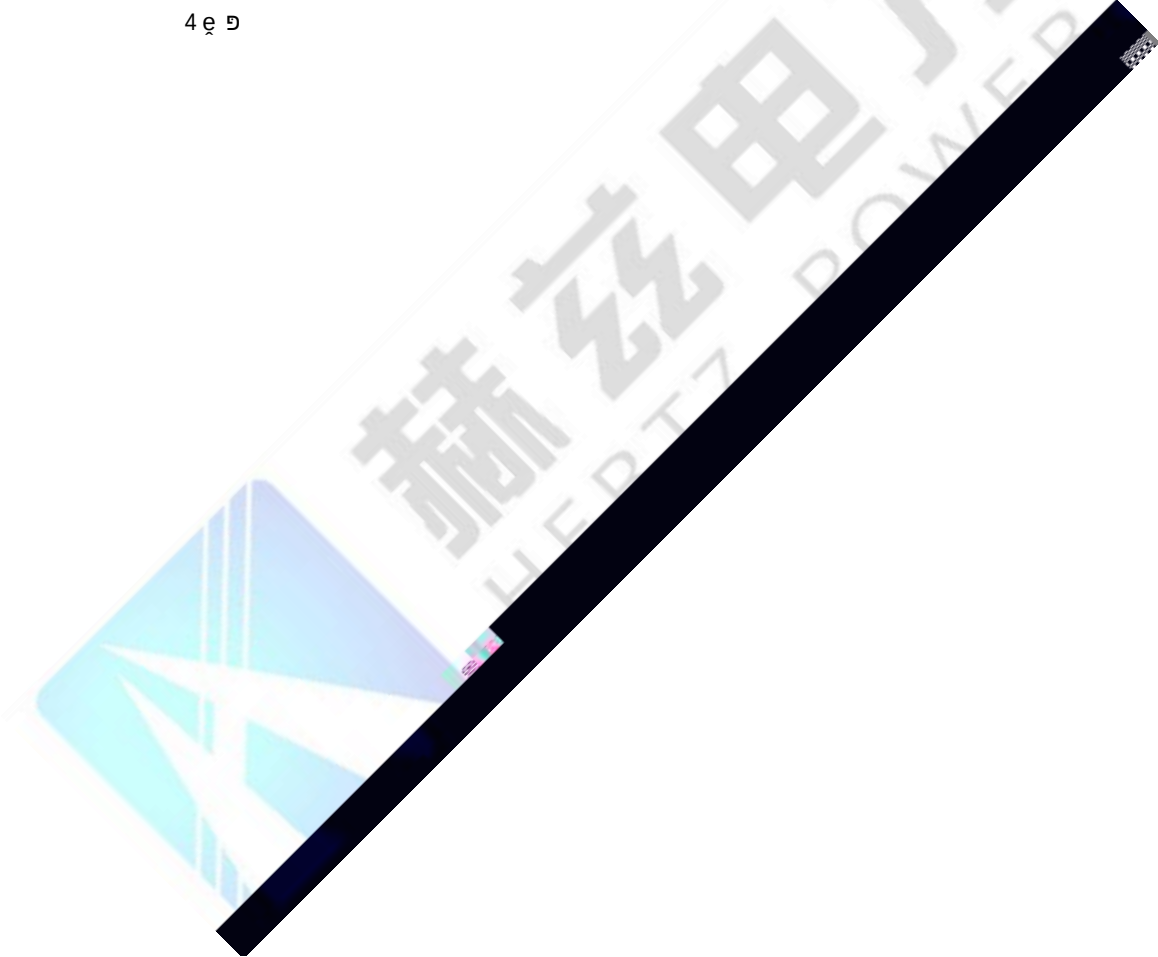
2. 5. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

$\tan \delta \approx 3$ 50 ≈ 1

| ≈ 1 | | | | | | | | | | |
|-------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| K | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| A | 1.15 | 1.3 | 1.5 | 1.7 | 1.9 | 2.2 | 2.5 | 2.9 | 3.3 | 3.7 |

a K ≈ 20
b

4 e 9



3

~ ≠

$$t = 120 \times \frac{f_N}{f_s}$$

f_N —

f_s —

t — 1

15s

4 1 1.5Um/√3 66kV Ĩ 1
100pC 66kV 1 300pC Ĩ 1

5 ||=

110kV 1 Ĩ 1 1

n

Ĩ 1 1 Ĩ 1 1
2 1

| 1 kV | |
|-------|----------|
| 110kV | 60 ± 5% |
| 220kV | 102 ± 5% |

1 10000MΩ
2 1000MΩ 1000MΩ
tan δ 2%

1 10 ⑤ tan δ

20kV Ĩ

1

tan δ

2

Ĩ

3

Ĩ
30%
r

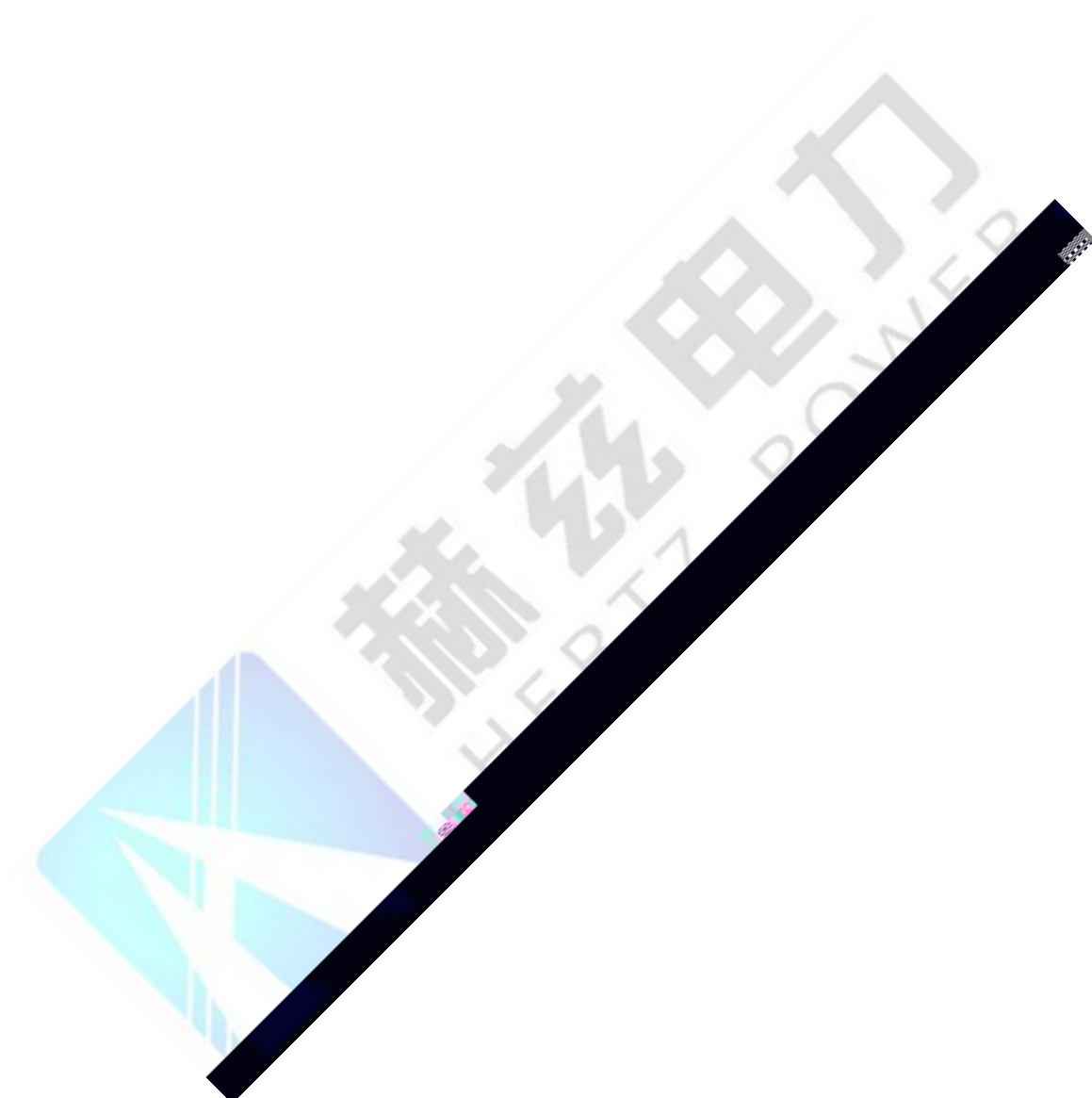
14

tan δ

| ⑤ tan δ % | |
|--------------|-----|
| tan δ % | |
| 0.4 | |
| 0.5 | |
| 1.0 35kV Ĩ 1 | 1.5 |
| 0.5 | |
| 0.5 | |
| 1. 5 | |
| 0.5 | |
| 0.5 | |
| Ĩ | |
| Ĩ | |

2 ± 5% ㄨ 1

3 1000MΩ tan δ 2%



| № | № | | | | |
|----|---|-------------------------------|---|---|--------|
| | | | 500kV 10 H ₂ 10 C ₂ H ₂ 0.1
220kV 10 H ₂ 30 C ₂ H ₂ 0.1
2 № mg/L $\ \leq 35$
3 $\bar{D}_p$ 1 kV 110kV ≥ 45 110kV 1 ≥ 40 | | |
| 20 | | № | 1
2 20min | | |
| 21 | | 1 | | | |
| 22 | | 1
2
3 | 1
2 1MΩ
3 | / | |
| 23 | | 1 | 1 L 1
2
3 1 MΩ
4
5 | / | |
| 24 | | 1 | 1 DL/T 540
2
3 1MΩ
4 | / | |
| 25 | | 1 2 | 1 L 1
2 1MΩ
3 1 2
4 | / | |
| 26 | | 1
$\bar{D}_{p_{\text{н}}}$ | 1 1 1 $\bar{D}_{p_{\text{н}}}$ 5
5min
2 $\bar{D}_{p_{\text{н}}}$ 1 1 2 1
3 1 1 $\bar{D}_{p_{\text{н}}}$ | | 5
3 |
| 27 | | | 1 | | |



| | | | | | |
|----|---|---------|---|---|--|
| 2 | ≠ | | | | |
| | | | 2 | 1 | |
| 28 | | α | GB/T26218.2-2010 10.3
a P2-P1 ≥ 20 mm
b S P2 0.9
c S ≥ 70 mm
d 500kV 1 4.7m
e 1000m
1000-2000m 2000m
ů 1.13 2000-2500m 2500m
ů 1.20 2500-3000m 3000m
ů 1.28 3000m
f 1 1 | | |
| 29 | | 1 | Um 40.5kV 400mm 1000m
↓
a) 1000-2000m 2000m
ů 1.13
b) 2000-2500m 2500m
ů 1.20
c) 2500-3000m 3000m
ů 1.28
d) 3000m | | |
| 30 | | 1
CT | 1
2
1 | | |
| 31 | | | 1 3°
2
3
4 | | |
| 32 | | Z | 1 1 Z | | |
| 33 | | 1 | 220kV 110kV 1 1 1 | | |



3



34

1 3

2

1

1

1

3

3

3

GB 5273 3

35

2

1

3

3

4 6.0

3

3

1

1

3

1

36

3

3

1

1

3

1

37

2

0

3

4 1 1

1

1

3

1

3

3

1 1

3

3

4h

2

3

38

3

3

3

3

0

3

4

3

3

30

1

1

1

2

3

4

1

3

5

1

39

1

6

7

0



3

| ~ | ≠ | | | | |
|---|---|--|-----------------------------|---|---|
| | | | 5
6
7
8
9
10 | ĩ
ĩ
ĩ
ĩ
500kV ĩ 1 240MVA ĩ 1 L 1
Z | ũ |

5.2 SF₆

4 SF₆

| ~ | ≠ | | | | | | | | |
|---|---|-----------------|-----------------|-----------------|----|-----|-----------------|-----|-----------------|
| 1 | | SF ₆ | SF ₆ | SF ₆ | ≠ | ĩ 1 | SF ₆ | ĩ | SF ₆ |
| 2 | | SF ₆ | | | 20 | Nº | 250 µ L/L | ĩ 1 | |

4 SF_6 $\pm 1\%$

6

 $\neq$

٢

1

 $\dot{I}$

1

2

1

1

 $\neq$

٢

1

1

 $\mathbb{F}$ $\neq$

2

1

4

 $\mathbb{F}$

५१३

1

1

1



f

i

i

1

i

i

7

2

1

1

2



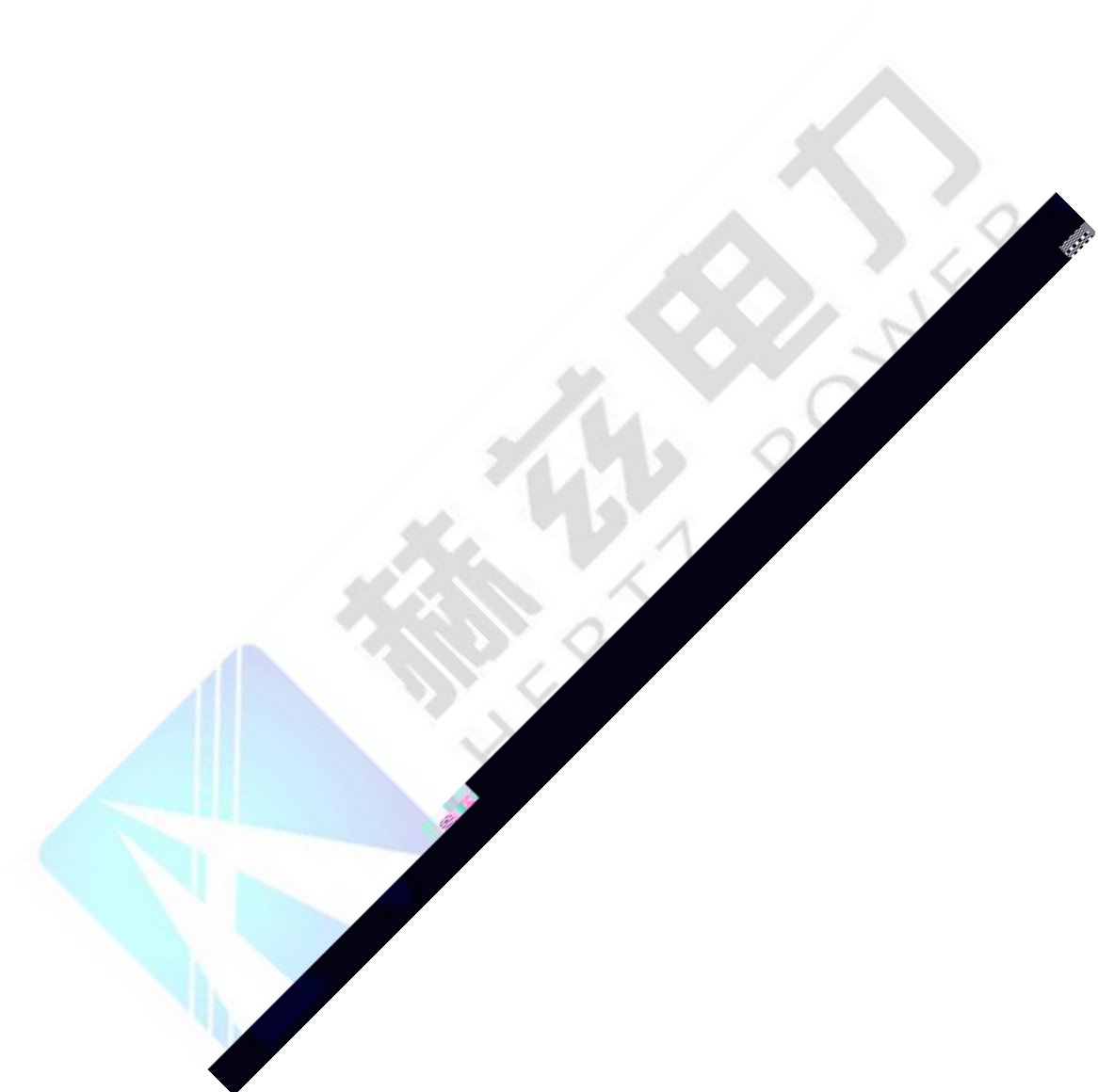
4 SF₆

~ ≠

tan δ
ĩ

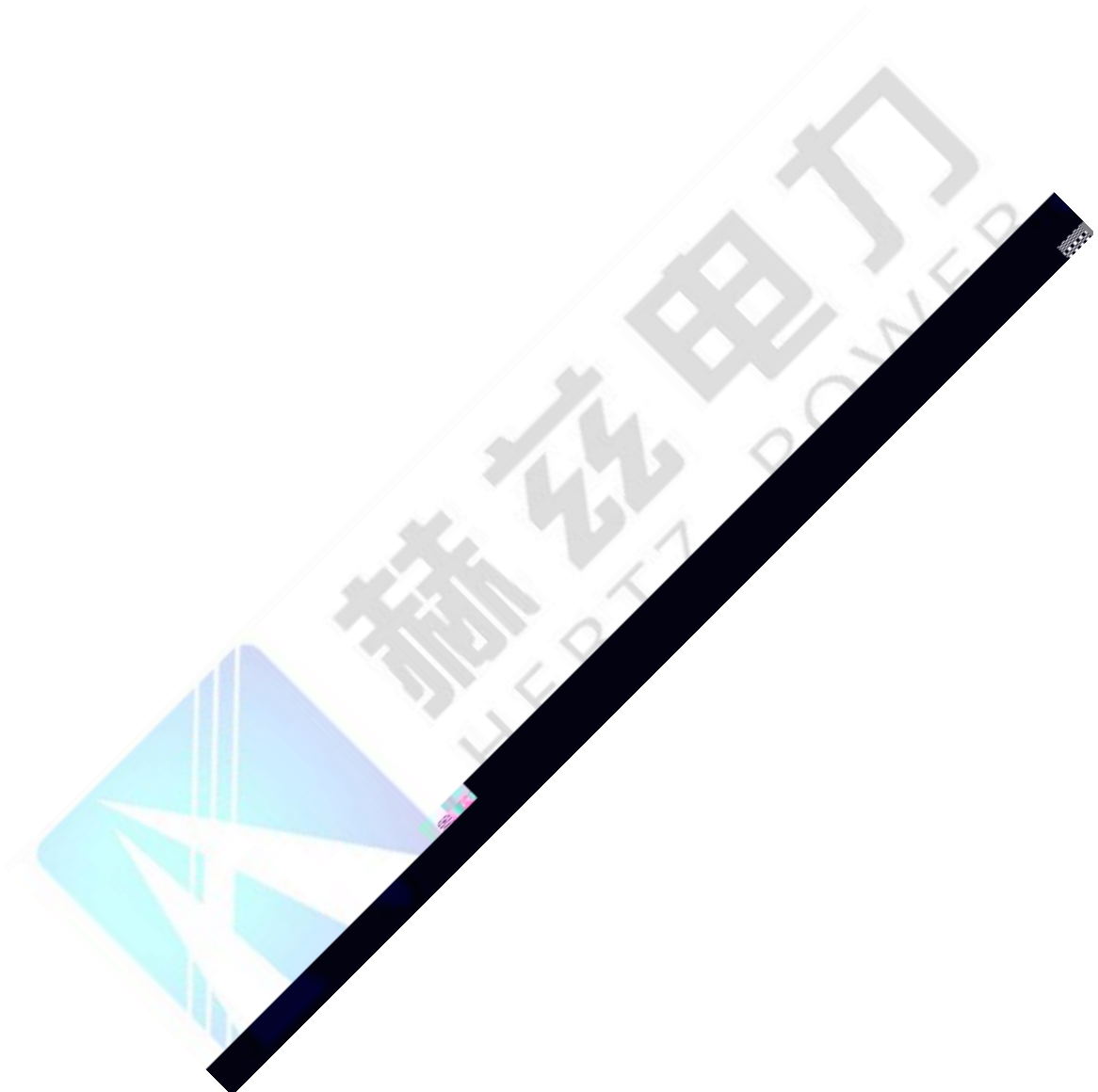
z ĩ 1

| K | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
|---|------|-----|-----|-----|-----|-----|-----|----|----|----|
| A | 1.15 | 1.3 | 1.5 | 1.7 | 1.9 | 2.2 | 2.5 | | | |





4 SF₆



4 SF₆

| № | № | | | | |
|----|---|---------|---|--|--|
| | | ĩ | 2 1 z 1 z
3 1 z ĩ
4 1 z 500V 1000V
1MΩ
5 | | |
| 24 | | | 1
2 1 | | |
| 25 | | ā | GB/T26218.2-2010 10.3
a P2-P1 ≥ 20 mm
b S P2 0.9
c S ≥ 70 mm
d 500kV 1 4.7m
e 1000m
1000-2000m 2000m
ů 1.13 2000-2500m 2500m
ů 1.20 2500-3000m 3000m
ů 1.28 3000m
f | | |
| 26 | | 1 | Um 40.5kV 400mm 1000m
↓
a) 1000-2000m 2000m
ů 1.13
b) 2000-2500m 2500m
ů 1.20
c) 2500-3000m 3000m
ů 1.28
d) 3000m | | |
| 27 | | 1
CT | ĩ | | |
| 28 | | z | ĩ 1 z | | |
| 29 | | 1 | 220kV 110kV ĩ 1 1 1 | | |
| 30 | | | 1
2 | | |



4 SF₆

~ ≠

1

ī

ī

z

z

vu

GB 5273 Ⅳ

31

2

ī

z

3

4 6.0

√

Ⅳ

ī

1

z

ī

32

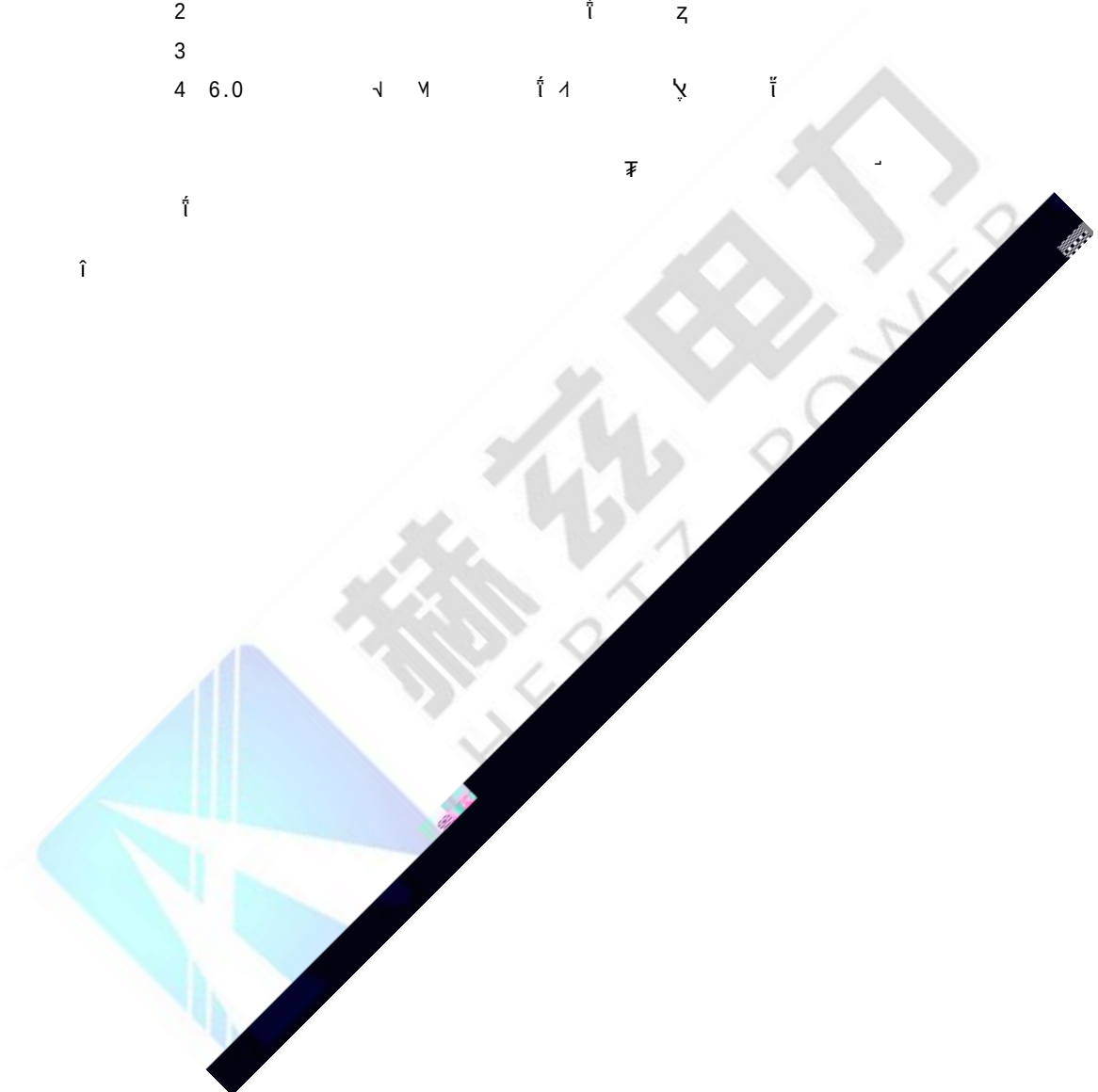
z

z

ī

33

ī



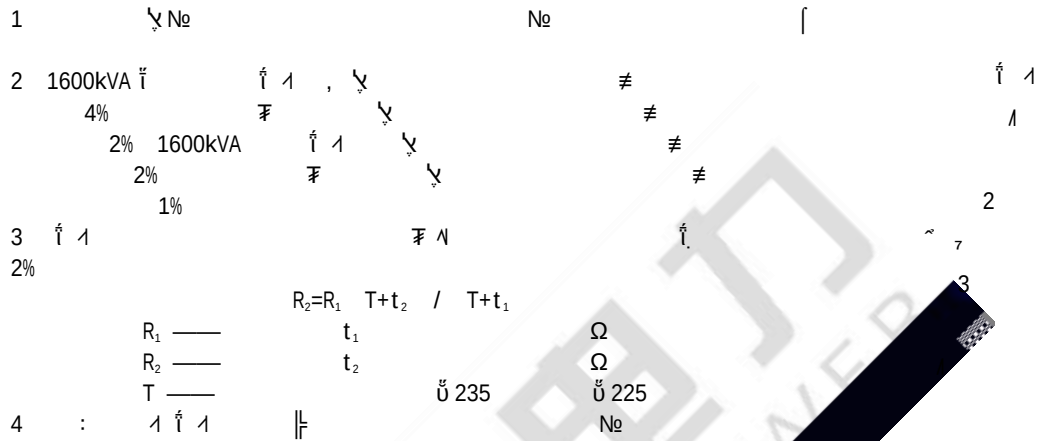


5.3

5

~ ≠

1



$$R_2 = R_1 \frac{T + t_2}{T + t_1}$$

$$\frac{t_1}{t_2}$$

$$\Omega$$

$$\Omega$$

$$\dot{U} 235$$

$$\dot{U} 225$$

$$N_0$$

5

$\sim$ $\neq$

a

K

$\simeq$ 20

3

$\downarrow$

$\hat{A}$

$\sim$

$$A = 1.5^{K/10}$$

1

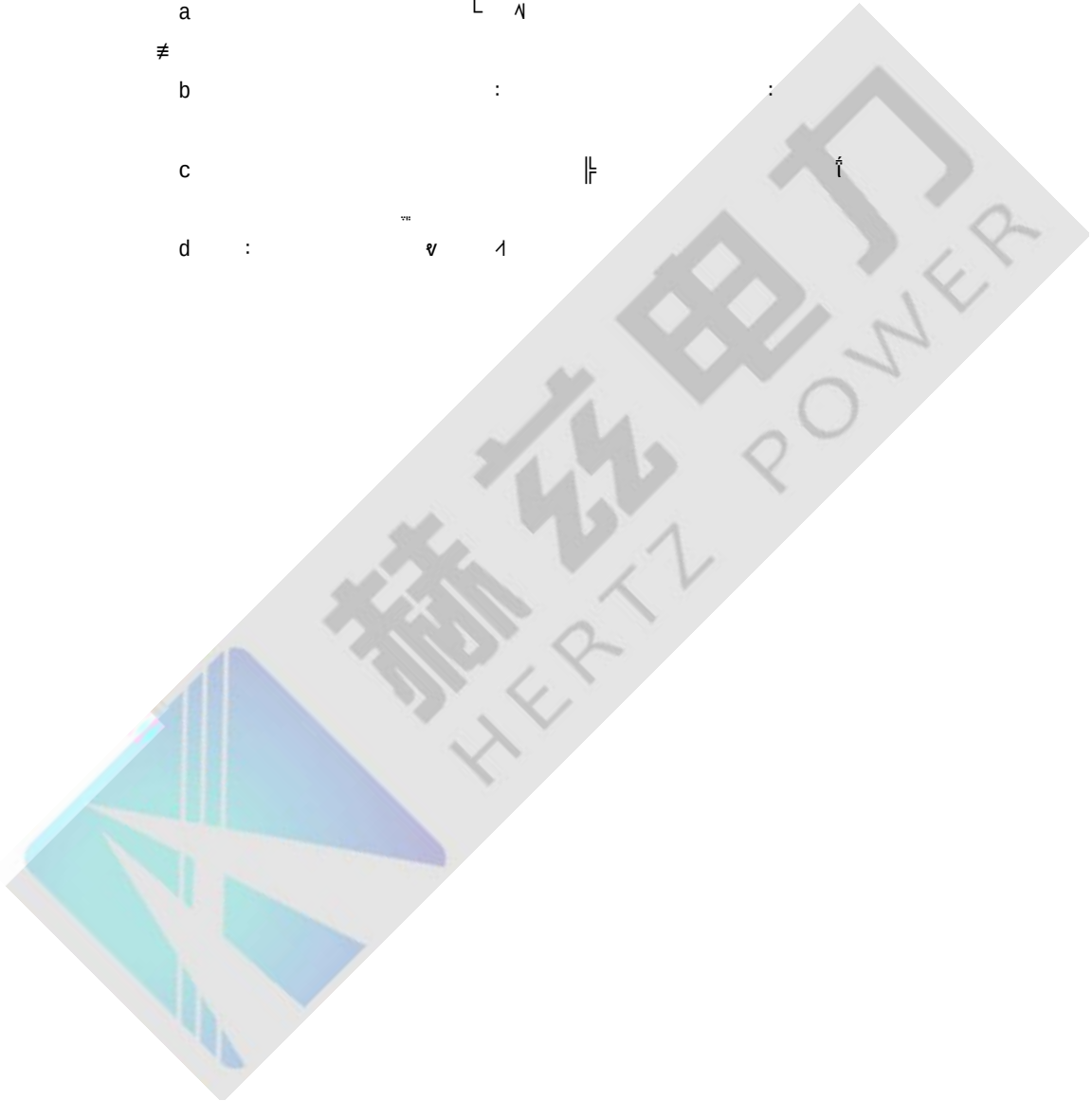
[



5

~ ≠

b ~ 10%
3 ≠
4 :
a L η
≠
b :
c ||
d : v 1



~ ≠

GB/T26218.2-2010 10.3

a ≠ P2-P1 ≥ 20 mm

b S ≠

14

$\bar{\alpha}$



5

| 21 | ≠ | | | | | |
|----|---|--|--|--|--|---|
| 1 | √ | | | | | |
| 2 | ≠ | | | | | |
| 3 | ≠ | | | | | |
| 4 | | | | | | |
| 5 | √ | | | | | |
| 6 | | | | | | / |
| 7 | √ | | | | | |
| 8 | | | | | | |
| 9 | √ | | | | | |
| 10 | ∞ | | | | | |

6

6.1 500kV

6 500kV

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 |

6 500kV

~ ≠

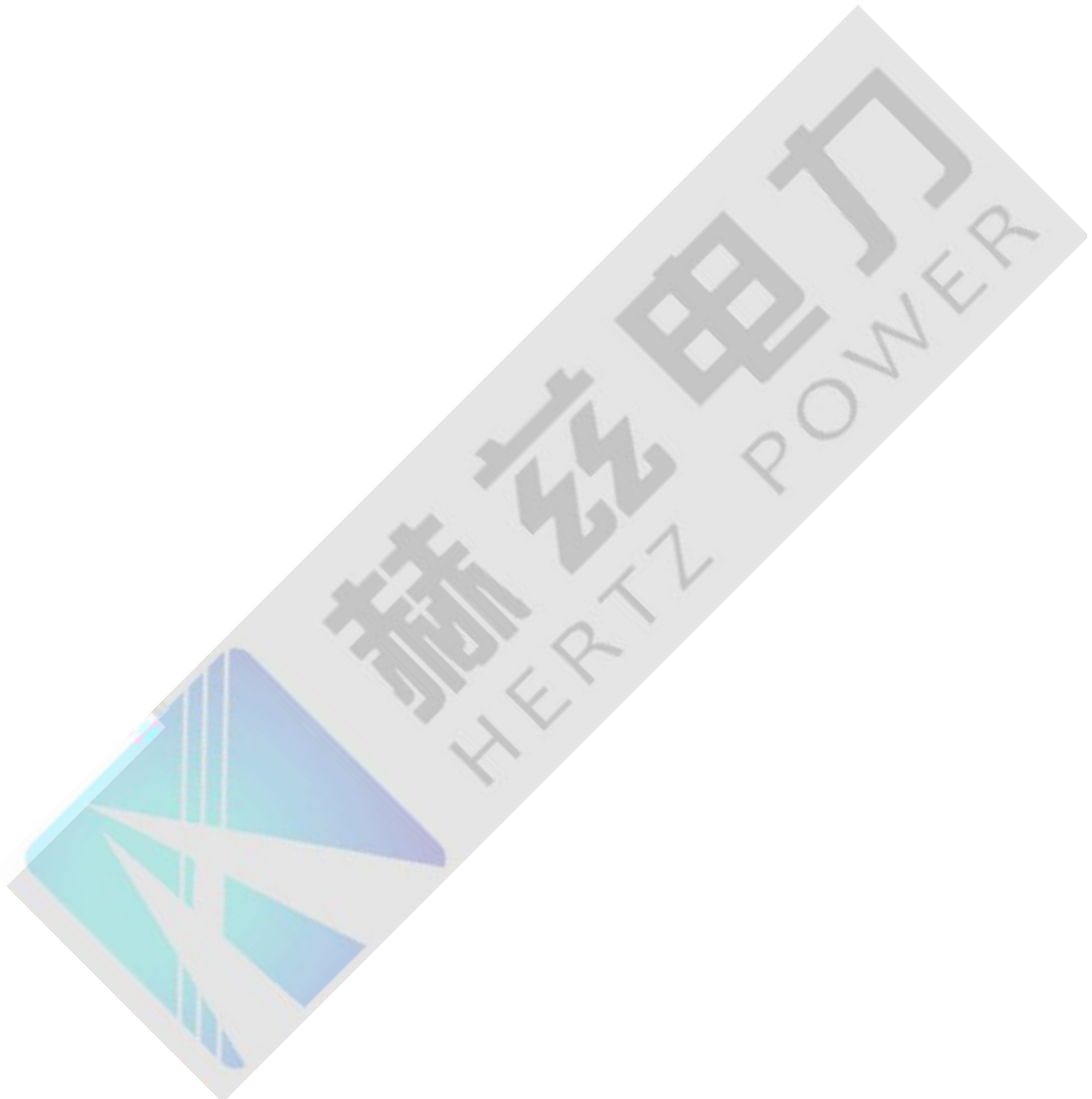
R_1 — t_1



6 500kV

≈ ≠

K 5 10 15 20 25 3



6 500kV

1

1

1

1

2

1

1

1

1

9

1

3

1

4

1

1

2500V

1min

1

1

a

b

2

a

b

3

4

a

L

1

1

1

b

:

:

10

1

d

c

1

1

d

:

1

1

1

4.5kV



6 500kV

| № | № | | | | |
|----|---|----------------------|--|---|-----|
| | | | 2 | / | |
| 13 | | | 1 L
2
3 1MΩ
4
5
6
7 3° | / | |
| 14 | | 1 z
i | 1 L
2 1MΩ
3 1 z
4 | / | |
| 15 | | | 500kV 1
DL/T 264 z i 1
0.035MPa 1 z
24h | | 1 z |
| 16 | | 1
D _{pe} | 1 i i
5 5min D _{pe} | | |
| 17 | | | 1 65 ° C | | 24h |
| 18 | | | 1 i 100 μ m | | 24h |
| 19 | | | 1
2 1 | | |
| 20 | | 1
α | GB/T26218.2-2010 10.3
a P2-P1 ≥ 20 mm | | |

6 500kV

≈ ≠

b S ₪ P2 0.9
c S ≥ 70 mm
d 500kV 1 4.7m
e 1000m ↓
1000-2000m 2000m
ű 1.13 2000-2500m 2500m
ű 1.20 2500-3000m 3000m
ű 1.28 3000m

ෆ f ෆ ෆ ෆ 3 °

21

2
3 ෆ ෆ

22

ෆ ෆ ෆ

23

1 -
2 ෆ ෆ ෆ ෆ ෆ ෆ

24

1 ෆ
2
1 ෆ
2 ෆ ෆ ෆ
3
4 6.0 ෆ ෆ ෆ ෆ

25

1 ෆ ෆ

26

2 d' d' ෆ ෆ ෆ

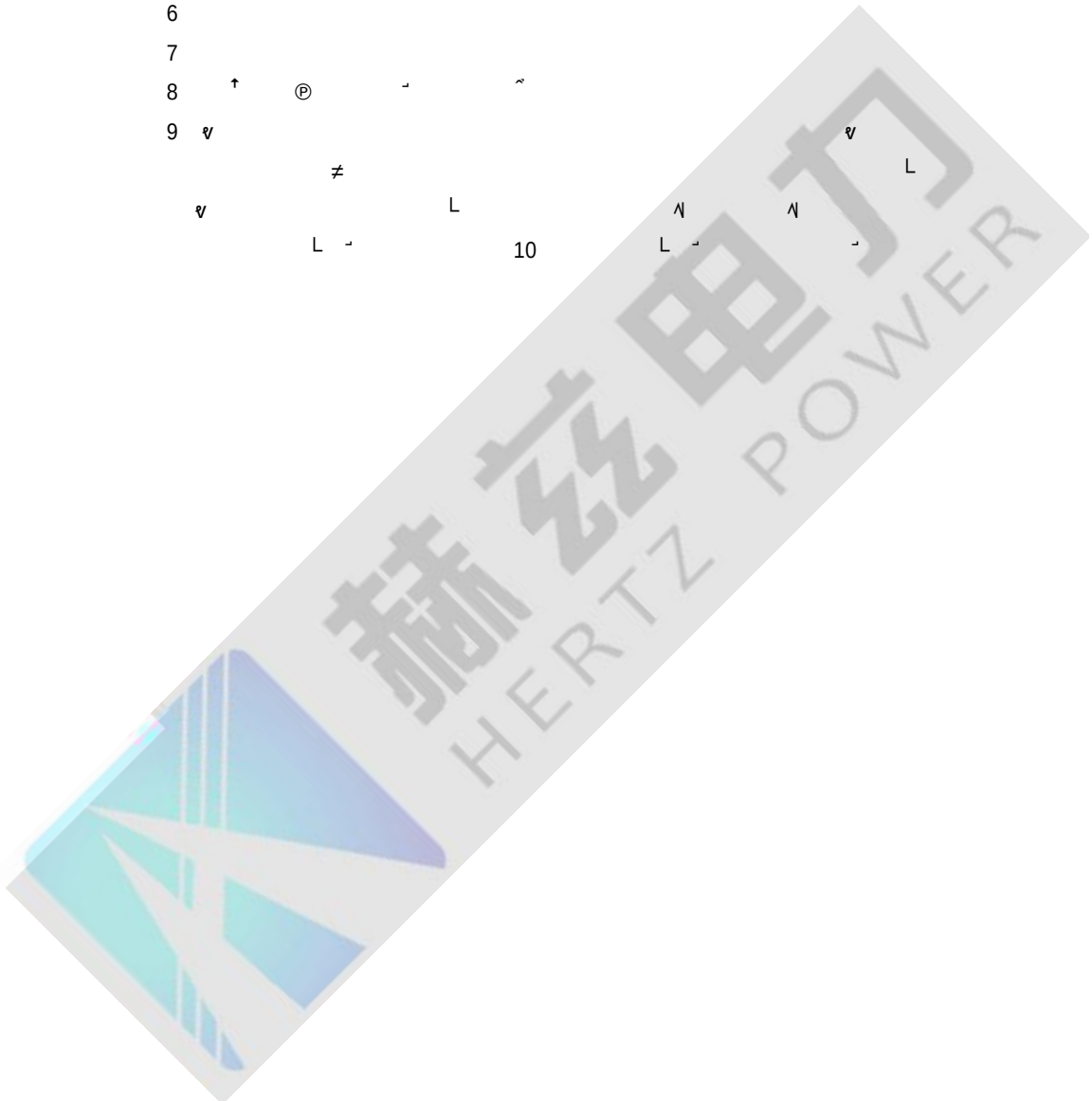


6 500kV

≈ ≠

3
4
5
6
7
8
9
10

↑ ⊕ ~
∇ ≠ L ∇ ∇ L
L ∇ L ∇ L



7 35kV

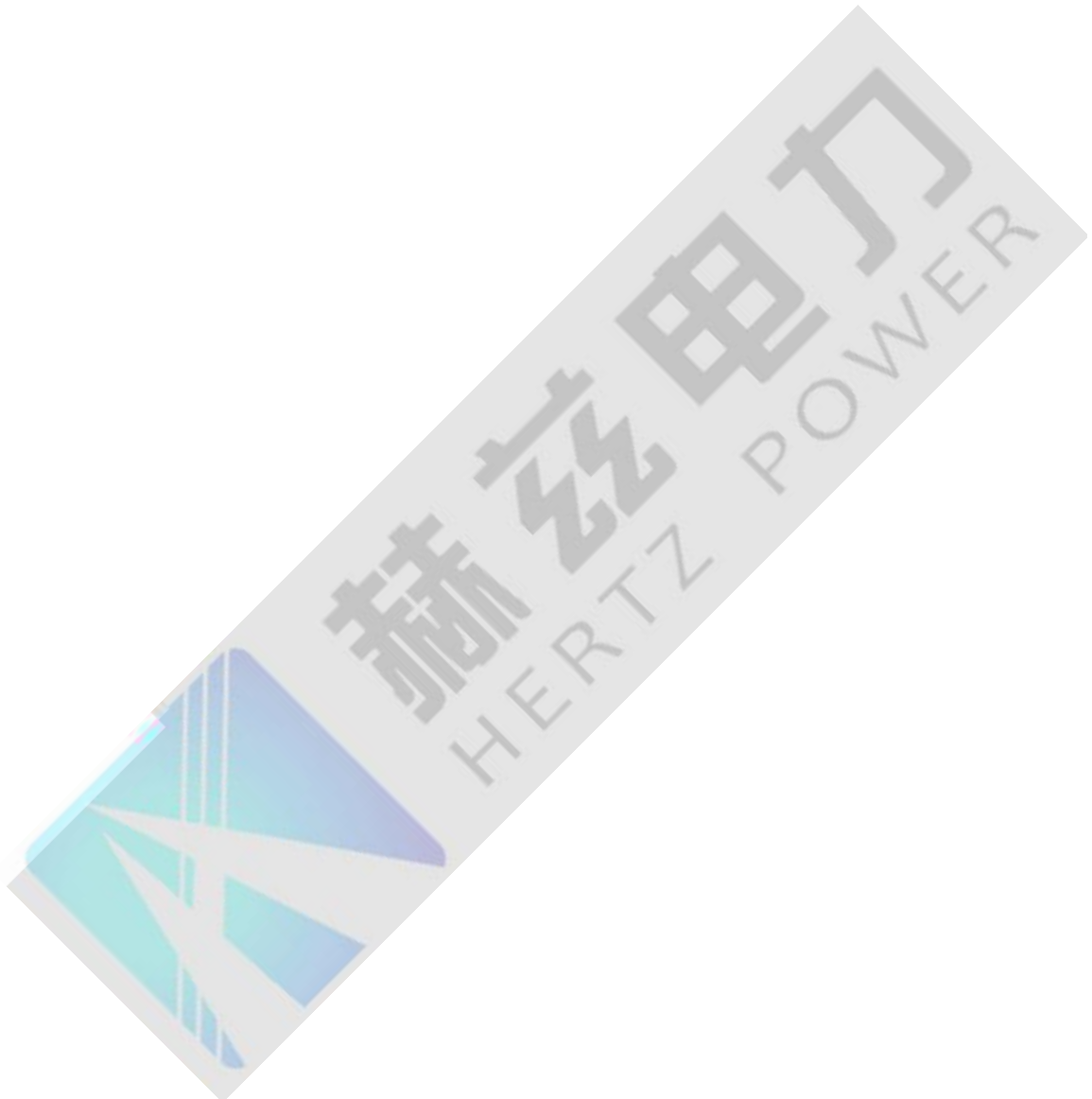
≈ ≠

i 90 Ω·m æ V

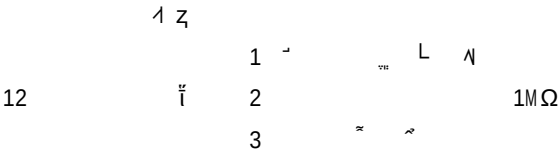




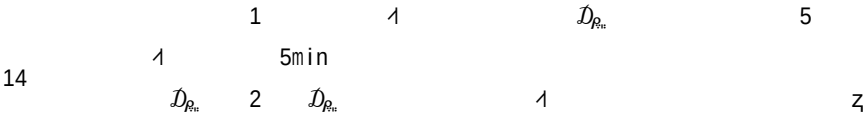
7 35kV



7 35kV



13





7 35kV

| | | | | | |
|----|--|---|-------|-----|-----|
| | | | | | |
| | | | 4 6.0 | √ 4 | 1 1 |
| 22 | | | 1 | √ | 1 |
| | | | 2 | | |
| | | | 3 | | |
| 23 | | | 1 | √ | 1 |
| | | | 2 | | |
| | | | 3 | | |
| | | | 4 | | |
| 24 | | √ | √ | | |
| 25 | | √ | 1 | √ | 1 |
| | | | 2 | | |
| | | | 3 | | |
| | | | 4 | | |
| | | | 5 | | |
| | | | 6 | | |
| | | | 7 | | |
| | | | 8 | | |
| | | | 9 | | |
| | | | 10 | | |
| 26 | | √ | | | |
| | | | | | |
| 27 | | | 1 | √ | |
| | | | 2 | √ | |
| | | | 3 | √ | |
| | | | 4 | | |
| | | | 5 | | |
| | | | 6 | | |

7 35kV

| | | | | | |
|---|---|--|---|---|-----|
| ~ | ≠ | | | | |
| | | | 7 | ĩ | |
| | | | 8 | ĩ | ĩ ı |
| | | | 9 | ≈ | |

6.3 35kV

8 35kV

| | | | | | |
|---|---|--|---|---|--|
| ≈ | ≠ | | | | |
| 1 | | | 1
2

$R_2=R_1 \quad T+t_2 \quad / \quad T+t_1$
$R_1 \quad t_1 \quad \Omega$
$R_2 \quad t_2 \quad \Omega$
T—

Ў 235
Ў 225 | 1%

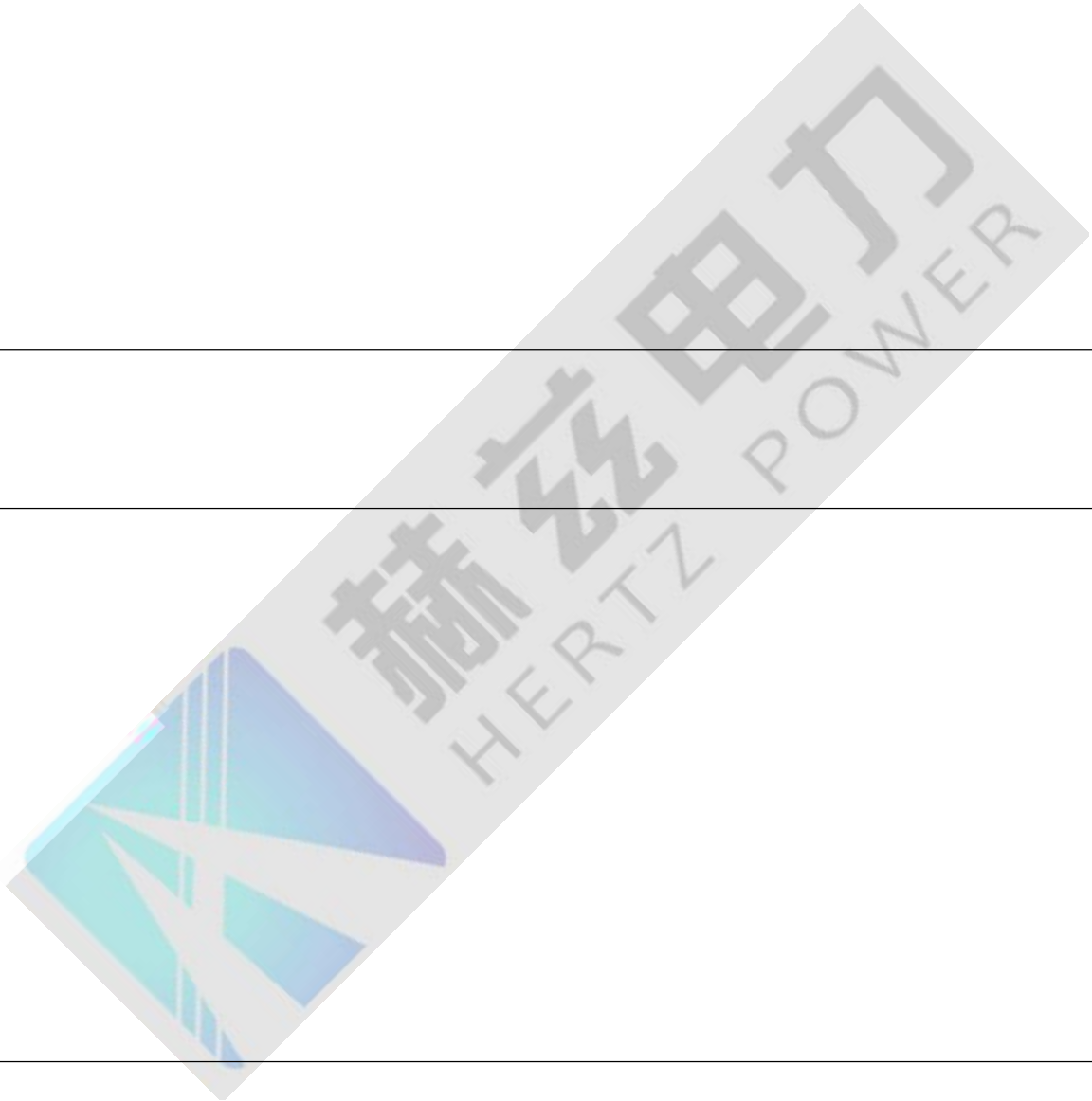
< | |



8

2

0



8 35k

| | | | | | |
|---|---|--|-----------------------------|-------------------|--|
| ~ | ≠ | | | | |
| | | | 8
9
10
11 35k
ĩ | ĩ
ĩ
F
C2 | |



~ ≠

1 tan δ 1 10kV tan δ %

tan δ % 20

| 1 kV | 20 35 | 66 110 | 220 | 500 |
|------|-------|--------|-----|-----|
| | 2.5 | 0.8 | 0.6 | 0.5 |
| | 2 | | | |

20kV

ĩ

2 ~ 1 0.5 1

3

$U_m/\sqrt{3}$

U_m

1

tan δ ĩ

tan δ

0.2%

ĩ

0.5%

3

ĩ

tan δ

4

≠ 1

≠ 5%

1

5

tan δ

2%

tan δ

1

2kV

1

≠ 1

80%

1

1

1

$\sqrt{2}$

1

2

1

66kV ĩ

1

1

1

110kV ĩ

4

1

N₂

ĩ

1

1

2kV

1

3

2500V

4

1

110kV ĩ

ĩ

1

2kV

~

2500V

5

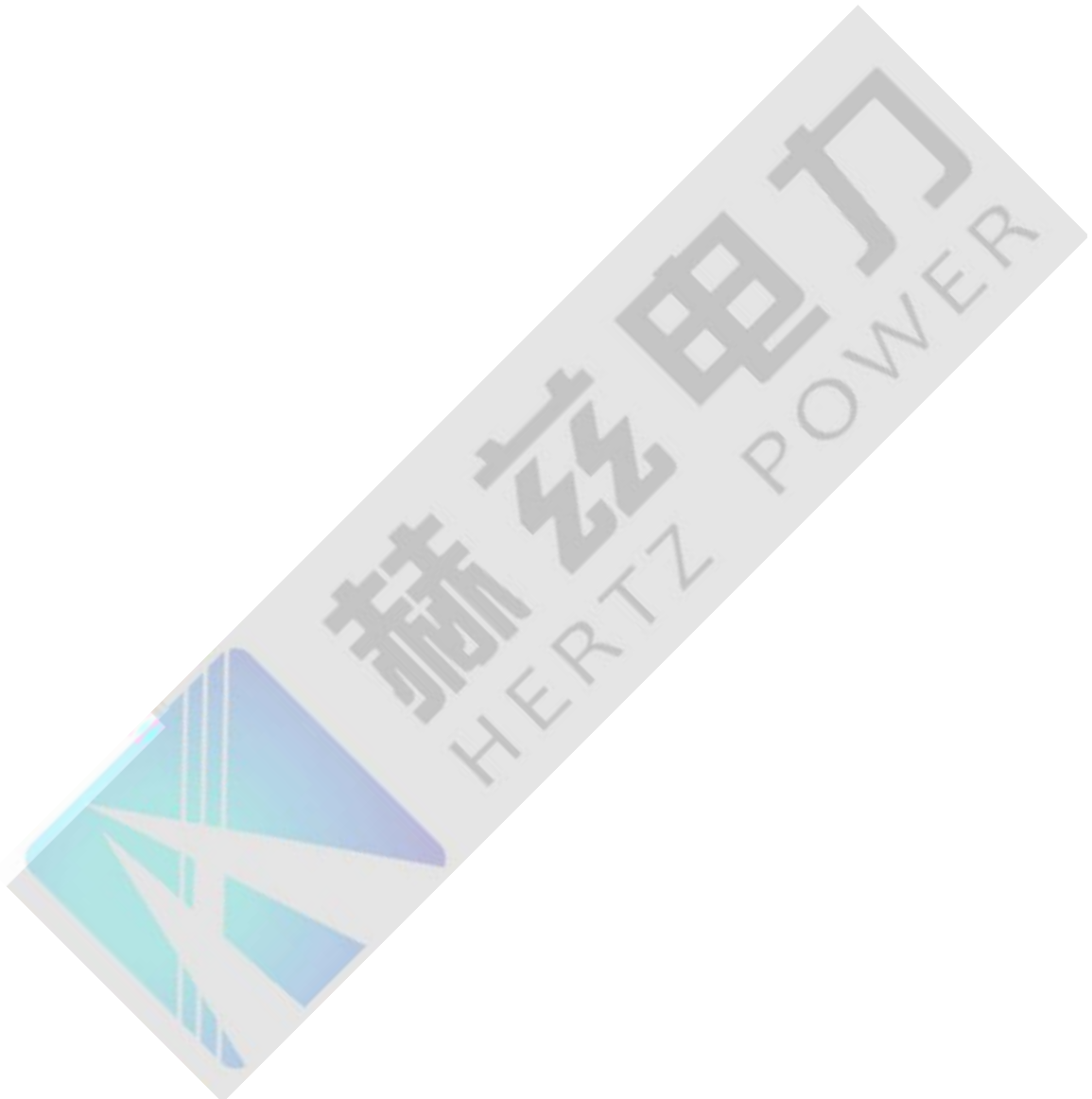


9

2

≠

4



10

~ ≠

2 ~

10%

3
30%

↓

v
50%

5 ≠

...

1

:

:

2

L N

6

:

≠

3

||

↑

4

:

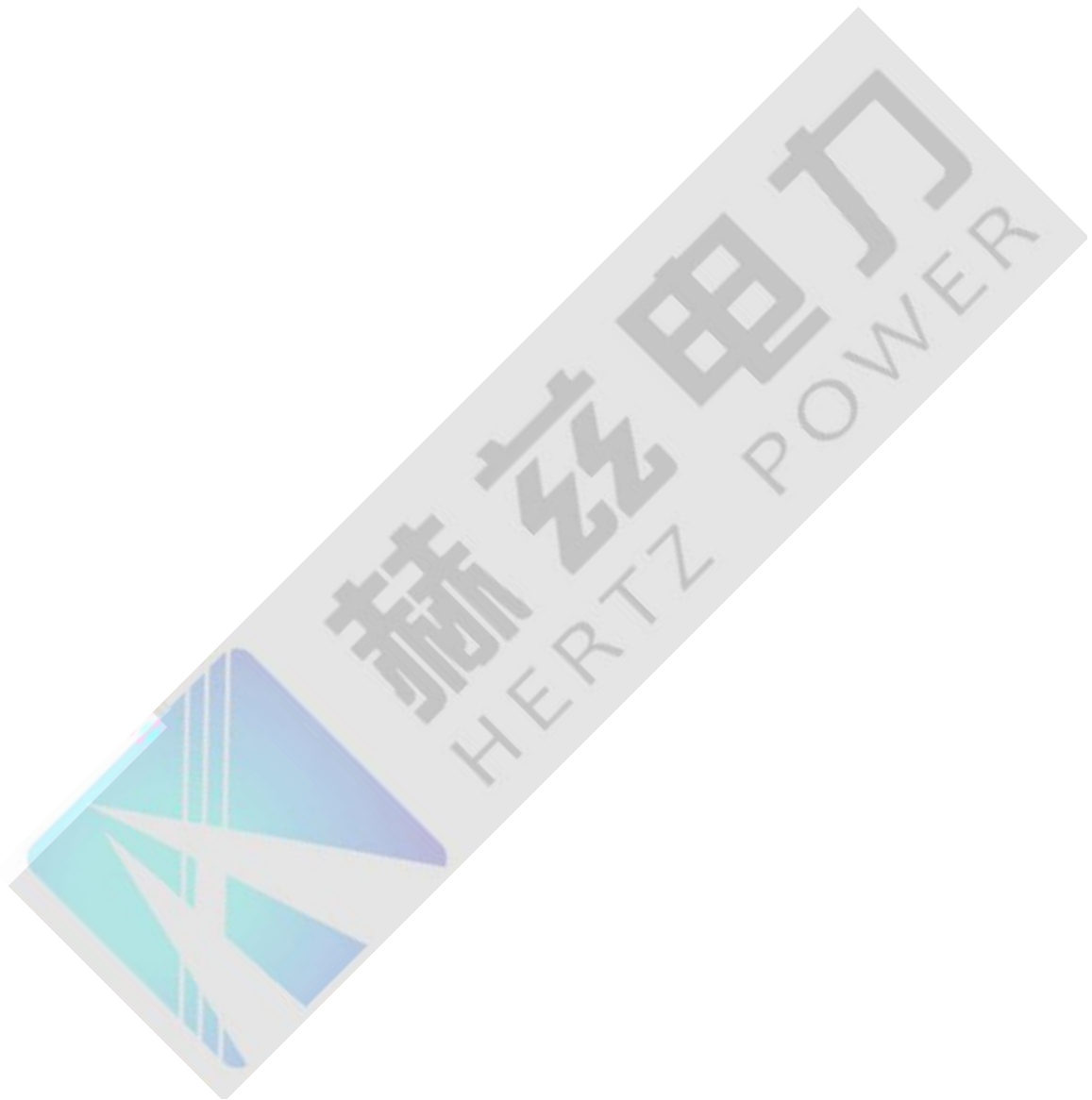
v

...

1

1

1



11 SF_6 $\neq$

1 2 220kV İ 1 1

1 İ 1 1 2kV ~

2500V

4 1 110kV İ İ 1 2kV

~ 2500V

| | | | | | |
|---|-----------------|---|------|---|-------------|
| 4 | SF ₆ | 1 | 20 | No | ≤ 250 µ L/L |
| | | 2 | NoNo | SF ₆ ≥ 99.9% CF ₄ ≤ 0.01% Air ≤ 0.03% | |



11 SF₆

≈ ≠

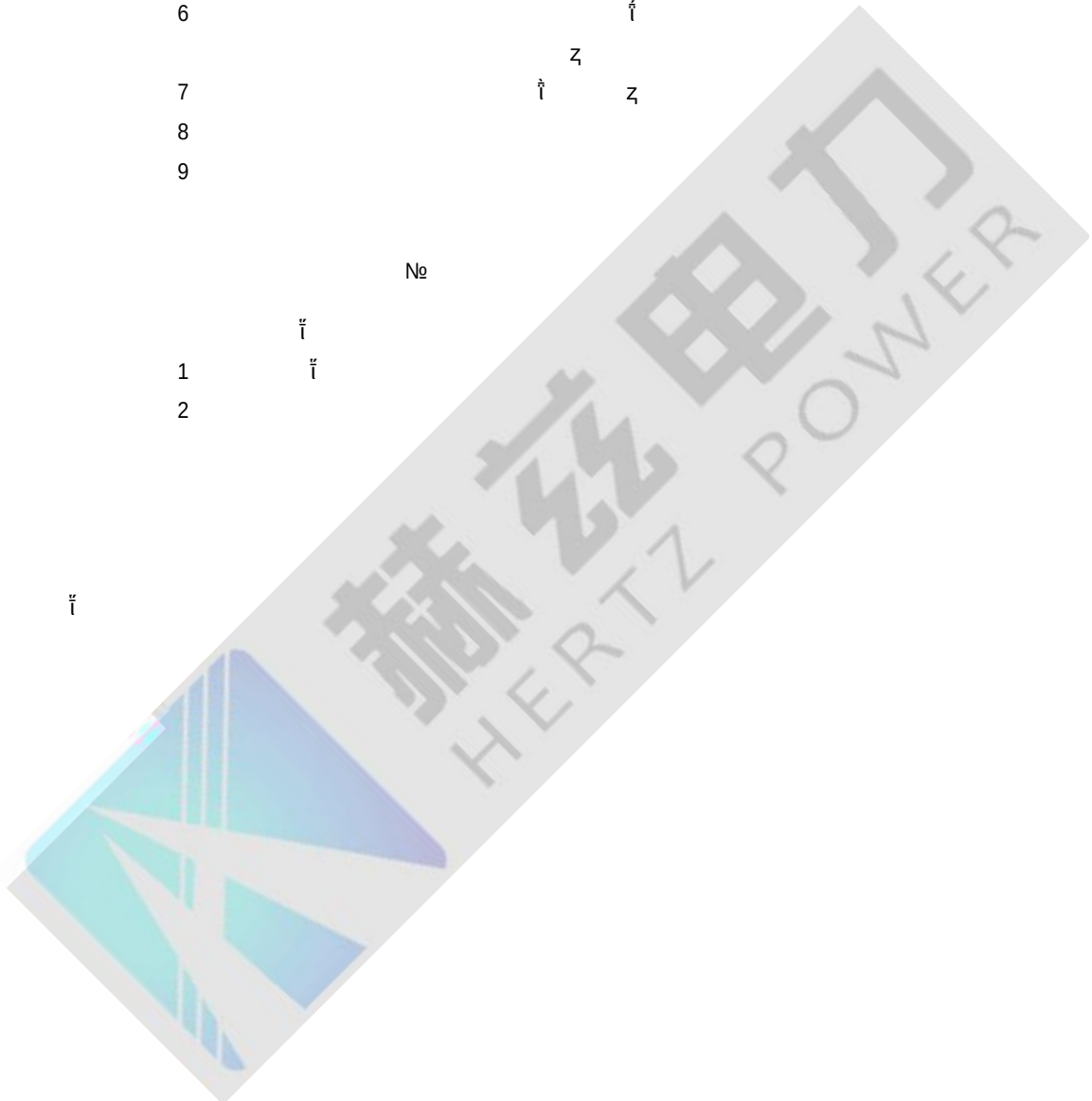
3 /
4
5 ~
6 ĩ
7 z ĩ z
8
9

11

No

ĩ
1 ĩ
2

12 ĩ



11 SF₆

| | | | | | |
|---|---|--|---|--------------|--|
| ~ | ≠ | | | | |
| | | | z | JJG1021-2007 | |



| | | | | | |
|---|---|-----|---|---|--|
| ~ | ≠ | | | | |
| | | | <p>t — 1 15s</p> <p>4 1 66kV ĩ 1 ŷ №</p> | | |
| 5 | | | <p>1 ĩ №</p> <p>10%</p> <p>2 ĩ №</p> <p>15%</p> <p>3</p> <p>$R_2=R_1 \quad T+t_2 \quad / \quad T+t_1$</p> <p>$R_1$ — t_1 Ω</p> <p>R_2 — t_2 Ω</p> <p>T — ŷ 235 ŷ 225</p> | | |
| 6 | | ≠ | | | |
| 7 | | : | <p>1 :</p> <p>30%</p> <p>2 :</p> <p>3 1 20% 50% 80% 100% 120%</p> <p>4 1 150% 1 150%</p> <p>1 190% :</p> <p>1 120% :</p> <p>1 120%</p> | | |
| 8 | | ĩ ĩ | <p>1 o</p> <p>2 o 5%</p> <p>№ ĩ</p> <p>3 ĩ L №</p> <p>4 o ĩ L №</p> <p>~ 7 № ĩ</p> | | |
| 9 | | ĩ | <p>1 ĩ</p> <p>2 ĩ</p> <p>3</p> <p>4</p> | / | |

~ ≠

5

6

7

~

ī



13

 $\sim \neq$

| | | | | | |
|---|---|---|---|-----|---|
| 1 | 1 | 1 | 7 | 80% | 1 |
|---|---|---|---|-----|---|

v 1

2 1 2kV N

1 2kV 2500V

3 1 1 7 1 80% 1

2

1

60s

1

2

1

1

110kV ĭ

1

$$t = 120 \times f_N / f_S$$

$$f_N \text{ —————}$$
 f_s _____

t_____ 1

15s

1

S

3

~ ≠

4 o ħ L 4
 7 Ne ħ

1 ħ
 2 ħ
 3

7 7 ħ 5 ħ /

6 ħ z
 7
 8

1 ħ
 2 ħ
 3
 4 ħ
 5 ħ

8 8 ħ
 9 v v

8 ↑ ⊕ ~
 9 v

≠ L v L 4 L 10 L

80 ħ 8

~ ≠

5 1 1 1 1
No 1 ĩ
6 1 || 1
≠

6 ≠

1 o ' o

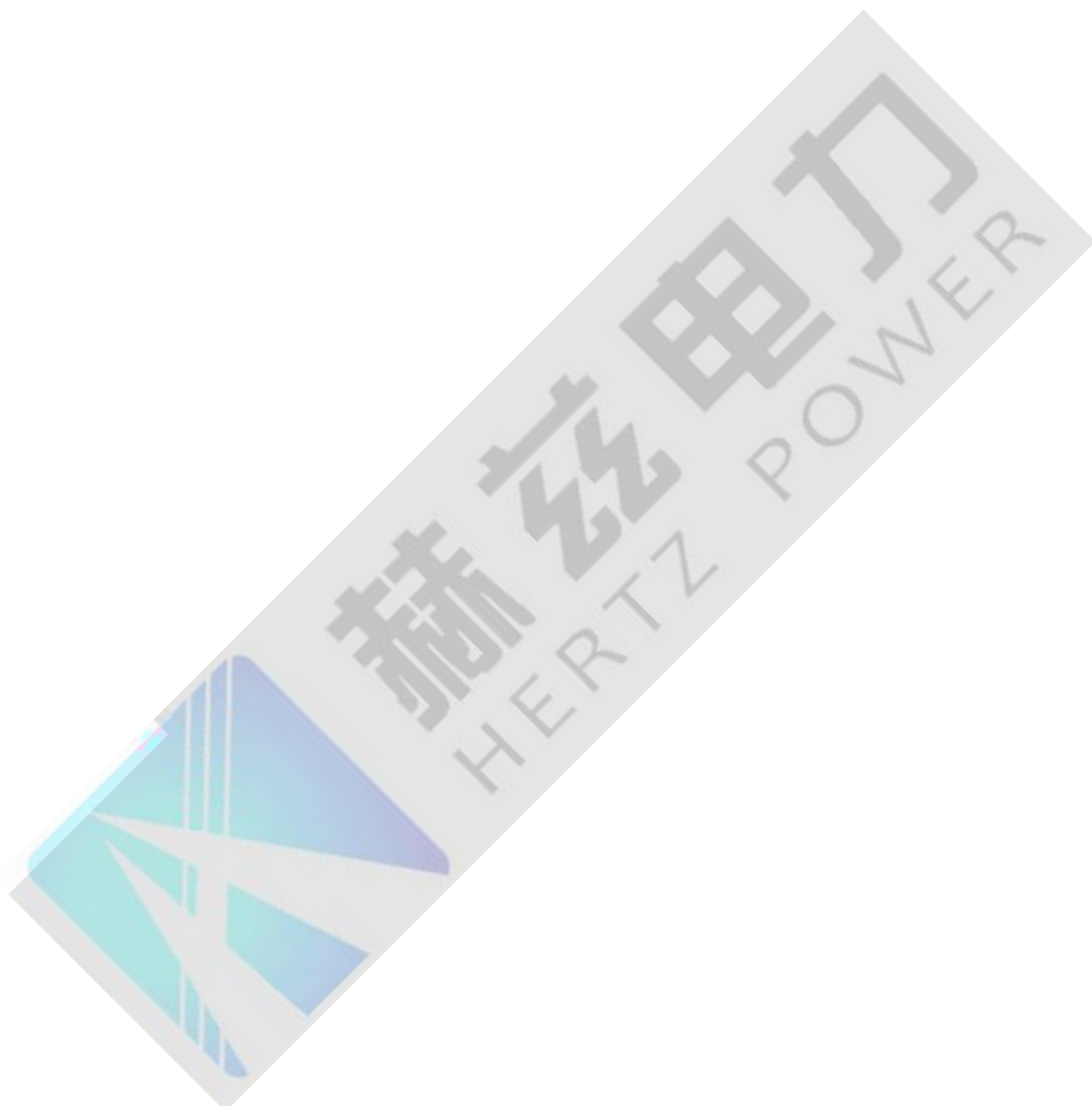
7 ĩ ĩ 2 o 5%

3 ĩ No ĩ ĩ L 1

4 a o ĩ L 1
a 7 No ĩ

1 ĩ
2 ĩ
3
4

8 Ē ĩ 6 7
o Ā λ 1 ð
ĩ



15 SF₆

| | | | | | |
|---|---|-----------------|--|---|--|
| № | № | | | | |
| | | | 1
2 2500V | | |
| | | | 1 100A 1
2 | | |
| | | | 1 SF ₆ 1 3
2
a) 1 D _p 1 1 3 1 1
0.8
b) 110kV 1 1 110kV 1
1 7 500kV 1 1
1 o 1
c) 1 L 1 1
3
a) 500kV 1 1 3 1 1 0.9
b) 220kV 1 1 1 3 1 1
c 1 1 1 1 1
1 1 3
d 1.2U _n /√3 1 | 1 110kV 1
1
2 1 1
1 20
№ _{тн}
№ _{тн} 20
1 | |
| | | 1 | 1 5000MΩ
2 tan δ
± 5% 10kV 1 tan δ % ↓
0.5%
0.2%
3 o tan δ
4 L 1 | | |
| | | 1 | 1 1
2 № _{тн} L 1
3 -№ _{тн} L 1
4 L 1 ₃ № _{тн} ↓
— 5ms
— № _{тн} 3ms
— 1 o 3ms
— 1 o № _{тн} 2ms | | |
| | | № _{тн} | 1 35kV 1 SF ₆
2 1 1
3 | | |
| | | | 1 L 1 ₃ 1 ± 5% | | |



15 SF_6

[illegible]

15 SF_6

$\sim$

$\neq$

:

2

$\models$

$\uparrow$

3

:

ν

th

1



15 SF₆

| | | | | | |
|---|---|-----|--|--|--|
| ~ | ≠ | | | | |
| | | 1 | | | |
| | | 2 | | | |
| | | 3 | | | |
| | | 4 | | | |
| | | 5 | | | |
| | | 6 | | | |
| | | 7 | | | |
| | | 8 | | | |
| | | 9 | | | |
| | | 10 | | | |
| | | 11 | | | |
| | | 12 | | | |
| | | 13 | | | |
| | | 14 | | | |
| | | 15 | | | |
| | | 16 | | | |
| | | 17 | | | |
| | | 18 | | | |
| | | 19 | | | |
| | | 20 | | | |
| | | 21 | | | |
| | | 22 | | | |
| | | 23 | | | |
| | | 24 | | | |
| | | 25 | | | |
| | | 26 | | | |
| | | 27 | | | |
| | | 28 | | | |
| | | 29 | | | |
| | | 30 | | | |
| | | 31 | | | |
| | | 32 | | | |
| | | 33 | | | |
| | | 34 | | | |
| | | 35 | | | |
| | | 36 | | | |
| | | 37 | | | |
| | | 38 | | | |
| | | 39 | | | |
| | | 40 | | | |
| | | 41 | | | |
| | | 42 | | | |
| | | 43 | | | |
| | | 44 | | | |
| | | 45 | | | |
| | | 46 | | | |
| | | 47 | | | |
| | | 48 | | | |
| | | 49 | | | |
| | | 50 | | | |
| | | 51 | | | |
| | | 52 | | | |
| | | 53 | | | |
| | | 54 | | | |
| | | 55 | | | |
| | | 56 | | | |
| | | 57 | | | |
| | | 58 | | | |
| | | 59 | | | |
| | | 60 | | | |
| | | 61 | | | |
| | | 62 | | | |
| | | 63 | | | |
| | | 64 | | | |
| | | 65 | | | |
| | | 66 | | | |
| | | 67 | | | |
| | | 68 | | | |
| | | 69 | | | |
| | | 70 | | | |
| | | 71 | | | |
| | | 72 | | | |
| | | 73 | | | |
| | | 74 | | | |
| | | 75 | | | |
| | | 76 | | | |
| | | 77 | | | |
| | | 78 | | | |
| | | 79 | | | |
| | | 80 | | | |
| | | 81 | | | |
| | | 82 | | | |
| | | 83 | | | |
| | | 84 | | | |
| | | 85 | | | |
| | | 86 | | | |
| | | 87 | | | |
| | | 88 | | | |
| | | 89 | | | |
| | | 90 | | | |
| | | 91 | | | |
| | | 92 | | | |
| | | 93 | | | |
| | | 94 | | | |
| | | 95 | | | |
| | | 96 | | | |
| | | 97 | | | |
| | | 98 | | | |
| | | 99 | | | |
| | | 100 | | | |

15 SF₆

| | | | | | |
|---|---|-----------------------|--|--|--|
| ≈ | ≠ | | | | |
| | | | ≈ | | |
| | | 1 | 1 ů 1 1 N
2 1 1 i 1
3 1 1 1 | | |
| | | | 1 1 i
2
3 No
4 “ ” ≈ ≈ | | |
| | | SF ₆ 1 z i | 1 SF ₆ 1 ≈ SF ₆
2 SF ₆ ů
3 SF ₆ 1 z N
4 SF ₆ 1 z 1 z
5 SF ₆ √
6
7 L L
8 o i ≈ 1 ≈ | | |
| | | | 1 1 | | |
| | | | w | | |
| | | i | 1 1 i
2 No i No
3 1
4
5 1
6 “ / ” © “ ”
7
8 1
9 i
10 | | |



13 SF

~ ≠

11

12 ↑ © ~
ĩ ~

13

~ ≠
L ~ L ~ 10 L
~ 80% 2-5mm

14

1 ~
2 ~
3 ~
4 ~
5 ~
j ~ ~ ~



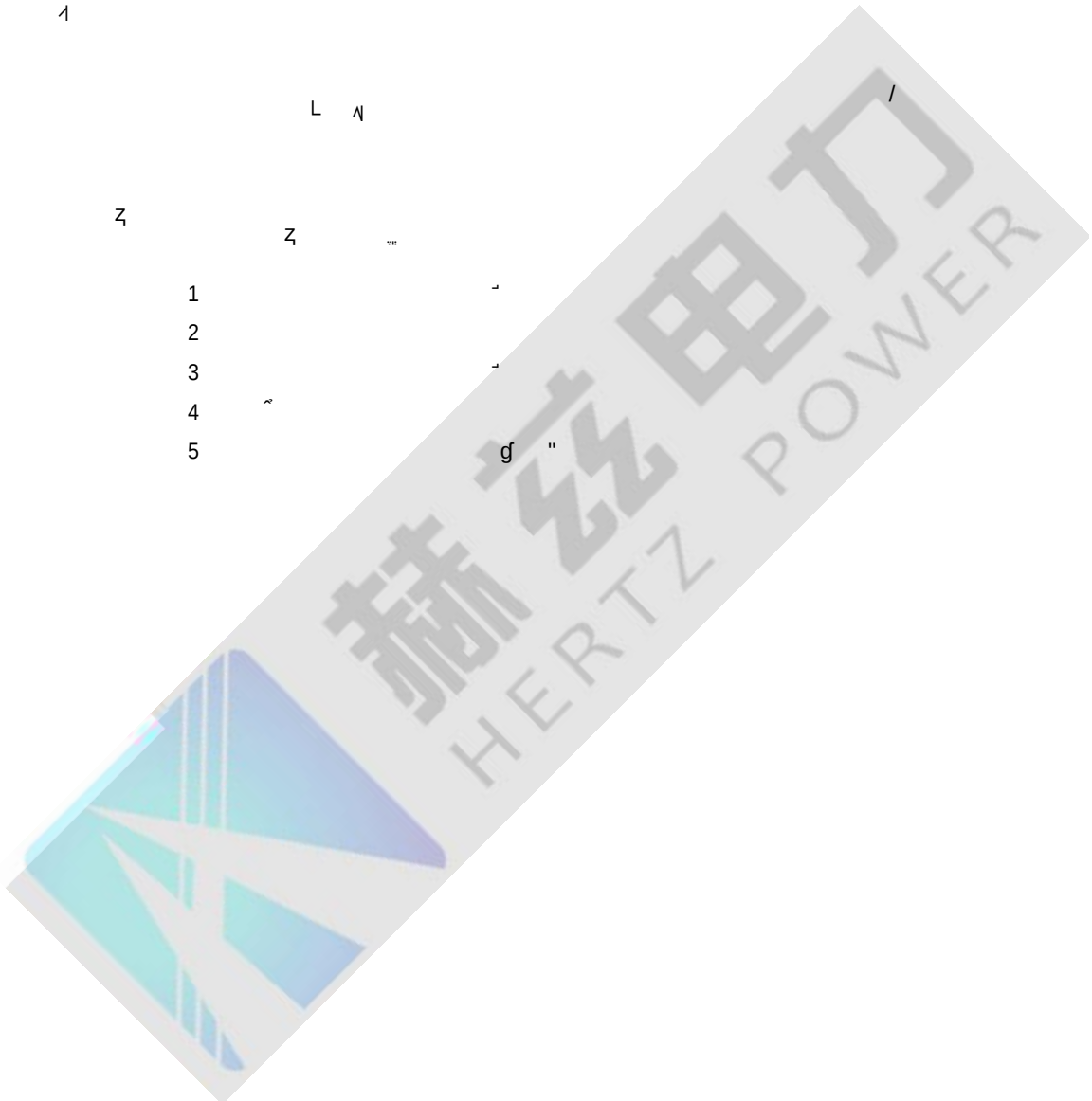
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|-------|---------|--|---------|-------|-------|-------|-------|----------|-------|-------|-------|-------|----|-------|-------|-------|-------|----|-------|-------|-------|-------|------|-------|-------|-------|---------|------|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| № | ≠ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | <table><tr><td>3.6</td><td>25/18</td><td>25/18</td><td>25/18</td><td>27/20</td></tr><tr><td>7.2</td><td>30/23</td><td>30/23</td><td>30/23</td><td>34/27</td></tr><tr><td>12</td><td>42/30</td><td>42/30</td><td>42/30</td><td>48/36</td></tr><tr><td>24</td><td>65/50</td><td>65/50</td><td>65/50</td><td>79/64</td></tr><tr><td>40.5</td><td>95/80</td><td>95/80</td><td>95/80</td><td>118/103</td></tr><tr><td rowspan="2">72.5</td><td>140</td><td>140</td><td>140</td><td>180</td></tr><tr><td>160</td><td>160</td><td>160</td><td>200</td></tr></table> | 3.6 | 25/18 | 25/18 | 25/18 | 27/20 | 7.2 | 30/23 | 30/23 | 30/23 | 34/27 | 12 | 42/30 | 42/30 | 42/30 | 48/36 | 24 | 65/50 | 65/50 | 65/50 | 79/64 | 40.5 | 95/80 | 95/80 | 95/80 | 118/103 | 72.5 | 140 | 140 | 140 | 180 | 160 | 160 | 160 | 200 | | |
| 3.6 | 25/18 | 25/18 | 25/18 | 27/20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7.2 | 30/23 | 30/23 | 30/23 | 34/27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | 42/30 | 42/30 | 42/30 | 48/36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | 65/50 | 65/50 | 65/50 | 79/64 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40.5 | 95/80 | 95/80 | 95/80 | 118/103 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72.5 | 140 | 140 | 140 | 180 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 160 | 160 | 160 | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 4 ð | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | ~
o 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | α | 1 1
2 40.5kV
2ms 40.5kV 3ms 3kA
10kV 2ms
3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | No | No 1 o
20% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | No
1 | 1 No 10MΩ
2 L 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | No
1 | 1 85% 110%
1 30%
2 No No 1 65% 110%
85% 110% 1
1 30% No
3 1 1
80% 50kA 85%
4 L 1 | | | | | | No
1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ↑
L | 2MΩ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

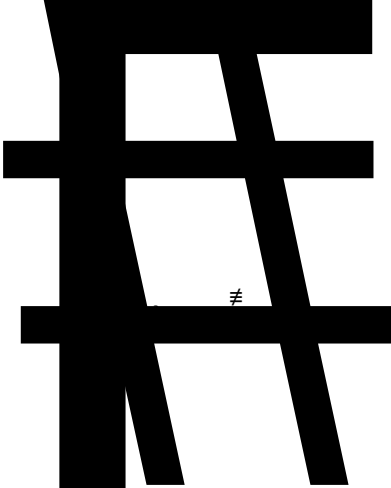


16

~ ≠
↑
L
1 2kV 1min ~ 2500V
1

L 1
Z Z
1
2
3
4
5
g "





13



2

1

2

3

4

5

6

TH

~

TH

」

」



| | | | | | |
|---|-----------------|---|---|-----------------|-----------------|
| 1 | ≠ | 1 | 100A | 1 | |
| | | 2 | GIS | GIS | |
| | | 3 | | | |
| | | 4 | | | SF ₆ |
| 2 | SF ₆ | 1 | 1*10 ⁻⁶ () | | |
| | | 2 | 5h | SF ₆ | No 15 μ L/L |
| | | 3 | GIS 24h | | |
| | | 1 | SF ₆ 20 | No GB7674 | |
| 3 | SF ₆ | 1 | 72.5kV | | GB/T8905 SF6 |
| | | 2 | No | 150 μ L/L | |
| | | 3 | No | 250 μ L/L | |
| | | 4 | GIS 24h | | |
| 4 | SF ₆ | 1 | SF ₆ ≥ 99.9% CF ₄ ≤ 0.01% Air ≤ 0.03% | | |
| | | 2 | SF ₆ | 24h | |
| | | | No | | |
| | | | No | | |
| 5 | No | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

18 GIS HGIS GIL

~ ≠

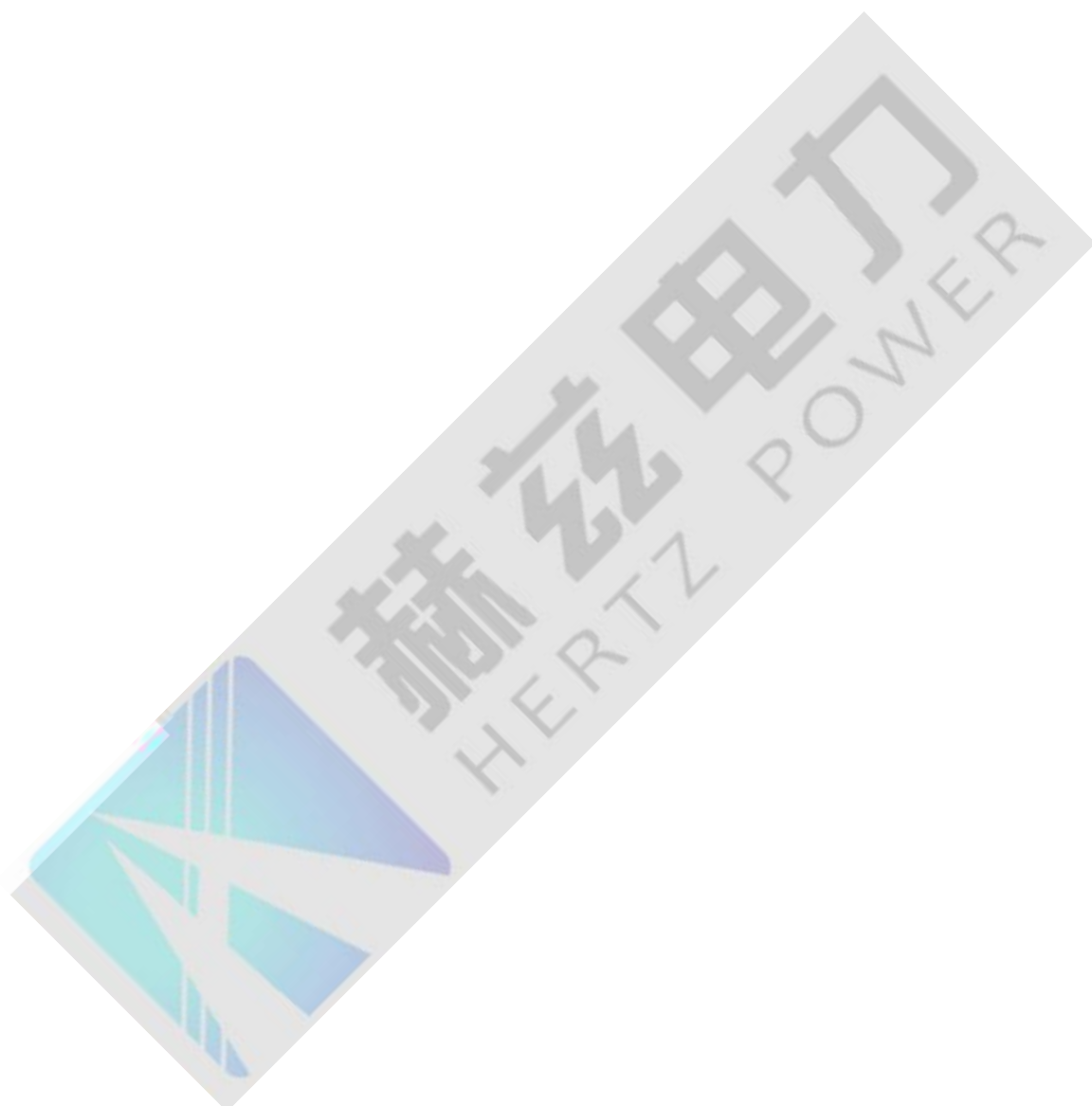
1 Z 2 y | /
1 Z' 3 ~ 1 Z ~
↑
L 2MΩ 500V 1000V

↑
L 1 2kV 1min ~ 2500V
1
o

10 L 1

tan δ

11





18 GIS HGIS GIL

≈ ≠

GIS /

32 1 80% 110% №

1

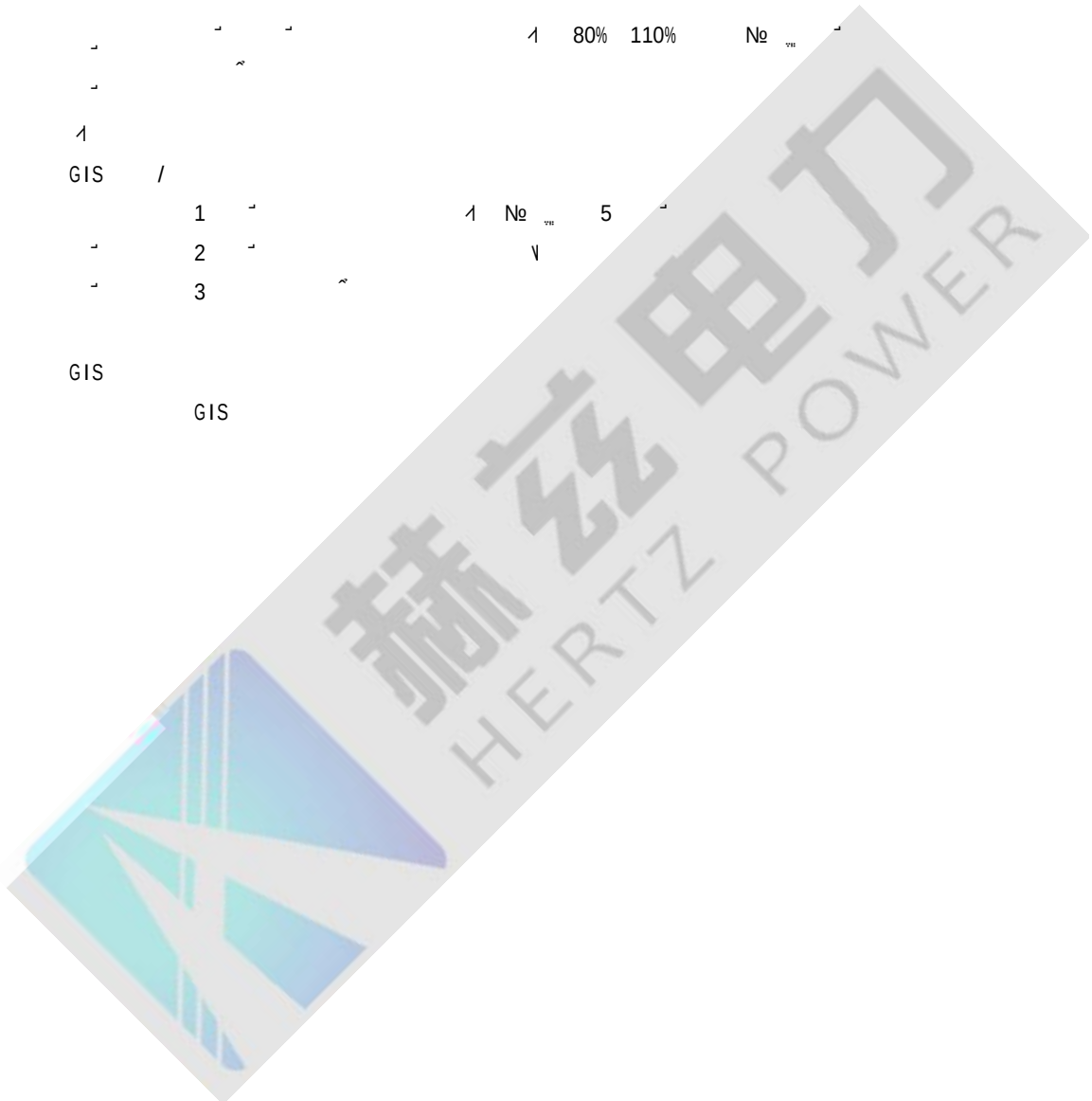
GIS /

1 № 5

33 1 2 3

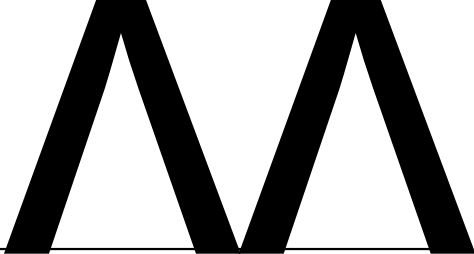
GIS

34 GIS



18 GIS HGIS GIL

~ ≠



18 GIS HGIS GIL

≈ ≠

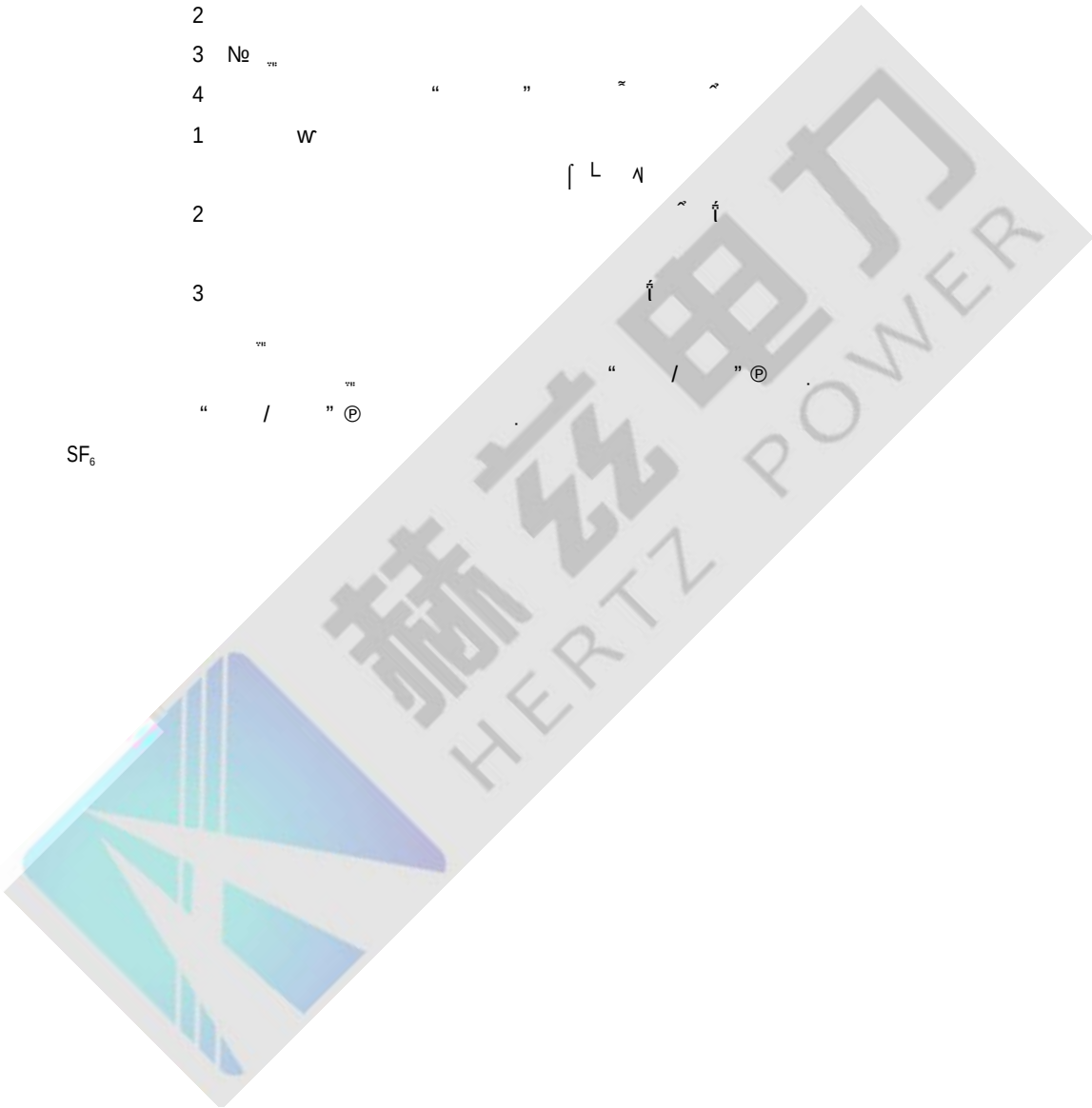
45

46

47

48

SF₆



| | | | | | | | | | | | | | |
|------|-----|-------------|---|------|---------|----|------|----|----|----|----|--|--|
| ≠ | | | | | | | | | | | | | |
| 1 | | | 1 2500V
2 L 4 | | | | | | | | | | |
| 2 | | 1 | 1
2 1. | | | | | | | | | | |
| 3 | | ↑
L
1 | 1 2kV 1min | | ~ 2500V | | | | | | | | |
| 4 | | | 1 100A 1
2 | | | | | | | | | | |
| 5 | | 1 | 1 17 1
<table><tr><td>1 kV</td><td>7.2</td><td>12</td><td>40.5</td></tr><tr><td>kV</td><td>30</td><td>42</td><td>95</td></tr></table> 2 o 1 o 1
3 1 ↓ 1
4 1
5 № 1 | 1 kV | 7.2 | 12 | 40.5 | kV | 30 | 42 | 95 | | |
| 1 kV | 7.2 | 12 | 40.5 | | | | | | | | | | |
| kV | 30 | 42 | 95 | | | | | | | | | | |
| 6 | | No | 1 SF6
a 1 1 1
b № L 4
c -№ L 4
d L 43 № ↓
— 5ms
— № 3ms
2
a 1
b 40.5kV
2ms 40.5kV 1 3ms 3kA 1
10kV 2ms
c № 2ms
d | | | | | | | | | | |
| 7 | | No
1 | No 1 o 20% | | | | | | | | | | |
| 8 | | | 1 85% 110%
1 30% | | No | | | | | | | | |

| № | № | № | | | |
|----|---|-------------------------|--|--|--------------------|
| | | № | 2 № № 1 65% 110%
85% 110% 1
1 30% №
3 80% 50kA 85%
4 L | | 1 |
| 9 | | № | 1 1000V
2 № 10MΩ
3 | | |
| 10 | | | | | |
| 11 | | SF ₆ | SF ₆ 20 № ↓
1 ≤ 150 μ L/L
2 SF ₆ 24h | | SF ₆ |
| 12 | | SF ₆
NeNe | № ↓
SF ₆ ≥ 99.9% CF ₄ ≤ 0.01% Air ≤ 0.03% | | SF ₆ |
| 13 | | SF ₆ | 1 GB 11023
2 1 × 10 ⁻⁶
3 24h
4 0.5% 24h | | SF ₆ |
| 14 | | 1 | 1 1000MΩ
2 | | 2500V 1
1000V 1 |
| 15 | | 1 | 1 80% № TV | | |

19

~

≠

1

2

1

1

16

ĩ

≠

1

2kV



| 序 | 号 | 名称 | 规格 | 单位 | 数量 |
|----|---|---|---|----|---------|
| | | ： | ≠
2 | ： | ≈ |
| 25 | | | | | |
| 26 | | | 1000MΩ | | 2500V Ⅱ |
| 27 | | 1mA
1 U _{1mA}
Ⅱ 0.75U _{1mA} | 1 GB11032
2 U _{1mA} L Ⅳ
3 0.75U _{1mA}
4 50μA ±5% | | |
| 28 | | 1 | Ⅲ | | |
| 29 | | | 1 Ⅱ
2 Ⅱ
3
4 | | |
| 30 | | | 1
2
3 No _Ⅲ
4 | | |
| 31 | | | 1
2 Ⅱ
3
4
5 No | | |
| 32 | | No _Ⅲ | No _Ⅲ No _Ⅲ Ⅱ ≈ | | |
| 33 | | | | | |

| ~ | ≠ | | | | |
|----|---|---|---|---|--|
| 34 | | | 1 ĩ ẽ
2
3 | | |
| 35 | | ı | 1 L
2 L [ı | | |
| 36 | | ı | 1 ı ĩ
2 ı ı | | |
| 37 | | | 1 ı ĩ
2 № ı | | |
| 38 | | ı | ı L ı
o ĩ ĩ | | |
| 39 | | | 1 ı ı
2 ı ĩ
3 ı
4 ı ı ı z
5 ı | | |
| 40 | | ı | 1 w ũ
2 ı
3 ı ũ | | |
| 41 | | | 1 ı
2 ı
3 ı
4
5 ĩ
6 ı
7 ĩ
8 ĩ ı ı
9 ı | / | |

13

13.1



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|----------------|--|-------|--------------------------------------|-------|-------|----|----|----|----|----|---|---|-------|-------|-------|-------|-------|-------|--|-----|-----|------|----|------|------|------|------|--|--|--|
| ~ | ≠ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | | 2500MΩ | | 1
1000V
1
2500V
1
2 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | GB/T 11024.1
1 3Mvar ±5%
2 3Mvar 0.5%
3 1
4 1.08
1.02
5 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | 1 1 1 kV
<table><tr><td></td><td>1</td><td>1</td><td>3</td><td>6</td><td>10</td><td>15</td><td>20</td><td>35</td></tr><tr><td>3</td><td>6</td><td>18/25</td><td>23/32</td><td>30/42</td><td>40/55</td><td>50/65</td><td>80/95</td><td></td></tr><tr><td>2.3</td><td>4.5</td><td>18.8</td><td>24</td><td>31.5</td><td>41.3</td><td>48.8</td><td>71.3</td><td></td></tr></table>
2 75%
3 10 s 1 | | 1 | 1 | 3 | 6 | 10 | 15 | 20 | 35 | 3 | 6 | 18/25 | 23/32 | 30/42 | 40/55 | 50/65 | 80/95 | | 2.3 | 4.5 | 18.8 | 24 | 31.5 | 41.3 | 48.8 | 71.3 | | | |
| | 1 | 1 | 3 | 6 | 10 | 15 | 20 | 35 | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 6 | 18/25 | 23/32 | 30/42 | 40/55 | 50/65 | 80/95 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.3 | 4.5 | 18.8 | 24 | 31.5 | 41.3 | 48.8 | 71.3 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | Z_p
D_p | 1 $D_{p_{sc}}$ 3 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | 1
2 1
3 1
4 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | 1 1
2 1
3 1
4 1
5 1 | / | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

20

| ~ | ≠ | | | | |
|---|---|--|------------------|------------------|---|
| | | | 6
7
8
9 | ǐ
ǐ
ǐ
≈ | ǐ |

13.2

21

~ ≠

2500V

1 2500MΩ

GB/T 11024.1

1 3Mvar ǐ

2 3Mvar

2 3 ǐ ǐ ǐ

4

1.02

5 𐍤

𐍤 𐍤

| ~ | ≠ | | | | |
|---|---|--|---|---|--------|
| | | | 4
5
6
7 | ĩ
ĩ
ĩ
~ | z
z |
| 6 | | | 1
2
3
4 | | |
| 7 | | | 1
2 | | |
| 8 | | | 1
2
3
4
5
6
7
8
9 | ĩ
ĩ
ĩ
ĩ
ĩ
ĩ
ĩ
ĩ
ĩ | / |

13.4

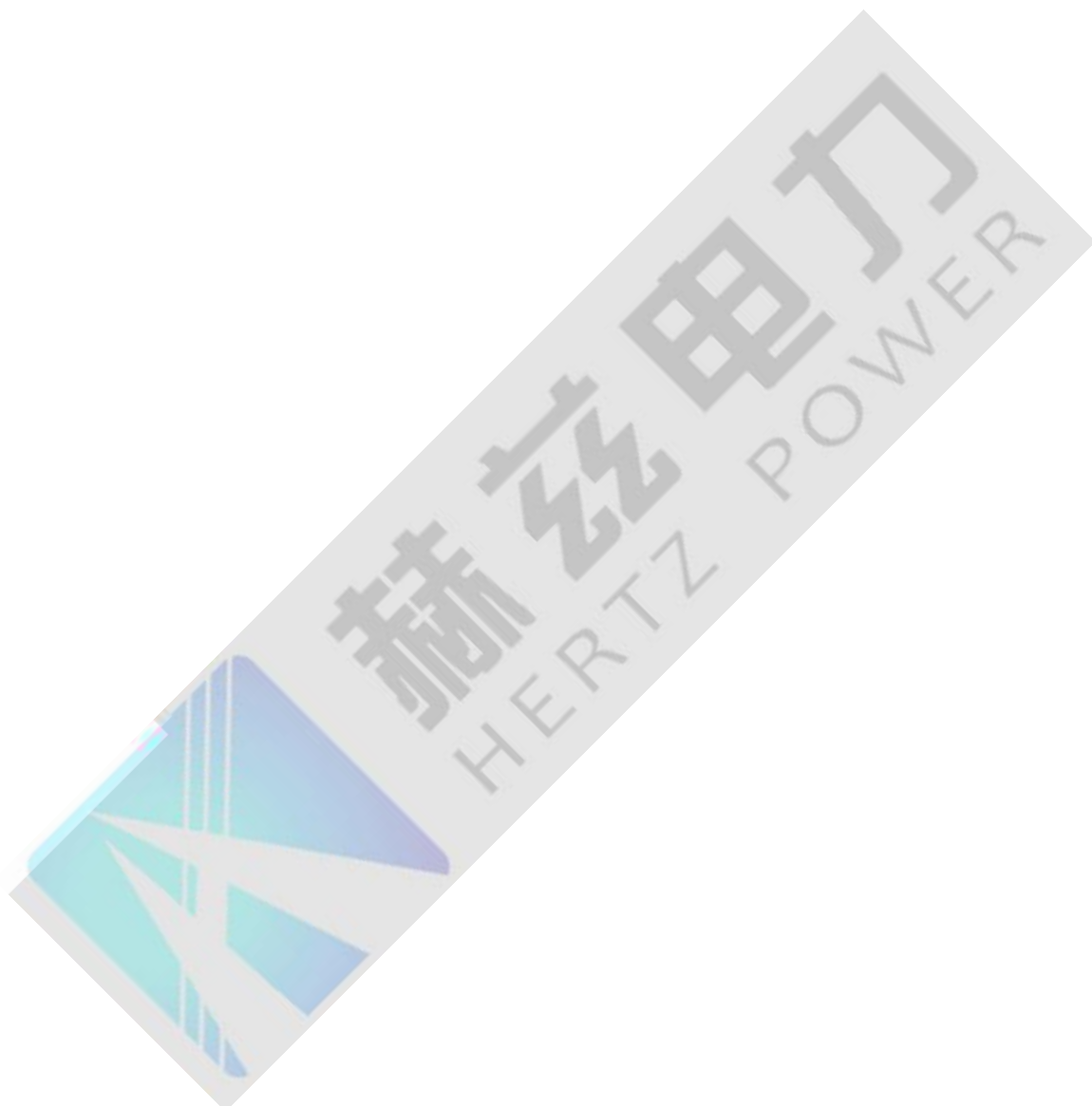
~ ≠

1 20%

2

3

4

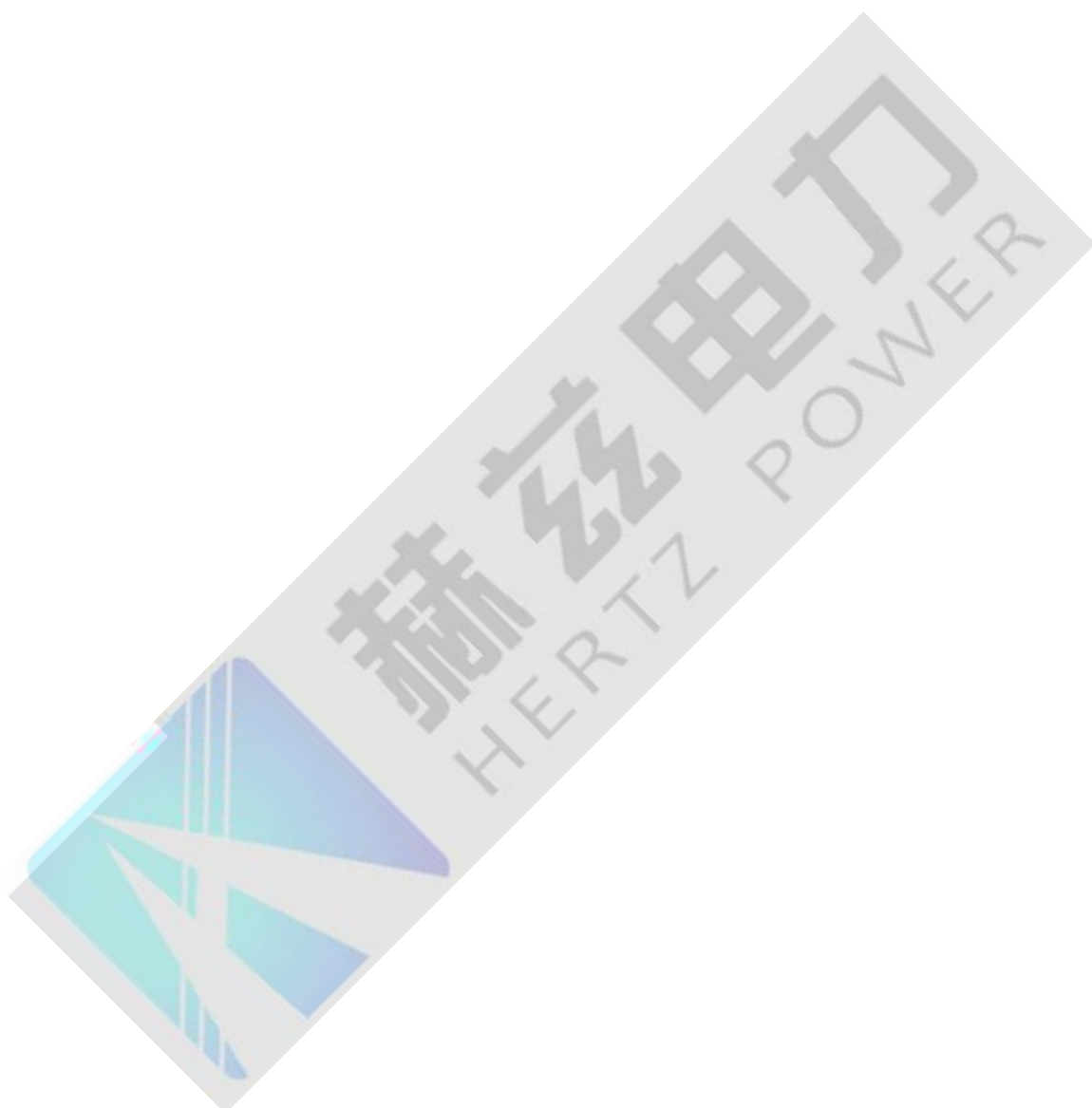


24 35kV

| | | | | | |
|---|---|---------|---|--|--|
| ≈ | ≠ | | | | |
| | | | | | |
| 3 | | No
1 | 1 No 1 1 1
2 L 1 1
a 1 35kV 1 3 1 1
± 1%
b 1 1 No 1 ± 0.5%
c No 1 1 1 % 1/10
± 1% | | |
| 4 | | ≠ | 1 1 1 ≠ 1 1 1
2 1 1 1 ≠ 1 1 1 | | |
| 5 | | 1 | 1
2 1 1 1 1
3 1 1
4 1 1 1
5 2500V 1min 1 1 | | |
| 6 | | | 1 1 1 70% 10000MΩ 20
2 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1
K 5 10 15 20 25 30 35 40 45 50 55 60
A 1.2 1.5 1.8 2.3 2.8 3.4 4.1 5.1 6.2 7.5 9.2 11.2
a K 20
b
3 1 1 1 1 1 1 1 1 1 1 1 1
A = 1.5 ^{K/10} 1
1 20 1 | | |



24 35kV



24 35kV

~ ≠

↑

1

13



24 35kV

| ~ | ≠ | | | | |
|---|---|--|---------------|---|--|
| | | | 3 4 5 6 7 8 9 | ĩ | |

14.2 35kV

25 35kV

| ~ | ≠ | | | | |
|---|---|--|---|-------------------|--|
| 1 | | | 1
a
b pH >5.4
c mgKOH/g ≤ 0.03
d ° ≥ 135
e Ne mg/L ≤ 20
f z 25 ,mN/m ≥ 40
g tan δ 90 % ≤ 1.0
h Dp 1 kV ≥ 40
i 90 Ω·m ≥ 6 × 10 ¹⁰
j Ne % ≤ 0.02
2 11
3 Ne
a 24h 1 24h
Ne
b GB/T 7252 1 Ne ∞ t
c 1 μ L/L
20 H ₂ 10 C ₂ H ₂ 0.1 | | |
| 2 | | | 1 1600kVA 1 2%
2 1% 1 1
2%
R ₂ =R ₁ T+t ₂ / T+t ₁
R ₁ — t ₁ Ω
R ₂ — t ₂ Ω
T — ů 235 ů 225 | | |
| 3 | | | 1 1 70% 10000 MΩ
20
2 50 1
1 1 | 1
2500V
2 1 | |



25 35kV

~ ≠

ĩ 1

ĩ

3

ĩ

4

⌘

⌘

5

2500V

1min

ĩ Dp

7 ð



25 35kV

≈ ≠



25 35kV

| | | | | | |
|---|---|--|---|---|-----|
| ~ | ≠ | | | | |
| | | | 8 | ĩ | ĩ ı |
| | | | 9 | ≈ | |

14.3 10kV

26 10kV

| | | | | | |
|---|---------|-------|--------------|------|--|
| ~ | ≠ | | | | |
| 1 | | 2500V | 1min | ĩ Dp | |
| 2 | | 1 2 | ≈ ı | ĩ 2% | |
| 3 | B P1/2k | | DL/T780-2001 | 1MΩ | |

≈ ≠

√

1

GB11032

↑

1 35kV 1 5000V 2500MΩ

2 35kV 1 2500V

2

1000MΩ

3 1kV 1 500V 2MΩ

4 5MΩ 500V

1 1 GB 11032

1

3

1

2 1

3 Ne

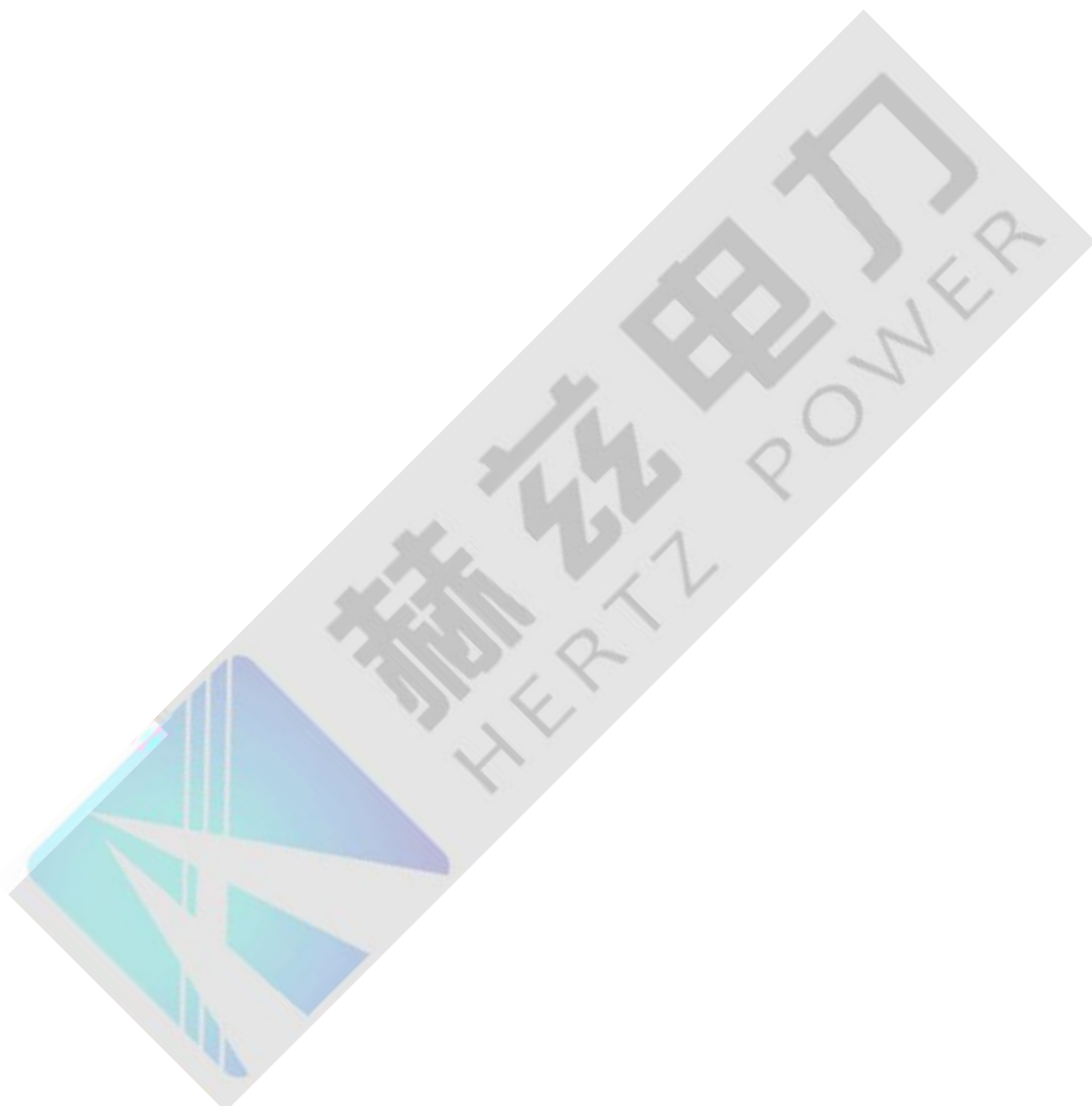
1

4

1 0.75

1

1





| | | | | | |
|---|---|------------------------|---|--|------------------------------------|
| № | № | | | | |
| 1 | | | 1
2
1000MΩ
tan δ
10000MΩ
1000MΩ
2% | | 1
2500V
1
2
1000V
1 |
| 2 | | 20kV
ĩ

tan δ | 1
2
3
2%
⊕ tan δ
± 5%
1000MΩ
tan δ | | |
| 3 | | 1 | 1
2
1min
ĩ
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1 | | |

≈ ≠

5 1 1.05U₉₅/√3 20pC 24h

6 SF₆ 1 SF₆ 250uL/L 2 SF₆ 1%

3 SF₆ 24h
SF₆ ≥ 99.9% CF₄ ≤ 0.01% Air ≤ 0.03%

7 7 / SF₆

8



17

30

~

≠

1

1 1

No

1 15kV 1
50MΩ
1MΩ /kV

2500V

2

1 1
1

| 1 kV | 1 kV | 1min 1 1 kV |
|------|------|-------------|
| 10 | 12 | 42 |
| 35 | 40.5 | 100 |

1

1 1

2

1

3

1

3

1

1

1

4

1

No

4

1

2

3

4

5

100%

6

7

8

1

A

B

C

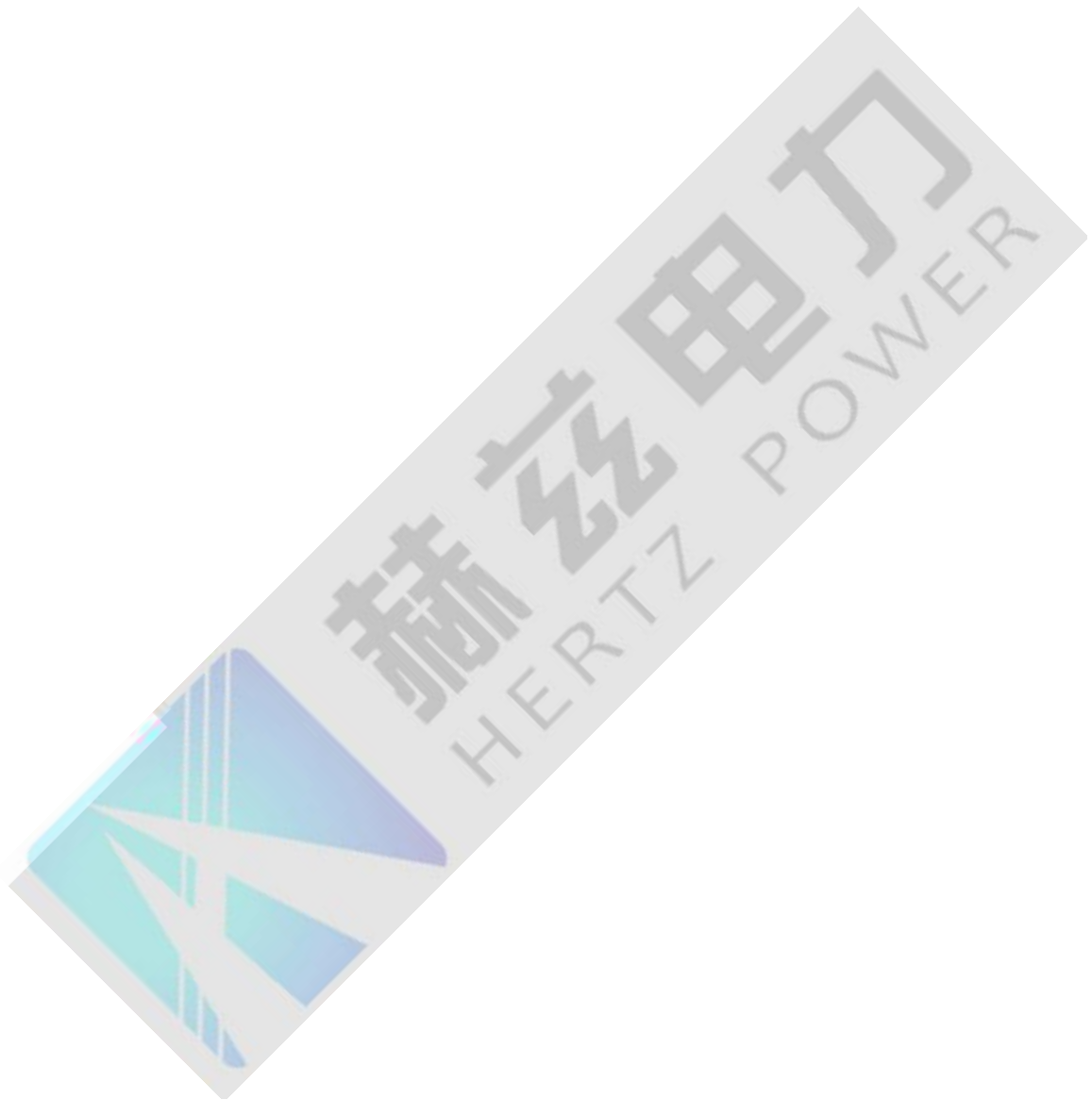
1

5

| ~ | ≠ | | | | |
|---|---|--|---------------|---|--|
| | | | 3 4 5 6 7 8 9 | / | |

18

| ~ | ≠ | |
|---|---|-------------|
| 1 | | 1 2 3 4 5 6 |
| 2 | | 1 2 |
| 3 | | 1 2 3 |
| 4 | | 1 2 3 4 |
| 5 | | 2 3 |
| 6 | | |



~ ≠

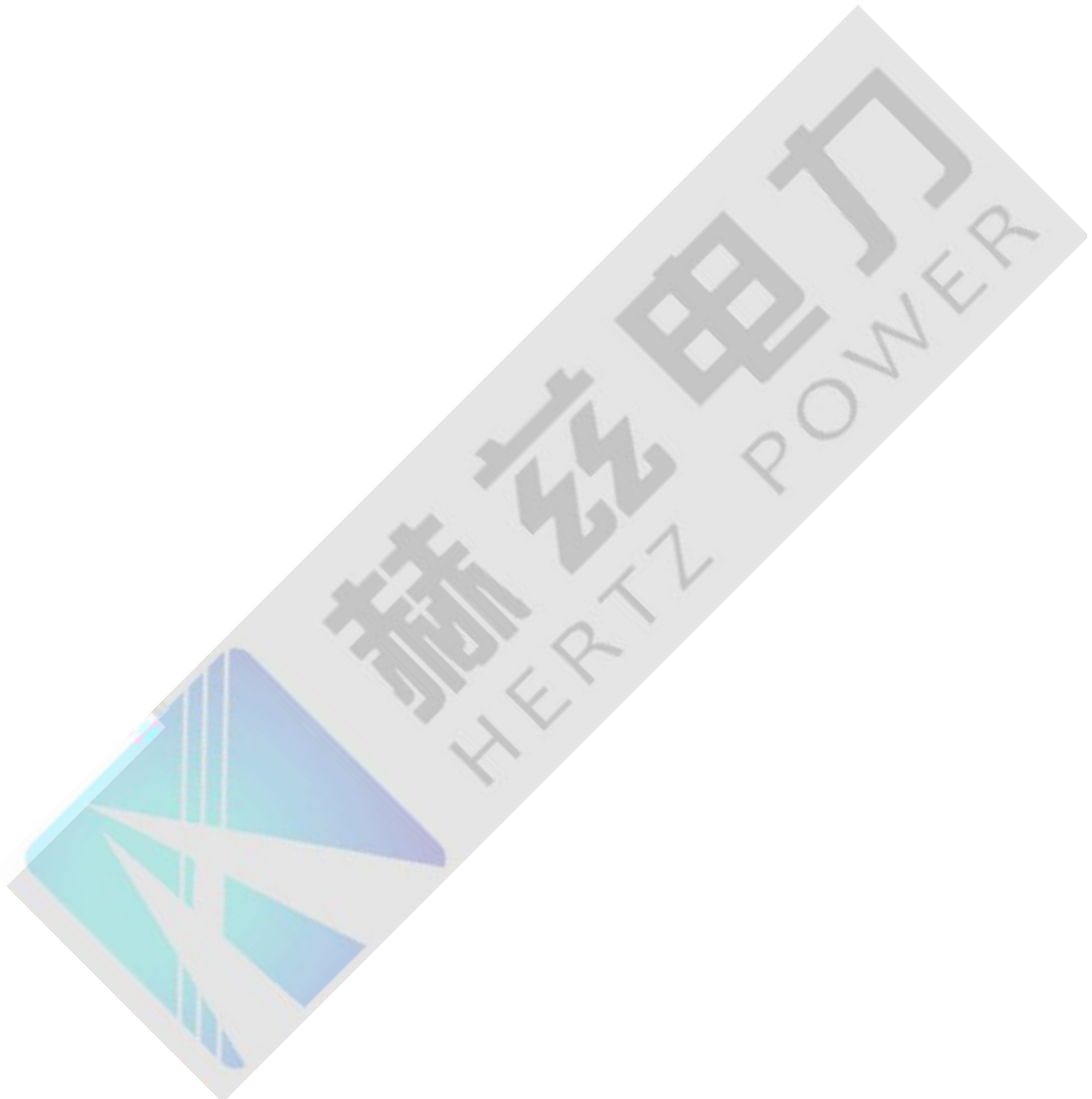
$$\begin{array}{lll}
 Z \leq 2000 / I & I > 4000 \text{ A} & Z \leq 0.5 \Omega \\
 I \text{ —} & & \text{A} \\
 Z \text{ —} & \frac{f}{I} & \Omega
 \end{array}$$



32

≈ ≠

ü ¼ ĩ



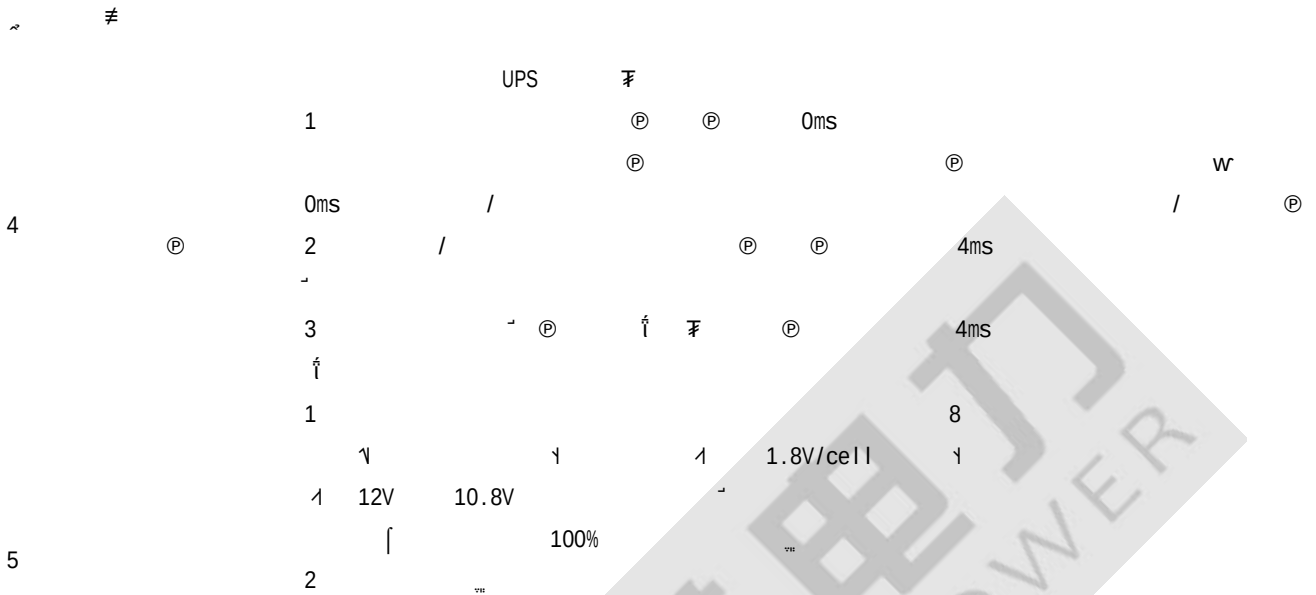
32

~ ≠

11



33



| | | | | | |
|----|---|---|---|--------|--------|
| ~ | ≠ | | | | |
| | | | 3 | ~ | ~ |
| | | | 4 | | |
| 11 | | | 1 | | |
| | | | 2 | ~ | |
| | | | 3 | 350mm | |
| | | | 4 | L | |
| | | | 5 | ~ | |
| | | | 6 | | |
| 12 | | | 1 | ~ | |
| | | | 2 | 1 | No |
| | | | 3 | ↓ | ~ |
| | | | 4 | ~ | ~ |
| | | | 5 | ~ | ~ |
| | | | 6 | ~ | ~ |
| | | | 7 | ~ | ~ |
| | | | 8 | ~ | ~ |
| | | | 9 | ~ | ~ |
| 13 | | | 1 | ~ | |
| | | | 2 | ~ | |
| 14 | | / | 1 | ~ | ~ |
| | | | 2 | ~ | ~ |
| | | | 3 | ~ | ~ |
| 15 | | | 1 | No ≠ ũ | |
| | | | 2 | ~ | ~ |
| 16 | | | 1 | UPS | |
| | | | 2 | SPD | SPD |
| | | | 3 | SPD | |
| 17 | | | 1 | | |
| | | | 2 | No | ~ |
| | | | 3 | No | |
| | | | 4 | ~ | No ≠ ũ |
| | | | 5 | ~ | No ≠ ũ |



33

~ ≠

6 卜 ↓ No≠

7 ĩ UPS

8 ~

9 UPS

1 𐄀

18 2 4

2 2 4

1 ③ UPS

2 ③ UPS ũ

2 ③ UPS ũ

19 3 ĩ UPS ũ ĩ

4 40kVA UPS 1 ũ 1 ||

4 40kVA UPS 10kVA ĩ UPS

𐄀 𐄀 5kVA ĩ UPS

𐄀 𐄀 𐄀 𐄀

1 𐄀 𐄀

2 𐄀 𐄀

20 3 𐄀

w 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

3 𐄀

~ ≠

5

↓

∇

6

≠

∇

≠

7

Ne≠

∇

8

9

≠

|

?



| 序 | 号 | | | | |
|----|---|---|----------------------------|------------------------------|--|
| | | | 10 | | |
| 15 | | 1 | 2 3 4 5 | 1 0.5% 1% 1 1 | |
| 16 | | | | 1 1 | |
| 17 | | | 1 2 3 4 | | |
| 18 | | | 1 2 3 4 5 6 7 8 9 10 11 12 | 1 500V 2.5mm 1.5mm 0.5mm 1 1 | |
| 19 | | | 1 2 3 4 5 6 7 8 | 350mm 1 2 | |

$\neq$

9 17

1

2 1 No

$$3 \quad \downarrow \quad \rightarrow \quad \frac{n}{1}$$
$$\dot{t} = \int \frac{1}{\sqrt{1 - \frac{1}{4} \left(\frac{dz}{dt} \right)^2}} dt$$

4 (P) (P)

20

5 i

| | | | |
|---|----|----|---|
| 6 | No | No | ↓ |
|---|----|----|---|

7

8 11

9

10

1

21

2

1 (P) 78

22

2

1 No₂ ≠ Ů

23

2 ④ w

1

2 1

24

3 No₂

1 1 vii

25

[illegible]

2. $\frac{1}{2}W$

1. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

1

2

4

2

3

4



34

| № | № | | | | |
|----|---|--|---|--|--|
| | | | 7
0.5%
8
9
10
11
12
13
14
15 | 1% 1
w
w
w
w
GPS
GPS
1ms
w
L
1 | |
| 29 | | | 1
2
3
4
5
6
7 | 1 220V 25KΩ 1 110V 7KΩ
1
1
1
1
1
1
1 | |
| 30 | | | 1
2
3
4
5 | 1
1
1
1
1 | |
| 31 | | | 1
2
3
4
5
6 | 1
1
1
1
1
1 | |

| | | | | | |
|----|---|---|--|--|--|
| ~ | ≠ | | | | |
| | | | <p>7 彡</p> <p>8 彡 W</p> <p>9 №≠</p> <p>10 彡 彡 L №</p> <p>11 №≠ Ů</p> <p>12 Ĩ . L Ů</p> <p>13 110kV Ĩ L Ů</p> <p>14 110kV Ĩ 彡 L Ů</p> <p>15</p> <p>16 Ů ⊕ 彡 彡 彡 彡 彡 彡</p> | | |
| 32 | | L | <p>1 Ĩ 彡 110kV Ĩ L</p> <p>2 №≠ 彡 彡 №≠</p> <p>3 10kV 35kV Ĩ 彡 L</p> <p>4 500kV GIS 彡 №≠ 110kV 220kV GIS</p> <p>5 500kV L 彡 6 ~ №</p> <p>6 PT ↓ L Ĩ . PT ↓</p> <p>№≠ Ů</p> | | |
| 33 | | | <p>1 彡 ⊕ L № Ĩ 彡 ⊕ Ů</p> <p>2 500kV Ĩ № 彡 彡</p> <p>3 500kV 220kV Ĩ</p> <p>4 № 220kV Ĩ Ĩ</p> | | |



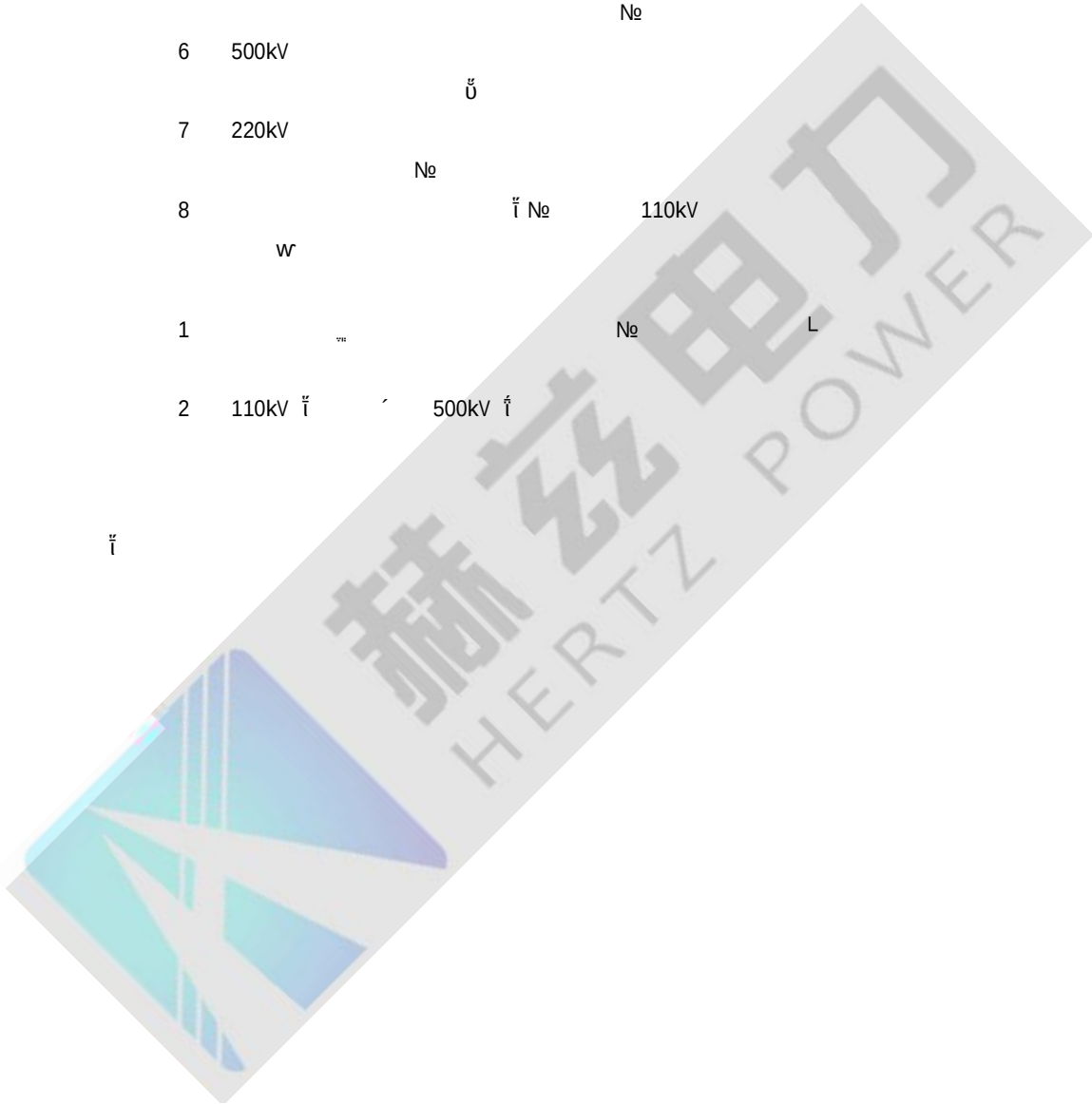
34

≠

No
5
No≠ Ů
6 500kV
7 220kV
8 No
w Ů No 110kV
1 No L
2 110kV Ů 500kV Ů

Ů

34



| | | | | |
|---|---|--|--|--|
| 2 | ≠ | | | |
| | | | | |

 $\neq$

| | | | | | | | | |
|----|---------|-------|------|--------|-------|---|------|---|
| 1 | | | | 2500V | | | 10MΩ | |
| 2 | ↘ | 1000V | | | | | 10MΩ | |
| 3 | #1 | ↙ | | ↘ | | | | |
| 4 | #2 | ↙ | | ↘ | | | | |
| 5 | #1 | ↗ | | ↘ | | ↗ | ↘ | |
| 6 | #2 | ↗ | | ↘ | | ↗ | ↘ | |
| 7 | #1 | ↗ | | ↘ | | ↗ | ↘ | / |
| 8 | #2 | ↗ | | ↘ | | ↗ | ↘ | |
| 9 | ATS ® | | | | | | | |
| 10 | 500kV ↗ | | | ↙ | | ↙ | | ↙ |
| 11 | ↗ | | 380V | ↙ | 380V | ↙ | ↙ | ↙ |
| 1 | | 380V | ↗ | ↙ | ↙ | | | |
| 2 | ↗ | | ↗ | | | | | |
| 3 | | | ↗ | | ↗ | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | ↗ | | | ↗ | | | | |
| 7 | | | | 1mm/m, | 1mm/m | | | |
| 8 | ↓ | | | 1.5mm | 2mm | | | |
| 9 | | | | | | | | |
| 10 | | | | ↙ | | | | |
| 11 | | | | | | | | |
| 12 | | | | ↗ | | | | |

≈ ≠

| | | | | |
|---|---|-------------------------------|-------------------------------|---|
| 1 | $\overset{\circ}{\mathbb{I}} \ \mathbb{I} \ \overset{\circ}{\mathbb{I}}$ | $\mathbb{F} \ \mathbb{N}$ | $\dots$ | $\mathbb{I}$ |
| 2 | | $\downarrow$ | | $\downarrow$ |
| 3 | | $\overset{\circ}{\mathbb{I}}$ | | |
| 4 | $\downarrow$ | | $\overset{\circ}{\mathbb{I}}$ | $\downarrow \ \overset{\circ}{\mathbb{I}} \ \downarrow$ |
| 5 | $\overset{\circ}{\mathbb{I}} \ \mathbb{I} \ \overset{\circ}{\mathbb{I}}$
$\overset{\circ}{\mathbb{I}}$ | | $\approx$ | $\approx$ |
| 6 | | $\overset{\circ}{\mathbb{I}}$ | | $\overset{\circ}{\mathbb{I}}$ |
| | $\mathbb{F}$ | $\downarrow$ | | |

7



~ ≠

| | | | | |
|------|------|-----------|---|---|
| 2 | α | 1 | № | Ů |
| 1mA/ | | (20 ± 15) | | L |
| М | | ± 5% | | |
| 3 | 0.75 | α | 1 | 1 |





39

2 ≠

2

a

b

c

400cm²

d

e

f

1

2

> Å

2

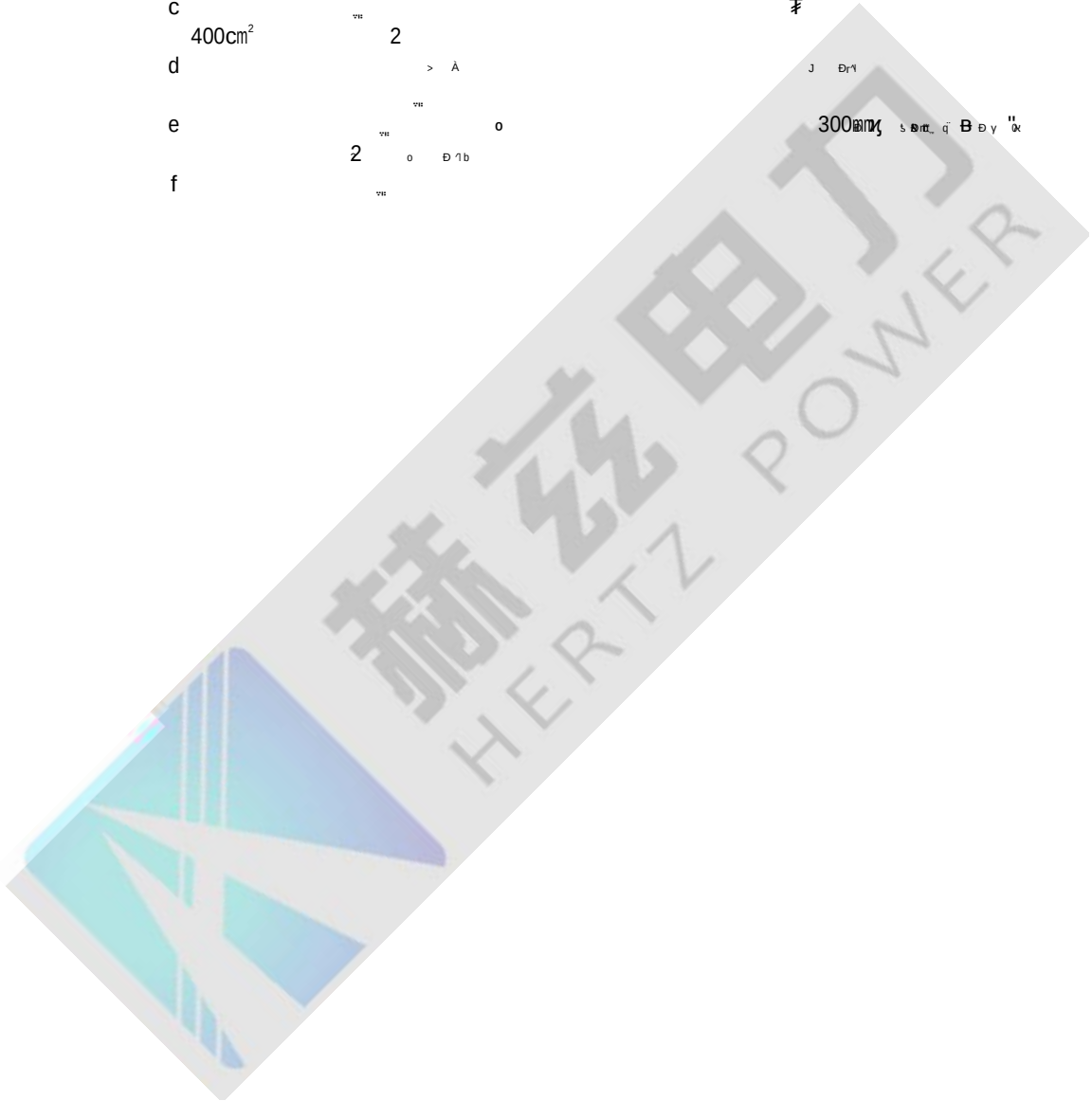
0 0 1b

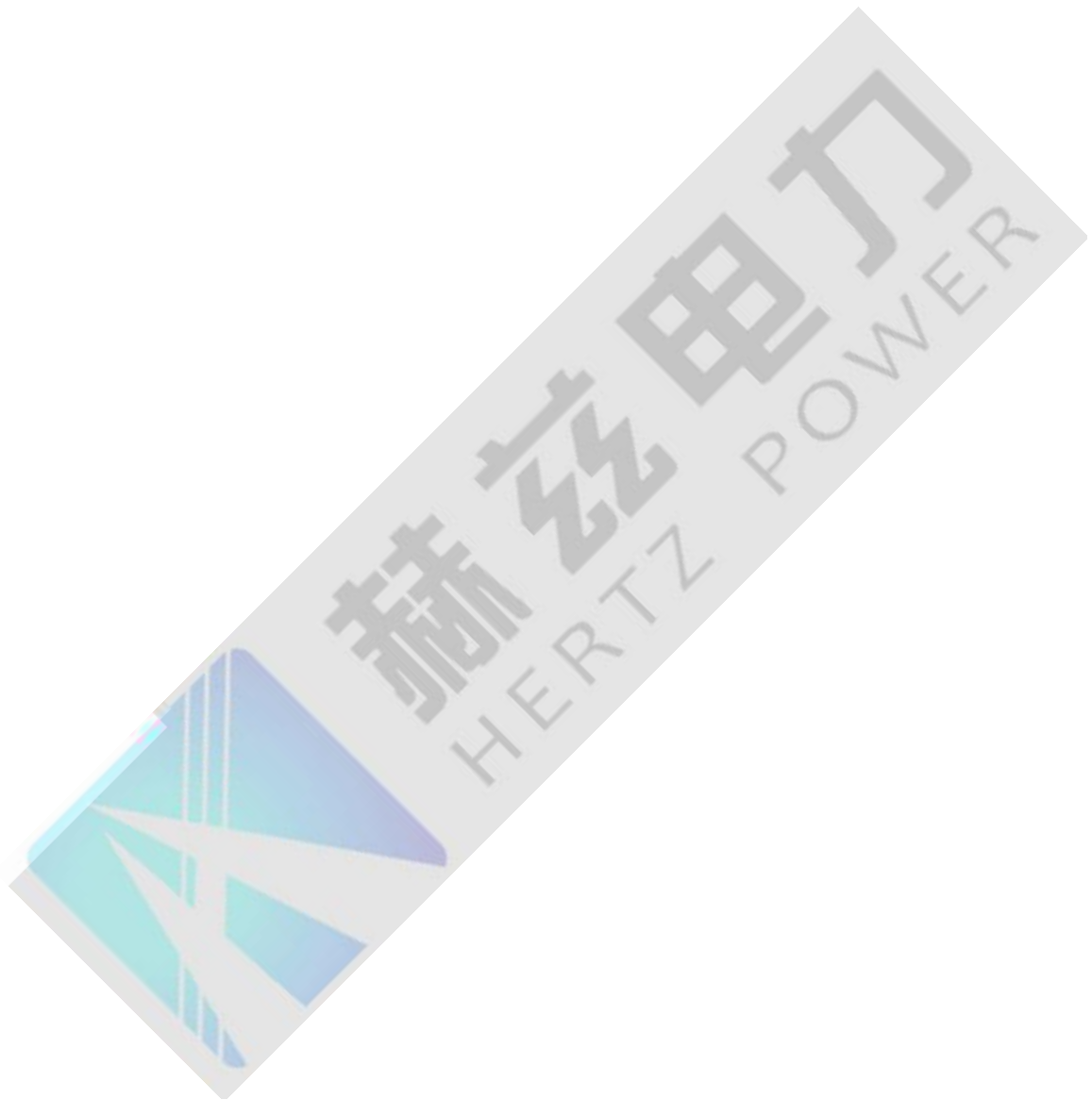
m " λ

3

J 0r1

300mm s 0m q B 0 y "k





$\neq$

6

7

8

9

a) $\frac{7}{8}$ 100mm $\frac{7}{8}$

| | | | |
|----|---------------------|---------------|---|
| b) | $\leq 100\text{mm}$ | $\frac{7}{8}$ | 8 |
|----|---------------------|---------------|---|

c) $\leq 500\text{mm}^2$

1

2

6

3

4

1

No 5m 2mm

L

1

598

7

2

1

3

4

1

500mm 1050mm

i

a)

| 1 | 1 | 1.5 | 0.6MPa | 1 |
|-----|--------|-----|---------|----------|
| 1 z | 1 z | 1 z | 0.02MPa | 1 z |
| 1 z | 10min | 1 z | 1 z | 0.05MPa |
| 1 z | 1.15 g | 1 z | 1 h | 0.03MPa, |
| 1 z | 1 z | 1 z | 1 z | 1 z |

b)

$\partial \bar{\partial}$ я $\frac{L}{F}$, $\tilde{U}$

c)

0.5m 1m 0 15m

8

d)

1

3

१

| № | № | № | № | № | № | | | | | | | | | | | | | | | |
|---|---|-----|---|---|---|----|--|--|----|--|--|---|--|--|-----|---|--|-----|--|--|
| | | | <div><div><div>o</div><div>1.1m</div><div>± 20mm</div><div>140mm</div><div>100mm</div><div>5mm</div><div>3mm</div></div><div>3)</div><div>a)</div><div>b)</div><div>c)</div><div>o</div><div>24h</div><div>1</div><div>1 z</div><div>10min</div><div>1 z</div></div> <div>d)</div> <div>e)</div> <div>f)</div> <div><table><tr><td></td><td></td><td>mm</td></tr><tr><td></td><td></td><td>15</td></tr><tr><td></td><td></td><td>5</td></tr><tr><td></td><td></td><td>0.1</td></tr><tr><td>1</td><td></td><td>0.1</td></tr></table></div> <div>4</div> <div>i</div> <div>a)</div> <div>4m</div> <div>b)</div> <div>o</div> <div>1</div> <div>c)</div> <div>300mrn</div> <div>1</div> <div>d)</div> <div>2m</div> <div>e)</div> <div>90 °</div> <div>300mm</div> <div>f)</div> <div>1m</div> <div>3mm, 5m</div> <div>10mm</div> <div>1m</div> <div>3mm, 5m</div> <div>15mm</div> <div>5</div> <div>i</div> <div>a)</div> <div>b)</div> <div>c)</div> <div>d)</div> <div>1m</div> <div>3mm, 5m</div> <div>10mm</div> <div>1m</div> <div>3mm, 5m</div> <div>15mm</div> <div>6</div> <div>1</div> | | | mm | | | 15 | | | 5 | | | 0.1 | 1 | | 0.1 | | |
| | | mm | | | | | | | | | | | | | | | | | | |
| | | 15 | | | | | | | | | | | | | | | | | | |
| | | 5 | | | | | | | | | | | | | | | | | | |
| | | 0.1 | | | | | | | | | | | | | | | | | | |
| 1 | | 0.1 | | | | | | | | | | | | | | | | | | |

~ ≠

- k) ↓ ~ ;
l) o ħ

- 2) a) ħ ħo ũ

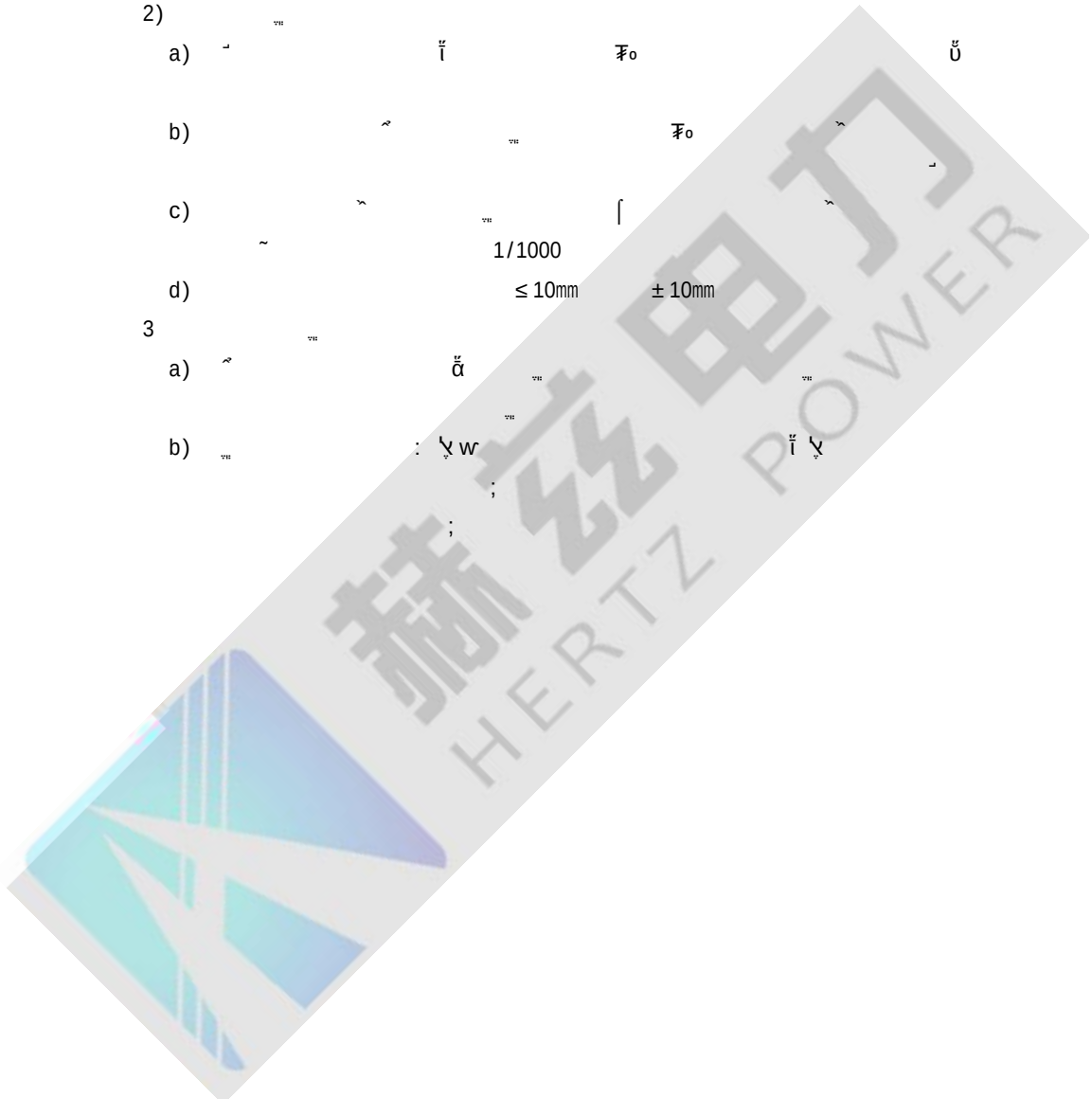
- b) ~ ħo ħ

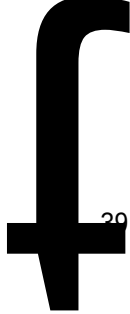
- c) ~ ħ ħ

- d) 1/1000 ≤ 10mm ± 10mm

- 3 a) ~ ħ ħ

- b) : ħ w ħ ħ



 $\neq$

d

e) $\downarrow$

-10mm

2

a)

b)

c)

2

d

└

e)

-10mm

3

a)

b)

c) 4

No

d

Λ

4

a)

No

10m

20mm

1

1m

No

10-20mm

~ ≠

11

ĩ

ĩ

ĩ

œ

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-----------------|--|-------------|---------|----|--|--|----|--|--|------|--|--|---|--|--|----|--|--|-----|--|--|-------|--|--|---|--|--|----|--|--|-------|--|--|-------|--|--|-----------------|--|--|
| № | № | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | <table><tr><td></td><td></td><td>mm</td></tr><tr><td></td><td></td><td>20</td></tr><tr><td></td><td></td><td>± 20</td></tr><tr><td></td><td></td><td>5</td></tr><tr><td></td><td></td><td>10</td></tr><tr><td></td><td></td><td>± 2</td></tr><tr><td></td><td></td><td>+20 0</td></tr><tr><td></td><td></td><td>5</td></tr><tr><td></td><td></td><td>10</td></tr><tr><td></td><td></td><td>+20 0</td></tr><tr><td></td><td></td><td>+20 0</td></tr><tr><td></td><td></td><td>≤ h/1200 ≤ 20.0</td></tr></table> | | | mm | | | 20 | | | ± 20 | | | 5 | | | 10 | | | ± 2 | | | +20 0 | | | 5 | | | 10 | | | +20 0 | | | +20 0 | | | ≤ h/1200 ≤ 20.0 | | |
| | | mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ± 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ± 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | +20 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | +20 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | +20 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≤ h/1200 ≤ 20.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | h | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | a) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 700mm | | 500mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | b) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | c) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | d) | | 450mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 250mm | 450mm | 350mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | e) | 1 z 1.5 | 0.6MPa | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1 z 10min | 1 z 0.05MPa | 1 z | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1 z 0.05MPa | 1 z | 1 h 1 z | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | f) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | a) | 1 z 1.5 | 0.6MPa | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1 z 10min | 1 z 0.05MPa | 1 z | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | b) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | c) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | d) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | ± 20mm; | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | f) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 3) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | a) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | b) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

40

≈ ≠

± 5mm

c .

≈



40

≠

f

| | | mm |
|---|---|-------|
| 1 | | ≤ 5 |
| 2 | л | +20 5 |
| 3 | | ± 20 |

2

a)

b)

c

| | | mm |
|---|--|------|
| 1 | | ≤ 5 |
| 2 | | ± 30 |
| 3 | | ≤ 10 |
| 4 | | ≤ 3 |

1

a

b

c

d

e

2) 1

a

ă ®

GB50208

No

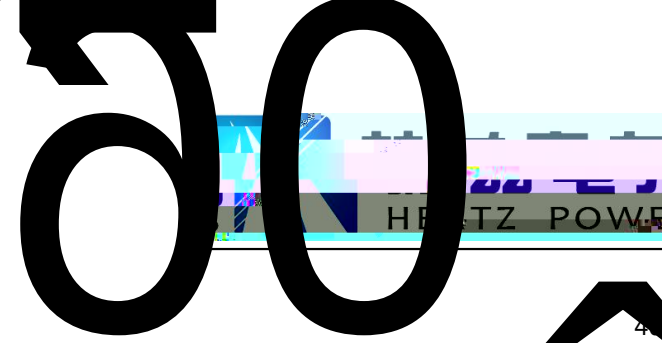
24h

1/3,

1

5-10mm

| ~ | ≠ | | | | |
|---|---|---|----|--------------------|---|
| | | | 2 | | |
| | | | a) | | |
| | | | b) | 5mm | |
| | | | c) | | |
| 8 | | ĩ | 1 | | |
| | | | a) | ĩ | 1 |
| | | | 2 | | |
| | | | b) | | |
| | | | c) | 2% | ≠ |
| | | | d) | 5% | ≈ ° |
| | | | 2 | | |
| | | | a) | | |
| | | | b) | — | |
| | | | c) | z_k kN $\geq$ | $z_k \geq 0.9$ |
| | | | d) | $\lambda \geq$ | 60% $\lambda \geq \lambda \geq 0.5$ λ |
| | | | e) | ĩ | λ |
| | | | 3) | | |
| | | | a) | | |
| | | | b) | ~ | 25kg |
| | | | c) | 200mm | |
| | | | d) | 15mm | 0.5m |
| | | | e) | | |
| | | | f) | $\leq 50\text{mm}$ | $\leq 30\text{mm}$ |
| | | | 4 | L | |
| | | | a) | ĩ | |
| | | | b) | L | ↓ |
| | | | c) | ~ | |
| | | | d) | $\leq 10\text{mm}$ | |
| | | | 5 | | |
| | | | a) | 300mm | ↘ |
| | | | b) | | |
| | | | c) | ≈ | |
| | | | d) | $\leq 20\text{mm}$ | |
| 9 | | | 1 | ĩ | |
| | | | 2 | | |
| | | | a) | | |
| | | | b) | λ | 80% |

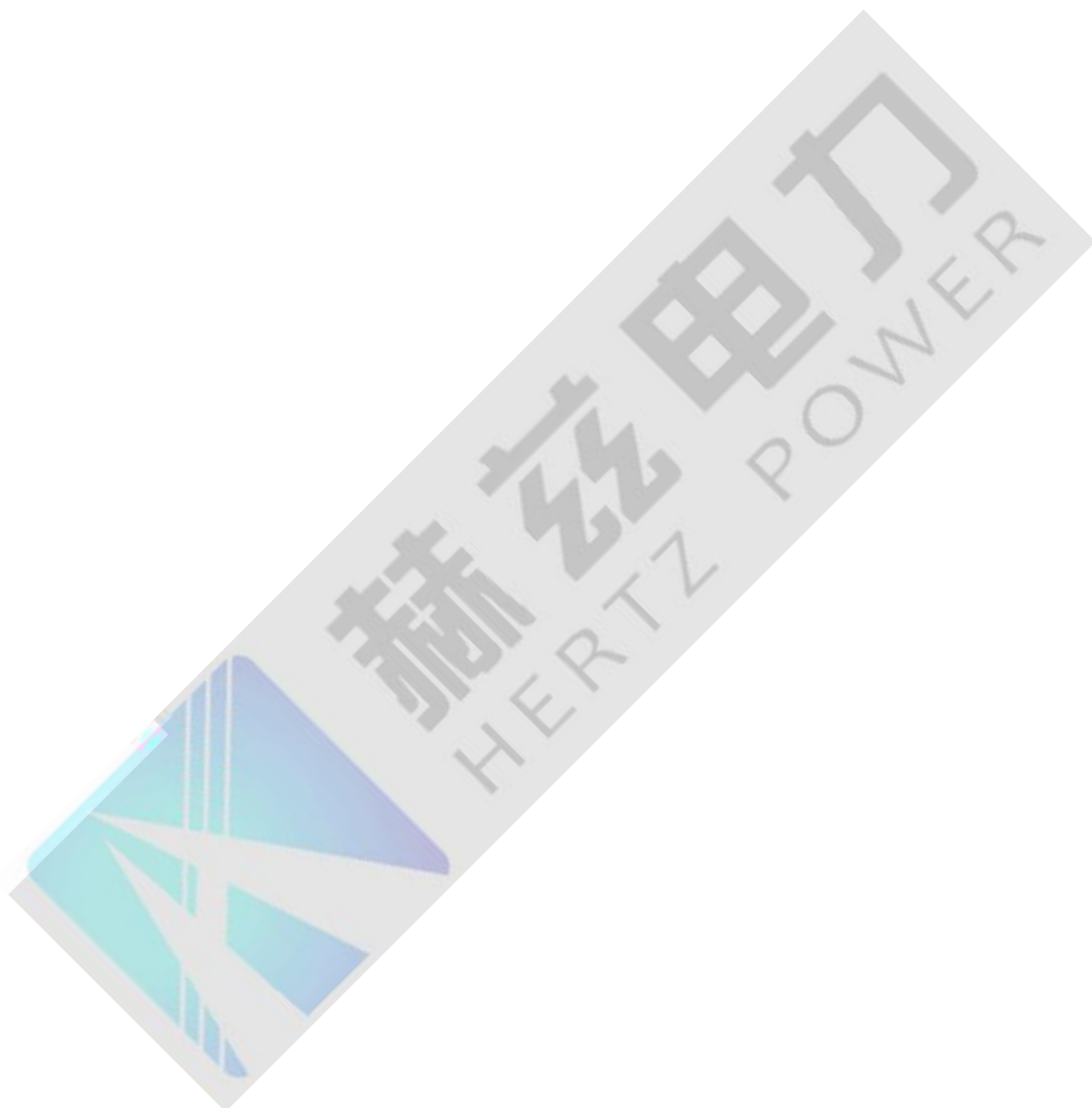


2

≠

c)

20m



~ ≠

1
2
3

VB



1

ü
i

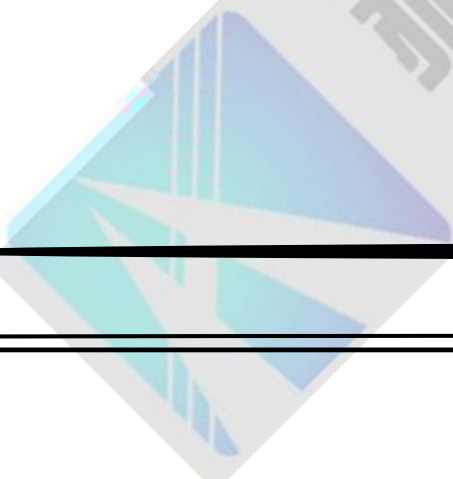


HERT

POW

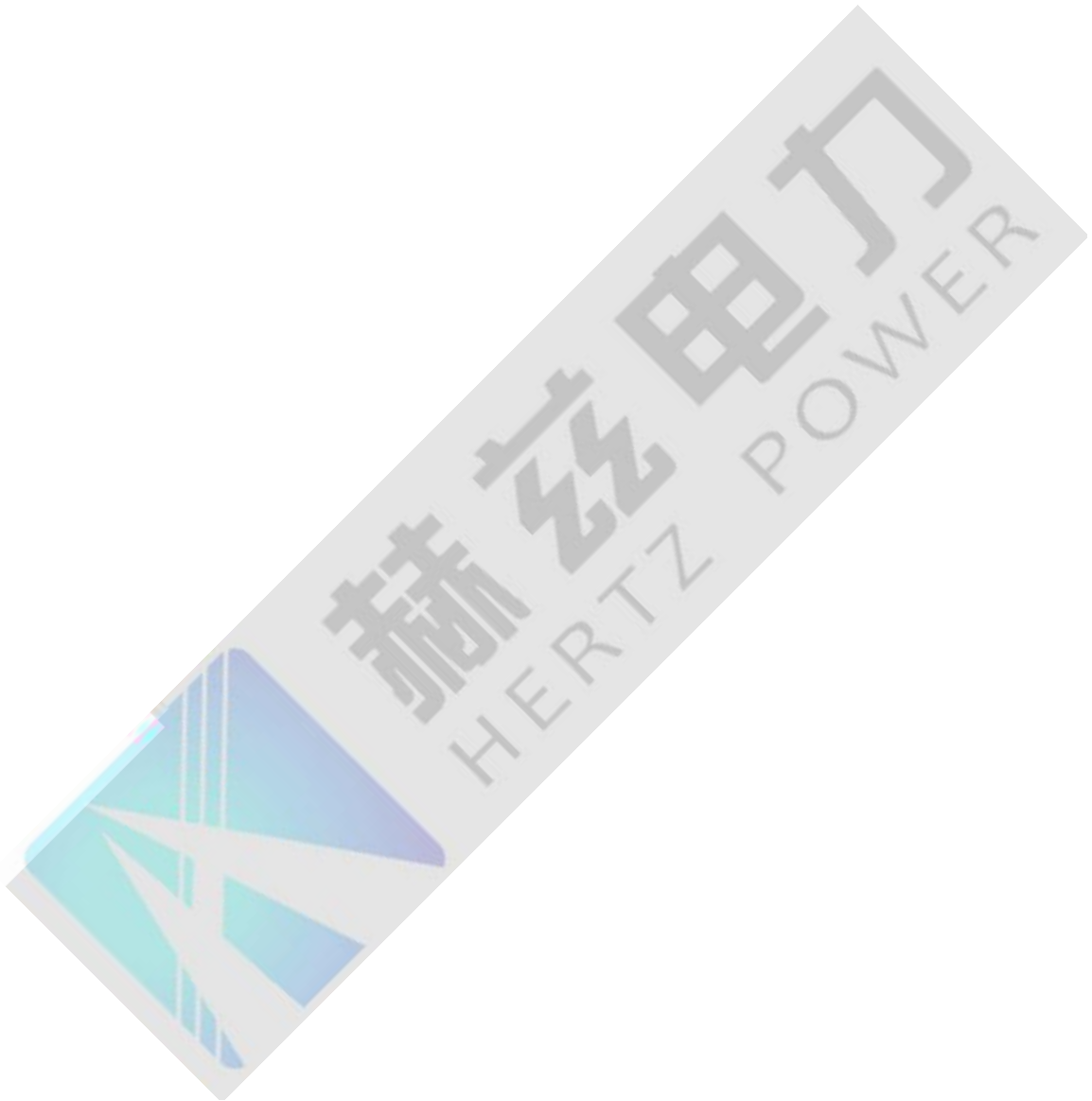
赫兹电力

赫兹电力
HERTZ POWER



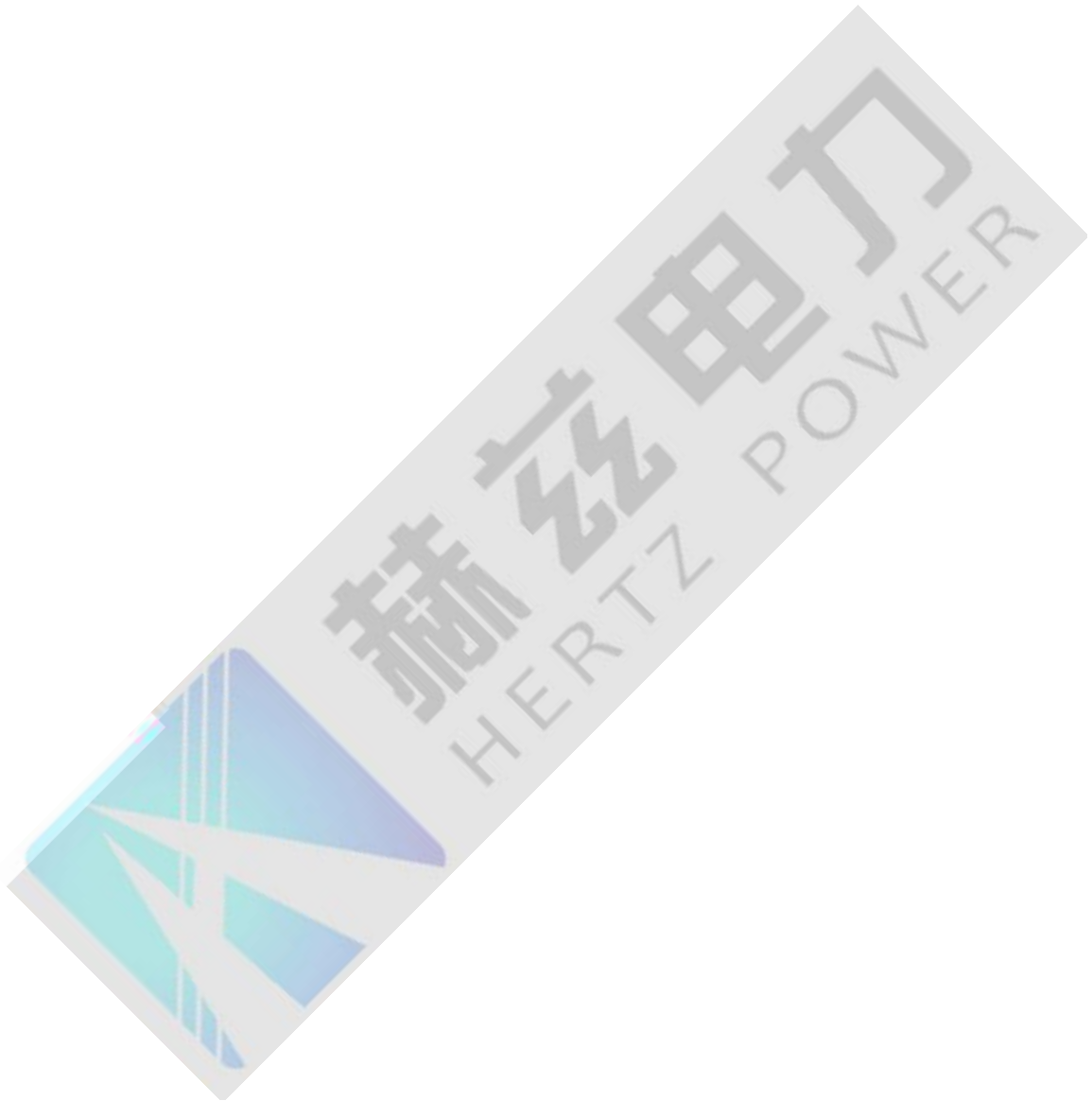
~ ≠

| | | | | | | |
|----|---|---|----------|----|------|-------|
| 6 | | | ĩ | ₣ | | |
| 7 | | | w | | | |
| 8 | | | | | | 8mm |
| 9 | | | | ~ | | |
| 10 | | | 300g/m2, | Nº | 100% | |
| 11 | | | ĩ | 4 | | 4 |
| 12 | | | | | √ | √ |
| 13 | √ | | | ∕ | ∕ | 0.8mm |
| 1 | | | | | 3 | |
| 2 | 2 | 4 | | | | 1mm |
| 3 | | | | | 0.2% | 2mm |
| 4 | | | 0.5% | √ | 0.6% | |
| 5 | | | | | | |



~ ≠

| | | | | | |
|------------------|-------|-------|--------|---------|--|
| | | 15 № | ĩ | ĩ z ĩ | |
| 8 | 0.5kg | тн | ĩ z | 3kg тн | |
| | | | | 6mm 2 3 | |
| 9 | | | | | |
| | | | | 1 2 | |
| 10 | 1 | | | 2.5 | |
| о ĩ | | | | | |
| 11 | 1 2 | | | | |
| 12 | | | | | |
| 13 | LED | | | ĩ | |
| ~ | | | | | |
| 14 | ı | | w | ı | |
| 1mm ² | | | | | |
| 15 | | w | 100W ĩ | | |
| | | 1 2 | | | |
| 16 | | | | ĩ | |
| | | 1 2 | | | |
| 17 | | | | | |
| 18 | ĩ | ı | | 2.4m | |
| | | 36V ĩ | 1 | | |
| 1 | ı | | | | |
| 2 | L | | ı | 50% | |
| 3 | ~ | Ⓟ | | | |
| | † | | | | |



~ ≠

5

1

2

6

N

PE

No≠

N

PE

7

8

2-5mm

1

1

1

ī

ŷ

™

ī

ī

L

o

2

2

ī

ī

ŷ

o

6

0.5lx

5

3

Ⓟ

N

/

4

ī

5

L

Ⓟ

~

Ⓟ

1

ī

ī

ŷ

||

ŷ

™

ŷ

≈

ī

5.7.1

30 No

2

L

L

ŷ

L

L

ŷ

o

10

6

ī

3

24

ŷ



43

| | | | | | |
|---|---|--|---|---|--|
| ≈ | ≠ | | | | |
| | | | 4 | | |
| | | | 5 | ≈ | |

24.6

44

| | | | | | |
|---|---|--|---|--|--|
| ≈ | ≠ | | | | |
| 1 | | | <div>1 1
RAL7035
800 mm 600 mm 2260 mm
/l 3.2mm
2
3
≠
4 ()
5 100mm²
4mm²
50mm²
6
7 2-5mm
10%
8
9
10 L</div> | | <div>α
10k
V
500kV
1
1</div> |
| 2 | | | <div>1 1
≥ 75 ° /s ≥ 50 ° /s 1 ≥ 704 × 576 1 ≥ 50m
w L
≥ 2048 × 1536
2 w
3 w
4 360
5 L
0.7 0.5</div> | | <div>1
5</div> |

44

1.5

2

30

v

2-5mm

6

z

7

≠

∅

w

8

L

Ů

| | | | | | |
|---|---|---|--|---|-------------------------------------|
| | ≠ | | <p>w</p> <p>15</p> <p>≠ w ü</p> <p>16 w</p> <p>17 ü ⑤</p> <p>18 7 7</p> <p>19 L w 0 7</p> <p>DLT634.5104-2002 7 7 7</p> | | |
| 4 | | w | <p>1 ⑤ L L /</p> <p>ü 7 L ⑤ Ne L /</p> <p>L 7 7 7</p> <p>2 L L 7 7</p> <p>7 w 7 7 7</p> <p>3 7 7 7 RTU 7</p> <p>z 7</p> <p>4 7 GA 1089-2013 z</p> <p>5 w Dp z</p> <p>6 7 L L 7</p> <p>L L 7</p> <p>7 w 7 7</p> <p>7 7 ü ü</p> <p>8 ü L RPU</p> <p>7 7 OSD 7 w</p> <p>9 7 w</p> <p>10 ü 7 7</p> | / | <p>1</p> <p>7</p> <p>3</p> <p>4</p> |
| 5 | | | <p>1 7 2</p> <p>2 U</p> <p>3 7</p> <p>4 L</p> <p>5 0.5M</p> <p>Ω</p> | | |



24.8

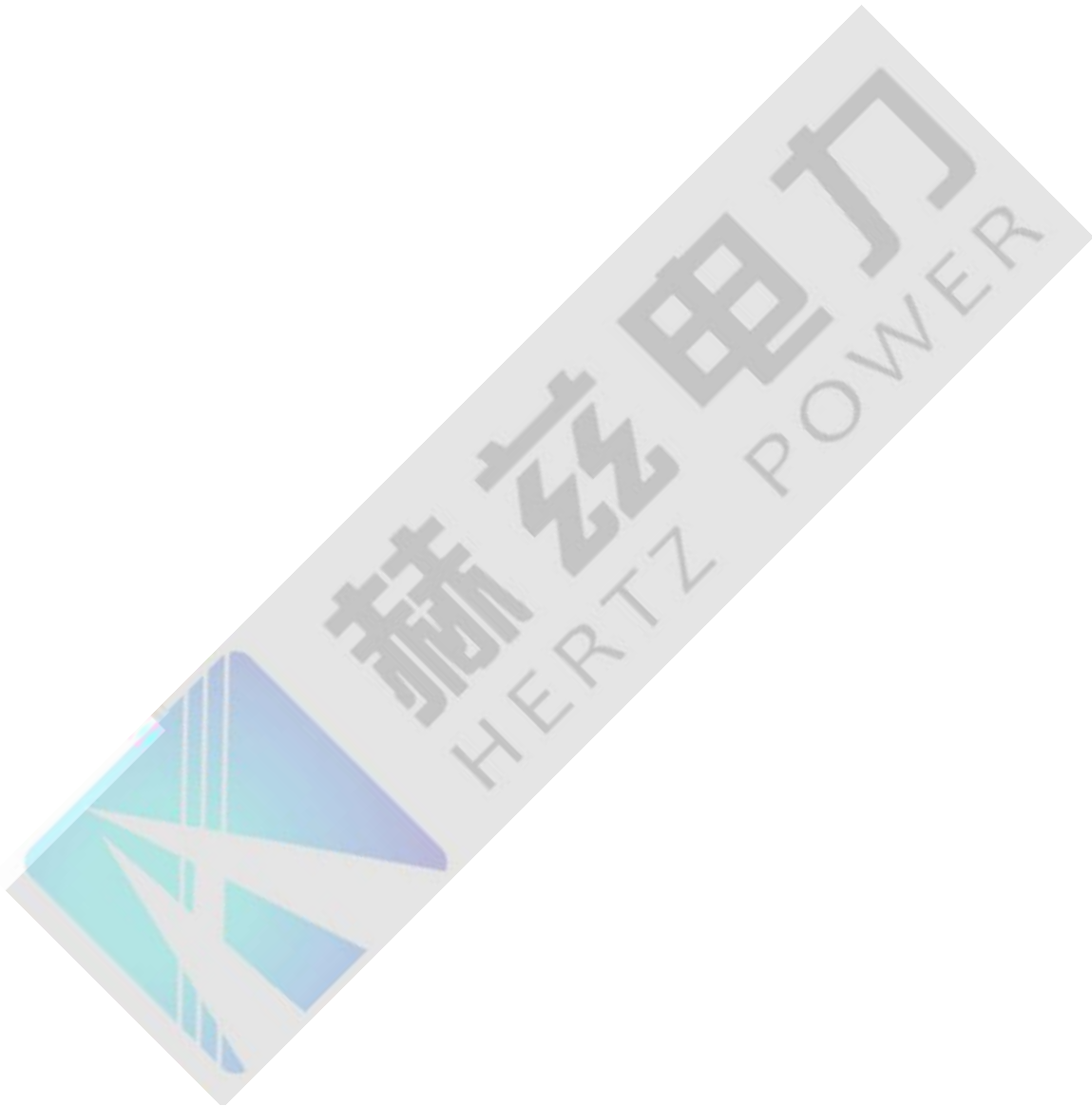
46

≈ ≠

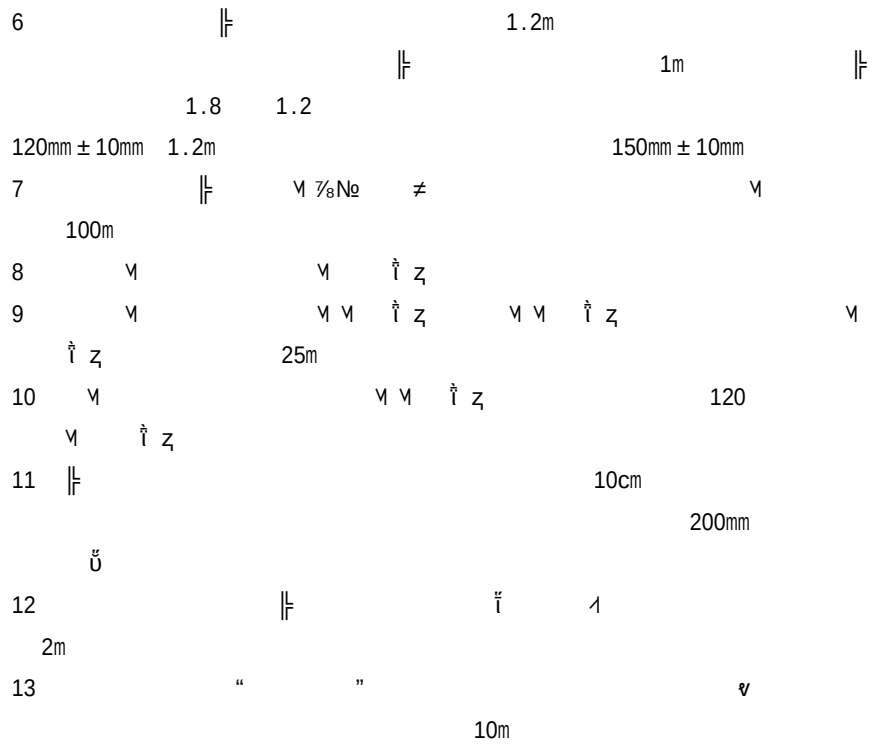
1

w ' 7

1



≈ ≠





24.9

47

| ~ | ≠ | | | | |
|---|---|---|--|---|--|
| 1 | | <p>1</p> <p>1) ~</p> <p>2) ~</p> <p>3) ~</p> <p>4) ~</p> <p>2</p> <p>1) ~</p> <p>2) ~</p> <p>3) ~</p> <p>4) ~</p> <p>3</p> <p>1) ~</p> <p>2) ~</p> <p>3) ~</p> <p>4) ~</p> <p>4</p> <p>1) ~</p> <p>2) ~</p> <p>3) ~</p> <p>4) ~</p> | <p>Q/CSG10001-2004</p> <p>-M100 Y100 -K100</p> <p>Q/CSG10001-2004</p> <p>- Y100 -K100</p> <p>Q/CSG10001-2004</p> <p>- C100 -K100</p> <p>Q/CSG10001-2004</p> <p>- C100 Y100 -K100</p> | | |
| 2 | | <p>1</p> <p>A Y100 M20 B C100 Y100 C M100 Y100</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> | <p>≠</p> <p>Q/CSG10001-2004</p> <p>η</p> | <p>M100 Y100</p> <p>Q/CSG10001-2004</p> | |

47

~ ≠

~

7

15-100mm

8

$\bar{0}$

9

~

∇

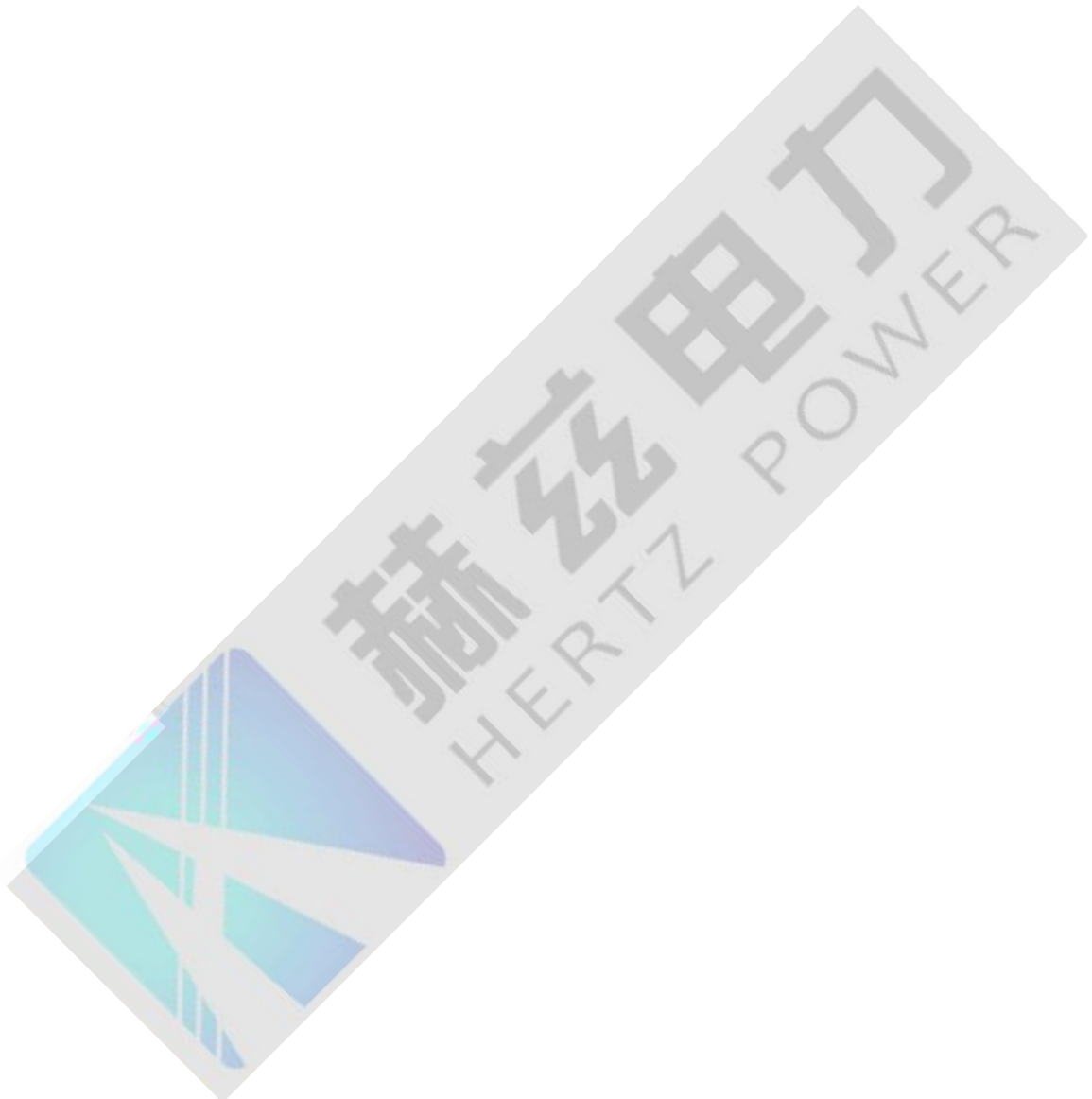
$\bar{i}$

∇

$\bar{\pi}$

$\bar{i}$

Q/CS



A

A.1

A.1

A.1

| | | | |
|----|--------------|---|---|
| ~ | | | |
| 1 | | | |
| 2 | PH | >5.4 | GB/T 7598 1 |
| 3 | KOH
mg/g | ≤ 0.03 | GB/T 264 |
| 4 | o | ≥ 135 | GB 261 - o |
| 5 | mg/L | 500kV ≤ 10
220kV ≤ 15
110kV 1 ≤ 20 | GB/T7600 1 No
GB/T 7601 1 No |
| 6 | z
25 mN/m | ≥ 40 | GB 50150 |
| 7 | tan δ % | 90
500kV ≤ 0.5
220kV 1 ≤ 1.0 | GB/T 5654 |
| 8 | Dp 1 kV | 500kV ≥ 65
110kV 220kV ≥ 45
35kV 1 ≥ 40 | 1. GB/T 507 Dp 1
2. ~ α DL/T
429.9 z |
| 9 | 90 Ω•m | ≥ 6 × 10 ¹⁰ | GB/T 5654
DL/T 421 z |
| 10 | %
No | 500kV ≤ 1.0 | DL/T 423 1
DL/T 703
500kV 1 |
| 11 | % No | ≤ 0.02 | GB/T 511 1 v 1 |
| 12 | No No | | GB/T 17623 No
DL/T 722 1 No ∞ t
1 DL/T 722 1 No ∞ t |
| 13 | 1 | 500kV 1
100mL
5um ≤ 2000 | DL/T 1096 1 |

A.2

A.2

A.2

| | |
|-----|---|
| № | |
| № 1 | 1. 6kV ĩ
2. ↓ ~ № 1
1 35kV
2 ů |
| № | ĩ 1 A-1 2 9 |
| № | A-1 |

B.1 SF₆

DL/T156

SF₆

GB1202

GB12022

B.1 SF₆

| | ű |
|-------------------------|---|
| 1 | 1 |
| 2 40 | 2 |
| 41 70 | 3 |
| 71 100 | 4 |
| 1 100 3 | |
| 2 SF ₆ 24h ˆ | |

B.2

1

vii

ı

2

vii

ˆ

vii

B.2 SF₆

ˆ

