

TUD310 超声波探伤仪 使用说明书

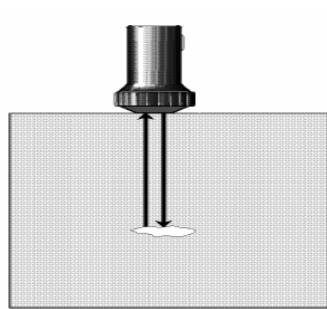


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		65
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1.1

1.1

TUD310

1 2 3 4

1.2

1.2.1

1.1

	1
	1
3A/9V	1

	2
USB	1
U	1
	Φ20 2.5MHz
	8× 9K2.5MHz
	1
	1
	1

1.2.2

1.2

USB	1
USB	1
PC	1
EPSON C65	1
BH-50	1

2.1

2.5 mm ~9999 mm
0dB ~110 dB
-20 μ s +3400 μ s
0 μ s 99.99 μ s
1000 m/s 9999m/s

2.2

-20 ~50
20% 90%RH

2.3

Li 4 \times 3.6V 2200mAh

2.4

240mm \times 175 mm \times 85 mm
1.50kg

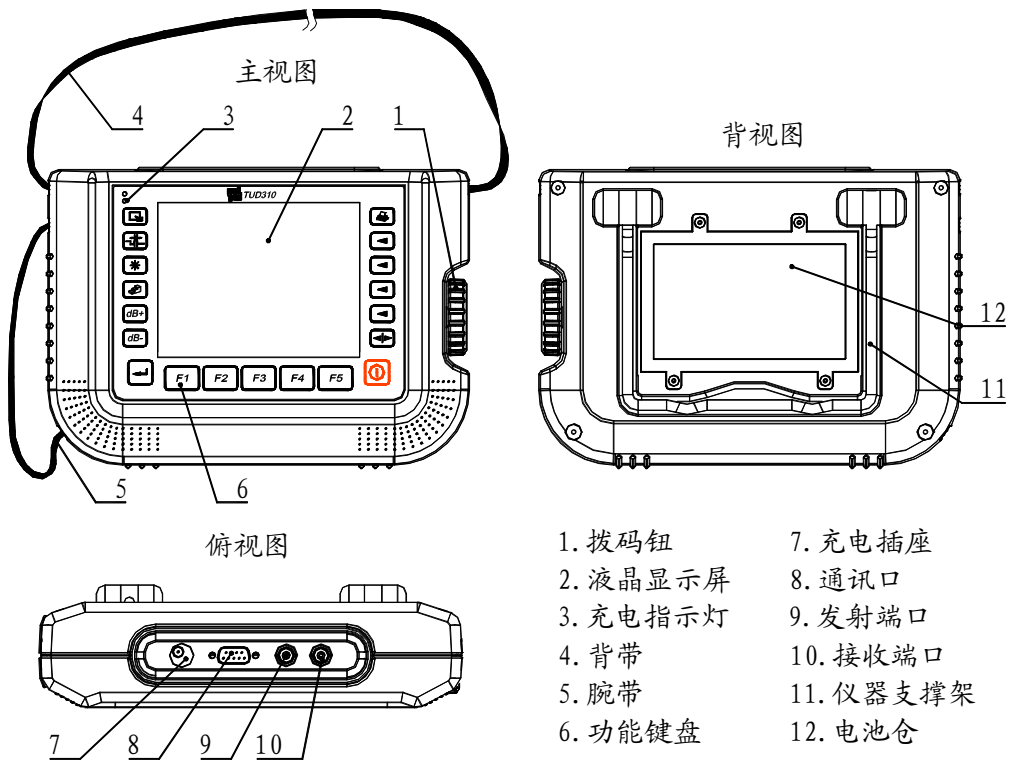
2.5

- A B
- 50 100 400
-
- 80%
-
-
-

●	32					
●			32	1024	A	DAC
	10	320		200	64000	
●				A		
●						
●						
●						
●		mm/inch				
●		K				
●		DAC	32			
●						
●						
●		B				
●						
●		/				
●						
●						
●		USB				
●	USB1.1 full speed					
●	PC					PC
●						
●	USB Hbst			USB		
●						
●						

3.1

3.1.1



3.1

3.1.2

TUD310

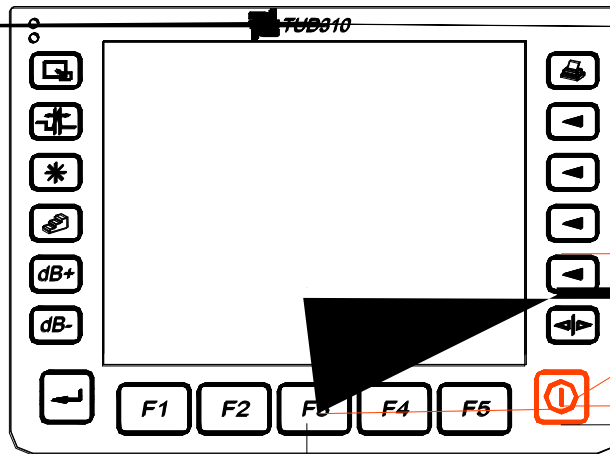
F1 F2 F3 F4 F5

<>

S1 S2 S3 S4

dB+ dB-

" "



TUD310

4 8

3.1.4

TUD310

TUD310 TUD310

BNC

TR

3.1.5

a)

b)

c) 3.1.3



" "

d)

e)

3 3

3 4

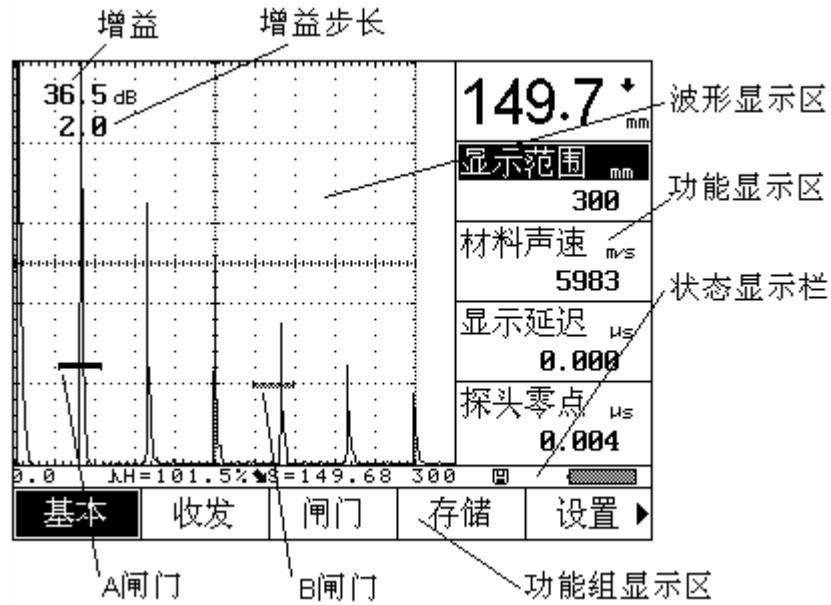
3 5

2

f)

g)

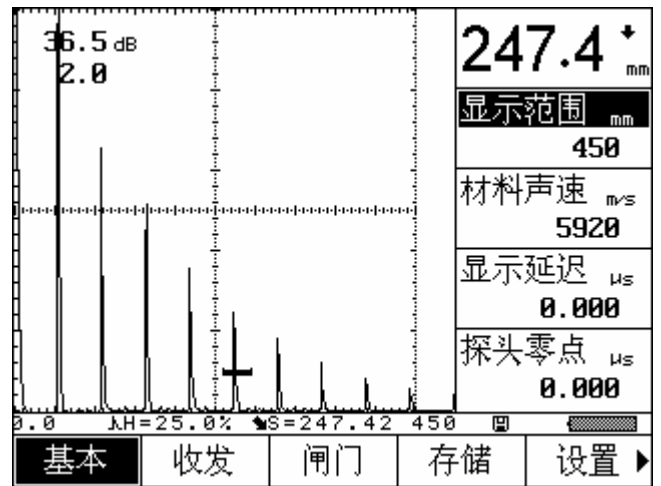
3.1.6




3.6

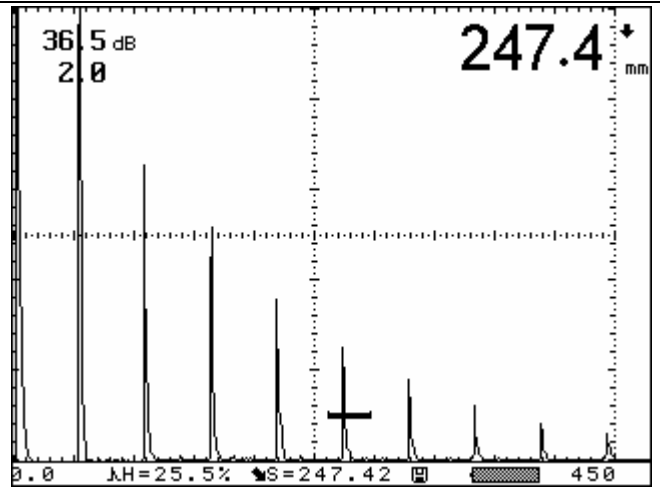
3.1.6.1 TUD310

- A



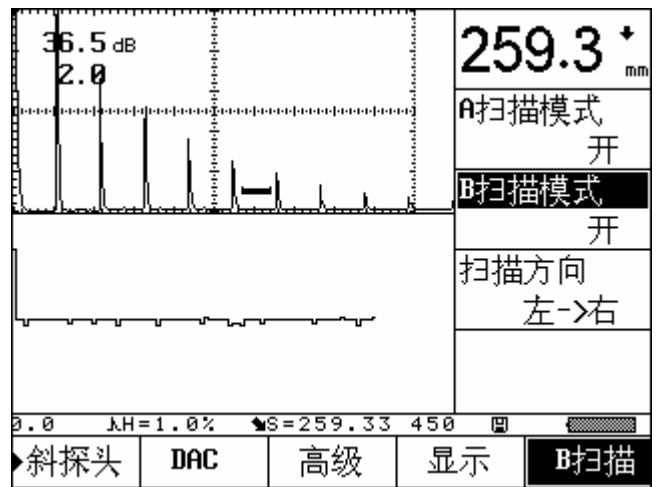
3.7 A

• A 
dB



3.8 A

• B



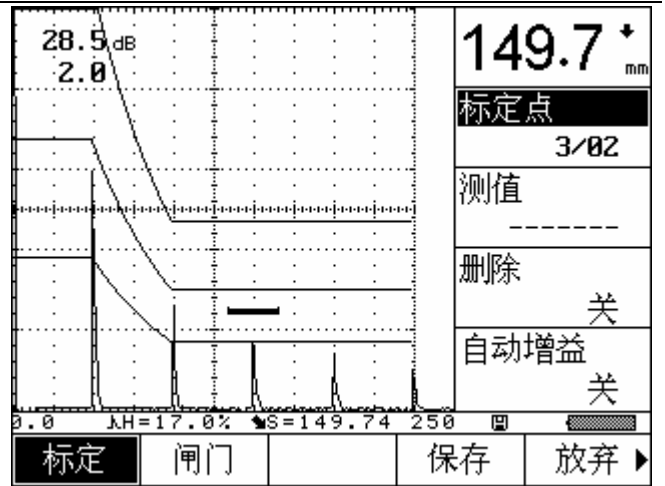
3.9 B

•



3.10

- DAC



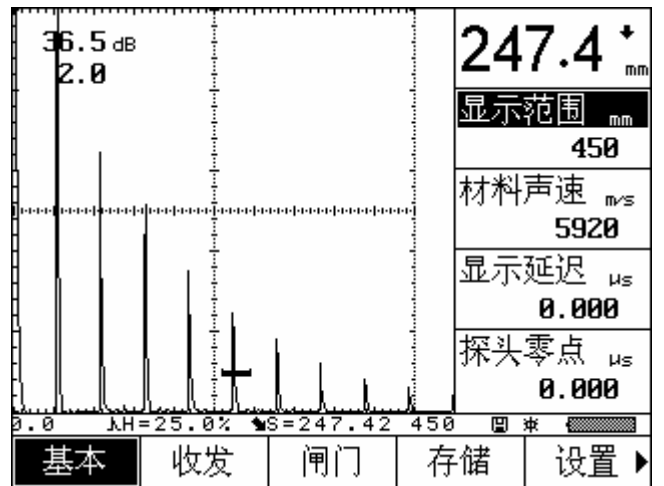
3.11 DAC

3.1.6.2

3.9

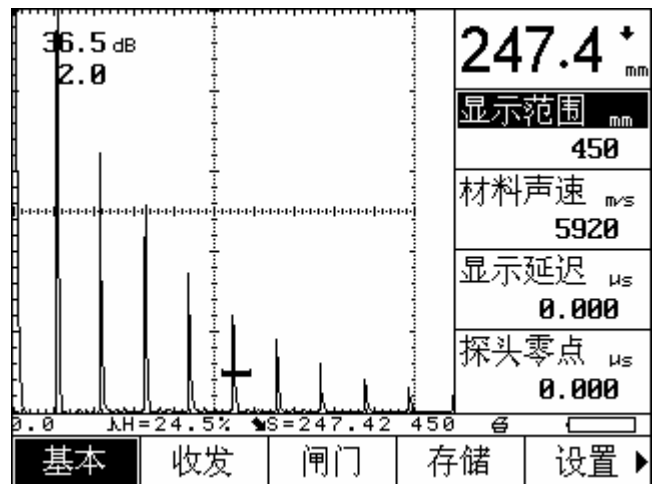
3.9

A



3.12

3.1.6.3



3.13



12.0dB 6.0dB 2.0dB 1.0dB 0.5dB 0.2dB 0dB

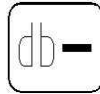
+



+

0dB~110dB

-



-

0dB~110dB



10



A



3.2.2

TUD310

DAC

DAC	ADV	BASE DISP	P/R B	GATE B-SCAN	MEM	CFG	ANGLE
-----	-----	--------------	----------	----------------	-----	-----	-------

3.2.3

< > < >

3.2.3.1

4 5 < >
< >

3.2.3.2

< > < >

3.2.3.3

" * " < >

K
DAC

3.2.3.4



3.2.4

3.2.4.1

-
- <F5>  

3.2.4.2

mm inch mm inch

-
- <F5>  

3.2.4.3

 ()

- :
-
- <F5>  

3.2.4.4

 ()

:

•

•

<F5>



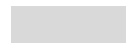
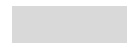
3.2.4.5 A

A



3.2.5

3.2.5.1



3.4

3.2.5.2



3.5

3.3

()		
DAC	DAC	
A B C		
B	B	

3.4



3.4.1

2.5mm 9999mm



2.5mm 5mm 10mm 20mm 30mm 40mm 50mm 60mm 70mm 80mm 90mm 100mm
 150mm 200mm 250mm 300mm 350mm 400mm 450mm 500mm 600mm 700mm 800mm
 900mm 1000mm 2000mm 3000mm 4000mm 5000mm 6000mm 7000mm 8000mm 9000 9999mm
 1mm

-
-
-

<F1>



3.4.2

1000m/s 9999m/s 0.0394in/μs 0.3937in/μs



2260m/s	0.089 in /μs
2730m/s	0.107 in /μs
3080m/s	0.121 in /μs
3230m/s	0.127 in /μs
4700m/s	0.185 in /μs
5920m/s	0.233 in /μs
6300m/s	0.248 in /μs
1m/s	0.001in/μs

-
-
-

<F1>



3.4.3

0
20 μ s 3400 μ s

-
-
-

<F1>



3.4.4

0 μ s 99.99 μ s
1 μ s 0.0125 μ s

-
-

<F1>



3.5



3.5.1

50Ω 100Ω 400Ω



3.5.2

DAC



DAC

3.5.3

(-3dB)

(0.2 MHz 1 MHz)

(0.5 MHz 4 MHz)

(2.0 MHz 10MHz)



3.5.4

0%~80%

1%

●

●

<F2>



1.

2.

3.5.5

-2~-2

1

●

●

<F2>

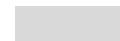


3.5.6

●

●

<F2>



3.5.7

10 1000Hz

20

1

-
-

<F2>

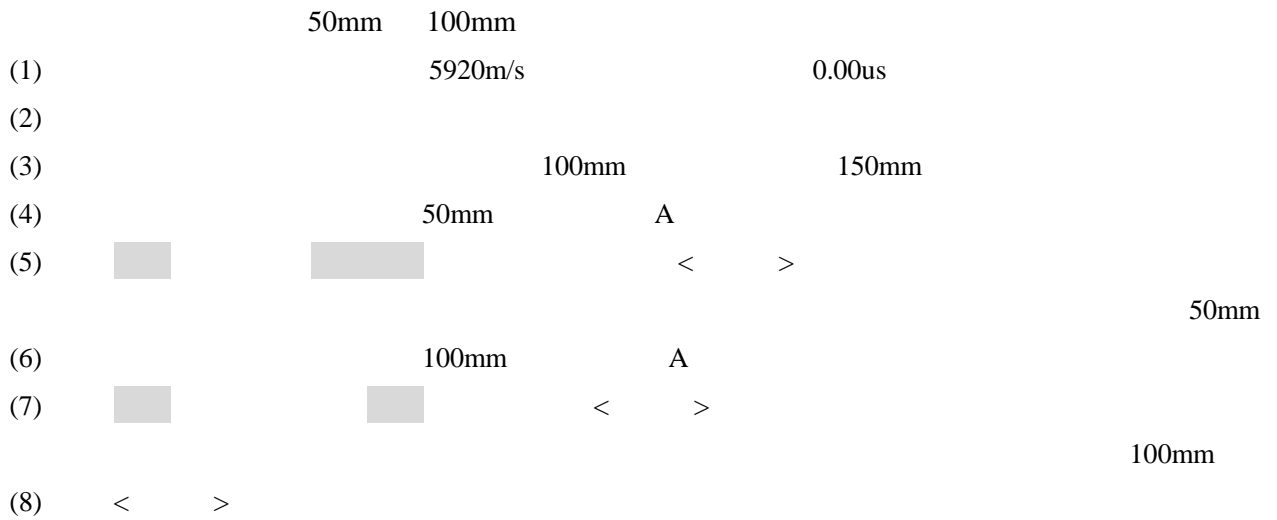


3.5.8

TUD310

2.5MHz

20mm



3.6

-



TUD310

A

B

A

3.6.1



<F3>

A

B

B

A

3.6.2

1/20

10

1/200

1



<F3>

B***A***

3.6.3

1/20

10

1/200

1



<F3>

3.6.4

2% 90%

-

-

<F3>



3.6.5

B

A

B

A

-

-

<F3>



3.6.6

-

-

<F3>



3.6.7



-



<F3>



3.6.8

dB

80



<F3>



<

>



<

>

3.7



32

10

320

32

200



1024

A

320

64000

DAC

*A**DAC*

3.7.1

U

TUD310

" WAV"

" SET"

" THK"



<F4>



3.7.9

*

3.7.2

" WAV"

DAC

DAC

" SET"

" THK"

-
-

<F4>

3.7.3

" *"

-
-
-

<F4>

" / ?"

3.7.4

" THK"

-
-
-

<F4>

" / "

3.7.5

32

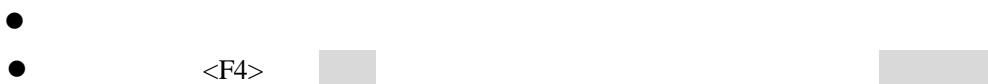
CHAN-000 CHAN-031



3.7.6

CHAN-002

CHAN-002.SET



1.

2.

DAC

DAC

3.7.7

CHAN-002

CHAN-002.SET

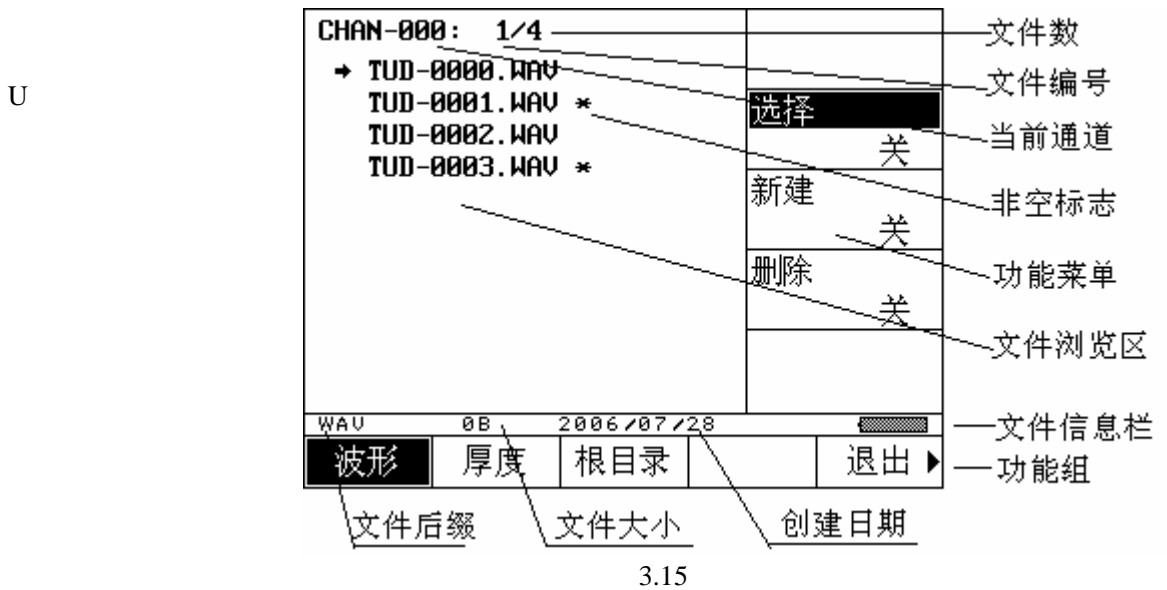


3.7.8

-
- <F4>

- 1.
- 2.

3.7.9



WAVE THICK (ROOT) (EXIT)

3.7.9.1

U U



CHAN-000: 1/4			
→ TUD-0000.WAV			
TUD-0001.WAV *			
TUD-0002.WAV			
TUD-0003.WAV *			
选择			关
新建			关
删除			关
WAV 0B 2006/07/28			
波形	厚度	根目录	退出 ▶

3.16

3.7.9.1.1



3.7.9.1.2

TUD-00XX.WAV

32



3.7.9.1.3



3.7.9.2

U

U



3.7.9.2.1

-
-

<F1>



" "

3.7.9.2.2

TUD-00XX.THK

10

-
-

<F1>



3.7.9.2.3

-
-
-

<F1>



3.7.9.2.4

-
-
-

<F1>



- 1.
- 2.

3.7.9.3

<p>Root : 1/33</p> <ul style="list-style-type: none"> → STARTUP0.SET * CHAN-000.SET * CHAN-001.SET * CHAN-002.SET * CHAN-003.SET CHAN-004.SET CHAN-005.SET CHAN-006.SET CHAN-007.SET CHAN-008.SET 	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">选择</td> </tr> <tr> <td style="text-align: center;">关</td> </tr> <tr> <td style="text-align: center;">存储位置</td> </tr> <tr> <td style="text-align: center;">本地</td> </tr> <tr> <td style="text-align: center;">格式化</td> </tr> <tr> <td style="text-align: center;">关</td> </tr> </table>	选择	关	存储位置	本地	格式化	关
选择							
关							
存储位置							
本地							
格式化							
关							
<p>SET 236B 1980/00/05</p>							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">波形</td> <td style="width: 25%;">厚度</td> <td style="width: 25%; text-align: center;">根目录</td> <td style="width: 25%; text-align: right;">退出 ▶</td> </tr> </table>		波形	厚度	根目录	退出 ▶		
波形	厚度	根目录	退出 ▶				

3.17

3.7.9.3.1

- <F1> [] [] []
- " "

3.7.9.3.2

U

U

- <F1> [] [] []
-

U

U

3.7.9.3.3

- <F1>  
-



1.

2. ..



3.7.9.4

- <F5>

3.8




3.8.1

0~3


-
- <F5>  

3.8.2


0~3

-
- <F5>  

3.8.3


-
- <F5>  

3.8.4

-
- <F5>  

3.8.5

English

-
- <F5>  

3.8.6

mm inch mm inch

-
- <F5>  

3.8.7

EPSON

C63, C65

-
-

<F5>



3.8.8

USB

-
-

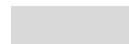
<F5>



3.9



K



3.9.1

3.9.5
0.0° 89.0°
5°

0.1°

K

-
-

<F1>



3.9.2

0.00mm 50.0mm

0.1mm

0.01mm

-
-

<F1>



3.9.3

5mm 1000mm

5mm <100 mm 50mm >100 mm

0.01mm <100 mm 0.1mm >100 mm

-
-

<F1>



3.9.4

3.4.2

3.9.5 K

K

K

K

K =

0.00 57.29

0.01

1

-
-

<F1>



K

3.9.6

1.0 30.0mm
 1mm 0.1mm

-
- <F1> []

K

3.10 DAC

DAC DAC DAC DAC

[]

DAC DAC DAC DAC DAC

DAC DAC DAC DAC DAC

DAC
 DAC 4.4

3.10.1

DAC DAC DAC [] DAC

-
- <F2> []

DAC []

3.10.2

DAC
 Ú 4

-
-

<F2> DAC
DAC



3.10.3

DAC

-50dB 50dB
1 dB 0.1dB

-
-

<F2> DAC
DAC



3.10.4

DAC
-50dB 50dB
1 dB 0.1dB

-
-

<F2> DAC
DAC



3.10.5

DAC

-50dB 50dB
1 dB 0.1dB

-
-

<F2> DAC
DAC



3.10.6

DAC

DAC

" " " "

DAC

-
-

<F2> DAC



3.10.7 DAC

DAC

-
-

<F2> DAC

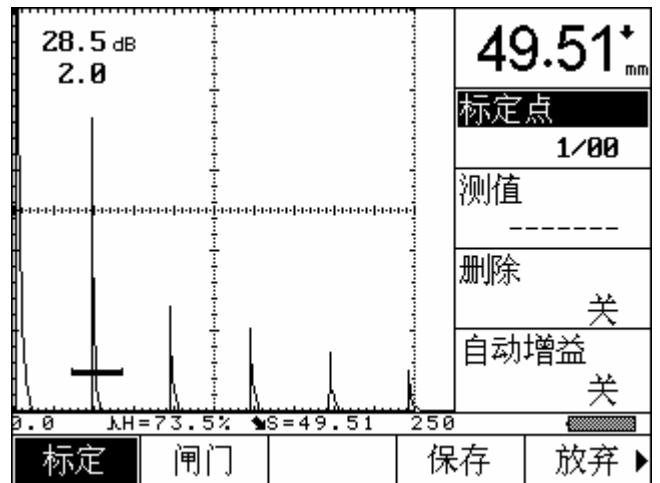


DAC

3.10.8 DAC

DAC

DAC



3.18 DAC

3.10.8.1



3.10.8.1.1

2
1~32

" 2/01"

1

- <F1>  
-

3.10.8.1.2

- <F1>  
- < >

DAC

<i>1.</i>	<i>2</i>	<i>DAC</i>	<i>32</i>
<i>2.</i>			

3.10.8.1.3

DAC

- <F1>  
- < >

3.10.8.1.4

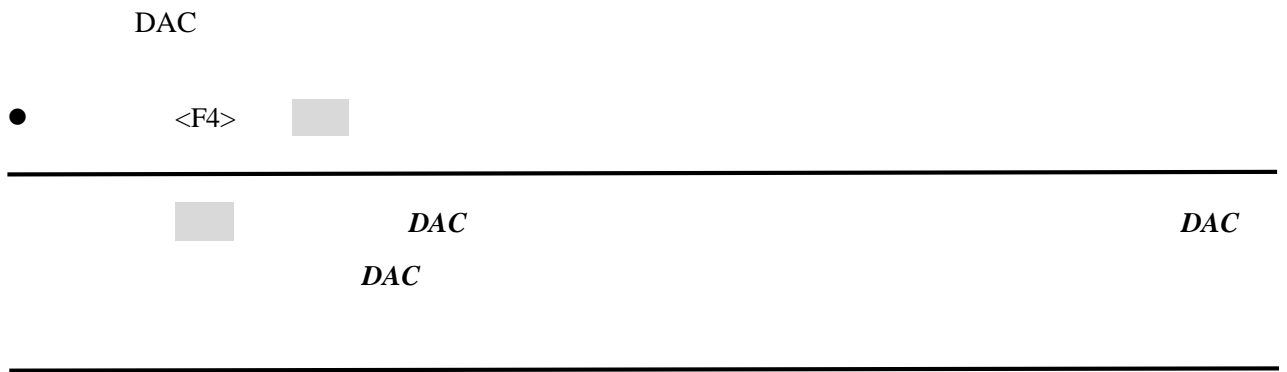
80

- <F1>   <
- >
- < >

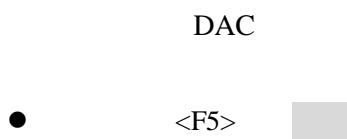
3.10.8.2



3.10.8.3



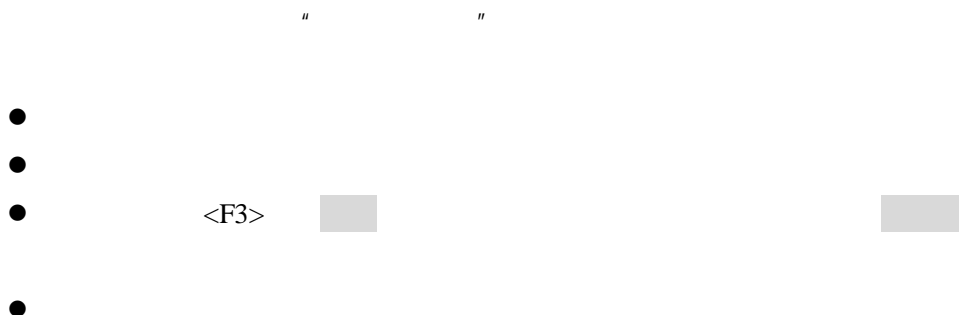
3.10.8.4



3.11



3.11.1



3.11.2

" "

-
-
-
-

<F3>



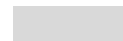
3.11.3AVG

TUD310

3.11.4

-
-

<F3>



3.12

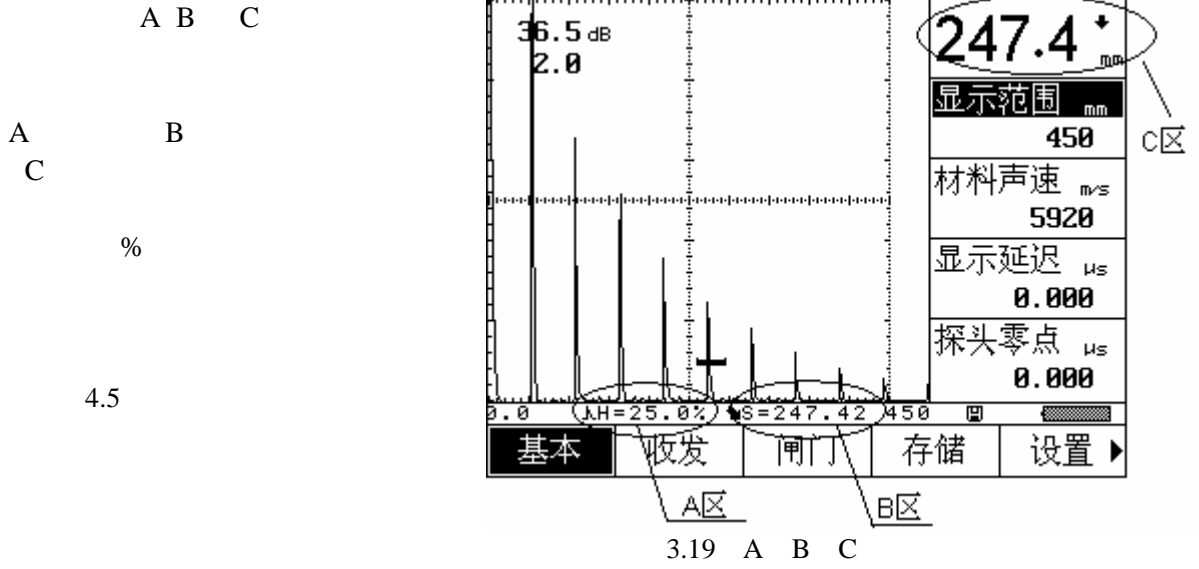
3.12.1

" " " " " " " "

-

<F4>

3.12.2 A



H
h
S
d
P
SZ

A dB

%

<F4>

A

3.12.3 B

B dB

%

<F4>

B

3.12.4 C

C

%

dB

-
-

<F4>



C



3.13 B

B



B

B

A



B



3.13.1

A

A

B

A

A

B

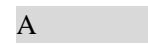
-
-

<F5>

B



A



A

3.13.2

B

B

B

B

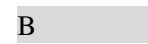
-
-

<F5>

B



B



B

3.13.3

" -> "

"

-> "

->

->

●

●

<F5>

B

B

3.14

+/-

3.14.1

0dB 0.2dB 0.5dB 1.0dB 2.0dB 6.0dB 12.0dB

●



3.14.2

+/-

0dB~110dB

●

+-

3.14.3

●



3.14.4

●



3.14.5

- 
- *

3.14.6

- 
- 

3.14.7

- 
- 
- 

4.1

4.1.1

-
-
-
-

S

4.1.2

-
-
-
-
-
-
-
-

A
A
B
B

A
B

S

S

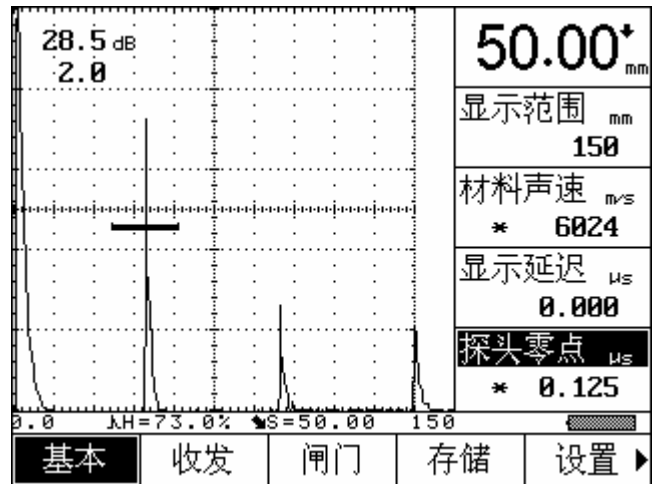
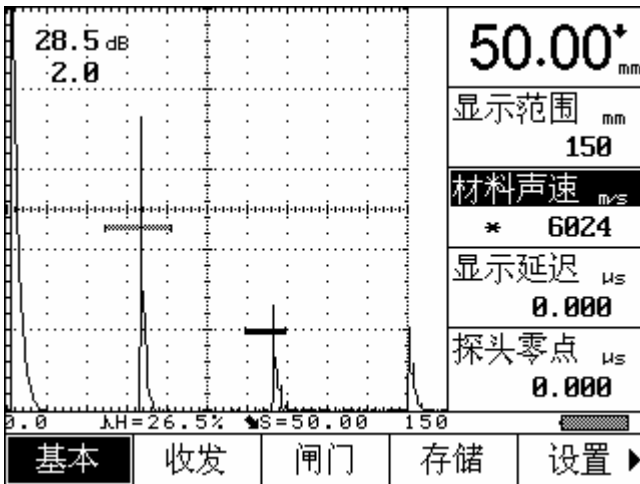
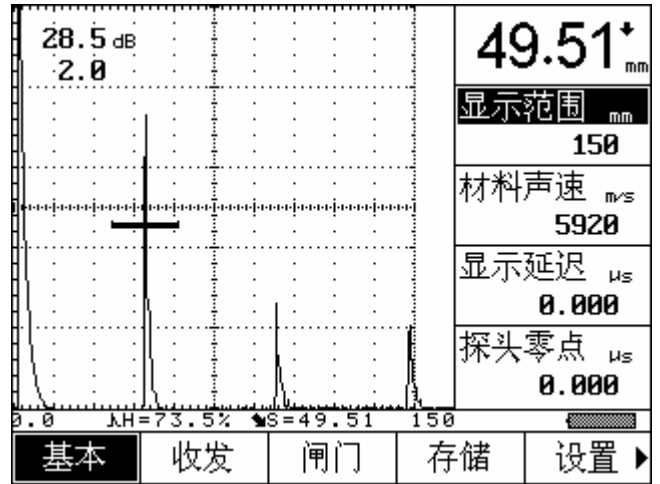
5920m/s

0

50mm

B

A



50mm

6024m/s

50mm

0.125us

4.2

-
-
-
-
-
-
-

A

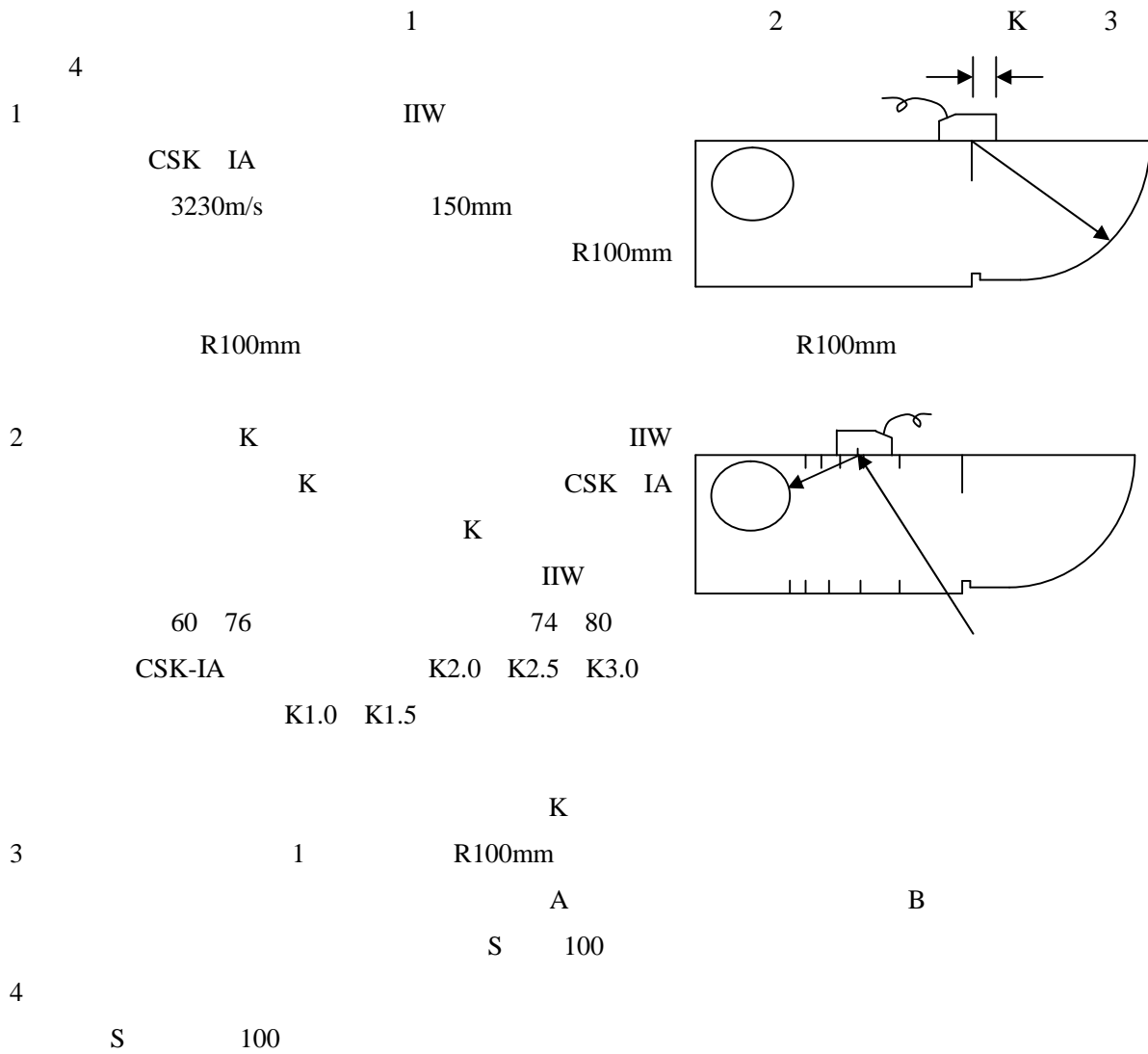
A

-
-
-
-
-

B

B

4.3



4.4 DAC

DAC

DAC
DAC

1

<F1>

DAC

2

DAC

DAC
DAC

3.10.7

DAC

3

<F2>

DAC

4

DAC

DAC

DAC

<F2>

DAC

5dB

-5dB

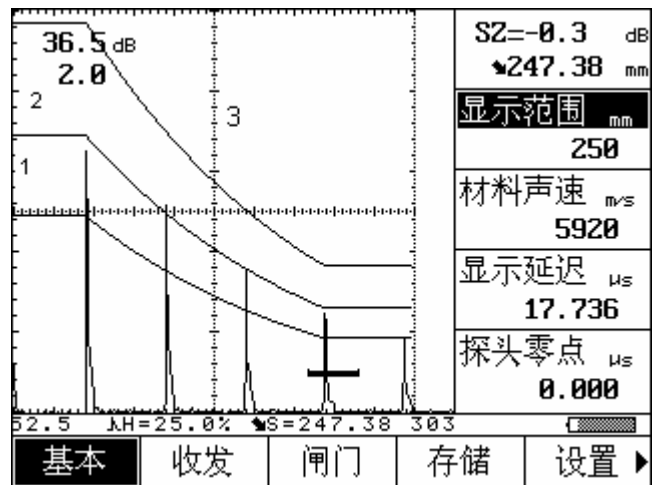
DAC

5dB

5dB

5

DAC



3

DAC

1 2
DAC

6

A B C

SZ

<F4>

<F2>

DAC

7

DAC

DAC

DAC

8

DAC

DAC

DAC

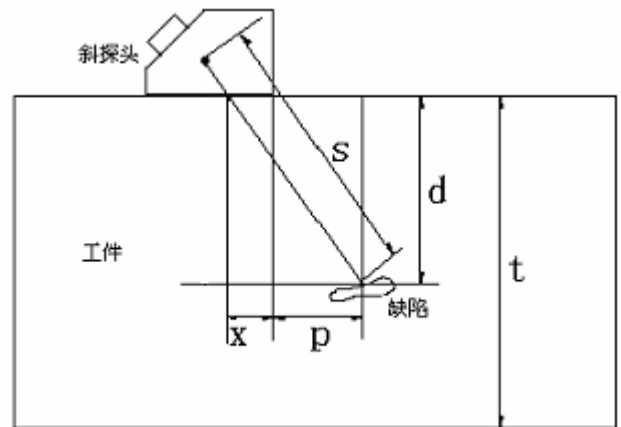
DAC

4.5

S
H(%)
h
d
P

s
d
t
x
p

d S x p



A

B



U

U

USB

TUD310

6.1

-
-
-

6.1.1

-
-
-
-

6.1.2

-
-
-
-

6.1.3

6.1.4

6.1.5

6.2

- a)
- b)
- c)
- d)
- e)
- f)
- g)
- h)
- i)

6.2.1

6.2.2

6.2.3

6.2.4

6.2.5

6.3

- a.
- b.

6.3.1

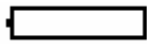
6.3.2

"

"

7.1

7.2



- a.
- b.
- c.
- d.

220V/50Hz

4.5 h

7.3

- a.
- b.
- c.
- d.
- e.

3

7.4

- a.
- b.
- c.
- d.

7.5

- a.
- b.
- c.



















" "

" "

" "

mm	mm 2.5 9999 2.5,5,10,20, 30,40,50,60,70,80,90, 100,150,200, 250, 300, 350, 400, 450,500,600,700,800,900,1000,2000,3000,4000,5000 6000 7000 8000 9000 9999
μs	1mm μs -20 +3400 10 1
μs	0.0 99.99 1us 0.0125us
m/s	1000 9999 7 2260,2730,3080,3230,4700,5920,6300 1
Hz	10~1000
Ω	50 100 400
MHz	0.2-1 0.5-4 2-10
dB	0 110 0.0 0.2 0.5 1 2 6 12
	0% 80% 1%
	-2 2 1
	3%
	0.2%
	$\geq 60\text{dB}$
	$\geq 34\text{dB}$
	2
	EL 320x 240 4
A- Scan	A-Scan A-Scan

	32
- -	>40dB
	1024 A-Scan 64000 320
	USB1.1 full speed, USB Device, USB Host
	mm/i nch
	Li 4× 3.6V 2200mAh
	100 Hz -240 Hz 50 Hz /60Hz 9V 12VDC/3A 4A
	-20 50
(mm)	240× 175 × 85
kg	1.50

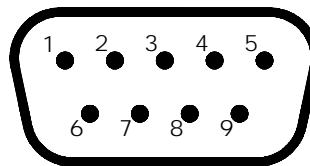
			3.14.1
	+		3.14.2
	-		3.14.2
			3.4 3.5 3.6 3.7 3.8 3.9 3.10 3.11 3.12 3.13
	F1		3.4 3.9
	F2		3.5 3.10
	F3		3.6 3.11
	F4		3.7 3.12
	F5		3.8 3.13
			3.4 3.5 3.6 3.7 3.8 3.9 3.10 3.11 3.12 3.13
			
		< >	3.4 3.5 3.6 3.7 3.8 3.9 3.10 3.11 3.12 3.13
			3.14.3
			3.14.4
			3.14.5
			3.14.6

USB Device USB Host DB9 DB9

		/	
1	D_D+	/	USB Device
2	H_D-	/	USB Host
3	H_D+	/	USB Host
4	GND		
5	+5V		
6	D_D-	/	USB Device
7	OUT1		IO
8	OUT0		
9	IN1		IO

DB9

DB9



DB9

-
- 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.

A

p *c*

A

X

Y

A

A

B

0.4 MHz ~15MHz

29.

30.

31.

32. DAC

33.

34.

35.

36.

37.

38.

39.

TUD310

1 GB/T 12604.1-1990

2 JB/T 10061-1999 A

3 JJG 746-2004