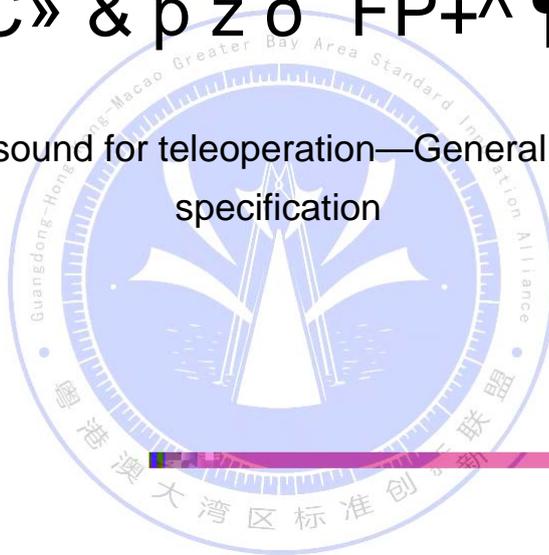


‰ =

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《广东省—香港—澳门大湾区标准创新联盟  
机器人超声远程操作—通用技术规范》

Robotic ultrasound for teleoperation—General technical  
specification



2023-12-25 9

2023-12-30 0 0

2023-12-25 9



- \$ !W

	.....	II
1	.....	1
2	.....	1
3	.....	1
4	.....	2
5	.....	4
6	.....	6
7	.....	9
8	.....	10



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*f* @ 6

GB/T 1.1—2020

1



# F 0AC» & p ž đ FP+^ ¶ e — ,

1 99 \*

2 ?ú99 ] K+^ ½ ,

- GB 4793.1-2007
- GB 9706.1-2020
- GB 10152-2009 B
- YY 0767-2009
- YY/T 1712-2021
- YY 9706.102-2021



3 eB# Â Đ •

3.1 F 0AC» & p ž đ remote ultrasonic robot

3.2 q+U1% q ÐAô =doctor- end master device

3.3 +û đ1% ÐAô = patient -end slave device

3.4 ? ~ ' pL\* effective workspace

[ YY/T 1712-2021 3.13]  
3.5 q Ý I ,F ,L\* m aster -slave control time delay

[ YY/T 1712-2021 3.24]  
3.6 Ú ] !~ ,L\* protective stopping time

3.7

0i Đ Ū@ Ñ stable contact force

3.8

¿ ž Ū@ Ñ protective contact force

3.9

NÓ ĐFU Ū ated velocity

[ YY/T 1712-2021 3.16]

3.10

a1% •>, ž end effector

[ YY/T 1712-2021 3.17]

4 ]73?."x

4.1 F 0AC» & p ž đF >, Ō\* <



a

b

4.2 L?ø D5 °

a)

b)

c)

4.3 C» & W • ]73?."x

a B

GB 101522009

b

YY 0767-2009

c

YY 0767-2009

4.4 Aô = ç ž?."x

- a GB 9706.12020 GB 9706.2372020
- b YY 9706.1022021 GB 9706.237-2020 202.6

4.5 ÝI]73

4.5.1 q ÝI f5α ü.α Ü

X Y ± 1 mm

4.5.2 q ÝI f5αH C]

X Y 0.1 mm

4.5.3 q ÝI 57 ü.α Ü

± 1 °

4.5.4 q ÝI 57H C]

0.5 °

4.5.5 q ÝI 0i Đ Ū@ Ñ Ý I2ô Ü

3N40N

± 3 N

4.5.6 q ÝI ? ~ 'pL\*

a)

L600 mm×W300 mm×H350 mm

b)

± 170 °

± 70 °

4.5.7 q ÝI ,F ,L\*

250ms

4.5.8 ç ž Ū@ Ñ

120 N

4.5.9 Ū ] 'r ,L\*

500 ms

4.5.10 NÓ ĐFU Ü

a)

X Y

375 mm/s Z

125 mm/s

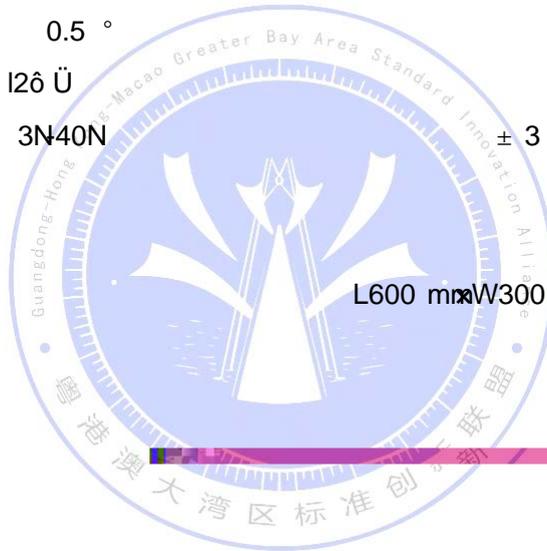
375mm/s

b)

RX RY

0.75 rad/s

4.6 Aô =F >,5±5 ==



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4.6.1  $VEÉFU)½$

20 Mbps

4.6.2  $VEÉ , ,$

100 ms

4.6.3  $VEÉ \%M- ]$

5 %

5  $Ö73?·"x$

5.1  $Aô = Ö73$

5.1.1  $Aô = 1x* <$

a)

b) /

c)

d)

5.1.2  $Aô = F Û$

a)

b) /

5.2  $E¥ , Ö73$

5.2.1  $C \ m1x* <$

a)

b) /

c) /

5.2.2  $! \ m1x* <$

a) /

b)

c)

d)



5.2.3 Ö73

a) /

b) /

5.2.4 CzïVF7DÛI

/

5.3 F0AÝIDVEÉ





a)

b) 5 5

c) 4.5.1

6.2.2 q Ýlf5µH C]B PÂ

a)

b) 5 5

c) 4.5.2

6.2.3 q Ýl57ü.µÜB PÂ

a)

b)

c) 5 5

d) 4.5.3

6.2.4 q Ýl57H C]B PÂ

a)

b)

c) 5 5

d) 4.5.4

6.2.5 q Ýl0iĐÛ@ ÑÝl2ôÜB PÂ

a)

b) 5 5



c) 4.5.5

6.2.6 q ÝI?~ 'pL\*B PÂ

a)

b)

c)

d) 4.5.6

6.2.7 q ÝI,F ,L\*B PÂ

a)

b) 5 5

c) 4.5.7

6.2.8 ÿ ž Ű@ ÑB PÂ

a)

b) 5

c) 4.5.8

6.2.9 Ú ]'r ,L\*B PÂ

a)

b) 5 5

c) 4.5.9

6.2.10 NÓ ĐFU ÜB PÂ



a)

b)

c) 5 5

d) 4.5.10

7 ;>û == =Cd Ž ÂF EÉ

7.1 ;>û

a)

b)

c)

7.2 =

7.2.1 =Aü

a)

b)

c)

d)

e)



GB 4793.1-2007-1

7.2.2 Aô ==

a)

b)

c) : x x

d)

e)

7.2.3 ;>û1ç =

a)

T/GBA 013—2023

b) × ×

c)

d)

e)

GB/T 191—2008



8.2.2 5\* Ú5\* \$ ¶ eB\* D

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

8.3 Ý ÷ > rA÷

- a)
- b)
- c)

