ADJUSTING MANUAL FOR PORTA 100HF

Eickemeyer®
VET
Medizintechnik für Tierärzte

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Adjusting manual for Porta 100HF

1. Most important caution

   All units must be assembled together with same Serial Number.

   If new assembly of DRVINV unit and XCONT unit with different serial number is required (by an exchange with a new unit such as a service work), readjust the Ip reference value of the XCONT unit by VR5 and VR1 as shown in the pictures 20 to 23 and figures 2 to 6 of 4.3. Adjustment of XCONT unit.

2. Measuring Instruments

   2.1. Storage Oscilloscope

   Model : Tektronix TDS3012B

   2.2. Digital Voltmeter

   Model : Agilent Technologies 34401A

   2.3. kV meter

   Model : RMI RMI1245

   2.4. Dose meter

   Model : RADCAL 9015

3. Consisting units

   3.1. Rectifying unit (RECT2/A5, RECT1/A6), refer to picture 2

   3.2. Drive unit (DRV/A1), refer to picture 1

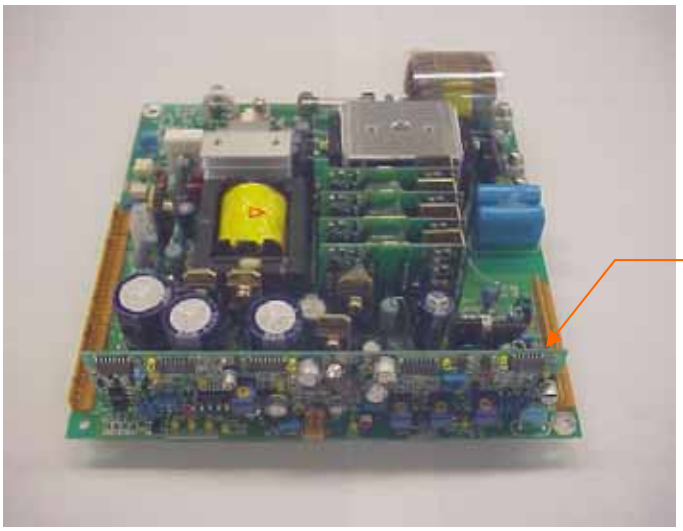
   3.3. Main control unit (XCONT/A2), refer to picture 4

   3.4. Display unit (DISPLAY/A3), refer to picture 5

   3.5. Collimator unit (COLLIMATOR/A7), refer to picture 6

   3.6. H.T.Tank unit (HT/A4), refer to picture 3

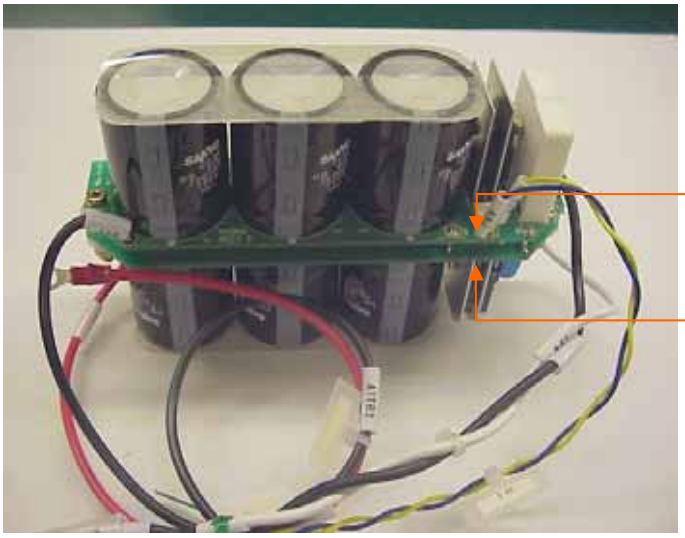
3. Consisting Unit



Picture 1

DRV unit (DRV/A1)

DRV CNT unit (sub unit)

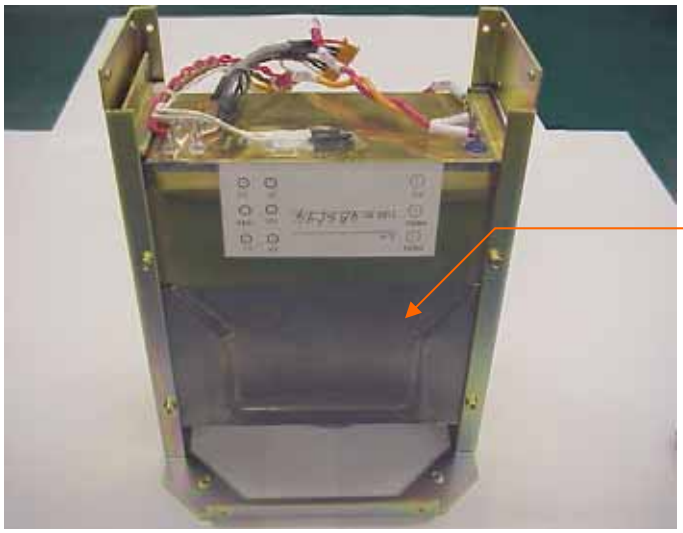


Picture 2

REC unit (RECT1/A5), (RECT2/A6)

RECT 2 unit

RECT 1 unit



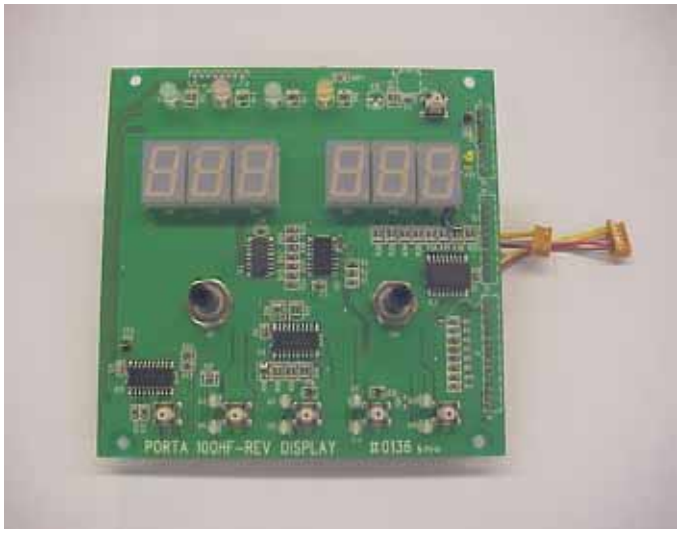
Picture 3

H.V. TANK unit (HT/A4)

H.V. TANK unit

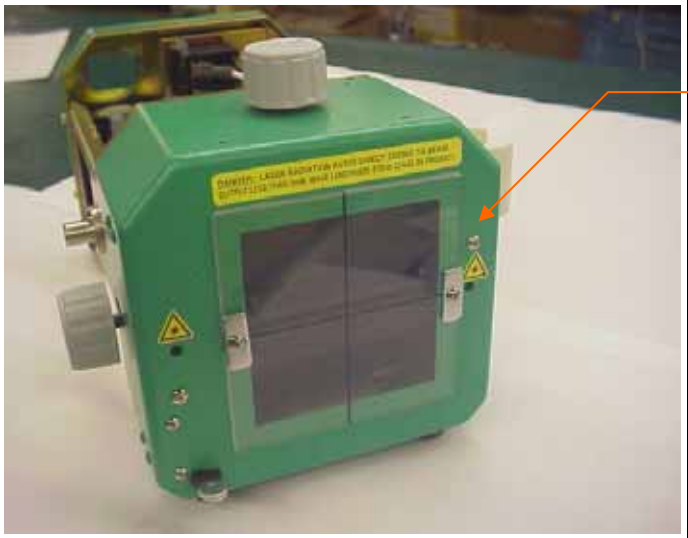
Picture 4

MAIN CONTROL unit (XCONT/A2)



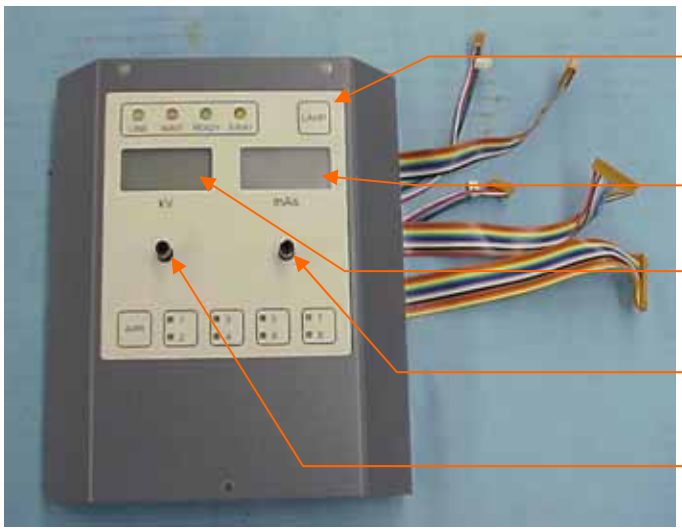
Picture 5

DISPLAY unit (DISPLAY/A3)



Picture 6

COLLIMATOR unit
(COLLIMATOR/A7)



Picture 7

DISPLAY unit is located under this panel

mAs display

kV display

mAs selector knob

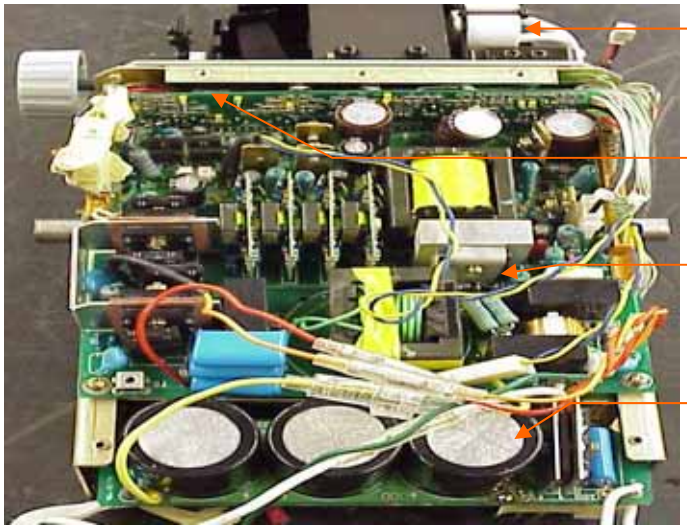
kV selector knob

Picture 8

XCONT unit

HT unit

RECT 2 unit



Picture 9

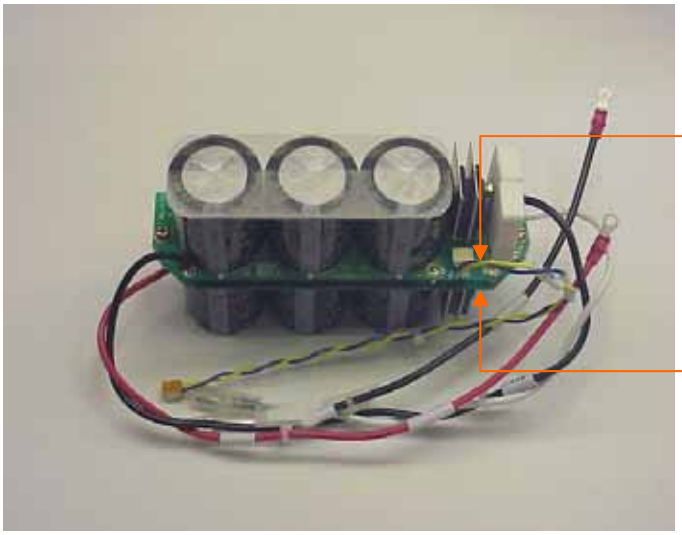
Collimator unit

DRV CNT unit

DRV unit

RECT 1 unit

4.1. Adjustment of REC Unit

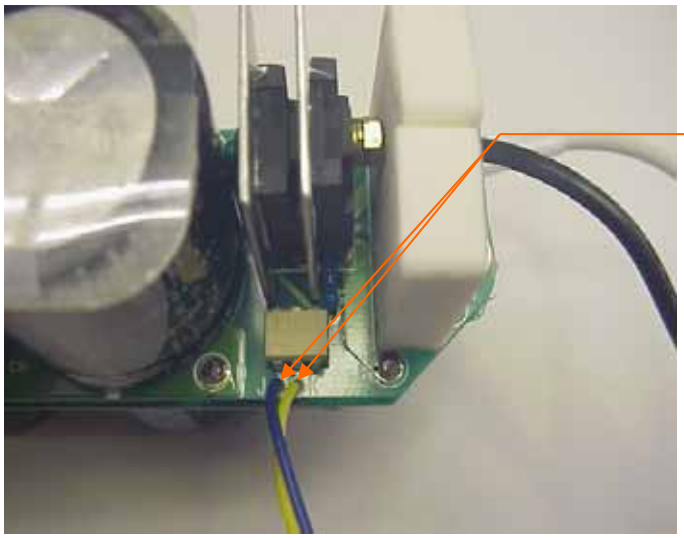


Picture 10

Outlook of a REC unit

REC 2 unit

REC 1 unit

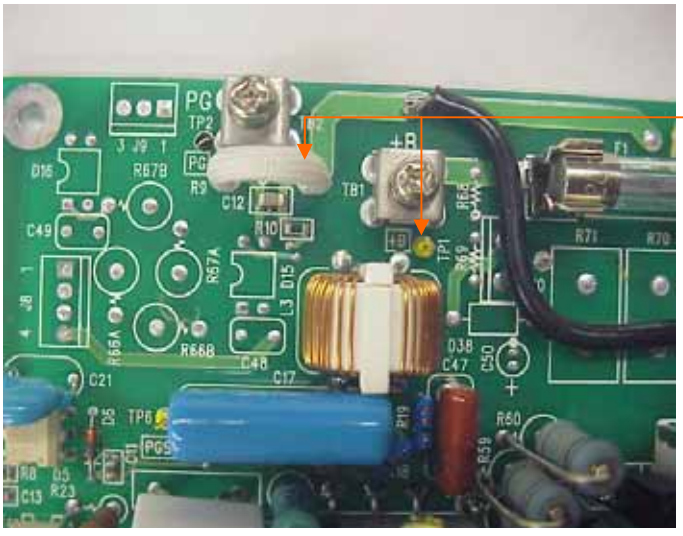


Picture 11

Confirmation of control circuit

Confirm whether the control input J and K are connected correctly.

J = Blue color
K = Yellow color

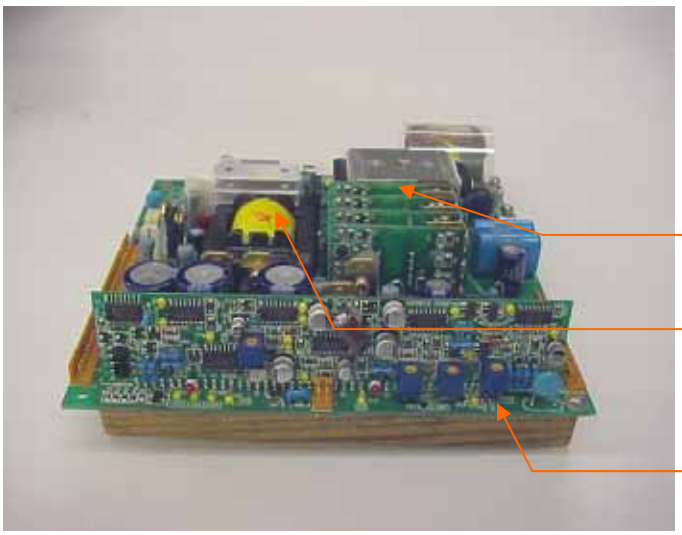


Picture 12

Confirmation of output voltage

Output voltage of REC unit comes to TB1(+B) and TB2 (PG).
Confirm whether the input voltage is DC270~280V by connecting a Digital Voltmeter to TB1 and TB2.

4.2.1. Adjustment of DRV Unit



Picture 13

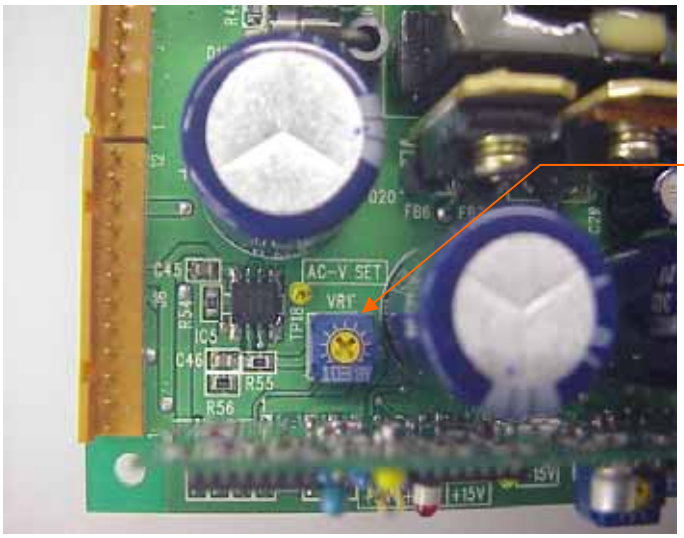
Outlook of a DRV unit

* For easy observation of inside, upper radiator was removed.

Radiator of DRV unit

Radiator of Sub power supply IC

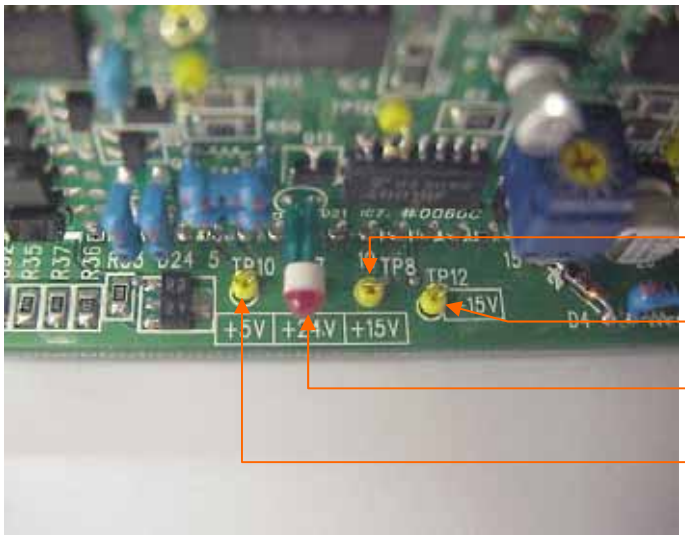
DRV CNT unit



Picture 14

Adjustment of AC-V SET

Turn VR1 fully counterclockwise since this is not used.



Picture 15

Confirmation of bias voltage

* 1. Voltage is all DC voltage.
  2. TP17 (S.GND) is used as GND.

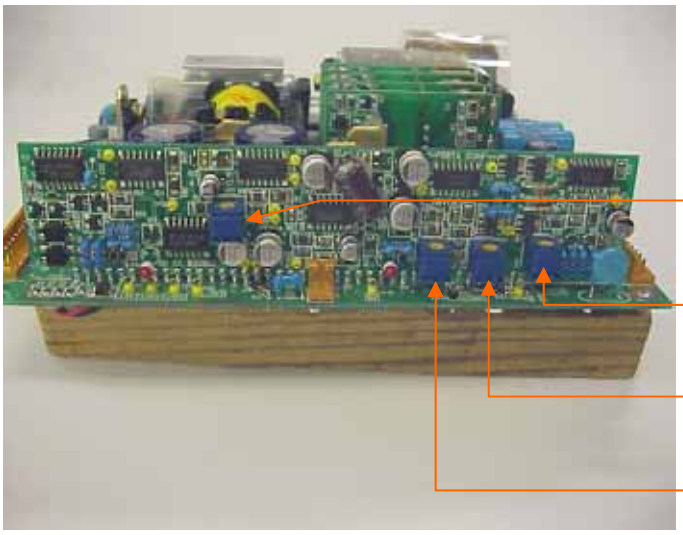
① Confirm TP8 (+15V)

② Confirm TP12 (-15V)

③ Confirm TP7 (+24V)

④ Confirm TP10 (+5V)

4.2.2. Adjustment of DRVCNT Unit



Picture 16

Outlook of a DRVCNT unit

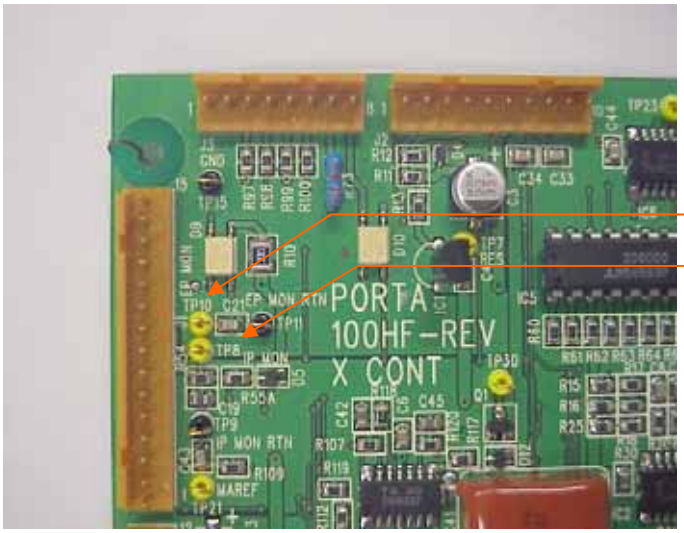
* Procedure which should be performed before the adjustment.

① Place VR1 (Ep-SET) at 12 o'clock position.

② Place VR4 (Pre-H) at 10 o'clock position.

③ Turn VR3 (Pre-H Gain) to fully counterclockwise.

④ Place VR2 (Ip-SET) at 12 o'clock position.



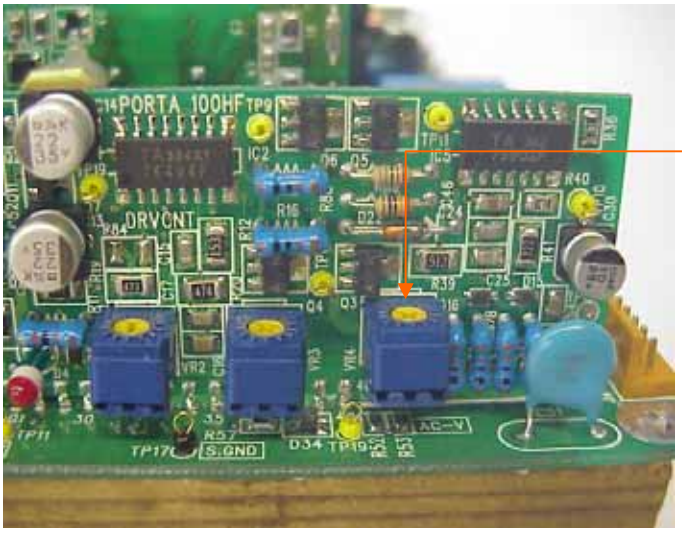
Picture 17

DRVCNT unit

* Procedure which should be performed before the adjustment.

detection terminal TP10 (Ep-MON) and mA detection terminal TP8 (Ip-MON) on the X-CONT unit. GND is TP11.

Settings are
TP10 2V/div. = 40kV/div.
TP 8 2V/div. = 8mA/div.
Time axis = 10msec./div.



Picture 18

Pre-heat adjustment

At the exposure under 40kV, 0.3mAs setting, adjust the peak waveform of TP8 (Ip MON) on the X-CONT unit by VR4 to becomes stable at 7.5V within the 10msec.
(Refer the attached charts)

Picture 19

Adjustment of IP wave form

At the time of the exposure under 70kV, 3.2mAs setting, adjust a peak waveform of TP8 (Ip MON) on the X-CONT unit by VR2 to become 5.0V

(Refer to attached charts, Fig. 3, Fig. 4, Fig. 5)

4.3. Adjustment of XCONT Unit

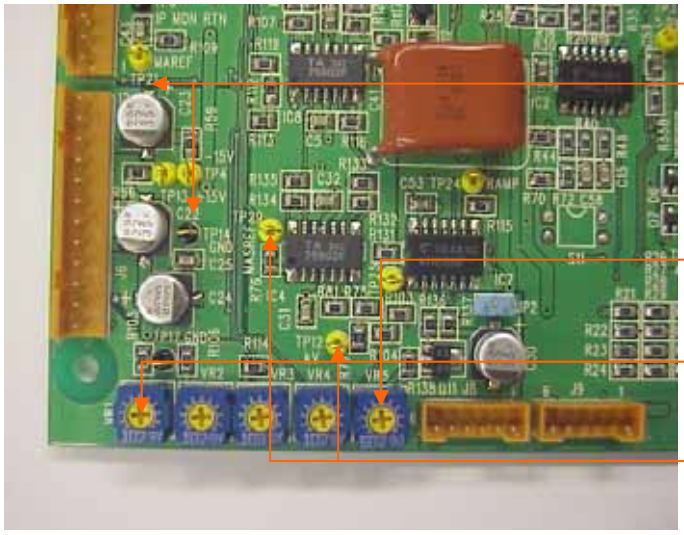
Picture 20

Out look of X-CONT unit

- TP21 (Ma Ref.)
- TP29 (mAs Ref.)
- TP12 (kV Ref.)

* For the GND, use the black terminal nearest to the terminal to measure.

VR3, VR4	They are VR for mAs measurement
VR5	(for 7.5V setting)
VR1	(for 5.0V setting)
VR2	(no adjustment)



Picture 21

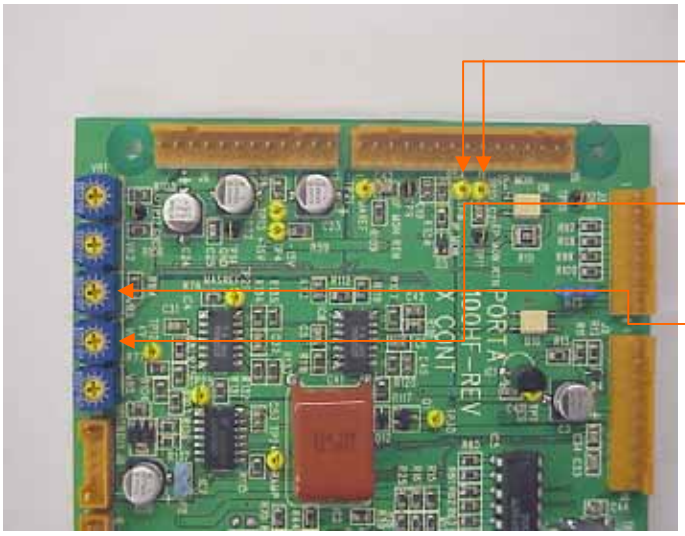
Adjustment for IP reference value

Caution 1. Connect a digital voltmeter to TP21 and TP14
2. Do not expose the x-ray during adjustment

① Set kV to 40kV and obtain 7.5V by VR5.

② Set kV to 70kV and obtain 5.0V by VR1.

③ Confirm the voltage at TP12 (kV) and TP29 (mAs Ref.) by attached reference chart.



Picture 22

mAs adjustment

Connect the oscilloscope to

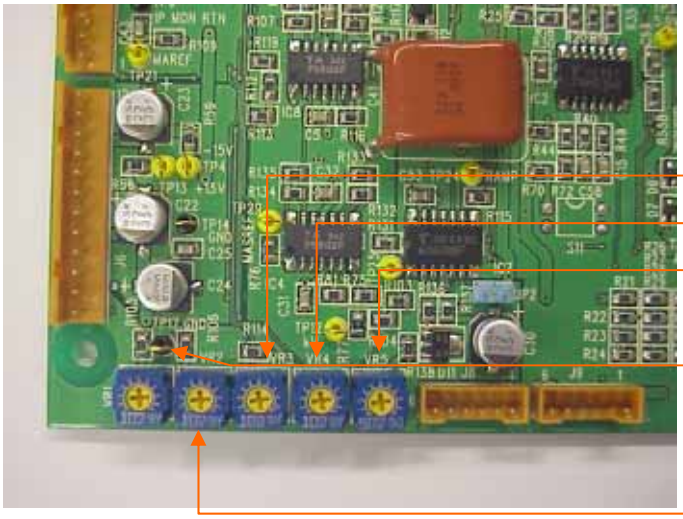
* [1] TP10 and TP8
[2] Make an exposure during the adjustment.

(1) When setting 70kV, 5mAs, adjust X-ON time of EP to 250msec. +/-7.0%by VR4

(2) When setting 70kV, 20mAs, adjust X-ON time of EP to 1sec. +/-7.0%by VR3

(3) When setting 70kV, 0.5mAs, confirm the X-ON time on EP is 25msec. +/-7.0%

(Refer to the waveform chart of Tp10 and TP8)



Picture 23

Additional explanation on VR

VR for mAs adjustment

VR3 (0.3~5.0, mAs).

VR4 (6.4~20, mAs).

VR5 (7.5V setting, 40~66kV, IP=30mA, automatic setting).

VR1 (5.0V setting, 68~100kV, IP=30mA, automatic setting).

VR2 (No adjustment)

4.3.1. Confirmation of kV reference value (TP12) corresponding to each kV value.

Confirm V value at TP12 by changing kV by a kV selector switch.

Fig. 1

kV	TP12(V)
40	2.00
42	2.10
44	2.20
46	2.30
48	2.40
50	2.50
52	2.60
54	2.70
56	2.80
58	2.90
60	3.00
62	3.10
64	3.20
66	3.30
68	3.40
70	3.50

kV	TP12(V)
72	3.60
74	3.70
76	3.80
78	3.90
80	4.00
82	4.10
84	4.20
86	4.30
88	4.40
90	4.50
92	4.60
94	4.70
96	4.80
98	4.90
100	5.00

4.3.2. Confirmation of kV reference value (TP29) corresponding to mAs value.

Confirm V value at TP29 by changing mAs by a mAs selector switch.

Fig. 2

mAs	TP29(V)
0.3	0.31
0.4	0.39
0.5	0.50
0.6	0.58
0.7	0.70
0.8	0.78
0.9	0.89
1.0	1.01
1.1	1.09
1.2	1.20
1.3	1.28
1.4	1.40
1.5	1.48
1.6	1.59
1.7	1.71
1.8	1.79
1.9	1.91
2.0	1.98

mAs	TP29(V)
2.2	2.19
2.5	2.51
2.8	2.80
3.2	3.19
4.0	3.99
5.0	4.99
6.4	0.65
7.0	0.70
8.0	0.80
9.0	0.90
10	1.00
12	1.29
16	1.60
20	2.00

4.3.3. Wave form of TP10(EP), TP8(IP) on XCONT board

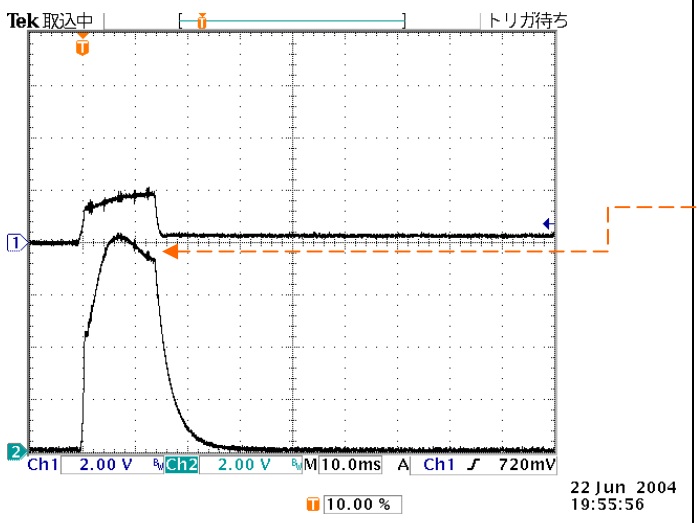


Fig. 3

Setting of 40kV, 0.3mAs (Ip=30mA)

* Acceptable waveform at the time of a pre-heat adjustment.
(Since it is confirmed that the peak waveform of Ch2 was 7.5V)

Ch 1 : TP10 (Ep) = 40kV/div.
Ch 2 : TP 8 (Ip) = 8mA/div.
(Ch 1, Ch 2 = 2V/div.)
Time axis : 10msec/div.

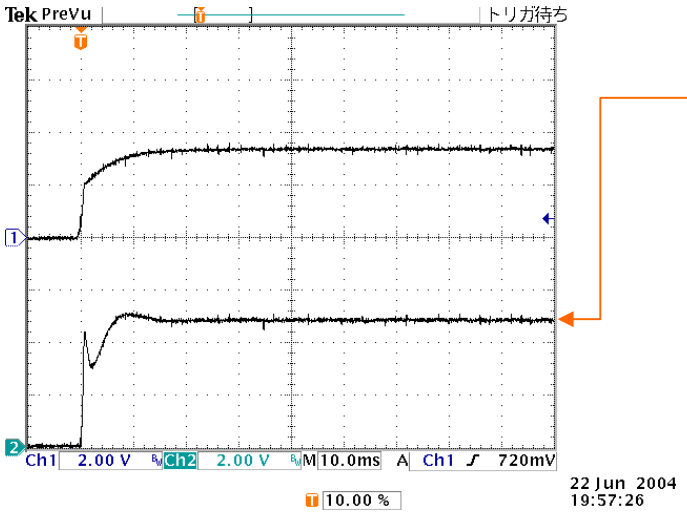


Fig. 4

Setting of 70kV, 3.2mAs (Ip=20mA)

* Acceptable waveform at the time of a pre-heat adjustment.
(Since it is confirmed that the peak waveform of Ch2 was 5.00V)

Ch 1 : TP10 (Ep) = 40kV/div.
Ch 2 : TP 8 (Ip) = 8mA/div.
(Ch 1, Ch 2 = 2V/div.)
Time axis : 10msec/div.

Ripple ; Ep = +/-3%
Ip = +/-5%

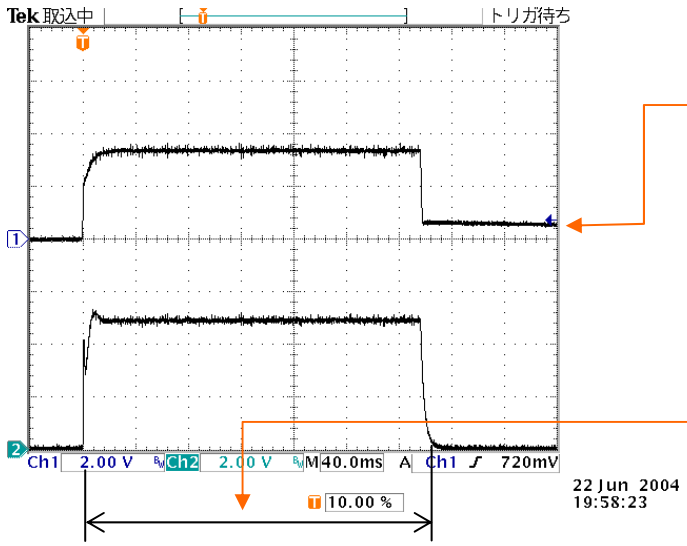


Fig. 5

Setting of 70kV, 5mAs (Ip=20mA)

* Acceptable waveform at the time of mAs waveform adjustment.
(Since it is confirmed that the pulse width of Ch2 was within 250msec. +/-7.0%)

Ch 1 : TP10 (Ep) = 40kV/div.
Ch 2 : TP 8 (Ip) = 8mA/div.
(Ch 1, Ch 2 = 2V/div.)
Time axis : 40msec/div.
250msec.

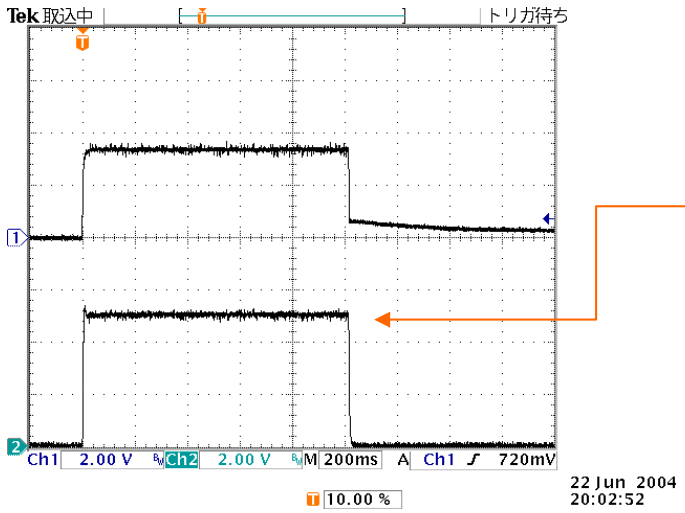


Fig. 6

Setting of 70kV, 20mAs (Ip=20mA)

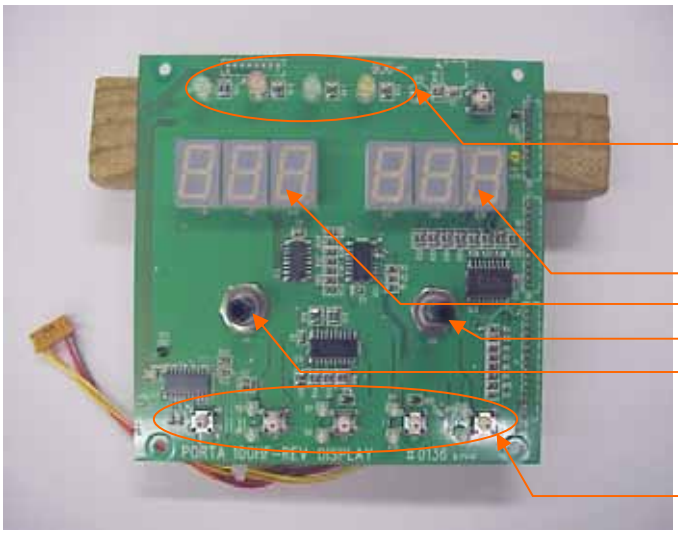
* Acceptable waveform at the time of a pre-heat adjustment. (Since it is confirmed that the pulse width of Ch2 was within 1sec. +/-7.0%)

Ch 1 : TP10 (Ep) = 40kV/div.

Ch 2 : TP 8 (Ip) = 8mA/div.

(Ch 1, Ch 2 = 2V/div.)

Time axis : 200msec/div.



Picture 24

Outlook of DISPLAY unit

From left, Display LEDs for

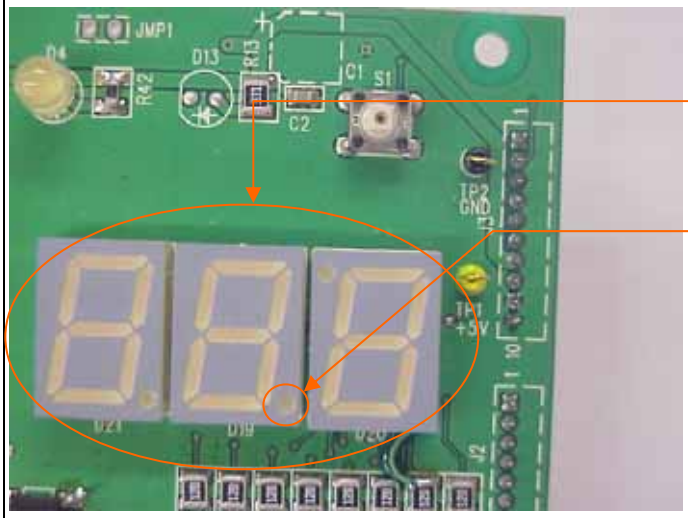
Line (D1), Wait (D2) Ready (D3), X-RAY (D4)

Collimator lamp switch

LED for mAs display
LED for kV display
mAs selector SW
kV selector SW

From left, APR switches for

(APR), (APR1,2), (APR3,4), (APR5,6), (APR7,8)

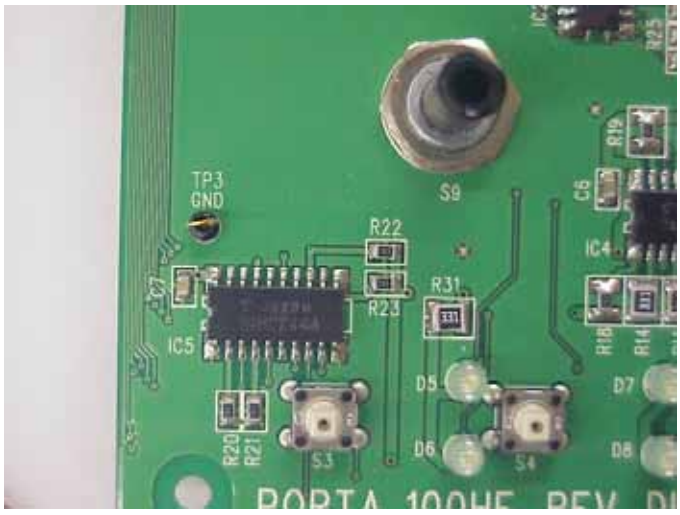


Picture 25

Confirmation of Display

① Confirm whether any LED of 7 segments is lighting or not during the display.

② Confirm whether the decimal point is lighting or not.



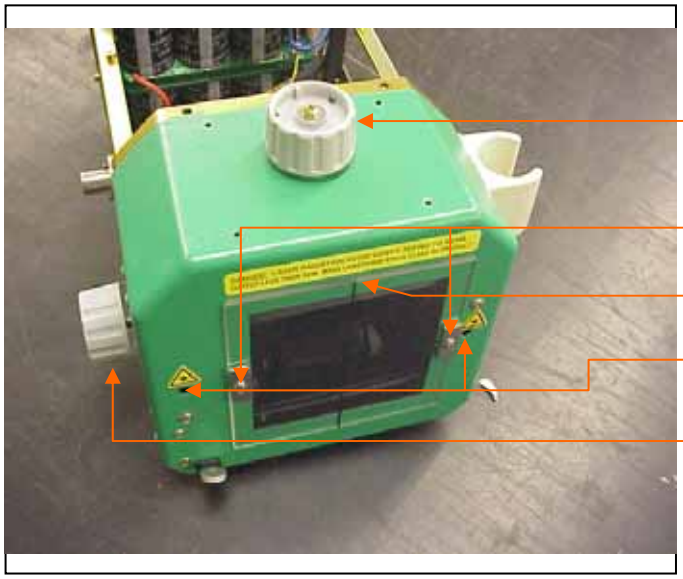
Picture 26

Confirmation of APR switch (S3)

① Confirm whether the selected kV and mAs are memorized or not.

② Confirm whether the figures in the display window turns upside down when the APR switch is pressed for more than 3 seconds. Also whether it turns to normal direction by pressing the switch again for more than 3 seconds.

4.5. Adjustment of COLLIMATOR Unit



Picture 27

Outlook of COLLIMATOR unit

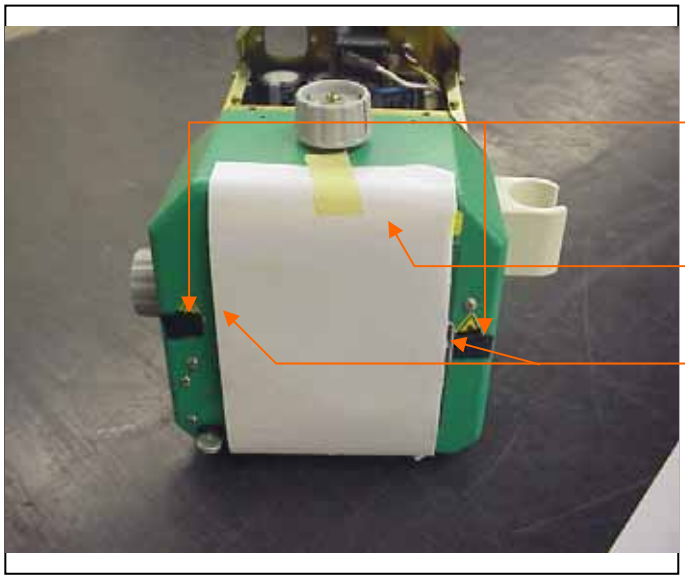
Adjusting knob for up/down movement of the blades.

Adjusting screws of acrylic plate

Acrylic plate with crossing lines

Windows for laser beam

Adjusting knob for left/light movement of the blades
(Most important notice ; Do not place the laser beam direct to the eyes)



Picture 28

Adjustment of the acrylic plate, No.1

* Paste a black tape doubly for the protection purpose of eyes.

① Place a white paper in front of the acrylic plate.

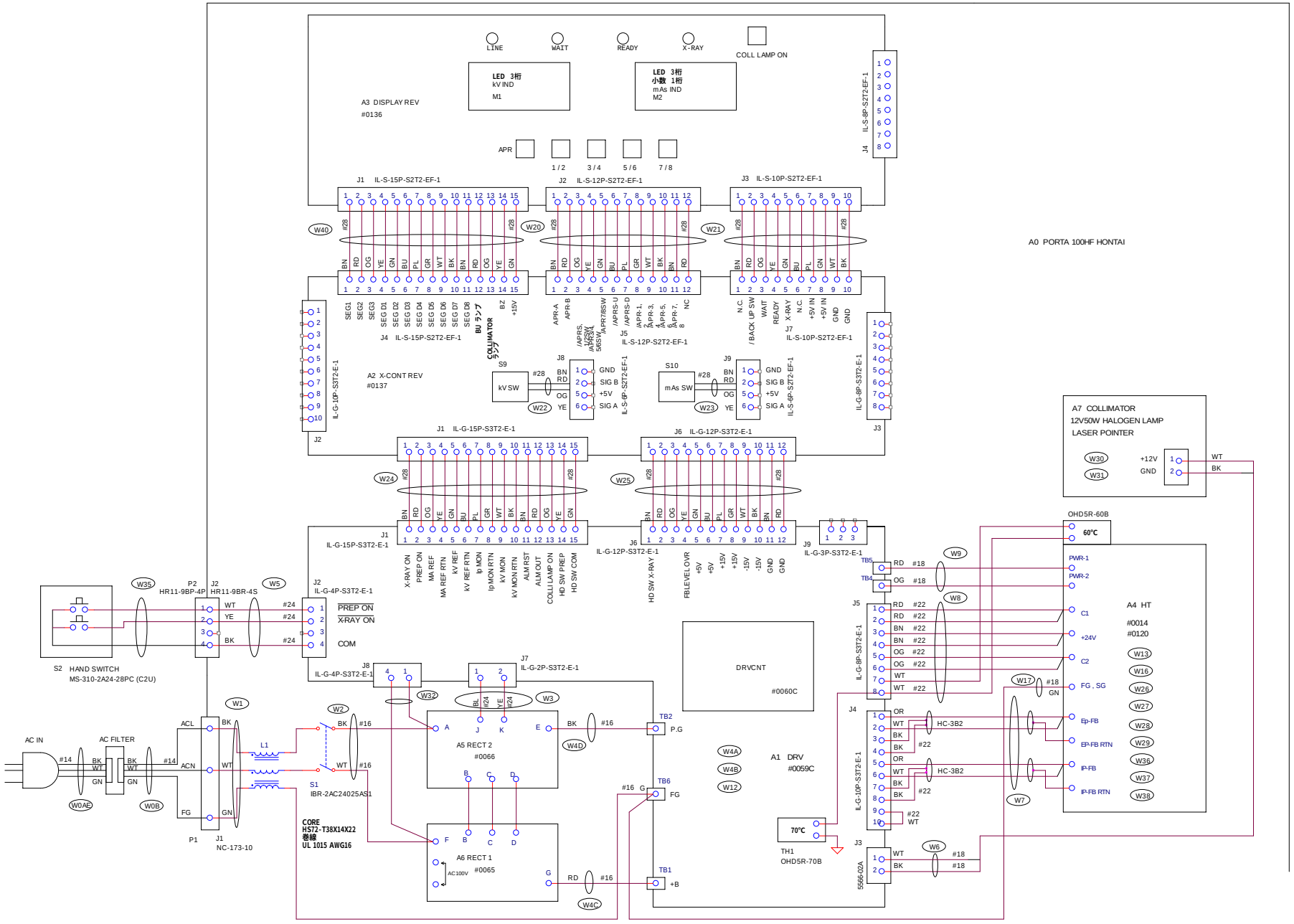
② Fully close either blades and open slightly the other.
Adjust the acrylic plate until the crossing line on the acrylic plate is placed on the line of the light coming from the collimator bulb.

Picture 29

Adjustment of the acrylic plate, No.2

① This shows that the blades for up/down movement are fully open, closing the blades for left/right movement.

② A fine adjustment is performed by the adjusting screws of the acrylic plate.



3A,3B	記 号 REV.MARK	材質 MATERIAL		処理 TREATMENT/FINISH		尺度 SCALE	単位 UNITS
'04-10-12	ゾーン ZONE	本 図 APPROVED BY	検 図 CHECKED BY	設 計 DESIGNED BY	製 図 DRAWN BY	名称 TITLE	PORTA 100HF_REV
	年月日 DATE	山本 '04-03-30		大和田 '04-03-29			本体接続図
	承 認 APPROVED BY						
	変更者 REVISED BY						
基板変更 #0060B → #0060C #0059B → #0059C	記 事 CONTENTS	株式会社 ジョブ				製品コード PRODUCT CODE. <Product Code> 図面番号 DRAWING No. A3E0145	SHEET 1/1 REV.MARK