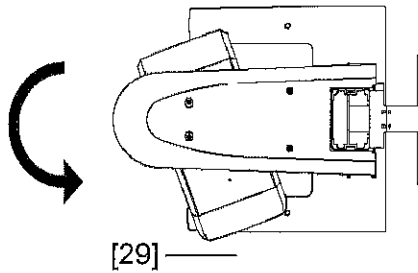


## 5.6 Potentiometer replacement

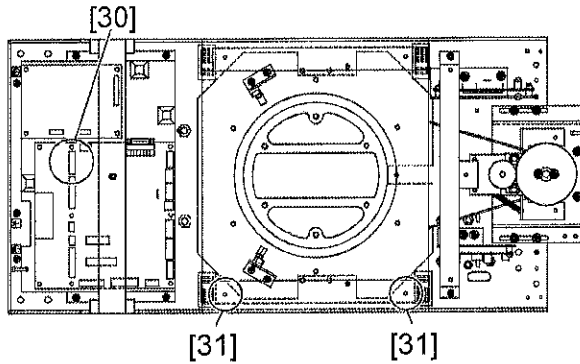
### 5.6.1 Potentiometer replacement

- 1 Remove the arm bottom cover, the arm top cover B and the sensor upper rear surface cover.



- 2 Turn the arm unit [29] in the direction of the arrow and move until it makes contact.

●When turning the arm, be careful that the chin rest and the sensor do not come in contact with each other.

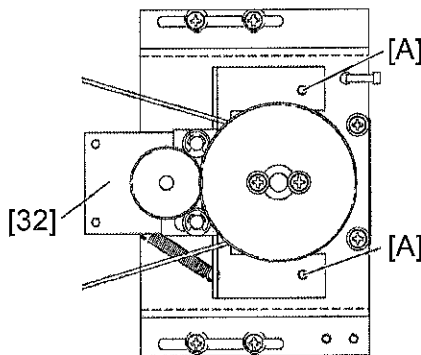


- 3 Remove the J5 connector [30] of the CPU circuit board (XE21-05\*) and remove the 2 clamps [31] fixing the wiring in the arm.

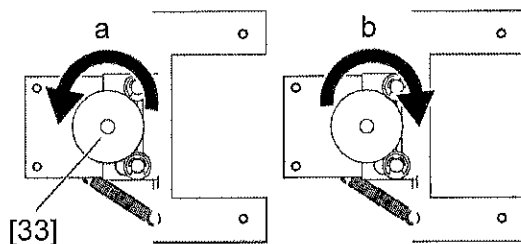
**NOTE :** When disconnecting connectors, be careful not to break the wires or bend the connector pins.

**AddInfo.:** For equipment with Cephalometric, remove the motor drive circuit board (XE20-04\*) and the sensor connecting control circuit board (XE23-02\*).

If using panoramic imaging, remove the sensor connecting control circuit board (XE23-02\*).



- 4 Remove the 2 semi screws for 3 points [A] (M4 x 8 mm) and replace the potentiometer [32].



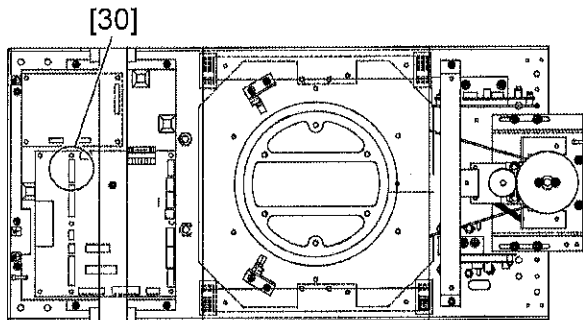
- 5 Turn the spur gear [33] counter-clockwise (as "a") until it makes contact and then one turn clockwise. Mount the potentiometer [32] at the "b" position.

- 6 After replacing the potentiometer, be sure to perform "5.7.2 Potentiometer adjustment" and "5.7.3 Operation check following potentiometer replacement".
- 7 When the checks and adjustments of step 6 have been completed, mount the arm bottom cover, arm top cover B and the sensor upper rear surface cover.

### \* Caution

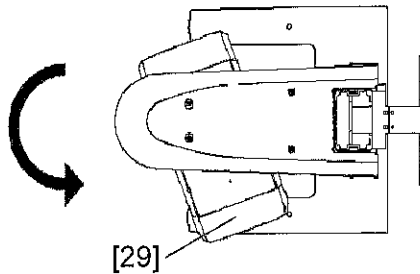
- When replacing the potentiometer, be careful not to damage the timing belt.

## 5.6.2 Potentiometer adjustment



- 1 Remove the J5 connector [30] of the CPU circuit board (XE21-05\*).

**NOTE :** When disconnecting connectors, be careful not to break the wires or bend the connector pins.

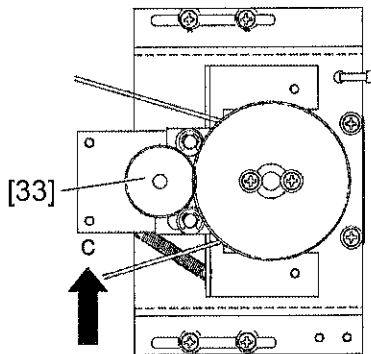


- 2 Turn the arm unit [29] in the direction of the arrow and move until it makes contact.

### \* Caution

- When turning the arm, be careful that the chin rest and the sensor do not come in contact with each other.

- 3 Measure resistance between the No. 2 (W) and No. 3 (BK) connector pins of the potentiometer wire harness (XP63W30000008\*) by the tester. Check if resistance is within the following range when the arm is at the position mentioned in step 2.  
Potentiometer resistance value:  $1800 \Omega \pm 10 \Omega$

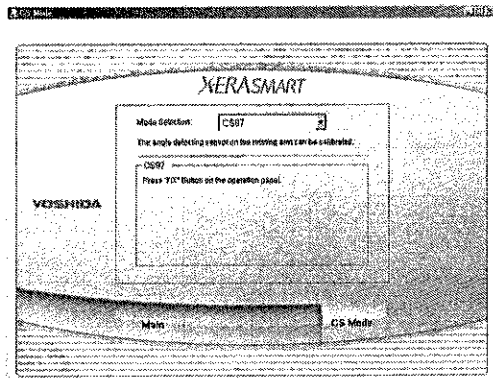


- 4 If the resistance values are not within the range, press to the "c" position, release the gear mesh and turn the spur gear [33].  
Make the gears mesh again at the position where the resistance is within the specified range.

Apply grease on the spur gears.  
"MOLYKTE (R) EM-50L GREASE"

- 5 Turn the PC power switch ON and launch the CS mode.

**REF. :** Refer to "8.7.1 CS mode setting" of "8.7 CS Mode" of "8. Software" on how to launch the CS mode.



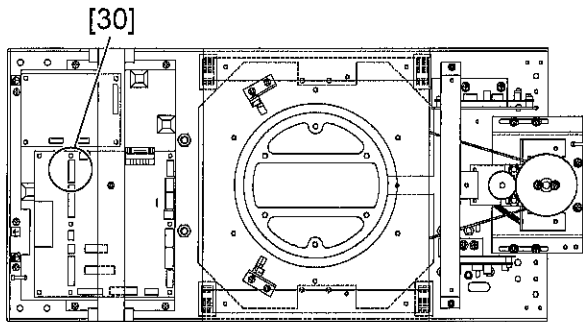
- 6 Select CS97 with the pulldown menu and perform gear calibration of the potentiometer.

REF. : For details concerning the CS mode, refer to "8.7 CS Mode" of "8. Software".

### 5.6.3 Operation check following potentiometer replacement

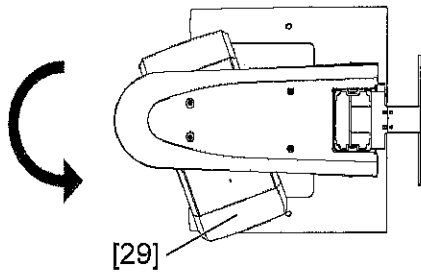
- 1 Perform (5) and (11) of "7.2 Main unit operation check items" of "7. Operation Check".

## 5.7.2 Potentiometer adjustment



- 1 Remove the J5 connector [30] of the CPU circuit board (XE21-05\*).

**NOTE :** When disconnecting connectors, be careful not to break the wires or bend the connector pins.



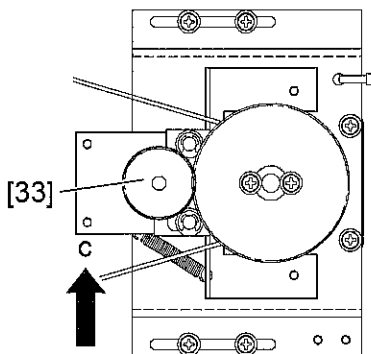
- 2 Turn the arm unit [29] in the direction of the arrow and move until it makes contact.

### ⚠ Caution

- When turning the arm, be careful that the chin rest and the sensor do not come in contact with each other.

- 3 Measure resistance between the No. 2 (W) and No. 3 (BK) connector pins of the potentiometer wire harness (XP63W30000008\*) by the tester. Check if resistance is within the following range when the arm is at the position mentioned in step 2.

Potentiometer resistance value:  $1800 \Omega \pm 10 \Omega$

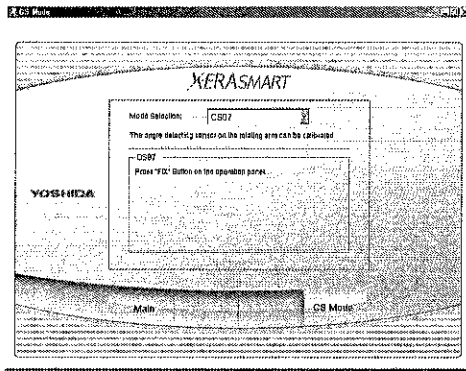


- 4 If the resistance values are not within the range, press to the "c" position, release the gear mesh and turn the spur gear [33].  
Make the gears mesh again at the position where the resistance is within the specified range.

Apply grease on the spur gears.  
"MOLYKTE (R) EM-50L GREASE"

- 5 Turn the PC power switch ON and launch the CS mode.

**REF. :** Refer to "8.7.1 CS mode setting" of "8.7 CS Mode" of "8. Software" on how to launch the CS mode.



- 6 Select CS97 with the pulldown menu and perform gear calibration of the potentiometer.

REF. : For details concerning the CS mode, refer to "8.7 CS Mode" of "8. Software".

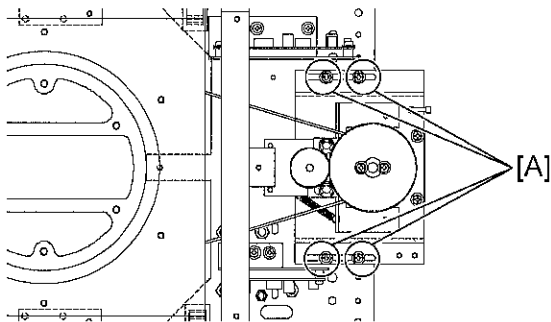
### 5.7.3 Operation check following potentiometer replacement

- 1 Perform (5) and (11) of "7.2 Main unit operation check items" of "7. Operation Check".

## 5.8 $\theta$ shaft motor replacement

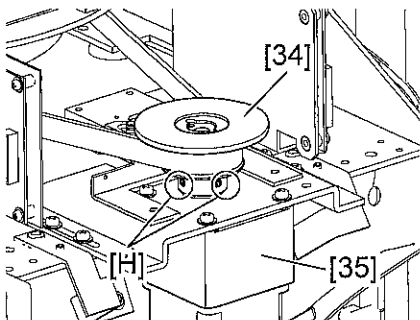
### 5.8.1 $\theta$ shaft motor replacement

- 1 Remove the sensor upper rear surface cover.

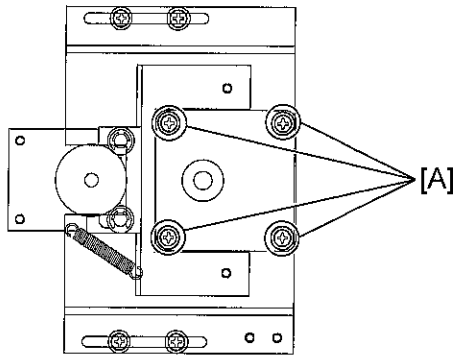


- 2 Loosen the 4 screws for 3 points [A] (M4 x 12 mm) fixing the motor mounting plate and remove the tension from the timing belt.

Add Info. : For equipment with Cephalometric, remove the motor drive circuit board (XE20-04\*) or the sensor connecting control circuit board (XE23-02\*).



- 3 Loosen the 2 set screws [H] (M4 x 6 mm) fixing the timing pulley (small) [34] and remove the timing pulley (small) [34] from the  $\theta$  shaft motor [35].



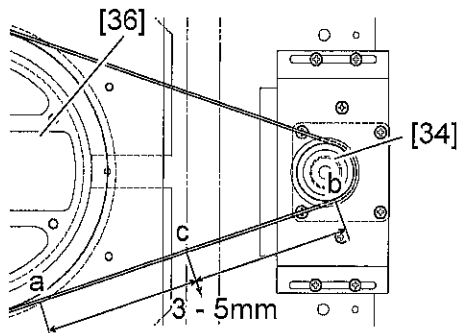
- 4** Remove the connector connected to the  $\theta$  shaft motor, remove the 4 sems screws for 3 points [A] (M4 x 12 mm) and replace the  $\theta$  shaft motor.

**NOTE :** When disconnecting connectors, be careful not to break the wires or bend the connector pins.

- 5** To mount, perform the procedure in reverse. When mounting the timing pulley (small), apply screw lock "three-bond 1401" on the 2 set screws. Temporarily fix the  $\theta$  shaft motor with 4 sems screws for 3 points.
- 6** After adjusting the tension of the timing belt in accordance with "5.8.2 Timing belt / potentiometer adjustment", fully tighten the 4 sems screws for 3 points [A] (M4 x 12 mm) and connect the connector. After adjustment, be sure to perform "5.8.3 Operation check after  $\theta$  shaft motor replacement".
- 7** When the checks and adjustments of step 6 have been completed, mount the sensor upper rear surface cover.

## 5.8.2 Timing belt / potentiometer adjustment

### Timing belt adjustment



- 1** Make sure there is 3 to 5 mm of slack when approximately 500 gf of perpendicular pressure is applied at position "a" in the timing pulley (large) [36], at position "b" in the timing pulley (small) [34] and at position "c" between position "a" and position "b".

**Add Info. :** For equipment with Cephalometric, remove the motor drive circuit board (XE20-04\*) or the sensor connecting control circuit board (XE23-02\*).

### ⚠ Caution

- If the belt tension is too slight, it may fall of the gear teeth.
- If the belt tension is too tight, it may produce a strange sound.

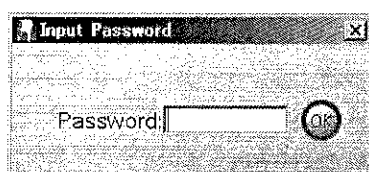
## 8.7 CS Mode

You can easily check operation during repair and maintenance using the CS mode.

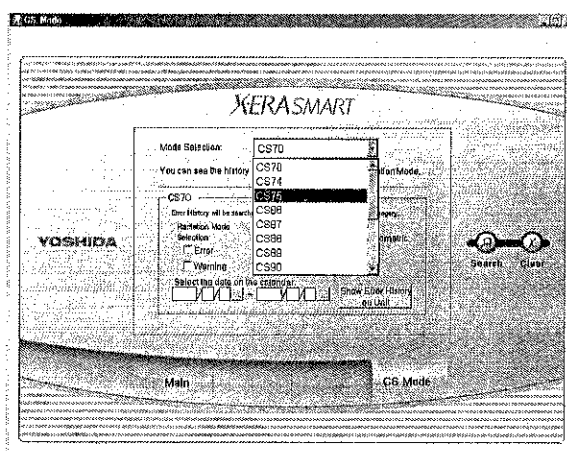
### ⚠ Warning

- Because there is danger of unintentional exposure, you should get a good understanding of the CS mode before attempting to utilize it. (In the case of X-ray irradiation other than for X-ray beam adjustment and image acquisition, mount lead to panoramic slit and cephalometric slit on the X-ray tube head assembly.) The CS mode should not be used by the user under any circumstances.

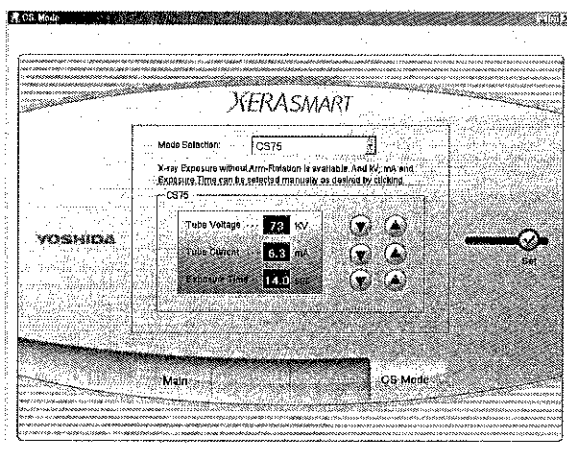
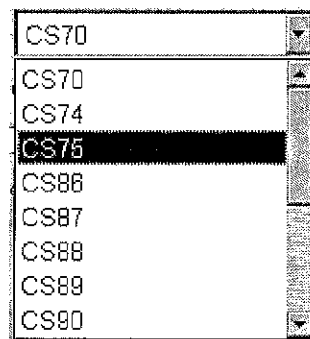
### 8.7.1 CS mode setting



- 1 Launch Control Manager. Click the "Setup" tab while pressing the shift key, the "Input Password" window is displayed. Input the password "p18p18".

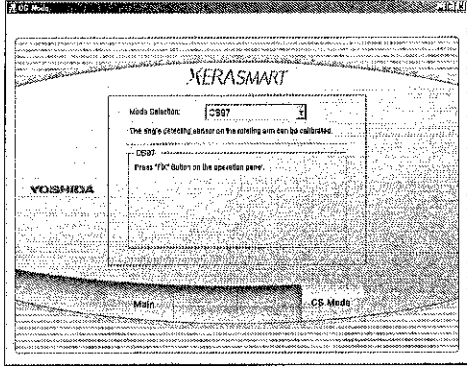
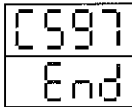


- 2 The screen then switches to the CS mode screen. Click [▼] of the pulldown menu and the list is displayed so you can select the function you want to use.



- 3 The screen of the selected function is then displayed and a simple description of operation is displayed. Operate in accordance with the description.



	Contents	Usage
CS97	Perform calibration of the potentiometer.	<p>1. Select CS97 with the pulldown menu.</p>  <p>2. Start calibration by pressing the FIX switch of the control panel. Reset the arm and rotate 240 degrees toward calibration. Angle counter value is displayed on the screen. Pressing the RESET switch of control panel interrupts the process.</p> <p>3. Rotate the arm 240 degrees; calibration is complete when the control panel appears as follows.</p>  <p>4. Quit the CS mode. Perform (5) and (11) of "7.2 Main unit operation check items". Make sure the arm is operating properly.</p>

## 7.2 Main unit operation check items

Item		Work description	Determination/performance criteria
(1)	Sliding body elevation check	Press UP switch of control panel.	Sliding body rises and stops at highest level position.
(2)		Press DOWN switch of control panel.	Sliding body lowers and stops at lowest level position.
(3)	Positioning beams operation check	Press BEAM switch of control panel.	Midsagittal vertical beam, Frankfurt horizontal beam and Canine position beam light and illuminate prescribed position.
(4)		Press BEAM switch when positioning beams light.	Midsagittal vertical beam, Frankfurt horizontal beam and Canine position beam are extinguished.
(5)	Arm unit operation check	Press RESET switch of control panel in exposure mode other than cephalometric exposure.	Arm unit moves to Start/reset position.
*(6)		Press RESET switch of control panel in cephalometric exposure mode.	Arm unit moves to cephalometric exposure position.
(7)		Press BEAM switch of control panel.	Arm unit moves to patient positioning position.
(8)		Press and hold RESET switch of control panel (3 sec).	Arm unit moves to sensor detachment position.
(9)		Press FWD switch of control panel to position.	While switch is pressed, arm unit moved forward (toward column unit) and stops when the switch is released.
(10)		Press BACK switch of control panel to position.	While switch is pressed, arm unit moves backward (away from column unit) and stops when the switch is released.
(11)		Set to test mode, and after setting to exposure mode other than cephalometric exposure, press and hold the X-ray exposure switch (hand switch).	Arm unit moves from exposure start position to exposure complete position.
(12)	Control panel operation check	Press the MODE switch.	Mode is switched and LED of the selected mode lights.
(13)		Press the SELECT switch.	Mode is toggled between "Auto" and "Manual", and LED of the selected mode lights.
(14)		Press FIX switch when Manual is selected.	Each time switch is pressed, switches from Tube voltage --> Tube current --> Exposure time in sequence.
(15)		To alter parameters when Manual is selected, press the + or - switches.	Pressing the + switch increments the selected setting 1 step, and pressing the - switch lowers it 1 step.
(16)		Press and hold the SELECT and FIX switches simultaneously.	Switches to test mode. The tube voltage and tube current values displayed on the indicator section become "-".
(17)	Head support open/close check	Grip the lateral head support and forehead support by the base and slide.	If exposure is in Auto mode, moves smoothly and exposure conditions vary according to width of lateral head support.

7. Operation Check

Item		Work description	Determination/performance criteria
(18)	Sensor knob operation check	Mount sensor on docking station and turn knob.	When locked, the sensor cannot be removed; when unlocked the sensor can be removed from docking station.
*	(19) Ear rod / nose support open/close check	Grip the base of the ear rod and nose support and slide.	Moves smoothly.
*	(20) Ear rod / nose support rotation check	Rotate the ear rod and nose support to the LA exposure position and PA exposure position.	Moves smoothly and is fixed at LA and PA positions.
	(21) Panoramic sensor check	Check by mechanical alignment.	Left/right, up/down positions are correctly adjusted.
*	(22) For cephalometric sensor	Check by mechanical alignment.	Left/right, up/down positions are correctly adjusted.
*	(23)	Select cephalometric exposure mode and press RESET switch of control panel.	Electric collimator operates and cephalometric slit position moves before exposure port.
*	(24) Electric collimator operation check	Select exposure mode other than cephalometric exposure mode and press RESET switch of control panel.	Electric collimator operates and panoramic slit position moves before exposure port.
*	(25)	Set to test mode, and after setting to cephalometric exposure mode, press and hold the X-ray exposure switch (hand switch).	Electric collimator moves smoothly during exposure.
*	(26) Cephalometric unit docking station and second slit operation check	Set to test mode, and after setting to cephalometric exposure mode, press and hold the X-ray exposure switch (hand switch).	Cephalometric unit docking station and second slit operate smoothly during exposure.
	(27)	Set to Panoramic exposure mode, mount Installation phantom on the chin rest and expose.	Arm unit operates only while the X-ray exposure switch (hand switch) is pressed; "X-ray" lamp of hand switch box and driving unit indicator light. Buzzer of control panel and hand switch box intermittently sounds during X-ray exposure. When exposure is complete, image is displayed correctly on PC.
*	(28) Exposure operation check	Set to cephalometric exposure mode (LA) and perform exposure with ear rod and nose support at LA position.	Electric collimator, cephalometric unit sensor and second slit operate only while the X-ray exposure switch (hand switch) is pressed; "X-ray" lamp of hand switch box and driving unit indicator light. Buzzer of control panel and hand switch box intermittently sounds during X-ray exposure. When exposure is complete, image is displayed correctly on PC.

\*For equipment with Cephalometric