

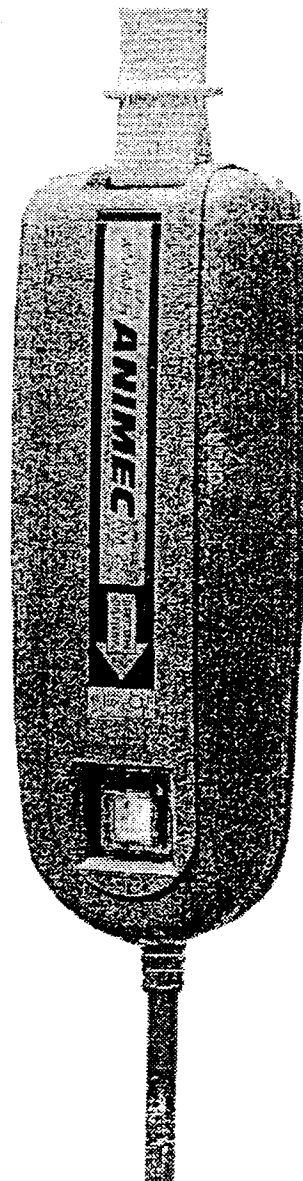
ELLTEC

BLOOD/INFUSION WARMER

ANIMEC

TYPE **AM-2S**

SERVICE MANUAL





AM-2S SERVICE MANUAL

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1. BE SUER TO OBSERVE THE INSTRUCTIONS.

1-1

To avoid possible accident when misused, this service manual shows the instructions with the safety alert symbols.



DANGER

: indicates an imminently hazardous situation which, if disregarded and misused, will result in causing death or serious injury to the user.



WARNING

: indicates a potentially hazardous situation which, if disregarded and misused, could result in causing death or serious injury to the user.



CAUTION

: indicates a potentially hazardous situation which, if disregarded and misused, may result in causing injury or property damage to the user.

Terms mentioned above are defined as:

Serious Injury : blindness, wound, burn (high/low temperature), electric shock, bone fracture, after effect by poisoning etc., injuries requiring hospitalization or long outpatient treatment.

Injury : wound, burn (high/low temperature), electric shock which do not require hospitalization or long treatment.

User : user of this apparatus, but it includes not only the purchaser but also the person who operates this device.

PAY ATTENTION TO THE FOLLOWINGS WHEN SERVICING AND INSPECTING.

⚠ WARNING



To avoid the risk of electric shock, unplug the power cord from the outlet before replacing the parts.

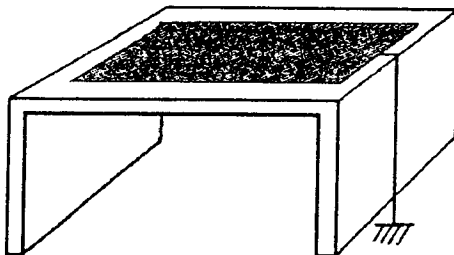


In case of the condition that access into the inside of main body is available, do not plug the power cord to the outlet.



Confirm that there is obstacle in the main body after replacing parts.

⚠ CAUTION



To avoid damaging of electric part by static electricity, be sure to ground working space.

Earth working desk, Measuring instruments, Human body.



Keep dry the device and parts. To avoid damage of the parts and defect the control circuit.



Do not repair near splashing water. To avoid damage of the parts and defect the control circuit.



Do not inspect the device in the place subject to electromagnetic wave generated from a mobile phone, wireless device and etc.

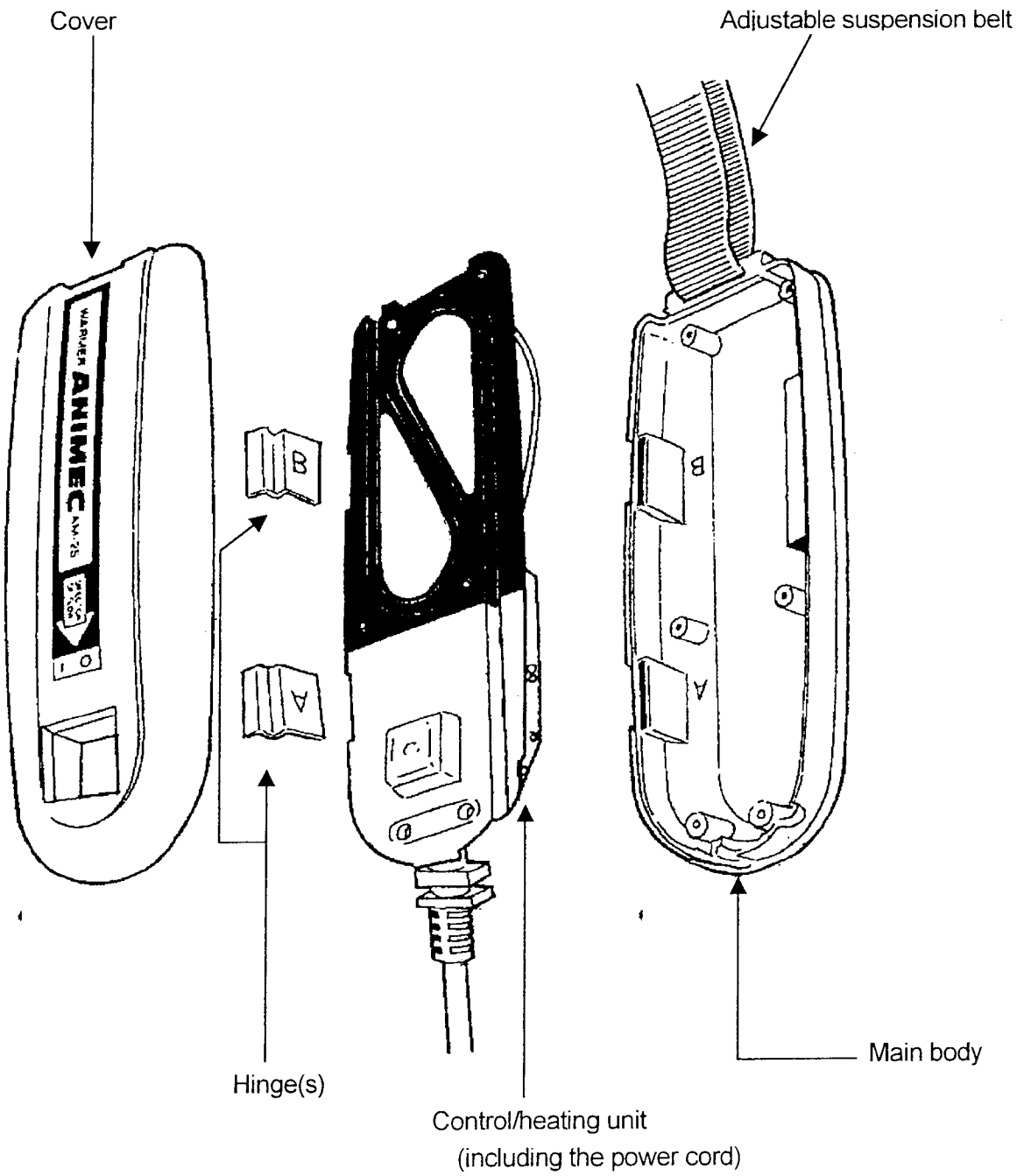


NOTICE OF STRAGE

Do not store the device and part in such the place where are affected by direct sun light.



Do not store the device and part in the place over 45°C or below -15°C.



1	Damage of the adjustable suspension belt.	Replacement the adjustable suspension belt.
2	Damage of the main body.	Replacement the main body.
3	Damage of the cover.	Replacement the cover.
4	Damage of the hinge(s).	Replacement the hinges.
5	Damage of the other parts.	Replacement the control/heating unit.

Repair Parts List

1. Adjustable Suspension Belt

2. Main body

3. Cover

4. Hinge Set

5. Control/Heating Unit for AM-2S-4A [3.0 – 4.0mm ϕ , 230V]

Control/Heating Unit for AM-2S-5A [4.1 – 5.0mm ϕ , 230V]

Control/Heating Unit for AM-2S-4B [3.0 – 4.0mm ϕ , 115V]

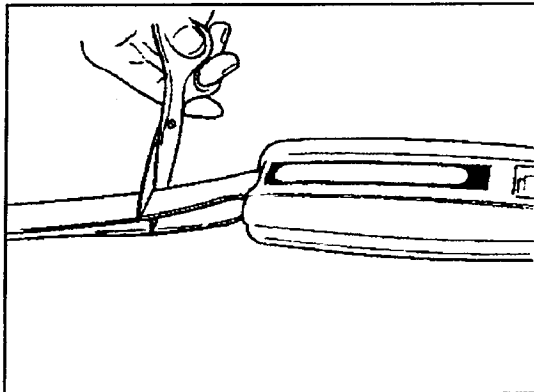
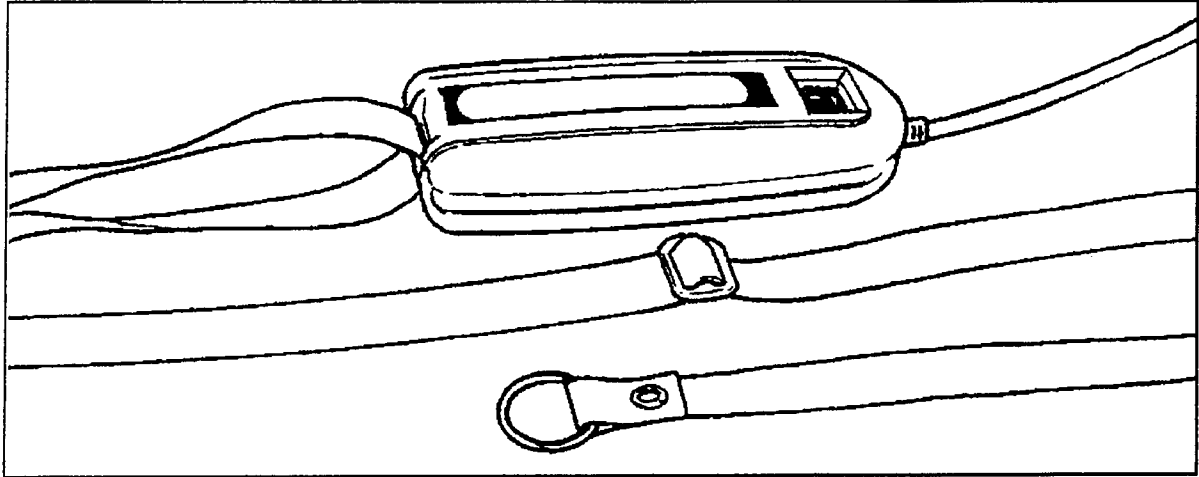
Control/Heating Unit for AM-2S-5B [4.1 – 5.0mm ϕ , 115V]

5. REPLACEMENT THE EACH PART

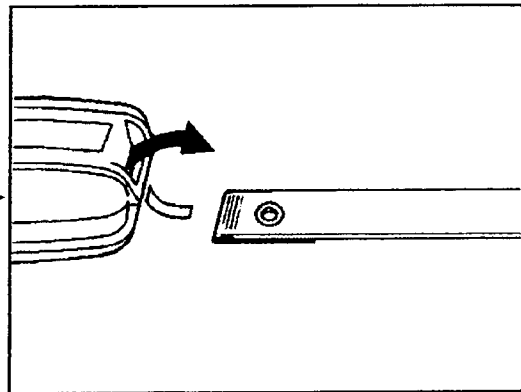
5-1-1

I. Replacement the adjustable suspension belt.

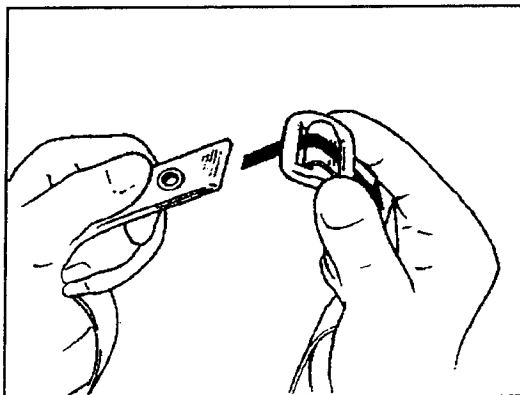
Combined adjustable suspension belt.



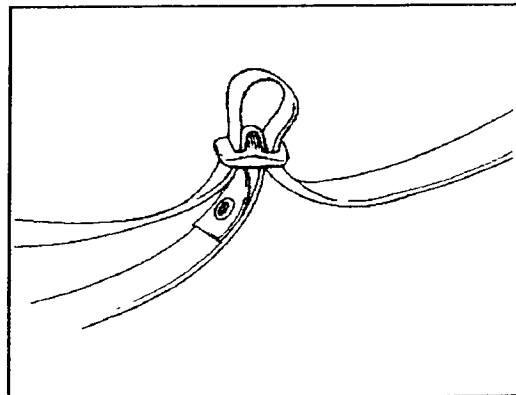
A. Cut the adjustable suspension belt, and remove it from the main body



B. Attach the new adjustable suspension belt to the main body.



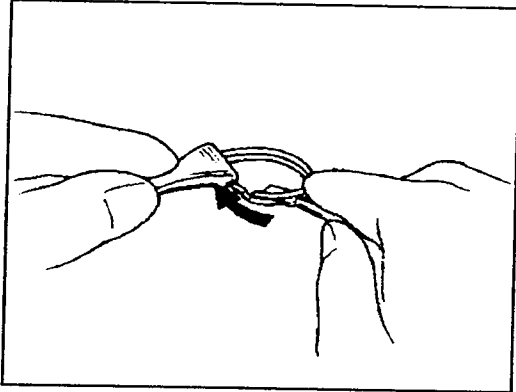
C. Put the belt through the plastic buckle.



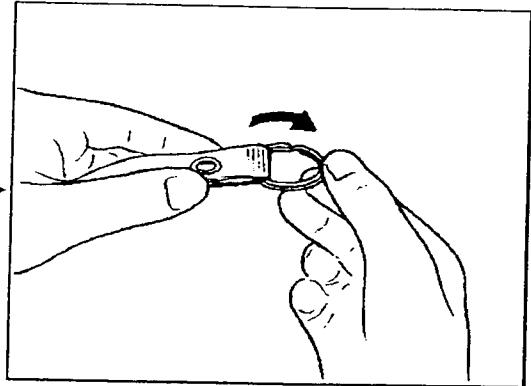
5. REPLACEMENT THE EACH PART

5-1-2

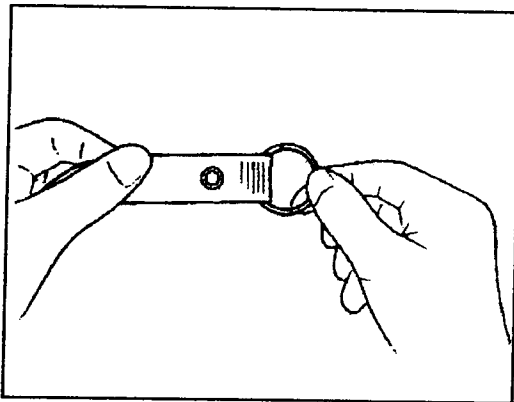
I. Replacement the adjustable suspension belt.



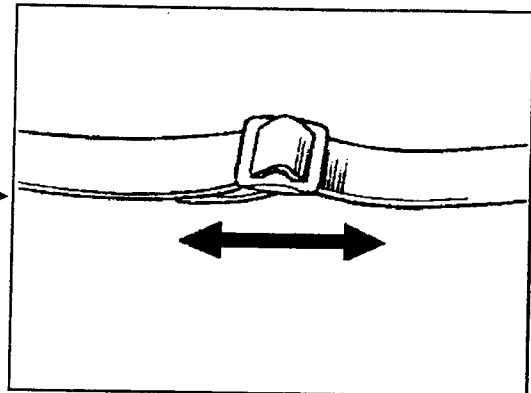
D. Put the steel ring into the loop of the belt.



E. Turn the steel ring.

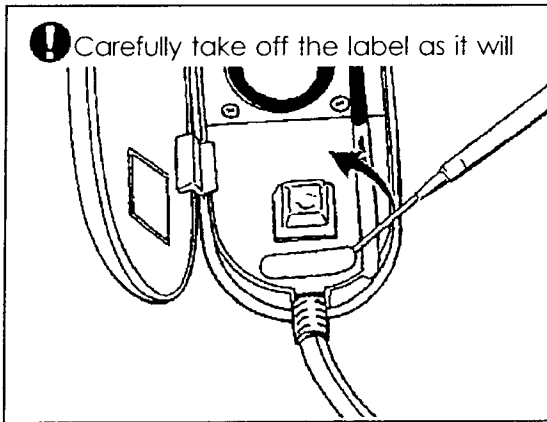


F. Confirm the steel ring is attached.

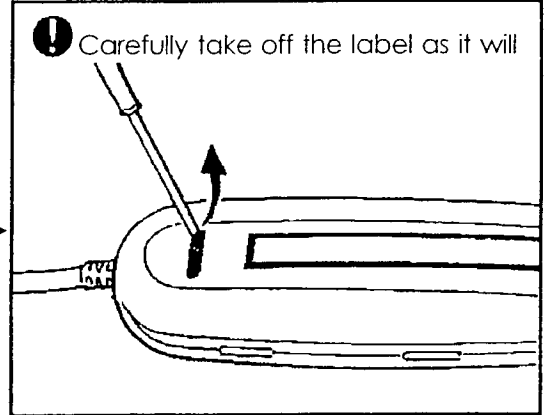


G. Confirm that the plastic part is attached firmly.

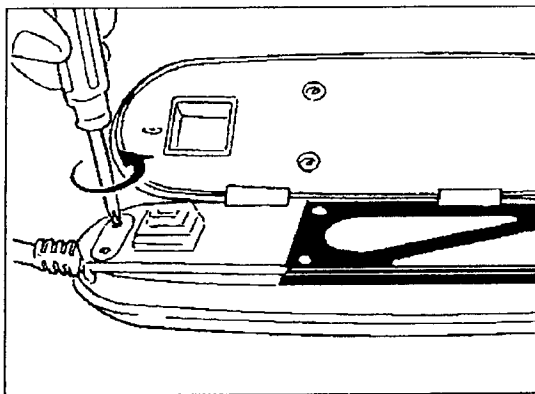
II. Replacement the main body.



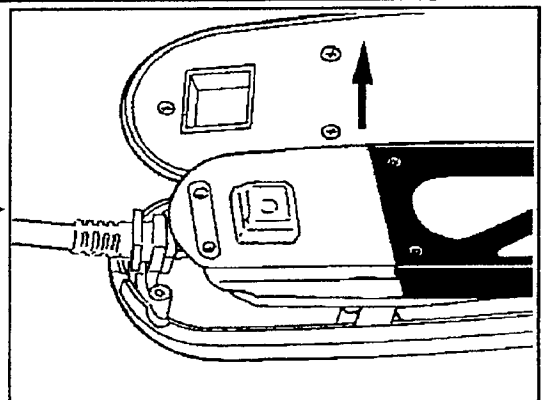
A. Open the cover and take off "I / O" label.



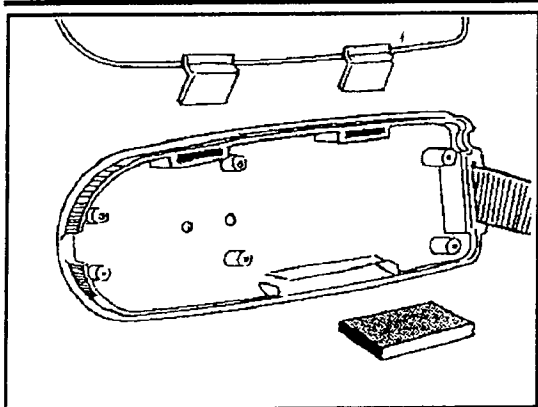
B. Take off the serial number label from the main body.



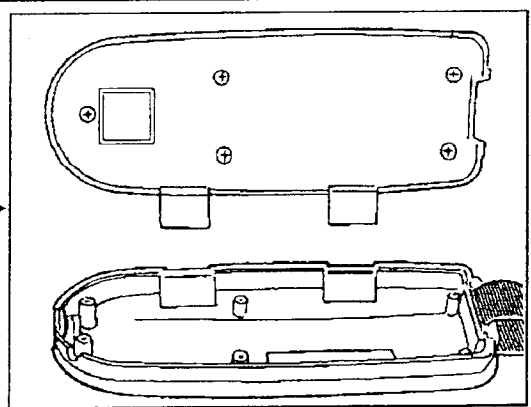
C. Take off the fixed screws from the control/heating unit.



D. Take off the control/heating unit from the main body.



E. Take off the hinges and magnet from the main body.

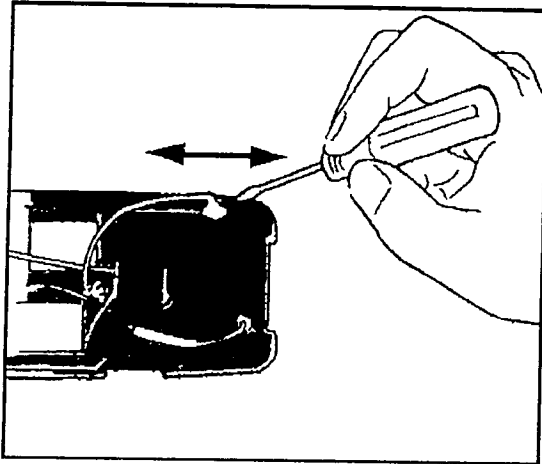


F. Attach the hinges to a new main body.

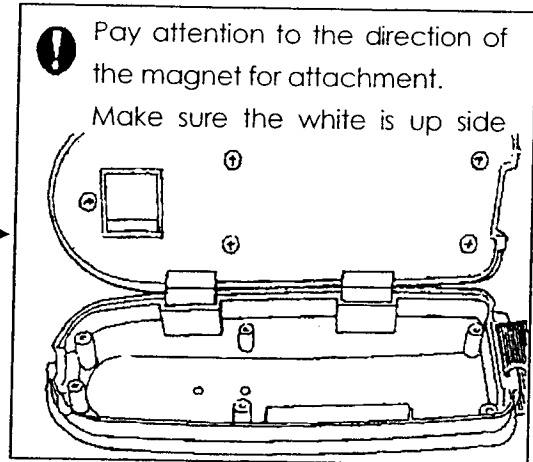
5. REPLACEMENT OF THE EACH PART

5-2-2

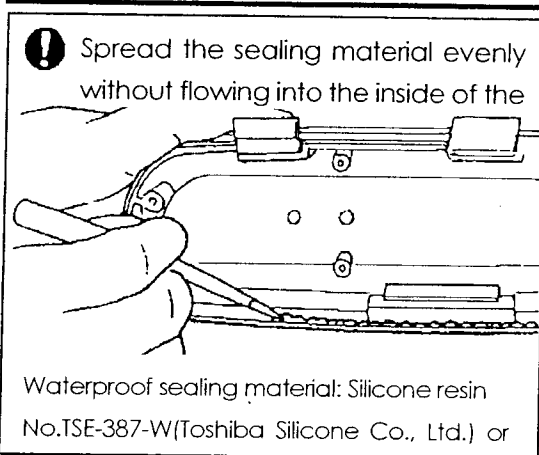
II. Replacement the main body.



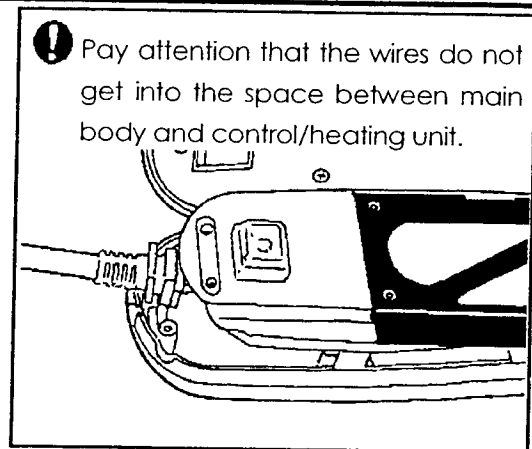
G. Take off waterproof sealing material from the control/heating unit.



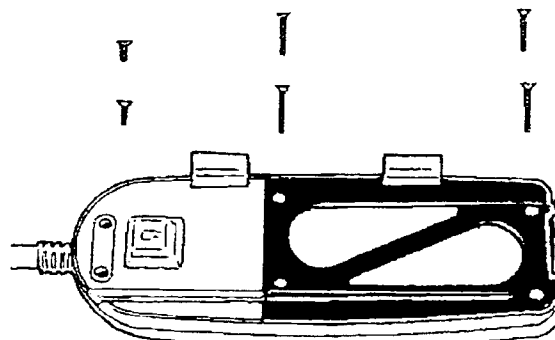
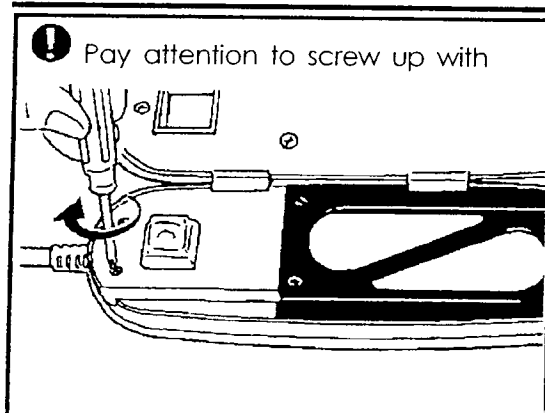
H. Attach the magnet into the new main body.



I. Apply waterproof sealing material to the new main body.



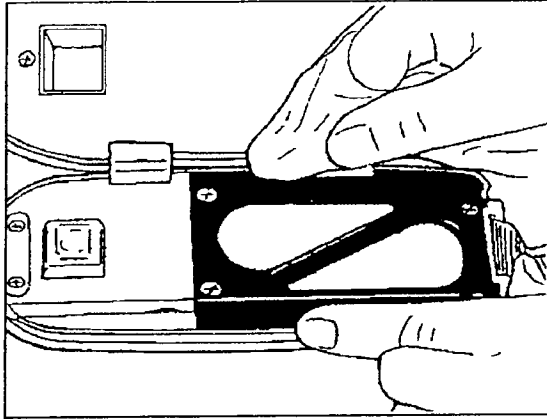
J. Attach the control/heating unit to the new main body and screw up.



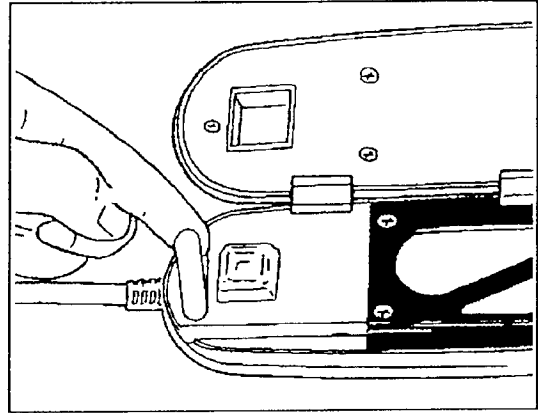
5. REPLACEMENT OF THE EACH PART

5-2-3

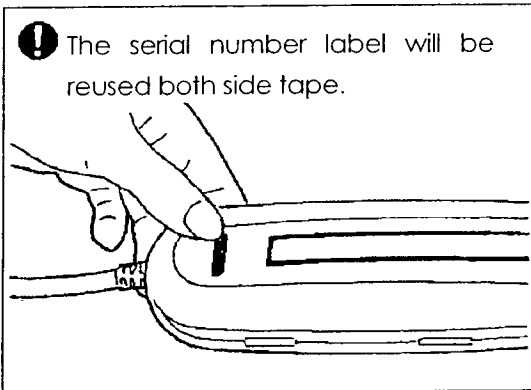
II. Replacement the main body.



❗ Wipe of the stuck out of the waterproof sealing material.



K. Stick the "| / O" label



❗ The serial number label will be reused both side tape.

L. Stick the serial number label into the new main body.

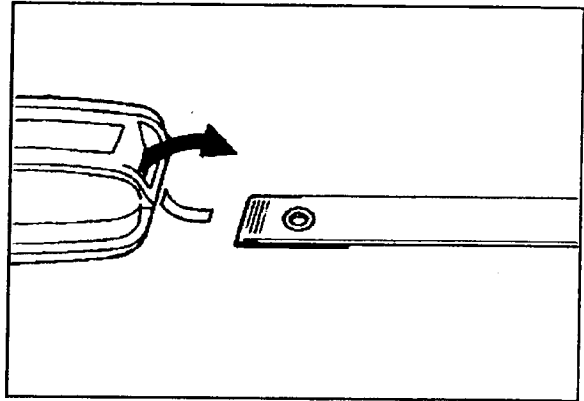
Continue to the next page.

5. REPLACEMENT OF THE EACH PART

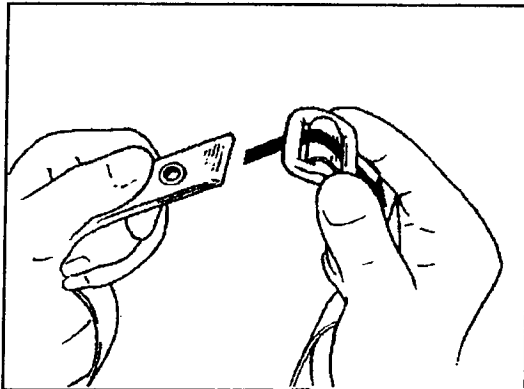
5-2-4

II. Replacement the main body.

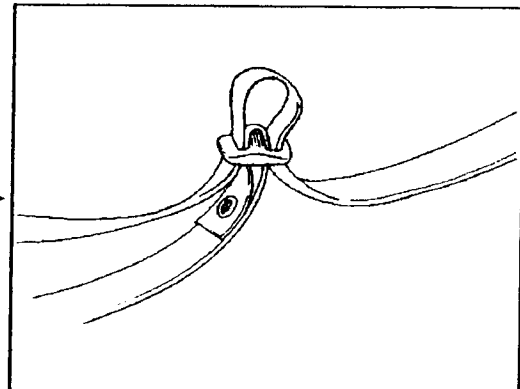
[Attach the adjustable suspension belt along with the item for the replacement adjustable suspension belt.]



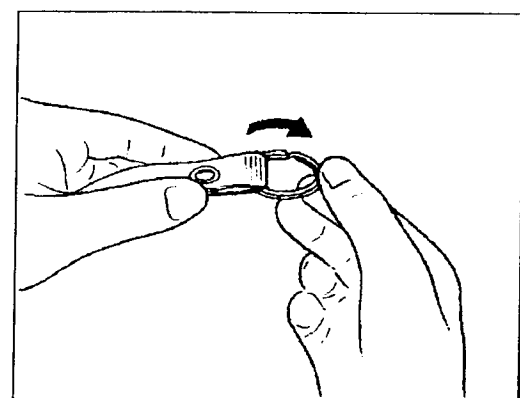
M. Attach the new adjustable suspension belt to the new main body.



N. Put the belt through the plastic buckle.

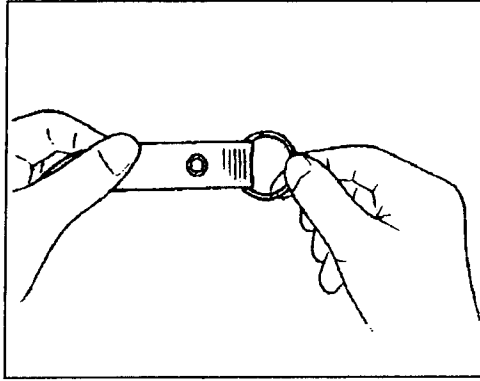


O. Put the steel ring into the loop of the belt.

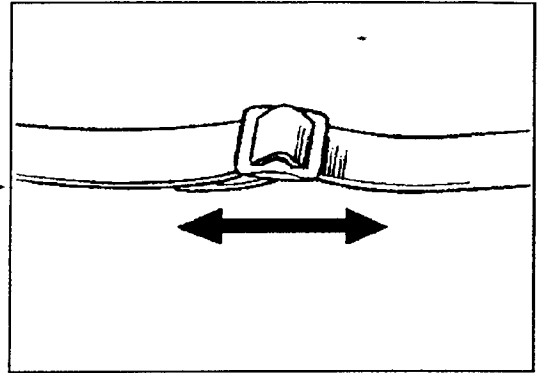


P. Turn the steel ring.

II. Replacement the main body.



Q. Confirm the steel ring is attached.

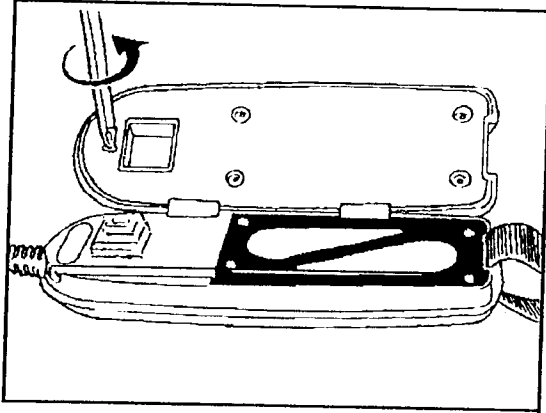


R. Confirm that the plastic part is attached firmly.

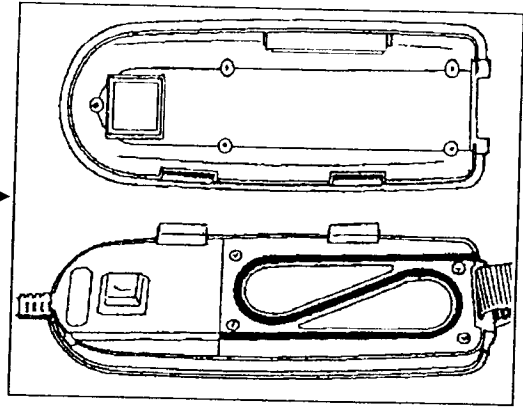
5. REPLACEMENT OF THE EACH PART

5-3-1

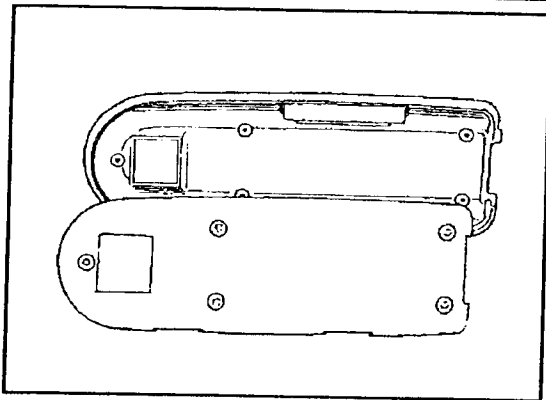
III. Replacement the cover.



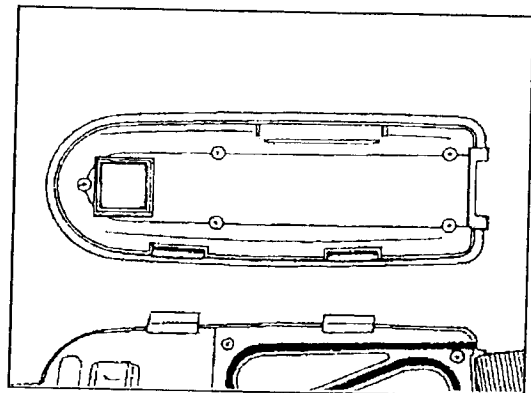
A. Screw down inside of the cover and take off the stainless board.



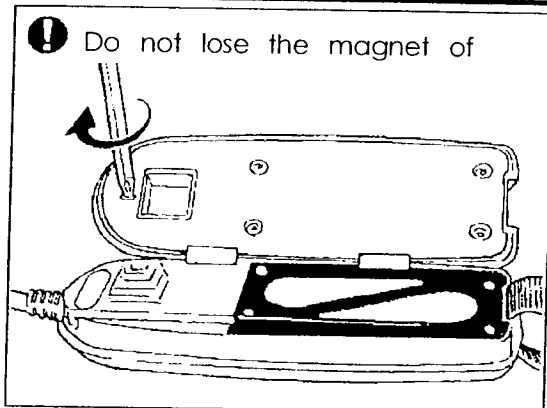
B. Take off the hinges from the cover.



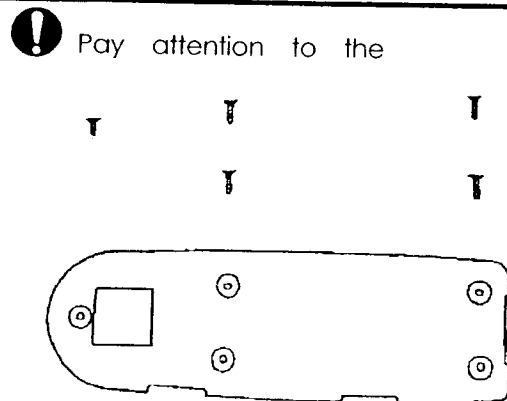
C. Screw down inside of the new cover and take off the stainless board.



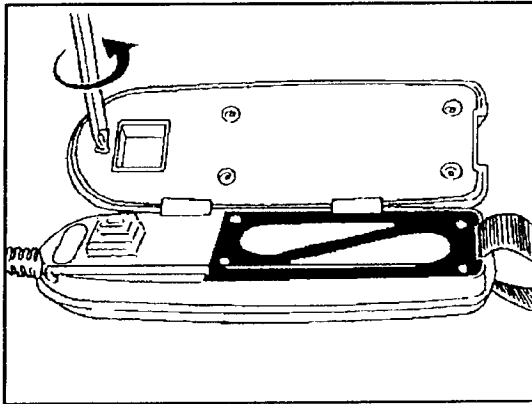
D. Attach the hinges into the new cover



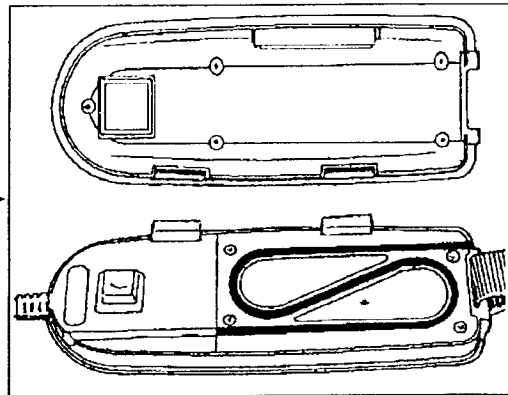
E. Attach the stainless board into the new cover and screw up.



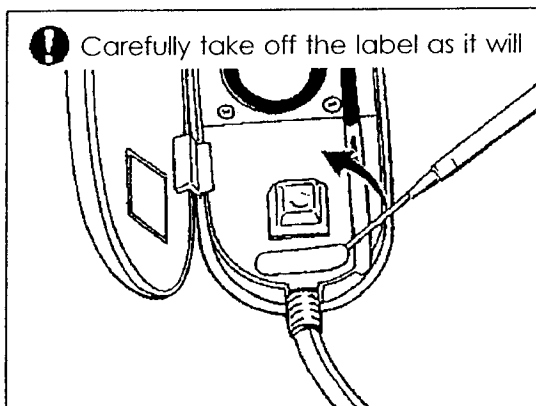
IV. Replacement the hinges.



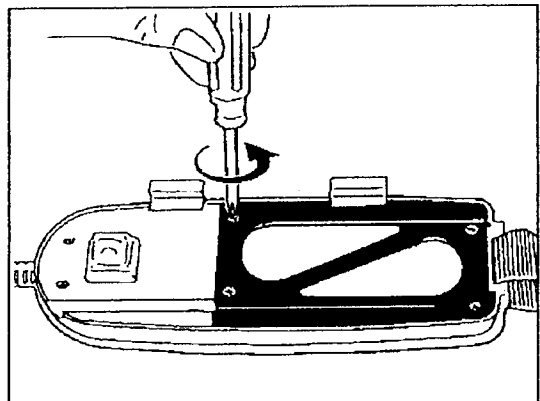
A. Screw down inside of the cover and take off the stainless board.



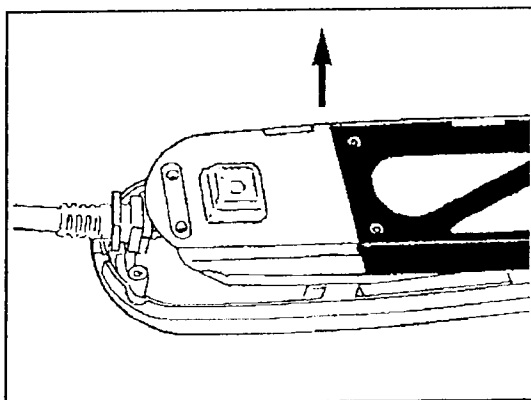
B. Take off the hinges from the cover.



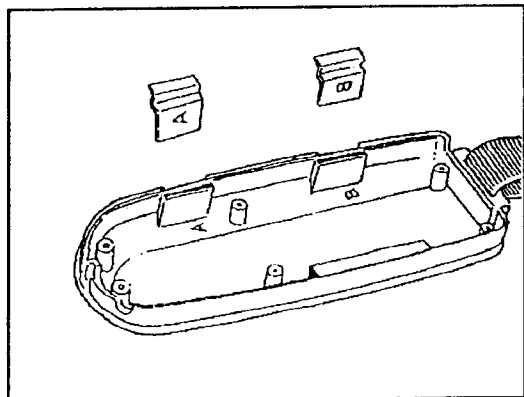
C. Take off the "| / O" label.



D. Screw down of the fixed control/heating unit.



E. Take off the control/heating unit.

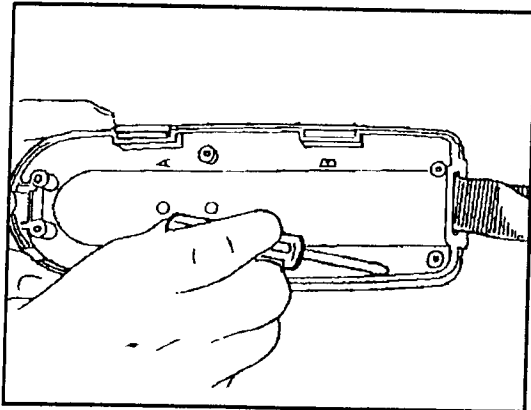


F. Take off the hinges from the main body

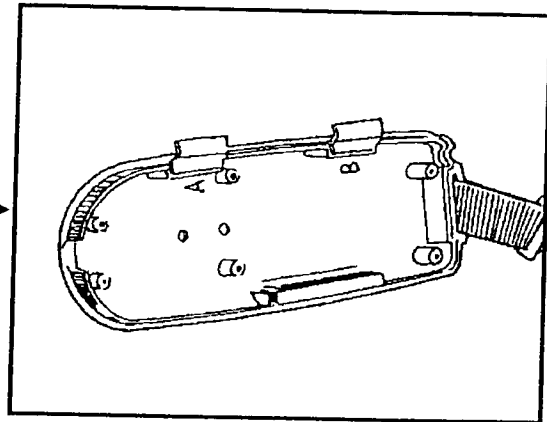
5. REPLACEMENT OF THE EACH PART

5-4-2

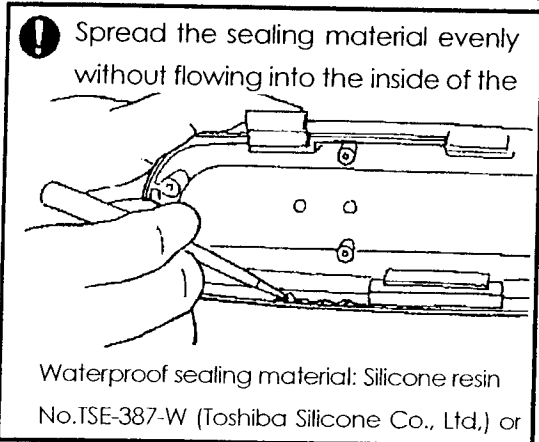
IV. Replacement the hinges.



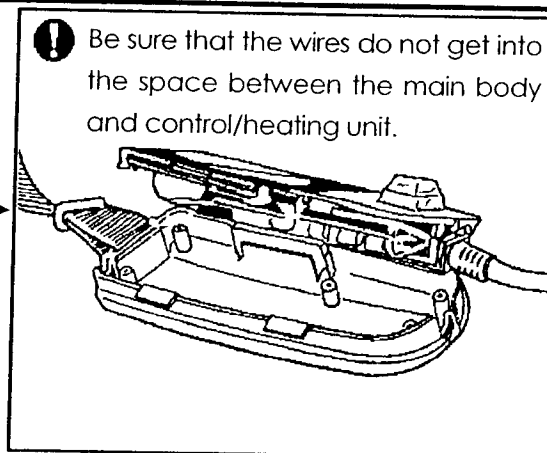
G. Wipe off the remaining waterproof sealing material on the main body and control/heating unit.



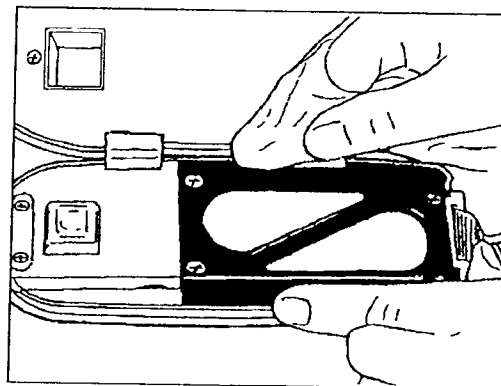
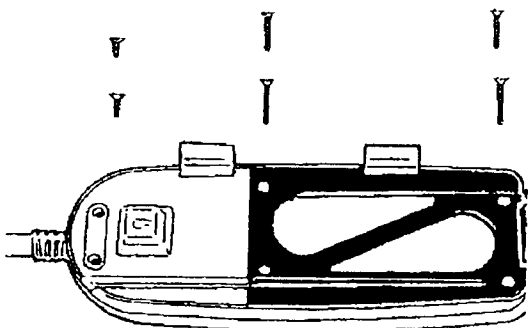
H. Attach the new hinges to the main body.



I. Spread waterproof sealing material to the main body.



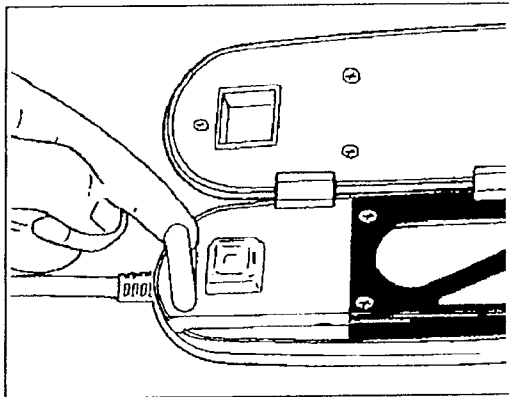
J. Attach the control/heating unit to the main body and screw up.



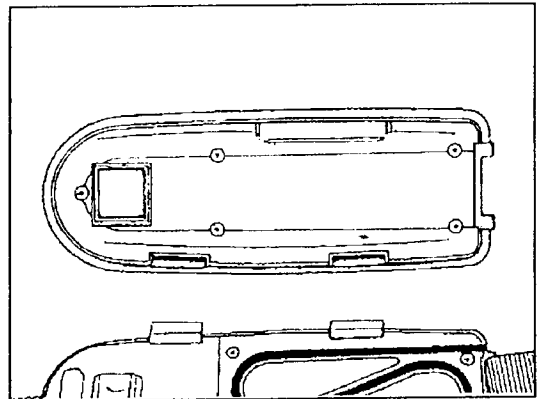
5. REPLACEMENT OF THE EACH PART

5-4-3

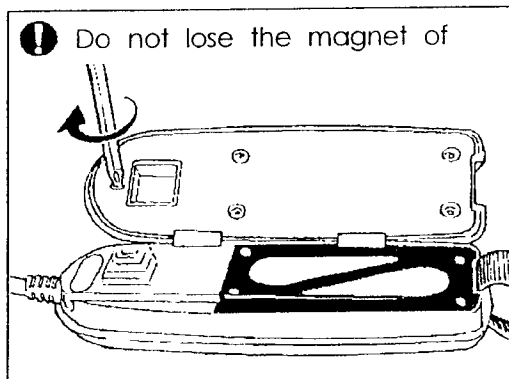
IV. Replacement the hinges.



K. Stick the "|/O" label.

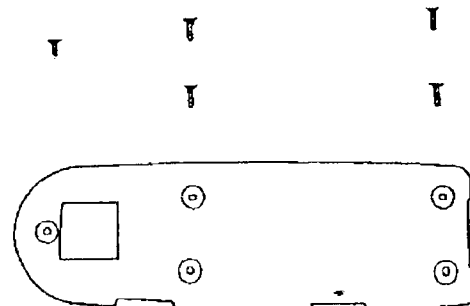


L. Attach the hinges into the cover.



M. Attach the stainless board into the cover and screw up.

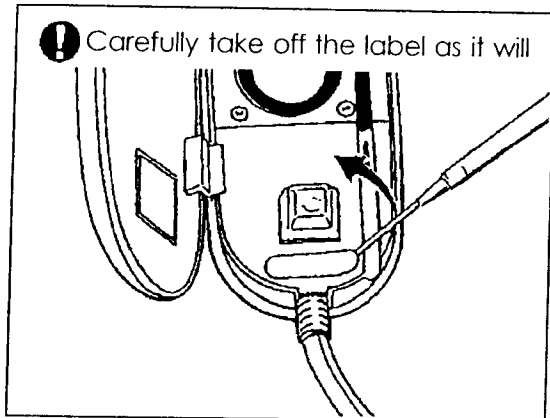
! Pay attention to the



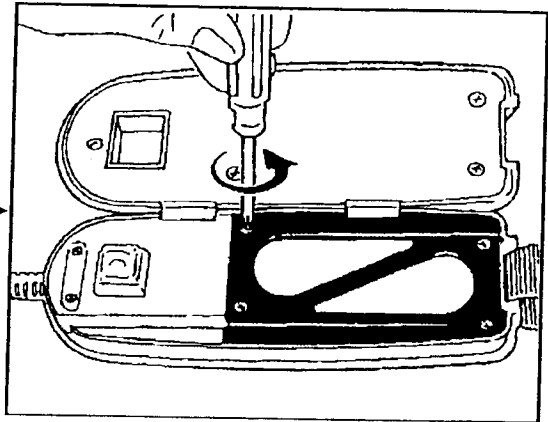
5. REPLACEMENT OF THE EACH PART

5-5-1

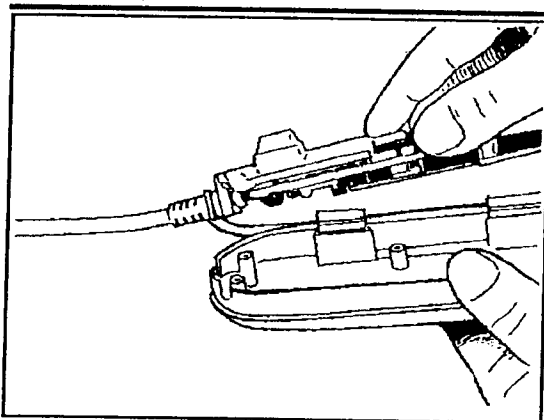
V. Replacement the control/heating unit.



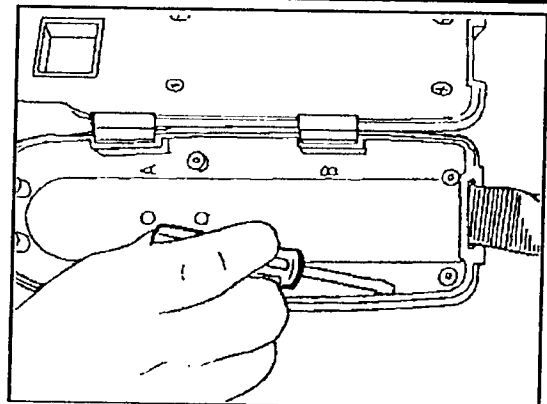
A. Open the cover and take off the "I/O" label.



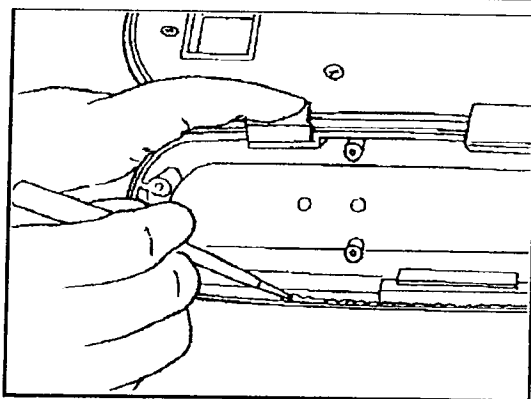
B. Take off the fixed screws from the control/heating unit.



C. Take off the control/heating unit from the main body.



D. Wipe off the remaining waterproof sealing material on the main body.



E. Spread waterproof sealing material to the main body.

! Spread the sealing material evenly without flowing into the inside of the

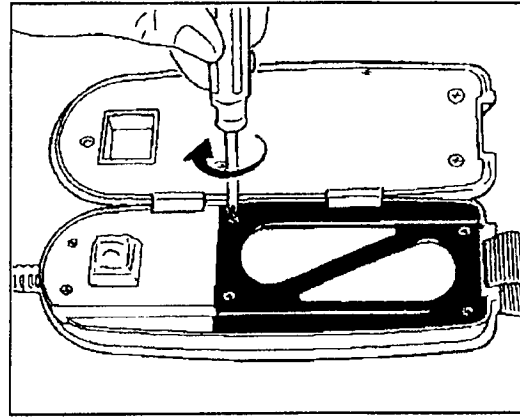
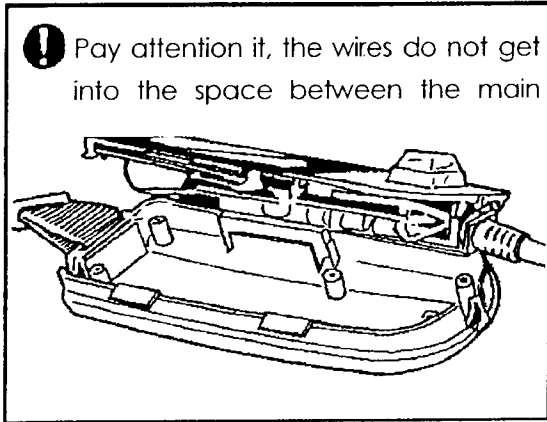
Waterproof sealing material :

No. TSE-387-W (Toshiba Silicone Co., Ltd.) or equivalent.

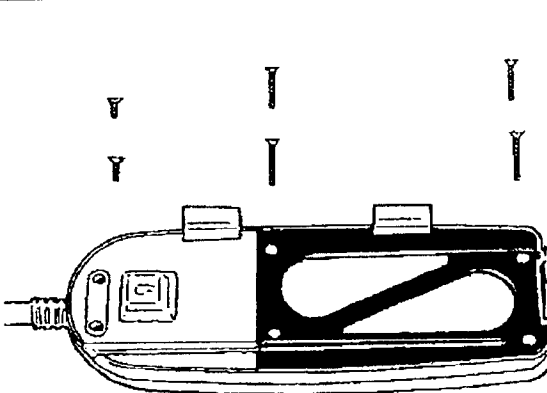
5. REPLACEMENT OF THE EACH PART

5-5-2

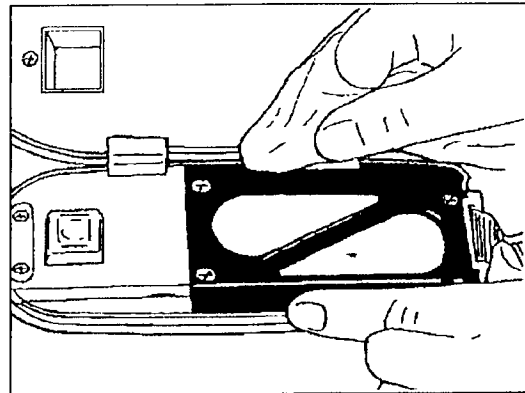
V. Replacement the control/heating unit.



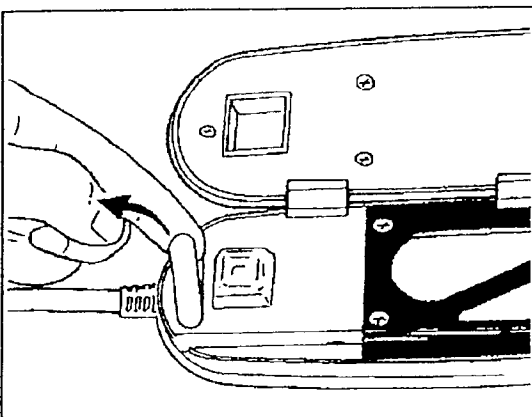
F. Attach the new control/heating unit to the main body and screw up.



! Pay attention not to screw up with wrong screw.



! Wipe of the stick out of the waterproof sealing material.



G. Stick the "I/O" label.

H. Wait until the waterproof sealing material congeal.

I. Preparation of tools and materials.

- A. Tube
 - ANIMEC AM-2S-4A/AM-2S-4B : outside diameter 3.0 – 4.0mmØ type tube
 - ANIMEC AM-2S-5A/AM-2S-5B : outside diameter 4.1 – 5.0mmØ type tube
- B. Thermo-meter and thermal sensors
- C. Infusion pump (Incase a infusion pump is not prepared, free drop is acceptable.)
- D. Stop watch (For confirmation of flow rate.)
- E. Measuring cup (For confirmation of flow rate.)

II. Positions of temperature measurement.

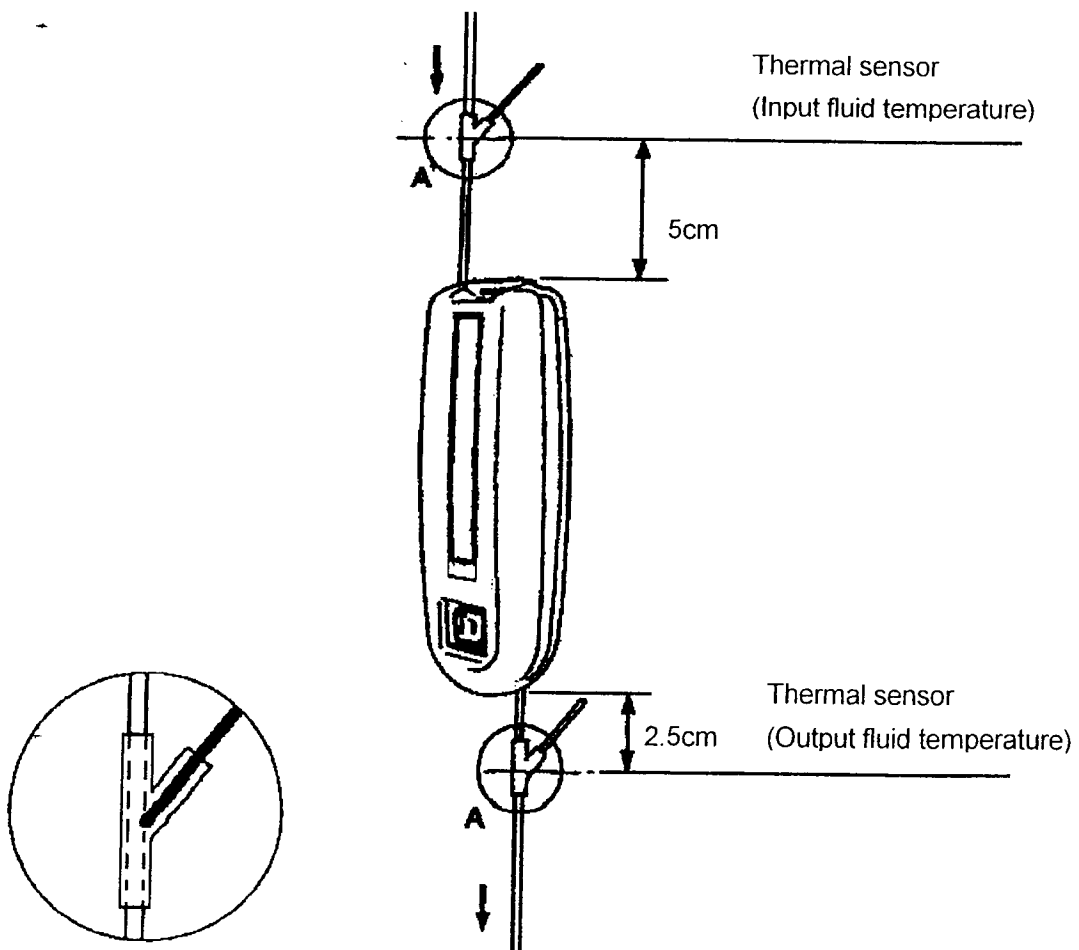


Fig. A

III. Confirmation method

A. Set the thermal sensor in the tube.



Connect the thermal sensor with thermo-meter for preparation of the temperature measurement.

B. Attach the tube fixed the thermal sensor to ANIMEC.



Position of the thermal sensors are beyond of the indicated diagram.

C. Keep the room temperature at $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$.

D. Cool water at $20^{\circ}\text{C}\pm 1^{\circ}\text{C}$ before use.

E. Pour water with the flow rate is beyond of the standard $4.5\pm 0.5\text{ml/min}$.



In case a infusion pump I not prepared, free drop is acceptable.
However, the flow rate is beyond of the standard $4.5\pm 0.5\text{ml/min}$.



Confirm the flow rate with a measurement cup.

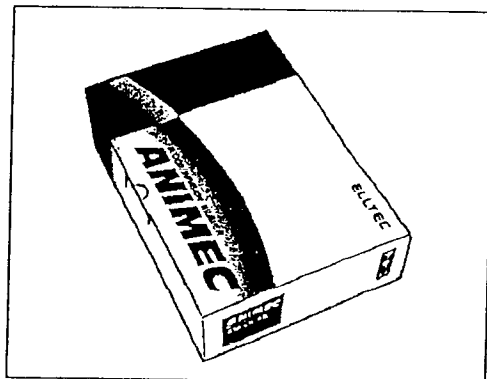
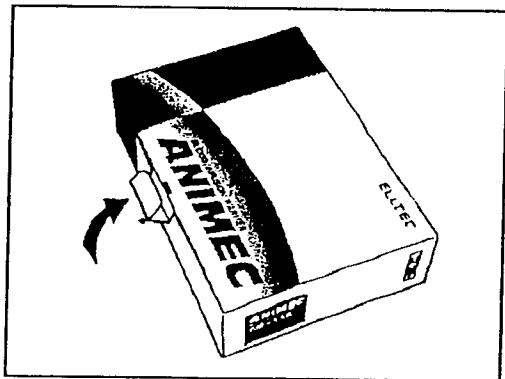
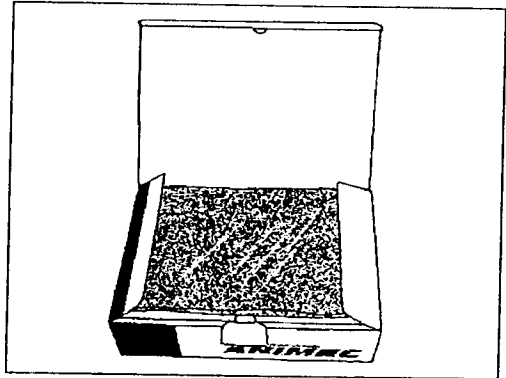
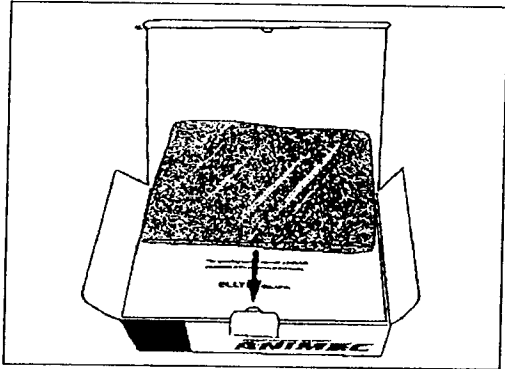
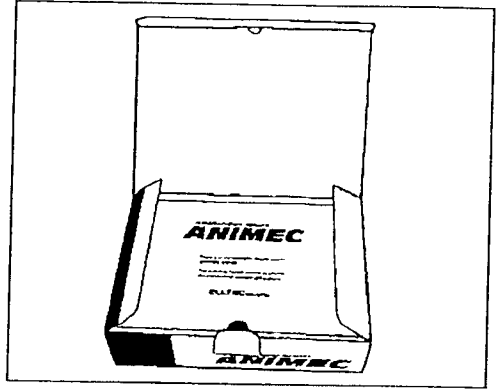
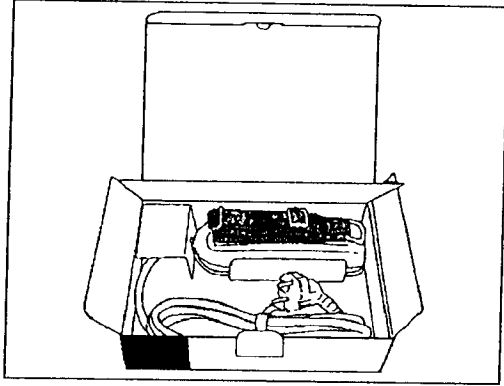
F. Turn on the power switch of ANIMEC AM-2S.

G. Confirm the temperature of warmed water.

H. No problem if the temperature of warm water is beyond of $35^{\circ}\text{C}\pm 1^{\circ}\text{C}$.

7. PACKING

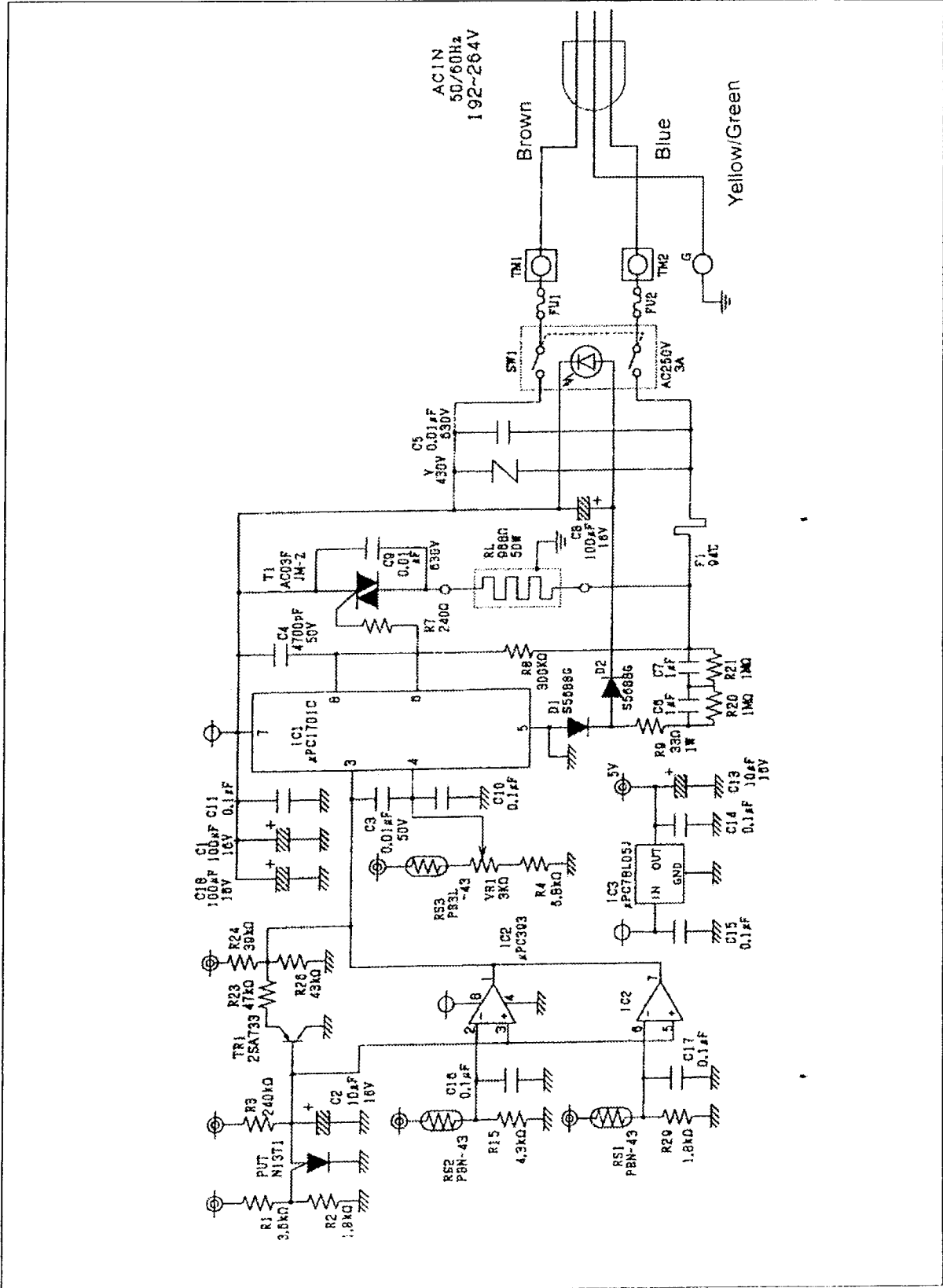
7-1



8.CIRCUIT DIAGRAM

8-1

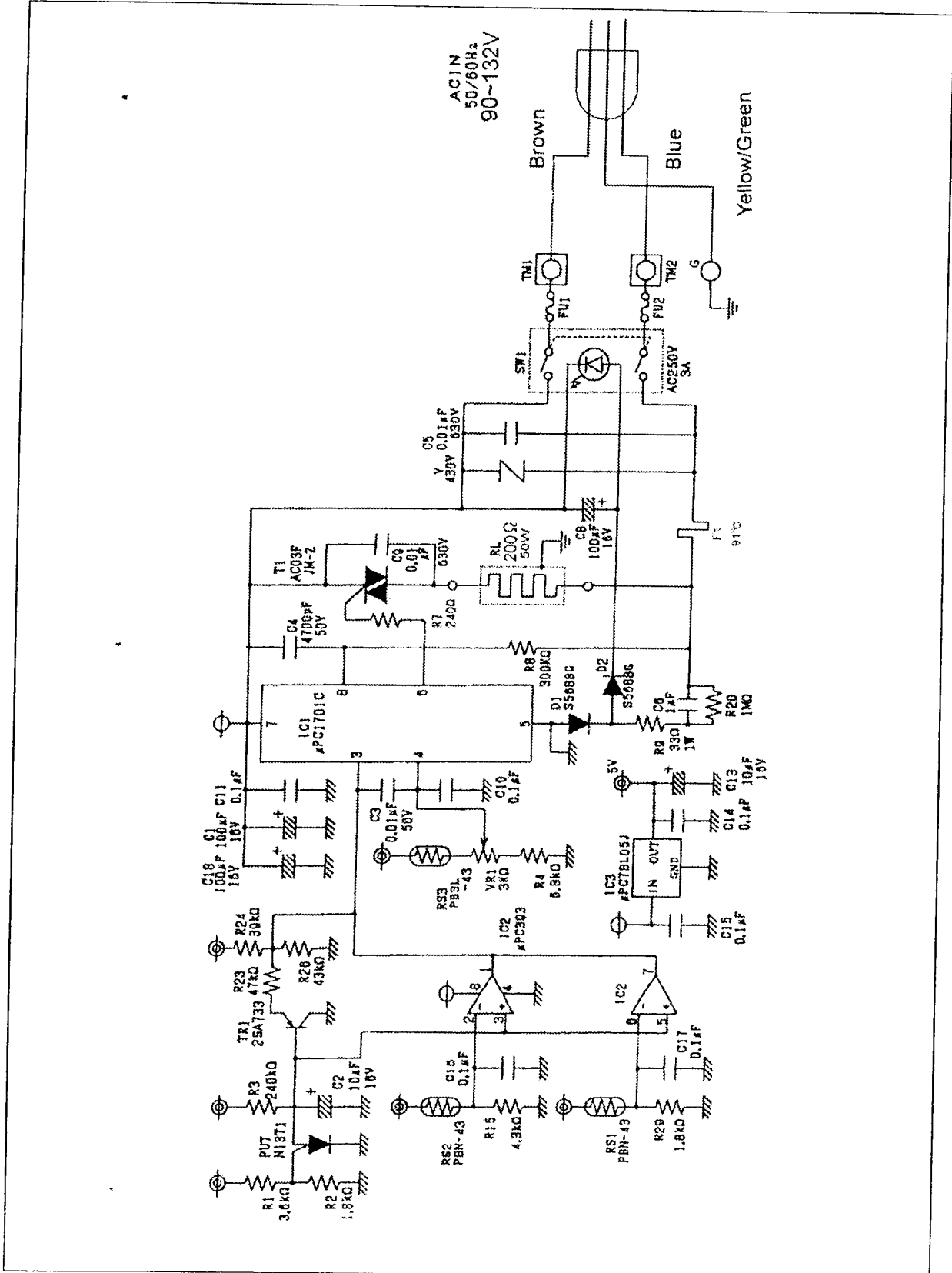
ANIMEC AM-2S-4A/ AM-2S-5A [Power requirement : 230V ~-(AC)]



8. CIRCUIT DIAGRAM

8-2

ANIMEC AM-2S-4B/AM-2S-5B [Power requirement : 115V ~ (AC)]



9. SPECIFICATIONS

9-1

Model	AM-2S-4A [AM-2S-4B]	AM-2S-5A [AM-2S-5B]
Tube size	3.0 - 4.0mmØ	4.1 - 5.0mmØ
Flow Rate	1 - 12 ml/min	
Power Requirements	230V±10%, ~(AC), 50/60Hz, 60VA [115V±10%, ~(AC), 50/60Hz, 100VA]	
Classification	Class I Equipment	
Operation Mode	Continuous Operation Equipment	
AP/AGP	Ordinary Equipment (Not AP/AGP Equipment)	
Applied Part Type	Type BF	
Heater	Number of Heater : 1 Type : Silicone Rubber Heater Wattage : 55W (at 230V, ~) [Wattage : 66W (at 115V, ~)	
Heat Exchange	Dry Heat Exchange	
Operating Temperature Range	1 -12 ml/min 37 - 27°C (At Input Fluid Temperature 20°C.)	
Operating Condition	0 - 40°C 30 - 95% Relative Humidity Non Condensing	
Transportation and Storage condition	-15 - 45°C 10 - 95% Relative Humidity Non Condensing	
Heating Plate Temperature	Max. 42°C	
Body Dimension	176(L) X 65(W) X 36(H) [mm]	
Weight	560g	
Standard Durable Years	5 years	

Specifications subject to change without notice.

SILICONE RESIN SPECIFICATIONS

i

Model Number : TSE-387-W

Manufacturer : Toshiba Silicone co., Ltd.

PHYSICAL PROPERTY

	Before hardening	After hardening (at 25°C, 50%Rh, Hardening time: 7days)
Appearance	White liquid paste	White elastic rubber
Viscosity (at 25°C)	60,000 [60]	-----
Tack-free time (at 25°C)	90	-----
Specific gravity (at 25°C)	-----	1.04
Hardness (JIS* A)	-----	25
Stretching strength kgf/cm ² [M Pa]	-----	18 [1.8]
Elongation [%]	-----	300
Heatproof and coldproof performance	-55°C ~ +200°C	-55°C ~ +200°C

ELECTRIC PROPERTY

Volume resistivity	[Ω·cm]	2×10^{15}
Permittivity	[60Hz]	2.9
Dielectric loss	[60Hz]	0.004
Dielectric breackdown strength	[per mm]	20

*JIS : Japan Industrial Standard



