II. Service and Adjustment

II-1. General Notice

DANGER

When adjusting or servicing the PCB with the power switch ON, securely connect the shield part of the ASSY CRT to the GND on the PCB (Secondary Radiator, etc.) with leads before turning the power switch on.
If not, the high voltage put into the monitor causes instability of the external earth. This will result in a serious electric shock or damage.

WARNING

1) Do not connect or disconnect any wires or connectors while the products is in operation.
It may result in damage to the circuit or may cause an electric shock.

2) Do not short any portion of circuit while the product is in operation.
This will cause smoke, electric shock or damage to the transistors, ICs or other parts or circuit in the unit. (*Excluding the Adjustments only when specified.)

3) Do not change the original design of the product.
This will cause smoke, electric shock or damage to the circuit.

4) Use 2 pin power plug of the Digital voltage meter.
Otherwise, an electric shock, damage to the circuit or breaker-down may occur

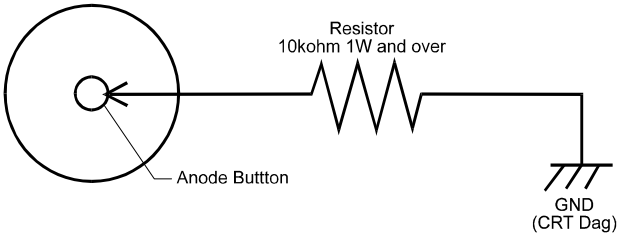
CAUTION

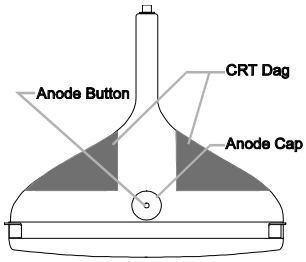
Do not touch the sharp edge of the chassis.
It may result in injury.

II-2. Notice about Electrical Circuit

⚠WARNING

1) **<u>Do not touch the +B Voltage and High Voltage terminals inside the monitor.</u>**
   If carelessly contacted, it can cause serious shock or result in damage to the monitor.
2) **<u>Check the adjustment VRs are adjusted within the specifications range and securely locked together with silicon rubber as instructed in the service manual.</u>**
   The VRs should be adjusted and then sealed with silicone rubber as instructed in the service manual. If the voltage is out of the specifications range, the X-ray radiation may increase or may cause damage to the monitor.
3) **<u>Do not operate with a High Voltage level exceeding the specified range in the service manual.</u>**
   Failures in the High Voltage Adjustment can increase X-ray radiation or damage to the circuit. To check for the presence of High Voltage, use an accurate high impedance High Voltage Meter connected between the Anode Button and the secondary earth. It may cause a rise in the voltage when the Power Supply Voltage is out of the specifications range.
4) **<u>Turn off the power switch and then connect the high voltage probe.</u>**
   Adjusting High Voltage with the monitor operating is extremely dangerous. An electric shock may occur.
5) **<u>When checking wave on the primary voltage line, use the 2-pin power plug of oscilloscope. Do not connect GND on the primary circuit and GND on the secondary circuit (chassis).</u>**
   If not, this may cause electric shock, damage to the circuit or breaker-down.
6) **<u>Do not check on the primary and secondary voltage line with same oscilloscope at the same time. If necessary, connect the Isolation Trans for the power of monitor.</u>**
   This may cause an electric shock or damage to the circuit.
7) **<u>Disconnect the Power Cord, and completely remove static charge before taking off the Anode Cap.</u>**
   When discharging high voltage, be sure to disconnect the power cord.
   Connect a 10kΩ resistor (1W and over) and a insulator wire (such as a test probe) between CRT dag and the Anode Button.
   If the High Voltage is not removed, you will get an electric shock by touching the Anode Cap area.





II-3. Important Service Safety Information

1) The high voltage adj. and hold-down adj. controls in this monitor are sealed in order to protect the user from X-ray radiation. These controls should not normally have to be adjusted. If these are replaced due to damage, check the high voltage and hold-down voltage to assure that it is within specification. Then seal the control according to the manufacture's specification.

2) Certain H.V. failures can increase X-ray radiation. Monitors should not be operated with H.V. level exceeding the specified rating in the service manual at input voltage of 120V AC. Higher voltage may also increase possibility of failure in H.V. supply.

3) It is important to maintain specified values of all components in high voltage circuit and anywhere else in the monitor that could cause a rise in high voltage or operating supply voltage. No change should be made to the original design of the monitor.

4) Components identified "★ " on the schematic diagram (identified " X " in the parts list) should be replaced only with exact factory recommended replacement parts. After these parts are replaced, the high voltage and/or hold-down voltage must be readjusted and sealed. The use of unauthorized substitute parts may create X-ray radiation.

II-4. About the method of repairing the PCB (printed circuit board).

1. Correction prohibition part.

The correction is prohibited under the following cases.

1) Circuit before output of regulator on primary side.
2) The horizontal output circuit connected with deflection yoke.
3) High-voltage circuit, FBT, PIN(Horizontal) correction circuit, V-OUT circuit, G2 line, and spark gap insertion circuit.
4) Degaussing circuit
5) ☆mark of circuit diagram(high voltage and X-rays), △marked parts(safety standard)
6) Circuit after inverter transformer.
7) Signal line of RGB
8) Signal line of sound
9) Pattern from BGA land

2. Repairing method

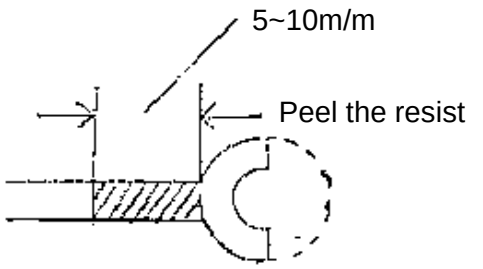
2-1 Loss of land, Floatage of land

Case 1: 1/4 or less of the land areas

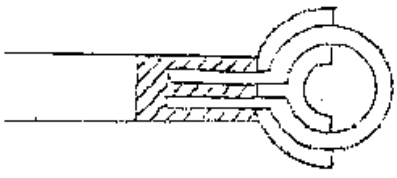
Soldering and land where leg bends of parts are specified are according to the case 2.

Case 2: From 1/4 or more to less than entire loss of land areas.

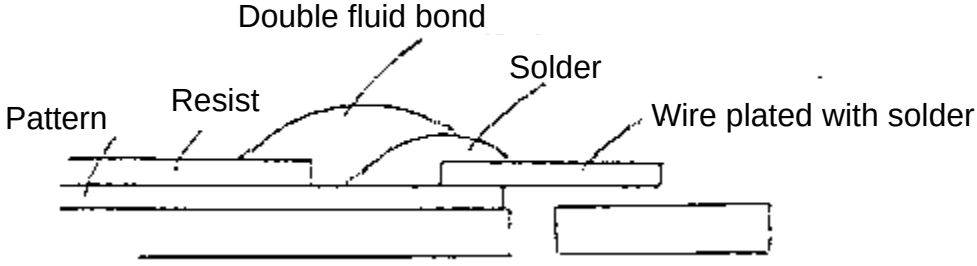
1) Peel the resist of pattern from 5m/m or more to less than 10m/m.



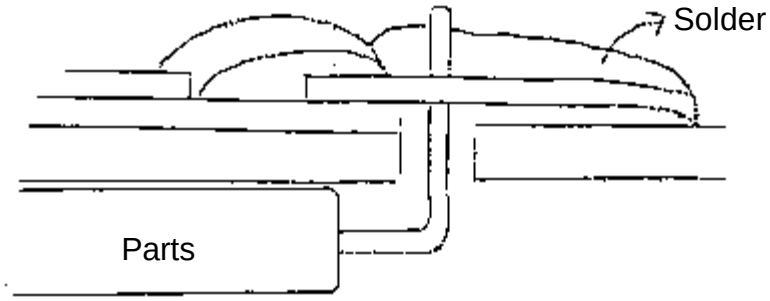
2) Bend the wire plated with solder (0.5∅ or 0.6∅) as U-shaped and make the land.



3) The part where the resist of the pattern was peeled off is soldered with the wire plated with solder and remove the impurities on the solder side by using the IPA. Then, fix it with double fluid bond.

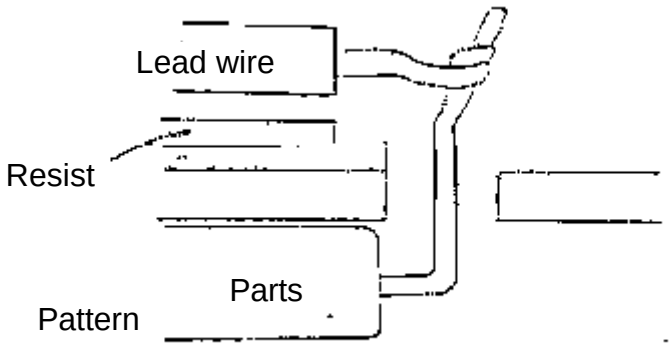


4) Solder the parts leg.

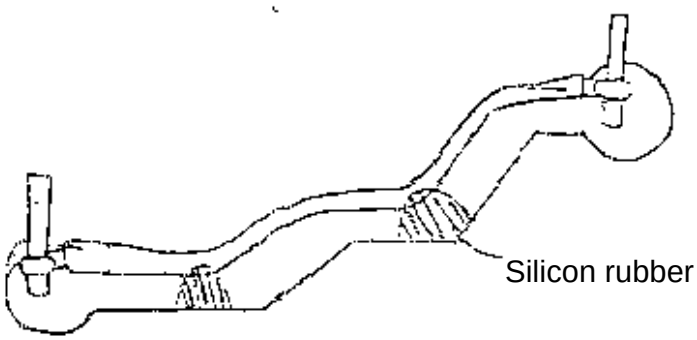


Or

1) The parts leg and lead wire (300V withstand voltage) should be wound more than 1.5 turns.



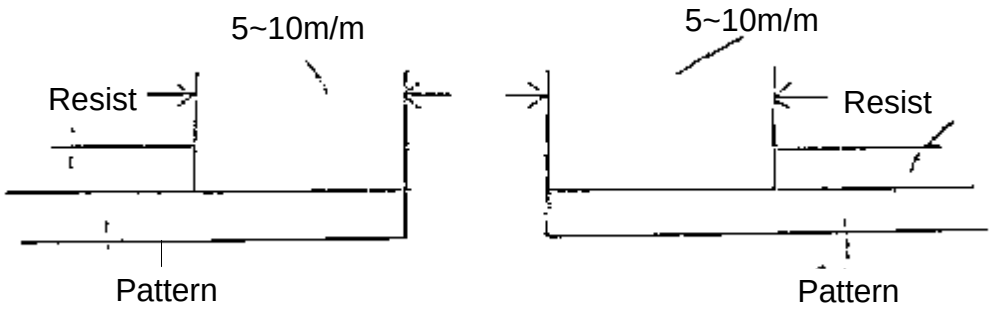
2) The opposite side of lead wire should be wound more than 1.5 terns to the parts lead on the same pattern.
3) Fix the both ends of the lead wire with solder. Then, fix more than 2 places by silicon rubber. The lead should be also stuck along with the pattern and PCB.



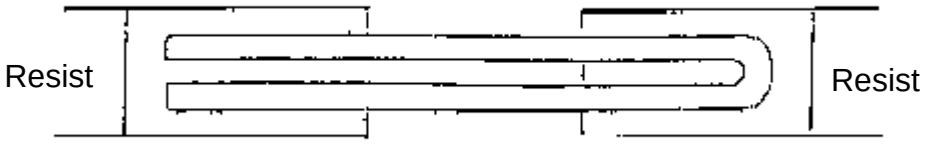
2-2 Loss of pattern, Floatage of pattern

(10m/m or less is acceptable and 10m/m or more is improper.)

1) Peel the resist of pattern from 5m/m or more to less than 10m/m.



2) The wire plated with solder is fold in two. And, it is put on the pattern.



3) Proceed soldering. Then, remove the impurities on the solder side by using the IPA and fix it with double fluid bond.

Or, the parts leg between patterns is connected with the lead wire.

Details are similar to item 2-1;1.

IPA	00N0J017A1
double fluid bond	08N08477A1
Silicon rubber	08F08087A1

*It is mentioned in the Sub Materials of Price List.

2-3 Crack correction of PCB

The crack correction of any part is prohibited.

3. Other notes

1) Remove resist enough when soldering, and fuse lead enough with the pattern. Please solder not to see the copper foil part.
2) The adhesive which you may use is only above mentioned silicon rubber.
3) When repairing the pattern (land) for surface mounting chip, be careful not to short-circuit with the other pattern (land).

II-5. Screw and nut torque List

Note: Please refer to the service manual first when there is a description in the service manual of each model.

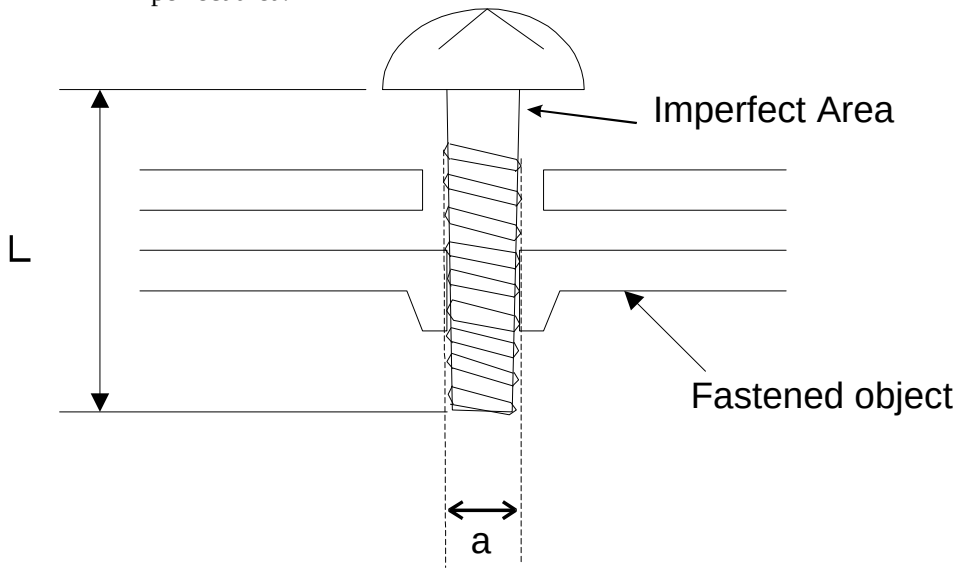
1. The unit of the torque in the list----- kgf·cm
2. The torque value is common to mechanical screw and tap-tight screw.
3. The above list is applied when there is no poor tightening due to the imperfect area and thread is tightened over 2 with the tightened materials.
4. If the value is within the listed standard, the slip or damage to the screw may occur due to the screw or working condition.
5. Glossary (reference)

1) Nominal Size of the Screw
The screw is divided by its size. The mechanical screw is like M2, M3, M4 and the tap tight screw is like 2, 3, 4. The number indicates the diagonal of the screw.

2) Mechanical Screw
The thread is tapped to the fastened object in accordance to the pitch of the screw. This screw avoids the screw error and its torque value is easy to be controlled.

3) Tap tight screw
Without tapping the fastening object, the screw itself taps the thread (self-tap screw). Then, the screw, which does not make tapping chip, is called tap-tight screw.

4) Imperfect area
If thread the screw, the thread cannot tap to its head due to production reason. This area is called imperfect area.



1. General torque standard (factory standard)

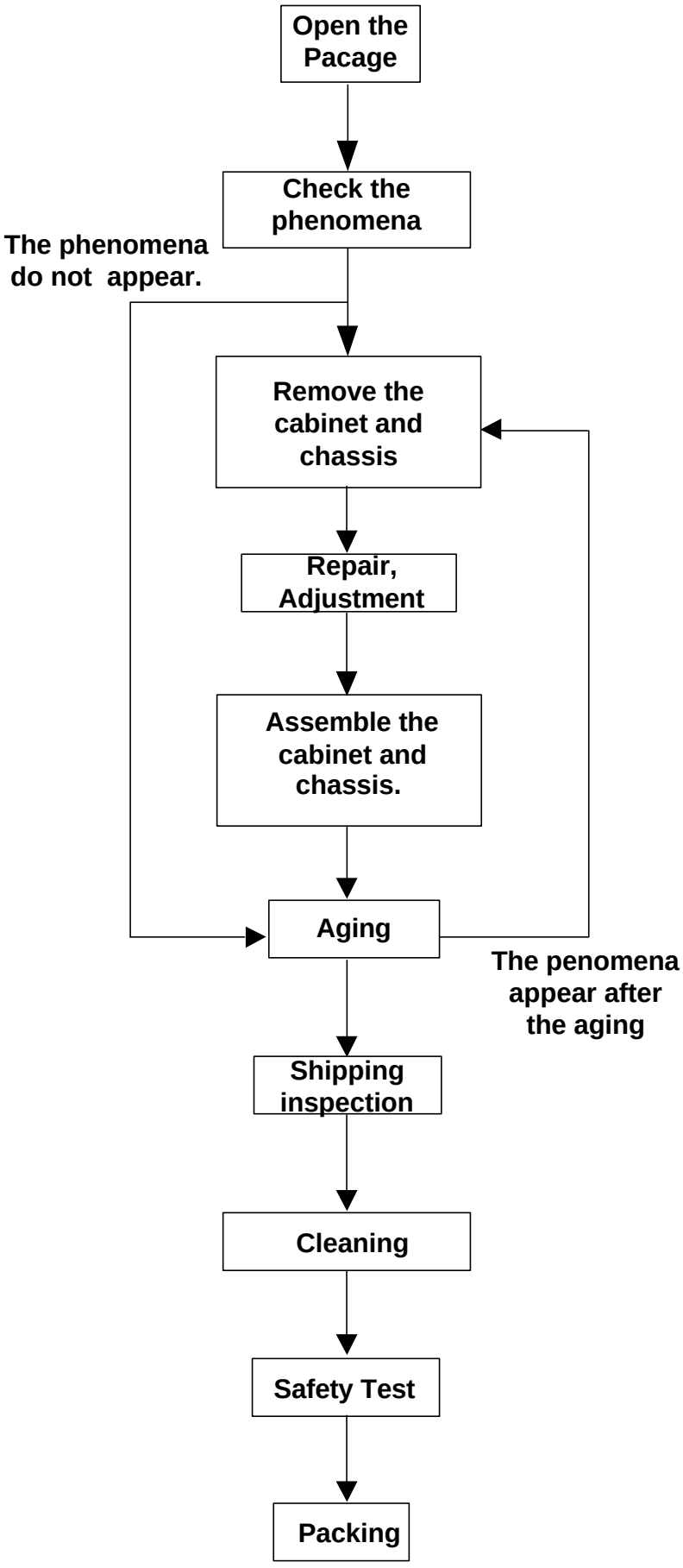
tighted / material / diameter (incl. Nut)	Aluminum (Al)	Steel (SPCC,SECC)	Resin (ABS,PS,Plastic) (L=Length of Screw)	
Nominal Size 3	5.0~9.0	6.0~10.0	L<10mm 4.0~8.0	10mm<L 6.0~10.0
Size 4	8.0~12.0	9.0~15.0	L<12mm 8.0~12.0	12mm<L 9.0~15.0
Size 5	*	15.0~25.0	L<20mm *	20mm<L 15.0~25.0
Size 6	*	20.0~30.0	*	
Size 8	*	Fix the CRT Refer to list 2	*	
Main use	fix the discharge plate (t>1.6)	blacket base, etc. sheet metal	fixing PCB (Size 3) FBT (Size 3) F.P (Size 4) to the Base or F.P	

2. Special Torque (Extraction the torque value which is out of the factory standard.)

Location	Model	Torque(kgf.cm)
Fixing CRT	MA-1560/61/62	40~45
	MA-1563	30~35
	MA-1783	25~31
	MA-1767/82	40~45
	MA-1762/64/66/80	45~55
	17 & 19” after MA-1570, 1790	37~43
	MA-2090/2091/2191/21A2/2192	40~50
	MA-1786/1794	30~36
	MS-2930	55~75
CP MAGNET	MA-1783	20
	MA-2171/2190/21B1	14~15
ASSY U202	MA-1767/82/83	8~10
BACK-COVER	MA-1767/82/83 17 & 19” after MA-1570, 1790	13~19
PCB-SW	MA-1570	5~9
	All the model after MA-1790	6~10
Power Earth	MA-2190/21A1 All the model after MA-1790	12
Equipping AC-INLET	All the model after MA-1790	8
Fixing LCD Panel	FA-1340/1561/1562/1563	5.5~7.5
Fixing ASSY MAIN-UNIT and TILT-STAND	FA-1340	13~15
Equipping ASSY PCB SUB-S*1	FA-1340	2.5~3.5
Equipping ASSY STAND-UNIT to PLATE-S*2	FA-1561	15~17
Equipping ASSY STAND-UNIT to SWIEBEL*3	FA-1880	16~20
Fixing STAY and ASSY CHASSIS	MS-2930	12~16
Fixing Q302 and radiator	MS-2930	2~3
Fixing the CASE	DH-1401	4~8

*1~3 Refer to the Disassembling drawing in the Service Manual for the detail.
*1 the torque value of screw No.13 which fixing the item No.G
*2 the torque value of screw No.p which fixes the item No.q
*3 the torque value of screw No.f which fixes the item No.8.

II-6. Service and adjustment Flow



1.Open the package

	Works	Controlled Item	Equipment
1.	Open the returned product from the user.	Packing Case	Crane
2.	Check the enclosed accessories in order not to miss at the shipment after the repair.	Enclosed accessories, RMA No. S/N	

2.Check the phenomena

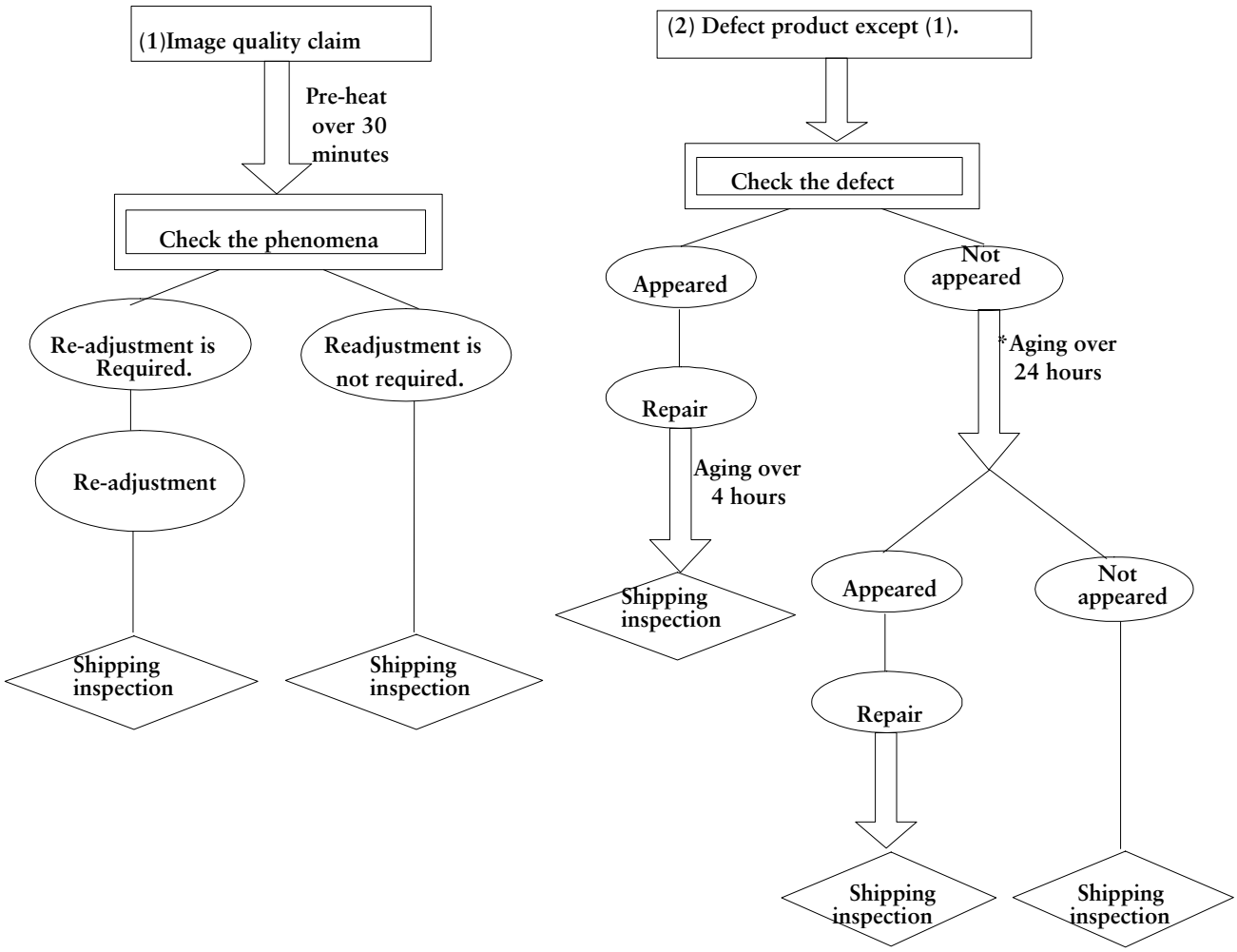
	Works	Controlled Item	Equipment
1.	Check the phenomena of the returned products.	Phenomena, RMA No.	Signal Generator, Brightness meter, Scale, loupe
2.	When the phenomena do not appear, go to “4. Aging”.		

3. Repair/Adjustment

	Works	Controlled Item	Equipment
1.	Remove the cabinet and chassis referring to the service manual.		Electric driver
2.	Perform the analysis, repair and adjustment to the confirmed phenomena.	Soldering iron temperature, wrist strap, parts handling and keeping	Signal generator, brightness meter, scale, loupe, soldering iron, tester oscilloscope, digital multi meter, high voltage meter, PC, frequency counter, high voltage meter
3.	Assemble after the repair and adjustment works are finished. Regarding the screw tightening torque or tightening location, refer to the attached materials III-2. (Please refer to the service manual first when there is a description in the service manual of each model.)	Screw tightening torque	Electric driver torque driver

4.Aging (flow)

(1) Image quality claim
(2) Another claim



	Notice at aging	Controlled Item	Equipment
1.	Input para-signal-generator, PC or signal generator during the aging.	Aging hours	Para-signal generator, PC, Signal Distributor
2.	The temperature is from 25ºC~45ºC. Regarding the products that can perform aging at the same condition with user (the internal shield or external cabinet are equipped.) the temperature control is not necessary.		
3.	The defective and damaged product due to the falling, etc. requires over 50 hours over aging.		
4.	Image quality adjustment, disconnecting, repair or the cabinet, etc. do not need aging. When the image quality adjustment, the pre-heat is needed before the phenomena confirmation for 30 minutes over.		
*	If the phenomena do not appear after 24 hours aging, contact with the user and decide the handling of it.		

5. Shipping Inspection

<table>
<tr><th></th><th>Works</th><th>Controlled Item</th><th>Equipment</th></tr>
<tr><td>1.</td><td>Perform the following shipping inspection and confirm that the repaired product fulfills the specification. If it does not fulfill, repair or adjust again.
<table>
<tr><th></th><th>Inspection</th><th>Judgement</th></tr>
<tr><td>Image quality</td><td>Brightness/Focus
Distortion/Size
Purity/Convergence
White Uniformity.</td><td>Refer to the each manual.</td></tr>
<tr><td>Function Test</td><td>Check the function of VR or SW, etc.</td><td>Operates.</td></tr>
<tr><td>PCB/Mechanical Test</td><td>Check the condition soldering, parts, wiring, chassis.</td><td>There is no leg slip non-soldering, missing pattern peeling or screws.</td></tr>
<tr><td>Shock test</td><td>Shock parts, PCB or and check the image and function.</td><td>The shock to the product not affect to the image quality function of the product.</td></tr>
</table></td><td>Proofread of the each meter, inspection before the work</td><td>PC, Signal Generator, Brightness meter, Scale Loupe</td></tr>
</table>

6.Cleaning

	Works	Controlled Item	Equipment
1.	Clean the outer dirt of the returned products.	Scratch, dirt	Gauze, AR cloth, ethanol, isopropyl ethanol

7.Safety Test

DANGER

When any portion of the chassis is short-circuit caused by a leakage of primary voltage line, the conductive area may become high voltage which can result in an electric shock or other hazardous danger.

WARNING

1) Testing equipment should be isolated by putting an insulating board in between.
When the back cabinet of the monitor is removed and the monitor is operating, there is a risk of an electric shock.

2) Keep people away during the test.
When the back cabinet of the monitor is removed and the monitor is operating, there is a risk of an electric shock.

3) Do not wear any metal or accessories.
There is a risk of an electric shock when the circuit is shorted.

7-1 Earth continuity Test

(All model of the monitor, projector and some peripherals which has the insulated transformer and earth function.)

	Works	Controlled Item	Equipment
1.	Connect the Test AC cord to the product at the shipping stage.	Current, resistance	Test equipment for earth continuity Test
2.	Impress AC 25A between the conductive chassis and the earth terminal of the AC Power cord for 1.5~2.5 seconds. Press the test button of the equipment and check the OHM meter of the test equipment show below 0.1OHM.(the OHM meter which indicates the resistance does not enter in the red zone.		
3.	If it exceeds 0.1OHM, the product is distinguished as the rejected one. Reconfirm the earth lead connection of the product and test method.		
4.	After the test, check the image quality and function.		

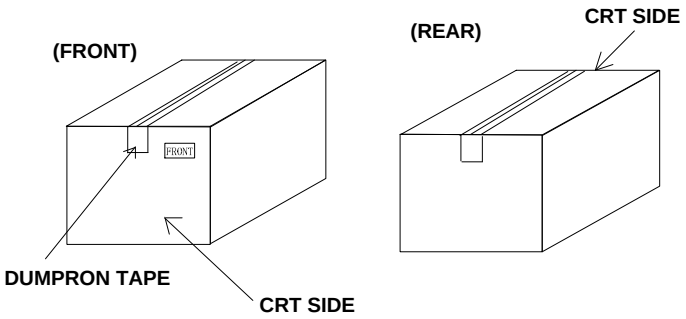
7-2 Withstanding voltage check

(All model of the monitor, some peripherals which has the insulated transformer with AC power supply)

<table>
<tr><th></th><th>Works</th><th>Controlled Item</th><th>Equipment</th></tr>
<tr><td>1.</td><td>Connect the Test AC cord to the product at the shipping stage.</td><td rowspan="4">Voltage, Current</td><td rowspan="4">Test equipment for withstanding voltage check</td></tr>
<tr><td>2.</td><td>Impress the AC voltage (100~120V: 1200VAC, 220~240V: 1500VAC) (projector:1550VAC(+50, -0)) between a conductive chassis and the line of the AC cord for 1~2 seconds when the Main Power SW is ON. Press the test button of the equipment and confirm if it should not be NG.
<table>
<tr><th>Model</th><th>Voltage</th><th>Current</th></tr>
<tr><td rowspan="2">CRT display and LCD display (exept L23, L34)</td><td>1500VAC</td><td>25mA</td></tr>
<tr><td>1200VAC</td><td>20mA</td></tr>
<tr><td rowspan="2">LCD display L23, L34 and Game</td><td>1500VAC</td><td>5mA</td></tr>
<tr><td>1200VAC</td><td>5mA</td></tr>
<tr><td>Projector</td><td>1550VAC</td><td>100mA</td></tr>
</table></td></tr>
<tr><td>3.</td><td>If it is broken down, the product should be distinguished as the rejected one. Reconfirm the internal condition of the product and test method.</td></tr>
<tr><td>4.</td><td>After the test, check the image quality and function.</td></tr>
</table>

8. Packing

Note: Please refer to the service manual first when there is a description in the service manual of each model.

<table>
<tr><th></th><th>Works</th><th>Controlled Item</th><th>Equipment</th></tr>
<tr><td>1</td><td>Cover new packing bag on the product.</td><td></td><td></td></tr>
<tr><td>2.</td><td>Pack the enclosed accessories from the user.</td><td>Enclosed accessories</td><td></td></tr>
<tr><td>3.</td><td>Confirm that product name and S/N on the Name-Plate is same in order not to mis-shipment.</td><td>Model Name, S/N</td><td></td></tr>
<tr><td>4.</td><td>Equip the cushion (If it damaged badly, replace with new one.)
(A) Fix the bottom of the cushion with plain dumpron tape (50mm width) (small model like F550·iW)
(B)Fasten with P.P Band (Large model likeT660I or T560I, etc.)
(C) Confirm the direction and location when 4 separated cushion. Are equipped.
(D)Others</td><td>Cushion</td><td></td></tr>
<tr><td>5.</td><td>Put the product in the packing case with noting its direction.
(Packing case other than EIZO's or badly damaged one should be replaced with new one)
 

[How to put the dampron tape at packing]
<table>
<tr><th></th><th>Model</th><th>Tape (Width)</th><th>way</th></tr>
<tr><td rowspan="2">Bottom</td><td>20" larger</td><td>00N08071A3 (50mm)</td><td>H</td></tr>
<tr><td>19" smaller, LCD, Peripheral</td><td>00N08071A5 (75mm)</td><td>I</td></tr>
<tr><td rowspan="2">Top</td><td>20"larger</td><td>00N08071A3 (50mm)</td><td>I</td></tr>
<tr><td>19" smaller, LCD, Peripheral</td><td>00N08071A5 (75mm)</td><td>I</td></tr>
</table></td><td>Dampron tape</td><td></td></tr>
</table>