LIYITEC INC.
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TEL: +886-2-22059988 FAX: +886-2-22057799 www.liyitec.com

General Specifications

Customer :
Product : Touch Panel

Mode : Five-Wire Analog Resistive Series

Version : E/S 01
Date : DEC-10-2003

Customer Sample Approval
Date of Signature : _____

Approval	Review	Preparation
張 武 坤	戴 維 仁	謝 仲 郁

Record of Revision

Version	Revise Date	Page	Content
1	2003/12/10	15	First draft

TABLE OF CONTENTS

1. FEATURES

Type	Five-Wire Analog Resistive Touch Panel
Input Mode	Stylus or Finger
Connector	FPC

2. DIMENSIONS

This document of general specifications applies to a wide range of sizes from 5.7" to 19" in diagonal, with total thickness of 2.05±0.2 mm. For dimensions and specifications of a specific 5-wire touch panel, please contact the Sales Department at Liyitec or e-mail sales@liyitec.com.

3. ENVIRONMENTAL CHARACTERISTICS

Status		Temperature
(1)	Operation	－10℃ ～ ＋60℃
(2)	Storage	－40℃ ～ ＋75℃

Note: The environment is of normal atmosphere pressure.

4. OPTICAL CHARACTERISTICS

Item		Specification
(1)	Transparency	82% ±5%
(2)	Newton Ring	As per actual samples provided

Note1: Transparency and Haze is measured by using BYK-Gardner instrument.

Note2: Test method-satisfy (2) of Item 10.

5. ELECTRICAL CHARACTERISTICS

Item		Specification
(1)	Linearity	≦1.5%* (Test method reference Item 9)
(2)	Chattering	≦10ms
(3)	Insulation	≧2MΩ/25V(DC)
(4)	Endurance	No arcing damage at DC 50V/60sec.
(5)	Operative Resistance	≦2KΩ

*≦2.0% for the 5.7" and 8.4" models.

6. MECHANICAL CHARACTERISTICS

Item		Condition	Specification
(1)	Touch Active Force	Stylus＝R0.8	≦50g
(2)	Writing Force	Stylus＝R0.8	≦250g
(3)	Impact	25.0 ϕ DIA. Steel Ball/68g Height＝15cm	1 time, no damage (Impact at center area)
(4)	Static Load	500g at 30 cm^2 area for 30 Sec	Satisfy (1),(3) of Item 5;
(5)	Hardness	3H pencil, pressure 1n/45°(JIS K5400)	≧3H
(6)	Tail Peeling	800g/cm by 90 degree	Satisfy (1) Of Item 5
(7)	Tail Bending	10 times by radius R:1mm left & right 135 degree	Satisfy (1) Of Item 5

7. RELIABILITY

Item		Condition	Specification
(1)	Constant Temperature / Humidity	60℃/90%RH ,240 hrs and normalized for 4 hrs	Satisfy (1),(2), of Item 4; (1),(3) Of Item 5;
(2)	Heat Cycle	75℃/240 hrs and normalized for 4 hrs	Same as above
(3)	Cold Cycle	-40℃/240 hrs and normalized for 4 hrs	Same as above
(4)	Thermal Shock	-40℃~+75℃(30 min each), 50 Cycles, ΔT≦30 sec. and normalized for 4 hrs	Same as above

8. DURABILITY

Item		Condition	Specification
(1)	Knock Test	35 Million Times, Force 150g3HZ, R8/HS60	Satisfy (1), (3) of Item 5
(2)	Pen Hitting	10 Million Times, Force 150g/3HZ,R0.8	Satisfy (1), (3) of Item 5
(3)	Altitude Test	50,000 feet / 4 HRS and normalized for 4 hrs	Satisfy (1), (3), of Item 5

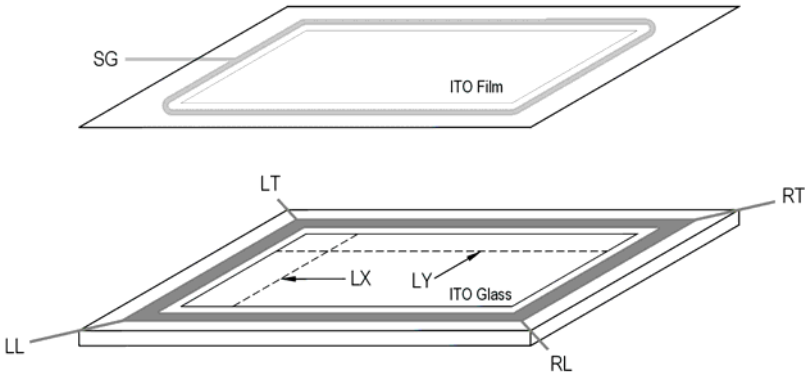
9. INSPECTION

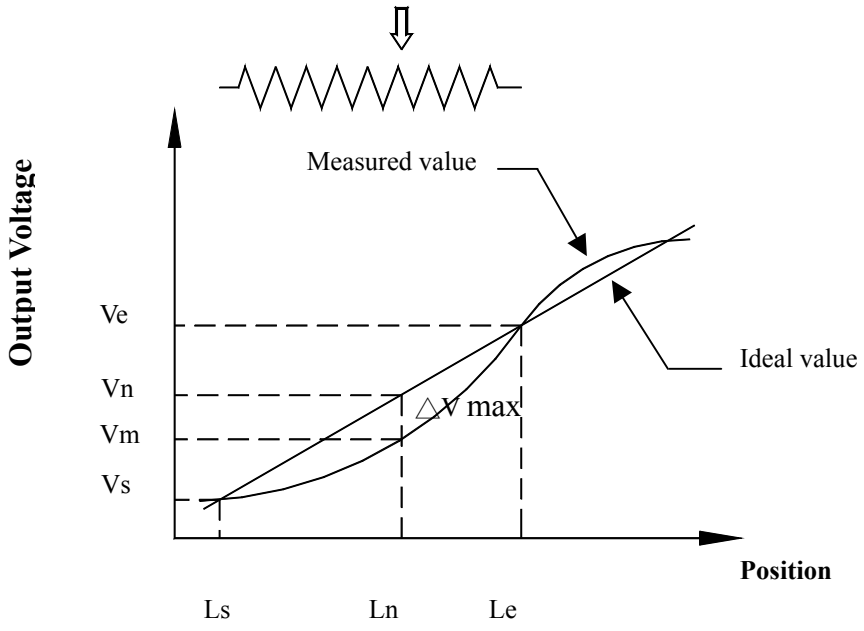
(1) Linearity Condition

Voltage (DC 5V) is applied to RT+RL or LL+RL and ground (0V) is applied to LT+LL or LT+RT.

Using stylus to draw straight points (LX and LY) at 12.5 mm intervals within pattern area and detect the voltage at SG.

To Measure the voltage differences between RT+RL and LT+LL or RL+LL and LT+RT.



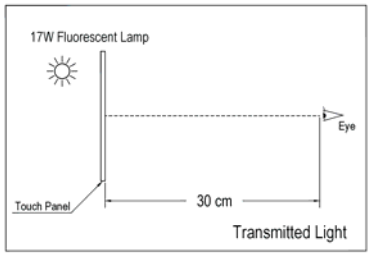


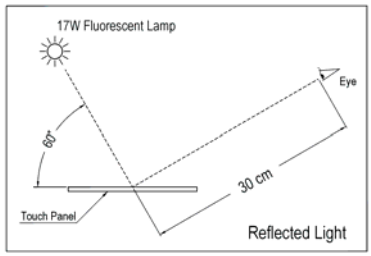
$$\text{Linearity} = \frac{\triangle V \text{ max}}{(Ve\text{-}Vs)} \times 100\%$$

10. APPEARANCE INSPECTION

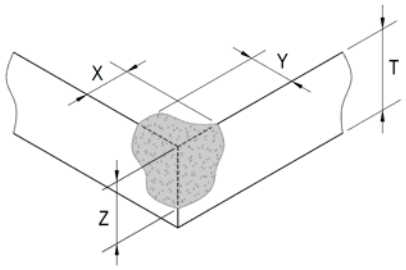
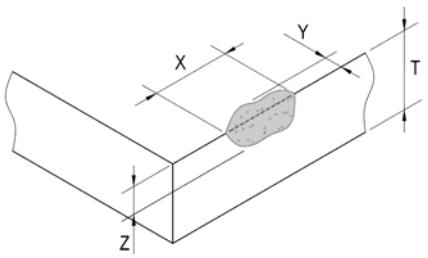
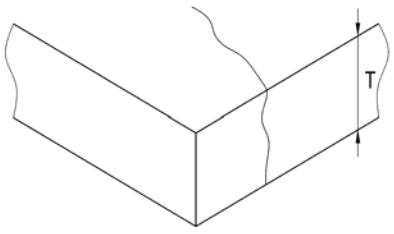
(1) The flaws and impurities are allowed outside viewing area except for those affecting electrical functions.

(2) The inspection shall be performed by using one 17w fluorescent lamp as back or side light. The panel shall be placed at 30cm away from eyes (as illustrated in the followings).





(3) Glass flaw

Corner flaw		X≦3.0mm Y≦3.0mm Z≦T
Edge flaw		X≦3.0mm Y≦3.0mm Z≦T
Progressive flaw		None allowed

T=Glass thickness

Please refer to Appendix I: Appearance Specification.

11. ATTENSION FOR MOUNTING CONDITION

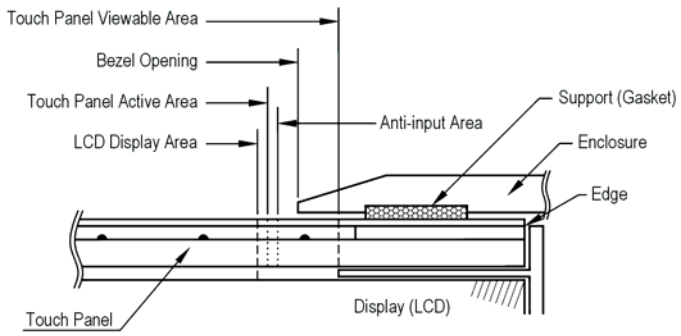
(1) The Support which fixes the touch panel must be designed outside of Viewable Area.
To avoid accidental pressing on touch panel, Enclosure must be designed with enough clearance to panel surface.

(2) Bezel opening must be between Viewable Area and Active Area..
Bezel opening must not touch Viewable Area.

(3) We recommend elastic material made Support.

(4) Do not use adhesive to bond Top Surface (ITO Film) of touch panel with Enclosure.

(5) Edges of touch panel are conductive.
Do not touch it with metal after mounting.



12. GUARANTY

With the exceptions listed below, all Liyitec's products are guaranteed free of manufacturing defects for a period of up to one year. All defected products will be repaired or exchanged free of charge if determined to be the responsibility of Liyitec. Liyitec reserves the sole discretion in determining the causes and the responsibilities of any defects or damages.

List of Exceptions:

1. Damages caused by improper handling of clients, including and not limited to, during shipping or manufacturing processes.
2. Damages caused by disasters, either by natural causes or human factors, after the delivery of products.
3. Any repairs, modifications or disassembling of Liyitec's products without prior notification to and the consent of Liyitec.

13. CAUTIONS

Storage	(1) Store packaged products at the temperature and humidity mentioned in the specification with care. Do not expose products to direct sunlight or stress such as that caused by piling.
Unpacking	(1) Check for the correct vertical direction of the package before unpacking.
Handling	(1) Clean finger sacks or gloves and mask are required during handing to prevent finger-prints or stain on the products and damages to the products caused by sharp edges. (2) Do not handle the viewing area of the panel. (3) Do not handle the panel at the tail (connector) to prevent detachment of the tail to the panel.
Cleaning	(1) Clean and soft clothes with neutral detergent or with ethanol may be used for cleaning. (2) Do not use any chemical solvent, acidic or alkali solution. (3) Do not allow liquid from soaking into the joint of film and glass which may result in peeling or malfunctioning.
Installing and Assembling	(1) Excessive force or strain to the panel or the tail is prohibited. (2) Provide a clearance of at least 0.3mm between panel and display module. (3) The panel is designed with air groove. Insulation and cushioning pads should be designed around the edges of the panel to prevent liquid penetration or dust gathering.
Operating	(1) Operate with a stylus(tip R0.8 or over), or with a finger without applying excessive load. Sharp edged or hard articles are prohibited. (2) The gathering of dew in the panel may occur with abrupt temperature or humidity changes. A stable environment condition is recommended.
Warranty	(1) Under normal condition, 12 months from the date of shipping from Liyitec. (2) Warranty will be voided, if touch panels are not stored or used properly.
Others	(1) Keep the surface clean. No adhesives should be applied. (2) Avoid high voltage and static charge. (3) Liyitec reserves the right to substitute materials with the same grade and specification.

14.APPENDICES

Appendix I	Appearance Specification	3 page
Appendix II	Durability Test Method	1 page
Appendix III	Cautions for Product Handing	1 page

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Appearance Specification

【Appendix-1-1】 (S＞ 11") Unit: mm Page:1/1

1	**Particle**	（1）Diameter≦0.25（each area contains≦3 particles, total≦5 particles）→ OK （2）0.25＜Diameter≦0.4（each area contains≦3 particles, total≦5 particles）→ OK （3）Diameter＞0.4 → NG
2	**Blur Stain**	（1）Diameter≦0.25（each area contains≦3 particles, total≦5 particles）→ OK （2）0.25＜Diameter≦0.4（each area contains≦3 particles, total≦5 particles）→ OK （3）Diameter＞0.4 → NG
3	**Linear Object**	（1）Width≦0.05 and Length≦12 → OK （2）0.05＜Width≦0.1and Length≦5, total≦3 objects → OK （3）Width＞0.1 and Length＞0.2 → NG （4）Curled objects are regarded as particles
4	**Blister**	（1）As per actual samples provided
5	**Fish Eye (Spread White Spots)**	（1）Diameter≦0.5 → OK （2）Diameter＞0.5 → NG （3）Each area contains≦3 spots, total≦5 spots → OK
6	**Newton Ring**	（1）As per actual samples provided
7	**Color Tone**	（1）As per actual samples provided
	Scratch	（1）0.05＜Width≦0.1 and Length≦12, total≦5 scratches → OK （2）Width＞0.1 or Length＞12 → NG
8	**Interference Pattern**	（1）Inspection according to the standard testing methods
9	**Damages to Glass** **A. Corner** **B. Edges**	（1）Length≦2, Width≦2, Depth≦1/3T, Total≦2 damages → OK （2）Damages with possible worsening disallowed

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Appearance Specification

【Appendix-1-2】 (6"≦S≦ 11") Unit: mm

1	**Particle**	(1) Diameter≦0.25 (each area contains≦2 particles, total≦5 particles) → OK (2) 0.25＜Diameter≦0.3 (each area contains≦2 particles, total≦5 particles) → OK (3) Diameter＞0.3 → NG
2	**Blur Stain**	(1) Diameter≦0.25 (each area contains≦2 particles, total≦5 particles) → OK (2) 0.25＜Diameter≦0.3 (each area contains≦2 particles, total≦5 particles) → OK (3) Diameter＞0.25 → NG
3	**Linear Object**	(1) Width≦0.05 and Length≦12 → OK (2) 0.05＜Width≦0.1and Length≦5, total≦3 objects → OK (3) Width＞0.1 and Length＞0.2 → NG (4) Curled objects are regarded as particles
4	**Blister**	(1) As per actual samples provided
5	**Fish Eye (Spread White Spots)**	(1) Diameter≦0.5 → OK (2) Diameter＞0.3 → NG (3) Each area contains≦3 spots, total≦5 spots → OK
6	**Newton Ring**	(1) As per actual samples provided
7	**Color Tone**	(1) As per actual samples provided
	Scratch	(1) 0.05＜Width≦0.1 and Length≦12, total≦5 scratches → OK (2) Width＞0.1 or Length＞12 → NG
8	**Interference Pattern**	(1) Inspection according to the standard testing methods
9	**Damages to Glass** **A. Corner** **B. Edges**	(1) Length≦2, Width≦2, Depth≦1/3T, Total≦2 damages → OK (2) Damages with possible worsening disallowed

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Appearance Specification

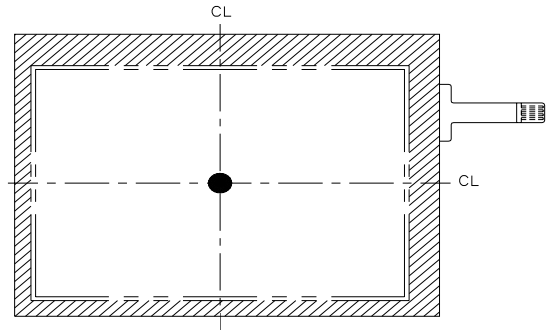
【Appendix-1-3】 (S< 6") Unit: mm Page:1/1

1	**Particle**	(1) Diameter≦0.2, Total≦3 particles → OK (2) 0.2<Diameter≦0.25, Total ≦3 particles → OK (3) Diameter>0.25 → NG
2	**Blur Stain**	(1) Diameter≦0.2, Total≦3 particles → OK (2) 0.2<Diameter≦0.25, Total≦3 particles → OK (3) Diameter>0.25 → NG
3	**Linear Object**	(1) Width≦0.05 and Length ≦12 → OK (2) Total≦3 objects → OK (3) Total>3 objects → NG (4) Curled objects are regarded as particles
4	**Blister**	(1) Not allowed
5	**Fish Eye (Spread White Spots)**	(1) Diameter≦0.3 and total ≦3 Spots → OK (2) Diameter>0.3 → NG
6	**Newton Ring**	(1) As per actual samples provided
7	**Color Tone**	(1) As per actual samples provided
	Scratch	(1) Width≦0.025 and Length≦12, Total≦3 scratches → OK (2) Width≦0.05 and Length≦12, Total≦1 scratches → OK (3) Width>0.05 or Length>12 → NG
8	**Interference Pattern**	(1) Inspection according to the standard testing methods
9	**Damages to Glass** **A. Corner** **B. Edge**	(1) Length≦2, Width≦2, Depth≦1/3T, Total 2 damages → OK (2) Damages with possible worsening disallowed

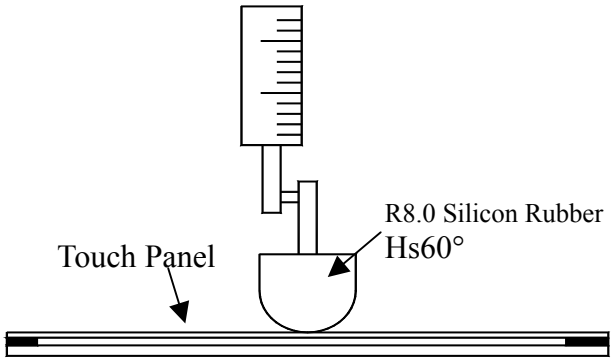
【Appendix- II】

Knock /Pen Hitting Test :

- Test Position: Center in Active Area (Fig 1)
- Test Speed: 3 Hz
- Load Force: 150g
- Test criteria1: 35 million times in same position / R8.0 Silicon Rubber Hs60°(Fig 2)
- Test criteria 2: 10 million times in same position / R0.8 Stylus



【Fig 1】



【Fig 2】

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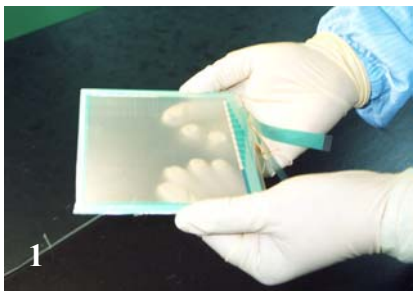
Cautions for Product Handling

Note: To prevent malfunction as a result of improper handling of touch panel product, please make sure that the following instructions are followed:

1、 Wear gloves at all time upon handling touch panel ,and hold touch panel only at the edge of the panel. (Fig: 1.2)

2、 Use only the standard polyacetal rod pen (with a radius of 0.8 at the end of the rod) for product testing (Fig: 3)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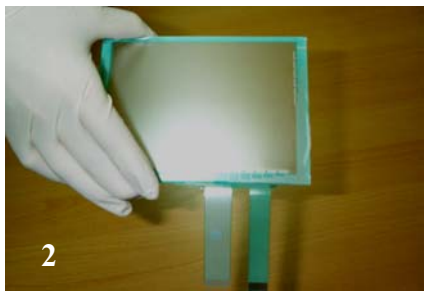
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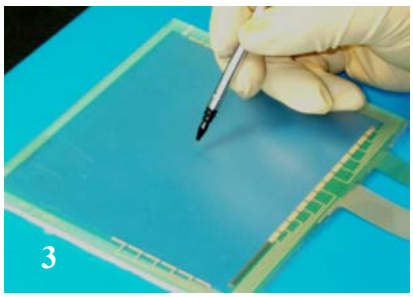
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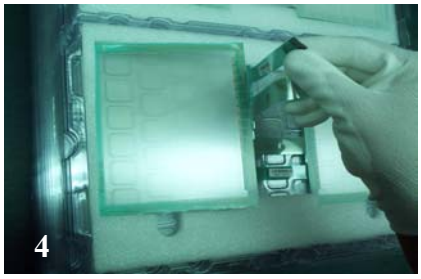
3、Do not lift touch panel via the connector (Tail) [Excess force applied on the Tail may cause displacement of the connector or cracks at the base of the panel.] (Fig: 4.5.6)

4、Do not handle the touch panel via the surface of the panel [Excess force applied on the touch panel may crack the glass layer of the touch panel.] (Fig: 7.8)

5、Do not pile up touch panels together or place heavy substance on the touch panel. [Excess stress on the touch panel may scratch the surface of the touch panel, or crack the touch panel.] (Fig: 9.10)

6、Do not touch the surface of the touch panel via sharp objects. [Sharp objects may cause scratch on the surface of the touch panel.] (Fig: 11)

7、Do not place the face of the film on the table or any other surface.[Various objects on the table may scratch the surface of the touch panel](Fig: 12)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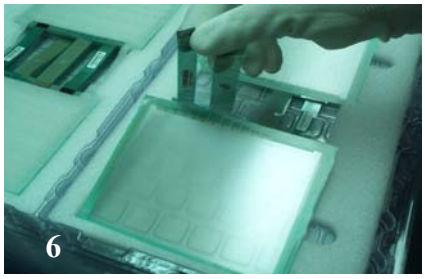
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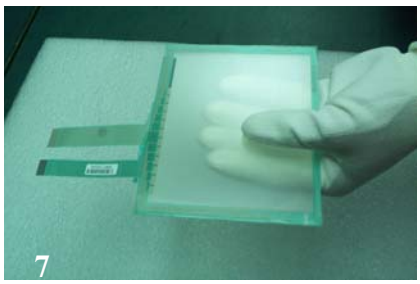
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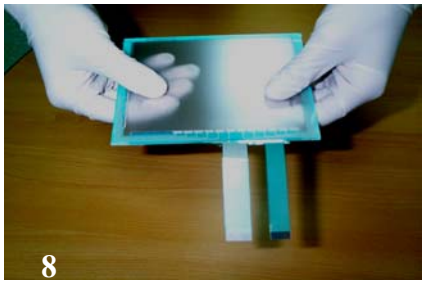
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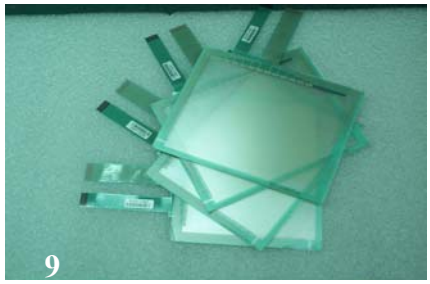
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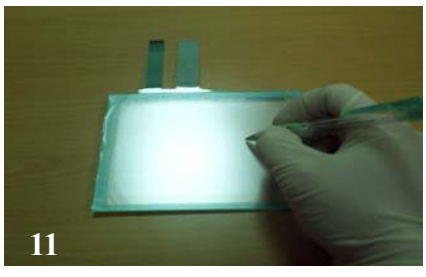
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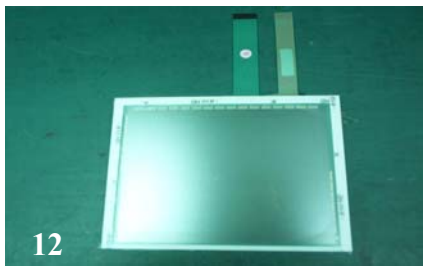
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