

PRODUCT SPECIFICATION

产 品 规 格 书

Product Name/品名: Touch Display

IVT PN /IVT 机种名: 050P01-1A2

Customer/客户名称: Avnet (S+)

Customer P/N/客户料号: IVA-050O1-NC9509-G020

Date /日 期: 2023-11-30

SPEC Version/规格书版本号: 1.3

iVTouch approve/维业达确认:

Approved by /承认	Checked by /审核	Designed by /设计

Customer approve/客户确认:

Approved by /承认	DATE /日期

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History of Version 变更记录

Date 日期	Ver. 版本	Description 描述	Page 页码	Editor 变更人
2023-03-20	1.0	For the first time to issue/首次发行	All	Sophia
2023-04-13	1.1	Update customer PN 根据客户要求更新客户料号	P1, P24	Sophia
2023-05-06	1.2	Update drawing	P24	Sophia
2023-11-08	1.3	Update drawing (correct CN2 definition)	P24	Sophia
2023-11-30	1.4	1. update TFT PN version 2. Update drawing (Correct the TFT connector type)	P3 P24	Sophia

1 FEATURES.概述

050P01 is an air bonded Touch/Display Stack with cover glass and TFT TCX050DTLN-09 (Xinli Optronics Co.,Ltd). The display is air bonded to the cover glass laminated with SP-ITO Technology PCAP. Follow RoHS (2002/95/EC) and Reach.

The cover glass is chemical strength cover glass with organic black silk-print.

2 PHYSICAL SPECIFICATIONS 基本参数

2.1 Basic data . 基本信息

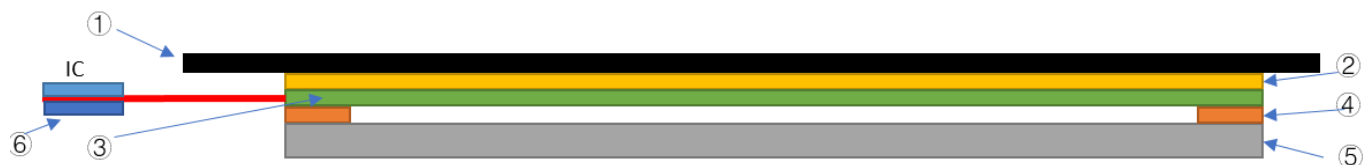
Item 项目		Contents 内容	Remark 备注
Glass	Glass Outline Dimension 玻璃外形尺寸	130mm*90 mm	
	Glass View Area 可视区	109 mm*65.8mm	
	Glass type 玻璃材质	Chinese clear glass	
	Glass Thickness 玻璃厚度	2.0mm	
Touch	Touch panel Interface Type 触控接口	IIC and USB	
	Touch panel Structure type 结构类型	GFF (SP-ITO Film)	
	TP Driver IC 触控驱动芯片	SIS 9509	
	TP size (inch)尺寸 (英寸)	5 inch	
Display	LCD Active Area	108.0(H)*64.8(V)mm	
	Dot Number	800*3(RGB)*480 dot	
	LCD Type	TFT Transmissive	
	Viewing direction	6(gray inversion)	
	Display color	16.7 M	
	TFT interface type	24bit RGB interface	
Touch Display	Weight	TBD	
	Operating temperature 工作 温度	-20 °C ~ 70 °C	
	Storage temperature 储存温 度	-30 °C ~ 80 °C	

Note1: Regarding display technical features, please take Display Datasheet for your reference. TCX050DTLN-09 SPEC V1.2

液晶屏的更多技术参数, 请参考液晶屏规格书 TCX050DTLN-09 SPEC V1.2

Note 2: Measured at LCD panel surface (including self-heat).

2.2 Structure 产品结构



① China clear glass with organic black silk-print

国产清玻加上常规黑色丝印

② OCA 透明光学胶

③ SP-ITO film 导电SP-ITO 膜

④ Air Bonding Material 框贴背胶

⑤ LCD Panel 液晶显示模组

⑥ Controller (with Chip) 控制板 (含芯片)

3 特性 Characteristics

3.1 电气性能 Electric characteristics

TP 工作电压 TP working Voltage	USB 5V
液晶供电电压 LCM input Voltage	3.3V (TYP)

3.2 接口&操作系统 Interface & OS support

触摸屏接口 touch panel Interface	USB
触摸屏可支持操作系统 Touch Panel OS support	Android,windows ,etc
液晶接口 LCM interface	RGB

更多信息，请参考触控芯片规格书。

For more information, please refer to the touch IC datasheet.

3.3 机械性能 Mechanical characteristics

触摸屏的机械性能要求如表 3 所示。

The mechanical characteristics of touch panel are shown in table 3.

表 3 表面硬度

Table 3 Surface hardness

项目 Item	描述 Description
表面硬度 Surface hardness	≥7H

4 液晶模组规格 LCM Specification

4.1 General Description and Features

The 5.0 inch Module named TCX050DTLN-09 is a-Si TFT-LCD module, which is the type of transmissive. It is consisted of TFT-LCD Panel, Driver IC, one FPC and one Back-Light unit. Features of this product are listed in the following table.

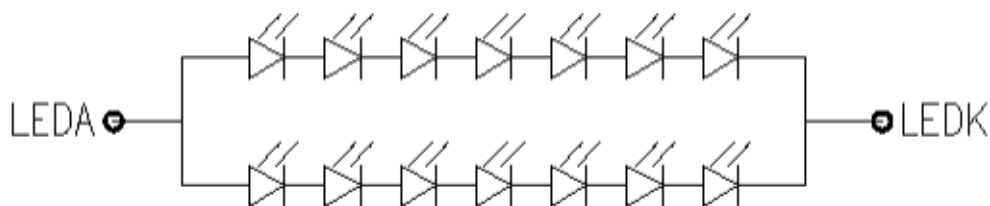
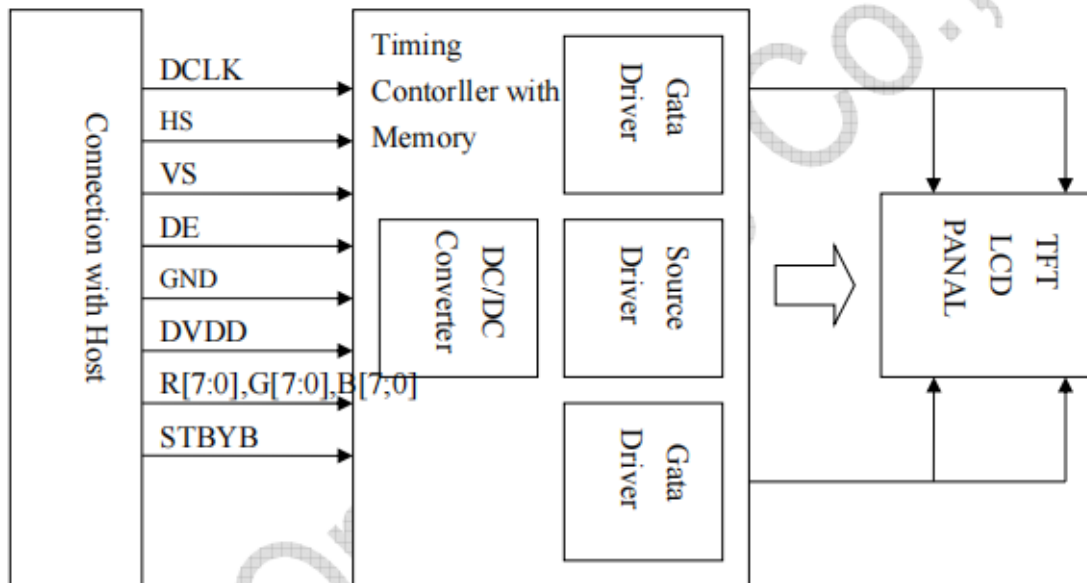
NO	Item	Contents	Unit
(1)	Module Outline	120.7(H)*76.30(V)*3.25(T)	mm
(2)	LCD Active area	108.0(H)*64.8(V)	mm
(3)	Dot Number	800*3(RGB)*480	dot
(4)	Dot size	0.135(H)*0.135(V)	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	16.7M	/
(7)	Viewing direction	6 (gray inversion)	O'clock
(8)	Backlight Type	14-chip LED, 2P7S	/
(9)	Power Supply	3.3(TYP)	V
(10)	Interface	FPC 0.5mm_Pitch 50pin	/
(11)	Interface type	24bit RGB interface	/
(12)	Surface treatment	Anti-glare	/

4.2 Interface Pin Connection

NO	Symbol	Level	Description
1	VLED+	I/O	Backlight+
2	VLED+	I/O	Backlight+
3	VLED-	I/O	Backlight-
4	VLED-	I/O	Backlight-
5	GND	P	Ground
6	VCOM	P	The power supply for common voltage in TFT driving.
7	DVDD	P	Power supply for digital circuits.
8	MODE	I/O	DE/SYNC mode select. Normally pull high. MODE="1": DE mode. (Default) MODE="0": HSD/VSD mode.
9	DE	I/O	Data input enable. Active high to enable the data input bus under "DE Mode ". Normally pull low.
10	VS	I/O	Horizontal sync input. Negative polarity. Normally pull high.
11	HS	I/O	Vertical sync input. Negative polarity. Normally pull high.
12	B7	I/O	Blue Data Input
13	B6	I/O	
14	B5	I/O	
15	B4	I/O	
16	B3	I/O	
17	B2	I/O	
18	B1	I/O	
19	B0	I/O	
20	G7	I/O	Green Data Input
21	G6	I/O	
22	G5	I/O	
23	G4	I/O	
24	G3	I/O	
25	G2	I/O	
26	G1	I/O	
27	G0	I/O	

28	R7	I/O	Red Data input
29	R6	I/O	
30	R5	I/O	
31	R4	I/O	
32	R3	I/O	
33	R2	I/O	
34	R1	I/O	
35	R0	I/O	
36	GND	P	Ground
37	DCLK	I/O	Clock for input data. Data latched at rising/falling edge of this signal. Default falling edge. Normally pull low.
38	GND	P	Ground
39	L/R	I/O	Source Right or Left sequence control. Normally pulled high. SHLR="0": Shift left: last data=S1< S2 < S3.....<S1200=first data. SHLR="1": Shift right: first data=S1>S2>S3.....S1200=last data.
40	U/D	I/O	Gate up or down scan control. Normally pulled low. UPDN="0": STV2 output vertical start pulse and UD pin output logical"0" to gate driver. (Default) UPDN="1": STV1 output vertical start pulse and UD pin output logical"1" to gate driver.
41	VGH	P	Power supply for Gate on output
42	VGL	P	Power supply for Gate off output
43	AVDD	P	Power supply for Analog circuits.
44	RESET	I/O	Global reset pin. Active low to enter Reset State. Suggest to connecting with an RC reset circuit for stability. Normally pull high.
45	NC	-	Not connect.
46	VCOM	P	The power supply for common voltage in TFT driving.
47	DITHB	I/O	Dithering function enable control. Normally pull high.
			DITHB="1": Disable internal dithering function. (Default) DITHB="0": Enable internal dithering function.
48	GND	P	Ground
49	NC	-	Not connect.
50	NC	-	Not connect.

4.3 Block Diagram



4.4 Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	-20 to 70	°C
Storage temperature	Tst	-30 to 80	°C
power supply	DVDD	-0.3V ~ 4.6	V
Analog Power supply.	AVDD	-0.5~13.5	V
Gate on Power supply	VGH	0~42.0	V
Gate off Power supply	VGL	-20.0~0.3	V

NOTE:

If the module was used these absolute maximum ratings as above, it may be damaged permanently. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability. VDD>GND must be maintained.

4.5 Electrical Characteristics

Item		Symbol	Min.	Typ.	Max.	Unit
power supply		DVDD	3.0	3.3	3.6	V
Analog Power supply		AVDD	10.2	10.4	10.6	V
Gate on Power supply		VGH	14.5	(15)	15.5	V
Gate off Power supply		VGL	-8.5	-8	-7.5	V
Common voltage		VCOM	3.74	4.24	4.74	V
Logic input signal Voltage	H level	V_{IH}	0.7*DVDD	-	DVDD	V
	L level	V_{IL}	0	-	0.3*DVDD	V

4.6 Backlight Characteristics

Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	-	22.4	-	V	IF=40mA
Number of LED	-	14			pcs	-
Power Consumption	PWF	-	896	-	mW	-
Connection mode	P&S	2P7S			-	-
LED life-span	-	(20000)	-	-	Hrs	Ta=25℃ Brightness ≤50%-

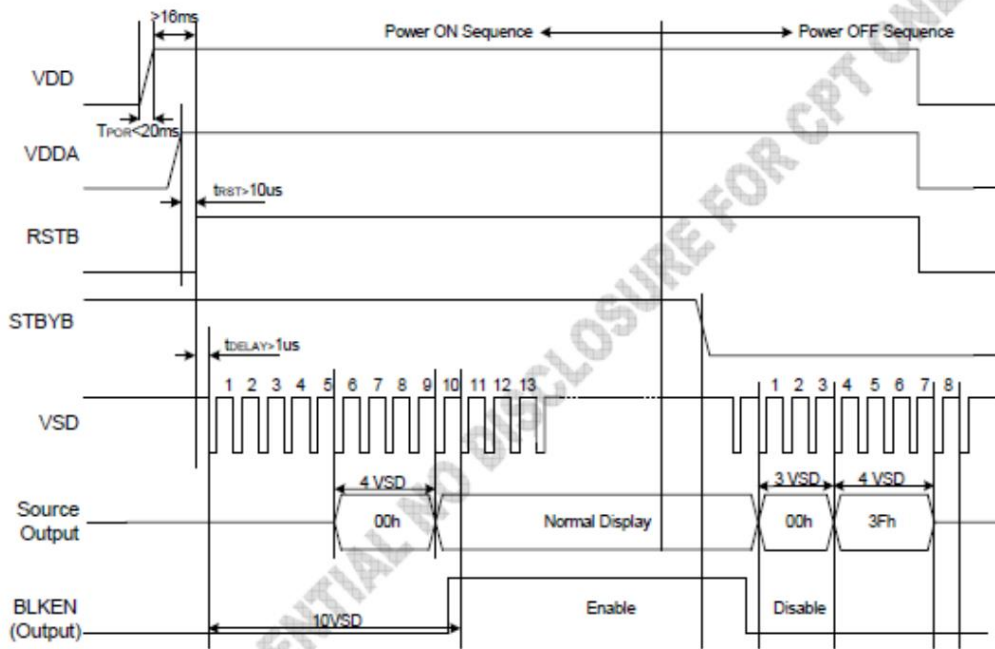
4.7 Timing Characteristics

Power ON/OFF Sequence

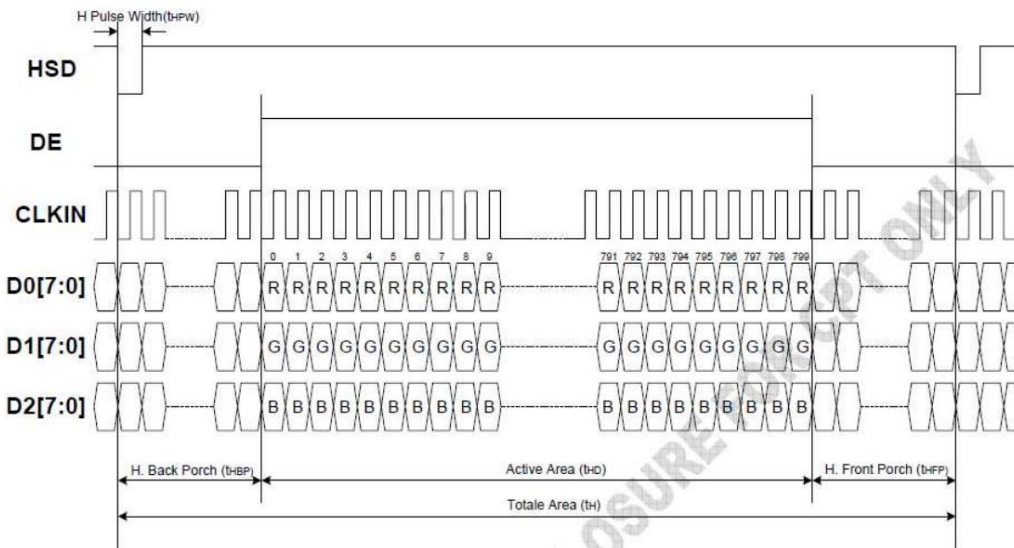
To prevent the device damage from latch up, the power ON/OFF sequence shown below must be followed.

Power ON: VDD, DGND → VDDA, AGND → V1 to V14

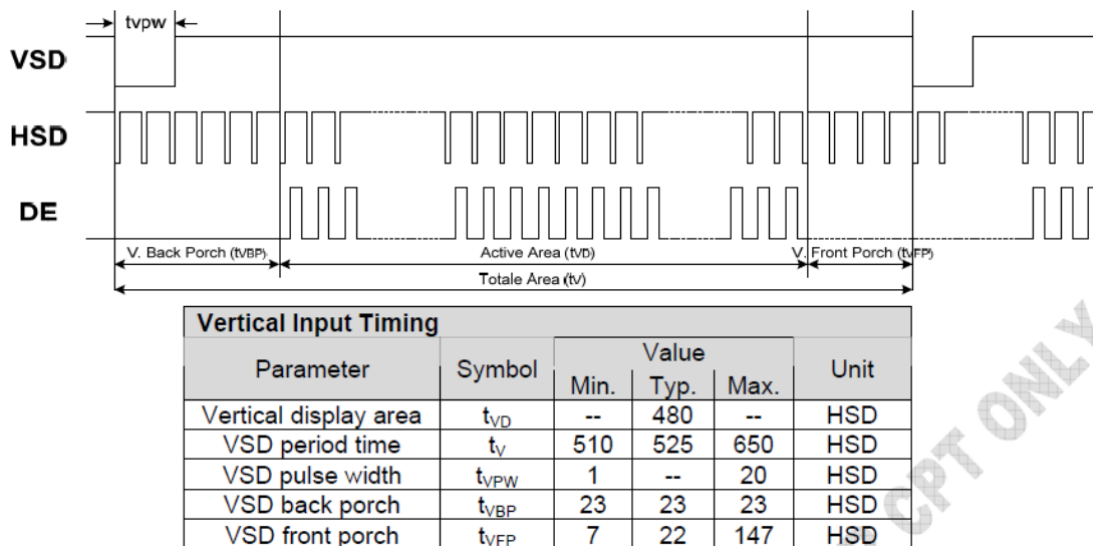
Power OFF: V1 to V14 → VDDA, AGND → VDD, DGND



Note: For prevent anormal operation, t_{RST} must be longer than 10us during Power ON sequence.



Horizontal Input Timing						
Parameter		Symbol	Value			Unit
			Min.	Typ.	Max.	
Horizontal display area		t_{HD}	--	800	--	CLKIN
CLKIN frequency		f_{CLK}	--	33.3	50	MHz
1 Horizontal line period		t_H	862	1056	1200	CLKIN
HSD pulse width	Min.	t_{HPW}	--	1	--	CLKIN
	Typ.		--	--	--	CLKIN
	Max.		--	40	--	CLKIN
HSD back porch	SYNC	t_{HBP}	46	46	46	CLKIN
HSD front porch	SYNC	t_{HFP}	16	210	354	CLKIN



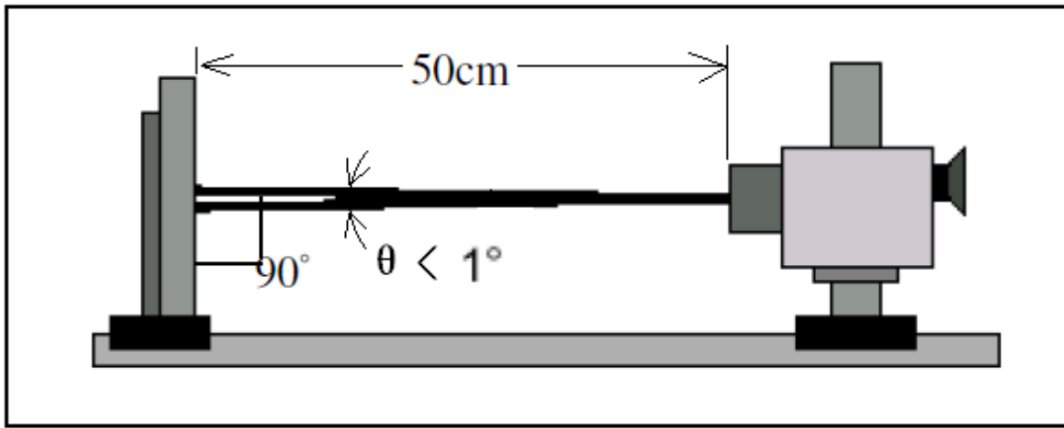
4.8 Electro-Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Response time	Tr	$\theta = 0^\circ$	-	10	20	ms	4
	Tf	$\phi = 0^\circ$	-	15	30	ms	
Uniformity (Five point)	δ WHITE	$T_a = 25^\circ\text{C}$	-	75	-	%	7
Contrast ratio	Cr		400	500	-	-	3,5
Surface Luminance	Lv		350	400	-	-	3,7
Viewing angle range	θ	$\phi = 90^\circ$	-	70	-	deg	6
		$\phi = 270^\circ$	-	70	-	deg	
		$\phi = 0^\circ$	-	70	-	deg	
		$\phi = 180^\circ$	-	50	-	deg	
Color filter chromaticity (x, y)	White	$\theta = \phi = 0^\circ$	X	0.296	0.336	0.376	7
			Y	0.314	0.354	0.394	

Note 1: Ambient temperature= $25^\circ\text{C} \pm 2^\circ\text{C}$

Note 2: To be measured in the dark room with backlight unit.

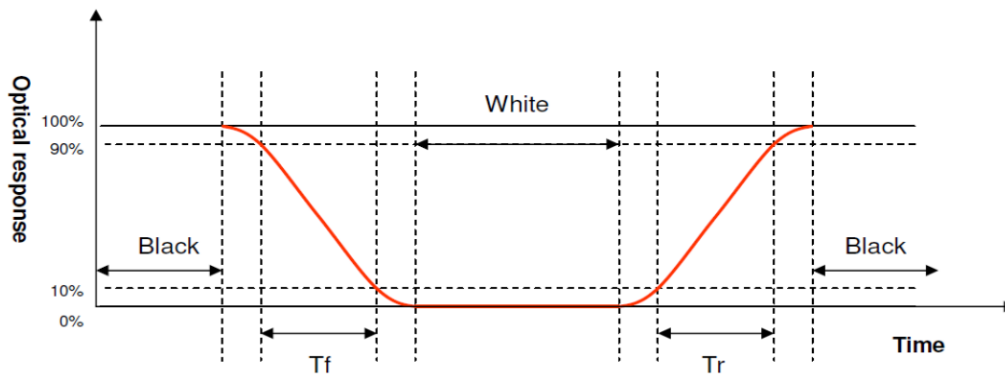
Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).



Note 4: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from “black” to “white” (rising time) and from “white” to “black” (falling time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes.

Refer to figure as below.



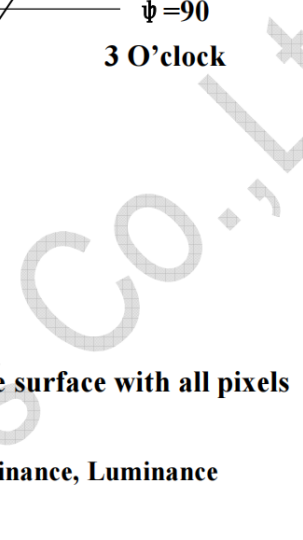
Note 5. Definition of contrast ratio:

Contrast ratio is calculated with the following formula:

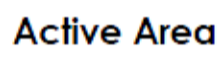
$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

Note 6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 2, for TFT module the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.



Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity



measurement instrument is TOPCON' s luminance meter BM-7A

L_v = Surface Luminance with all white pixels (P₅)

5 可靠性试验标准 RA test**5.1 高温保存 High temperature storage test**

内容 Contents	备注 Remark
(1)温度 70℃,放置 240 小时; (2)室温放置 24 小时以上; (3) 功能与外观符合规格要求。 (1)Put the product at 70 °C for 240 hours; (2) Keep at a room temperature for more than 24 hours; (3) The function and appearance meet the specification	

5.2 低温保存 Low temperature storage test

内容 Contents	备注 Remark
(1)温度 -20℃,放置 240 小时; (2)室温放置 24 小时以上; (3)功能与外观符合规格要求。 (1) Put the product -20℃ for 240 hours; (2) Keep at a room temperature for more than 24 hours; (3) The function and appearance meet the specification	

5.3 高温高湿保存 High temperature & high humidity

内容 Contents	备注 Remark
(1) 温度 70 °C 湿度 90 % , 放置 240 小时; (2)室温放置 24 小时以上; (3)功能与外观符合规格要求。 (1) Put the product at 70 °C and 90 % RH environment for 240 hours; (2) Keep at a room temperature for more than 24 hours; (3) The function and appearance meet the specification	

5.4 冷热冲击测试 Thermal shock test

内容 Contents	备注 Remark
(1) -20 °C(0.5 hour)→70 °C(0.5 hour)共 50 次循环; (2)室温放置 24 小时以上; (3)功能与外观符合规格要求。 (1) -20℃(30min)→ 70 °C(30min) total 50 cycles; (2) Keep at a room temperature for more than 24 hours; (3) The function and appearance meet the specification	

5.5 钢球跌落 Ball Drop Test

内容 Contents	备注 Remark
227g钢球,从60cm高度自由落下至产品中心位置。玻璃无破裂,测试3次,产品无破裂 227g steel ball freely fell to the center of the product from a height of 60cm. The glass was not cracked. Do this test 3 times	

5.6 表面硬度 Surface Hardness

内容 Contents	备注 Remark
7H铅笔,压力500g,产品表面与铅笔成45°划5条线,表面无刮伤 pencil:7H,force:500g ,angle :45° between product surface and pencil; draw five lines. Surface of the panel has no scuffing	

5.7 FPC 弯折/拉力测试 FPC bending / tension test

内容 Contents	备注 Remark
FPC 弯曲半径为 1mm, 弯曲次数 3 次, 测试产品性能。 bending radius:1mm, 3 times ,there is no breakage , the function of the FPC is OK	

6. 外观检验标准 Appearance inspection standard

6.1 Inspection condition 检验条件

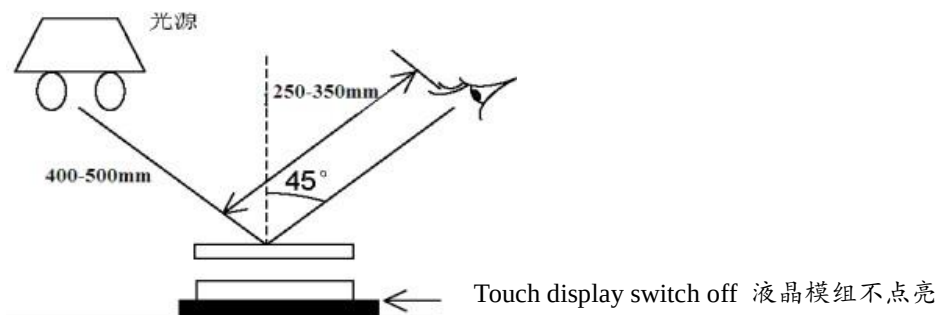
6.1.1 Temperature/温度: $22 \pm 3^{\circ}\text{C}$; humidity/湿度: $50\% \pm 25\%\text{RH}$;

6.2 Glass printing area Inspection condition 玻璃印刷区域检验

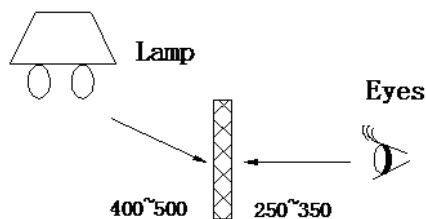
6.2.1 Reflection light (RL) and Through Light (TL) inspection conditions 透过和反射检验环境:

Under the cold white fluorescent lamp (LUX: $1000 \pm 200\text{LUX}$) 在冷白色的荧光灯台下 (LUX: $1000 \pm 200\text{LUX}$) ;

Touch display switch off 液晶显示模组不点亮



RL inspection method 反射检手法



TL inspection method 透过检手法

6.2.2 Inspection distance/检验距离:

Eye to product distance is 30 ± 5 cm, the product to lamp is 45 ± 5 cm, as shown in Picture 1 and picture 2
眼睛与产品距离 30 ± 5 cm, 产品与灯管距离 40 ± 5 cm, 如图 1 和图 2;

6.2.3 RL Inspection view/反射检验视角:

Vertical rotating 45 degrees from top to bottom, from left to right horizontally rotating 45 degrees
垂直旋转 $\pm 45^\circ$ (由上到下), 水平旋转 $\pm 45^\circ$ (由左到右)

6.2.4 Inspection time/检验时间:

Top side will be inspected for 10 s, then change to bottom side. Bottom side will be inspected for 10 s.

Then change to side view inspected for 5s~10 s;

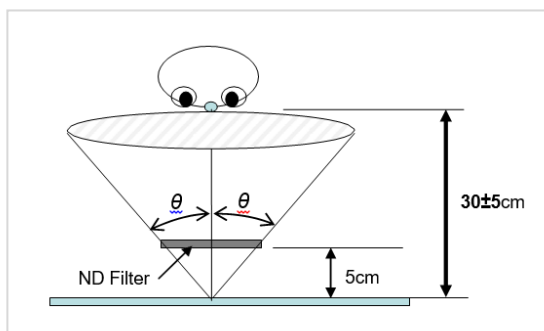
检验时间: 先检查正面, 正面检查时间 10 秒, 在检查背面, 背面检查时间 10 秒。最后检查四周边, 检查时间 5~10 秒;

6.2.5 Inspection frequency: 100% 检查频率: 100%检查

6.3 Visible Area Inspection condition 可视区检验

6.3.1 Under the dark room/在暗室 ; Dark room: 50~200lux(lighting) 暗室: 50~200lux 照度 (点亮液晶模组)

Touch display switch on/液晶显示模组点亮



Room temperature : 20 ~ 25 °C.

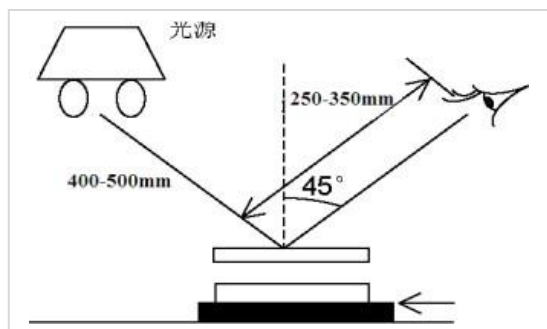
Humidity: 65±5% RH.

Distance: 30±5 cm in front of LCD unit with a viewing angle of $\Theta=10^\circ$. (Refer to picture3)

6.3.2 Under the bright room/在明亮的检验环境下 ;

Bright room: 800~1000 lux 亮室: 800~1000lux 照度;

6.3.2.1 Inspection distance/检验距离: Eye to product distance is 40 ± 5 cm, 眼睛与产品距离 40 ± 5 cm, 如图 3; Inspection time/检验时间: 20s 20 秒.



6.3.2.2 Inspection frequency: 100% 检查频率: 100%检查

6.3.2.3 Inspection method: same as Item 6.2.3

6.4 Glass printing area Inspection Criteria 玻璃印刷区域检验标准

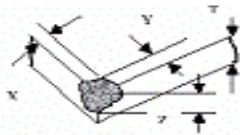
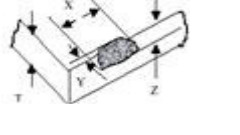
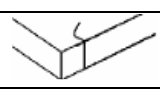
(inspection condition follow 6.2 检验条件参考条款 6.2)

Items	Conditions	Inspection Criteria	Method
Light Transparent Hole/Light Leakage 印刷针孔	TL/RL	Within 0.3mm of printing outer border: 从玻璃外边缘往里 0.3mm 范围内 $D \leq 0.2\text{mm}$, ignore; $D > 0.2\text{mm}$, not allowed; Without 0.3mm of printing outer border: 从玻璃外边缘往里 0.3mm 范围外 $D \leq 0.1\text{mm}$, ignore; $D > 0.1\text{mm}$, not allowed	Eye view, dot /wire gauge
Printing Saw edge 印刷锯齿	TL	Follow Glass VA dot-like and Linear defects SPEC. 按照可视区域点状, 线状不良管控。	Eye view, dot /wire gauge
Ink Off 油墨 脱落	TL	not allowed 不允许	Eye view
Stain and Dirty Mark 脏污、污迹	RL	* Contamination cannot be cleaned by soft cloth and alcohol, not Allowed; the non-cleanable stain should be inspected as "Dot-like Defects". 无尘布或者酒精无法擦拭的脏污不可有。不可擦拭脏污, 按 照点状不良管控。 * Contamination can be cleaned by soft cloth and alcohol, Accept; but if the ratio of such contamination defected products is more than 10% of all the inspected products, not allowed; 可擦拭脏污, 可接受, 但是比例不可超过整批产品的 10% 。	Eye view
Linear Particle 线状不良	RL	Refer to the view area Dot-like Defects 参考可视区线状不良管控标准	Eye view, dot /wire gauge
Dot-like Defects 点状不良	RL	Refer to the view area Dot-like Defects 参考可视区点状不良管控标准	Eye view, dot /wire gauge

6.5 View Area and other Area Appearance Inspection Criteria (Not TFT defect)

可视区域以及其他区域外观检验规范(非模组)

(inspection condition follow 6.3 and 6.2 检验条件参考条款 6.3 和 6.2)

Items	Conditions	Inspection Criteria	Method
Dot-like Defects 点状不良	RL	$D \leq 0.15\text{mm}$, ignore; $0.15\text{mm} < D \leq 0.2\text{mm}$, $N \leq 3$ $0.2\text{mm} < D \leq 0.25\text{mm}$, $N \leq 2$, accept $D > 0.25\text{mm}$, not allowed	Eye view, Dot/ wire gauge
Glass Dent Bubble 玻璃的平凹, 气泡	RL	$D \leq 0.1\text{mm}$, ignore; $0.1\text{mm} < D \leq 0.15\text{mm}$, $N \leq 3$, accept $D > 0.15\text{mm}$, not allowed	Eye view, dot /wire gauge
Linear Particle 线状不良	RL	$W \leq 0.03\text{mm}$, $L \leq 5\text{mm}$, ignore; $0.03\text{mm} < W \leq 0.05\text{mm}$, $L \leq 5\text{mm}$, $N \leq 3$, accept $0.05\text{mm} < W \leq 0.08\text{mm}$, $L \leq 5\text{mm}$, $N \leq 2$, accept $W > 0.08\text{mm}$ or $L > 5\text{mm}$, not allowed	Eye view, dot /wire gauge
Scratch (sensor/glass) 玻璃或 sensor 上的 划伤	RL	$W \leq 0.03\text{mm}$, $L \leq 5\text{mm}$, ignore; $0.03\text{mm} < W \leq 0.08\text{mm}$, $L \leq 5\text{mm}$, $N \leq 2$, accept $W > 0.08\text{mm}$ or $L > 5\text{mm}$, not allowed Inductive scratch, not allowed 有感刮伤不允许	Eye view, dot /wire gauge
Corner Defect、 Edge Defect 缺角、崩边	RL	“X” for Length, “Y” for Width, “Z” for Thickness, “T” for Total thickness of the glass; X: 长度, Y: 宽度, Z: 厚度, T: 玻璃总厚度; Corner defect/ 崩角: $X \leq 1.5\text{mm}$, $Y \leq 1\text{mm}$, $Z \leq 1\text{GT}$, and do not hurt line;	 
		warped corner/翘角: $X < 1.5\text{mm}$, $Y < 1\text{mm}$, $Z < \text{GT}$, except the exterior surface; Edge Defect /崩边: $X \leq 2\text{mm}$, $Y \leq 1\text{mm}$, $Z \leq \text{GT}$, and do not hurt line;	
Glass Crack 玻璃 裂痕	RL	Not allowed;	
FPC	RL	Bonding offset: FPC and sensor pin bonding about migration $< \text{pin width } 1/2$; (FPC 与 Sensor Pin bonding 左右偏移 $< \text{Pin 宽的 } 1/2$;)	
	RL	FPC surface are not allowed to have: crack, crease, with glue etc. 表面: 破裂、折痕、沾胶, 不允许;	
	RL	TFT all connectors have to be installed correctly 液晶模组上所有连接, 需要准确无误	
Gold finger 金手指	RL	Glue residue, broken, oxidation, smudgy, does not allow; 残胶、折伤、氧化、脏污, 不允许;	
Dirty/脏 污	RL	Flake smudgy does not allow, bad dot the dirt of the specifications of the reference point; 片状脏污不允许, 点状脏污不良参照点的规格;	
Total Defects 总缺点数		The defects were ignore, it is not count here. 忽略不计的不良, 不做统计。 Total 6 defects Max. 不超过 6 个缺点。	

Remarks: 1.Distance between two defects must be more than 10 mm. 缺点间距需要大于10 mm。

2. scratch that can felt, not allowed; scratch which is not recognizable by touch, follow the criteria above. 有感刮伤不允许。无感刮伤按照上述判定标准。

6.6 Display Specifications 显示模组检验标准

(inspection condition follow 6.3 检验条件参考条款 6.3)

Items	Condi tions	Inspection Criteria	Method
Bright dot 亮点	RL	$QTY \leq 2$; accept;	Eye view
Black dot 暗点	RL	$QTY \leq 3$; accept;	Eye view
Total		$QTY \leq 4$; accept; (Total bright dot and black dot)	Eye view
Inclusion 异物点	RL	$D \leq 0.25\text{mm}$, ignore; $0.25\text{mm} < D \leq 0.5\text{mm}$, $N \leq 3$, $D > 0.5\text{mm}$, not allowed	Eye view, dot /wire gauge
Linear Particle (include POL Linear indentation) 线状不良 (含偏光片线 状压痕)	RL	$W \leq 0.01\text{mm}$, ignore; $0.01\text{mm} < W \leq 0.05\text{mm}$, $L \leq 3\text{mm}$, $N \leq 3$, accept $W > 0.05\text{mm}$ or $L > 3\text{mm}$, not allowed	Eye view, dot /wire gauge
POL air bubble 偏光片气泡	RL	$D \leq 0.25\text{mm}$, ignore; $0.25\text{mm} < D \leq 0.5\text{mm}$, $N \leq 3$, $D > 0.5\text{mm}$, not allowed	Eye view, dot /wire gauge
Mura	RL	Black screen is not visible with ND 5% coverage, other screens are not controlled. 黑色画面下使用 5% 的 ND 卡 看不见视作良品。 其他颜色画面不进行管控。	Eye view, dot /wire gauge

Remark: 1.Distance between two defects must be more than 5 mm. 缺点间距需要大于 5mm。

6.6.1 定义 Definition

6.6.1.1 Dot defect: For dot defect, one sub pixel is defined as one dot. Defect area (of dot defect) should be larger than 1/2 area of one sub-pixel to be count as 1 dot defect. However, if bright area is small than 1/2 area of a sub-pixel, it won't be considered as a defect. 对于点缺陷，一个子像素定义为一个点。缺陷面积（点状缺陷）应大于 1 个子像素面积的 1/2 才算 1 个点缺陷。但是，如果亮区小于子像素的 1/2 区域，则不会被视为缺陷。

6.6.1.2 The drawing of 1/2 area sub-pixel definition: The 1/2 area sub-pixel can be defined as below one or more of specific shapes (Fig.1). The small bright dots is less than or equal to 10 dots. 1/2 区域子像素定义图：1/2 区域子像素可以定义为以下一个或多个特定形状（图 1）。小亮点小于或等于 10 点。

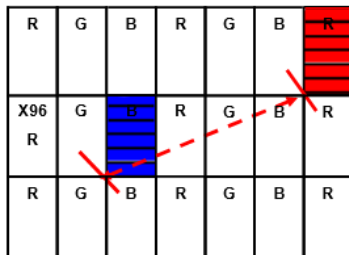


Fig.1

6.6.1.3 All bright dot defects should not be noticeable by observer under specified inspection environment (Please refer list as below). 在规定的检验环境下，所有的亮点缺陷都不应被观察者发现（见下表）。

Test Pattern 测试画面	Defect 不良类型
Black 黑色	For bright dot(s) 亮点
White 白色	For dark dot(s) 黑点
Red 红色	For bright and dark dot(s) 亮点和黑点
Green 绿色	For bright and dark dot(s) 亮点和黑点
Blue 蓝色	For bright and dark dot(s) 亮点和黑点

6.6.1.4 Definition of distance between defect dots as following 缺陷点之间的距离定义如下



6.7 TFT position inspection and function check

贴合后液晶模组位置度检查以及功能检查

Use “TFT_INSPECTION.exe” software “液晶位置度检查，使用液晶位置度检查软件

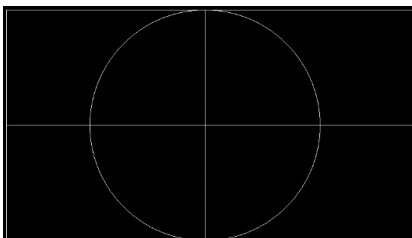
Inspection frequency: 100% 检查频率： 100%检查



TFT_INSPECTION.
exe.exe

This is the ICON of the used SW to check the TFT position. This SW will be used also to test Black, white, red, blue, green background.

使用此软件，对贴合后的产品进行位置度检查，要求黑、白、红、蓝、绿均需要检查。外围白色一圈可见为合格。

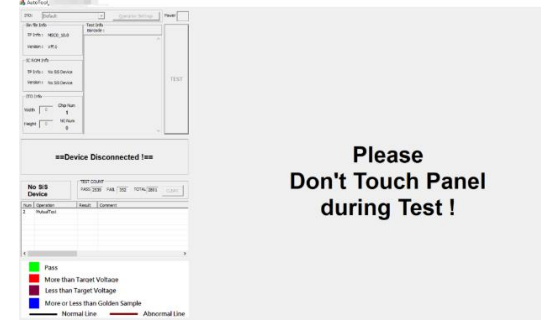
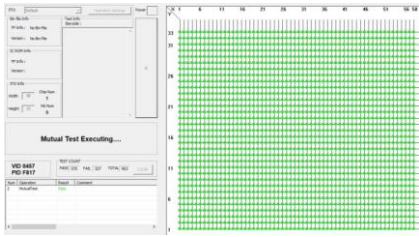
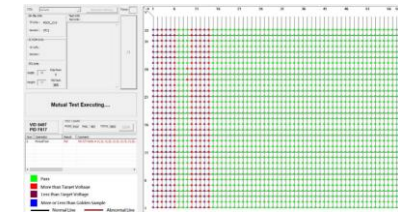


6.8 Touch panel Function check 触控面板的功能检查

6.8.1 Inspection frequency: 100% 检查频率: 100%

6.8.2 Function test Tool: SIS-Auto test tool 测试工具: SIS-Auto test tool

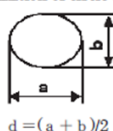
6.8.2 connect FPC to laptop and open the SIS-Auto test tool, press “Test” button.

Steps	Reference picture	Note
connect FPC to laptop and open the SIS-Auto test tool, press “Test” button.		
If Touch panel function is ok, picture show as below “ Pass”		
If Touch panel function is NG , will show “Fail” picture		

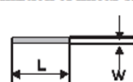
Note:

- 1) If we cannot see any spot or line in the appropriate operating condition of panel, it is Acceptable. 如果在适当的操作面板的条件下，我们不能看到任何点或线，它是可以接受的。
- 2) The foreign materials that can be blown out by air and washed out by wet cleaning are not regarded as a defect. 异物通过风不能吹掉的，且无尘布也不能擦拭掉的，视为不良。
- 3) Defects of Back side, located outside the View Area: Appearance defects, such as Scratch, Foreign Object, Stain and Dirty mark, on the backside of a Module don't lead to performance failure, Accept.
产品背面外观不良，不影响产品性能以及使用，则允收
- 4) Pin hole at Glass printing area . Can be repaired. Not visible from top side, and can not be clean by alcohol ,will be accepted.
玻璃印刷区域针孔可以维修。正面无异色，背面酒精无法擦拭则可接受。
- 6) W=Width; L=Length. Linear defects measurements method as below W=宽度; L=长度 (线状不良测量方法)
When $a \geq 2b$ or $L \geq 2W$, defect count as liner defect. 当 $a \geq 2b$ 或者 $L \geq 2W$, 缺点为线状缺点

Definition of circle size



Definition of linear size



7 出货检验事项 Quality Control Notices

每批交货实施下列检查，并附检查报告

We here shall make the quality inspection for each lot products as the following, and attach inspection report as well:

- (1) 外观 Appearance inspection
- (2) 尺寸 Out Dimension
- (3) 电气特性 Electric characteristics
- (4) 功能 function

8 使用过程中注意事项 Precautions in use

为了避免不良事故的发生和产品性能的破坏，请遵守如下警告及禁止事项。

In order to prevent accidental use and performance deterioration, please keep the following precautions and inhibited points.

8.1 储存注意事项 Cautions for storage

产品建议仓储环境：温度 $22 \pm 3^{\circ}\text{C}$ ，湿度 $65\% \pm 10\text{RH}$ ，避免阳光直射或重物重压。产品存储超过 6 个月，保护膜可能会有脏污，需客户自行更换。

Recommended storage environment: temperature $22 \pm 3^{\circ}\text{C}$, humidity $65\% \pm 10\text{RH}$, avoid direct sunlight or heavy weight. If the product is stored for more than 6 months, the protective film may be dirty, which needs to be replaced by the customer.

8.2 操作过程注意事项 Cautions for operation

- 1) 请勿以锐利刀刃或其它尖锐制品在本制品上磨擦。

Don't scratch or rub with knives or other sharp substances.

- 2) 请勿任意拉扯或弯折本制品。

Don't stretch or bend.

- 3) 请勿将产品堆叠放置以免引起表面刮花造成外观不良

To avoid scratch surface of product, so don't pile product.

- 4) 请避免将本制品靠近或暴露于有机溶剂，酸性气体的环境下使用及存放。

Keep away from organic solvent or acidic environment.

- 5) 请勿任意剥离或拆解本制品。

Don't detach the surface or disassemble the product.

- 6) 请勿拉其尾端(FPC)以提起本制品，应以提起制品本体为正确的方式。

Do not lift the product by the FPC. Lift by the product body instead.

- 7) 制品上有污迹时，请以柔质绵布或沾有中性洗剂,酒精的布料轻拭。若不慎有刺激性药品附着于制品上时，在不影响人体健康状态下,请迅速擦拭。

To remove dirt or smear on the surface, use soft cotton or cloth with ethanol wipe off gently. For irritating substances, immediately wipe off if it doesn't affect personal health.

- 8) 请注意在玻璃端四周边角处,易因留有尖角而造成刮伤的危險。

Take caution to the four corners of the glass, which may cause injury when scratched..

8.3 搬运注意事项 Cautions for handling

- 1) 须保持产品的透明清晰度，因而在接触产品之前戴上清洁的指套、手套和面罩以免留下指纹或污点，并且握拿产品时请握住产品的四周

Transparency is an important factor for the product. So, please wear clean finger sacks, gloves and mask to protect the products from fingerprint or stain attach, and also hold the portion outside the view

area when handling the panel.

8.4 组装上机注意事项 Cautions for installing and assembling

- 1) 不要对产品施加额外的拉力。

Do not give excessive strain to the product.

- 2) T/P若有通气槽，请在设计产品结构时,注意产品附近不能有液体物和粉状物。

The transparent touch panel is provided with an air groove. Therefore please design the structure not to store any liquid nor any fine particles near it.

- 3) 当使用双面胶等将产品与 LCM 或其它机器组合时，请使用充分的力按压 T/P 的非动作区从而使 T/P 与 LCM 或其它机器粘合既无脱落又无空隙。当组合时，请平衡压合 T/P 角落和四周，由于 T/P 与机壳组合时起初粘合需一定的时间，所以当产品起初粘合好后，请勿接触产品。

When this product is attached on LCM or other target by using a double-sided tape etc., put an enough pressure onto the non-active area (Frame) of a touch panel so that neither exfoliation nor gap may take place between a touch panel and LCM or other target. As attachment, please apply pressure equally onto the corner part and four sides of a touch panel. There is a case to take a time being for conducting an original adhesion, therefore, please do not move the product after attachment.

8.5 其它注意事项 Other cautions

- 1) 由于环境温湿状态易发生变化，因此组装与仓储都应该保持环境一至($22 \pm 3^{\circ}\text{C}$ ， $65\% \pm 10\%\text{RH}$)。产品结露会引起产品的性能严重劣化。

Since the temperature and humidity of the environment are easy to change, both the assembly and storage should be maintained in the environment from $22 \pm 3^{\circ}\text{C}$ to $65\% \pm 10\%\text{RH}$. The product dew will cause serious deterioration of product performance.

- 2) 当产品组合上机时，若有硫性材料如硫化橡胶，这种材料在机壳附近可能会引起硫化反应，正因为这种异常现象的出现从而导致产品的线性紊乱，功能下降，请务必谨慎。

When this product was built into the set, if there is vulcanization material such as vulcanized rubber which has a possibility of generating the sulfuration gas near the set, since abnormalities will be caused to wiring of the product and it will become the cause of functional degradation, please give a constitutional cautions.

- 3) 虽然我司很谨慎地保证产品的品质，但是还会有像功能下降、断路、短路现象出现的可能。因此，贵方在设计产品装置的同时，请预先要研究引起产品功能不良的因素，并且要考虑产品的配置安全性。（设计组装区域时需要避免硬物顶到功能及走线区域。FPC区域不可有受到拉力，元件区需要避免正面接触导电物体。）

Although full care is taken to ensure product quality, failure modes such as degradation, short circuits, or open circuits might be caused. Therefore, to design a product set, please study the element of any single failure of the panel in advance and consider the safety of product configuration (When designing assembly area, it is necessary to avoid hard top to function and line area. FPC area must not be pulled, and element area should avoid frontal contact with conductive object.)

- 4) 产品仓存时间是180天，超过180天产品表面出现的外观不良、脏污问题，需要客户自行清洁处理。

Product warehouse storage time is 180 days, we will not be responsible for the poor appearance (dirt) that more than 180 days on the product surface, the customer needs to clean and handle it by himself.

- 5) 因客户整机组装、拆机造成的产品破损、刮花、脏污、FPC压伤、撕裂、毛丝等不良我司不接受退换货（TP 自身脏污、毛丝、白点超出标准的除外）

Due to customer machine assembly, disassemble cause product damage, scratches, dirt, FPC crushing, tearing, wool silk and other bad I do not accept return (TP own dirt, fuzz, white point beyond the standard except)

9. 工程图纸 Drawing

