

# 深圳市诚皓光电有限公司

*Shenzhen ChengHao Optoelectronic Co., Ltd.*

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## SPECIFICATION

**Product Model : CH430WV15A-CT**

Designed by	R&D Checked by	Quality Department by	Approved by

### Approval by Customer

OK

NG, Problem survey:

Approved By \_\_\_\_\_

## Revision Record

[illegible]

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## 1. Numbering System

TBD

## 2. TFT General Information

ITEM	STANDARD VALUES	UNITS
LCD type	4.3”TFT + CTP	--
Dot arrangement	480×(RGB)×800	dots
Color filter array	RGB vertical stripe	--
Display mode	IPS / Transmissive / Normally Black	--
Viewing Direction	ALL	--
TFT Driver IC	NT35510	--
CTP type	G+F+F	--
Surface Treatment	6H	--
CTP Driver IC	GT911	--
Module size	66.26(W)×113.9(H)×3.35(T)	mm
TFT/CTP Active area	56.16(W)×93.6(H)	mm
Dot pitch	0.117(W)×0.117(H)	mm
Interface	2 lane-MIPI DSI	--
Operating temperature	-20 ~ +70	℃
Storage temperature	-30 ~ +80	℃
Back Light	8 White LED in serial	--
Weight	TBD	g

[illegible]

## 4. Interface Description

### 4.1 TFT Interface Description

Pin NO.	SYMBOL	DESCRIPTION
1	LEDA	Power for LED backlight (Anode).
2	LEDK	Power for LED backlight (Cathode).
3	VCI	A supply voltage to the analog circuit.
4	IOVCC	A supply voltage to the logic circuit.
5	/RESET	Reset input pin, Active “L”.
6	LEDPWM	Used for turning On/Off external LED backlight control.
7	GND	Power ground.
8	MIPI_D1P	MIPI-DSI data Lane 1 positive-end input pin
9	MIPI_D1N	MIPI-DSI data Lane 1 negative-end input pin
10	GND	Power ground
11	MIPI_CLKP	MIPI-DSI clock Lane positive-end input pin
12	MIPI_CLKN	MIPI-DSI clock Lane negative-end input pin
13	GND	Power ground
14	MIPI_D0P	MIPI-DSI data Lane 0 positive-end input pin
15	MIPI_D0N	MIPI-DSI data Lane 0 negative-end input pin
16	GND	Power ground
17	TE	Tearing effect output pin to synchronize MCU to frame writing, activated by S/W command. When this pin is not activated, this pin is output low.
18	GND	Power ground
19	NC	NC.
20	NC	NC.

### 4.2 CTP Interface Description

Pin NO.	SYMBOL	DESCRIPTION
1	VDD	Digital Power.
2	RST	Reset pin. Active low to enter reset state.
3	INT	Interruption signal.
4	NC	NC.
5	NC	NC.
6	SCL	I2C_clock.
7	SDA	I2C_data.
8	GND	Power ground.

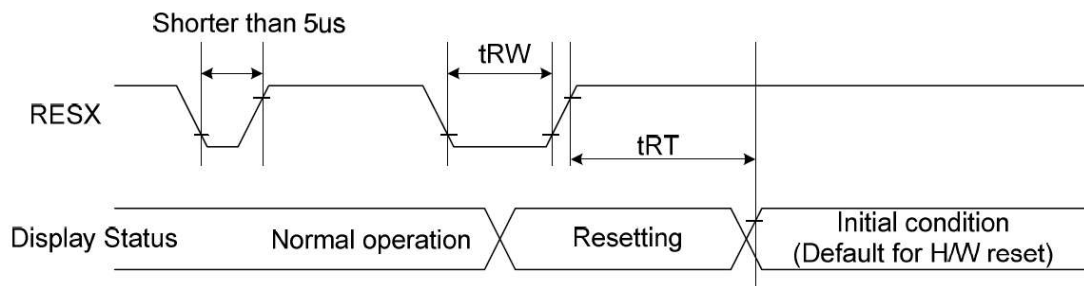
## 5. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	IOVCC	-0.3	4.6	V
Analog Supply Voltage	VCI	-0.3	4.6	V
Input Voltage	Vin	-0.3	IOVCC+0.5	V
Operating Temperature	TOP	-20	70	°C
Storage Temperature	TST	-30	80	°C
Storage Humidity	HD	20	90	%RH

## 6. DC Characteristics

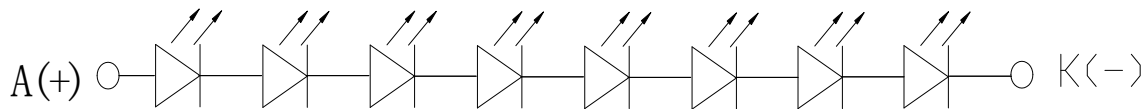
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Logic Supply Voltage	IOVCC	1.65	1.8/2.8	3.3	V	-
Analog Supply Voltage	VCI	2.5	2.8	3.3	V	-
Input High Voltage	V <sub>IH</sub>	0.7IOVCC	-	IOVCC	V	Digital input pins
Input Low Voltage	V <sub>IL</sub>	GND	-	0.3IOVCC	V	Digital input pins
Output High Voltage	V <sub>OH</sub>	0.8IOVCC	-	IOVCC	V	Digital output pins
Output Low Voltage	V <sub>OL</sub>	GND	-	0.2IOVCC	V	Digital output pins
I/O Leak Current	ILI	-1.0	-	1.0	uA	-

## 7. Reset Timing Characteristics



Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		uS
	tRT	Reset cancel		5 (note 1,5)	mS
				120 (note 1,6,7)	mS

## 8. Backlight Characteristics



Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition
Supply Voltage	Vf	23.2	26.4	28.0	V	If=20mA
Supply Current	If	-	20	30	mA	-
Luminous Intensity for LCM	-	250	300	-	Cd/m <sup>2</sup>	If=20mA
Uniformity for LCM	-	80	-	-	%	If=20mA
Life Time	-	20000	-	-	Hr	If=20mA
Backlight Color	White					

## 9. Optical Characteristics

The test of Optical specifications shall be measured in a dark room (ambient luminance 1lux and temperature =  $25 \pm 2^\circ\text{C}$ ) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of  $\theta$  and  $\Phi$  equal to 0. The center of the measuring spot on the Display surface shall stay fixed.

The backlight should be operating for 30 minutes prior to measurement.

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle	$\theta_L$	C.R. 10	70	80	-	degree
	$\theta_R$		70	80	-	
	$\theta_U$		70	80	-	
	$\theta_D$		70	80	-	
Contrast Ratio	-	T = $25^\circ\text{C}$	650	800	-	-
Transmittance	T%(with polarizer + D65 light)	T = $25^\circ\text{C}$	4.1	4.3	-	%
Response time	Tr	T = $25^\circ\text{C}$	35	40	ms	
	Tf					

Figure 1. The definition of Vth & Vsat

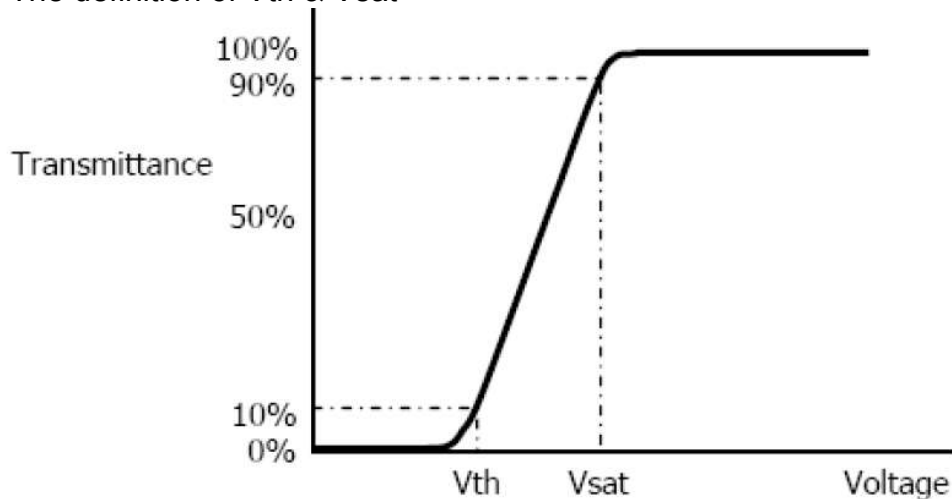


Figure 2. Measurement Set Up

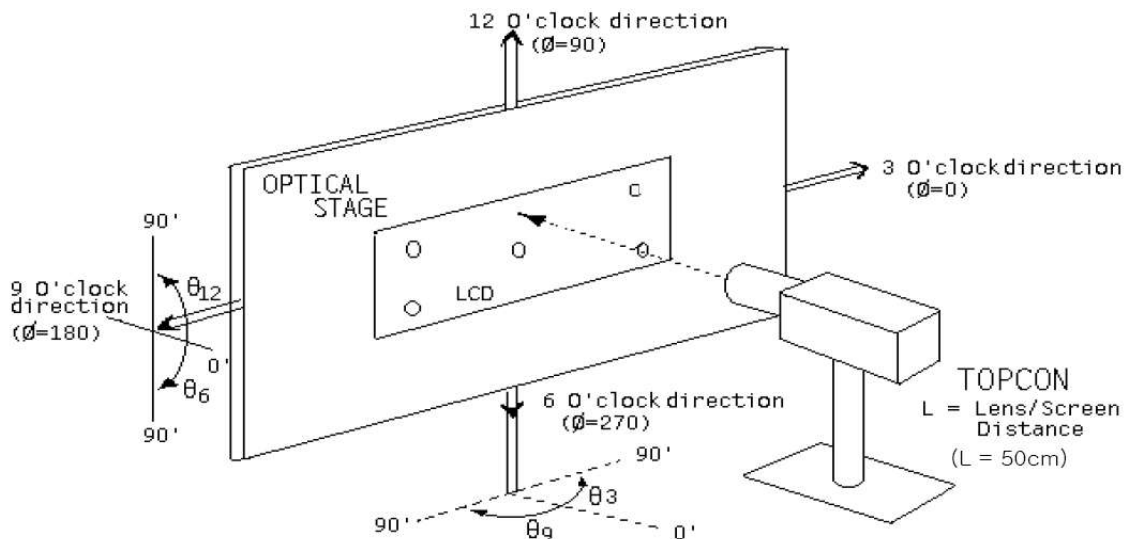
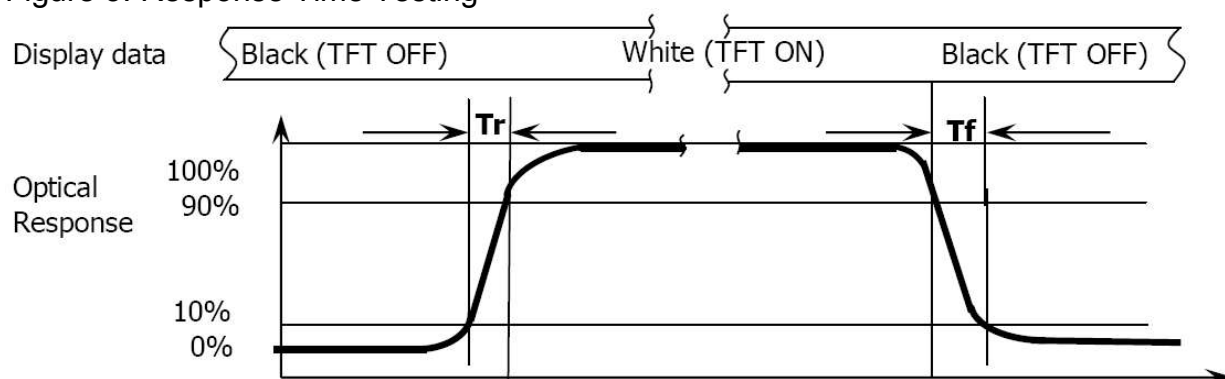


Figure 3. Response Time Testing



## 10. Reliability Test Conditions And Methods

NO.	TEST ITEMS	TEST CONDITION	INSPECTION AFTER TEST
①	High Temperature Storage	$80^{\circ}\text{C} \pm 2^{\circ}\text{C} \times 96\text{Hours}$	Inspection after 2~4hours storage at room temperature,the samples should be free from defects: 1,Air bubble in the LCD. 2,Sealleak. 3,Non-display. 4,Missing segments. 5,Glass crack. 6,Current IDD is twice higher than initial value. 7,The surface shall be free from damage. 8,The electric charateristic requirements shall be satisfied.
②	Low Temperature Storage	$-30^{\circ}\text{C} \pm 2^{\circ}\text{C} \times 96\text{Hours}$	
③	High Temperature Operating	$70^{\circ}\text{C} \pm 2^{\circ}\text{C} \times 96\text{Hours}$	
④	Low Temperature Operating	$-20^{\circ}\text{C} \pm 2^{\circ}\text{C} \times 96\text{Hours}$	
⑤	Temperature Cycle(Storage)	$-20^{\circ}\text{C} \longleftrightarrow 25^{\circ}\text{C} \longleftrightarrow 70^{\circ}\text{C}$ (30min) (5min) (30min) 1cycle Total 10cycle	
⑥	Damp Proof Test (Storage)	$50^{\circ}\text{C} \pm 5^{\circ}\text{C} \times 90\%\text{RH} \times 96\text{Hours}$	
⑦	Vibration Test	Frequency:10Hz~55Hz~10Hz Amplitude:1.5M X,Y,Z direction for total 3hours (Packing Condition)	
⑧	Drooping Test	Drop to the ground from 1M height one time every side of carton. (Packing Condition)	
⑨	ESD Test	Voltage: $\pm 8\text{KV}$ ,R:330 $\Omega$ ,C:150PF,Air Mode,10times	

### REMARK:

- 1,The Test samples should be applied to only one test item.
- 2,Sample side for each test item is 5~10pcs.
- 3,For Damp Proof Test,Pure water(Resistance  $> 10\text{M}\Omega$ )should be used.
- 4,In case of malfunction defect caused by ESD damage,if it would be recovered to normal state after resetting,it would be judge as a good part.
- 5,EL evaluation should be excepted from reliability test with humidity and temperature:Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.
- 6,Failure Judgment Criterion:Basic Specification Electrical Characteristic,Mechanical Characteristic,Optical Characteristic.

## 11. Inspection Standard

This standard apply to C-STN/TFT module

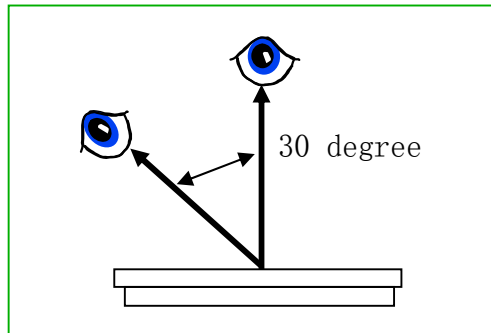
### 1. Spot check plan:

According to spot check level II ,MIL-STD-105D Level II ,the rank of accept or reject is below:

3A 级、2A 级: major non-conformance: AQL 0.25 minor non-conformance: AQL 0.4

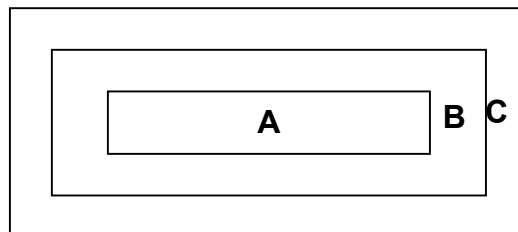
A 级: major non-conformance: AQL 0.65 minor non-conformance: AQL 1.

### 2. Inspection condition:



Under daylight lamp 20~40W, product distance inspector'eye 30cm,incline degree 30°.

### 3. LCD area define:



Area A: display area

Area B: VA area

Area C: out of VA area,not in sight after assembly

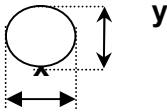
Remark :non-conformance at area C,but is OK that isn't influence reliability of product & assembly by customer.

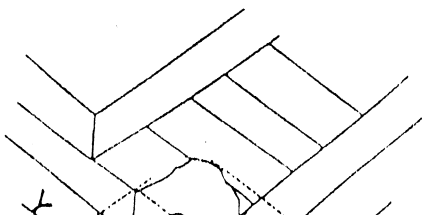
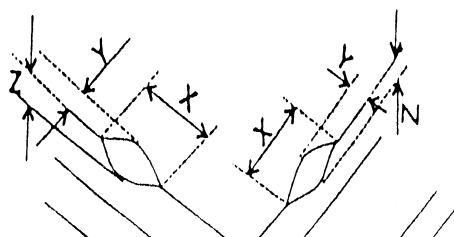
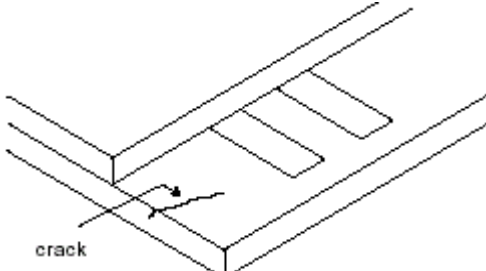
## 4. Inspection standard

### 4.1 Major non-conformance

NO.	Item	Inspection standard	Rate
4.1.1	Function non-conformance	1) No display, display abnormaly 2) Miss line, short 3) B/L no function or function abnormaly 4) TP no function	major
4.1.2	miss	No matter miss what component	
4.1.3	Out of size	Module dimension out of spec	

### 4.2 Appearance non-conformance

NO.	Item	Inspection standard	Rate																											
4.2.1	Black or white spot (power on)	<div> <div>dot non-conformance define <math>\Phi</math></div> <div> <math display="block">\Phi = \frac{(x+y)}{2}</math>  </div> </div>	Minor																											
		<div>A grade</div> <table> <tr> <th rowspan="2"> <div> <div>area</div> <div>size (mm)</div> </div> </th> <th colspan="3">Most approve q'ty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> <tr> <td><math>\Phi \leq 0.10</math></td> <td colspan="2">ignore</td> <td rowspan="5">ignore</td> </tr> <tr> <td><math>0.10 &lt; \Phi \leq 0.15</math></td> <td colspan="2">3</td> </tr> <tr> <td><math>0.15 &lt; \Phi \leq 0.20</math></td> <td colspan="2">2</td> </tr> <tr> <td><math>0.20 &lt; \Phi \leq 0.3</math></td> <td colspan="2">1</td> </tr> <tr> <td><math>0.3 &lt; \Phi</math></td> <td colspan="2">0</td> </tr> </table>		<div> <div>area</div> <div>size (mm)</div> </div>	Most approve q'ty			A	B	C	$\Phi \leq 0.10$	ignore		ignore	$0.10 < \Phi \leq 0.15$	3		$0.15 < \Phi \leq 0.20$	2		$0.20 < \Phi \leq 0.3$	1		$0.3 < \Phi$	0					
		<div> <div>area</div> <div>size (mm)</div> </div>			Most approve q'ty																									
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		$\Phi \leq 0.10$		ignore		ignore																								
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		$0.15 < \Phi \leq 0.20$		2																										
		$0.20 < \Phi \leq 0.3$		1																										
$0.3 < \Phi$	0																													
Most approve 4 damages, dot to dot $\geq 10\text{mm}$																														
4.2.2	Black or white line (power on)	<div>A grade</div> <table> <tr> <th colspan="2">Size(mm)</th> <th colspan="3">Most approve q'ty</th> </tr> <tr> <th>L(length)</th> <th>W(width)</th> <th>A</th> <th>B</th> <th>C</th> </tr> <tr> <td>ignore</td> <td><math>W \leq 0.03</math></td> <td colspan="2">ignore</td> <td rowspan="5">ignore</td> </tr> <tr> <td><math>L \leq 5.0</math></td> <td><math>0.03 &lt; W \leq 0.05</math></td> <td colspan="2">2</td> </tr> <tr> <td><math>L \leq 3.0</math></td> <td><math>0.05 &lt; W \leq 0.07</math></td> <td colspan="2">1</td> </tr> <tr> <td></td> <td><math>0.07 &lt; W</math></td> <td colspan="2">Treat with dot non-conformance</td> </tr> </table>	Size(mm)		Most approve q'ty			L(length)	W(width)	A	B	C	ignore	$W \leq 0.03$	ignore		ignore	$L \leq 5.0$	$0.03 < W \leq 0.05$	2		$L \leq 3.0$	$0.05 < W \leq 0.07$	1			$0.07 < W$	Treat with dot non-conformance		Minor
		Size(mm)		Most approve q'ty																										
		L(length)	W(width)	A	B	C																								
		ignore	$W \leq 0.03$	ignore		ignore																								
		$L \leq 5.0$	$0.03 < W \leq 0.05$	2																										
		$L \leq 3.0$	$0.05 < W \leq 0.07$	1																										
			$0.07 < W$	Treat with dot non-conformance																										
Most approve 3 damages, line to line $\geq 10\text{mm}$																														
4.2.3	Polarizer position	1) polarizer attach meet drawing,disallow out of LCD.	Minor																											
		2) polarizer must cover display area (special require unless)																												

4.2.4	LCD non-conformance	<p>(i) crash at side (remark: S=ITO length)</p>  <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0</td><td>≤S</td><td>ignore</td></tr></table> <p>Crash disallow extend to ITO or seal.</p>	X	Y	Z	≤3.0	≤S	ignore	Minor	
		X	Y	Z						
		≤3.0	≤S	ignore						
<p>(ii) commonly surface scathe</p>  <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤2.0</td><td>&lt;frame edge</td><td>ignore</td></tr></table>	X	Y	Z	≤2.0	<frame edge	ignore				
X	Y	Z								
≤2.0	<frame edge	ignore								
<p>(iii) crack</p> <p>Disallow extend crack</p> 										
4.2.5	Contrast voltage warp	VOP/Vlcd voltage of confirmed sample±0.15V	Minor							
4.2.6	color	Color & luminance of module scope reference spec	Minor							
4.2.7	Cross talk	Reference confirmed limit sample	Minor							

## 12. Handling Precautions

### 12.1 Mounting method

The LCD panel of CH LCD module consists of two thin glass plates with polarizers which easily be damaged. And since the module is so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

### 12.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent

[recommended below] and wipe lightly

- Isopropyl alcohol
- Ethyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:

- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns

Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux
- Chlorine (Cl) , Sulfur (S)

If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happens by miss-handling or using some materials such as Chlorine (Cl), Sulfur (S) from customer, Responsibility is on customer.

### 12.3 Caution against static charge

The LCD module uses C-MOS LSI drivers, so we recommend that you:

Connect any unused input terminal to Vdd or Vss, do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity.

### 12.4 packing

- Module employs LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity

### 12.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage than the limit causes the shorter LCD life.
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

## 12.6 storage

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it . And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else.  
[It is recommended to store them as they have been contained in the inner container at the time of delivery from us

## 12.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water

## 13. Precaution For Use

### 13.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

### 13.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported to CH LCD , and some problem is arisen in this specification due to the change
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

## 14. Packing Method

