

DISPLAY Elektronik GmbH

DATA SHEET

LCD MODULE

DEM 320240H1 VMH-PW-N

Product Specification

Version:0

16.08.2023

GENERAL SPECIFICATION

MODULE NO. :

DEM 320240H1 VMH-PW-N

CUSTOMER

VERSION NO.	CHANGE DESCRIPTION	DATE
0	ORIGINAL VERSION	16.08.2023

PREPARED BY: LM

DATE: 16.08.2023

APPROVEDBY: WH

DATE: 16.08.2023

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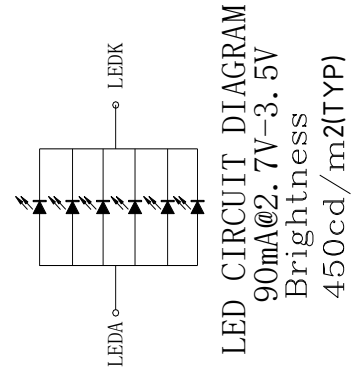
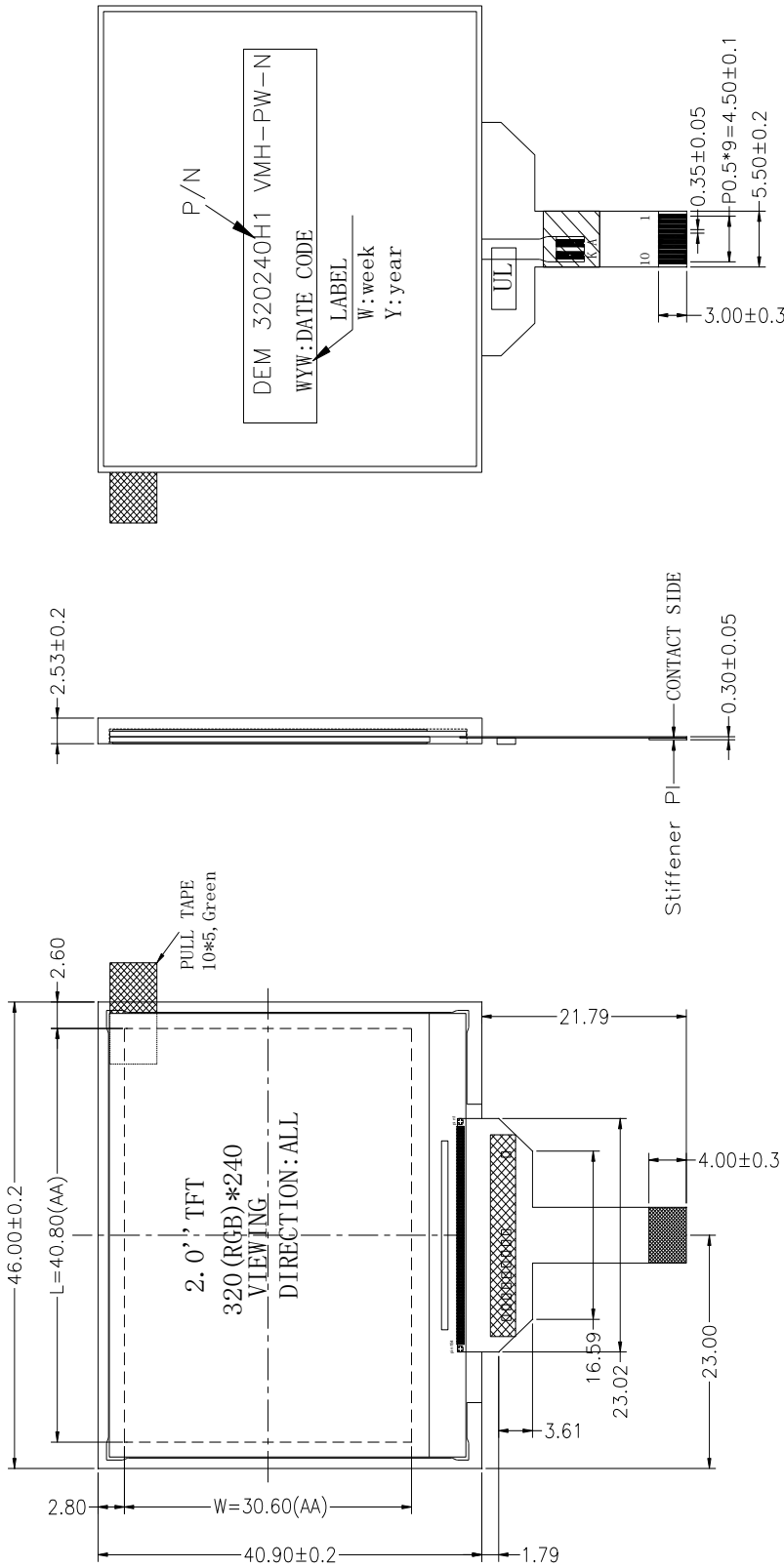
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1. GENERAL SPECIFICATIONS

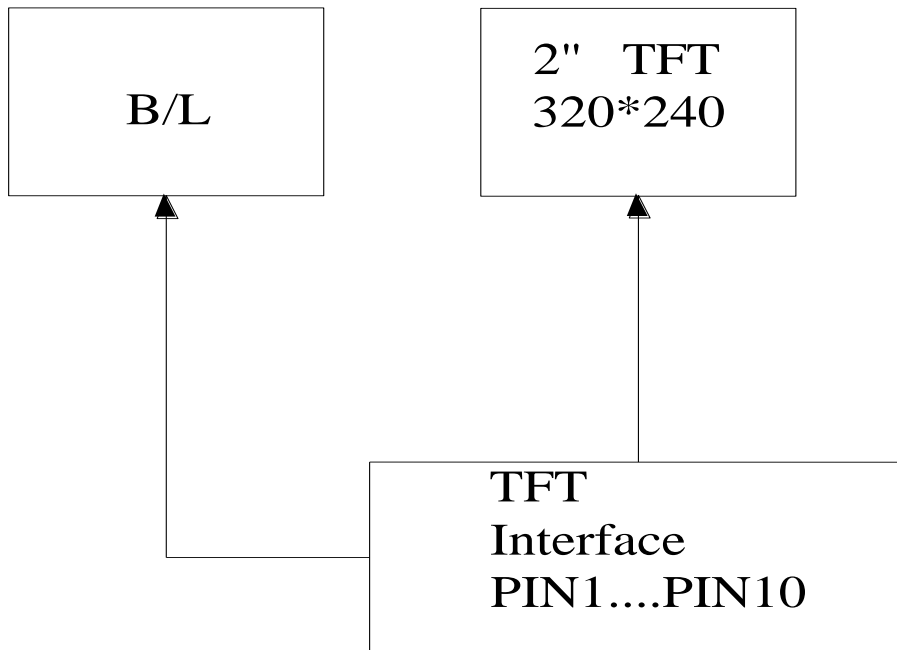
Item	Contents	Unit
LCD SIZE	2.0	Inch
LCD TYPE	TFT/IPS/NORMALLYBLACK/TRANSMISSIVE	
MODULE SIZE(W*H*T)	46.0 x 40.90 x 2.53	mm
ACTIVE SIZE(W*H)	40.80 x 30.60	mm
Pixel Size	0.0425 x 0.1275	mm
NUMBER OF DOTS	320 x RGB x 240	
DRIVER IC	ILI9342C	
INTERFACE TYPE	4-WIRE SPI	
RECOMMEND VIEWING DIRECTION	ALL	O'CLOCK
GRAY SCALE INVERSION DIRECTION	-	O'CLOCK
COLORS	262K	
BACKLIGHT TYPE	6-DIES WHITE LED	
TOUCH PANEL TYPE	WITHOUT	

2. EXTERNAL DIMENSIONS



1. Myymddnnn(for example M06H12001)
 M=Produced by RCL
 yy=2-digit loading year(06=2006,...,10=2010,...)
 m=1-alphabet loading month(A=Jan,B=Feb,...,L=Dec)
 dd=2-digit loading day(1,2,...,31)
 nnn=3-digit sequence number at our production line (001,002,...,999)
 nnn will not duplicate in the same date
 nnn maybe independence of project in the same date.
 2.Unmarked tolerance is ±0.3
 3.All materials comply with RoHS
 4.LED lifetime:50000Hrs

3.BLOCK DIAGRAM



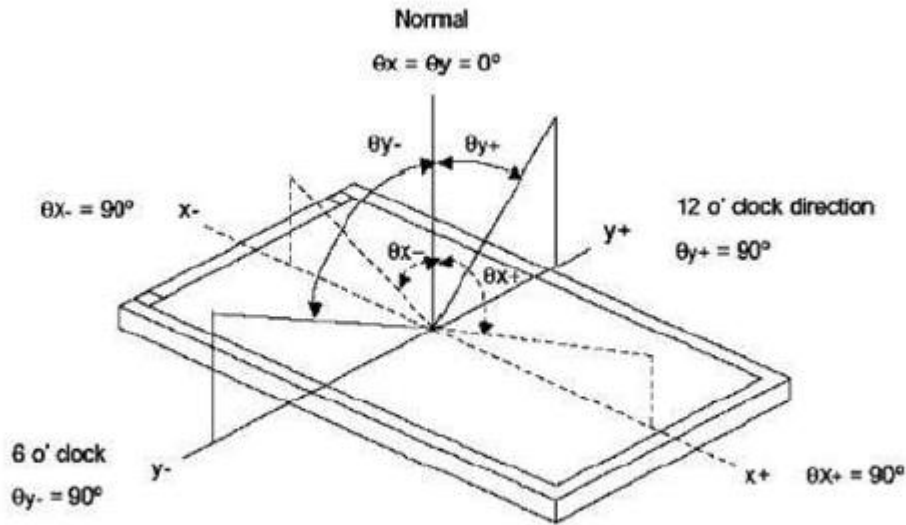
4. PIN ASSIGNMENT

PIN NO.	Symbol	Function
1	GND	Ground
2	D/CX	Display Data/Command Selection Serial Data
3	CSX	Chip Select
4	SCL	Serial Clock
5	SDA	Serial Data
6	RESET	Reset Signal Pin
7	VDD	Power supply for analog
8	VSS	Ground
9	LED+	Anode of LED backlight
10	LED-	Backlight LED Ground

5. OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE	
			MIN	TYP.	MAX			
Luminance	L		-	450	-	Cd/m ²		
Contrast ratio	CR	$\theta = 0^\circ$	1000	1500	-			
Response time	T _{ON}				30	40	ms	
	T _{OFF}							
CIE COLOUR COORDINATE	RED	RX	VIEWING NORMAL ANGLE	0.618	0.638	0.658		
		RY		0.318	0.338	0.358		
	GREEN	GX		0.276	0.296	0.326		
		GY		0.555	0.575	0.595		
	BLUE	BX		0.117	0.137	0.157		
		BY		0.104	0.124	0.144		
	WHITE	WX		0.298	0.318	0.338		
		WY		0.321	0.341	0.361		
VIEWING ANGLE	Hor.	θ_{x+}	CR ≥ 10	70	80	-	Degree	
		θ_{x-}		70	80	-		
	Ver.	θ_{y+}		70	80	-		
		θ_{y-}		70	80	-		

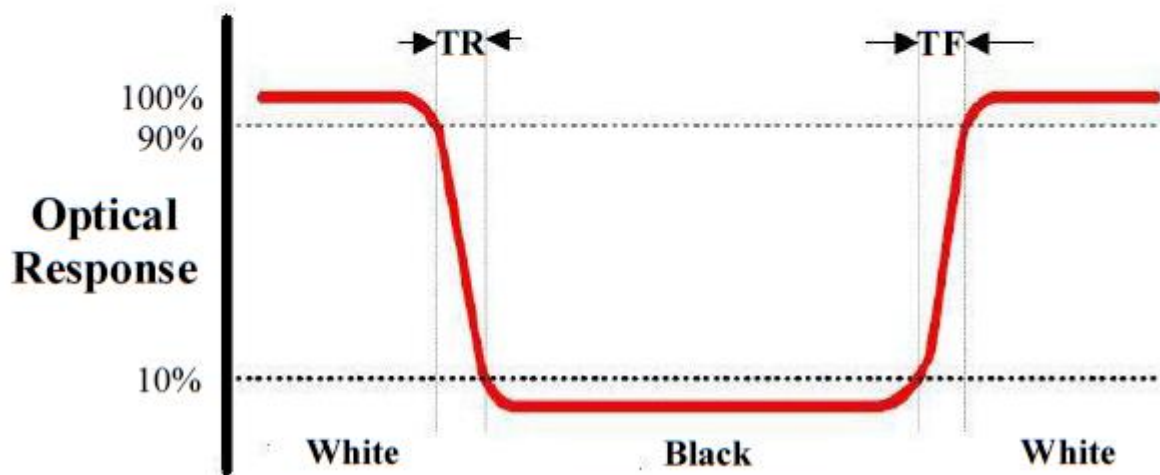
Note 1: Definition of Viewing Angle θ_x and θ_y :



Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Luminance of white state}}{\text{Luminance of black state}}$$

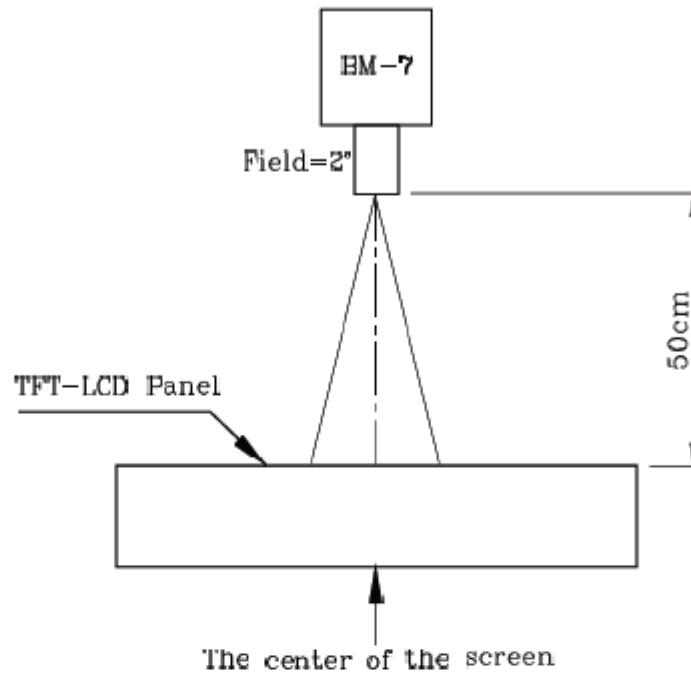
Note 3: Definition of Response Time (T_r, T_f)



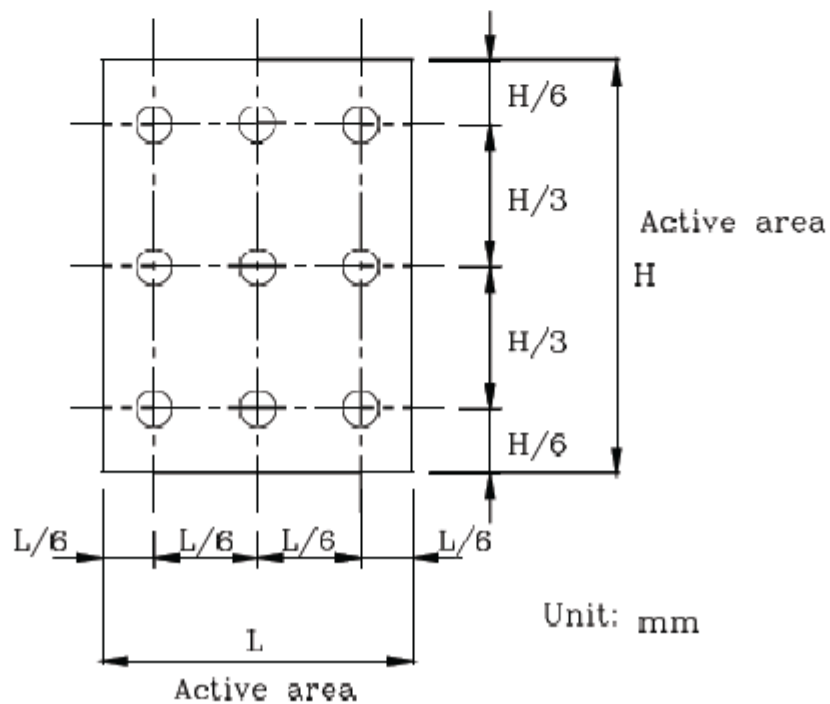
Note 4: Definition of Luminance

① The Brightness Test Equipment Setup

Field=2° (As measuring “black” image, field=2° is the best testing condition)



② The Brightness Test Point Setup



6. ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Power Supply Voltage	VDD	-0.3	4.2	V
Supply Voltage for Logic	VDDI	-0.3	3.0	V
Supply Current (One LED)	I _{LED}		15	mA
Operating Temperature	Top	-20	+70	°C
Storage Temperature	Tst	-30	+80	°C

7. ELECTRICAL CHARACTERISTICS**7.1 ELECTRICAL CHARACTERISTICS**

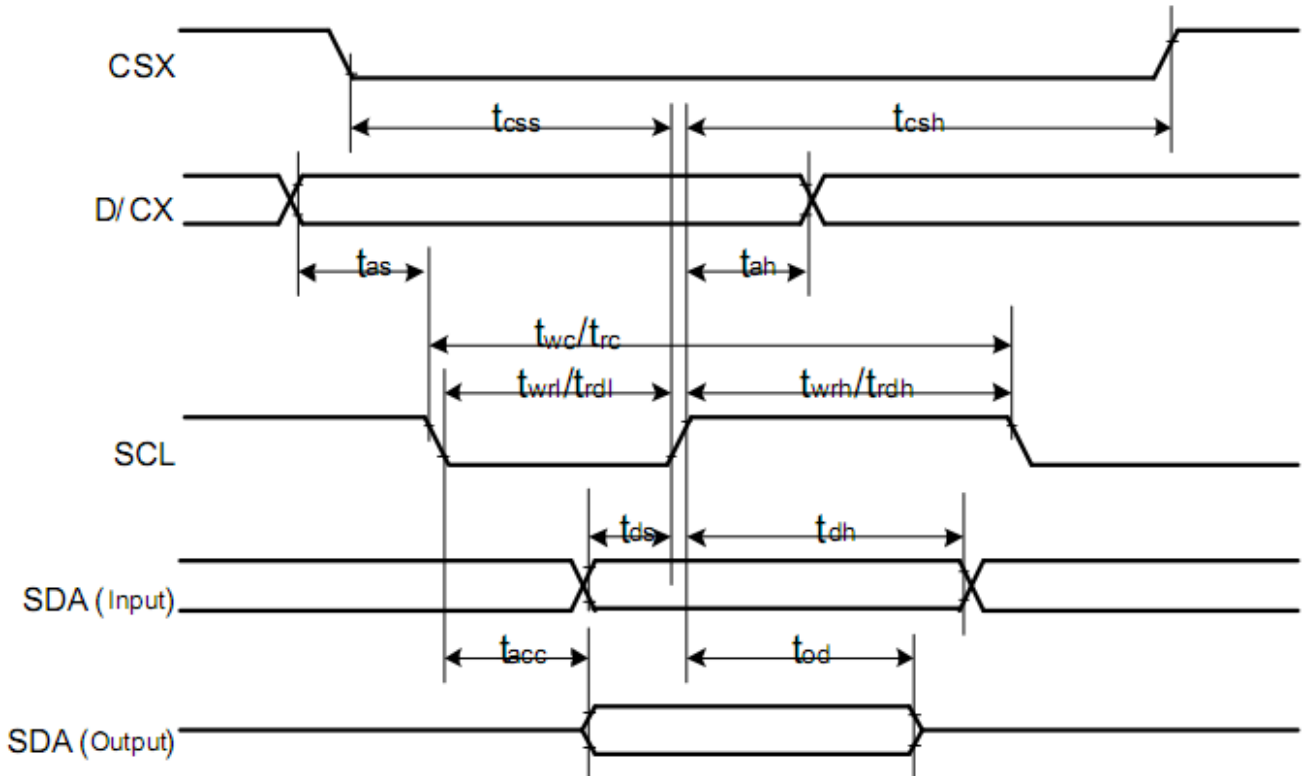
Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Power Supply	VDD	Ta=25°C	2.6	2.8	3.3	V	
Power Supply	VDDI	Ta=25°C	1.65	1.8	2.8	V	
Input Voltage	VIH	Ta=25°C	0.7VDDI	-	VDDI	V	
	VIL	Ta=25°C	GND	-	0.3VDDI	V	

7.2 BACKLIGHT CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply Voltage	Vr	-	2.7	-	3.5	V	
Supply Current	If	-		90		mA	
Power Consumption	P		0.243	-	0.315	W	
LED Lifetime	-	-	50000	-	-	Hr	

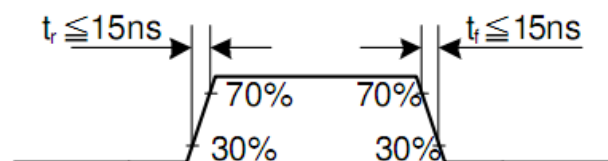
8.TIMING CHARACTERISTICS

(4-line SPI system)



Signal	Symbol	Parameter	min	max	Unit	Description
CSX	t_{css}	Chip select time (Write)	30	-	ns	
	t_{csh}	Chip select hold time (write)	30	-	ns	
SCL	t_{wc}	Serial clock cycle (Write)	100	-	ns	
	t_{wrh}	SCL "H" pulse width (Write)	35	-	ns	
	t_{wrl}	SCL "L" pulse width (Write)	35	-	ns	
	t_{rc}	Serial clock cycle (Read)	150	-	ns	
	t_{rdh}	SCL "H" pulse width (Read)	60	-	ns	
	t_{rdl}	SCL "L" pulse width (Read)	60	-	ns	
D/CX	t_{as}	D/CX setup time	10	-		
	t_{ah}	D/CX hold time (Write / Read)	10	-		
SDA (Input)	t_{ds}	Data setup time (Write)	30	-	ns	
	t_{dh}	Data hold time (Write)	30	-	ns	
SDA (Output)	t_{acc}	Access time (Read)	-	50	ns	For maximum CL=30pF
	t_{od}	Output disable time (Read)	15	50	ns	For minimum CL=8pF

Note: $T_a = 25\text{ }^\circ\text{C}$, $IOVCC=1.65\text{V to }2.8\text{V}$, $VCI=2.6\text{V to }3.3\text{V}$, $AGND=GND=0\text{V}$



9.RELIABILITY TEST ITEMS AND CRITERIA

NO.	TEST ITEM	CONDITIONS	
1	HIGH TEMPERATURE STORAGE	TA=+80°C	240H
2	LOW TEMPERATURE STORAGE	TA=-30°C	240H
3	HIGH TEMPERATURE OPERATION	TA=+70°C	240H
4	LOW TEMPERATURE OPERATION	TA=-20°C	240H
5	HIGH TEMPERATURE AND HIGH HUMIDITY OPERATION	+60°C, 90%RH	240H

10. LCD MODULES HANDLING PRECAUTIONS

- The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- If the display panel is damaged and the liquid crystal substance inside it leaks out, do not get any in your mouth. If the substance come into contact with your skin or clothes promptly wash it off using soap and water.
- Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarize carefully.
- To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - Be sure to ground the body when handling the LCD module.
 - Tools required for assembly, such as soldering irons, must be properly grounded.
 - To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
 - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
- Storage precautions

When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps. Keep the modules in bags designed to prevent static electricity charging under low temperature / normal humidity conditions (avoid high temperature / high humidity and low temperatures below 0°C).Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

11. OTHERS

- Liquid crystals solidify at low temperature (below the storage temperature range) leading to defective orientation of liquid crystal or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subjected to a strong shock at a low temperature.
- If the LCD modules have been operating for a long time showing the same display patterns may remain on the

screen as ghost images and a slight contrast irregularity may also appear. Abnormal operating status can be resumed to be normal condition by suspending use for some time. It should be noted that this phenomena does not adversely affect performance reliability.

- To minimize the performance degradation of the LCD modules resulting from caused by static electricity, etc. exercise care to avoid holding the following sections when handling the modules:
 - Exposed area of the printed circuit board
 - Terminal electrode sections.