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|--|--|-----------------------|
| EXAMINED BY :<br><br><i>C. H. Chiu</i>   | EMERGING DISPLAY<br><br>TECHNOLOGIES CORPORATION | FILE NO . CAS-0008800 |
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|  |  | VERSION : 1           |

CUSTOMER                      ACCEPTANCE                      SPECIFICATIONS

MODEL NO. :

ETEMB070016XDRAM

(RoHS)

FOR MESSRS :

\_\_\_\_\_

CUSTOMER'S APPROVAL

DATE :

\_\_\_\_\_

BY :

\_\_\_\_\_

EMERGING DISPLAY  
TECHNOLOGIES CORPORATION

|                  |         |      |
|------------------|---------|------|
| MODEL NO.        | VERSION | PAGE |
| ESEMB070016XDRAM | 1       | 0-1  |

|                     |                   |              |
|---------------------|-------------------|--------------|
| RECORDS OF REVISION | DOC . FIRST ISSUE | APR.12, 2019 |
|---------------------|-------------------|--------------|

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|------|------------------------|---|
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1. GENERAL SPECIFICATIONS

1.1 DATA SHEETS FOR EMBEDDED SYSTEM MCU DRIVER  
PLEASE REFER TO :

STM32H750

1.2 DATA SHEET FOR CAPACITIVE TOUCH PANEL CONTROLLER/ DRIVER  
PLEASE REFER TO :

ILI 2511

1.3 MATERIAL SAFETY DESCRIPTION

ASSEMBLIES SHALL COMPLY WITH EUROPEAN ROHS REQUIREMENTS, INCLUDING PROHIBITED MATERIALS/COMPONENTS CONTAINING LEAD, MERCURY, CADMIUM, HEXAVALENT CHROMIUM, POLYBROMINATED BIPHENYLS (PBB) AND POLYBROMINATED DIPHENYL ETHERS (PBDE), BIS(2-ETHYLHEXYL) PHTHALATE (DEHP), BUTYL BENZYL PHTHALATE (BBP), DIBUTYL PHTHALATE (DBP), DIISOBUTYL PHTHALATE (DIBP).

2. MECHANICAL SPECIFICATIONS

2.1 EMBEDDED SYSTEM MECHANICAL SPECIFICATIONS

- ( 1 ) DISPLAY SIZE ----- 7 inch
- ( 2 ) NUMBER OF DOTS ----- 1024W \* (RGB) \* 600H DOTS
- ( 3 ) MODULE SIZE ----- 194.4W \* 127.44H \*13.7(MAX.)D mm
- ( 4 ) VIEWING AREA ----- 155.21W \* 86.92H mm
- ( 5 ) ACTIVE AREA ----- 154.21W \* 85.92H mm
- ( 6 ) DOT SIZE ----- 0.0502W \* 0.1432H mm
- ( 7 ) PIXEL SIZE ----- 0.1506W \* 0.1432H mm
- ( 8 ) LCD TYPE ----- TFT , TRANSMISSIVE, ANTI-GLARE
- ( 9 ) COLOR ----- 262K
- ( 10 ) VIEWING DIRECTION ----- SUPER WIDE VIEW
- ( 11 ) BACK LIGHT ----- LED , COLOR : WHITE
- ( 12 ) INTERFACE MODE ----- RJ45(10/100 BASE), RS485, CAN, RS232, I<sup>2</sup>C, SPI, GPIO, USB

## 2.2 CAPACITIVE TOUCH PANEL MECHANICAL SPECIFICATIONS

- ( 1 ) TOUCH PANEL SIZE ----- 7 inch
- ( 2 ) OUTER DIMENSION ----- 194.4W \* 127.44H mm
- ( 3 ) EFFECTIVE AREA ----- 155.21W \* 86.92H mm
- ( 4 ) ACTIVE AREA ----- 155.6W \* 91.01H mm
- ( 5 ) INPUT TYPE ----- MULTI TOUCH \*
- ( 6 ) NUMBER OF TOUCH SENSOR ----- 28\*16 SENSORS

\*NOTE: ACCORDING TO IMPLEMENTATION DESIGN

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### 3. ABSOLUTE MAXIMUM RATINGS

#### 3.1 EMBEDDED SYSTEM ELECTRICAL ABSOLUTE MAXIMUM RATINGS

| ITEM                  | SYMBOL | MIN. | MAX. | UNIT | REMARK |
|-----------------------|--------|------|------|------|--------|
| POWER VOLTAGE FOR POE | VDC    | -0.3 | +57  | V    |        |
| POWER VOLTAGE FOR CN2 | VP_IN  | -0.3 | +40  | V    | VSS=0  |
| INPUT VOLTAGE         | VIN    | -0.3 | 4.0  | V    |        |

#### 3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

| ITEM                | OPERATING      |                                     | STORAGE        |                                     | REMARK                                  |
|---------------------|----------------|-------------------------------------|----------------|-------------------------------------|---|
|                     | MIN.           | MAX.                                | MIN.           | MAX.                                |   |
| AMBIENT TEMPERATURE | -20°C          | 70°C                                | -30°C          | 80°C                                | NOTE ( 1 ), ( 2 )                       |
| HUMIDITY            | NOTE ( 3 )     |                                     | NOTE ( 3 )     |                                     | WITHOUT<br>CONDENSATION                 |
| VIBRATION           | —              | 2.45 m/s <sup>2</sup><br>( 0.25 G ) | —              | 11.76 m/s <sup>2</sup><br>( 1.2 G ) | 10~100Hz XYZ<br>DIRECTIONS<br>1HR. EACH |
| SHOCK               | —              | 29.4 m/s <sup>2</sup><br>( 3 G )    | —              | 490 m/s <sup>2</sup><br>( 50 G )    | 10ms<br>XYZ DIRECTIONS<br>1 TIME EACH   |
| CORROSIVE GAS       | NOT ACCEPTABLE |                                     | NOT ACCEPTABLE |                                     |   |

NOTE ( 1 ) : Ta AT -30°C : WILL BE 48HRS MAX.

80°C : WILL BE 168HRS MAX.

NOTE ( 2 ) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE  
THIS PHENOMENON IS REVERSIBLE.

NOTE ( 3 ) : Ta ≤ 60°C : 90%RH MAX (96HRS MAX).

Ta > 60°C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY  
OF 90%RH AT 60°C(96HRS MAX).

#### 4. ELECTRICAL CHARACTERISTICS

##### 4.1 EMBEDDED SYSTEM ELECTRICAL CHARACTERISTICS

Ta = 25 °C

| ITEM                         | SYMBOL | CONDITION | MIN. | TYP. | MAX. | UNIT | REMARK                   |
|------------------------------|--------|-----------|------|------|------|------|--------------------------|
| POWER SUPPLY VOLTAGE FOR POE | VDC    | —         | 42.5 | 48   | 57   | V    | NOTE ( 3 )               |
| POWER SUPPLY CURRENT FOR POE | IDC    | VDC=48V   | —    | 205  | 250  | mA   | NOTE ( 3 )               |
| POWER SUPPLY VOLTAGE FOR CN1 | VP_IN  | —         | 7    | 12   | 36   | V    | VSS=0                    |
| POWER SUPPLY CURRENT         | IVP_IN | VP_IN=7V  | —    | 1335 | 1600 | mA   | —                        |
|                              | IVP_IN | VP_IN=12V | —    | 765  | 920  | mA   | —                        |
|                              | IVP_IN | VP_IN=36V | —    | 270  | 324  | mA   | —                        |
| LED LIFE TIME                | —      | —         | 30K  | —    | —    | HRS  | NOTE ( 4 )<br>NOTE ( 5 ) |

NOTE ( 1 ) : VIL/VIH/VOL/VOH REFER TO STM32H750 DATA SHEET

NOTE ( 2 ) : THE POWER SUPPLY OPTION SHOULD EITHER BE CN2 OR POE

NOTE ( 3 ) : FOLLOW IEEE 802.3AT TYPE B

NOTE ( 4 ) : CONDITIONS; TA=25°C, CONTINUOUS LIGHTING

NOTE ( 5 ) : DEFINITIONS OF LIFE TIME :

LCD LUMINANCE BECOMES HALF OF THE INITIAL VALUE.

#### 5. TIMING CHARACTERISTICS

REFER TO STM32H750 DATA SHEET

#### 6. MCU CHARACTERISTICS

| PARAMETER | MEMORY SIZE |          | REMARK |
|-----------|-------------|----------|--------|
|           | INTERNAL    | EXTERNAL |        |
| SD RAM    | 1MB         | 16 MB    | —      |
| FLASH     | 128KB       | 64 MB    | —      |

NOTE : THE EXTERNAL FLASH MEMORY SIZE CAN BE UP TO 128MB

7. OPTICAL CHARACTERISTICS

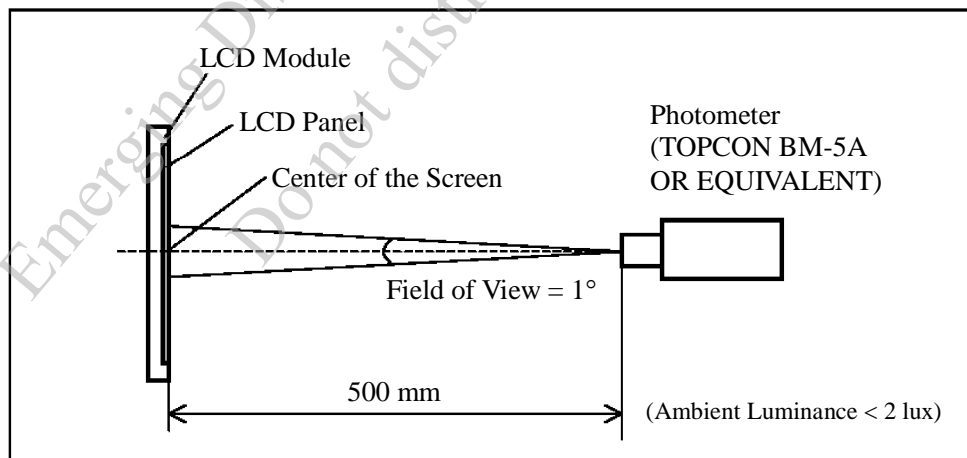
7.1 OPTICAL SPECIFICATIONS

Ta = 25 ± 2 °C

| ITEM                              | SYMBOL                  | CONDITION   | MIN.               | TYP. | MAX. | UNIT              | REMARK                   |            |
|-----------------------------------|-------------------------|---|--------------------|------|------|-------------------|--------------------------|------------|
| VIEWING ANGLE                     | $\theta_{y+}$           | CR ≥ 10   | 80                 | 85   | —    | deg.              | NOTE ( 2 )<br>NOTE ( 3 ) |            |
|                                   | $\theta_{y-}$           |   | $\theta_x=0^\circ$ | 80   | 85   |                   |                          | —          |
|                                   | $\theta_{x+}$           |   | $\theta_y=0^\circ$ | 80   | 85   |                   |                          | —          |
|                                   | $\theta_{x-}$           |   |                    | 80   | 85   |                   |                          | —          |
| CONTRAST RATIO (CENTER)           | CR                      | $\theta_x=0^\circ, \theta_y=0^\circ$                | 600                | 800  | —    | —                 | NOTE ( 3 )               |            |
| RESPONSE TIME                     | T <sub>R</sub> ( rise ) | $\theta_x=0^\circ, \theta_y=0^\circ$                | —                  | 13   | 20   | msec              | NOTE ( 4 )               |            |
|                                   | T <sub>F</sub> ( fall ) |   | —                  | 15   | 25   |                   |                          |            |
| COLOR CHROMATICITY (CENTER)       | WHITE                   | $\theta_x=0^\circ, \theta_y=0^\circ$<br>NTSC : 47 % | W <sub>x</sub>     | 0.26 | 0.31 | 0.36              | —                        | NOTE ( 5 ) |
|                                   |                         |   | W <sub>y</sub>     | 0.30 | 0.35 | 0.40              |                          |            |
|                                   | RED                     |   | R <sub>x</sub>     | 0.53 | 0.58 | 0.63              |                          |            |
|                                   |                         |   | R <sub>y</sub>     | 0.31 | 0.36 | 0.41              |                          |            |
|                                   | GREEN                   |   | G <sub>x</sub>     | 0.30 | 0.35 | 0.40              |                          |            |
|                                   |                         |   | G <sub>y</sub>     | 0.53 | 0.58 | 0.63              |                          |            |
|                                   | BLUE                    |   | B <sub>x</sub>     | 0.11 | 0.16 | 0.21              |                          |            |
|                                   |                         |   | B <sub>y</sub>     | 0.06 | 0.11 | 0.16              |                          |            |
| THE BRIGHTNESS OF MODULE (CENTER) | B                       | $\theta_x=0^\circ, \theta_y=0^\circ$                | 680                | 850  | —    | cd/m <sup>2</sup> | NOTE ( 6 )               |            |
| THE UNIFORMITY OF MODULE          | —                       |   | 65                 | 70   | —    | %                 | NOTE ( 7 )               |            |

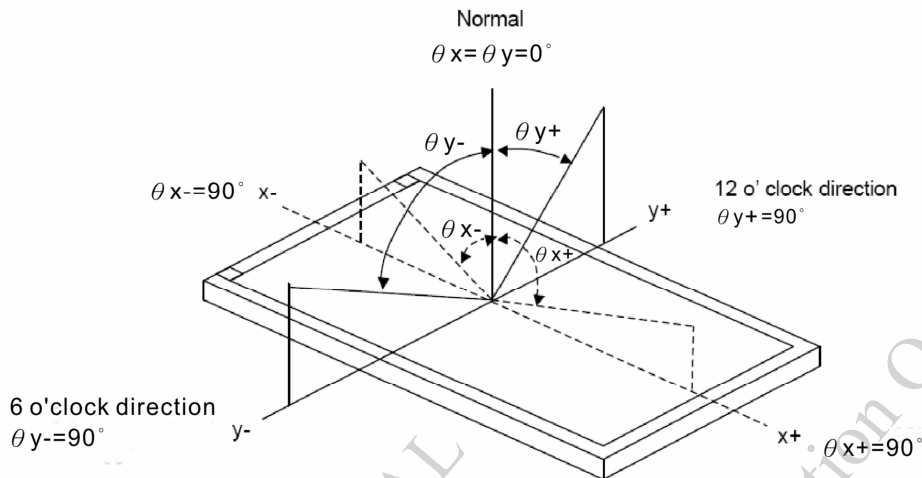
NOTE ( 1 ) : TEST CONDITION :

AFTER STABILIZING AND LEAVING THE PANEL ALONE AT A GIVEN TEMPERATURE FOR 30 MINUTES. MEASUREMENT SHOULD BE EXECUTED IN A STABLE, WINDLESS, AND DARK ROOM.





NOTE ( 2 ) : DEFINITION OF VIEWING ANGLE :



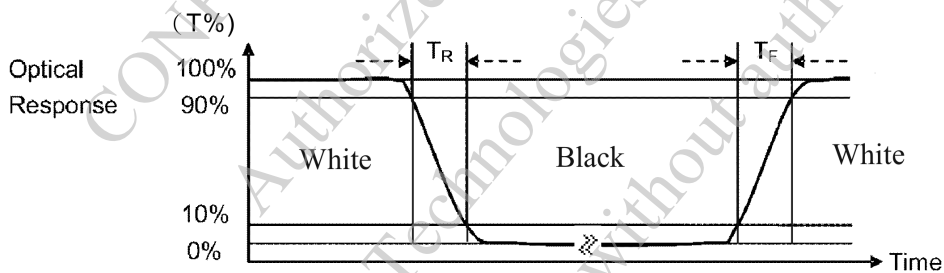
NOTE ( 3 ) : DEFINITION OF CONTRAST RATIO ( CR ) :

MEASURED AT THE CENTER POINT OF MODULE

$$\text{CONTRAST RATIO(CR)} = \frac{\text{BRIGHTNESS MEASURED WHEN LCD IS AT "WHITE STATE"}}{\text{BRIGHTNESS MEASURED WHEN LCD IS AT "BLACK STATE"}}$$

NOTE ( 4 ) : DEFINITION OF RESPONSE TIME :  $T_R$  AND  $T_F$

THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR.



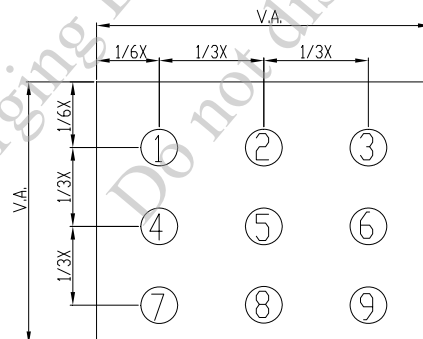
NOTE ( 5 ) : DEFINITION OF COLOR CHROMATICITY

(a)100% RGB PIXEL DATA TRANSMISSION WHEN ALL THE INPUT TERMINALS OF MODULE ARE ELECTRICALLY POWERED ON.

(b)MEASURED AT THE CENTER POINT OF MODULE

NOTE ( 6 ) : MEASURED THE BRIGHTNESS OF WHITE STATE AT CENTER POINT.

NOTE ( 7 ) : (a)DEFINITION OF BRIGHTNESS UNIFORMITY

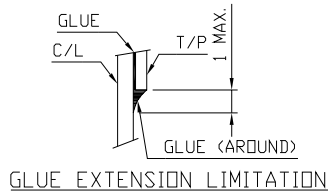
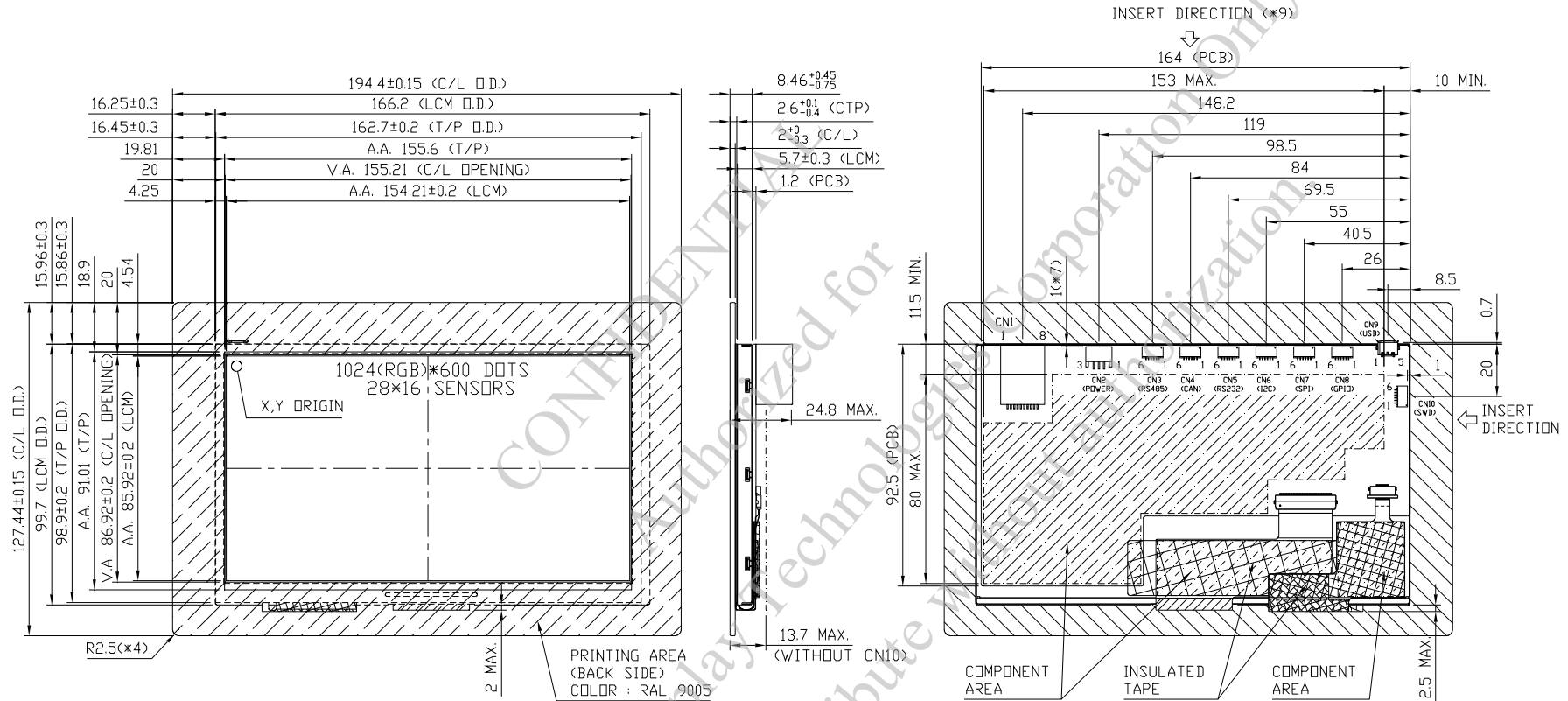


UNIT : mm

(b)THE BRIGHTNESS UNIFORMITY CALCULATING METHOD

$$\text{UNIFORMITY} : \frac{\text{MINIMUM BRIGHTNESS}}{\text{MAXIMUM BRIGHTNESS}} * 100\%$$

8. OUTLINE DIMENSIONS



UNIT : mm

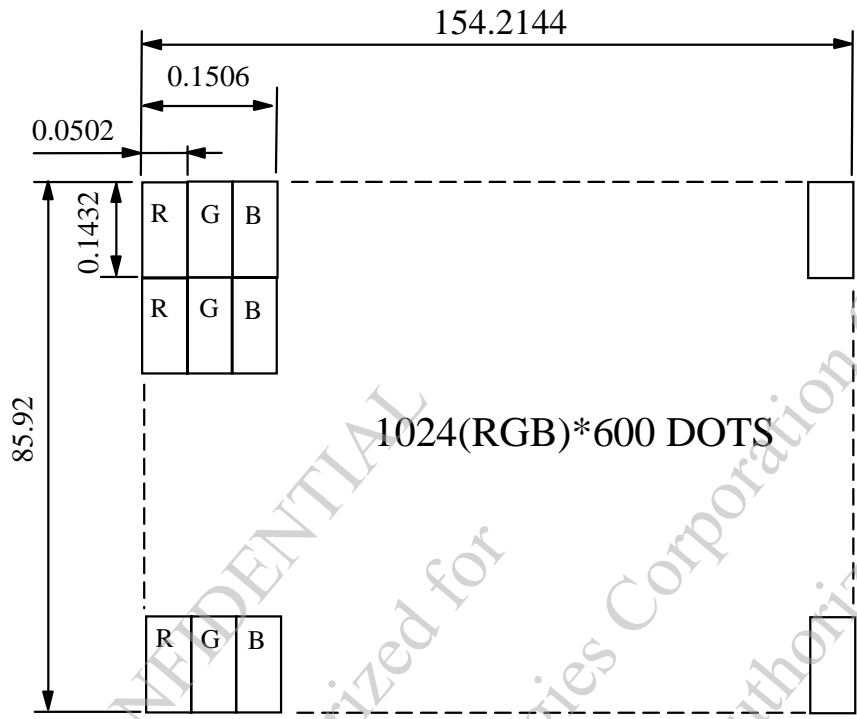
SCALE : NTS

NOT SPECIFIED TOLERANCE IS ± 0.5

NOTE :

- 1.C/L GLASS : SODA LIME, CHAMFERED EDGES
- 2.CN1 : WISCONN WRJ18D-436
- 3.CN2 : CHIN-TEK 2022-03/SMT
- 4.CN3~CN8,CN10 : JST SM06B-SRSS-TB(LF)(SN)
- 5.CN9 : MOLEX 47590-0001

9. DETAIL DRAWING OF DOT MATRIX

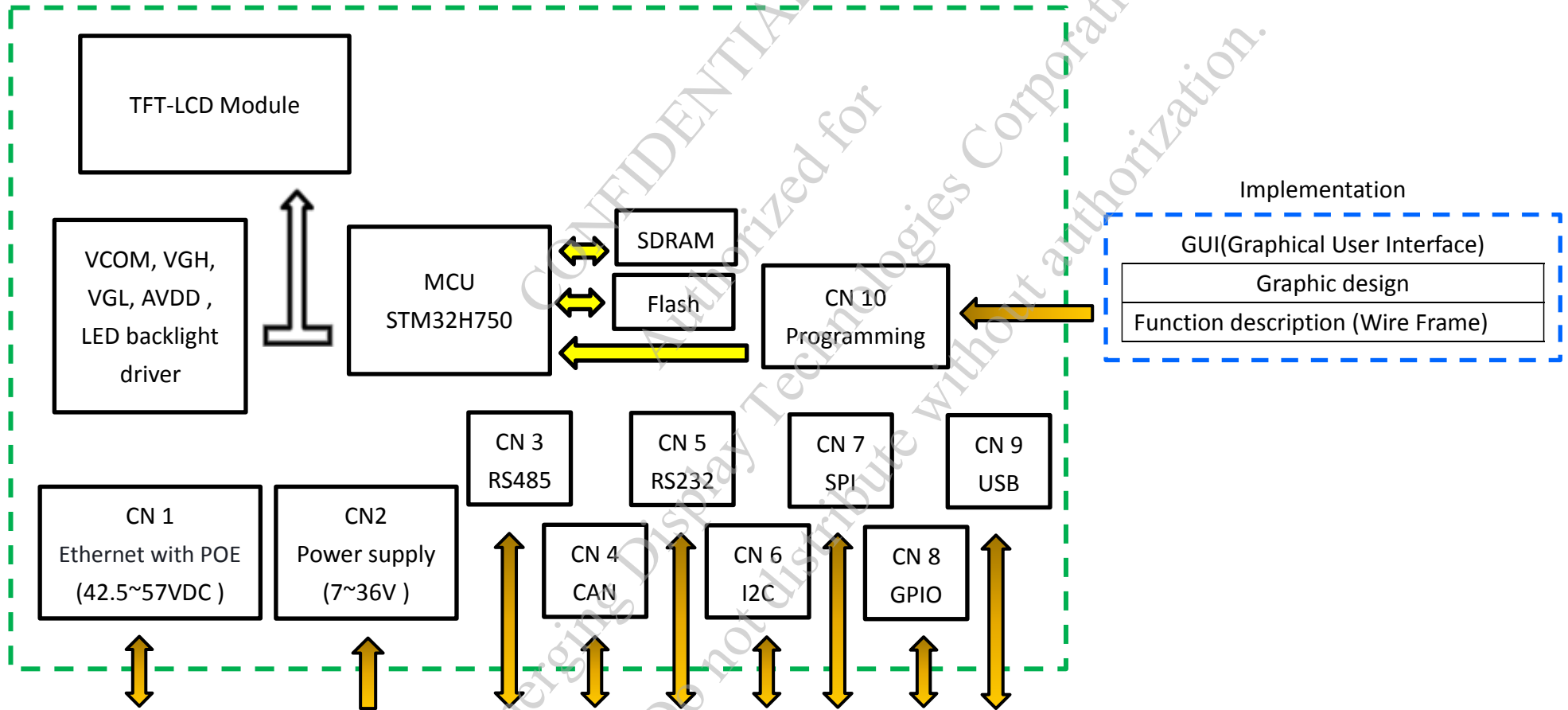


UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS  $\pm 0.1$   
DOTS MATRIX TOLERANCE IS  $\pm 0.01$

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10. BLOCK DIAGRAM

10.1 BLOCK DIAGRAM



10.2 IMPLEMENTATION TURN-KEY SOLUTION

| BUSINESS MODEL | IMPLEMENTATION         | GRAPHIC DESIGN         |
|----------------|------------------------|------------------------|
| MODEL 1        | EDT                    | EDT                    |
| MODEL 2        | EDT                    | CUSTOMER / THIRD PARTY |
| MODEL 3        | CUSTOMER / THIRD PARTY | CUSTOMER / THIRD PARTY |

NOTE : THE MODEL 3 WILL REQUIRE THE SOFTWARE IMPLEMENTATION BY CUSTOMER OR A THIRD PARTY. CUSTOMER OR THIRD PARTY WILL NEED TO PROVIDE A BIN OR HEX FILE TO EDT DURING INITIAL DESIGN/DEVELOPMENT STAGE OF PROJECT, AND COULD REFERENCE TouchGFX FOR THIS DEVELOPMENT.

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## 11. INTERFACE SIGNALS

### 11.1 CN1 RJ45 (10/100 BASE) WITH POE INTERFACE

| PIN NO. | SYMBOL | FUNCTION             |
|---------|--------|----------------------|
| 1       | TX+    | TRANSMIT DATA(+)     |
| 2       | TX-    | TRANSMIT DATA(-)     |
| 3       | RX+    | RECEIVE DATA DATA(+) |
| 4       | VDC+   | POWER INPUT(+)       |
| 5       | VDC+   | POWER INPUT(+)       |
| 6       | RX-    | RECEIVE DATA(-)      |
| 7       | VDC-   | POWER INPUT(-)       |
| 8       | VDC-   | POWER INPUT(-)       |

### 11.2 CN2 POWER SUPPLY INTERFACE

| PIN NO. | SYMBOL | FUNCTION                                 |
|---------|--------|--|
| 1       | VP_IN  | POWER SUPPLY                             |
| 2       | VP_EN  | POWER SUPPLY ENABLE (INTERNAL PULL HIGH) |
| 3       | VSS    | GROUND                                   |

### 11.3 CN3 RS485 INTERFACE

| PIN NO. | SYMBOL | FUNCTION |
|---------|--------|----------|
| 1       | VSS    | GROUND   |
| 2       | VSS    | GROUND   |
| 3       | RS485A | RS485-A  |
| 4       | RS485B | RS485-B  |
| 5       | VSS    | GROUND   |
| 6       | VSS    | GROUND   |

### 11.4 CN4 CAN BUS INTERFACE

| PIN NO. | SYMBOL | FUNCTION                  |
|---------|--------|---------------------------|
| 1       | VSS    | GROUND                    |
| 2       | VSS    | GROUND                    |
| 3       | CANL   | LOW LEVEL CAN BUS SIGNAL  |
| 4       | CANH   | HIGH LEVEL CAN BUS SIGNAL |
| 5       | VSS    | GROUND                    |
| 6       | VSS    | GROUND                    |

### 11.5 CN5 RS232 INTERFACE

| PIN NO. | SYMBOL | FUNCTION        |
|---------|--------|-----------------|
| 1       | VSS    | GROUND          |
| 2       | RTS    | REQUEST TO SEND |
| 3       | TX     | TRANSMIT DATA   |
| 4       | RX     | RECEIVE DATA    |
| 5       | CTS    | CLEAR TO SEND   |
| 6       | VSS    | GROUND          |

### 11.6 CN6 I2C INTERFACE

| PIN NO. | SYMBOL  | FUNCTION              |
|---------|---------|-----------------------|
| 1       | 3V3     | 3.3V OUTPUT           |
| 2       | I2C_SCL | CLOCK INPUT           |
| 3       | I2C_SDA | DATA INPUT AND OUTPUT |
| 4       | I2C_INT | INTERRUPT SIGNAL      |
| 5       | I2C_RST | RESET SIGNAL          |
| 6       | VSS     | GROUND                |

### 11.7 CN7 SPI INTERFACE

| PIN NO. | SYMBOL   | FUNCTION           |
|---------|----------|--------------------|
| 1       | 3V3      | 3.3V OUTPUT        |
| 2       | SPI_NSS  | CHIP SELECT SIGNAL |
| 3       | SPI_SCK  | SERIAL CLOCK       |
| 4       | SPI_MISO | SERIAL DATA OUTPUT |
| 5       | SPI_MOSI | SERIAL DATA INPUT  |
| 6       | VSS      | GROUND             |

### 11.8 CN8 GPIO INTERFACE

| PIN NO. | SYMBOL | FUNCTION                           |
|---------|--------|------------------------------------|
| 1       | GPIO1  | GPIO FUNCTION PER CUSTOMER REQUEST |
| 2       | GPIO2  | GPIO FUNCTION PER CUSTOMER REQUEST |
| 3       | GPIO3  | GPIO FUNCTION PER CUSTOMER REQUEST |
| 4       | GPIO4  | GPIO FUNCTION PER CUSTOMER REQUEST |
| 5       | GPIO5  | GPIO FUNCTION PER CUSTOMER REQUEST |
| 6       | GPIO6  | GPIO FUNCTION PER CUSTOMER REQUEST |

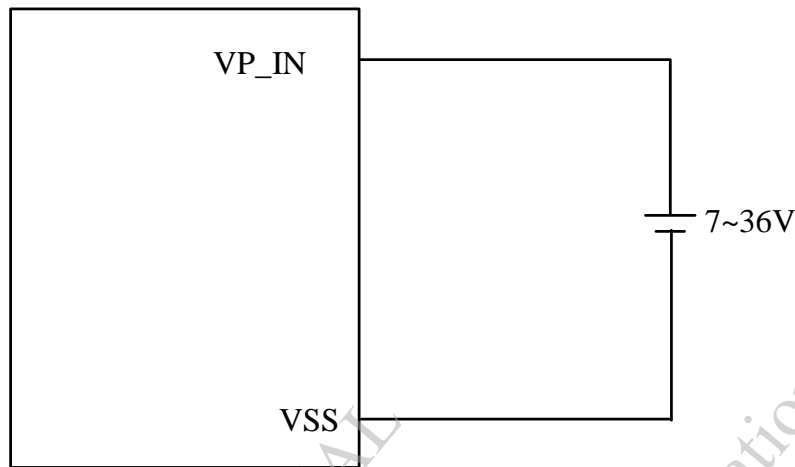
### 11.9 CN9 USB INTERFACE

| PIN NO. | SYMBOL | FUNCTION |
|---------|--------|----------|
| 1       | VBUS   | VBUS     |
| 2       | DM     | USB D -  |
| 3       | DP     | USB D+   |
| 4       | ID     | ID       |
| 5       | VSS    | GROUND   |

### 11.10 CN10 PROGRAMMING INTERFACE

| PIN NO. | SYMBOL | FUNCTION    |
|---------|--------|-------------|
| 1       | 3V3    | 3.3V OUTPUT |
| 2       | SWO    | SWO         |
| 3       | SWDIO  | DATA        |
| 4       | SWCLK  | CLOCK       |
| 5       | NRST   | RESET       |
| 6       | VSS    | GROUND      |

12. POWER SUPPLY



13. CAPACITIVE TOUCH PANEL SPECIFICATION

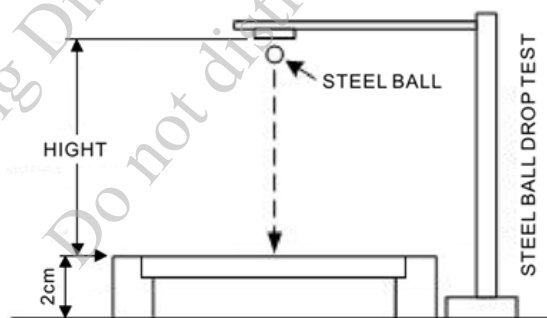
13.1 HARDNESS

| ITEM             | DESCRIPTION |
|------------------|-------------|
| SURFACE HARDNESS | 7H (min)    |

13.2 DURABILITY

USING STEEL BALL AND FALLING ON TOUCH PANEL SURFACE, FROM THE HEIGHT MUST PASS BELOW CONDITIONS :

| ITEM                 | CONDITION                              | INSPECTION METHOD | DESCRIPTION   |
|----------------------|--|-------------------|---|
| STEEL BALL DROP TEST | WEIGHT : 67g<br>HEIGHT OF FALL : 30 cm | VISUAL INSPECTION | SIGN OF FRACTURE OR DAMAGE IS NOT ACCEPTABLE<br>1 TIMES/ 1 POINTS,<br>25°C(CENTER TEST) |





14. INSPECTION CRITERION

14.1 APPLICATION

THIS INSPECTION STANDARD IS TO BE APPLIED TO THE LCD MODULE DELIVERED FROM EMERGING DISPLAY TECHNOLOGIES CORP.( E.D.T ) TO CUSTOMERS

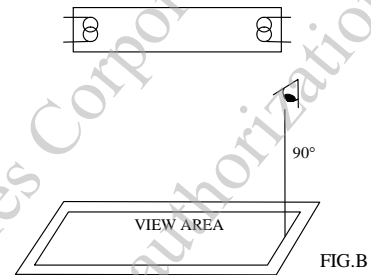
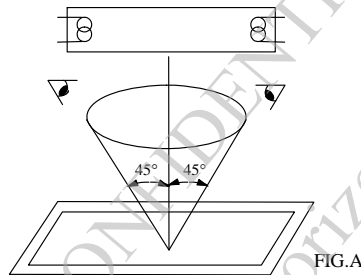
14.2 INSPECTION CONDITIONS

14.2.1 (1)OBSERVATION DISTANCE :  $45 \pm 5$ cm

(2)VIEWING ANGLE :  $\pm 45^\circ$

$\pm 45^\circ$  (FOR SECTION WITHIN VIEWING AREA), REFER TO FIG.A  
 $90^\circ$  (FOR SECTION OUTSIDE OF VIEWING AREA), REF TO FIG.B  
PERPENDICULAR TO MODULE SURFACE

VIEWING ANGLE SHOULD BE SMALLER THAN  $45^\circ$



THE INSPECTION CRITERIA IS ACCORDING TO LINE OF SIGHT. INSPECTION SHALL BE MADE WITHIN THE HALF SECTION OF THE VIEWING CONE GENERATED BY LINE SEGMENT OF  $45^\circ$  WITH RESPECTS TO THE VERTICAL AXIS FROM CENTER VERTEX OF LCD, THE FLUORESCENT LAMP AND THE CONE AXIS MUST BE PERPENDICULAR TO THE LCD SURFACE.

IF THE DEFECTS ARE OUTSIDE OF VIEWING AREA, IT SHALL BE INSPECTED BY  $90^\circ$  WITH RESPECTS TO THE VERTICAL AXIS FROM EDGE OF VIEWING AREA.

14.2.2 ENVIRONMENT CONDITIONS :

|                      |                       |                          |
|----------------------|-----------------------|--------------------------|
| AMBIENT TEMPERATURE  |                       | $25 \pm 5^\circ\text{C}$ |
| AMBIENT HUMIDITY     |                       | $65 \pm 20\% \text{RH}$  |
| AMBIENT ILLUMINATION | COSMETIC INSPECTION   | 600~800 lux              |
|                      | FUNCTIONAL INSPECTION | 300~500 lux              |
| INSPECTION TIME      |                       | 15 secs                  |

14.2.3 INSPECTION LOT

QUANTITY PER DELIVERY LOT FOR EACH MODEL

14.2.4 A SAMPLING INSPECTION SHALL BE MADE ACCORDING TO THE FOLLOWING PROVISIONS TO JUDGE THE ACCEPTABILITY

(a)APPLICABLE STANDARD :

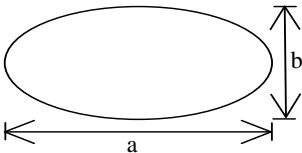
ANSI/ ASQ Z1.4 NORMAL INSPECTION LEVEL II

(b)AQL : MAJOR DEFECT : AQL 0.65

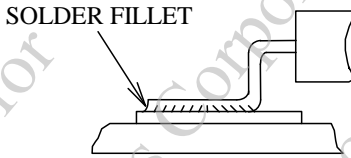
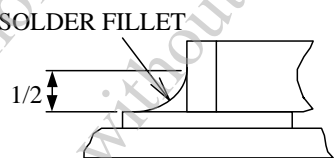
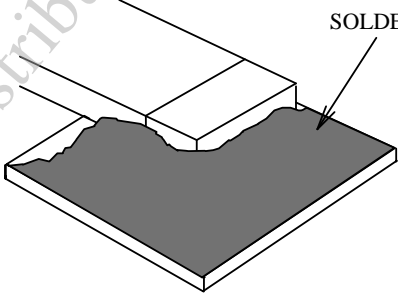
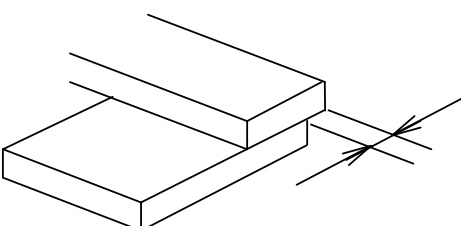
MINOR DEFECT : AQL 1.0

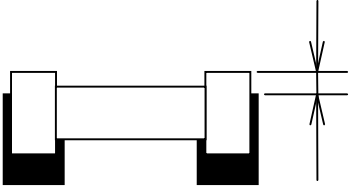
14.3 DEFECTS CLASSIFICATION

| TYPE OF DEFECT | INSPECTION ITEM               | DEFECT FEATURE   | AQL  |
|----------------|-------------------------------|--|------|
| MAJOR DEFECT   | 1.DISPLAY ON                  | <ul style="list-style-type: none"> <li>• DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS</li> <li>EX: DISCONNECTION, SHORT CIRCUIT ETC</li> </ul>  | 0.65 |
|                | 2.CTP FUNCTION                | <ul style="list-style-type: none"> <li>• NO FUNCTION</li> <li>• BROKEN LINE</li> <li>• FALSE TOUCH</li> </ul>  |      |
|                | 3.BACKLIGHT                   | <ul style="list-style-type: none"> <li>• NO LIGHT</li> <li>• FLICKERING AND OTHER ABNORMAL ILLUMINATION</li> </ul>   |      |
|                | 4.DIMENSIONS                  | <ul style="list-style-type: none"> <li>• SUBJECT TO INDIVIDUAL ACCEPTANCE SPECIFICATIONS</li> </ul>  |      |
| MINOR DEFECT   | 1.DISPLAY ZONE (VIEWING AREA) | <ul style="list-style-type: none"> <li>• BLACK/WHITE SPOT / CIRCULAR TYPE</li> <li>• BUBBLES ON POLARIZER</li> <li>• NEWTON RING</li> <li>• BLACK/WHITE LINE / LINEAR TYPE</li> <li>• SCRATCH</li> <li>• CONTAMINATION</li> <li>• UNEVEN COLOR SPREAD</li> </ul> | 1.0  |
|                | 2.BEZEL ZONE                  | <ul style="list-style-type: none"> <li>• STAINS</li> <li>• SCRATCHES</li> <li>• FOREIGN MATTER</li> </ul>  |      |
|                | 3.SOLDERING                   | <ul style="list-style-type: none"> <li>• INSUFFICIENT SOLDER</li> <li>• SOLDERED IN INCORRECT POSITION</li> <li>• CONVEX SOLDERING SPOT</li> <li>• SOLDER BALLS</li> <li>• SOLDER SCRAPS</li> </ul>  |      |
|                | 4.DISPLAY ON (ALL ON)         | <ul style="list-style-type: none"> <li>• LIGHT LINE</li> </ul>   |      |

| NO.                                | ITEM  | CRITERIA  |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
|------------------------------------|---|---|-------|---------------------------|-----------------|---------------------|---------------|------------|----------------------------|------------|-----------|---|------------------------------------|-----------|--------|--------------------|------------|----------------|-----------|--------|--------------------|------------|
| 1                                  | DISPLAY ON INSPECTION                                   | 1. INCORRECT PATTERN<br>2. MISSING SEGMENT<br>3. DIM SEGMENT<br>4. OPERATING VOLTAGE BEYOND SPEC  |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
| 2                                  | OVERALL DIMENSIONS                                      | 1. OVERALL DIMENSION BEYOND SPEC  |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
| 3                                  | DOT DEFECT  | <p>1. INSPECTION PATTERN: FULL WHITE, FULL BLACK, RED, GREEN AND BLUE SCREENS.</p> <p>2.</p> <table border="1"> <thead> <tr> <th>ITEMS</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>BRIGHT DOT</td> <td><math>N \leq 1</math></td> </tr> <tr> <td>DARK DOT</td> <td><math>N \leq 4</math></td> </tr> <tr> <td>TOTAL BRIGHT AND DARK DOTS</td> <td><math>N \leq 5</math></td> </tr> </tbody> </table> <p>NOTE :</p> <p>(1)THE DEFINITION OF DOT :<br/>THE SIZE OF A DEFECTIVE DOT OVER 1/2 OF WHOLE DOT IS REGARDED AS ONE DEFECTIVE DOT.</p> <p>(2)BRIGHT DOT :<br/>DOTS APPEAR BRIGHT AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER BLACK PATTERN.<br/>THE BRIGHT DOT DEFECT MUST BE VISIBLE THROUGH 2% ND FILTER.</p> <p>(3)DARK DOT :<br/>DOTS APPEAR DARK AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER PURE RED, GREEN, BLUE PICTURE.</p>   | ITEMS | PERMISSIBLE NO.           | BRIGHT DOT      | $N \leq 1$          | DARK DOT      | $N \leq 4$ | TOTAL BRIGHT AND DARK DOTS | $N \leq 5$ |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
| ITEMS                              | PERMISSIBLE NO.   |   |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
| BRIGHT DOT                         | $N \leq 1$  |   |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
| DARK DOT                           | $N \leq 4$  |   |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
| TOTAL BRIGHT AND DARK DOTS         | $N \leq 5$  |   |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
| 4                                  | BUBBLES ON POLARIZER /SURFACE STAINS /DIRT/CF FAIL/SPOT | <table border="1"> <thead> <tr> <th></th> <th>AVERAGE DIAMETER (mm) : D</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td rowspan="3">BUBBLE ON POLARIZER</td> <td><math>D \leq 0.25</math></td> <td>IGNORE</td> </tr> <tr> <td><math>0.25 &lt; D \leq 0.5</math></td> <td><math>N \leq 5</math></td> </tr> <tr> <td><math>0.5 &lt; D</math></td> <td>0</td> </tr> <tr> <td rowspan="2">SURFACE STAINS / DIRT ON POLARIZER</td> <td><math>D &lt; 0.1</math></td> <td>IGNORE</td> </tr> <tr> <td><math>0.1 &lt; D \leq 0.3</math></td> <td><math>N \leq 3</math></td> </tr> <tr> <td rowspan="2">CF FAIL / SPOT</td> <td><math>D &lt; 0.1</math></td> <td>IGNORE</td> </tr> <tr> <td><math>0.1 &lt; D \leq 0.3</math></td> <td><math>N \leq 3</math></td> </tr> </tbody> </table> <p>NOTE : (1)POLARIZER BUBBLE IS DEFINED AS THE BUBBLE APPEARS ON ACTIVE DISPLAY AREA. THE DEFECT OF POLARIZER BUBBLE SHALL BE IGNORED IF THE POLARIZER BUBBLE APPEARS ON THE OUTSIDE OF ACTIVE DISPLAY AREA.</p> <p>(2)THE EXTRANEIOUS SUBSTANCE IS DEFINED AS IT CAN BE OBSERVED WHEN THE MODULE IS POWER ON.</p> <p>(3)THE DEFINITION OF AVERAGE DIAMETER, D IS DEFINED AS FOLLOWING.<br/>AVERAGE DIAMETER (D)=(a+b)/2</p>  |       | AVERAGE DIAMETER (mm) : D | PERMISSIBLE NO. | BUBBLE ON POLARIZER | $D \leq 0.25$ | IGNORE     | $0.25 < D \leq 0.5$        | $N \leq 5$ | $0.5 < D$ | 0 | SURFACE STAINS / DIRT ON POLARIZER | $D < 0.1$ | IGNORE | $0.1 < D \leq 0.3$ | $N \leq 3$ | CF FAIL / SPOT | $D < 0.1$ | IGNORE | $0.1 < D \leq 0.3$ | $N \leq 3$ |
|                                    | AVERAGE DIAMETER (mm) : D                               | PERMISSIBLE NO.   |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
| BUBBLE ON POLARIZER                | $D \leq 0.25$   | IGNORE  |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
|                                    | $0.25 < D \leq 0.5$                                     | $N \leq 5$  |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
|                                    | $0.5 < D$   | 0   |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
| SURFACE STAINS / DIRT ON POLARIZER | $D < 0.1$   | IGNORE  |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
|                                    | $0.1 < D \leq 0.3$                                      | $N \leq 3$  |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
| CF FAIL / SPOT                     | $D < 0.1$   | IGNORE  |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |
|                                    | $0.1 < D \leq 0.3$                                      | $N \leq 3$  |       |                           |                 |                     |               |            |                            |            |           |   |                                    |           |        |                    |            |                |           |        |                    |            |

| NO.              | ITEM   | CRITERIA  |        |  |                 |  |        |                  |   |                 |   |       |   |  |
|------------------|--|---|--------|--|-----------------|--|--------|------------------|---|-----------------|---|-------|---|--|
| 5                | BLACK/WHITE SPOT CIRCULAR TYPE                 | THE FOLLOWING BLACK/WHITE SPOT ARE WITHIN THE VIEWING AREA. AVERAGE DIAMETER : D (mm) <table border="1"> <thead> <tr> <th>SIZE D</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>D≤0.1</td> <td>IGNORE</td> </tr> <tr> <td>0.1&lt;D≤0.3</td> <td>5</td> </tr> <tr> <td>0.3&lt;D≤0.5</td> <td>5</td> </tr> <tr> <td>D&gt;0.5</td> <td>0</td> </tr> </tbody> </table> NOTE ( 1 ) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.                                   |        | SIZE D                                       | PERMISSIBLE NO. | D≤0.1  | IGNORE | 0.1<D≤0.3        | 5 | 0.3<D≤0.5       | 5 | D>0.5 | 0 |  |
| SIZE D           | PERMISSIBLE NO.                                |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| D≤0.1            | IGNORE   |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 0.1<D≤0.3        | 5  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 0.3<D≤0.5        | 5  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| D>0.5            | 0  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 6                | SCRATCH  | THE FOLLOWING SCRATCH IS WITHIN THE VIEWING AREA. WIDTH : W (mm) , LENGTH : L (mm) <table border="1"> <thead> <tr> <th>SIZE W &amp; L</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>W≤0.05</td> <td>IGNORE</td> </tr> <tr> <td>0.05&lt;W≤0.08, L≤8</td> <td>3</td> </tr> <tr> <td>0.08&lt;W≤0.1, L≤5</td> <td>2</td> </tr> <tr> <td>W&gt;0.1</td> <td>0</td> </tr> </tbody> </table> NOTE ( 1 ) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.                |        | SIZE W & L                                   | PERMISSIBLE NO. | W≤0.05                                       | IGNORE | 0.05<W≤0.08, L≤8 | 3 | 0.08<W≤0.1, L≤5 | 2 | W>0.1 | 0 |  |
| SIZE W & L       | PERMISSIBLE NO.                                |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| W≤0.05           | IGNORE   |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 0.05<W≤0.08, L≤8 | 3  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 0.08<W≤0.1, L≤5  | 2  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| W>0.1            | 0  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 7                | BLACK / WHITE LINE LINEAR TYPE / FOREIGN FIBER | THE FOLLOWING BLACK LINE, WHITE LINE IS WITHIN THE VIEWING AREA. WIDTH : W (mm) , LENGTH : L (mm) <table border="1"> <thead> <tr> <th>SIZE W &amp; L</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>W≤0.05</td> <td>IGNORE</td> </tr> <tr> <td>0.05&lt;W≤0.08, L≤8</td> <td>3</td> </tr> <tr> <td>0.08&lt;W≤0.1, L≤5</td> <td>2</td> </tr> <tr> <td>W&gt;0.1</td> <td>0</td> </tr> </tbody> </table> NOTE ( 1 ) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART. |        | SIZE W & L                                   | PERMISSIBLE NO. | W≤0.05                                       | IGNORE | 0.05<W≤0.08, L≤8 | 3 | 0.08<W≤0.1, L≤5 | 2 | W>0.1 | 0 |  |
| SIZE W & L       | PERMISSIBLE NO.                                |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| W≤0.05           | IGNORE   |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 0.05<W≤0.08, L≤8 | 3  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 0.08<W≤0.1, L≤5  | 2  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| W>0.1            | 0  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 8                | BUBBLE / DENT FOR OPTICAL BONDING              | BUBBLES WITHIN VIEWING AREA. AVERAGE DIAMETER : D (mm) <table border="1"> <thead> <tr> <th>SIZE D</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>D≤0.2</td> <td>IGNORE</td> </tr> <tr> <td>0.2&lt;D≤0.3</td> <td>3</td> </tr> <tr> <td>0.3&lt;D≤0.5</td> <td>1</td> </tr> <tr> <td>D&gt;0.5</td> <td>0</td> </tr> </tbody> </table> NOTE ( 1 ) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.  |        | SIZE D                                       | PERMISSIBLE NO. | D≤0.2  | IGNORE | 0.2<D≤0.3        | 3 | 0.3<D≤0.5       | 1 | D>0.5 | 0 |  |
| SIZE D           | PERMISSIBLE NO.                                |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| D≤0.2            | IGNORE   |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 0.2<D≤0.3        | 3  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 0.3<D≤0.5        | 1  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| D>0.5            | 0  |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 9                | CHIPPING                                       | <table border="1"> <tr> <td>CORNER</td> <td>X ≤ 3mm 、 Y ≤ 3mm 、 Z ≤ t<br/>(t : THICKNESS)</td> </tr> <tr> <td>EDGE</td> <td>X ≤ 6mm , Y ≤ 1mm , Z &lt; t<br/>(t : THICKNESS)</td> </tr> </table>  | CORNER | X ≤ 3mm 、 Y ≤ 3mm 、 Z ≤ t<br>(t : THICKNESS) | EDGE            | X ≤ 6mm , Y ≤ 1mm , Z < t<br>(t : THICKNESS) |        |                  |   |                 |   |       |   |  |
| CORNER           | X ≤ 3mm 、 Y ≤ 3mm 、 Z ≤ t<br>(t : THICKNESS)   |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| EDGE             | X ≤ 6mm , Y ≤ 1mm , Z < t<br>(t : THICKNESS)   |   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 10               | CRACKED GLASS                                  | NOT ACCEPTABLE  |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 11               | LINE DEFECT ON DISPLAY                         | OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED.  |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 12               | MURA ON DISPLAY                                | IT'S ACCEPTABLE, IF MURA IS SLIGHT VISIBLE THROUGH 5% ND FILTER.  |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 13               | UNEVEN COLOR SPREAD, COLORATION                | TO BE DETERMINED BASED UPON THE LIMITED SAMPLE.   |        |  |                 |  |        |                  |   |                 |   |       |   |  |
| 14               | BEZEL APPEARANCE                               | 1. BEZEL MAY NOT HAVE RUST, BE DEFORMED OR HAVE FINGER PRINTS STAINS OF OTHER CONTAMINATION.<br>2. BEZEL MUST COMPLY WITH JOB SPECIFICATIONS.   |        |  |                 |  |        |                  |   |                 |   |       |   |  |

| NO. | ITEM      | CRITERIA   |
|-----|-----------|--|
| 15  | PCB       | <ol style="list-style-type: none"> <li>1. THERE MAY NOT BE MORE THAN 2mm OF SEALANT OUTSIDE THE SEAL AREA ON THE PCB, AND THERE SHOULD BE NO MORE THAN THREE PLACES.</li> <li>2. NO OXIDATION OR CONTAMINATION ON PCB TERMINALS.</li> <li>3. PARTS ON PCB MUST BE THE SAME AS ON THE PRODUCTION CHARACTERISTIC CHART. THERE SHOULD BE NO WRONG PARTS, MISSING PARTS OR EXCESS PARTS.</li> <li>4. THE JUMPER ON THE PCB SHOULD CONFORM TO THE PRODUCT CHARACTERISTIC CHART.</li> <li>5. IF SOLDER GETS ON BEZEL TAB PADS, LED PAD, ZEBRA PAD OR SCREW HOLD PAD; MAKE SURE IT IS SMOOTHED DOWN.</li> </ol>   |
| 16  | SOLDERING | <ol style="list-style-type: none"> <li>1. NO SOLDERING FOUND ON THE SPECIFIED PLACE</li> <li>2. INSUFFICIENT SOLDER               <ol style="list-style-type: none"> <li>(a)LSI, IC<br/>A POOR WETTING OF SOLDER IS BETWEEN LOWER BEND OR "HEEL" OF LEAD AND PAD<br/>  </li> <li>(b)CHIP COMPONENT<br/> <ul style="list-style-type: none"> <li>· SOLDER IS LESS THAN 50% OF SIDES AND FRONT FACE WETTING<br/>  </li> <li>· SOLDER WETS 3 SIDES OF TERMINAL, BUT LESS THAN 25% OF SIDES AND FRONT SURFACE AREA ARE COVERED<br/>  </li> </ul> </li> </ol> </li> <li>3. PARTS ALIGNMENT               <ol style="list-style-type: none"> <li>(a)LSI, IC<br/>LEAD WIDTH IS MORE THAN 50% BEYOND PAD OUTLINE<br/>  </li> </ol> </li> </ol> |

| NO. | ITEM               | CRITERIA  |
|-----|--------------------|---|
| 16  | SOLDERING          | <p>(b)CHIP COMPONENT COMPONENT IS OFF CENTER, AND MORE THAN 50% OF THE LEADS IS OFF THE PAD OUTLINE</p>  <p>4. NO UNMELTED SOLDER PASTE MAY BE PRESENT ON THE PCB.<br/>5. NO COLD SOLDER JOINTS, MISSING SOLDER CONNECTIONS, OXIDATION OR ICICLE.<br/>6. NO RESIDUE OR SOLDER BALLS ON PCB.<br/>7. NO SHORT CIRCUITS IN COMPONENTS ON PCB.</p>  |
| 17  | BACKLIGHT          | <p>1. NO LIGHT<br/>2. FLICKERING AND OTHER ABNORMAL ILLUMINATION<br/>3. SPOTS OR SCRATCHES THAT APPEAR WHEN LIT MUST BE JUDGED USING LCD SPOT, LINES AND CONTAMINATION STANDARDS.<br/>4. BACKLIGHT DOESN'T LIGHT OR COLOR IS WRONG.</p>   |
| 18  | GENERAL APPEARANCE | <p>1. NO OXIDATION, CONTAMINATION, CURVES OR, BENDS ON INTERFACE PIN (OLB) OF TCP.<br/>2. NO CRACKS ON INTERFACE PIN (OLB) OF TCP.<br/>3. NO CONTAMINATION, SOLDER RESIDUE OR SOLDER BALLS ON PRODUCT.<br/>4. THE IC ON THE TCP MAY NOT BE DAMAGED, CIRCUITS.<br/>5. THE UPPERMOST EDGE OF THE PROTECTIVE STRIP ON THE INTERFACE PIN MUST BE PRESENT OR LOOK AS IF IT CAUSE THE INTERFACE PIN TO SEVER.<br/>6. THE RESIDUAL ROSIN OR TIN OIL OF SOLDERING (COMPONENT OR CHIP COMPONENT) IS NOT BURNED INTO BROWN OR BLACK COLOR.<br/>7. SEALANT ON TOP OF THE ITO CIRCUIT HAS NOT HARDENED.<br/>8. PIN TYPE MUST MATCH TYPE IN SPECIFICATION SHEET.<br/>9. LCD PIN LOOSE OR MISSING PINS.<br/>10. PRODUCT PACKAGING MUST BE THE SAME AS SPECIFIED ON PACKAGING SPECIFICATION SHEET.<br/>11. PRODUCT DIMENSION AND STRUCTURE MUST CONFORM TO PRODUCT SPECIFICATION SHEET.<br/>12. THE APPEARANCE OF HEAT SEAL SHOULD NOT ADMIT ANY DIRT AND BREAK.</p> |

NOTE :

1. FOR ANY SPOTS OR LINES, WHICH ARE NOT OBSERVED UNDER APPROPRIATE PANEL OPERATING CONDITION ARE DEEMED ACCEPTABLE.
2. THE FOREIGN MATERIALS THAT CAN BE BLOWN OUT BY AIR AND REMOVED BY WET CLEANING ARE NOT REGARDED AS DEFECTS.

15. RELIABILITY TEST

15.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE

| NO. | ITEM   | DESCRIPTION  |
|-----|--|--|
| 1   | HIGH TEMPERATURE OPERATION                   | THE SAMPLE SHOULD BE ALLOWED TO STAND AT +70°C FOR 240 HRS                         |
| 2   | LOW TEMPERATURE OPERATION                    | THE SAMPLE SHOULD BE ALLOWED TO STAND AT -20°C FOR 240 HRS                         |
| 3   | HIGH TEMPERATURE STORAGE                     | THE SAMPLE SHOULD BE ALLOWED TO STAND AT +80°C FOR 240 HRS                         |
| 4   | LOW TEMP STORAGE                             | THE SAMPLE SHOULD BE ALLOWED TO STAND AT -30°C FOR 240 HRS                         |
| 5   | HIGH TEMPERATURE /HUMIDITY TEST STORAGE      | THE SAMPLE SHOULD BE ALLOWED TO STAND AT 60°C, 90% RH 240 HRS                      |
| 6   | THERMAL SHOCK (NOT OPERATED)                 | <p>THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION:</p> |
| 7   | ESD (ELECTROSTATIC DISCHARGE) (NOT OPERATED) | AIR DISCHARGE ± 12KV<br>CONTACT DISCHARGE ± 8KV<br>ACCORDING TO IEC-61000-4-2      |

NOTE ( 1 ) : THE TEST SAMPLES HAVE RECOVERY TIME FOR 2 HOURS AT ROOM TEMPERATURE BEFORE THE FUNCTION CHECK. IN THE STANDARD CONDITIONS, THERE IS NO DISPLAY FUNCTION FAILURE ISSUE OCCURRED.

NOTE ( 2 ) : WHEN THE LCD MODULE IS OPERATED AT A HIGHER AMBIENT TEMPERATURE THAN 60°C, THE PWM DUTY CYCLE OF THE LED BACKLIGHT SHOULD BE ADJUSTED TO BE LESS THAN 60%. IF THE MODULE IS OPERATED AT A HIGHER DUTY CYCLE THAN 60%, THEN THERE IS A POSSIBILITY OF DISTORTION AND IRREGULARITY OF THE PICTURE DUE TO LIQUID CRYSTAL BEHAVIOR.

15.2 TESTING CONDITIONS AND INSPECTION CRITERIA

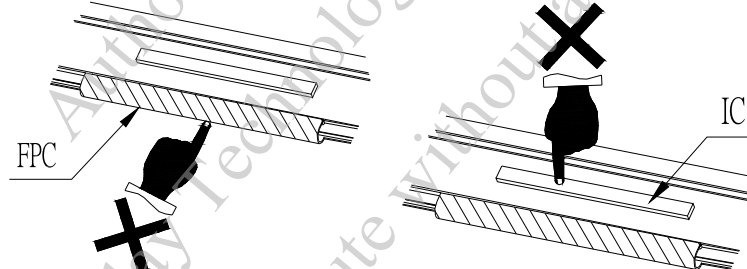
FOR THE FINAL TEST THE TESTING SAMPLE MUST BE STORED AT ROOM TEMPERATURE FOR 24 HOURS, AFTER THE TESTS LISTED IN TABLE 15.1, STANDARD SPECIFICATIONS FOR RELIABILITY HAVE BEEN EXECUTED IN ORDER TO ENSURE STABILITY.

| NO. | ITEM                | TEST MODEL             | INSPECTION CRITERIA  |
|-----|---------------------|------------------------|--|
| 1   | CURRENT CONSUMPTION | REFER TO SPECIFICATION | THE CURRENT CONSUMPTION SHOULD CONFORM TO THE PRODUCT SPECIFICATION.   |
| 2   | CONTRAST            | REFER TO SPECIFICATION | AFTER THE TESTS HAVE BEEN EXECUTED, THE CONTRAST MUST BE LARGER THAN HALF OF ITS INITIAL VALUE PRIOR TO THE TESTS. |
| 3   | APPEARANCE          | VISUAL INSPECTION      | DEFECT FREE  |

## 16. PRECAUTION

### 16.1 OPERATION

- 16.1.1 DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .
- 16.1.2 USE THE MODULE WITHIN SPECIFIED TEMPERATURE ; LOWER TEMPERATURE CAUSES THE RETARDATION OF BLINKING SPEED OF THE DISPLAY ; HIGHER TEMPERATURE MAKES OVERALL DISPLAY DISCOLOR. WHEN THE TEMPERATURE RETURNS TO NORMALITY, THE DISPLAY WILL OPERATE NORMALLY .
- 16.1.3 ADJUST THE LC DRIVING VOLTAGE TO OBTAIN THE OPTIMUM CONTRAST.
- 16.1.4 POWER ON SEQUENCE INPUT SIGNALS SHOULD NOT BE SUPPLIED TO LCD MODULE BEFORE POWER SUPPLY VOLTAGE IS APPLIED AND REACHES THE SPECIFIED VALUE .  
IF ABOVE SEQUENCE IS NOT FOLLOWED , CMOS LSIS OF LCD MODULES MAY BE DAMAGED DUE TO LATCH - UP PROBLEM .
- 16.1.5 NOT ALLOWED TO INFLICT ANY EXTERNAL STRESS AND TO CAUSE ANY MECHANICAL INTERFERENCE ON THE BENDING AREA OF FPC DURING THE TAIL BENDING BACKWARDS!  
DO NOT STRESS FPC AND IC ON THE MODULE!



COMPLIANCE WITH THE PROHIBITION ON THE USE OF UNAUTHORIZED REPRODUCTION  
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## 16.2 HANDLING

- 16.2.1 USE A GROUNDED SOLDERING IRON WHEN SOLDERING CONNECTOR I/O TERMINALS . FOR SOLDERING OR REPAIRING, TAKE PRECAUTION AGAINST THE TEMPERATURE OF THE SOLDERING IRON AND THE SOLDERING TIME TO PREVENT PEELING OFF THE THROUGH-HOLE-PAD .
- 16.2.2 DO NOT DISASSEMBLE . EDT SHALL NOT BE HELD RESPONSIBLE IF THE MODULE IS DISASSEMBLED AND UPON THE REASSEMBLY THE MODULE FAILED .
- 16.2.3 DO NOT CHARGE STATIC ELECTRICITY , AS THE CIRCUIT OF THIS MODULE CONTAINS CMOS LSIS. A WORKMAN'S BODY SHOULD ALWAYS BE STATIC-PROTECTED BY USE OF AN ESD STRAP. WORKING CLOTHES FOR SUCH PERSONNEL SHOULD BE OF STATIC-PROTECTED MATERIAL .
- 16.2.4 ALWAYS GROUND THE ELECTRICALLY-POWERED DRIVER BEFORE USING IT TO INSTALL THE LCD MODULE. WHILE CLEANING THE WORK STATION BY VACUUM CLEANER, DO NOT BRING THE SUCKING MOUTH NEAR THE MODULE ; STATIC ELECTRICITY OF THE ELECTRICALLY-POWERED DRIVER OR THE VACUUM CLEANER MAY DESTROY THE MODULE .
- 16.2.5 DON'T GIVE EXTERNAL SHOCK.
- 16.2.6 DON'T APPLY EXCESSIVE FORCE ON THE SURFACE.
- 16.2.7 LIQUID CRISTAL IN LCD IS HAZARDOUS SUBSTANCE. MUST NOT LICK AND SWALLOW.  
WHEN THE LIQUID IS ATTACH TO YOUR, SKIN, CLOTH ETC.  
WASH IT OUT THOROUGHLY AND IMMEDIATELY.
- 16.2.8 DON'T OPERATE IT ABOVE THE ABSOLUTE MAXIMUM RATING.
- 16.2.9 STORAGE IN A CLEAN ENVIRONMENT, FREE FROM DUST, ACTIVE GAS, AND SOLVENT.
- 16.2.10 STORE WITHOUT ANY PHYSICAL LOAD.
- 16.2.11 REWIRING: NO MORE THAN 3 TIMES.