

## CONTENTS

1	Scope .....	6
2	Normative references .....	6
3	Terms, definitions, symbols and units.....	6
3.1	Physical gap.....	6
3.2	Optical gap.....	6
3.3	Image dislocation .....	6
3.4	LCD splicing terminal installation deviation.....	6
3.5	Splicing .....	6
4	Measuring conditions.....	6
4.1	Standard measuring conditions .....	6
4.1.1	Standard measuring environmental conditions .....	6
4.1.2	Optical measuring distance .....	6
5	Measuring methods of LCD slicing terminal structure test.....	7
5.1	Physical gap.....	7
5.1.1	General .....	7
5.1.2	Test method.....	7
5.2	Optical gap.....	7
5.2.1	General .....	7
5.2.2	Test method.....	7
5.3	Image dislocation .....	7
5.3.1	General .....	7
5.3.2	Test method.....	8
5.4	LCD splicing terminal installation tolerances.....	8
5.4.1	General .....	8
5.4.2	Test method.....	8
6	Measuring methods of LCD splicing terminal brightness uniformity .....	9
6.1	Single Terminal Brightness uniformity .....	9
6.1.1	General .....	9
6.1.2	Test method.....	9
6.2	Adjacent unit brightness uniformity.....	10
6.2.1	General .....	10
6.2.2	Test method.....	10
7	Measuring methods of LCD splicing terminal colour uniformity.....	12
7.1	Single unit colour uniformity.....	12
7.2	LCD splicing terminal colour uniformity ratio.....	12
8	Measuring methods of LCD splicing terminal contrast uniformity .....	12
8.1	Single unit contrast ratio .....	12
8.2	LCD splicing terminal contrast uniformity ratio.....	12
9	Measuring methods of LCD splicing terminal gamut.....	12
9.1	Single unit colour gamut .....	12
9.2	LCD splicing terminal gamut .....	12
10	Measuring methods of LCD splicing terminal reproduction ratio .....	12
10.1	Single unit reproduction ratio .....	12
10.2	LCD splicing terminal reproduction ratio .....	12

- 11 Measuring methods of LCD splicing terminal definition .....12
  - 11.1 Single unit definition .....12
  - 11.2 LCD splicing terminal definition .....12

# INTERNATIONAL ELECTROTECHNICAL COMMISSION

## MEASURING METHODS OF LCD SPLICING TERMINAL

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XXX	Report on voting
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This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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- replaced by a revised edition, or
- amended.

The National Committees are requested to note that for this publication the stability date is 2018.

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

## MEASURING METHODS OF LCD SPLICING TERMINAL

### 1 Scope

This International Standard specifies the standard measurement conditions and measuring methods for LCD splicing terminal.

### 2 Normative references

None

### 3 Terms, definitions, symbols and units

#### 3.1 Physical gap

Gap between two adjacent screen edges in LCD splicing terminal. (mm)

#### 3.2 Optical gap

Gap between two adjacent image edges in LCD splicing terminal. (mm)

#### 3.3 Image dislocation

The image display dislocation in LCD splicing terminal.

#### 3.4 LCD splicing terminal installation deviation

The flatness of LCD splicing terminal in vertical and horizontal direction.

#### 3.5 Splicing

Multiple terminals are connected and formed a new terminal.

### 4 Measuring conditions

#### 4.1 Standard measuring conditions

##### 4.1.1 Standard measuring environmental conditions

Measurements shall be carried out under the standard environmental conditions:

- Temperature: 25 °C ± 3 °C,
- Relative humidity: 25 %RH to 85 % RH,
- Atmospheric pressure: 86 kPa to 106 kPa.

When different environmental conditions are used, they shall be noted in the measurement report.

##### 4.1.2 Optical measuring distance

The optical test distance of LCD splicing terminal should be 1.5 times the splicing screen height.

## 5 Measuring methods of LCD splicing terminal structure test

### 5.1 Physical gap

#### 5.1.1 General

The purpose of this test is to measure the gap between two adjacent screen edges in LCD splicing terminal. .

#### 5.1.2 Test method

Using the feeler gauge to measure all the adjacent screen edges of the LCD splicing terminal, choose the largest figure and recorded as physical gap.( refer to figure 3)

### 5.2 Optical gap

#### 5.2.1 General

The purpose of this test is to measure the gap between two adjacent image edges in LCD splicing terminal

#### 5.2.2 Test method

- 1) To display the whole white signal on the LCD splicing terminal
- 2) Using the calliper to measure all the distance between each two adjacent images in LCD splicing terminal, choose the largest figure and record as optical gap. (refer to figure 1)

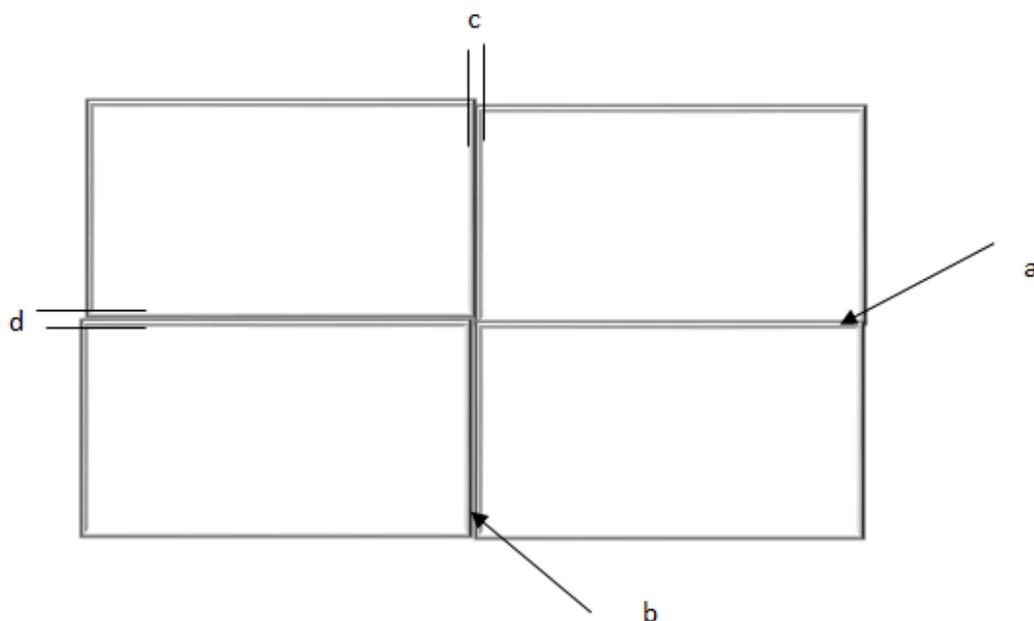


Figure 1

Comment : a, b represent the Physical gap

c, d represent the optical gap

### 5.3 Image dislocation

#### 5.3.1 General

The purpose of this test is to measure the image dislocation caused by LCD splicing terminal.

**5.3.2 Test method**

- 1) Setting the brightness and contrast of the LCD splicing terminal to the standard states.
- 2) To display the cross cable & circle on the LCD splicing terminal
- 3) Checking the image dislocation at the gap of the adjacent units, record the dislocation pixels. ( refer to figure 4)

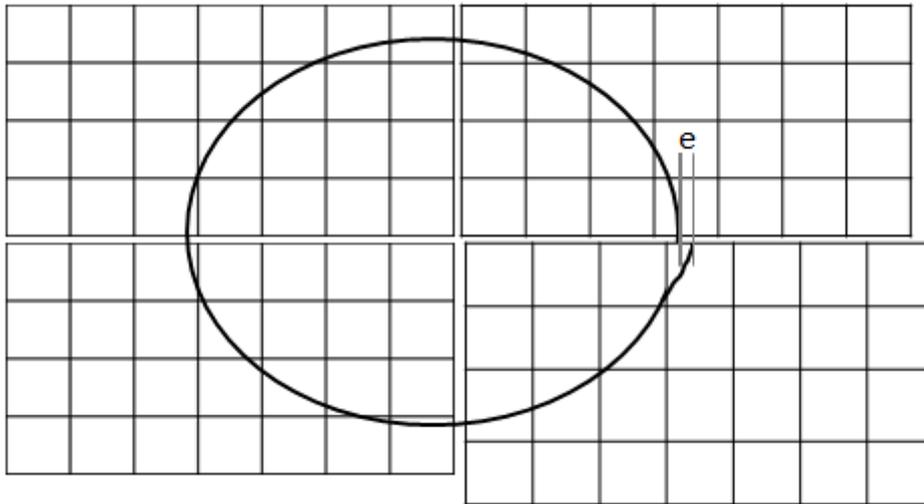


Figure 2

Comment: e represent the image dislocation

**5.4 LCD splicing terminal installation tolerances**

**5.4.1 General**

The purpose of this test is to verify the flatness and installation tolerances of the LCD splicing terminal, Including diagonal tolerance, edge horizontal flatness, adjacent units flatness, vertical installation tolerance.

**5.4.2 Test method**

- 1) Define the LCD splicing terminal four corner as A,B,C,D
- 2) Measuring the length of AC and recorded as L1,measuring the length of BD and recorded as L2, diagonal tolerance  $\Delta L = L2-L1$ . ( refer to figure 3)
- 3) Measuring the horizontal position of A,B point , calculate the tolerance as edge horizontal flatness.
- 4) Measuring the surface flatness deviation between adjacent units surface, calculate the tolerance as flatness.
- 5) Hanging a vertical plumb from B point, measuring and calculating  $\angle EBC$  degree as LCD splicing terminal vertical installation tolerance. ( refer to figure 4)

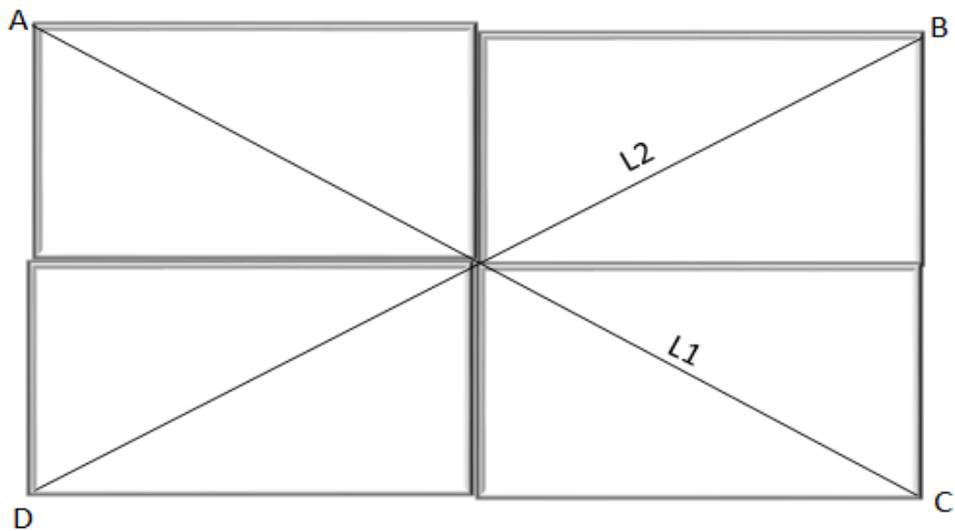


Figure 3

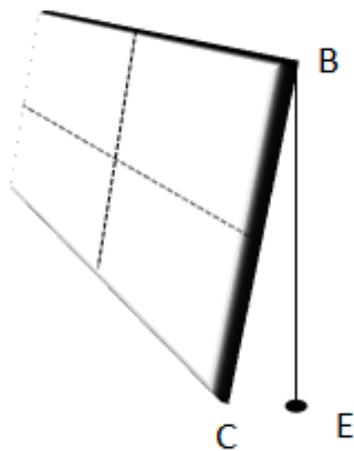


Figure 4

## 6 Measuring methods of LCD splicing terminal brightness uniformity

### 6.1 Single Terminal Brightness uniformity

#### 6.1.1 General

The purpose of this test is to verify the brightness tolerance between each unit in the LCD splice terminal.

#### 6.1.2 Test method

- 1) To display the whole white signal on LCD splicing terminal, the brightness and contrast of all units are set to standard states.

- 2) Using luminance meter to measure the centre brightness of each unit and recorded as L01、L02、L03、L04 ……L0n (refer to figure 5)
- 3) Calculating the average brightness of the LCD terminal using the formula below:

$$L0 = (L01 + L02 + L03 + \dots + L0n) / n$$

L0—LCD terminal average brightness;

n—The number of LCD splicing terminal units

i—1,2,3……n

Calculate brightness uniformity using the formula below and expressed as a percentage.

$$\Delta L = L0i / L0$$

L01	L02	L03
L04	L05	L06
L07	L08	L0n

Figure 5

## 6.2 Adjacent unit brightness uniformity

### 6.2.1 General

The purpose of this test is to verify the adjacent unit brightness uniformity in the LCD splicing terminal.

### 6.2.2 Test method

- 1) LCD splicing terminal display the whole white signal, the brightness and contrast of all units are set to standard states.
- 2) Using luminance meter measure 8 points brightness of each unit and record as P<sub>n1</sub>, P<sub>n2</sub>, P<sub>n3</sub>, P<sub>n4</sub>, P<sub>n5</sub>, P<sub>n6</sub>, P<sub>n7</sub>, P<sub>n8</sub>. (refer to figure 6)
- 3) In each units, comparing brightness in each edge point and its adjacent unit edge point, record and calculate adjacent unit brightness uniformity as below table 1. (example for P<sub>n</sub> unit)

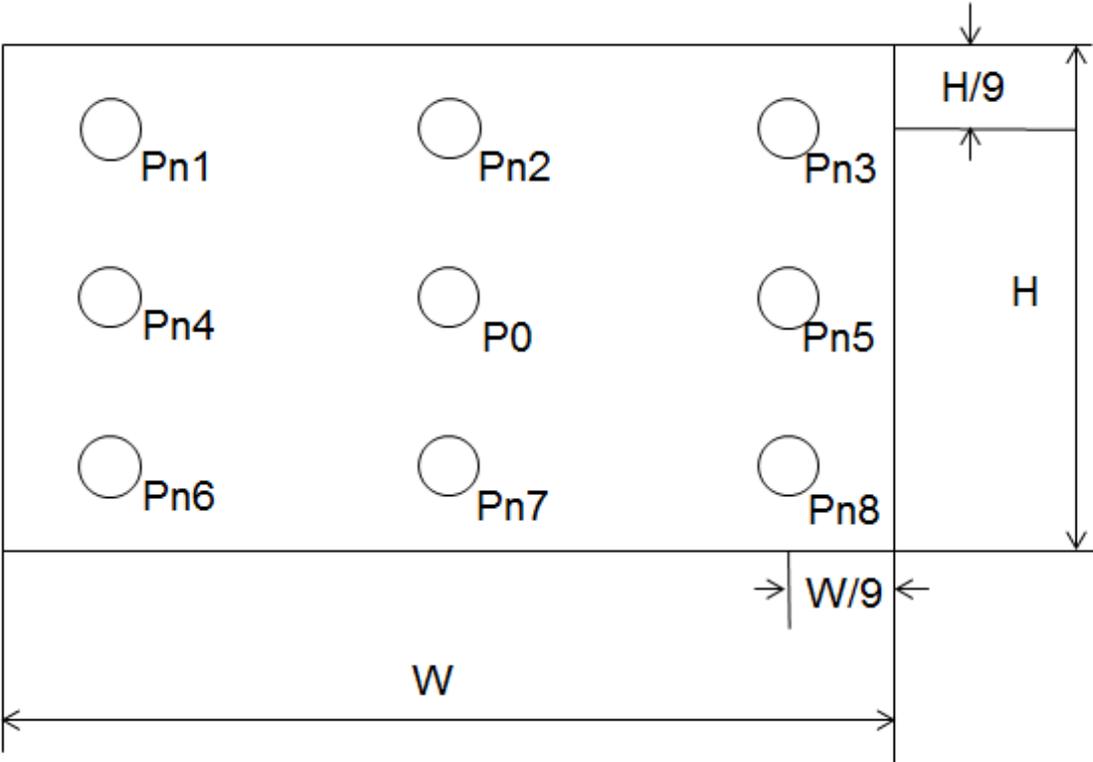


Figure 6

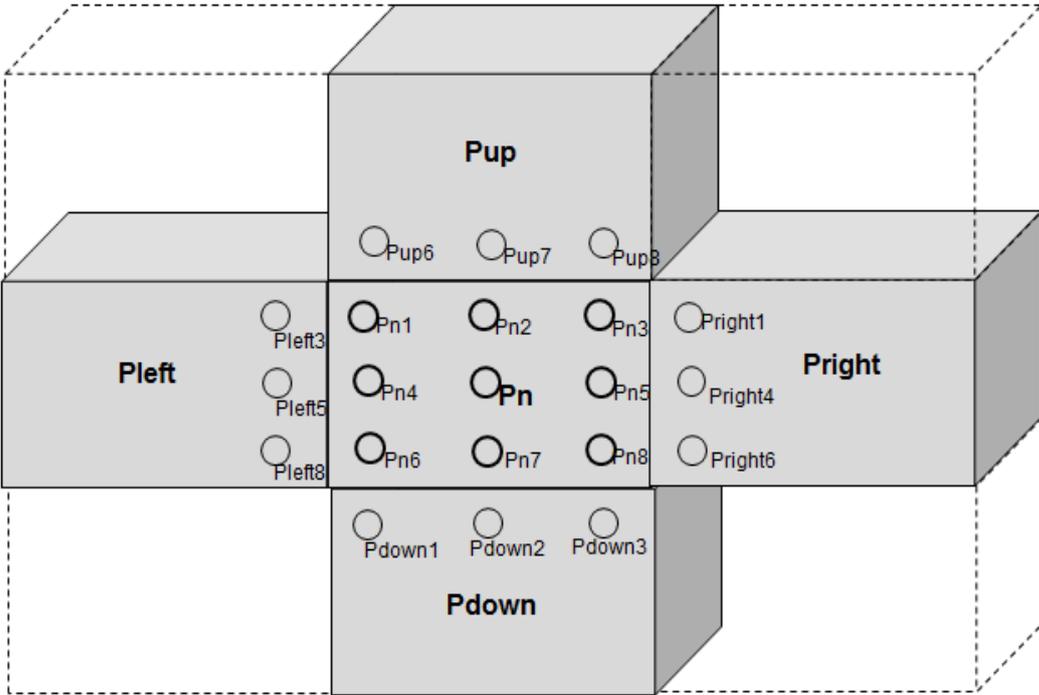


Figure 7

Table 1

Test point ( $P_n$ )	$P_{n3}/P_{right1}$		$P_{n5}/P_{right4}$		$P_{n8}/P_{right6}$		$P_{n8}/P_{down3}$		$P_{n6}/P_{down1}$		$P_{n7}/P_{down2}$	
	$P_{n3}$	$P_{right1}$	$P_{n5}$	$P_{right4}$	$P_{n8}$	$P_{right6}$	$P_{n8}$	$P_{down3}$	$P_{n6}$	$P_{down1}$	$P_{n7}$	$P_{down2}$
Adjacent unit bu(%)												
	$P_{n1}/P_{up6}$		$P_{n2}/P_{up7}$		$P_{n3}/P_{up8}$		$P_{n1}/P_{left3}$		$P_{n4}/P_{left5}$		$P_{n6}/P_{left8}$	
	$P_{n1}$	$P_{up6}$	$P_{n2}$	$P_{up7}$	$P_{n3}$	$P_{up8}$	$P_{n1}$	$P_{left3}$	$P_{n4}$	$P_{left5}$	$P_{n6}$	$P_{left8}$

Comment:  $n$ --- positive integer, represent a unit in LCD splicing terminal.

$P_{right}$ ,  $P_{down}$ ,  $P_{up}$ ,  $P_{left}$  represent right,down,up and left 4 adjacent units to  $P_n$  unit. (refer to figure 9)。

**7 Measuring methods of LCD splicing terminal colour uniformity**

**7.1 Single unit colour uniformity**

**7.2 LCD splicing terminal colour uniformity ratio**

**8 Measuring methods of LCD splicing terminal contrast uniformity**

**8.1 Single unit contrast ratio**

**8.2 LCD splicing terminal contrast uniformity ratio**

**9 Measuring methods of LCD splicing terminal gamut**

**9.1 Single unit colour gamut**

**9.2 LCD splicing terminal gamut**

**10 Measuring methods of LCD splicing terminal reproduction ratio**

**10.1 Single unit reproduction ratio**

**10.2 LCD splicing terminal reproduction ratio**

**11 Measuring methods of LCD splicing terminal definition**

**11.1 Single unit definition**

**11.2 LCD splicing terminal definition**