

To : _____

Specification of FUJITSU TFT-LCD module

FLC44SXC8V

Approval
 Date : By :

This Product is designed, developed and manufactured as contemplated for general use, including without limitation, general office use, personal use, household use, and ordinary industrial use, but is not designed, developed and manufactured as contemplated for use accompanying fatal risks or dangers that, unless extremely high safety is secured, could lead directly to death, personal injury, severe physical damage or other loss (hereinafter "High Safety Required Use"), including without limitation, nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, missile launch control in weapon system. If customer's product possibly falls under the category of High Safety Required Use, please consult with our sales representatives in charge before such use. In addition, Fujitsu shall not be liable against the Customer and/or any third party for any claims or damages arising in connection with the High Safety Required Use of the Product without permission.

Specification No. : Tech Bes LCD-00028

Issue Date : Jan. 23, 2002

Issued by :



T. Naka

Director

LCD Design Dep.

LCD Technology Div.

LCD Group

FUJITSU LIMITED

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04	20011121	T.Ito		K.Tanaka	Add 03B,Revised P8,P17								
03	20001016	T.Ito		K.Tanaka	Add 02A,Revised P14,P30				DRAW. NO. Tech Bes LCD-00028			CUST.	
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	DESIG.	20000711	T.Ito	CHECK			APPR.	K.Tanaka					

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Table 6-1 shows the absolute maximum rating of this LCD module.

Table 6-1 Absolute Maximum Rating

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Supply Voltage	V _{CC}	Ta=25°C	−0.3	—	6.0	V
Input Signal Voltage	V _{IN}	Ta=25°C	−0.3	—	V _{CC} +0.3	V

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Table 7-1 shows the recommended operating conditions of this LCD module.

Table 7-1 Recommended Operating Conditions

Item		Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage(Logic)		V _{CC}	4.75	—	5.25	V
Ripple Voltage	V _{CC}	V _{RP}	—	—	0.1	V

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Measurement circuit is based on Figure 8-1.

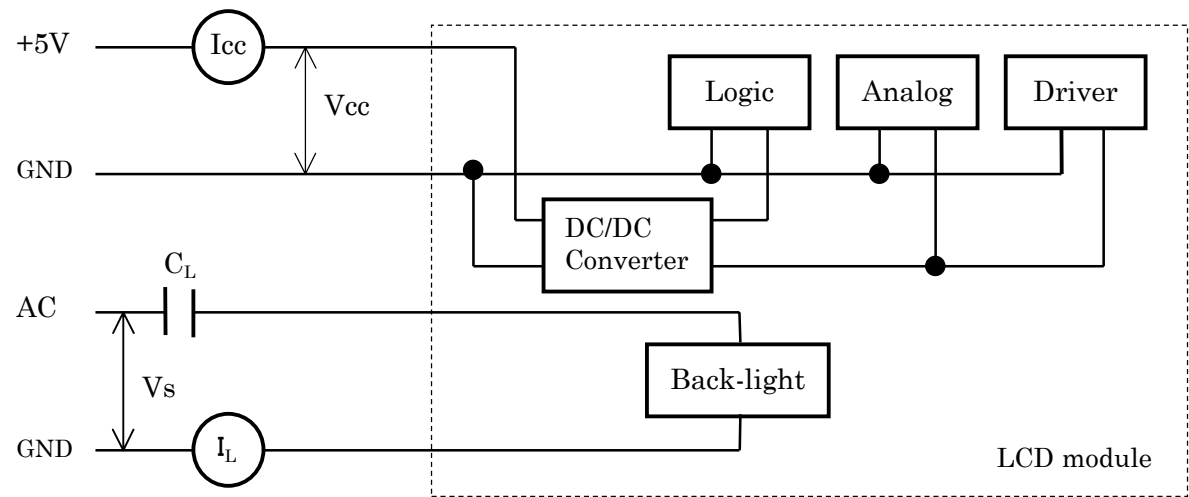


Figure 8-1 Measurement circuit

Input signals



Figure 8-2(A) Equivalent circuit of logic signal Input

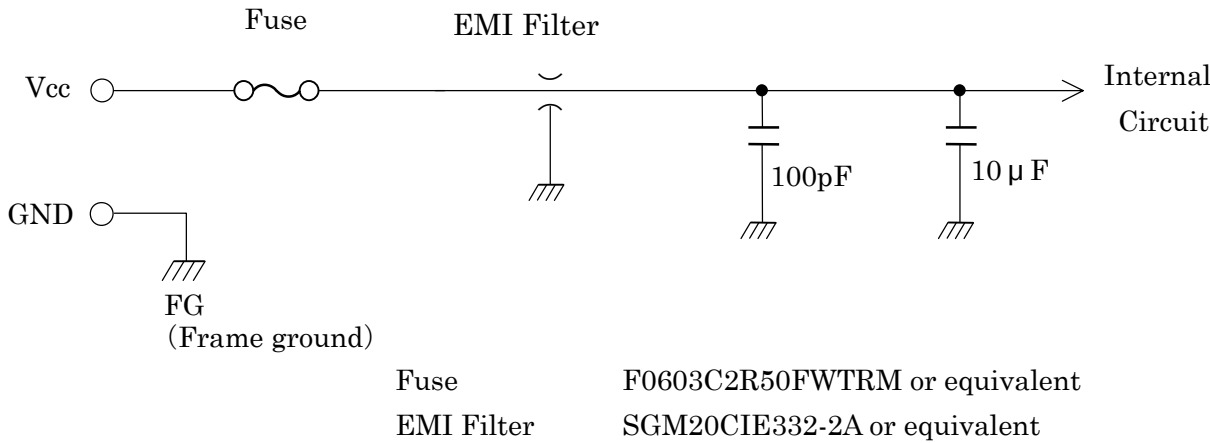


Figure 8-2(B) Equivalent circuit of power supply

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9. OPTICAL SPECIFICATIONS

Table 9-1 shows the optical specifications of this LCD module.

Table 9-1 Optical Specifications

 $T_a = 25^\circ\text{C}$

Item		Symbol	Condition		Specifications			Unit	Remark		
					MIN.	TYP.	MAX.			Note	
Visual Angle	Horizontal	$\theta_{L,R}$	CR 10	$\theta_{U,D}=0^{\circ}$	80	—	—	deg		(1)(2)	
	Vertical	$\theta_{U,D}$		$\theta_{L,R}=0^{\circ}$	80	—	—	deg		(3)(5)(6)	
Contrast Ratio		CR	$\theta_{L,R,U,D}=0^{\circ}$		210	400	—	—	White/Black	(1)(2)(3)(5)	
Response Time(ON) (B→W)		t_{on}	$\theta_{L,R,U,D}=0^{\circ}$	Ta=25℃	—	15	30	ms		(1)(4)(5)	
				Ta=0℃	—	50	100	ms			
Response Time(OFF) (W→B)		t_{off}	$\theta_{L,R,U,D}=0^{\circ}$	Ta=25℃	—	10	25	ms			
				Ta=0℃	—	50	100	ms			
Brightness		I	$\theta_{L,R,U,D}=0^{\circ}$ $V_{CC}=5V$ $I_L=6mA$		170	220		cd/m ²	White*1	(1)(5)	
Brightness Uniformity		I			70	—	—	%		(1)(5)(7)	
Chromaticity	W	x			0.293 0.295	0.313 0.315	0.333 0.335	—			(1)(5)
		y			0.309 0.320	0.329 0.340	0.349 0.360	—			
	R G B	(x,y)			Red	(0.609, 0.335) (0.644,0.349) Typ.					
					Green	(0.306, 0.565) (0.295,0.596) Typ.					
Blue			(0.150, 0.120) (0.150,0.131) Typ.								
LCD Panel Type					TFT Color						
Display Mode					Normaly Black						
Wide Viewing Angle Technology					MVA						
Optimum Viewing Angle					— (symmentry)					(6)	
Display Color					16,777,216 (8-bit color)						
Color of non-display area					Black						
Surface Treatment					Anti-glare (Haze value:25% , 2H)						

(*1) Value at 15 ~ 20 minutes after lighting on.

(Note) ・CS-1000 (MINOLTA Co., Ltd.) , BM-5A(Topcon) and the like should be used as a luminance colorimeter.

Field=1 °, L=500mm

· Back-light current = 6mA, Dark room condition(1 lux or less)

[illegible]

Based on Figure 9-1.

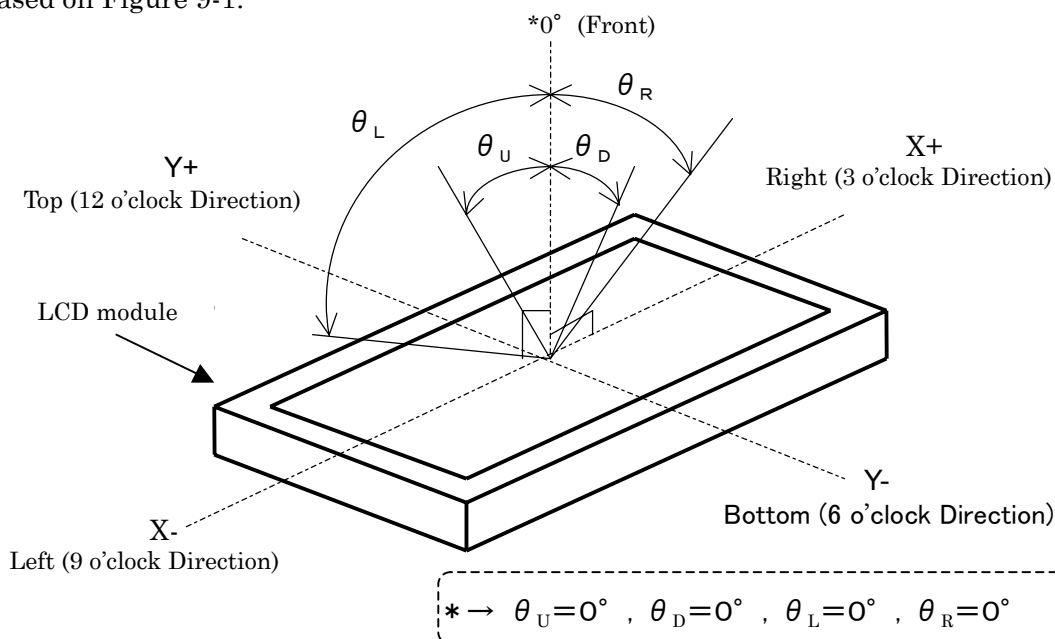


Figure 9-1 Definition of Viewing Angle (1)

Note 2) Definition of Viewing Angle (2)

Based on Figure 9-2.

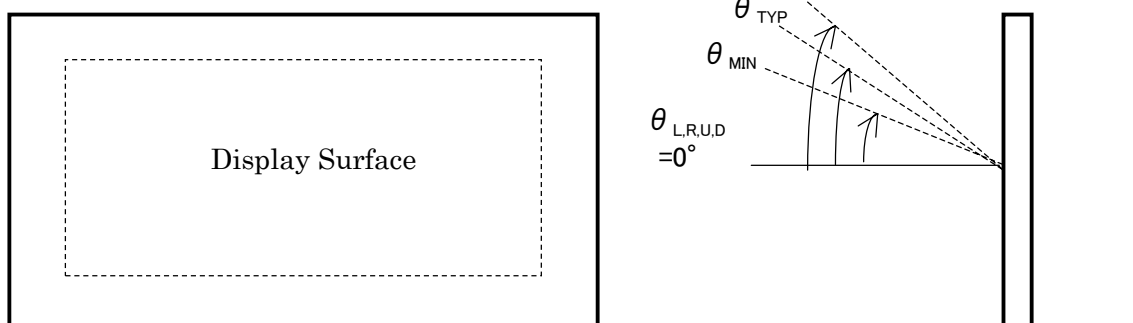


Figure 9-2 Definition of Viewing Angle (2)

Note 3) Definition of Contrast Ratio (CR)

Determined by Formula (1) based on Figure 9-3 Voltage-Brightness characteristics. Br

$$= \frac{L_w (\text{Brightness at white})}{L_B (\text{Brightness at black})} \dots\dots(1)$$

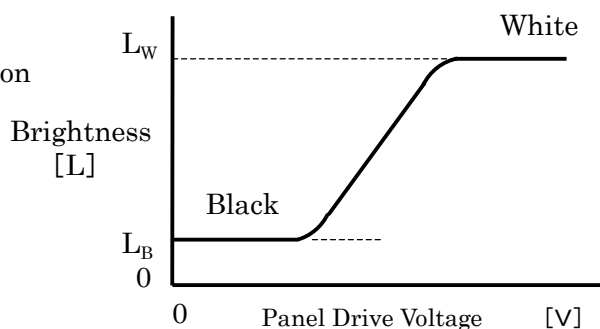


Figure 9-3 Voltage-Brightness Characteristics

Note 3) Definition of Contrast Ratio (CR)
Determined by Formula (1) based on Figure 9-3 Voltage-Brightness characteristics.

$$= \frac{L_W (\text{Brightness at white})}{L_B (\text{Brightness at black})} \cdots \cdots (1)$$

Figure 9-3 Voltage-Brightness Characteristics

Based on Figure 9-4.

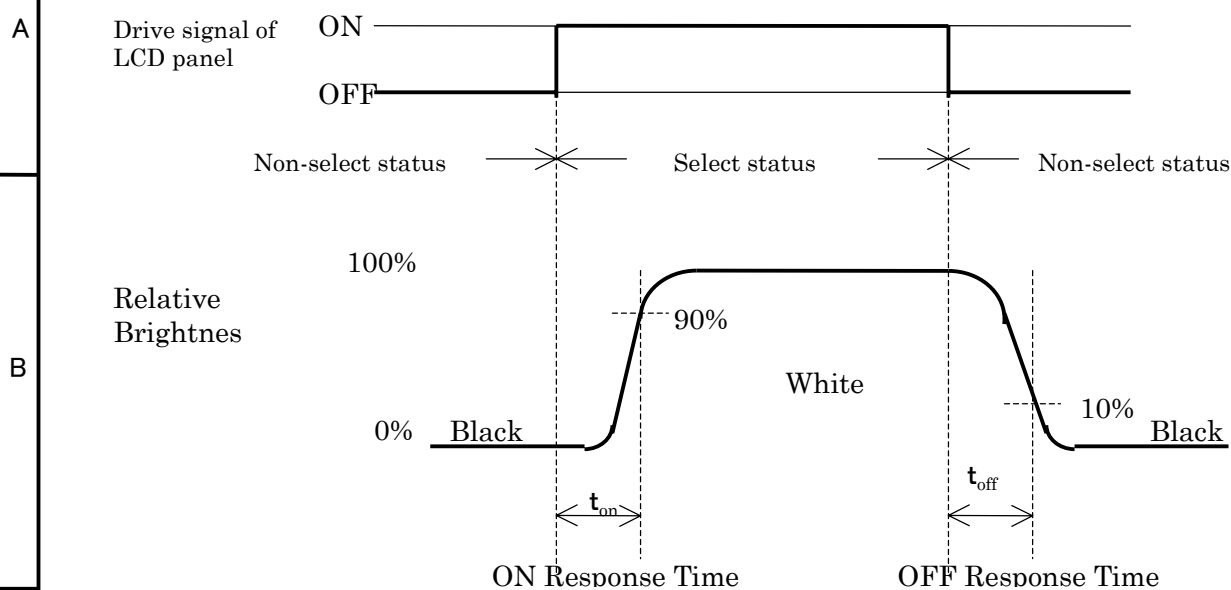


Figure 9-4 Definition of Response Time

Note 5) Contrast Ratio and Response Measurement System

Based on Figure 9-5.

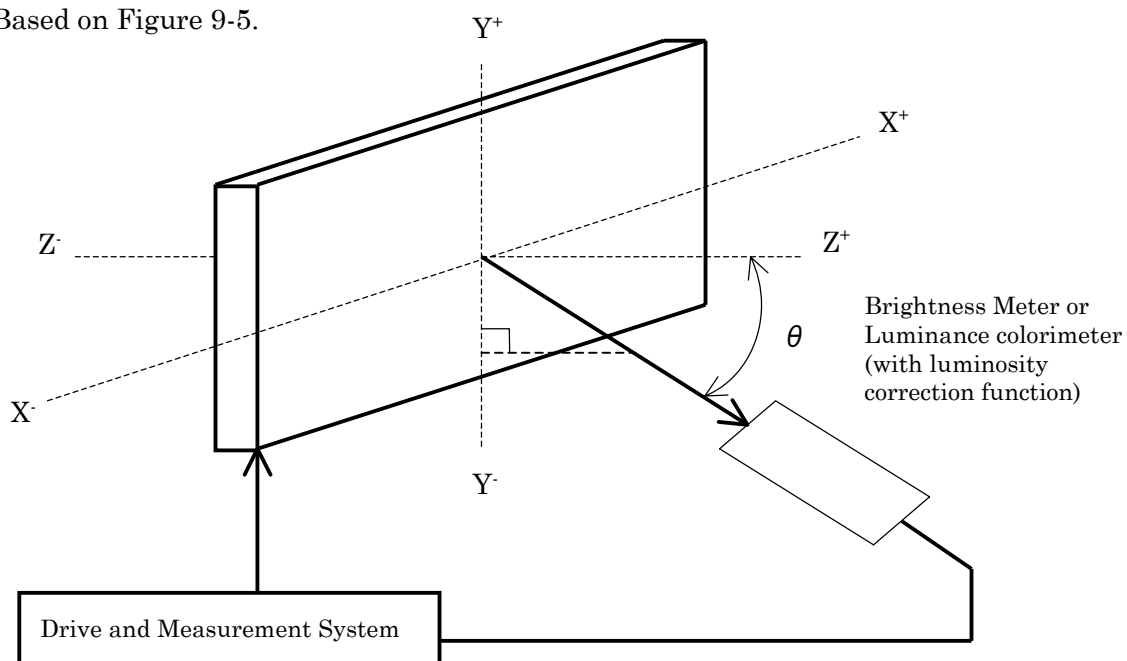


Figure 9-5 Contrast Ratio and Response Time Measurement System

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10. INTERFACE SPECIFICATIONS																																																																																																																																																																																																																																																																																																																																															
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Table 10-1 shows the description and configuration of interface signals (CN1).																																																																																																																																																																																																																																																																																																																																															
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6</td></tr><tr><td>30</td><td>BO7</td><td>I</td><td>Blue odd data 7</td></tr><tr><td>31</td><td>GND</td><td>—</td><td>Ground</td></tr><tr><td>32</td><td>RE0</td><td>I</td><td>Red even data 0</td></tr><tr><td>33</td><td>RE1</td><td>I</td><td>Red even data 1</td></tr><tr><td>34</td><td>RE2</td><td>I</td><td>Red even data 2</td></tr><tr><td>35</td><td>RE3</td><td>I</td><td>Red even data 3</td></tr><tr><td>36</td><td>GND</td><td>—</td><td>Ground</td></tr><tr><td>37</td><td>RE4</td><td>I</td><td>Red even data 4</td></tr><tr><td>38</td><td>RE5</td><td>I</td><td>Red even data 5</td></tr><tr><td>39</td><td>RE6</td><td>I</td><td>Red even data 6</td></tr><tr><td>40</td><td>RE7</td><td>I</td><td>Red even data 7</td></tr></table>				Pin No.	Symbol	I/O	Function	1	GND	—	Ground	2	RO0	I	Red odd data 0	3	RO1	I	Red odd data 1	4	RO2	I	Red odd data 2	5	RO3	I	Red odd data 3	6	GND	—	Ground	7	RO4	I	Red odd data 4	8	RO5	I	Red odd data 5	9	RO6	I	Red odd data 6	10	RO7	I	Red odd data 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supply</td></tr><tr><td>75</td><td>VCC</td><td>—</td><td>+5V Power supply</td></tr><tr><td>76</td><td>VCC</td><td>—</td><td>+5V Power supply</td></tr><tr><td>77</td><td>TEST</td><td>—</td><td>Test pin *1</td></tr><tr><td>78</td><td>TEST</td><td>—</td><td>Test pin *1</td></tr><tr><td>79</td><td>TEST</td><td>—</td><td>Test pin *1</td></tr><tr><td>80</td><td>GND</td><td>—</td><td>Ground</td></tr></table>				Pin No.	Symbol	I/O	Function	41	GND	—	Ground	42	GE0	I	Green even data 0	43	GE1	I	Green even data 1	44	GE2	I	Green even data 2	45	GE3	I	Green even data 3	46	GND	—	Ground	47	GE4	I	Green even data 4	48	GE5	I	Green even data 5	49	GE6	I	Green even data 6	50	GE7	I	Green even data 7	51	GND	—	Ground	52	BE0	I	Blue even data 0	53	BE1	I	Blue even data 1	54	BE2	I	Blue even data 2	55	BE3	I	Blue even data 3	56	GND	—	Ground	57	BE4	I	Blue even data 4	58	BE5	I	Blue even data 5	59	BE6	I	Blue even data 6	60	BE7	I	Blue even data 7	61	GND	—	Ground	62	GND	—	Ground	63	DCLK	I	Dot clock signal	64	GND	—	Ground	65	GND	—	Ground	66	NC	—	No connection	67	GND	—	Ground	68	GND	—	Ground	69	ENAB	I	Data enable signal	70	NC	—	No connection	71	NC	—	No connection	72	NC	—	No connection	73	VCC	—	+5V Power supply	74	VCC	—	+5V Power supply	75	VCC	—	+5V Power supply	76	VCC	—	+5V Power supply	77	TEST	—	Test pin *1	78	TEST	—	Test pin *1	79	TEST	—	Test pin *1	80	GND	—	Ground
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18	GO5	I	Green odd data 5																																																																																																																																																																																																																																																																																																																																												
19	GO6	I	Green odd data 6																																																																																																																																																																																																																																																																																																																																												
20	GO7	I	Green odd data 7																																																																																																																																																																																																																																																																																																																																												
21	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
22	BO0	I	Blue odd data 0																																																																																																																																																																																																																																																																																																																																												
23	BO1	I	Blue odd data 1																																																																																																																																																																																																																																																																																																																																												
24	BO2	I	Blue odd data 2																																																																																																																																																																																																																																																																																																																																												
25	BO3	I	Blue odd data 3																																																																																																																																																																																																																																																																																																																																												
26	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
27	BO4	I	Blue odd data 4																																																																																																																																																																																																																																																																																																																																												
28	BO5	I	Blue odd data 5																																																																																																																																																																																																																																																																																																																																												
29	BO6	I	Blue odd data 6																																																																																																																																																																																																																																																																																																																																												
30	BO7	I	Blue odd data 7																																																																																																																																																																																																																																																																																																																																												
31	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
32	RE0	I	Red even data 0																																																																																																																																																																																																																																																																																																																																												
33	RE1	I	Red even data 1																																																																																																																																																																																																																																																																																																																																												
34	RE2	I	Red even data 2																																																																																																																																																																																																																																																																																																																																												
35	RE3	I	Red even data 3																																																																																																																																																																																																																																																																																																																																												
36	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
37	RE4	I	Red even data 4																																																																																																																																																																																																																																																																																																																																												
38	RE5	I	Red even data 5																																																																																																																																																																																																																																																																																																																																												
39	RE6	I	Red even data 6																																																																																																																																																																																																																																																																																																																																												
40	RE7	I	Red even data 7																																																																																																																																																																																																																																																																																																																																												
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41	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
42	GE0	I	Green even data 0																																																																																																																																																																																																																																																																																																																																												
43	GE1	I	Green even data 1																																																																																																																																																																																																																																																																																																																																												
44	GE2	I	Green even data 2																																																																																																																																																																																																																																																																																																																																												
45	GE3	I	Green even data 3																																																																																																																																																																																																																																																																																																																																												
46	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
47	GE4	I	Green even data 4																																																																																																																																																																																																																																																																																																																																												
48	GE5	I	Green even data 5																																																																																																																																																																																																																																																																																																																																												
49	GE6	I	Green even data 6																																																																																																																																																																																																																																																																																																																																												
50	GE7	I	Green even data 7																																																																																																																																																																																																																																																																																																																																												
51	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
52	BE0	I	Blue even data 0																																																																																																																																																																																																																																																																																																																																												
53	BE1	I	Blue even data 1																																																																																																																																																																																																																																																																																																																																												
54	BE2	I	Blue even data 2																																																																																																																																																																																																																																																																																																																																												
55	BE3	I	Blue even data 3																																																																																																																																																																																																																																																																																																																																												
56	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
57	BE4	I	Blue even data 4																																																																																																																																																																																																																																																																																																																																												
58	BE5	I	Blue even data 5																																																																																																																																																																																																																																																																																																																																												
59	BE6	I	Blue even data 6																																																																																																																																																																																																																																																																																																																																												
60	BE7	I	Blue even data 7																																																																																																																																																																																																																																																																																																																																												
61	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
62	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
63	DCLK	I	Dot clock signal																																																																																																																																																																																																																																																																																																																																												
64	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
65	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
66	NC	—	No connection																																																																																																																																																																																																																																																																																																																																												
67	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
68	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
69	ENAB	I	Data enable signal																																																																																																																																																																																																																																																																																																																																												
70	NC	—	No connection																																																																																																																																																																																																																																																																																																																																												
71	NC	—	No connection																																																																																																																																																																																																																																																																																																																																												
72	NC	—	No connection																																																																																																																																																																																																																																																																																																																																												
73	VCC	—	+5V Power supply																																																																																																																																																																																																																																																																																																																																												
74	VCC	—	+5V Power supply																																																																																																																																																																																																																																																																																																																																												
75	VCC	—	+5V Power supply																																																																																																																																																																																																																																																																																																																																												
76	VCC	—	+5V Power supply																																																																																																																																																																																																																																																																																																																																												
77	TEST	—	Test pin *1																																																																																																																																																																																																																																																																																																																																												
78	TEST	—	Test pin *1																																																																																																																																																																																																																																																																																																																																												
79	TEST	—	Test pin *1																																																																																																																																																																																																																																																																																																																																												
80	GND	—	Ground																																																																																																																																																																																																																																																																																																																																												
Connector : 52760-080X (Molex)				User's connector : 53475-080X (Molex)																																																																																																																																																																																																																																																																																																																																											
*1: Keep open. (Internal test use only.)																																																																																																																																																																																																																																																																																																																																															
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1		2		3		4										
10-2 Color Data Assignment																
Table 10-2 shows the Color Data Assignment.																
Table 10-2 Color Data Assignment																
A	B	Color		R Input data												
		Odd		R7 R6 R5 R4 R3 R2 R1 R0												
		Even		R7 R6 R5 R4 R3 R2 R1 R0												
				G7 G6 G5 G4 G3 G2 G1 G0												
				G7 G6 G5 G4 G3 G2 G1 G0												
				B7 B6 B5 B4 B3 B2 B1 B0												
				B7 B6 B5 B4 B3 B2 B1 B0												
B	Basic Color	Black		0 0 0 0 0 0 0 0												
		Blue		0 0 0 0 0 0 0 0												
		Green		0 0 0 0 0 0 0 0												
		Cyan		0 0 0 0 0 0 0 0												
		Red		1 1 1 1 1 1 1 1												
		Magenta		1 1 1 1 1 1 1 1												
		Yellow		1 1 1 1 1 1 1 1												
		White		1 1 1 1 1 1 1 1												
C	Red	Black 0		0 0 0 0 0 0 0 0												
		↑ 1		0 0 0 0 0 0 0 1												
		↑ :		: : : : : : : :												
		↓ :		: : : : : : : :												
		Brighter 253		1 1 1 1 1 1 0 1												
		↓ 254		1 1 1 1 1 1 1 0												
		Red 255		1 1 1 1 1 1 1 1												
D	Green	Black 0		0 0 0 0 0 0 0 0												
		↑ 1		0 0 0 0 0 0 0 0												
		↑ :		: : : : : : : :												
		↓ :		: : : : : : : :												
		Brighter 253		0 0 0 0 0 0 0 0												
		↓ 254		0 0 0 0 0 0 0 0												
		Green 255		0 0 0 0 0 0 0 0												
E	Blue	Black 0		0 0 0 0 0 0 0 0												
		↑ 1		0 0 0 0 0 0 0 0												
		↑ :		: : : : : : : :												
		↓ :		: : : : : : : :												
		Brighter 253		0 0 0 0 0 0 0 0												
		↓ 254		0 0 0 0 0 0 0 0												
		Blue 255		0 0 0 0 0 0 0 0												
Note.1) Definition of gray scale:Color (n)···"n" indicates gray scale level.																
Larger number means brighter level.																
Note.2) Data; 1:High, 0:Low																
Note 3) Color data consist of 8 bit red, green and blue data of odd and even number pixel data.																
Total data number is 48 signals. This module is able to display 16,777,216 colors because each red, green and blue data is controlled independently.																
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	FLC44SXC8V															
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1																

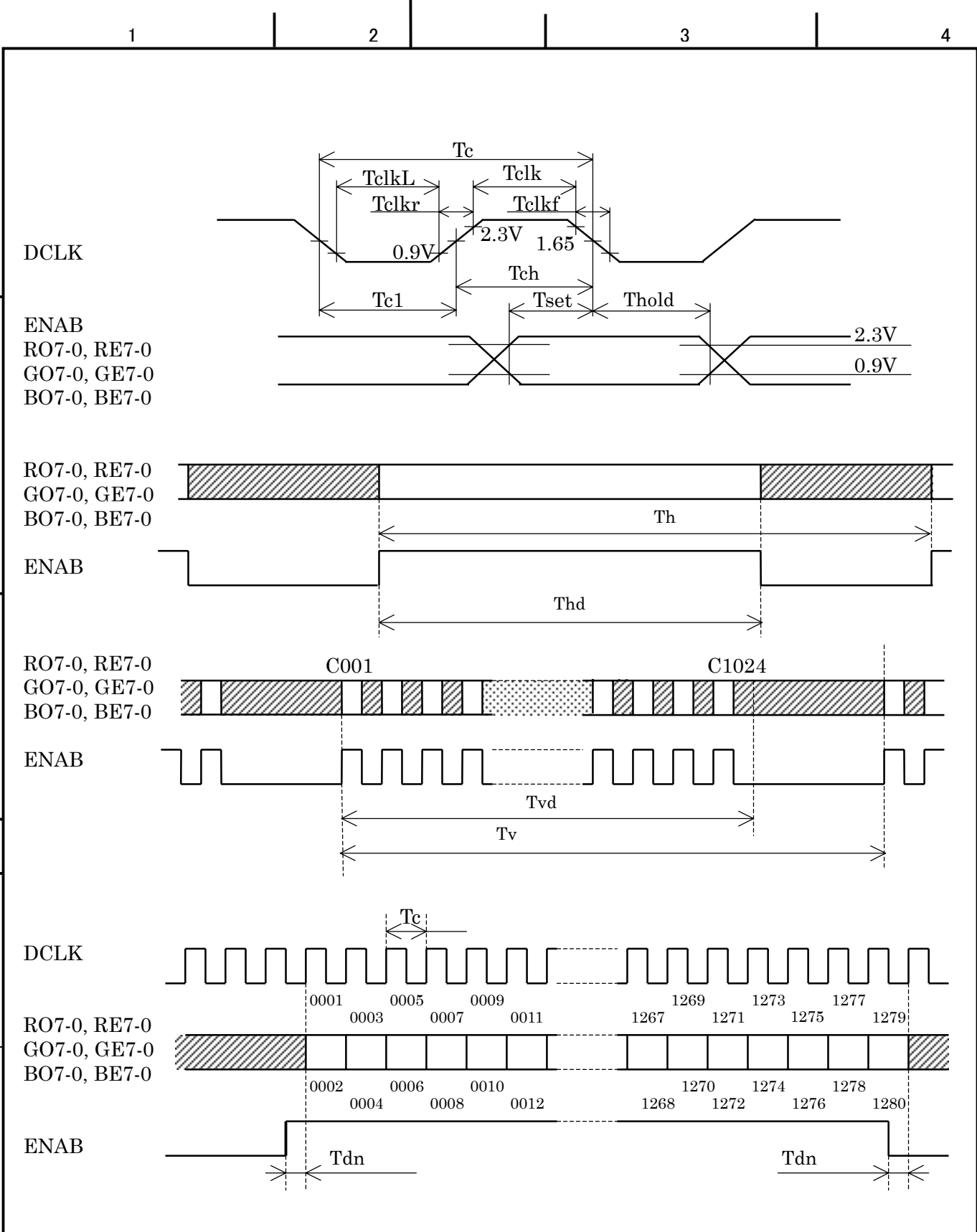


Figure 10-1 Input Signal Timing Chart

						TITLE FLC44SXC8V					
						DRAW. NO. Tech Bes LCD-00028				CUST.	
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10-4 Correspondence between Data and Display Position

Figure 10-2 shows the Correspondence between Data and Display Position.

	S0001	S0002	S0003	S0004	S0005	S0006	S0007	-----	S3839	S3840	
C001	RO 0001	GO 0001	BO 0001	RE 0002	GE 0002	BE 0002	RO 0003	GO 0003		GE 1280	BE 1280

Figure 10-2 Correspondence Data and Display Position

10-5 Power Supply Sequence

The sequence of input signals and On/Off of the power supply of this LCD module should be in the specification shown in Figure 10-3 to prevent latch-up of the driver ICs and DC driving of the LCD panel.

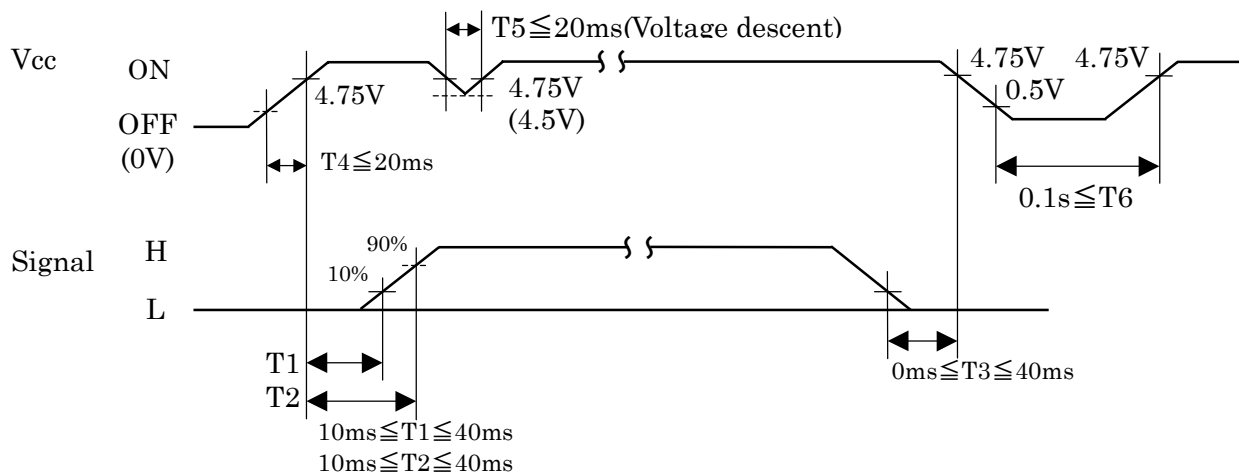


Figure 10-3 Power Supply Sequence

DATE	DOCUMENT CONTROL SECTION
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						TITLE	FLC44SXC8V
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						CUST.	
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A

A

B

B

Pin No.	Signal	Function	Cable Color
1	V _{L3}	Power supply for CCFL 3	Pink Blue
2	V _{L4}	Power supply for CCFL 4	Pink Blue
3	NC	—	—
4	GND	Ground (for V _{L3,4})	White

C

C

D

D

E

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DATE _____

						TITLE FLC44SXC8V													
						DRAW. NO. Tech Bes LCD-00028										CUST.			
04	20011121				Change CCFL spec.														
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	DESIG.			CHECK				APPR.											

12. APPEARANCE SPECIFICATIONS

Length:L [mm]

Width: $W[\text{mm}]$

Average diameter: D [mm]

12-1 Appearance

No.	Item		Judgement method and standard	Remarks
1	Foreign Particle	Black particle	0.5 >D N ≤ 4	Recognized in the cell with lighting
		Fiber	3.0 >L N ≤ 4	
2	Scratch	Scratch on polarizer film	10.0 >L N ≤ 6	
3	Nick	Nick on polarezer film	0.5 >D N ≤ 6	

Note

- Foreign particle and scratch that do not affect display image, such as foreign article between glass and polarizer film out of the display area, scratch on metal vessel, back-light module or polarizer film out of the display area, etc. are not counted.
- These items apply to defects in the cell when the back-light is on, and defects on the surface of polarizer film inside the display area.
- Visually inspect appearance with keeping your eyes 35cm or more from the panel, using one 20W fluorescent light illumination at 50cm above the work table. At this time, the illuminance in the vertical direction to the fluorescent light is 400 to 600lux (reference value).

12-2 Dot defects (Bright spots, Dark spots)

12-2-1 Zone

Inside display dot area (345.6 X 276.48mm)

Display dot area means active area.

One pixel consists of 3 dots (red, green and blue).

12-2-2 Bright spots

- (1) Bright spots classification (based on brightness samples)
 - Red or Green spot is High Bright spot.
 - Blue spot is Low Bright spot.
 - Spots not seen in 50% gray pattern are ignored.
- (2) Defects of color filter
 - Larger than one half of a dot
 - Same or smaller than one half of a dot
- (3) Defects of chrome mask
 - Larger than $\varnothing 50\mu\text{m}$ ----- High Bright spot
 - Same or smaller than $\varnothing 50\mu\text{m}$ ----- not counted

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						DRAW. NO. Tech Bes LCD-00028						CUST.		
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12-2-3 Number of luminescent spot standard

Item	Entire Screen	
Brightness classification	High Bright Spots	High and Low Bright Spots
Number of defects	9 or less	15 or less

NOTES:

1. Display should be all black when luminescent spot is counted.
2. Number of high Bright spots of green (G) is up to 7.
3. Number of two low Bright spot connections is up to 7.
4. Number of three Bright spot connections and two high Bright spot connections is 0.
5. Number of high Bright spot and low Bright spot connections is up to 4.

12-2-4 Distance between Bright spots

- High Bright spots R and G ----- 15mm or more
- High Bright spots and low Bright spot ----- 5mm or more
(Except one or two of two bright spot connections)

12-2-5 Number of Dark spots standard

Item	Entire Screen
Number of defects	16 or less (When display is all white)

NOTES:

1. Display should be all white when dark spot is counted.
2. Number of two dark spot connections is up to 5.
3. Distance between defects is 5mm or more.
4. If dark spot is smaller than one dot size, convert with following rule and sum up.

- (a) $A < 1/3$: Not count.
(Only one of 4 dark connection is allowed.)
- (b) $1/3 \leq A < 2/3$: Considered as 0.5 dot.
- (c) $2/3 \leq A$: Considered as 1 dot.

(A= Dark spot size/dot size)

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13. ENVIRONMENTAL SPECIFICATIONS

Table 13-1 show the environmental specifications.

Table 13-1 Environmental specifications

Item	Condition		Remark
Temperature	Operation	0~50°C	Temperature on surface of LCD panel (display area.)
	Storage	-20~60°C	
Humidity	Operation	20~85%RH	Maximum wet-bulb temperature should not exceed 29°C. No condensation.
	Storage	5~85%RH	
Vibration	Non-operation	10~500Hz, 1octave/20minute, 2G, 1.5mm max, 1hour each X, Y and Z directions	For single module without package.
Shock	Non-operation	30G, 6ms, 1time each ±X, ±Y and ±Z directions.	

NOTE: Table 13-2 and Figure 13-1 show the shock resistance standard when module is packaged.

Table 13-2 Shock resistance standard when module is packaged

Dropping location	Dropping height	Count
A~J	60cm	1 time

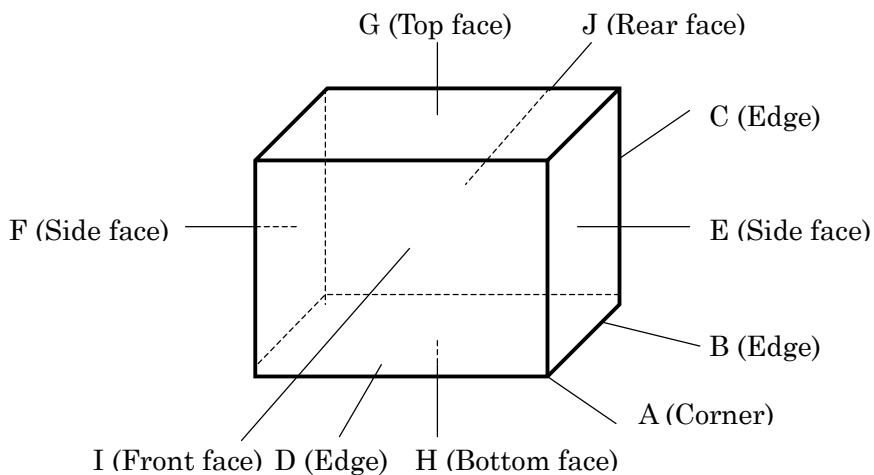


Figure 13-1 Direction to apply shock to package

DATE	DOCUMENT CONTROL SECTION
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14. INDICATIONS

This module has the following indications.

- (1) Product name : **LCD unit**
- (2) Model Number : **FLC44SXC8V**
- (3) Product Drawing Number : **NA19020-C151**
- (4) Manufacturing Number : **0 7 0 0 0 0 1**

Serial number
(To be reset every month on 1st.)

Manufacturing month
(Oct. = X, Nov. =Y, Dec. =Z)

Last digit of manufacturing year.

- (5) Version number : **01A** (Example)
-1st 2 digits "01" means operational version.
-3rd alphabet means functional version.

- (6) Manufacturer Country Name :
- (7) Company Name : **FUJITSU LIMITED**
- (8) Disposal method of cold-cathode tubes. (See Figure 14-1)
- (9) Caution when changing cold-cathode tubes. (See Figure 14-2)

・ THIS TFT COLOR LCD
CONTAINS COLD CATHODE
FLUORESCENT LAMPS. PLEASE
FOLLOW LOCAL ORDINANCES
OR REGULATIONS FOR ITS DISPOSAL.
・ 当該液晶ディスプレイユニットには
蛍光管が組み込まれていますので、
地方自治体の条例または規則に従って
廃棄して下さい。

Figure 14-1

・ WHEN CHANGING COLD CATHODE FLUO-
RESCENT LAMPS, FOLLOW OPERATING
SPECIFICATIONS. ESPECIALLY BE CAREFUL
BOUT THE LAMPS SIDE-EDGE.
・ 蛍光管の交換は作業仕様書に従っ
て行って下さい。特に蛍光管ホル
ダ側面のエッジに気をつけて下さ
い。

Figure 14-2

15. PACKAGING

Separately specified in packaging specifications.

15-1 Packing specifications

- (1) 5 LCD modules/1package.
- (2) Weight:approximately 13kg/1package.
- (3) Outline dimensions:533mm (W)x308mm (D)x 468mm (H)

15-2 Packing method

Figure 15-1, 2 show the packing method.

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DATE

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						Tech Bes LCD-00028			
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	DESIG.			CHECK		APPR.			

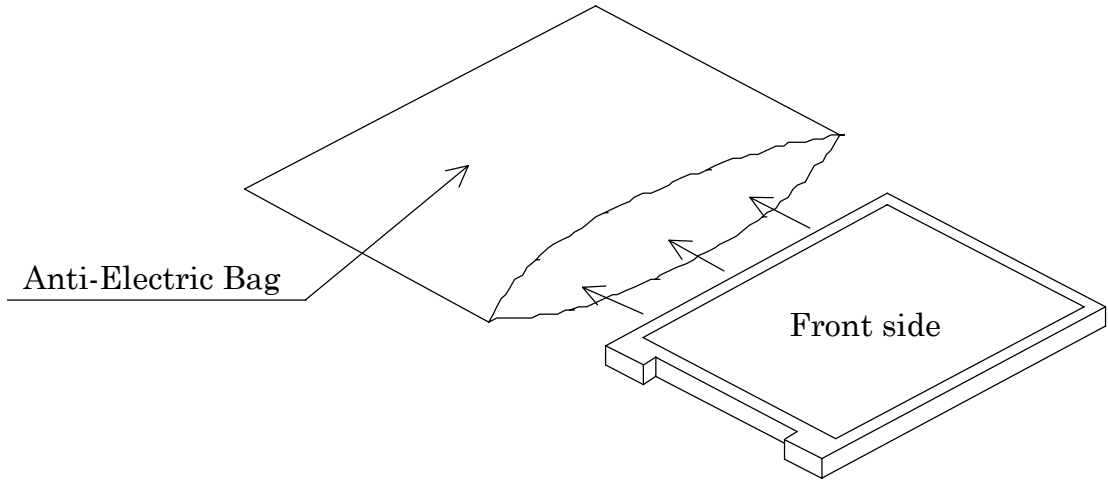
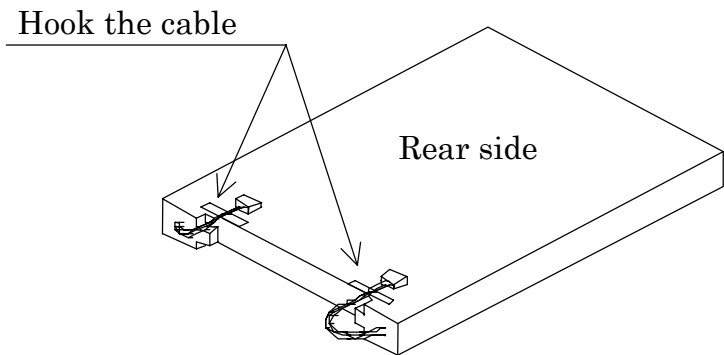
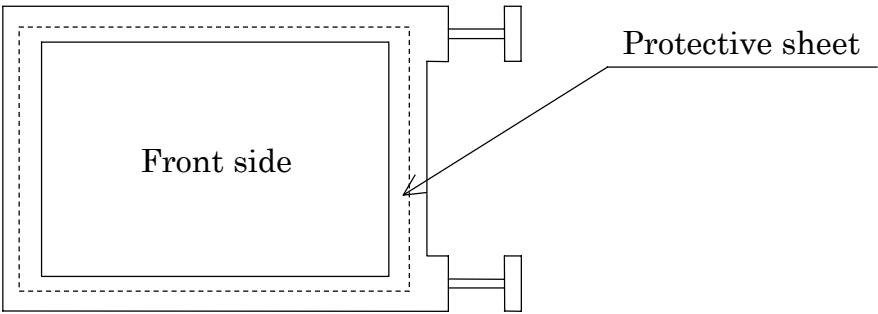


Fig.15-2 (a) Packaging Method

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						TITLE FLC44SXC8V	
						DRAW. NO. Tech Bes LCD-00028	
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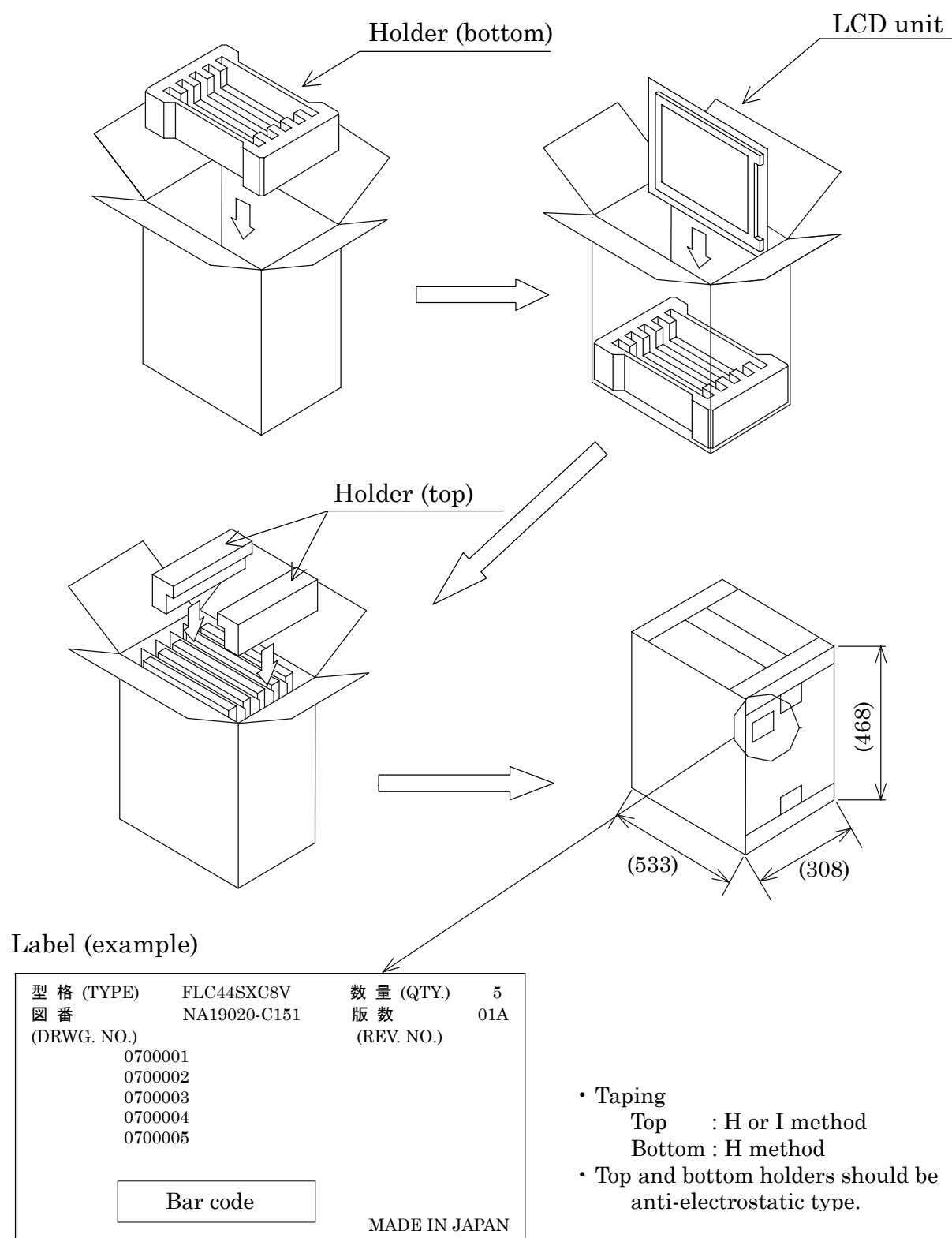


Fig.15-2 (b) Packaging Method

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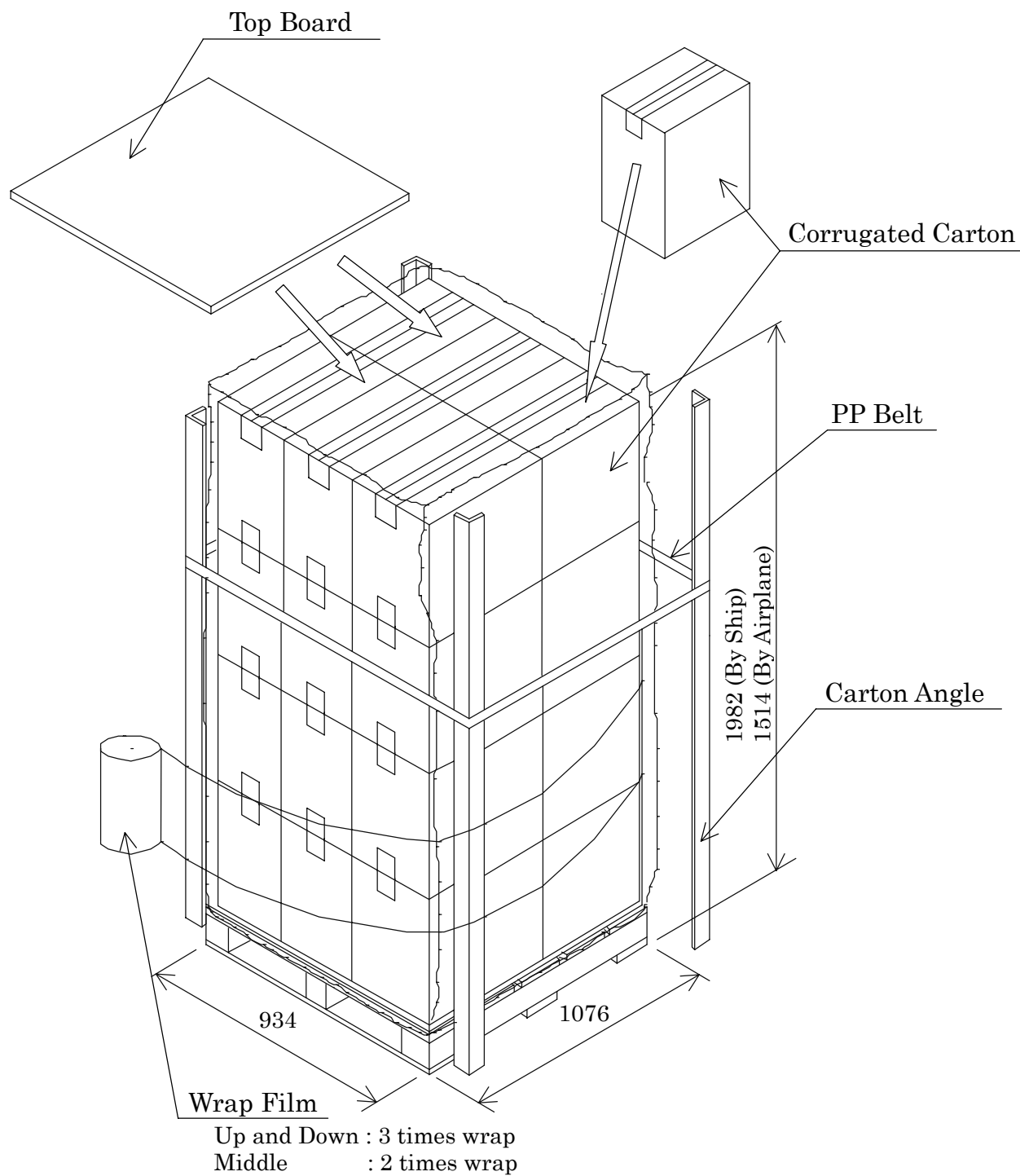
TITLE FLC44SXC8V

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Note:1) 6 boxes × 4 layers (maximum 24 boxes) : by ship
6 boxes × 3 layers (maximum 18 boxes) : by airplane
Note:2) This drawing shows marine transportation specification.

Fig.15-2 (c) Packaging Method

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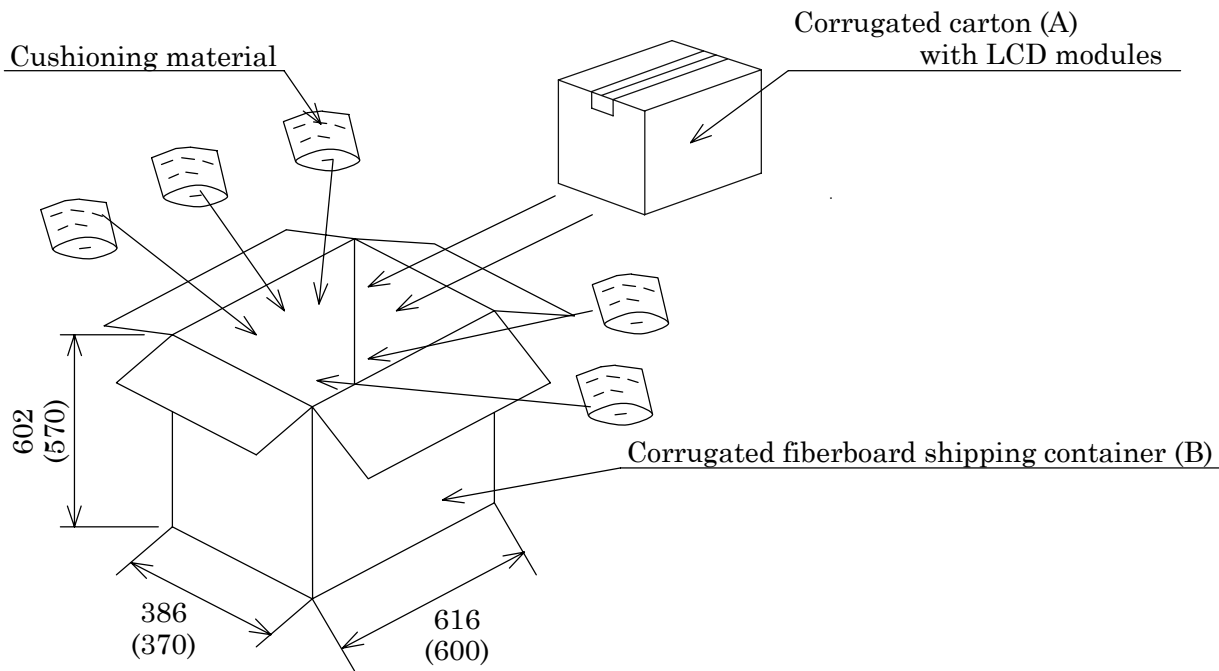
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DRAW. NO. Tech Bes LCD-00028

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Note 1) The carton (A) should be placed in the middle of the container (B) with enough cushioning materials.

Note2) The figures in () show inside measurements of the container (B).

Figure.15-2 (d) Packing method

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		1		2		3		4	
A	16.WARRANTY The warranty period is one year after shipping. Products which fail during this period are repaired or replaced without charge, unless the failure is caused by user.								
	17.PRECAUTIONS Adhere to the following precautions to use this LCD module properly.								
B	(1) Handling of LCD panel Do not apply any strong mechanical shock to the LCD panel. Since the LCD panel is made of glass, excessive shock may damage the panel or cause a malfunction.								
	Do not press hard on the LCD panel surface. In the LCD panel, the gap between two glass plates is kept perfectly even to maintain display properties and reliability. The hard pressure on the LCD panel may cause the following problems.								
C	Ununiformity of color Disorder of orientation of liquid crystal Problem returns to normal condition after a while. Problem returns to normal condition by turning the power off and turning on again. However these operations should be avoided to insure reliability.								
D	Do not scratch the polarizer film on the LCD panel surface. • Do not press or rub the display surface with a hard tool, tweezers, etc. • For handling, use cotton or conductive gloves so that the display surface is not soiled. • If dust or dirt soils the display surface, clean it as follows with a soft cloth (deerskin, etc.) [Dust] Wipe off with a soft cloth. (do not rub.) [Dirt] Apply clear water to a soft cloth and squeeze hard out of water drops, then lightly wipe off the specified parts. Only if the dirt is hardly wiped off, use isopropyl alcohol or ethanol. Be careful not to splash the water or the solvents on the edge of polarizer and in the LCD unit. The polarizer possibly exfoliates due to the solvent and water penetrated between the polarizer and the LCD panel. Do not use unspecified solvent such as ketone (acetone, etc.) and aromatics (xylene, toluene, etc.)								
	(Caution) Be careful not to allow the water or solvent to enter the module. • If saliva or water drops are left for a long period of time, the part may become deformed or discolored. Wipe off immediately in the same way as for dirt. • Do not allow oil to adhere to the module since excessive oil is hard to clean.								
F	DATE DOCUMENT CONTROL SECTION					TITLE FLC44SXC8V DRAW. NO. Tech Bes LCD-00028 CUST.			
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1									

A

This may make some parts of the LCD module distorted and the quality of display may deteriorate.

B

If the cable is pulled with the strength of 2kg or more, the cable may be damaged or may lose reliability.

Conductive foreign matter adheres to the module may cause failures.

Since the LCD module contains CMOS-ICs, the following points should be observed.

- For assembling the module, operator should be grounded and wear cotton or conductive gloves.
- Floor of work area and work table to assemble the LCD module should be covered with electrostatic shielding in order to discharge static electricity via an earth wire.
- If necessary, ground operation tools (soldering iron, radio pliers, tweezers, etc.).
- Do not take the module out of the conductive bag until the module is assembled.
- Do not assemble the module under low humidity (50%RH or less).

C

Disassembly or remodeling of the LCD module may result in malfunctions or deterioration of the display quality and reliability.

D

If not followed, the CMOS-IC may cause a latch-up, or DC voltage may be applied to the liquid crystal, which cause a failure or serious deterioration in display quality.

D

If the LCD module is operated when condensation is on the terminals of the LCD panel, the terminals cause electrochemical reaction, and may reach disconnection. Condensation easily occurs especially when the module is moved from cold environment to warm environment.

E

F

A

- B

If control signals (DCLK, ENAB) are not input, or if the timing is out of the specified timing, DC voltage may be applied to the liquid crystal and, as a result, cause image sticking or deterioration of contrast.

C

Excessive pressure on the screen caused by the installation of the LCD module may deteriorate display quality and reliability.

Brightness uniformity and the reliability of CCFL may decrease if the pressure is applied to the backlight module.

Excessive twist and bend may damage display quality and reliability.

This may cause the backlight to flicker or not to light.

D

When frequency current for backlight driving leak to the metal enclosure, the desired brightness may not be assured.

When Mounting LCD module with M3 screws (x4), tighten the screws with torque below 4.5kgf.

When connecting CN-1 with M3 screws (x2), tighten the screws with torque below 2kgf.

In an organic solvent atmosphere, the polarizer film discolours and display quality deteriorates.

In a corrosive gas environment, various parts of the module may corrode or deteriorate.

At storing, Fujitsu packages can be stacked up to 3 boxes.

The LCD module is in an anti-static bag. Keep the module in that status.

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When connecting LCD module with the screws (x2), tighten the screws with torque below 4.5kgf.

When connecting CN-1 with M3 screws (x2), tighten the screws with torque below 2kgf.

(5) Storage method

Do not store the LCD module in an atmosphere of organic solvent or corrosive gas.
 In an organic solvent atmosphere, the polarizer film discolors and display quality deteriorates.
 In a corrosive gas environment, various parts of the module may corrode or deteriorate.

Store the LCD module in a Fujitsu package.
 At storing, Fujitsu packages can be stacked up to 3 boxes.
 The LCD module is in an anti-static bag. Keep the module in that status.

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A

- Place : Dark (avoid direct sunlight)
- Temperature : 10 ~ 35
- Humidity : 50 ~ 60%RH

B

B

The components of this LCD module can be grouped into metal, resin, glass and so on. As the backlight contains CCFL which includes mercury, it must be disposed according to the local ordinance or regulations.

All the packages are made of recyclable papers except the anti-ESD bag.

C

C

If the liquid crystal adhere to the body or cloths, wash it off with soap immediately. Follow regular precautions for electronic components.

Fujitsu has adopted non-wash technology on module assembly process.

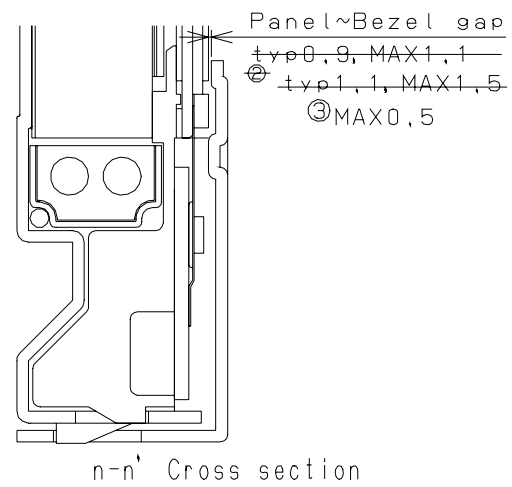
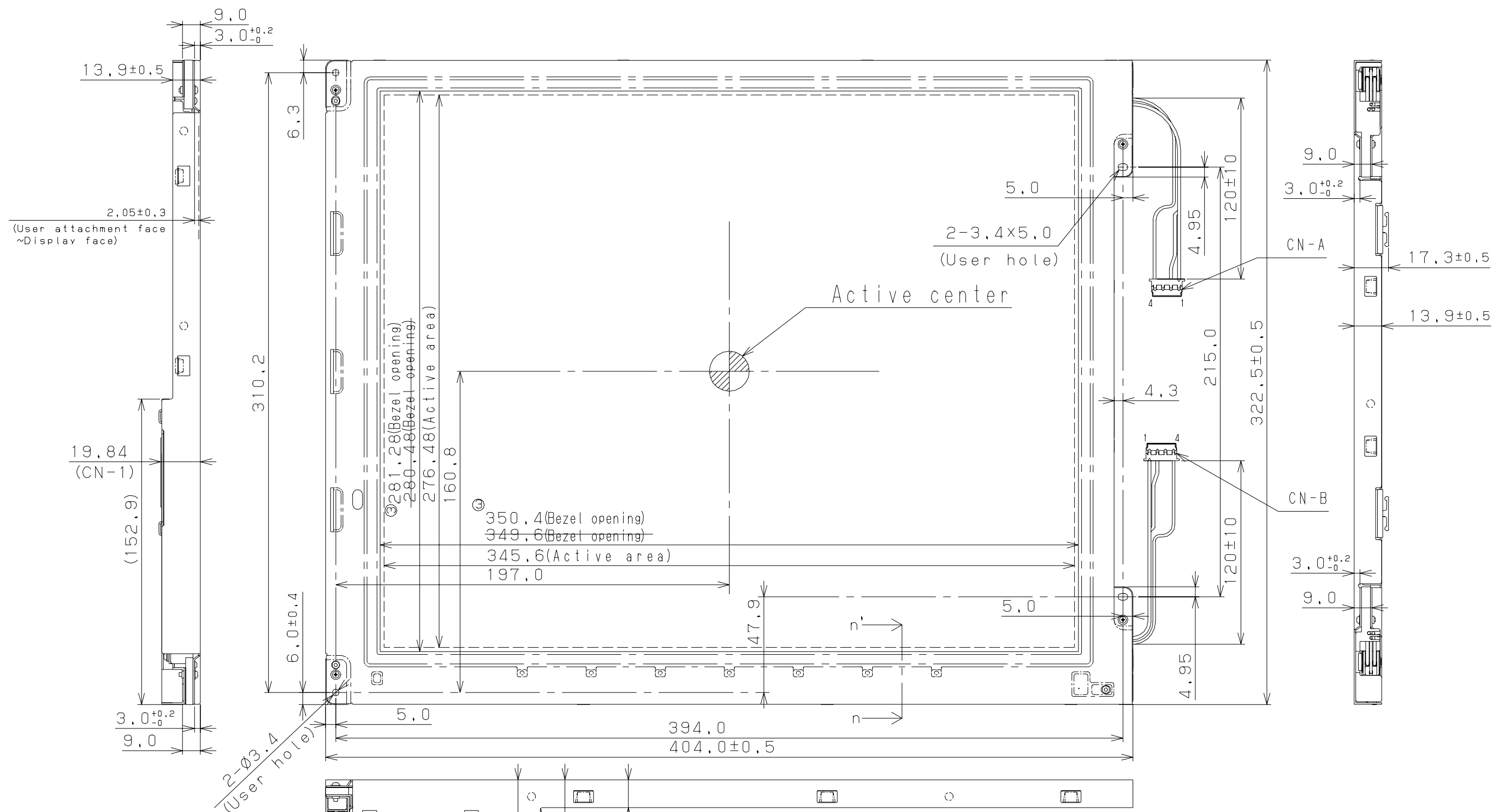
D

D

E

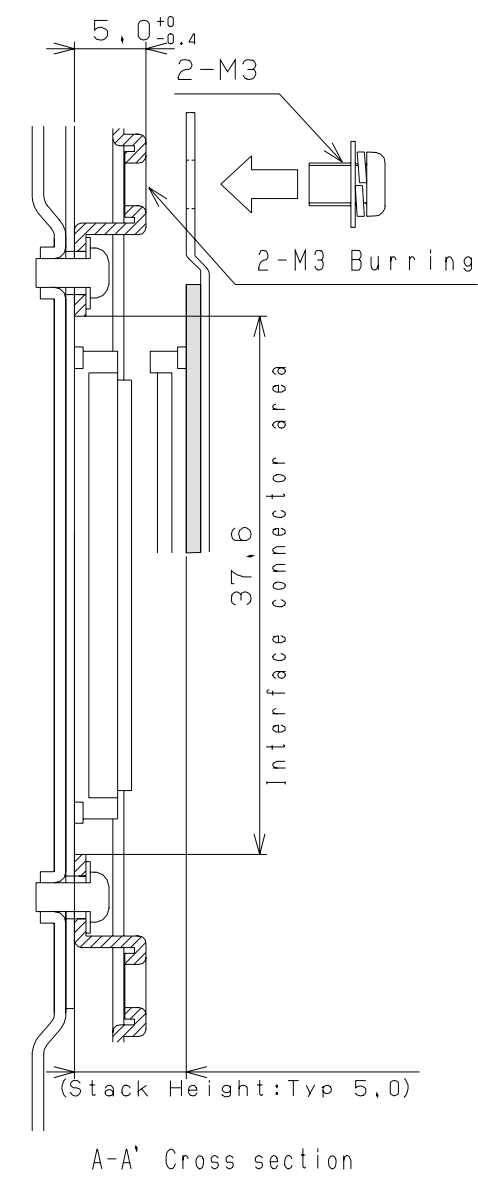
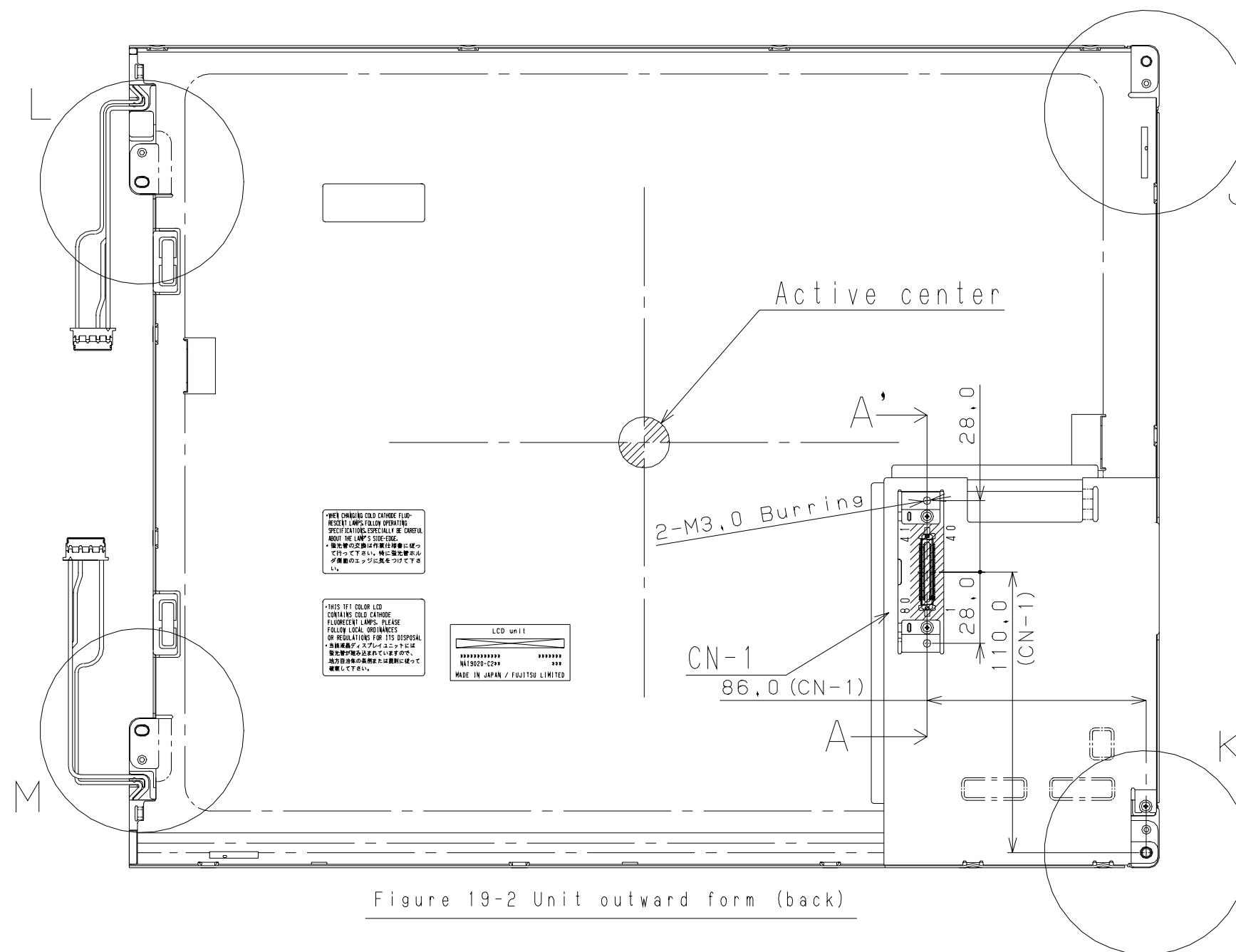
This LCD module is not designed for the purpose where high reliability is required, such as for aero-space equipment, control system of nuclear power and medical life-support equipment.

DATE	DOCUMENT CONTROL SECTION									
Both parties shall discuss together and make the best effort to reach agreement in case of the rising of any doubt to the contents of the specifications. This LCD module is not designed for the purpose where high reliability is required, such as for aero-space equipment, control system of nuclear power and medical life-support equipment.										
						TITLE FLC44SXC8V				
						DRAW. NO. Tech Bes LCD-00028				CUST.
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DESIG.			CHECK				APPR.		FUJITSU LIMITED	29 /



NOTE

1) Unspecified tolerance to be $\pm 0,5$



NOTE

- 2)  is the area of interface connector.
- 3) The height of interface connector does not include that of a counterpart connector.

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						DRAW. NO.			Tech Bes LCD-00028		
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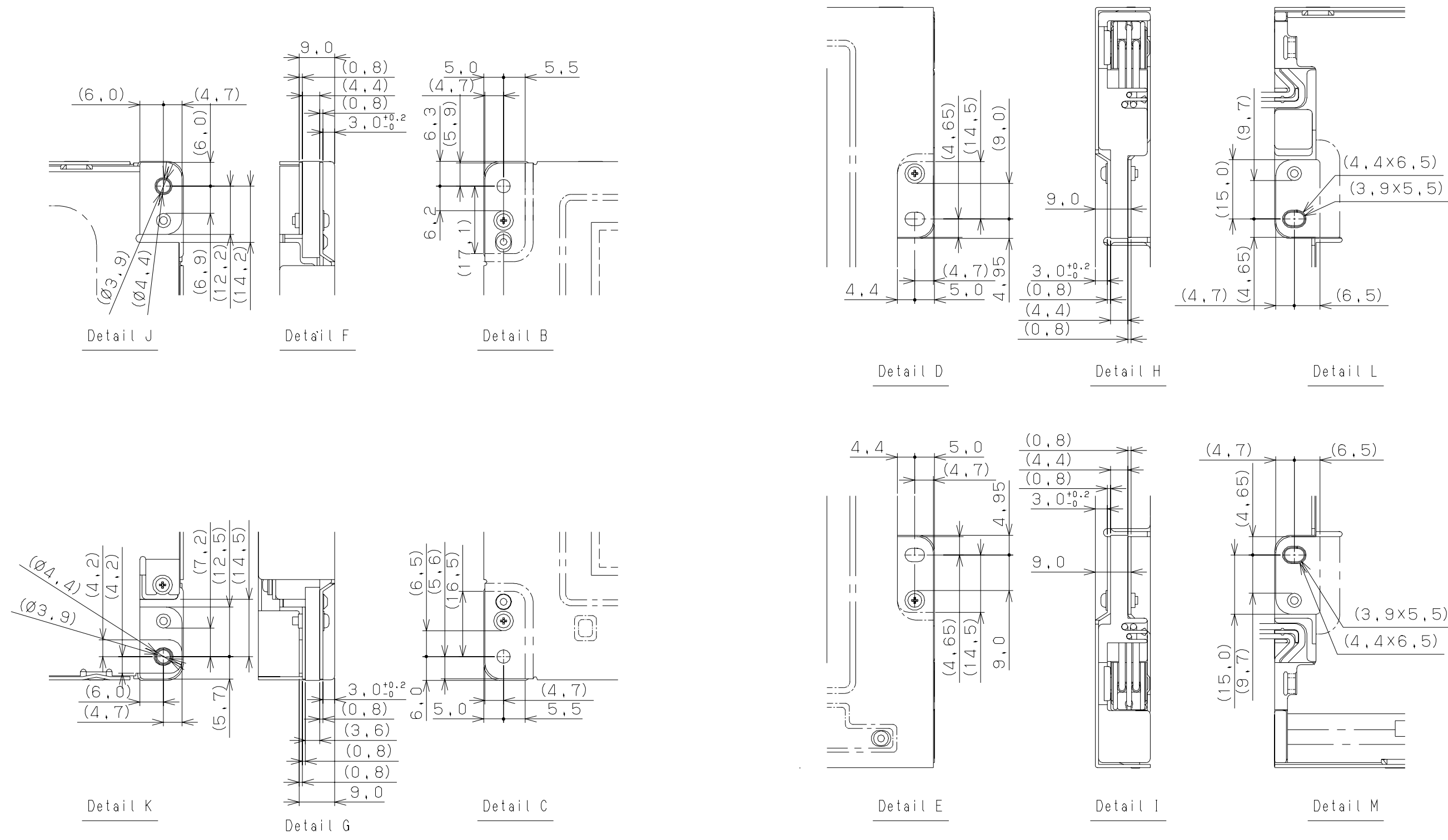


Figure 19-3 Unit outward form (detail)

NOTE
4) This page is referende.
(Not guarantee)

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