DATA MODUL

ORTUSTECH

Specification

COM35H3R10UTC

3.5" - 240 x 320 - RGB

Spec Revision: 2.0 Revision Date: 31.01.2025

Note: This specification is subject to change without prior notice

Passion Displayed

	(1/36)
SPECIFICATIONS № 22TLM067	lssue:Jan.31,2025
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Specifications for	
Blanview IFI-LCD Monitor	
(3.5" QVGA 240 x RGB x 320 Portrait)	
<u>C</u> <u>Sunlight readable TFT-LCD Monitor</u> Version 2.0	
(Please be sure to check the specifications latest version.)	
MODEL COM35H3R10UTC	
Customer's Approval	
Signature :	
Name :	
Section :	
Title :	
Date :	
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TOPPAN INC.	
Technological Developr	nent Department IV
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Checked by	1
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Prepared by	~
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SPECIFICATIONS № 22TLM067

Version History

Ver.	Date	Page		Description
0.0	Oct.18,2022	-	-	Tentative issue
0.1	Mar.3,2023	P.14		8. Switching waveform
•			Correct	Error correct
\land ×4		P.15		9.1 Input Timing Characteristics
			Correct	Rating
		P.17		9.3 Example of Driving Timing Chart (fCLK=5.6MHz)
			Correct	Example of Driving Timing Chart
		P.31		19.5 Precautions for Peeling off the Protective film
			Correct	Error correct
1.0	Aug.2,2023			First issue
		P.1		Cover
			Change	Department name
A -		P.12		5. Absolute Maximum Rating
∠⊡ ×/		D 40	Correct	
		P.13	A .1.1	7.1 DC Characteristics
		D 14	Add	Operating Current
		P.14	۸dd	7.2 AC Characteristics
			Add	Syllibol 9. Switching waveform
			Corroct	o. Switching wavelorm
		D 22	Conect	16.1 Defective Display and Screen Quality
		F.23	۸dd	Signal condition
			Correct	Notation
		P 25	Conect	17 Reliability Test
		1.20	Δdd	number of failures / number of examinations
			Add	Applied voltage (Surface discharge test)
2.0	Jan.31.2025	All	7100	All
			Change	Company name font
A ×7		P.1	enange	Cover
			Add	Model specification
			Change	Department name
		P.3	_	Contents
			Add	Item
		P.5		2.1 Features of the Product
			Change	Note
		P.6		<features blanview="" of=""></features>
			Change	Content
		P.21		15.2 About Sunlight readable
			Add	Content
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				TOPPAN INC.

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1. Application

This Specification is applicable to 89.4 mm (3.5 inch) Blanview TFT-LCD monitor with Touch Panel for non-military use.

- TOPPAN makes no warranty or assume no liability that use of this Product and/or any information including drawings in this Specification by Purchaser is not infringing any patent or other intellectual property rights owned by third parties, and TOPPAN shall not grant to Purchaser any right to use any patent or other intellectual property rights owned by third parties. Since this Specification contains TOPPAN's confidential information and copy right, Purchaser shall use them with high degree of care to prevent any unauthorized use, disclosure, duplication, publication or dissemination of TOPPAN's confidential information and copy right.
- If Purchaser intends to use this Products for an application which requires higher level of reliability and/or safety in functionality and/or accuracy such as transport equipment (aircraft, train, automobile, etc.), disaster-prevention/security equipment or various safety equipment, Purchaser shall consult TOPPAN on such use in advance.
- This Product shall not be used for application which requires extremely higher level of reliability and/or safety such as aerospace equipment, telecommunication equipment for trunk lines, control equipment for nuclear facilities or life-support medical equipment.
- It must be noted as an mechanical design manner, especial attention in housing design to prevent arcuation/flexure caused by stress to the LCD module shall be considered.
- TOPPAN assumes no liability for any damage resulting from misuse, abuse, and/or miss-operation of the Product deviating from the operating conditions and precautions described in the Specification.
- It shall be mutually conferred if nonconforming defect which result from unspecified cause in this specification arises.
- If any issue arises as to information provided in this Specification or any other information, TOPPAN and Purchaser shall discuss them in good faith and seek solution.
- TOPPAN assumes no liability for defects such as electrostatic discharge failure occurred during peeling off the protective film or Purchaser's assembly process.

◎ This Product is compatible for RoHS(2.0) directive.

Object substance	Maximum content [ppm]
Cadmium and its compound	100
Hexavalent Chromium Compound	1000
Lead & Lead compound	1000
Mercury & Mercury compound	1000
Polybrominated biphenyl series (PBB series)	1000
Polybrominated biphenyl ether series (PBDE series)	1000
Bis(2-ethylhexyl)phthalate series(DEHP series)	1000
Butyl benzyl phthalate series(BBP series)	1000
Dibutyl phthalate series(DBP series)	1000
Diisobutyl phthalate series(DIBP series)	1000

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2. Outline Specifications

 \bigwedge° 2.1 Features of the Product

- 3.5 inch diagonal display, 720 [H] x 320 [V] dots. 240RGB x 320 pixel.
- 6-bit / 262,144 colors.
- Single power supply operation of 3.0V.
- Timing generator [TG], Counter-electrode driving circuitry, Built-in power supply circuit.
- Long life & High bright white LED back-light and Touch panel operation monitor.
- Blanview TFT-LCD, improved outdoor readability.



2.2 Display Method

Items	Specifications	Remarks
Display type	VA type 262,144 colors	
	Blanview, Normally Black.	
Driving method	a-Si TFT Active matrix	
	Line-scanning, Non-interlace	
Dot arrangement	RGB stripe arrangement	Refer to "Dot arrangement"
Input signal type	6-bit RGB, parallel input.	
Backlight	Long life & High bright white LED.	
Touch panel	Resistance type, transmissive analog tablet	
NTSC ratio	50%	





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3. Dimensions and Shape

3.1 Dimensions

Items	Specifications	Unit	Remarks
Monitor outline dimensions	63.5[H] × 85.0[V] × 4.33[D]	mm	Exclude FPC cable and
			parts on FPC.
Active area	53.64[H] × 71.52[V]	mm	89.40mm diagonal
Number of dots	720[H] × 320[V]	dot	
Dot pitch	74.5[H] × 223.5[V]	μm	
Hardness of Touch Panel surface	3	Н	
Weight	43.5	g	Include FPC cable



NO.	REVISE	DATE (Y:M:D)	APPROVED	CHECKED	PREPARED
		##:##:##	##	##	

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Design guidance for the upper case & the cushion

Note 11. Upper case opening

a. Please place the upper case opening to maintain the operation by a stylus pen inside the TP response area b. The any pressures in the area between TP response area and TP viewing area is prohibited. c. Please use the appropriate material(PMMA, PC, etc.) as the upper case. Note 12. Cushion design

- a.Please put the cushion on the upper case.
- b. Do not use an adhesive tape to stick on the TP suface.
- c. Please position the cushion over the cushion area to avoid a short.

APPROVED木下大輔	General tolerance ± 0.5	SCAL
CHECKED加藤真一	ISSUE (Y:M:D) 23:07:27	MODE
CHECKED	NAME	
DESIGN 富田恵太		. F _
DRAW 富田恵太		

NU.	REVISE	DATE (Y:M:D)	APPROVED	CHECKED	PREPARED
		##:##:##	##	##	

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3.3 Serial Label (S-label)

3.3.1 Display items

S-label indicates the least significant digit of manufacture year (1digit), manufacture month with below alphabet (1letter), model code (5characters), serial number (6digits).

* Contents of Display

<u>* * * ***** *****</u> a b c d

	Contents of display			
а	The least significant digit of manufacture year			
b	Manufacture month	Jan-A	May-E	Sep-I
		Feb-B	Jun-F	Oct-J
		Mar-C	Jul-G	Nov-K
		Apr-D	Aug-H	Dec-L
С	Model code	35RSC (Made in Japa	an)	
		35RTC (Made in Malaysia)		
d	Serial number			

* Example of indication of Serial label (S-label)

Made in Japan

2L35RSC000125

means "manufactured in December 2022, 3.5" RS type, C specifications, serial number 000125"

Made in Malaysia

2L35RTC000125

means "manufactured in December 2022, 3.5" RT type, C specifications, serial number 000125"

3.3.2 Location of Serial Label (S-label) Refer to 3.2 "Outward Form".

4. Pin Assignment

No.	Symbol	Functions	IO
1	VSS	Ground	Р
2	VSS	Ground	Р
3	VDD	Power supply	Р
4	VDD	Power supply	Р
5	VSS	Ground	Р
6	RESETB	Reset signal. When RESETB is Lo, an internal reset is performed.	I
7	HSYNC	Horizontal sync signal input. (Low active)	I
8	VSYNC	Vertical sync signal input. (Low active)	I
9	CLK	Clock signal for data latching and internal counter of the timing controller	I
10	VSS	Ground	Р
11	D00		I
12	D01	Display data(B)	I
13	D02	00h: Black	Ι
14	D03	D00:LSB D05:MSB	Ι
15	D04	Driver has internal gamma conversion.	I
16	D05		I
17	D10		I
18	D11	Display data(G)	I
19	D12	00h: Black	I
20	D13	D10:LSB D15:MSB	I
21	D14	Driver has internal gamma conversion.	I
22	D15		I
23	D20		I
24	D21	Display data(R)	I
25	D22	00h: Black	I
26	D23	D20:LSB D25:MSB	I
27	D24	Driver has internal gamma conversion.	I
28	D25		I
29	VSS	Ground	Р
30	DE	Input data effective signal. (It is effective for the period of "H")	I
31	STBYB	Standby signal (Lo:Standby operation,Hi:Normal operation)	I
32	TEST1	Connect to Ground.	I
33	XL	X-Axis left terminal	I/O
34	YD	Y-Axis downside terminal	I/O
35	XR	X-Axis right terminal	I/O
36	YU	Y-Axis upside terminal	I/O
37	TEST2	Connect to Ground.	
38	BLH	LED drive power source (Anode side)	Р
39	BLL	LED drive power source (Cathode side)	Р

- Recommended connector: HIROSE ELECTRIC FH23 series [FH23-39S-0.3SHW(05)]

- Please refer to the section "3.2 Outward Form" for pin assignment.

- Since FPC cable has gold plated terminals, gilt finish contact shoe connector is recommended.

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5. Absolute Maximum Rating

VSS=0V

Item	Symbol	Condition	Ra	ting	Unit	Applicable terminal
			MIN	MAX		
Supply voltage	VDD		-0.3	4.6	V	VDD
Input voltage for logic	VI		-0.3	VDD+0.3	V	CLK,VSYNC,HSYNC,DE
						D[05:00],D[15:10],D[25:20]
						STBYB,RESETB
						TEST1,TEST2
LED forward current	IL	Ta = 25° C	-	35	mA	BLH - BLL
		Ta = 70° C	-	15		
Touch Panel input voltage	VIT		-	7.0	V	XR,XL,YU,YD
Storage temperature range	Tstg		-30	80	°C	
Storage humidity range	Hstg	Non conde moisture at	nsing in an env or less than 4	/ironmental 0°C90%RH	%	

6. Recommended Operating Conditions

	-						VSS=0V
Item	Symbol	Condition		Rating		Unit	Applicable terminal
			MIN	TYP	MAX		
Supply voltage	VDD		2.7	3.0	3.6	V	VDD
Input voltage for logic	VI		0	_	VDD	V	CLK,VSYNC,HSYNC DE,D[05:00] D[15:10],D[25:20] STBYB,RESETB TEST1,TEST2
Operational temperature range	Тор	Note1,2	-20	+25	+70	°C	Touch Panel surface temperature
Operating humidity	Нор	Ta ≦ 40°C	20	_	85	%	
range		Ta > 40°C	Non conde moisture at	nsing in an t or less tha	environmen n 40°C85%	tal RH.	

Note1: This monitor is operatable in this temperature range. With regard to optical characteristics, refer to Item "15. Characteristics".

Note2: Acceptable Forward Current to LED is up to 15mA, when Ta=+70° C. Do not exceed Allowable Forward Current shown on the chart below.



7.1 DC Characteristics

7.1.1 Display section

				(Unless	s otherwise	noted, Ta	a=25°C,VDD=3.0V,VSS=0V)
Item	Symbol	Condition		Rating		Unit	Applicable terminals
			MIN	TYP	MAX		
Input voltage	VIH		0.7×VDD	-	VDD	V	CLK,VSYNC,HSYNC
for logic							DE,STBYB,RESETB
	VIL		0	-	0.3×VDD	V	D[05:00],D[15:10],D[25:20]
							TEST1,TEST2
Operating	IDD	fCLK=5.6MHz	_	7.5	15.0	mA	VDD
Current		Color bar display					

7.1.2 Backlight section

Item	Symbol	Condition		Rating		Unit	Applicable terminal
			MIN	TYP	MAX		
Forward current	IL25	Ta=25° C	-	6.5	35.0	mA	BLH - BLL
	IL70	Ta=70° C	-	-	15.0	mA	
Forward voltage	VL	Ta=25° C, IL=6.5mA	-	16.0	16.7	V	(Reference Value)
Estimated Life	LL	Ta=25° C, IL=6.5mA	-	50,000	-	hrs	
of LED		Note					

note :

- The lifetime of the LED is defined as a period till the brightness of the LED decreases to the half of its initial value.

- This figure is given as a reference purpose only, and not as a guarantee.

- This figure is estimated for an LED operating alone. As the performance of an LED may differ when assembled as a monitor.

- Estimated lifetime could vary on a different temperature and usually higher temperature could reduce the life significantly.

7.1.3 Touch Panel

Condition Unit Item Symbol Rating Applicable terminal MIN TYP MAX Linearity LE Note -1.5 -1.5 % RI DC 25V 20 MΩ XR,XL-YU,YD Insulation resistance -Terminal resistance Х 200 900 Ω XR,XL _ 900 200 YU,YD Rated voltage DC -5.0 7.0 V XR,XL,YU,YD on/off chattering R 0.8mm 10 XR,XL,YU,YD _ ms Polyacetal pen.

Note: -Linearity Measurement:Refer to the APPENDIX of "Reference Method for Measuring Optical Characteristics". Load:2.45N

Mechanical Characteristics

Item	Rating		Unit	Remark	
	MIN	TYP	MAX		
Detectable activation force	0.05	-	0.80	N	R0.8mm Polyacetal pen or finger.
					Resistance between X and Y axis must be
					equal or lower than 2KΩ.
Keystroke durability	1,000,000	-	-	times	key the same part by silicon rubber.
					(Touch panel Active area only)
					-Rubber tip part: R8mm -Load:2.45 N
					-Speed:2 times/second
					· · · · · · · · · · · · · · · · · · ·
		ET.			

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Ta=25℃



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9. Input Timing

9.1 Input Timing Characteristics

			(Unl	ess otherwi	se noted	, Ta=25°C,VDD=3.0V,VSS=0V)
Item	Symbol		Rating		Unit	Applicable terminals
		MIN	TYP	MAX	1	
CLK frequency	fCLK	4.4	5.6	7.0	MHz	CLK
VSYNC frequency Note1	fVSYNC	54	60	66	Hz	VSYNC
VSYNC signal cycle time	tv	326	326	-	Н	VSYNC,HSYNC
VSYNC pulse width	tw2H	2	2	tvb-2	Н	
Vartical back porch	tvb	4	4	127	Н	VSYNC,HSYNC, D[05:00],D[15:10],D[25:20]
Vartical front porch	tvf	2	2	-	Н	
Vartical display period	tvdp	—	320	_	Н	
HSYNC frequency	fHSYNC	—	19.5		kHz	HSYNC
HSYNC signal cycle time	th	262	287	-	CLK	HSYNC,CLK
HSYNC pulse width	tw3H	2	2	thb-4	CLK	
Horizontal back porch	thb	20	20	31	CLK	CLK,HSYNC,
						D[05:00],D[15:10],D[25:20]
Horizontal front porch	thf	2	27	1	CLK	
DE pulse width	tw4H	—	240	1	CLK	DE,CLK
Horizontal display period	thdp	—	240	-	CLK	CLK
						D[05:00],D[15:10],D[25:20]

Note 1: The characteristic of this item is recommended standard.

Please use it after it confirms it enough like the display fineness etc. when it comes off from this characteristic and it is used.

SPECIFICATIONS № 22TLM067 Issue:Jan.31,2025 10. Power ON/OFF sequence VDD Min 1ms*1 RESETB 16 Frames or more *3 STBYB Min 0ms *2 VSYNC CLK HSYNC DE DISP ON

*1 After the power suplly, Please excute RESETB.(12. Reset sequence Reference)

Max 350 msec

- *2 There is no regulations at time until each signal is supplied from RESETB"H" But meanwhile, It is necessary to fix each signal to "H"or"L".
- *3 It is necessary to supply VSYNC and CLK(DOTCLK) for 16 frames or more from STBYB "L" to turning off the power supply without leaving the afterimage.

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11. Display ON/OFF sequence	
It explains the display sequence when display ON/OFF by the STBYB signal. The following time will be needed by the time the displayis begun from the standby release.	
STBYB Max 350msec	
DATA Display OFF Display ON	
Backlight OFF ON	
The following time will be needed by the time the standby sequence is ended from the standby set Meanwhile, DOTCLK and the VSYNC signal should keep being supplied. When DOTCLK and the VSYNC signal are stopped or the power supply is turned off to a regulated frame or less, the afterimage might remain.	.ting. d
STBYB	
DATA Display ON Display OFF Standby In	
Backlight ON OFF	
12. Reset seqence	
There is a limitation between the power supply turning on and the RESETB input. Please defend the following conditions. 90%	
VDD	
RESETB	
T > 1ms	
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	21,	21/3

15. Characteristics

15.1 Optical Characteristics

(Measurement Condition)

Measuring instruments: CS2000 (KONICA MINOLTA), LCD7200 (OTSUKA ELECTRONICS), EZcontrastXL88 (ELDIM) Driving condition: VDD = 3.0V, VSS = 0V, Optimized VCOMDC

Backlight: IL= 6.5 mA

Measured temperature: Ta = 25°C

	Item	Symbol	Condition	MIN	TYP	MAX	Unit	Note №	Remark
Response time	Rise time + Fall time	TON + TOFF	[Data]= 00h← → 3Fh	-	-	100	ms	1	
trast tio	Backlight ON	CR	[Data]= 3Fh / 00h	480	800	-		2	
Con	Backlight OFF			-	3	-			
D	Left	θL	[Data]=	80	-	-	deg	3	
vinç gle	Right	θR	3Fh / 00h	80	-	-	deg		
/ie/ an	Up	φU	CR ≧ 10	80	-	-	deg		
_	Down	φD		80	-	-	deg		
White	e Chromaticity	х	[Data]= 3Fh	White cl	nromatici	ty range		4	
		у							
Cente	er Brightness		[Data]= 3Fh	140	200	-	cd /m²	5	
Brigh	tness distribution		[Data]= 3Fh	70	-	-	%	6	
Burn-	in			No notic be obse window	eable bu rved afte pattern	rn-in ima r 2 hours display	ge shall of	7	

* Note number 1 to 7: Refer to the APPENDIX of "Reference Method for Measuring Optical Characteristics and Performance".

Х	У
0.26	0.29
0.33	0.29
0.35	0.30
0.36	0.32
0.36	0.39
0.30	0.39
0.28	0.38
0.26	0.36

(White Chromaticity Range)

15.2 About Sunlight readable

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Item	Illuminance	Display visibility	Remarks					
Sunlight readable	100,000 lx	Possible	Refer to <features blanview="" of=""></features>					
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15.3 Temperature Characteristics

(Measurement Condition)

Measuring instruments: CS2000 (KONICA MINOLTA), LCD7200 (OTSUKA ELECTRONICS) Driving condition: VDD = 3.0V, VSS = 0V, Optimized VCOMDC Backlight: IL= 6.5 mA

Item Symbol Specification Remark Ta = -20 °C Ta = 70 °C Response time Rise time TON 1000 msec or less 80 msec or less + + Fall time TOFF Contrast ratio CR 200 or more 200 or more Backlight ON **Display Quality** No noticeable display defect or ununiformity should be observed.

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		SPECI	FICATIONS № 22TL	_M067		Issue:Jan.31,2025
16	5. Criteria d	of Judgment				
0	16.1 Defe Test C Drivin Signal c bservation o Illur B	ctive Display and Sc ondition: Observed TF g Signal: Raster Patter ondition: [Data]:00h, 2d distance: 30 cm minance: 200 to 350 lx dacklight: IL=6.5mA	reen Quality T-LCD monitor from fro (RGB, white, black) 8h, 3Fh (3steps)	ont during operatio	n with the following c	onditions
De	efect item	Defect content			Criteria	
	Line defect	Black, white or color li	ne, 3 or more neighbor	Not exists		
Display Quality	Dot defect	Uneven brightness on TFT or CF, or dust is o (brighter dot, darker d High bright dot: Visible Low bright dot: Visible	dot-by-dot base due to counted as dot defect ot) e through 2% ND filter a e through 5% ND filter a	o defective at [Data]=00h at [Data]=00h	Refer to table 1	
		Invisible through 5% N	ID filter at [Data]=00h	al [Dala]=2011	Accentable	
	Stain	Uneven brightness (w	ite stain, black stain etc)		Invisible through 5%	ND filter at Black screen.
	Foreign particle	Foreign Point-like 0.25 mm< ϕ particle 0.20 mm< $\phi \leq 0.25$ mm $\phi \leq 0.20$ mm		mm mm	N=0 N≦2 Acceptable	
ality		Liner	3.0mm <l 0.08m<="" and="" td=""><td>m<w< td=""><td>N=0</td><td></td></w<></td></l>	m <w< td=""><td>N=0</td><td></td></w<>	N=0	
Qui			L≦3.0mm or W≦0.0	8mm	Acceptable	
Screen C	Flaw	Flaw on the surface of Touch Panel	0.05mm <w< td=""><td></td><td>Conform to the crite point-like foreign pa</td><td>ria of rticles.</td></w<>		Conform to the crite point-like foreign pa	ria of rticles.
			0.03 <w≦0.05mm< td=""><td>2<l≦5mm< td=""><td>N≦5</td><td></td></l≦5mm<></td></w≦0.05mm<>	2 <l≦5mm< td=""><td>N≦5</td><td></td></l≦5mm<>	N≦5	
	U SO 03mm			L⊇ZMM	Acceptable	

for judgment when necessary * φ (mm): Average diamiter = (major axis + minor axis) / 2, W (mm): Width, L (mm): Length, N: Permissible number

Use boundary sample

Т	a	bl	le	1

Others

TableT					
Area	High	Low	Dark	Total	Criteria
	bright dot	bright dot	dot		
Α	0	2	2	3	Permissible distance between same color bright dots
					(includes neighboring dots): 3 mm or more
В	2	4	4	6	Permissible distance between same color high bright dots
					(includes neighboring dots): 5 mm or more
Total	2	4	4	7	

<Portrait model>

Division of A and B areas

B area: Active area Dimensional ratio between A and B areas: 1: 4: 1 (Refer to the left figure)

	SPECIFICATIONS № 22TLM067 Issue:Jan.31					ssue:Jan.31,2025		
	16.2 Screen and Other Appearance							
	Testing conditions							
	Observation	lumin	ance: 30 cm					
Г	ltem				Remark			
	Flaw	lanor	re invisible defect when the backlight is on	Applica	ble area: Active area only			
	Stain	.ge.		(Refer	to the section 3.2 Outward	Form)		
izer	Dirt			(,		
olar	Bubble							
ď	Dust							
	Dent							
S	case	No fu	unctional defect occurs					
FF	2C	No fi	Inctional defect occurs					
	•							
	Itom		Δηροστορίο		Critor	ia		
-	Glass chinning	r	Corner area		Ciller	Unit: mm		
		9			a ≤ 3	Onic. min		
					$b \leq 3$			
			Entra L		$c \leq t$ (t: glass the	nickness)		
					a,b≦0.5 is acceptable	ę		
					n≦2			
			Others			Unit: mm		
					$a \leq 5$			
			b		b≦1			
			C C		$c \leq t$ (t: glass the	nickness)		
					a,b≦0.5 is acceptable	;		
		a			Maximum permissible	number		
			<u> </u>		of chipping off on a sid	te is 5.		
	Interference fringe		Progressive crack		None			
	Interference fringe		Concentric interference tringe					
			C		(Test method) Observe the Panel surface from 60 degrees angle to the surface under white fluorescent lamp			
0								
an			(Triple band fluorescent lamp)	amp	Average diameter · D<8	Rom is accentable		
ЧЧ					Darkness: comply with t	he boundary sample		
on					Danthood. comply mart	to boundary campio		
Γ			120° /7					
			60°					
			4					
	Fisheve				Φ0.6 mm < D	N=0		
	Film surface				$\Phi 0.2 \text{ mm} < D \le \Phi 0.6$	imm N≦2		
				\sim	$D \leq \Phi 0.2$	2 mm lanored		
))				
			(D: Average diameter of valley part)	2				
	Puffiness		0.4mm course		H≤0.4mm is accentable			
						·		
			Touch Panel					
	TOPPAN INC.							

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17. Reliability Test

	Test item	Test condition	number of failures /
			number of examinations
	High temperature storage	Ta = 80°C 240hrs	0/3
	Low temperature storage	Ta = -30°C 240hrs	0/3
st	High temperature &	Ta = 60°C, RH = 90%, 240hrs	0/3
y te	high humidity storage	non condensing X	
bilit	High temperature operation	Tp = 70°C 240hrs	0/3
ural	Low temperature operation	Tp = -20°C 240hrs	0/3
ā	High temperature &	Tp = 40°C, RH = 90%, 240hrs	0/3
	high humidity operation	non condensing X	
	Thermal shock storage	$-30^{\circ}C \leftrightarrow 80^{\circ}C (30 \text{min} / 30 \text{min})$ 100 cycles	0/3
	Electrostatic discharge test	Confirms to EIAJ ED-4701/300, C=200pF,R=0Ω,V=±200V	0/3
ŝŝt	(Non operation)	Each 3 times of discharge on and power supply	
al te		and other terminals.	
ente	Surface discharge test	C=250pF, R=100Ω, V=±12kV	0/3
Ĕ	(Non operation)	Each 5 times of discharge in both polarities	
/irol		on the center of screen with the case grounded.	
env	Vibration test	Total amplitude 1.5mm, f=10 \sim 55Hz,	0/3
Sal		X,Y,Z directions for each 2 hours	
anic	Impact test	Use TOPPAN original jig (see next page) and	0/3
sch		make an impact with peak acceleration of 1000m/s ² for 6 msec	
ž		with half sine-curve at 3 times to each X, Y, Z directions	
		in conformance with JIS C 60068-2-27-2011.	
5	Packing vibration-proof test	Acceleration of 19.6m/s ² with frequency of $10 \rightarrow 55 \rightarrow 10$ Hz,	0 / 1 packing
št		X,Y, Zdirection for each 30 minutes.	
ac te	Packing drop test	Drop from 75cm high.	0 / 1 packing
Ľ			

Note:Ta=ambient temperature Tp=Panel temperature

% The profile of high temperature/humidity storage and High Temperature/humidity operation (Pure water of over $10M\Omega \cdot cm$ shall be used.)

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Table2. Reliability Criteria

The parameters should be measured after leaving the monitor at the ordinary temperature for 24 hours or more after the test completion.

Item	Standard	Remark
Display quality	No visible abnormality shall be seen.	
	(Except for unevenness by Pol deterioration.)	
Contrast ratio	200 or more	Backlight ON
		1

TOPPAN Original Jig

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Step 1. Each product is to be placed in one of the cut-outs of the tray
with the display surface facing upward.
Foam sheet A are to be placed on the products in the tray.
(10 products per tray)

- Step 2. Each tray is to be piled up in same orientation and the trays be in a stack of 10.One empty tray is to be put on the top of stack of 10 trays.
- Step 3. 2 packs of moisture absorbers are to be placed on the top tray as shown in the drawing.Put piled trays into a sealing bag.
- Step 4. Vacuum and seal the sealing bag with the vacuum sealing machine.
- Step 5. The stack of trays in the plastic back is to be wrapped with B SHEET A.
- Step 6. The wrapped trays are placed in the carton.
- Step 7. B SHEET B are to be inserted into a outer carton with same orientation. The outer carton is to be sealed in H-shape with packing tape as shown in the drawing.
- Step 8. The model number, quantity of products, and shipping date are to be printed on the outer carton.
 - If necessary, shipping labels or impression markings are to be put on the outer carton.

Dimension of outer carton				
D : Approx.	(356mm)			
W : Approx.	(664mm)			
H : Approx.	(182mm)			
Quantity of products packed in o	ne carton: 100			
Gross weight : Approx.	7.3 kg			

Remark: The return of packing materials is not required.

	Packing item name	Specs., Material
1	Tray	A-PET
2	Drier	Moisture absorber
3	Sealing bag	
4	Packing tape	
5	B SHEET A	Anti-static air bubble sheet
6	B SHEET B	Anti-static air bubble sheet
(7)	Outer carton	Corrugated cardboard

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Llond	
Handi	ing instruction
9.1 C	autions for Handling LCD panels
	Caution
(1)	Do not make an impact on the LCD panel glass because it may break and you may get injured from it.
(2)	If the glass breaks, do not touch it with bare hands. (Fragment of broken glass may stick you or you cut yourself on it.
(3)	If you get injured, receive adequate first aid and consult a medial doctor.
(4)	Do not let liquid crystal get into your mouth. (If the LCD panel glass breaks, try not let liquid crystal get into your mouth even toxic property of liquid crystal has not been confirmed.)
(5)	If liquid crystal adheres, rinse it out thoroughly. (If liquid crystal adheres to your cloth or skin, wipe it off with rubbing alcohol or wash it thoroughly with soap If liquid crystal gets into eyes, rinse it with clean water for at least 15 minutes and consult an eye doctor.
(6)	If you scrap this products, follow a disposal standard of industrial waste that is legally valid in the community, country or territory where you reside.
(7)	Do not connect or disconnect this product while its application products is powered on.
(8)	Do not attempt to disassemble or modify this product as it is precision component.
(9)	If a part of soldering part has been exposed, and avoid contact (short-circuit) with a metallic part of the case etc. about FPC of this model, please. Please insulate it with the insulating tape etc. if necessary. The defective operation is caused, and there is a possibility to generation of heat and the ignition.
(10)	Since excess current protection circuit is not built in this TFT module, there is the possibility that LCD module or peripheral circuit become feverish and burned in case abnormal operation is generated. We recommend you to add excess current protection circuit to power supply.
(11)	The end part of glass and film of touch panel has conductivity, and avoid contact (short-circuit) with electroconductive case etc There is a possibility of setting up a defective touch panel, and insulate it for the case suppression (cushion etc.) if necessary, please.
(12)	It may cause electrical corrosion if liquid material penetrates the edge of the touch panel, so handle with care so that no liquid adheres to the touch panel.
(13)	The devices on the FPC are damageable to electrostatic discharge, because the terminals of the devices are exposed. Wear grounded wrist-straps and use electrostatic neutralization blowers to prevent static charge and discharge when handling the TFT monitors. Designate an appropriate operating area, and set equipment, tools, and machines properly when handling this product.

This mark is used to indicate a precaution or an instruction which, if not correctly observed, may result in bodily injury, or material damages alone.

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19.2	2 Precautions for Handling	
1)	Wear finger tips at incoming inspection and for handling the TFT monitors to keep display quality and keep the working area clean. Do not touch the surface of the monitor as it is easily scratched.	
2)	Wear grounded wrist-straps and use electrostatic neutralization blowers to prevent static cha when handling the TFT monitors as the LED in this TFT monitors is damageable to electrost Designate an appropriate operating area, and set equipment, tools, and machines properly v	arge and discharge atic discharge. vhen handling this product.
3)	Avoid strong mechanical shock including knocking, hitting or dropping to the TFT monitors for Do not use the TFT monitors that have been experienced dropping or strong mechanical sho	or protecting their glass parts ock.
4)	Do not use or storage the TFT monitors at high temperature and high humidity environment. Particularly, never use or storage the TFT monitors at a location where condensation builds	up.
5)	Avoid using and storing TFT monitors at a location where they are exposed to direct sunlight or ultraviolet rays to prevent the LCD panels from deterioration by ultraviolet rays.	
6)	Do not stain or damage the contacts of the FPC cable . FPC cable needs to be inserted until it can reach to the end of connector slot. During insertion, make sure to keep the cable in a horizontal position to avoid an oblique inse Otherwise, it may cause poor contact or deteriorate reliability of the FPC cable.	ertion.
7)	The FPC cable is a design very weak to the bend and the pull as it is fixed with the tape. Do not bend or pull the FPC cable or carry the TFT monitor by holding the FPC cable.	
8)	Peel off the protective film on the TFT monitors during mounting process. Refer to the section 19.5 on how to peel off the protective film. We are not responsible for electrostatic discharge failures or other defects occur when peelin	ng off the protective film.
19.3	3 Precautions for Operation	
1)	Since this TFT monitors are not equipped with light shielding for the driver IC, do not expose the driver IC to strong lights during operation as it may cause functional failure	es.
2)	In case of powering up or powering off this LCD module, be sure to comply the sequence as instructed in this specification.	
3)	Do not plug in or out the FPC cable while power supply is switch on. Plug the FPC cable in and out while power supply is switched off.	
4)	Do not operate the TFT monitors in the strong magnetic field. It may break the TFT monitors	5.
5)	Do not display a fixed image on the screen for a long time. Use a screen-saver or other measures to avoid a fixed image displayed on the screen for a l Otherwise, it may cause burn-in image on the screen due the characteristics of liquid crystal.	ong time.

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19.4 Storage Condition for Shipping Cartons

(Storage environment)

•	Temperature	0 to 40°C
•	Humidity	60%RH or less
		No-condensing occurs under low temperature with high humidity condition.
•	Atmosphere	No poisonous gas that can erode electronic components and/or
		wiring materials should be detected.
•	Time period	1 year
•	Unpacking	To prevent damages caused by static electricity, anti-static precautionary measures
		(e.g. earthing, anti-static mat) should be implemented.
		After unpack, keep product in the appropriate condition,
		otherwise bubble seal of Protective film may be printed on Polarizer.
•	Maximum piling up	8 cartons(excluding the bottom)

*Conditions to storage after unpacking

(Storage environment)

Temperature	0 to 40° C
Humidity	60%RH or less
	No-condensing occurs under low temperature with high humidity condition.
Atmosphere	No poisonous gas that can erode electronic components and/or
	wiring materials should be detected.
 Time period 	1 year (Shelf life)
Others	Keep/ store away from direct sunlight
	Storage goods on original tray made by TOPPAN.

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19.5 Precautions for Peeling off the Protective film

The followings work environment and work method are recommended to prevent the TFT monitors from static damage or adhesion of dust when peeling off the protective films.

A) Work Environment

- a) Humidity: 50 to 70 %RH, Temperature15 to 27 $^\circ\text{C}$
- b) Operators should wear conductive shoes, conductive clothes, conductive finger tips and grounded wrist-straps. Use an electrostatic neutralization blower.
- c) Anti-static treatment should be implemented to work area's floor.
 Use a room shielded against outside dust with sticky floor mat laid at the entrance to eliminate dirt.
- B) Work Method
 - The following procedures should taken to prevent the driver ICs from charging and discharging.
 - a) Use an electrostatic neutralization blower to blow air on the TFT monitors to its lower right FPC is placed at lower left.
 Optimize direction of the blowing air and the distance between the TFT monitors and the electrostatic neutralization blower.
 - b) Peel off the tab slowly (spending more than 2 secs to complete) by pulling it to opposite direction.

Blower wind direction (Set an ion blower with its adequate conditions.)

19.6 Warranty

TOPPAN is only liable to defective goods which is stored and used under the condition complying with this specifications and returned within 1 (one) year. Warranty caused by manufacturing defect shall be conducted by replacement of goods or refundment at unit price.

APPENDIX

Reference Method for Measuring Optical Characteristics and Performance

1. Measurement Condition (Backlight ON)

Measuring instruments: CS2000(KONICA MINOLTA), LCD7200(OTSUKA ELECTRONICS), EZcontrastXL88(ELDIM) Driving condition: Refer to the section "Optical Characteristics"

Measured temperature: 25°C unless specified

Measurement system: See the chart below. The luminance meter is placed on the normal line of measurement system. Measurement point: At the center of the screen unless otherwise specified

Dark box at constant temperature

*Measurement is made after 30 minutes of lighting of the backlight.

Measurement point: At the center point of the screen

Brightness distribution: 9 points shown in the following drawing.

<Portrait model>

Dimensional ratio of active area

Backlight IL=6.5 mA

Measuring nstrument CD7200	Remark Black display [Data]=00h White display [Data]=3Fh TON Rise time
Measuring nstrument -CD7200	Remark Black display [Data]=00h White display [Data]=3Fh TON Rise time
nstrument CD7200	Black display [Data]=00h White display [Data]=3Fh TON Rise time
.CD7200	Black display [Data]=00h White display [Data]=3Fh TON Rise time
	[Data]=00h White display [Data]=3Fh TON Rise time
	White display [Data]=3Fh TON Rise time
	[Data]=3Fh TON Rise time
	TON Rise time
	Rise time
	TOFF
	Fall time
CS2000	Backlight ON
CD7200	Backlight OFF
Zeentreet VI 99	
CS2000	
CS2000	
20000	
.52000	
	At optimized
	VCOMDC
	:S2000 :S2000

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Cautionary instruction to handle a Touch-panel

Cushion (between Touch Panel Chassis) Design

- A cushion is required to be placed between Touch Panel and customer's chassis and there is a designated area to attach it. Attachment at area inside Input Prohibition Area must be forbidden. If cushion was located inside Input Prohibition Area, Upper Electrode may be push constantly and which may cause the electrode breakage at the position falling on the edge of adhesive; it eventually results in Touch Panel malfunction in the future. (Please see "NG-1")
- 2) Be attention to the cushion material you use. In the case that too soft cushion was used, the cushion may protrude into Prohibition Area by being push strongly; which may result in the electrode breakage. Eventually there is a chance that the electrode breakage leads to the malfunction of Touch Panel in the future. (Please see "NG-2")
- 3) Cushion is required to be attached at the side of Customer's chassis. Attaching a cushion at the side of Upper Electrode Film has a chance to deform the film and lead to the malfunction of Touch Panel in the future.

·Design Guidance of Chassis (Front Part)

- 4) Be attention to stay Input Prohibition Area away from touching and/or drawing by a stylus pens in order to avoid the electrode breakage and potential malfunction of Touch Panel. (Please see "NG-3") We recommend customers to design chassis (front case) being able to protect Input Prohibition Area.
- 5) Clearance between customer's chassis and Touch Panel surface is certainly required in order to avoid erroneous input caused by a collision of the edge of chassis. (Please see "NG-4") A clearance of 0.3 to 0.7mm is recommended.
- ·Design Guidance of Chassis (Side Part)
- 6) Upper Electrode and Lower Electrode fall on the edge of Touch Panel outline.
 Redundant design having enough clearance to avoid electric short with chassis is highly recommended. (Please see "NG-5")

•Example of Recommended Chassis Design Refer to "3.2 Outward Form".

•As a terminal resistance has individual specificity, calibration to align the displaying and the sensing position one each is mandatory before use.

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