SPEC. NO.	TQ3C-8EAC0-E1DDD21-00
DATE	January 26, 2005

SPEC

FOR :

TYPE:KCG075VG2BG-G00

CONTENTS

1. Application
2. Construction and Outline
3. Mechanical Specifications
4. Absolute Maximum Ratings
5. Electrical Characteristics
6. Optical Characteristics
7. Circuit Block Diagram
8. Interface Signals
9. Interface Timing Chart
10. Data and Screen
11. Input Timing Characteristics
12. Supply Voltage Sequence Condition
13. Backlight Characteristics
14. Design Guidance for Analog Touch-Panel (T/P)
15. Lot Number Identification
16. Warranty
17. Precautions for Use
18. Reliability Data / Environmental Test
19. Outline Drawing

Issued
Date: JAN.27.2005
KYOCERA
Hayato LCD Division

KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

This specification is subject to change.
Consult Kyocera before ordering.

Original Issue Data	Designed by :Engineering Dept.			Confirmed by :QA Dept.	
	Prepared	Checked	Approved	Checked	Approved
January 26, 2005	H. Nishino	Y. Yamazaki	M.Fujitani	Y. Yoshida	S. Hayashi

Caution

1. This Kyocera LCD module has been specifically designed for use only in electronic devices in the areas of audio control, office automation, industrial control, home appliances, etc. The modules should not be used in applications where module failure could result in physical harm or loss of life, and Kyocera expressly disclaims any and all liability relating in any way to the use of the module in such applications.

2. Customer agrees to indemnify, defend and hold Kyocera harmless from and against any and all actions, claims, losses, damages, liabilities, awards, costs, and expenses, including legal fees, resulting from or arising out of Customer's use, or sale for use, of Kyocera modules in applications.

3. Kyocera shall have the right, which Customer hereby acknowledges, to immediately scrap or destroy tooling for Kyocera modules for which no Purchase Orders have been received from the Customer in a two-year period.

Revision Record

Date	Designed by: Engineering Dept.			Confirmed by: QA Dept.	
	Prepared	Checked	Approved	Checked	Approved

Rev. No.	Date	Page	Descriptions

１．Application

This data sheet defines the specification for a (640×R.G.B)×480 dot, STN Transmissive color dot matrix type Liquid Crystal Display with CFL backlight.

２．Construction and Outline

(640×R.G.B)×480 dots, COG type LCD with CFL backlight.

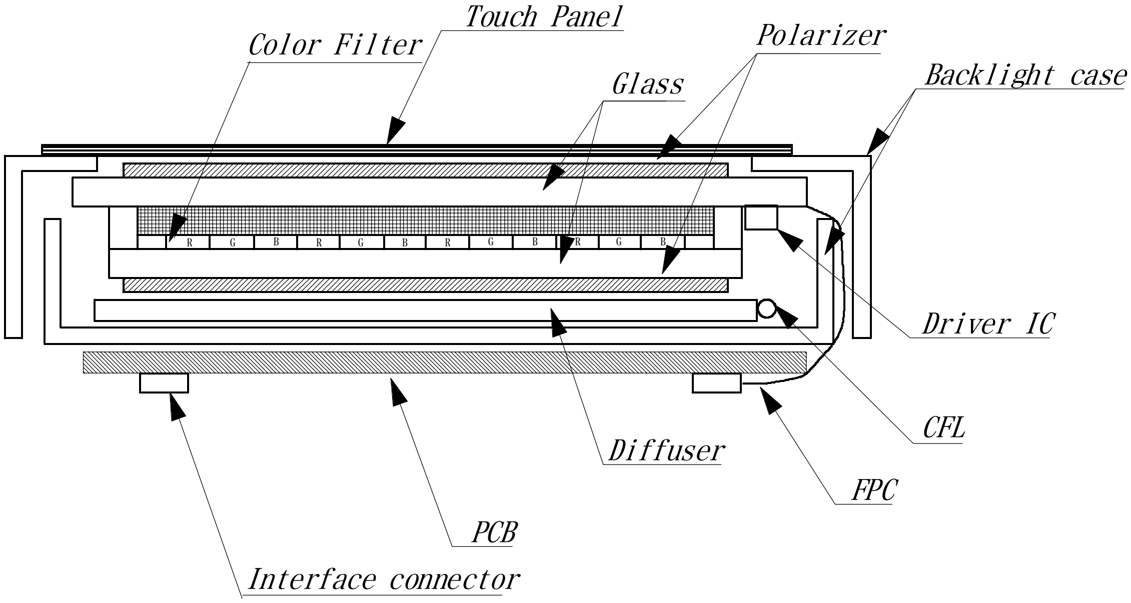
Backlight system : CFL (2 tubes).

Inverter : Option
Recommended Inverter : CXA-0217 (TDK)
(Old Part Number : CXA-P1212-VJL)
or equivalent

Polarizer : Glare treatment.

Additional circuit : Bias voltage circuit, Randomizing circuit, DC-DC Converter

Touch Panel : Analog type. Non-Grare treatment.


Touch Panel
Color Filter
Polarizer
Glass
Backlight case
R G B R G B R G B R G B
Driver IC
CFL
Diffuser
FPC
PCB
Interface connector

This drawing is showing conception only.

3. Mechanical Specifications

3-1. LCD

ITEM	SPECIFICATION	UNIT
Outline dimensions	184 (W) × 139.8(H) × 14.45 (D)	mm
Effective viewing area	153.7 (W) × 115.8 (H)	mm
Dot number	(640×R.G.B) (W) × 480 (H)	Dots
Dot size	0.059 (W) × 0.217 (H)	mm
Dot pitch	0.079 (W) × 0.237 (H)	mm
Display color *1	White *2	—
Base color *1	Black *2	—
Mass	(350)	g

*1 Due to the characteristics of the LC material, the color vary with environmental temperature.

*2 Negative-type display
Display data "H" :R.G.B Dots ON : White
Display data "L" :R.G.B Dots OFF : Black

3-2. Mechanical Specifications of touch panel

ITEM	SPECIFICATION	UNIT
Input	Radius-0.8 stylus or Finger	—
Actuation Force	0.05～0.8	N
Transmittance	Typ.83	%
Surface hardness	pencil hardness 2H or more according	—

4. Absolute Maximum Ratings

4-1. Electrical absolute maximum ratings

ITEM	SYMBOL	MIN.	MAX.	UNIT
Supply voltage for logic	VDD	0	6.0	V
Supply voltage for LCD driving	VCONT	0	VDD	V
Input signal voltage *1	Vin	0	VDD	V
Frame frequency	f_{FRM}	—	(120)	Hz
Touch panel supply voltage	Vtp	0	6.0	V
Touch panel Input current	Itp	0	0.5	mA

*1 Input signal : CP, LOAD, FRM, DISP, D0～D7

4-2. Environmental absolute maximum ratings

ITEM	SYMBOL	MIN	MAX	UNIT
Operating temperature *1	Top	0	60	℃
Storage temperature *2	T_{STO}	-20	60	℃
Operating humidity *3	Hop	10	*4	%RH
Storage humidity *3	H_{STO}	10	*4	%RH
Vibration	—	*5	*5	—
Shock	—	*6	*6	—

*1 LCD's display quality shall not be guaranteed at the temperature range of :
below 0℃ and upper 40℃.

*2 Temp. = -20℃ ＜ 48 h , Temp = 60℃ ＜ 168 h
Store LCD panel at normal temperature/humidity.
Keep it free from vibration and shock.
LCD panel that is kept at low or high temperature for a long time can be defective due to the other conditions, even if the temperature satisfies standard.
(Please refers to 16. Precautions for use as detail).

*3 Non-condensation.

*4 Temp. ≦ 40℃, 85% RH Max.
Temp. ＞ 40℃, Absolute Humidity shall be less than 85%RH at 40℃.

*5

Frequency	10～55 Hz	Converted to acceleration value : ($0.3～9\ m/s^2$)
Vibration width	0.15 mm	
Interval	10-55-10 Hz 1 minute	

2 hours in each direction X/Y/Z (6 hours as total)
EIAJ ED-2531

*6 Acceleration: $490 m/s^2$
Pulse width : 11 ms
3 times in each direction : ±X/±Y/±Z.
EIAJ ED-2531

5. Electrical Characteristics

5-1. VDD = 5.00V

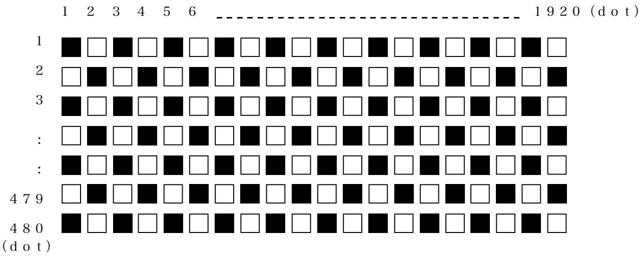
VDD = 5.00V ± 0.25V, Temp. = 0～60°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply voltage for logic	VDD	—	4.75	5.00	5.25	V
LCD driving voltage *1	Vop= VCONT	0 ℃	(1.35)	—	—	V
		25 ℃	(1.45)	(1.95)	(2.45)	V
		60 ℃	—	—	(2.55)	V
Input voltage (FRM,LOAD,CP,DISP,D0～D7)	Vin	”H” level	0.8VDD	—	VDD	V
		”L” level	0	—	0.2VDD	V
Input current	Iin	Input signal	-100	—	100	μA
Rush current for logic	Irush	When rush current happens	3.0A(Peak) × 1ms			
Clock frequency	f cp	—	8.10	8.68	9.26	MHz
Frame frequency *2	f_{FRM}	—	70	75	80	Hz
Current consumption for logic	IDD	*3	—	(62)	(80)	mA
Power consumption	Pdisp		—	(310)	(400)	mW

*1 Maximum contrast ratio is obtained by adjusting the LCD supply voltage (Vop= VCONT) for driving LCD.

*2 In consideration of display quality, it is recommended that frame frequency is set in the range of 70-80Hz. When you have to use higher frame and clock frequencies, confirm the LCD's performance and quality prior to finalizing the frequency values:
Generally, as frame and clock frequencies become higher current consumption will get bigger and display quality will be degraded.

*3 Display high frequency pattern, (see below).
VDD = 5.0V , Vop = VCONT , f_{FRM} = 75 Hz , fcp = 8.68MHz, Temp = 25°C
Pattern:



* We recommend that you should set 1/482 duty so as to get high LCD's display quality.

5-2. VDD = 3.30V

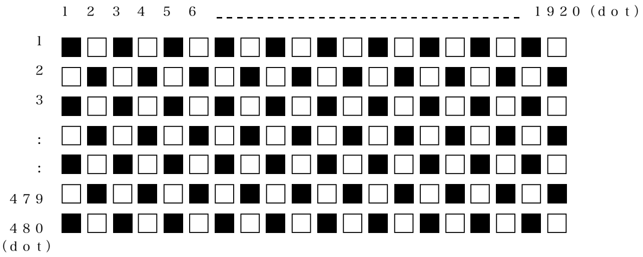
VDD = 3.30V ± 0.30V, Temp. = 0～60°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply voltage for logic	VDD	—	3.00	3.30	3.60	V
LCD driving voltage *1	Vop= VCONT	0 ℃	(1.35)	—	—	V
		25 ℃	(1.45)	(1.95)	(2.45)	V
		60 ℃	—	—	(2.55)	V
Input voltage (FRM,LOAD,CP,DISP,D0～D7)	Vin	"H" level	0.8VDD	—	VDD	V
		"L" level	0	—	0.2VDD	V
Input current	Iin	Input signal	-100	—	100	μA
Rush current for logic	Irush	When rush current happens	3.0A(Peak) × 1ms			
Clock frequency	f_{cp}	—	8.10	8.68	9.26	MHz
Frame frequency *2	f_{FRM}	—	70	75	80	Hz
Current consumption for logic	IDD	*3	—	(85)	(110)	mA
Power consumption	Pdisp		—	(280)	(365)	mW

*1 Maximum contrast ratio is obtained by adjusting the LCD supply voltage (Vop= VCONT) for driving LCD.

*2 In consideration of display quality, it is recommended that frame frequency is set in the range of 70-80Hz. When you have to use higher frame and clock frequencies, confirm the LCD's performance and quality prior to finalizing the frequency values:
Generally, as frame and clock frequencies become higher current consumption will get bigger and display quality will be degraded.

*3 Display high frequency pattern, (see below).
VDD = 3.3V , Vop = VCONT , f_{FRM} = 75 Hz , fcp = 8.68MHz, Temp = 25°C
Pattern:



* We recommend that you should set 1/482 duty so as to get high LCD's display quality.

5-3. Touch Panel

5-3-1. Terminal resistance
Between xL and xR : 200 ～ 1000 Ω
Between yU and yL : 200 ～ 1000 Ω

5-3-2. Linearity
±1.5% x : 1.5% or less
y : 1.5% or less

5-3-3. Insulation resistance
100MΩ or more at DC25V

6. Optical Characteristics

Temp. = 25℃

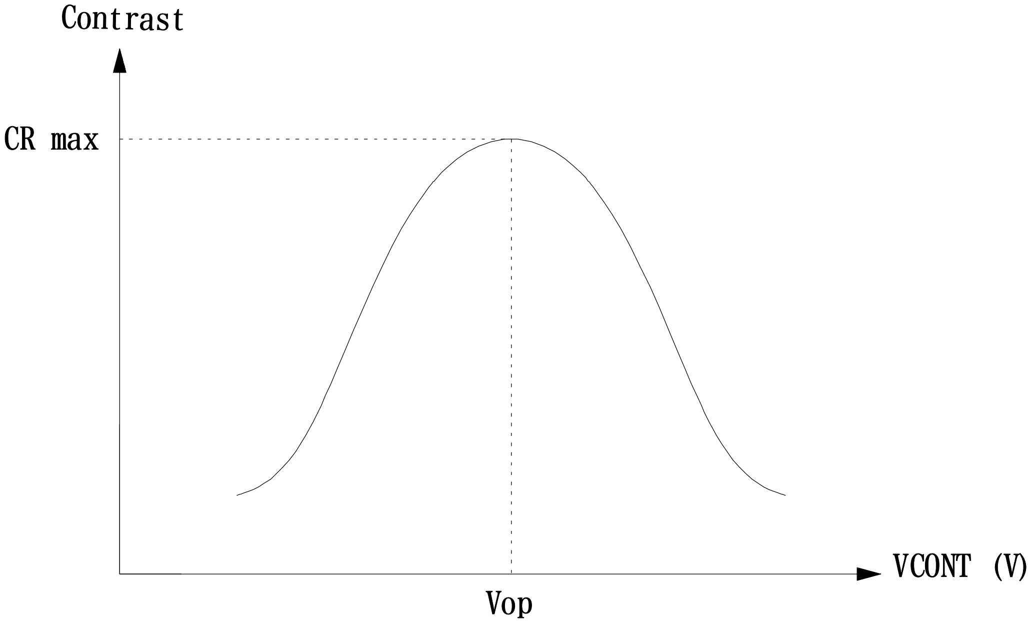
ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
Response time	Rise	Tr	$\theta=\phi=0^\circ$		—	(270)	(370)	ms
	Down	Td	$\theta=\phi=0^\circ$		—	(280)	(380)	ms
Viewing angle range		θ	CR≧2	Upper	—	(20)	—	deg.
				Lower	—	(40)	—	deg.
		ϕ		Left	—	(40)	—	deg.
				Right	—	(40)	—	deg.
Contrast ratio		CR	$\theta=\phi=0^\circ$		(20)	(30)	—	—
Brightness		L	IL= 4.0 mA		(100)	(160)	—	cd/m^2
Chromaticity coordinates	Red	x	$\theta=\phi=0^\circ$		(0.54)	(0.59)	(0.64)	—
		y			(0.30)	(0.35)	(0.40)	
	Green	x	$\theta=\phi=0^\circ$		(0.24)	(0.29)	(0.34)	
		y			(0.49)	(0.54)	(0.59)	
	Blue	x	$\theta=\phi=0^\circ$		(0.10)	(0.15)	(0.20)	
		y			(0.07)	(0.12)	(0.17)	
	White	x	$\theta=\phi=0^\circ$		(0.27)	(0.32)	(0.37)	
		y			(0.28)	(0.33)	(0.38)	

Optimum contrast is obtained by adjusting the LCD driving voltage(Vop) while at the viewing angle of $\theta = \phi = 0^\circ$.

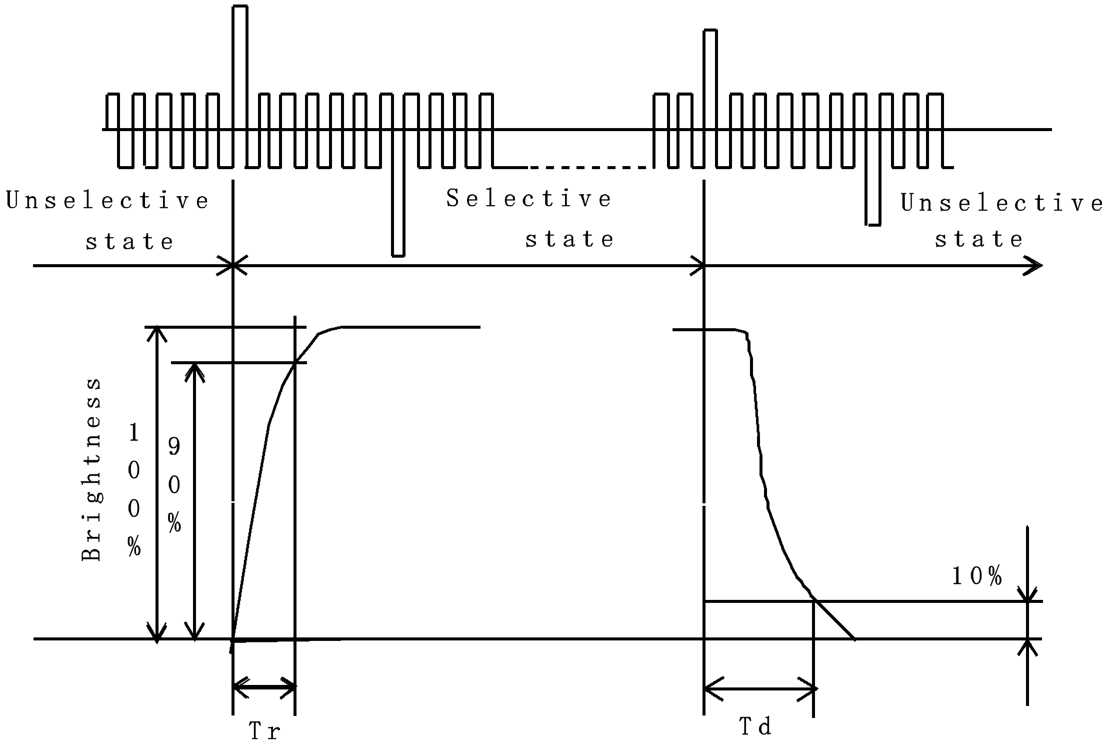
6-1. Contrast ratio is defined as follows:

$$CR = \frac{\text{Brightness at all pixels "White"}}{\text{Brightness at all pixels "Black"}}$$

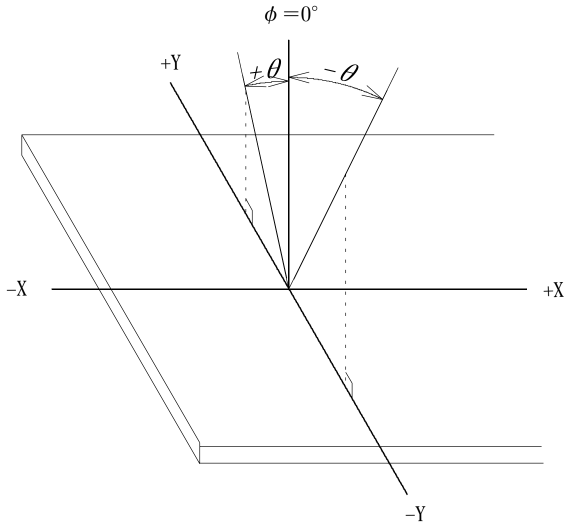
6-2. Definition of Vop



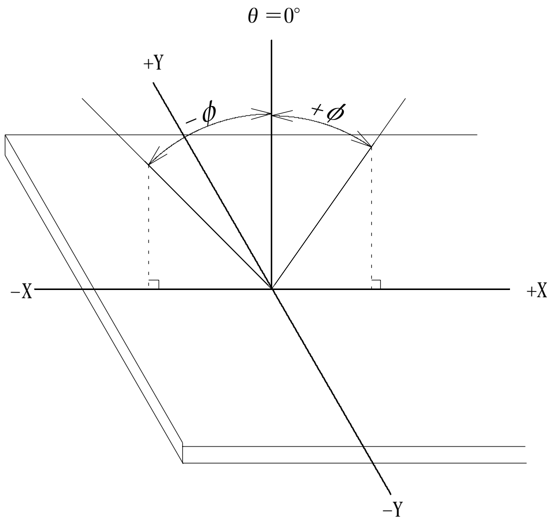
6-3. Definition of response time


Unselective state
Selective state
Unselective state
Brightness
100%
90%
10%
Tr
Td

6-4. Definition of viewing angle

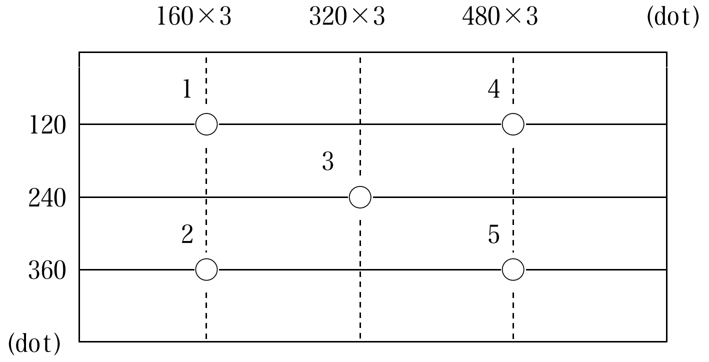


(θ direction)



(φ direction)

6-5. Measuring points

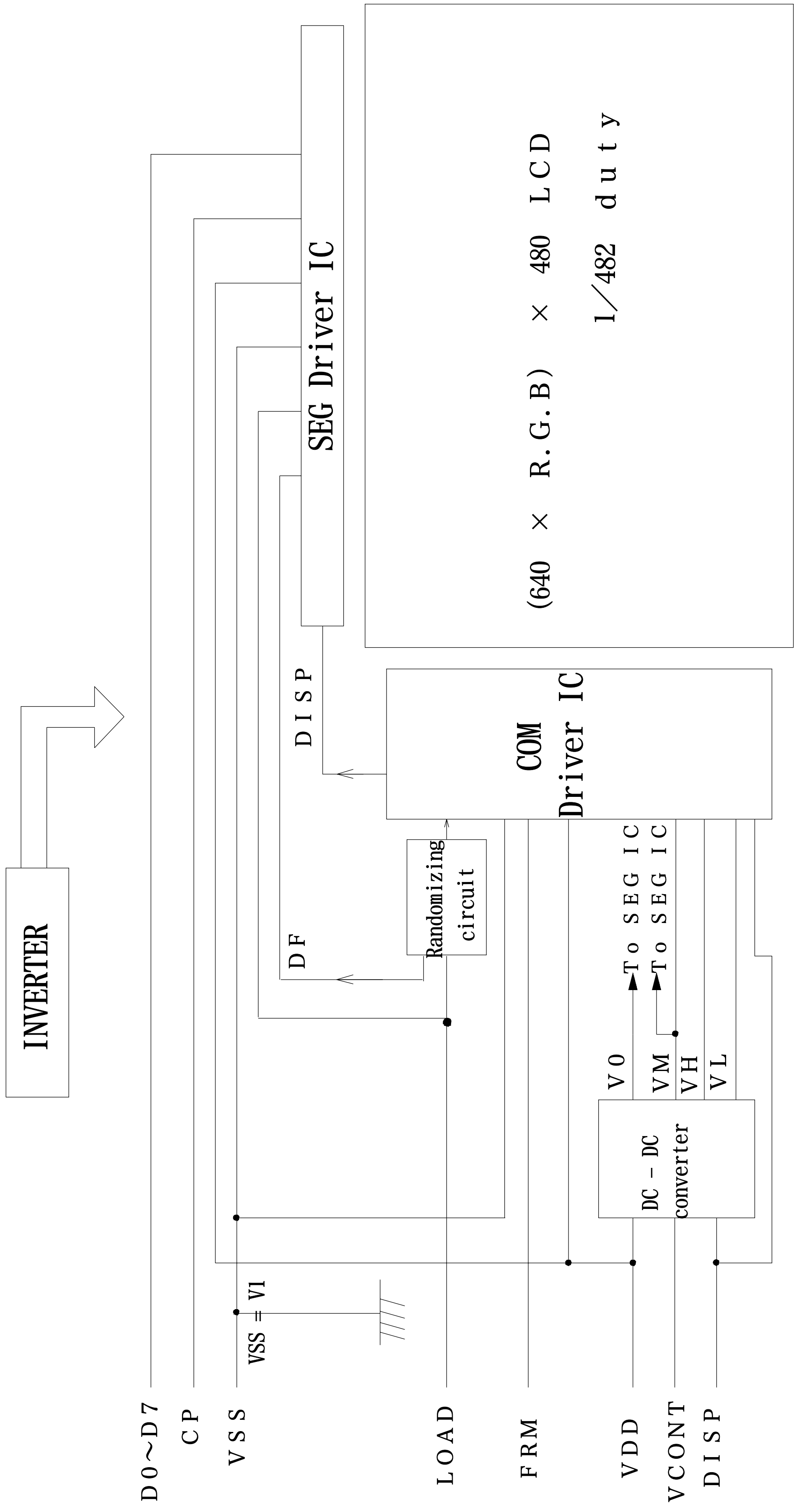

160×3
320×3
480×3
(dot)
1
4
120
3
240
2
5
360
(dot)

1) Rating is defined as the average brightness inside the viewing area.

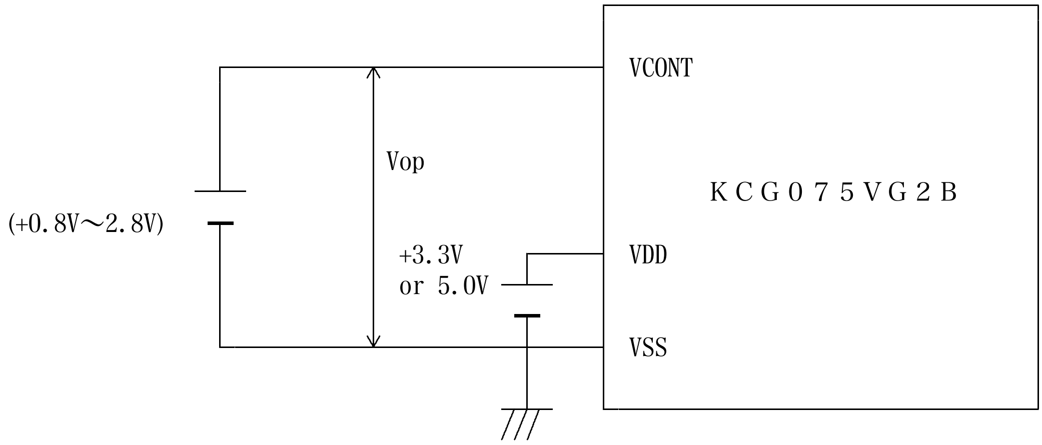
2) 30 minutes after CFL is turned on. (Ambient Temp.=25°C)

3) The inverter should meet the eccentric conditions;
-Sine, symmetric waveform without spike in positive and negative.

7. Circuit Block Diagram


INVERTER
SEG Driver IC
(640 × R.G.B) × 480 LCD
1/482 duty
COM Driver IC
DISP
Randomizing circuit
DF
To SEG IC
To SEG IC
V0
VM
VH
VL
DC - DC converter
VSS = V1
D0～D7
CP
VSS
LOAD
FRM
VDD
VCONT
DISP

7-1. Power supply


VCONT
Vop
KCG075VG2B
(+0.8V～2.8V)
+3.3V
or 5.0V
VDD
VSS

8. Interface signals

8-1. LCD

CN1

PIN NO.	SYMBOL	DESCRIPTION	LEVEL
1	FRM	Synchronous signal for driving scanning line	H
2	LOAD	Data signal latch clock	H → L
3	CP	Data signal shift clock	H → L
4	DISP	Display control signal	H(ON),L(OFF)
5	VDD	Power supply for logic	—
6	VSS	GND	—
7	VCONT	LCD adjust voltage	—
8	D7	Display data	H(ON),L(OFF)
9	D6		
10	D5		
11	D4		
12	D3		
13	D2		
14	D1		
15	D0		
16	VDD	Power supply for logic	—
17	VDD		
18	VSS	GND	—
19	VSS		
20	VSS		

LCD connector : 08-6210-020-340-800+ (ELCO)
Recommended matching connector : 0.5mm pitch FFC or FPC

8-2. CFL

CN2

PIN No	SYMBOL	DESCRIPTION
1	HOT	Inverter output high voltage side
2	NC	—
3	COLD	Inverter output low voltage side

LCD side connector : BHR-03VS-1 (JST)
Recommended matching connector : SM02-(8.0)B-BHS-1 (JST)

CN3

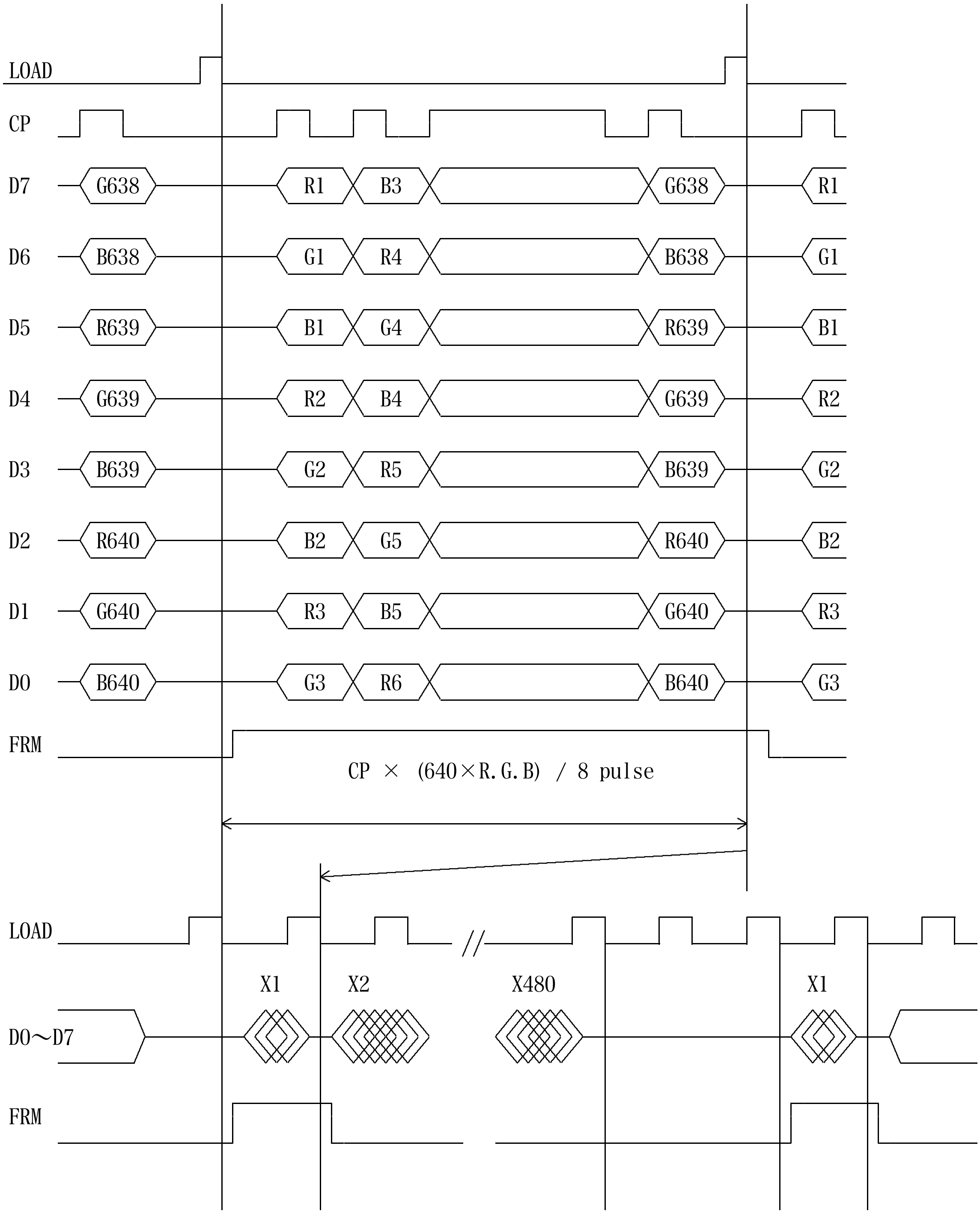
PIN No	SYMBOL	DESCRIPTION
1	HOT	Inverter output high voltage side
2	NC	—
3	COLD	Inverter output low voltage side

LCD side connector : BHR-03VS-1 (JST)
Recommended matching connector : SM02-(8.0)B-BHS-1 (JST)

7-3. Touch panel

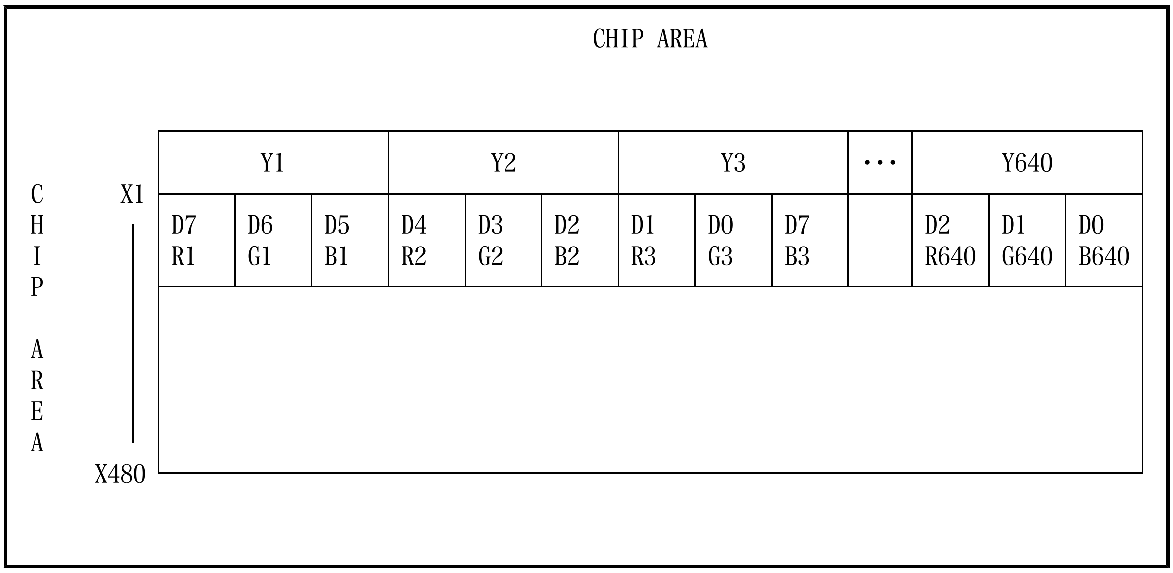
PIN No.	SYMBOL	DESCRIPTION
1	yU	y-Upper terminal
2	xL	x-Left terminal
3	yL	y-Lower terminal
4	xR	x-Right terminal

９．タイミング図


LOAD
CP
D7
G638
R1
B3
G638
R1
D6
B638
G1
R4
B638
G1
D5
R639
B1
G4
R639
B1
D4
G639
R2
B4
G639
R2
D3
B639
G2
R5
B639
G2
D2
R640
B2
G5
R640
B2
D1
G640
R3
B5
G640
R3
D0
B640
G3
R6
B640
G3
FRM
CP × (640×R.G.B) / 8 pulse
LOAD
X1
X2
X480
X1
D0～D7
FRM

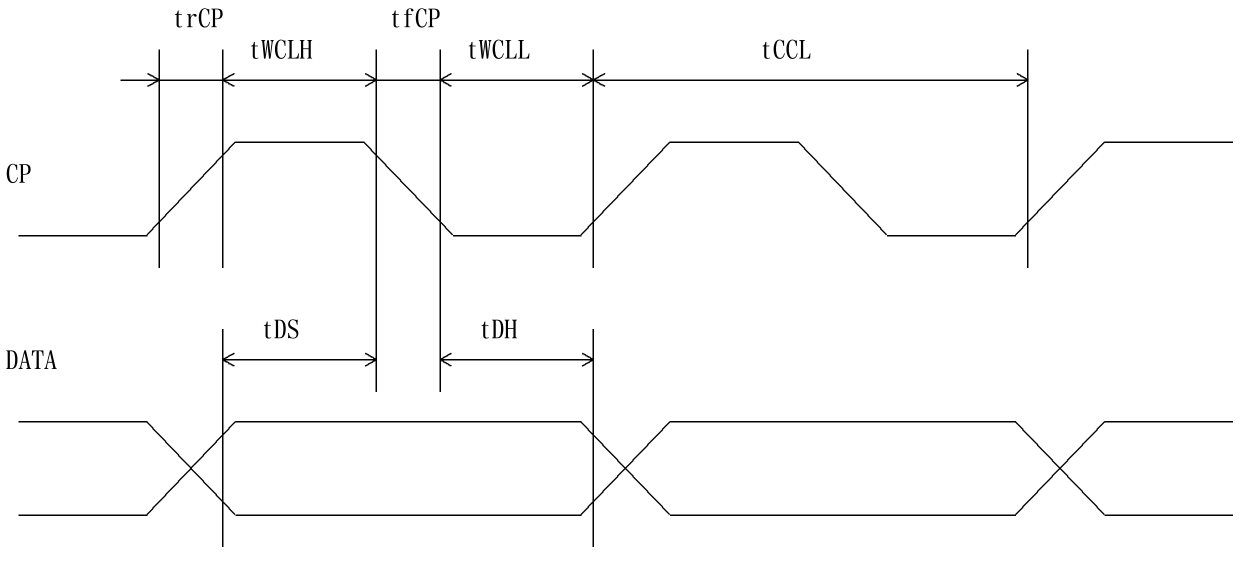
* The cycle of load signal should be stable and continuously applied without interruption.
* The above-mentioned timing chart shows a reference to set up a LCD module, not an electrical rating.

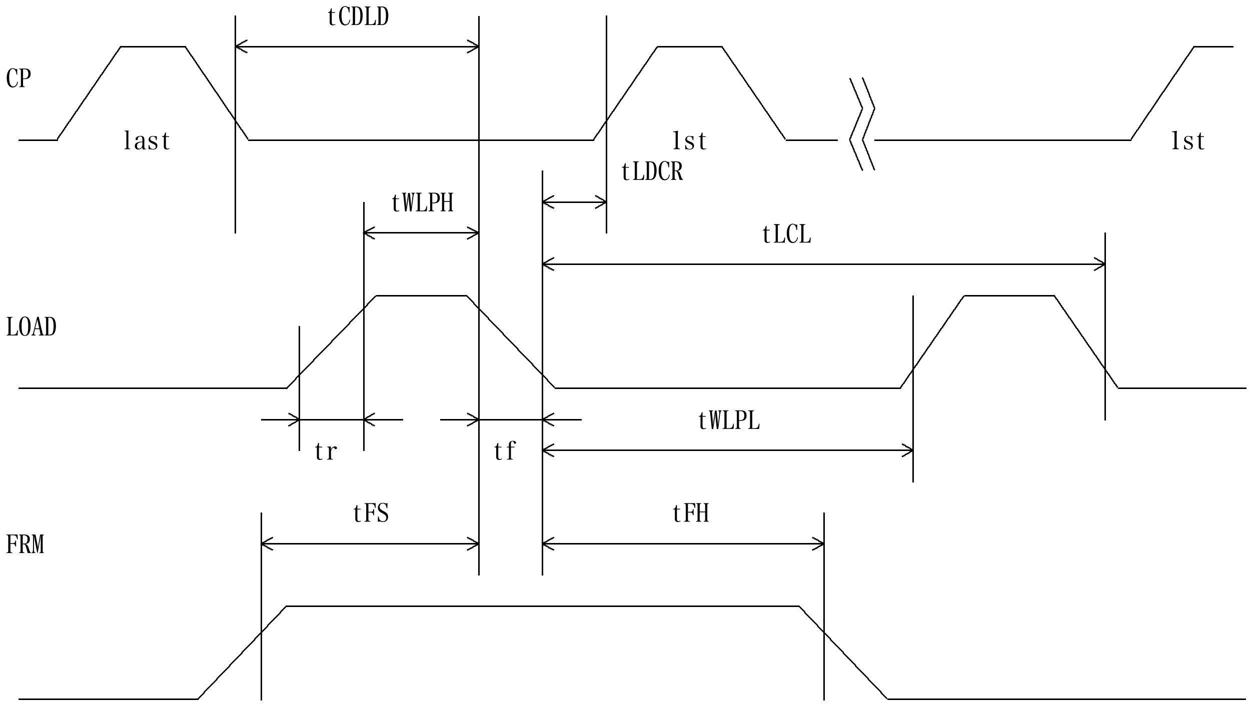
１０. Data and Screen


CHIP AREA
CHIP AREA
X1
X480

Y1			Y2			Y3			···	Y640		
D7 R1	D6 G1	D5 B1	D4 R2	D3 G2	D2 B2	D1 R3	D0 G3	D7 B3		D2 R640	D1 G640	D0 B640

１１．Input Timing Characteristics


trCP
tfCP
tWCLH
tWCLL
tCCL
CP
tDS
tDH
DATA


tCDLD
CP
last
1st
1st
tLDCR
tWLPH
tLCL
LOAD
tr
tf
tWLPL
tFS
tFH
FRM

11-1. Switching characteristics (VDD = 5.00V)

Input Characteristics ; VDD = 5.00V ± 0.25V, Temp. = 0～60 ℃

ITEM	SYMBOL	MIN.	MAX.	UNIT
CP Cycle *1	tCCL	(100)	—	ns
CP ”H” Pulse Width	tWCLH	(30)	—	ns
CP ”L” Pulse Width	tWCLL	(30)	—	ns
CP Rise Up Time	trCP	—	(15)	ns
CP Fall Down Time	tfCP	—	(15)	ns
Data Set Up Time	tDS	(25)	—	ns
Data Hold Time	tDH	(25)	—	ns
LOAD ”H” Pulse Width	tWLPH	(50)	—	ns
LOAD ”L” Pulse Width	tWLPL	(400)	—	ns
LOAD Cycle *2	tLCL	(500)	—	ns
CP Down→LOAD Down Delay Time	tCDLD	(60)	—	ns
LOAD Down→CP Rise Delay Time	tLDCR	(60)	—	ns
Input Signal Rise Up Time	tr	—	(20)	ns
Input Signal Fall Down Time	tf	—	(20)	ns
FRM Data Set Up Time	tFS	(70)	—	ns
FRM Data Hold Time	tFH	(70)	—	ns

*1 CP Cycle is adjust so that FRM signal is 75Hz.

*2 LOAD Cycle is const.

11-2. Switching characteristics (VDD = 3.30V)

Input Characteristics ; VDD = 3.30V ± 0.30V, Temp. = 0～60 ℃

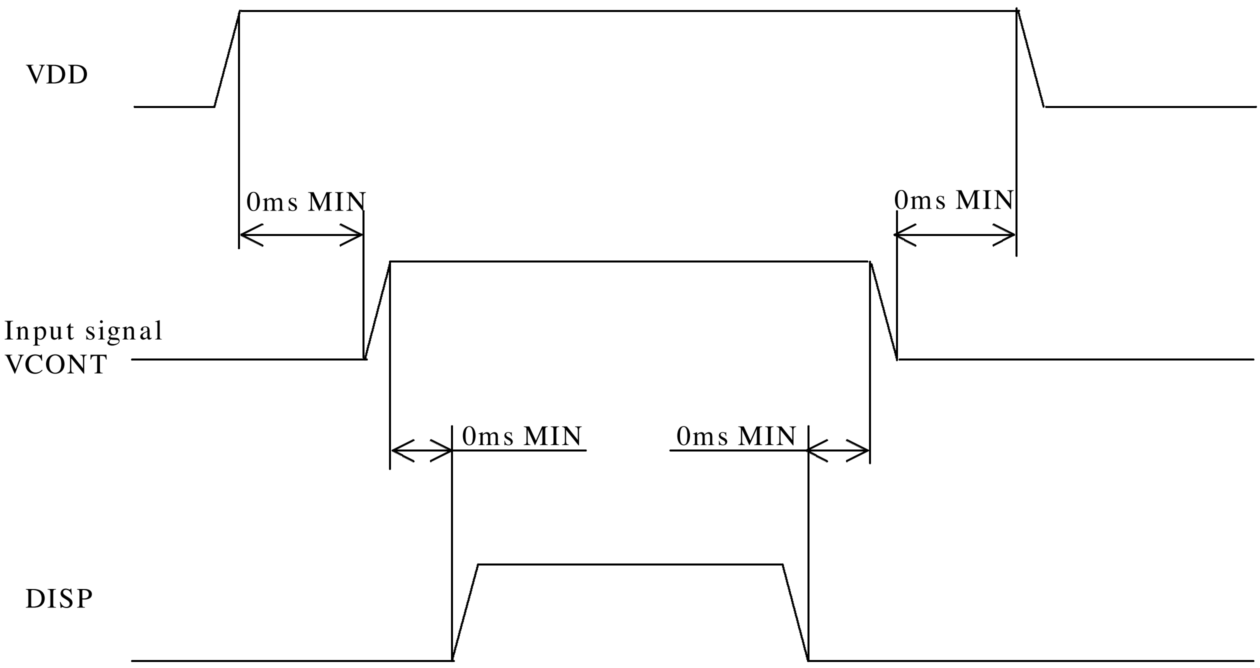
ITEM	SYMBOL	MIN.	MAX.	UNIT
CP Cycle *1	tCCL	(100)	–	ns
CP "H" Pulse Width	tWCLH	(40)	–	ns
CP "L" Pulse Width	tWCLL	(40)	–	ns
CP Rise Up Time	trCP	–	(20)	ns
CP Fall Down Time	tfCP	–	(20)	ns
Data Set Up Time	tDS	(35)	–	ns
Data Hold Time	tDH	(35)	–	ns
LOAD "H" Pulse Width	tWLPH	(80)	–	ns
LOAD "L" Pulse Width	tWLPL	(400)	–	ns
LOAD Cycle *2	tLCL	(500)	–	ns
CP Down→LOAD Down Delay Time	tCDLD	(60)	–	ns
LOAD Down→CP Rise Delay Time	tLDCR	(80)	–	ns
Input Signal Rise Up Time	tr	–	(20)	ns
Input Signal Fall Down Time	tf	–	(20)	ns
FRM Data Set Up Time	tFS	(70)	–	ns
FRM Data Hold Time	tFH	(70)	–	ns

*1 CP Cycle is adjust so that FRM signal is 75Hz.

*2 LOAD Cycle is const.

１２. Supply Voltage Sequence Condition

DO NOT apply DC voltage to the LCD panel. DC voltage induce irreversible electrochemical reactions and reduce LCD life. Always follow the power supply ON/OFF sequence of VDD first, input signal second, VCONT third and finally DISP. This will prevent DC driving of the LCD or CMOS LSI latch up as shown below.



＊ Input signal : CP,LOAD,FRM,VCONT,D0～D7

＊ The above sequence should be designed as to keep each normal figure on condition that liquid crystal module is loaded on your system.

＊ Control the input signal and VCONT to the above ON - OFF timing when you switch ON/OFF the display during VDD and DISP are on.
And design the circuit as VCONT's OFF level become GND level at the some time.

＊ Control the supply voltage sequence not to float all signal line when the LCD panel is driving.

１３. Backlight Characteristics

Temp.= 25℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	NOTE
Starting discharge Voltage *1	VS	—	—	(1100) Vrms.	0 ℃
		—	—	(725) Vrms.	25 ℃
Discharging tube current *2,*3	IL	(2.0)mArms.	(4.0)mArms.	(6.0)mArms.	—
Discharging tube voltage (IL=4.0 mArms.)	VL	—	(440) Vrms.	—	—
Operating life *4 (IL=4.0 mArms.)	T	(45,000) h	(58,000) h	—	—
Operating frequency	F	(40) kHz	—	(100) kHz	—

*1 The Non-load output voltage (VS) of the inverter should be designed to have some margin, because VS may increase due to the leak current which may be caused by wiring of CFL cables. (Reference value: (1,430) Vrms. Min)

*2 We recommend that you should set the discharging tube current at lower than typical value so as to prevent the heat accumulation of CFL tube from deteriorating a performance of the LCD.

*3 Do not apply more than (6.0)mA discharging tube current. Because CFL maybe broken due to over current.

*4 When the illuminance or quantity of light has decreased to 50 % of the initial value. Average life time of CFL will be decreased when LCD is operating at lower and higher temperature.

* The inverter should meet the eccelentic conditions : sine, symmetric waveform without spike in poitive and negative.

１４. Design Guidance for Analog Touch-Panel(T/P)

14-1. Electrical

In customer's design, please remember the following considerations.

1. Do not use the current regulated circuit.
2. Keep the current limit with top and bottom layer.(See Sec, 4-1)
3. Analog T/P can not sense two point touching separately.
4. A contact resistance is appeared at the touch point between top and bottom layer. After this resistance has stable read the T/P position data.
5. Analog T/P is also a "Capacitor" in an equivalent circuit. Design your sensing circuit and low-pass filter with considering this "Capacitor" value.
6. Because noise of inverter or peripheral circuits may interfere signal of touch panel itself it is necessary to design carefully in advance to avoid these noise problem.

14-2. Software

1. Do the "User Calibration".
2. "User Calibration" may be needed with long term using. Include "User Calibration" menu in your software.
3. When drawing a line with a stylus, there may be a slight discontinuity when the stylus passes over a spacer-dot. If necessary, please provide a compensation feature within your software.

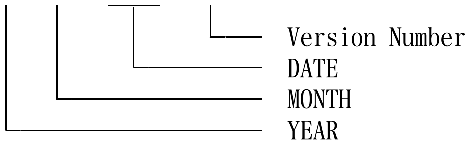
14-3. Mounting on display and housing bezel

1. Do not use an adhesive tape to bond it on the front of T/P and hang it to the housing bezel.
2. Never expand the T/P top layer (PET-film) like a balloon by internal air pressure. The life of the T/P will be extremely short.
3. If a dew will be on the heat-sealed area or exposed traces at the end of a flexible tail, the migration of silver can occur. This will cause sometimes a short circuit.

１５．Lot Number Identification

The lot number shall be indicated on the back of the backlight case of each LCD.

ＫＣＧ０７５ＶＧ２ＢＧ－Ｇ００－ □ □－□ □－□



YEAR	2005	2006	2007	2008	2009	2010
CODE	5	6	7	8	9	0

MONTH	JAN.	FEB.	MAR.	APR.	MAY	JUN.
CODE	1	2	3	4	5	6

MONTH	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
CODE	7	8	9	X	Y	Z

１６．Warranty

16-1. Incoming inspection

Please inspect the LCD within one month after your receipt.

16-2. Production Warranty

Kyocera warrants its LCDs for a period of 12 months after receipt by the purchaser, and within the limits specified. Kyocera shall, by mutual agreement, replace or rework defective LCDs that are shown to be Kyocera’s responsibility.

１７. Precautions for use

17-1. Installation of the LCD

1. The Metal frame of the LCD module is not grounded. You can use the M2 burring, which is located on the right side of the LCD module, for the grounding purpose, if necessary.
2. The LCD shall be installed so that there is no pressure on the LSI chips.
3. The LCD shall be installed flat, without twisting or bending.
4. The display window size should be the same as the effective viewing area.
5. In case you use outside frame of effective viewing area as outward appearance of your product, unevenness of its outward appearance is out of guarantee.
6. Please refer to the following our recommendable value of Clamp-down torque when installing.
   Clamp-down torque : 3.3+/-0.5kgf.cm Please set up'SPEED-LOW', 'SOFT START-SLOW' when using electric driver.
   Recommendable screw : P-TITE screw two types nominal dia.3.0mm.
   installing boss hole depth : 5.5mm Max.
   Please be careful not to use high torque which may damage LCD module in installation.
7. Do not pull the CFL lead wires and do not bend the root of the wires.
   Housing should be designed to protect CFL lead wires from external stress.
8. This Kyocera LCD module has been specifically designed for use in general electronic devices, but not for use in a special environment such as usage in an active gas.
   Hence, when the LCD is supposed to be used in a special environment, evaluate the LCD thoroughly beforehand and do not expose the LCD to chemicals such as an active gas.

17-2. Static Electricity

1. Since CMOS ICs are mounted directly onto the LCD glass, protection from static electricity is required. Operation should wear ground straps.

17-3. LCD Operation

1. The LCD shall be operated within the limits specified. Operation at values outside of these limits may shorten life, and/or harm display images.
2. Adjust "LCD driving voltage" to obtain optimum viewing angle and contrast.
3. Operation of the LCD at temperature below the limit specified may cause image degradation and/or bubbles.
   It may also change the characteristics of the liquid crystal.
   This phenomenon may not recover. The LCD shall be operated within the temperature limits specified.

17-4. Storage

1. The LCD shall be stored within the temperature and humidity limits specified.
   Store in a dark area, and protected the LCD from direct sunlight or fluorescent light.
2. Always store the LCD so that it is free from external pressure onto it.

17-5. Screen Surface

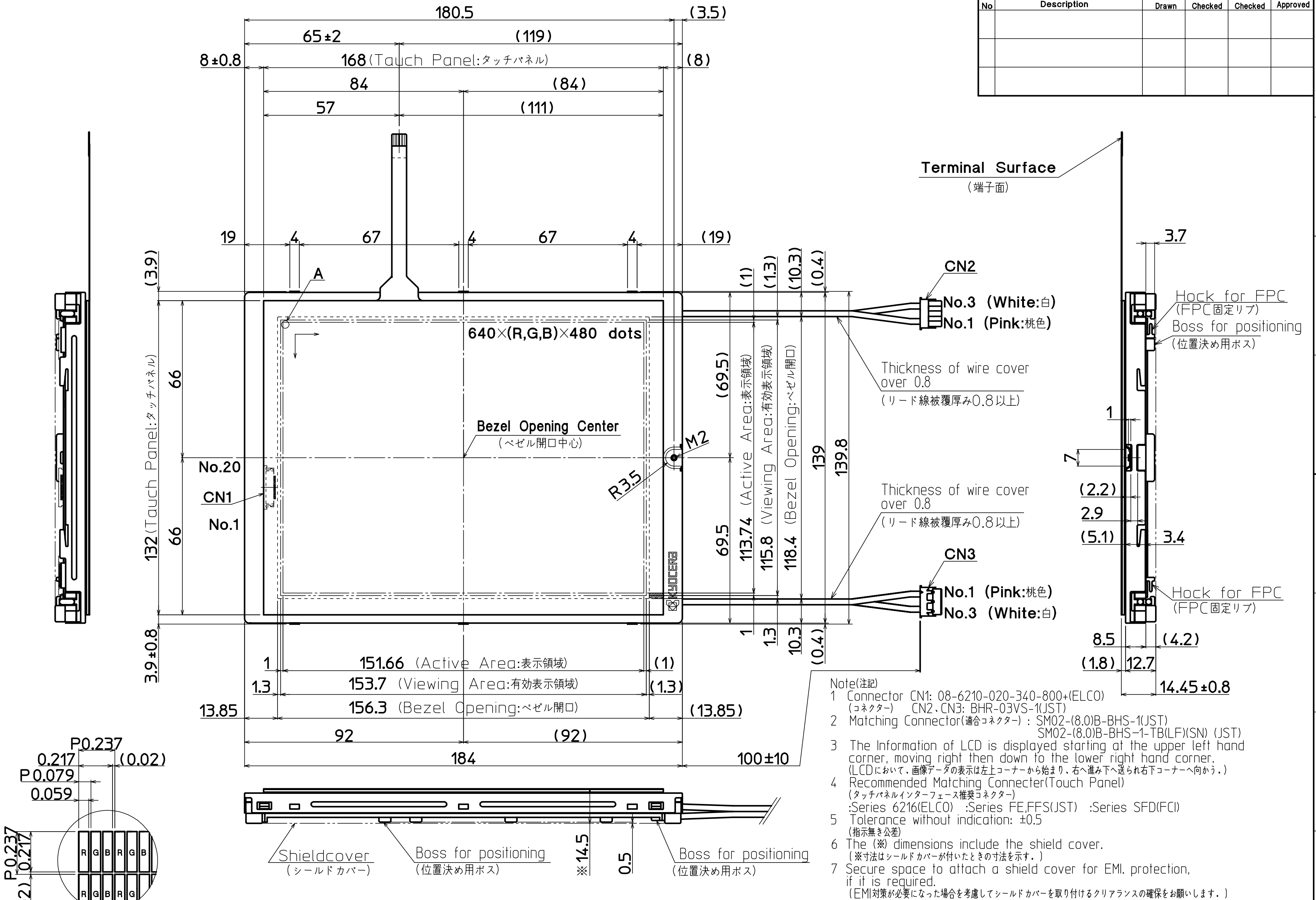
1. DO NOT store in a high humidity environment for extended periods.
   Image degradation, bubbles, and/or peeling off of polarizer may result.
2. Do not push or rub the touch panel’s surface with hard to sharp objects such as knives, or the touch panel may be scratched.
3. When the touch panel is dirty, gently wipe the surface with a soft cloth, sometimes moistened by mild detergent or alcohol. If a hazardous chemical is dropped on the touch panel by mistake, wipe it off right away to prevent human contact.
4. Touch panel edges are sharp. Handle the touch panel with enough care to prevent cuts.
5. Always keep the LCD free from condensation during testing.
   Condensation may permanently spot or stain the polarizers.

１８．Reliability Data / Environmental Test

TEST ITEM	TEST CONDITION	TEST TIME	RESULT
High Temp. Atmosphere	60℃	240 h	Display Quality : No defect Display Function : No defect Current Consumption : No defect
Low Temp. Atmosphere	-20℃	240 h	Low Temp. Bubble : None Solid Crystallization of Liquid Crystal : None Display Quality : No defect Display Function : No defect Current Consumption : No defect
High Temp. Humidity Atmosphere	40℃ 90%RH	240 h	Display Quality : No defect Display Function : No defect Peel-off of Organic Sealing : None Current Consumption : No defect
Temp. Cycle	-20℃ 0.5 h R.T. 0.5 h 60℃ 0.5 h	10 cycles	Display Quality : No defect Display Function : No defect Peel-off of Organic Sealing : None Bubble on Cell : None
High Temp. Operation	60℃ Vop	500 h	Display Quality : No defect Current Consumption : No defect
Point Activation life	Polyacetal stylus(R0.8) Hitting force 3N Hitting speed 2 time/s	one million times	Satisfy spec below item Terminal resistance Insulation resistance Linearity Actuation Force

- * Each test item uses a test LCD only once. The tested LCD is not used in any other tests.
- * The LCD is tested in circumstances in which there is no condensation.
- * The tested LCD is inspected after 24 hours of storage at room temperature and room humidity after each test is finished.
- * The reliability test is not an out-going inspection.
- * The results of the reliability test are for your reference purpose only.
  The reliability test is conducted only to examine the LCD’s capability.

No	Description	Drawn	Checked	Checked	Approved

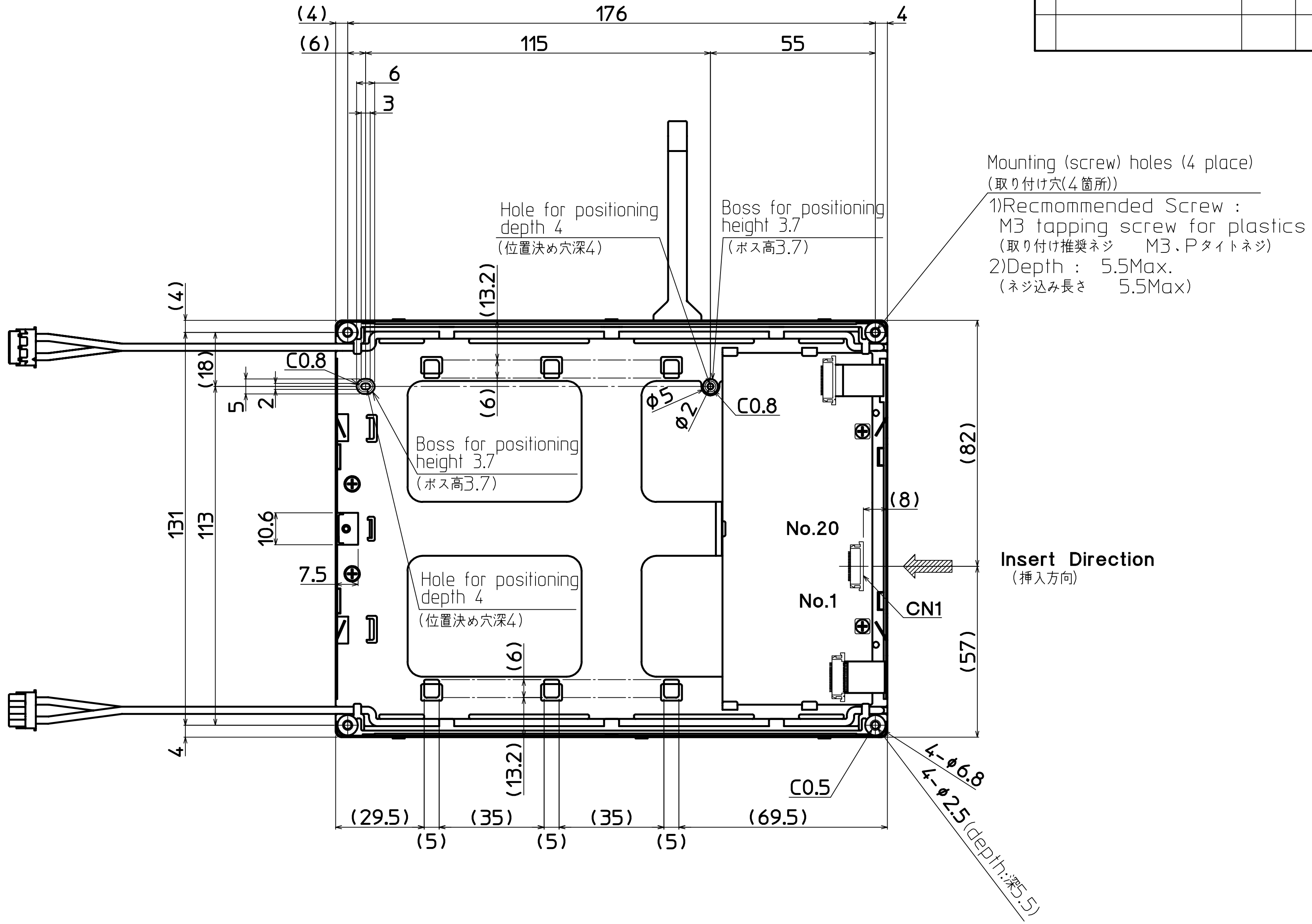

180.5
(3.5)
65±2
(119)
8±0.8
168(Tauch Panel:タッチパネル)
(8)
84
(84)
57
(111)
19
4
67
4
67
4
(19)
A
(3.9)
640×(R,G,B)×480 dots
66
66
132(Tauch Panel:タッチパネル)
Bezel Opening Center
(ベゼル開口中心)
No.20
CN1
No.1
M2
R3.5
(69.5)
69.5
(1)
113.74 (Active Area:表示領域)
(1.3)
115.8 (Viewing Area:有効表示領域)
(10.3)
118.4 (Bezel Opening:ベゼル開口)
(0.4)
139
139.8
1
1.3
10.3
(0.4)
3.9±0.8
CN2
No.3 (White:白)
No.1 (Pink:桃色)
Thickness of wire cover over 0.8
(リード線被覆厚み0.8以上)
CN3
No.1 (Pink:桃色)
No.3 (White:白)
KYOCERA
1
151.66 (Active Area:表示領域)
(1)
1.3
153.7 (Viewing Area:有効表示領域)
(1.3)
13.85
156.3 (Bezel Opening:ベゼル開口)
(13.85)
92
(92)
184
100±10
Terminal Surface
(端子面)
3.7
Hock for FPC
(FPC固定リブ)
Boss for positioning
(位置決め用ボス)
1
7
(2.2)
2.9
(5.1)
3.4
8.5
(4.2)
(1.8)
12.7
14.45±0.8
P0.237
0.217
(0.02)
P0.079
0.059
P0.237
0.217
(0.02)
R G B R G B
DETAIL A (NTS)
(Dot Size)
Shieldcover
(シールドカバー)
Boss for positioning
(位置決め用ボス)
※14.5
0.5

Note(注記)

1. Connector CN1: 08-6210-020-340-800+(ELCO)
   (コネクター) CN2,CN3: BHR-03VS-1(JST)
2. Matching Connector(適合コネクター) : SM02-(8.0)B-BHS-1(JST)
   SM02-(8.0)B-BHS-1-TB(LF)(SN) (JST)
3. The Information of LCD is displayed starting at the upper left hand corner, moving right then down to the lower right hand corner.
   (LCDにおいて、画像データの表示は左上コーナーから始まり、右へ進み下へ送られ右下コーナーへ向かう。)
4. Recommended Matching Connecter(Touch Panel)
   (タッチパネルインターフェース推奨コネクター)
   :Series 6216(ELCO) :Series FE,FFS(JST) :Series SFD(FCI)
5. Tolerance without indication: ±0.5
   (指示無き公差)
6. The (※) dimensions include the shield cover.
   (※寸法はシールドカバーが付いたときの寸法を示す。)
7. Secure space to attach a shield cover for EMI. protection, if it is required.
   (EMI対策が必要になった場合を考慮してシールドカバーを取り付けるクリアランスの確保をお願いします。)

Material 材質	Treatment 処理	Approved '05.01.27 阿部	Checked	Checked	Drawn 鶴崎	Scale 1:1 (NTS)	Title KCG075VG2BG	KYOCERA	Year-Month-Day '05.01.26	Size 2
Quantity 製作数	Description; 備考 05009AAB						Outline Dimensions	Drawing No.	121A5037700	1/3

No	Description	Drawn	Checked	Checked	Approved

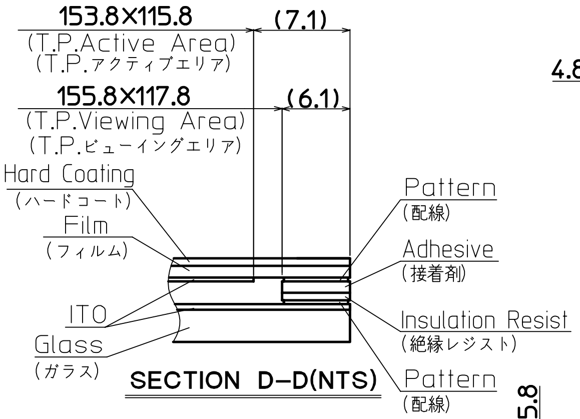

176
(4)
4
(6)
115
55
6
3
Mounting (screw) holes (4 place)
(取り付け穴(4箇所))
1)Recommmended Screw :
M3 tapping screw for plastics
(取り付け推奨ネジ M3、Pタイトネジ)
2)Depth : 5.5Max.
(ネジ込み長さ 5.5Max)
Hole for positioning
depth 4
(位置決め穴深4)
Boss for positioning
height 3.7
(ボス高3.7)
(13.2)
(4)
(18)
C0.8
5
2
(6)
φ5
φ2
C0.8
Boss for positioning
height 3.7
(ボス高3.7)
(82)
131
113
10.6
7.5
(8)
No.20
Insert Direction
(挿入方向)
No.1
CN1
Hole for positioning
depth 4
(位置決め穴深4)
(6)
(57)
4
(13.2)
C0.5
4-φ6.8
4-φ2.5(depth:深5.5)
(29.5)
(35)
(35)
(69.5)
(5)
(5)
(5)

Note(注記)

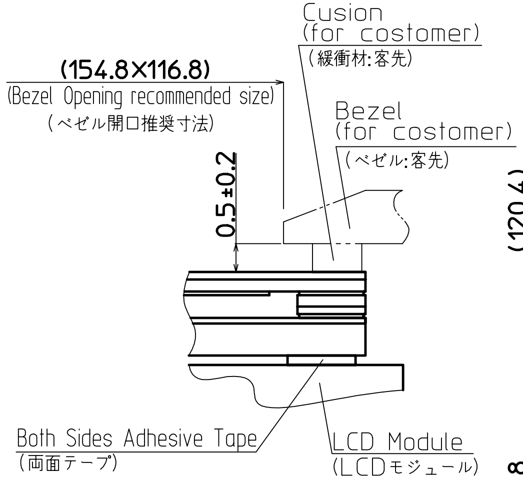
1 Tolerance without indication: ±0.5
(指示無き公差)

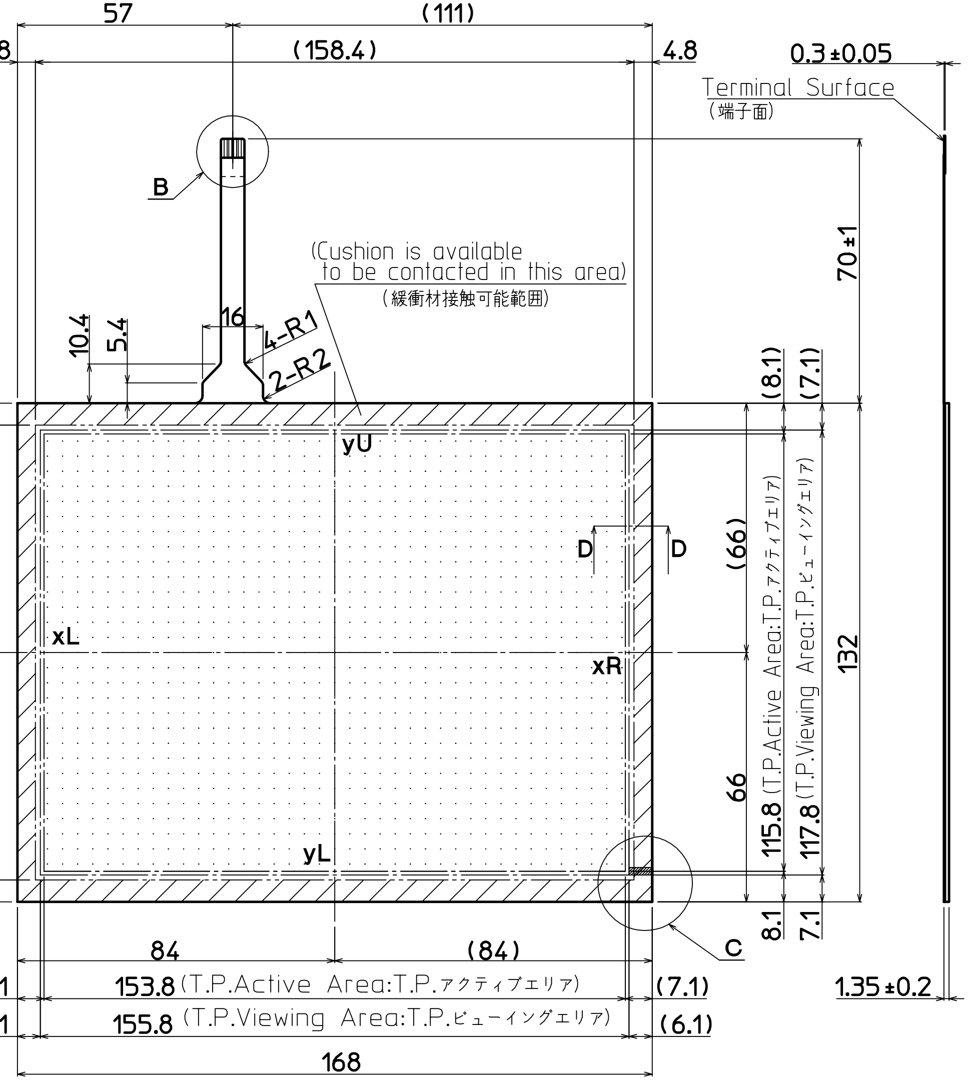
Material 材質	Treatment 処理	Approved '05.01.27	Checked	Checked	Drawn	Scale 1:1	Title KCG075VG2BG	KYOCERA	Year-Month-Day '05.01.26	Size 2
Quantity 製作数	Description; 備考 05009AAB	阿部			鶴崎		Outline Dimensions	Drawing No.	121A5037700	2/3

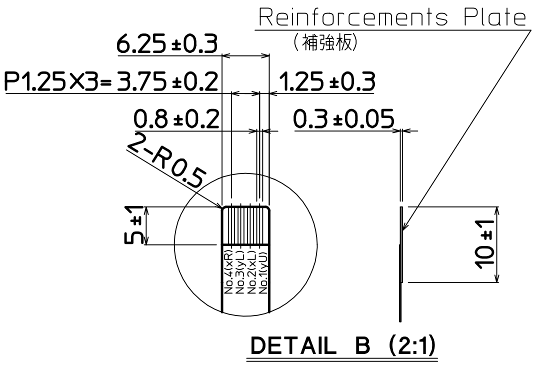
No	Description	Drawn	Checked	Checked	Approved


153.8X115.8
(7.1)
(T.P.Active Area)
(T.P.アクティブエリア)
155.8X117.8
(6.1)
(T.P.Viewing Area)
(T.P.ビューイングエリア)
Hard Coating
(ハードコート)
Film
(フィルム)
ITO
Glass
(ガラス)
Pattern
(配線)
Adhesive
(接着剤)
Insulation Resist
(絶縁レジスト)
Pattern
(配線)

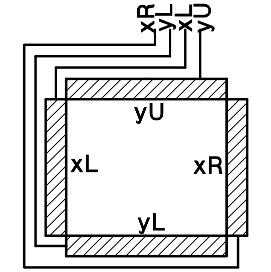
SECTION D-D(NTS)


(154.8X116.8)
(Bezel Opening recommended size)
(ベゼル開口推奨寸法)
Cusion
(for costomer)
(緩衝材:客先)
Bezel
(for costomer)
(ベゼル:客先)
0.5±0.2
Both Sides Adhesive Tape
(両面テープ)
LCD Module
(LCDモジュール)


57
(111)
4.8
(158.4)
4.8
0.3±0.05
Terminal Surface
(端子面)
B
70±1
(Cushion is available to be contacted in this area)
(緩衝材接触可能範囲)
10.4
5.4
16
4-R1
2-R2
5.8
yU
(8.1)
(7.1)
D
D
(66)
(T.P.Active Area:T.P.アクティブエリア)
(T.P.Viewing Area:T.P.ビューイングエリア)
(120.4)
xL
xR
132
66
115.8
117.8
yL
C
5.8
8.1
7.1
84
(84)
7.1
153.8 (T.P.Active Area:T.P.アクティブエリア)
(7.1)
6.1
155.8 (T.P.Viewing Area:T.P.ビューイングエリア)
(6.1)
168
1.35±0.2

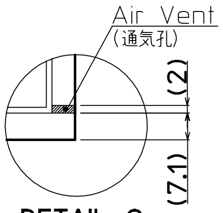

Reinforcements Plate
(補強板)
6.25±0.3
P1.25X3=3.75±0.2
1.25±0.3
0.8±0.2
0.3±0.05
2-R0.5
5±1
10±1
No.4(xR)
No.3(yL)
No.2(xL)
No.1(yU)

DETAIL B (2:1)


xR
yL
xL
yU
yU
xL
xR
yL

Touch Panel Pin-assign

(タッチパネル ピンアサイン)


Air Vent
(通気孔)
(2)
(7.1)

DETAIL C

Precaution in use of touch panel.
(タッチパネル使用上の注意事項)

1. Fix touch panel at LCD module and the rear side of touch panel.
   (タッチパネルの固定はLCDモジュール側とタッチパネル裏面とで行なうこと)
2. Must maintain a gap between inside of bezel and touch panel to avoid malfunction or electrode damage of touch panel.
   (ベゼル内側とタッチパネルの接触厳禁。誤動作や電極破損の原因となります。)
3. Please inform us beforehand when you design window of your housing with the different size from recommended size.
   (ベゼル開口を推奨寸法以外で製作される場合は必ず前もって相談願います。)

Note(注記)

	Name(名称)	Explanation(説明)
1	T.P.	Touch panel (タッチパネル)
2	T.P. Active Area (T.P.アクティブエリア)	Operating area of touch panel (タッチパネルの動作範囲)
3	T.P. Viewing Area (T.P.ビューイングエリア)	Warranty area of touch panel's appearance (タッチパネルの外観(傷・異物等)保証範囲)
		By giving pressure between the active area and the effective viewing area of the touch panel, there is a possibility that the touch panel will operate. (タッチパネルアクティブエリアとタッチパネルビューイングエリア間は荷重をかけた場合は、タッチパネルが動作する可能性があります。)

Precaution in use of touch panel.
(タッチパネル使用上の注意事項)

There is vent channel to equalize air pressure between the inner space of the touch panel and the atmosphere. Please make sure it is not blocked by your housing and mounting method.
(タッチパネルの中には内圧と外圧を均一にするため通気孔を設けています。
取り付け時にこの通気孔を塞がないようにしてください。)

Material 材質	Treatment 処理	Approved	Checked	Checked	Drawn	Scale	Title		Year-Month-Day	Size
		'05.01.27 阿部			鶴崎	1:1(2:1,NTS)	KCG075VG2BG	KYOCERA	'05.01.26	2
Quantity 製作数	Description; 備考						T.P. Outline Dimensions	Drawing No.	121A5037700	3/3

SPEC. NO.	TQ3C-8EAC0-E2DDD20-00
DATE	January 26, 2005

FOR:

KYOCERA INSPECTION STANDARD

TYPE : KCG075VG2BG-G00

KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

Original	Designed by :Engineering Dept.			Confirmed by :QA Dept.	
Issue Data	Prepared	Checked	Approved	Checked	Approved
January 26, 2005	K. Nishino	Y. Yamazaki	M.Fujitani	Y.Yoshida	[illegible] Hayashi

Revision Record

Date	Designed by: Engineering Dept.			Confirmed by: QA Dept.	
	Prepared	Checked	Approved	Checked	Approved

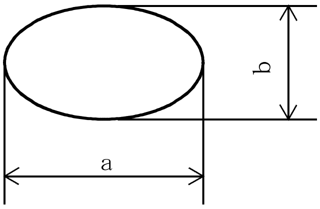
Rev. No.	Date	Page	Descriptions

Visuals specification

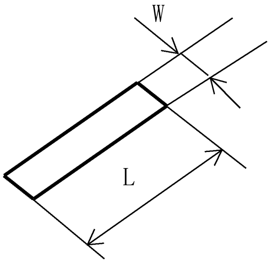
1)Note

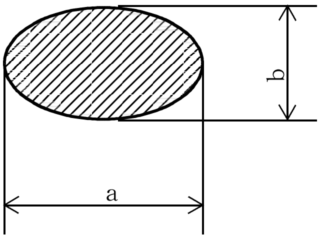
Item	Note	
General	1.When defects specified in this Inspection Standards are inspected, operating voltage(Vop) shall be set at the level where optimized contrast is available. Display quality is applied up to effective viewing area. (Bi-Level INSPECTION) 2.This inspection standard about the image quality shall be applied to any defect within the effective viewing area and shall not be applicable to outside of the area. 3.Should any defects which are not specified in this standard happen, additional standard shall be determined by mutual agreement between customer and Kyocera. 4.Inspection conditions Luminance : 500 Lux minimum . Inspection distance : 300 mm (from the sample) Temperature : 25 ± 5 ℃ Direction : right above	
Definition of Inspection item	Pinhole, Bright spot Black spot, Scratch Foreign particle	The color of a small area is different from the remainder. The phenomenon dose not change with voltage.
	Contrast variation	The color of a small area is different from the remainder. The phenomenon changes with voltage.
	Polarizer (Scratch, Bubble, Dent)	Scratch, Bubble and Dent in the polarizer which can be observed in on / off state.

2)Standard

<table>
<tr><th>Inspection item</th><th>Judgement standard</th></tr>
<tr><td>Pinhole, Bright spot
Black spot,
Foreign particle
(LCD portion)</td><td>


$d = (a + b) / 2$

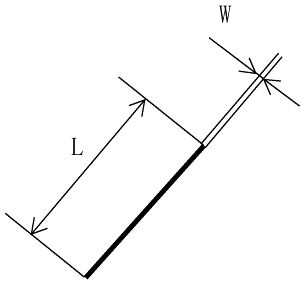
<table>
<tr><th>Category</th><th>Size (mm)</th><th>Acceptable number</th></tr>
<tr><td>A</td><td>d ≦ 0.2</td><td>neglected</td></tr>
<tr><td>B</td><td>0.2 < d ≦ 0.3</td><td>5</td></tr>
<tr><td>C</td><td>0.3 < d ≦ 0.5</td><td>3</td></tr>
<tr><td>D</td><td>0.5 < d</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Scratch,Foreign particle
(LCD portion)</td><td>


<table>
<tr><th></th><th>Width (mm)</th><th>Length (mm)</th><th>Acceptable No.</th></tr>
<tr><td>A</td><td>W ≦ 0.03</td><td>—</td><td>neglected</td></tr>
<tr><td>B</td><td rowspan="3">0.03< W ≦0.1</td><td>L ≦ 2.0</td><td>neglected</td></tr>
<tr><td>C</td><td>2.0 < L ≦ 4.0</td><td>3</td></tr>
<tr><td>D</td><td>4.0 < L</td><td>0</td></tr>
<tr><td>E</td><td>0.1 < W</td><td>—</td><td>According to ’ Circular ’</td></tr>
</table>
</td></tr>
<tr><td>Contrast variation</td><td>


$d = (a + b) / 2$

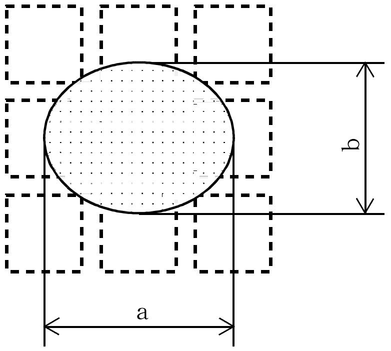
<table>
<tr><th>Category</th><th>Size (mm)</th><th>Acceptable number</th></tr>
<tr><td>A</td><td>d ≦ 0.5</td><td>neglected</td></tr>
<tr><td>B</td><td>0.5 < d ≦ 0.7</td><td>3</td></tr>
<tr><td>C</td><td>0.7 < d</td><td>0</td></tr>
</table>
</td></tr>
</table>

Inspection item	Judgement standard
Polarizer (Scratch, Bubble, Dent)	(1) Scratch



	Width (mm)	Length (mm)	Acceptable No.
A	W ≦ 0.1	—	neglected
B	0.1 < W ≦0.3	L ≦ 5.0	neglected
C		5.0 < L	0
D	0.3 < W	—	0

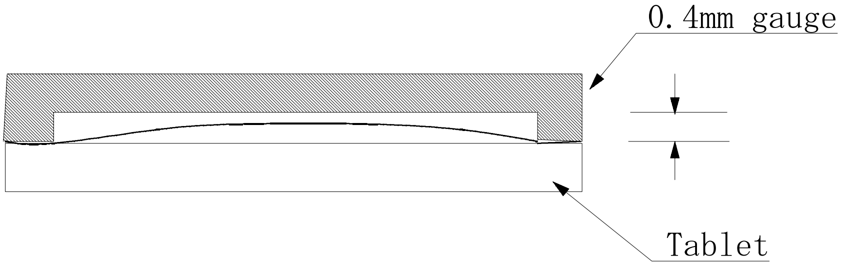
(2)Bubble (dent)

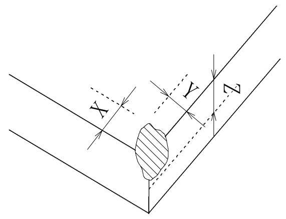
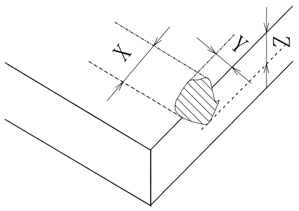


$d = (a + b) / 2$

Category	Size (mm)	Acceptable number
A	d ≦ 0.2	neglected
B	0.2 < d ≦ 0.3	5
C	0.3 < d ≦ 0.5	3
D	0.5 < d	0

<table>
<tr><th>Inspection item</th><th>Judgement standard</th></tr>
<tr><td>Scratch
(Touch Screen portion)</td><td>
<table>
<tr><th>Width(mm)</th><th>Length(mm)</th><th>Acceptable number</th></tr>
<tr><td>W ＜ 0.05</td><td rowspan="3">10 ＜ L</td><td>neglected</td></tr>
<tr><td>0.05 ≦ W ＜ 0.10</td><td>3</td></tr>
<tr><td>0.10 ≦ W</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Swell
(Touch Screen portion)</td><td>
Touch Screen not to contact measurement surface of the gauge, 0.4mm gauge to be utilized for the measurement



</td></tr>
<tr><td>Glass crack
(Touch Screen portion)</td><td>
<table>
<tr><td rowspan="2">Judgement standard</td><td colspan="3">Corner crack

</td><td colspan="3">Cracks in other area than in corner

</td></tr>
<tr></tr>
<tr><td></td><td>X</td><td>Y</td><td>Z</td><td>X</td><td>Y</td><td>Z</td></tr>
<tr><td></td><td>OK≦3</td><td>OK≦3</td><td>OK≦t</td><td>OK≦3</td><td>OK≦3</td><td>OK≦t</td></tr>
</table>

・If one of X,Y,Z is not satisfied, it is regarded as NG.
・Regarding the corner crack, within 0.5mm depth is regarded as OK. (t=thickness of Touch panel)
</td></tr>
<tr><td></td><td></td></tr>
</table>