SPEC.NO.	TQ3C-8EAC0-E1CUQ05-01
DATE	February 23, 2007

S P E C

FOR :

TYPE:KCG047QV1AE-G00

CONTENTS

Issued
Date: Mar. 1, 2007
KYOCERA
Hayato LCD Division

KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

This specification is subject to change without notice.
Consult Kyocera before ordering.

Original	Designed by :Engineering Dept.			Confirmed by :QA Dept.	
Issue Date	Prepared	Checked	Approved	Checked	Approved
January 16,2003	T. Onodera	Y. Yamazaki	M.Fujitani	J.Sakaguchi	

Warning

1. This Kyocera LCD module has been specifically designed for use only in electronic devices and industrial machines in the area of audio control, office automation, industrial control, home appliances, etc. The module should not be used in applications where the highest level of safety and reliability are required and module failure or malfunction of such module results in physical harm or loss of life, as well as enormous damage or loss. Such fields of applications include, without limitation, medical, aerospace, communications infrastructure, atomic energy control. Kyocera expressly disclaims any and all liability resulting 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, damages, liabilities, awards, costs and expenses, including legal expenses, resulting from or arising out of Customer's use, or sale for use, or Kyocera modules in applications.

Caution

1. 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
Feb. 23, 2007	T. Cradera	Y. Yamazaki	M. Fujitani	J. Sakaguchi	

Rev. No.	Date	Page	Descriptions
01	Feb. 23, 2007	—	～Change "Warning"
		1	1. Application ～Add "『RoHS Compliant』"
		3	4-2. Environmental absolute maximum ratings ～Add comment "*2"
		4	5-1. VDD = 5.0V ～Add page
		5	5-2. VDD = 3.3V ～Delete ( ) ～Change CONDITION "LCD driving voltage" ～Change "Clock frequency" MAX "5.88" → "10.00" ～Add "Frame frequency" MAX "80" ～Add comment "*2","*3"
		6	6. Optical Characteristics ～Change CONDITION "Viewing angle range" ～Delete ( )
		11	8-1. LCD ～Change "LCD side connector" "08-6210-020-340-800" → "08-6210-020-340-800+"
			8-2. CFL ～Add "Recommended matching connector" "SM02(8.0)B-BHS-1-TB(LF)(SN)"
			8-3. Touch panel ～Add "LCD side FPC : 1.25mm pitch"
		14	11. Input Timing Characteristics ～Change Drawing
		15	11-1. Switching characteristics (VDD = 5.0V) ～Chaange All
		16	11-2. Switching characteristics (VDD = 3.3V) ～Add page
		17	12. Supply Voltage Sequence Condition ～Add comment
		18	13. Backlight Characteristics ～Change comment "*1" ～Add comment
		19	14. Design Guidance Analog Touch-Panel(T/P) ～All change
		20	15. Lot Number Identification ～Add "⑤Country of origin(Japan or China)"
		21	17-1. Installation of the LCD ～Add comment "9"

Revision Record

Date	Designed by: Engineering Dept.			Confirmed by: QA Dept.	
	Prepared	Checked	Approved	Checked	Approved
Feb. 23, 2007	T. Onodera	Y. Yamagishi	M.Fujitani	J.Sakaguchi	

Rev. No.	Date	Page	Descriptions
01	Feb. 23, 2007	21	17-3. LCD Operation ～Change comment "2"
			17-4. Storage ～Change comment "2"
			17-5. Screen Surface ～Change comment "2","3","4" ～Add comment "6","7","8"
		23	19. Outline Drawing ～Change Drawing "121A5021200" → "121A5021200-2"

1. Application

This data sheet defines the specification for a (320×R,G,B)×240 dot, STN Transmissive color dot matrix type Liquid Crystal Display with CFL backlight. 『RoHS Compliant』

2. Construction and Outline

(320×R,G,B)×240 dots, COG type LCD with CFL backlight.

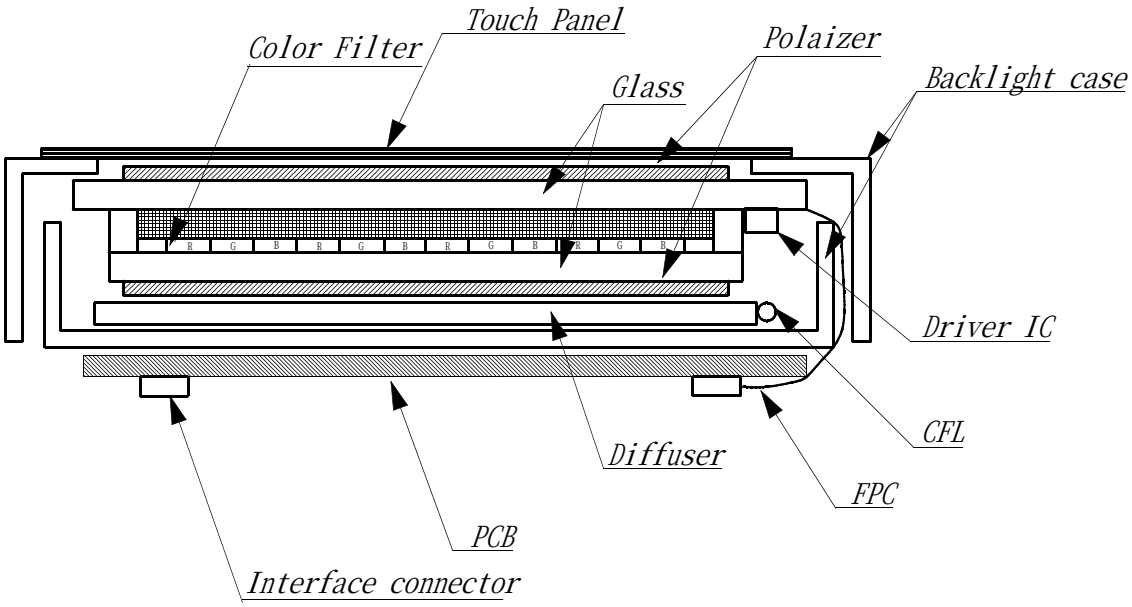
Backlight system : Side-edge type CFL (1 tube).

Inverter : Option.
Recommended Inverter : PH-BLC08-K3(HITACHI MEDIA ELECTRONICS)
or Equivalent.

Polarizer : Glare treatment.

Additional circuit : Bias voltage circuit, Randomizing circuit, DC/DC Converter, Temperature Compensation Circuit

Touch Panel : Analog type . Non-Glare treatment.



This drawing is showing conception only.

3. Mechanical Specifications

ITEM	SPECIFICATION	UNIT
Outline dimensions	122.4 (W) × 90.0 (H) × 9.4 (D) (PCB and componentsnot included.) ※Refer outline drawing in detail.	mm
Effective viewing area	98.0 (W) × 74.0 (H)	mm
Dot number	(320×R,G,B) (W) × 240 (H)	Dots
Dot size	0.08 (W) × 0.28 (H)	mm
Dot pitch	0.10 (W) × 0.30 (H)	mm
Display color *1	White *2	—
Base color *1	Black *2	—
Mass	150	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	0.5N±0.3N	—
Transmittance	Typ.80	%
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
FRM freguency	fFRM	—	150	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	50	°C
Storage temperature *2	T_{STO}	-20	60	°C
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°C and upper 40°C.

*2 Temp. = -20°C < 48 h , Temp = 60°C < 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 17. Precautions for use as detail).

*3 Non-condensation.

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

*5

Frequency	10～55 Hz	Converted to acceleration value : (0.3～9 m/s²)
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: 490m/s²
Pulse width : 11 ms
3 times in each direction : ±X/±Y/±Z.
EIAJ ED-2531

5.Electrical Characteristics

5-1. VDD = 5.0V

Temp. = 25°C, VDD = +5.0V ± 5%

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply voltage for logic	VDD	—	4.75	5.0	5.25	V
LCD driving voltage *1 *3	Vop= VCONT	0～50 °C *2	1.30	1.80	2.30	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	fcp	—	2.02	2.16	10.00	MHz
Frame frequency *4	f_{FRM}	—	70	75	80	Hz
Current consumption for logic	IDD	*5	—	30	45	mA
Power consumption	Pdisp		—	150	225	mW

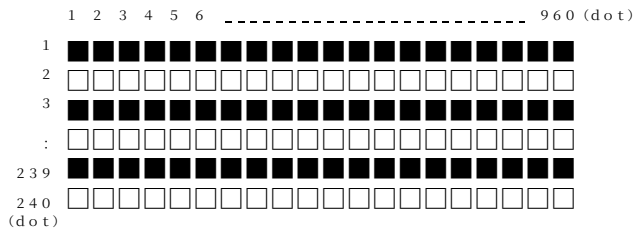
*1 Maximum contrast ratio is obtained by adjusting the LCD supply voltage (Vop= VCONT) for driving LCD.

*2 This LCD Module has the Temperature Compensation Circuit.

*3 Frame frequency : f_{FRM} = 75Hz

*4 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 performan -ce 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.

*5 Display high frequency pattern, (see below).
Vop = VCONT , f_{FRM} = 75 Hz , fcp = 2.16MHz, Temp = 25°C
Pattern:



5-2. VDD = 3.3V

VDD = +3.3V ± 0.3V, Temp. = 25°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply voltage for logic	VDD	—	3.0	3.3	3.6	V
LCD driving voltage *1 *3	Vop= VCONT	0～50 °C *2	1.30	1.80	2.30	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	fcp	—	2.02	2.16	10.00	MHz
Frame frequency *4	f_{FRM}	—	70	75	80	Hz
Current consumption for logic	IDD	*5	—	45	68	mA
Power consumption	Pdisp		—	150	225	mW

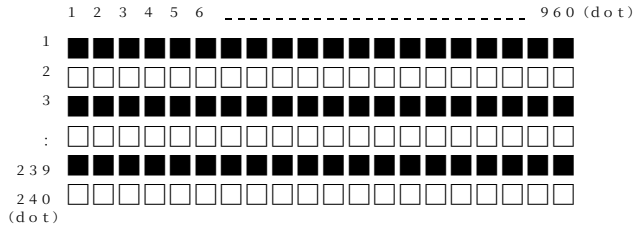
*1 Maximum contrast ratio is obtained by adjusting the LCD supply voltage (Vop= VCONT) for driving LCD.

*2 This LCD Module has the Temperature Compensation Circuit.

*3 Frame frequency : f_{FRM} = 75Hz

*4 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 performan -ce 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.

*5 Display high frequency pattern, (see below).
Vop = VCONT , f_{FRM} = 75 Hz , fcp = 2.16MHz, Temp = 25°C
Pattern:



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%

5-3-3.Insulation resistance

100MΩ or more at DC25V

6. Optical Characteristics

Temp. = 25°C

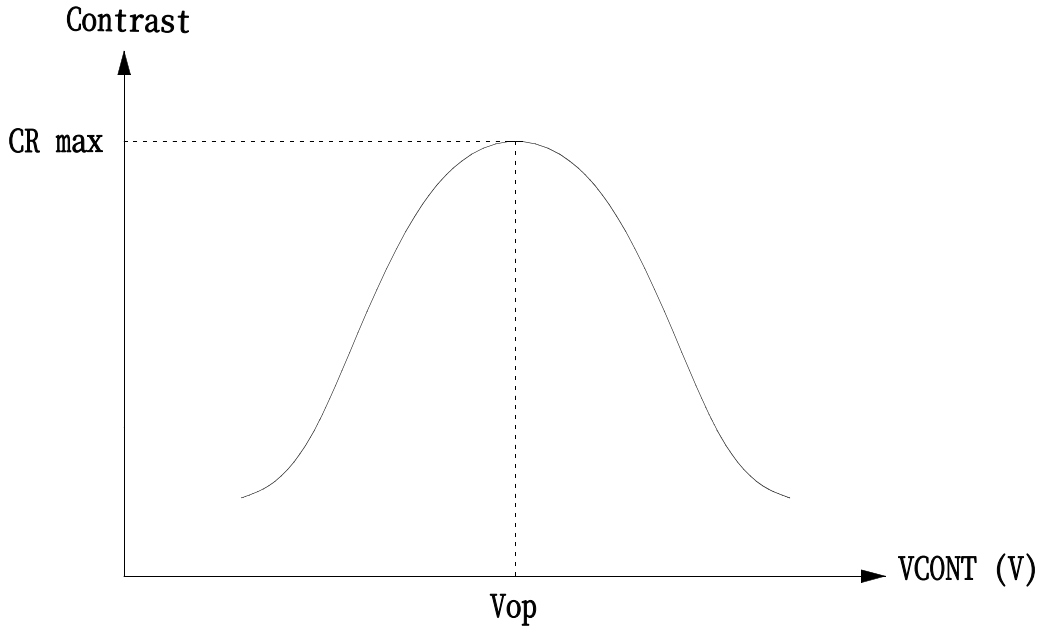
ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
Response time	Rise	Tr	θ=φ=0°		—	190	290	ms
	Down	Td	θ=φ=0°		—	180	280	ms
Viewing angle range		θ	CR≧2	Upper	—	20	—	deg.
				Lower	—	30	—	
		φ		Left	—	50	—	deg.
				Right	—	50	—	
Contrast ratio		CR	θ=φ=0°		15	30	—	—
Brightness		L	IL=5.0mArms		90	130	—	cd/m²
Chromaticity coordinates	Red	x	θ=φ=0°		0.48	0.53	0.58	—
		y			0.29	0.34	0.39	
	Green	x	θ=φ=0°		0.24	0.29	0.34	
		y			0.44	0.49	0.54	
	Blue	x	θ=φ=0°		0.11	0.16	0.21	
		y			0.09	0.14	0.19	
	White	x	θ=φ=0°		0.25	0.30	0.35	
		y			0.27	0.32	0.37	

Optimum contrast is obtained by adjusting the LCD driving voltage(Vop) while at the viewing angle of θ = φ = 0°.

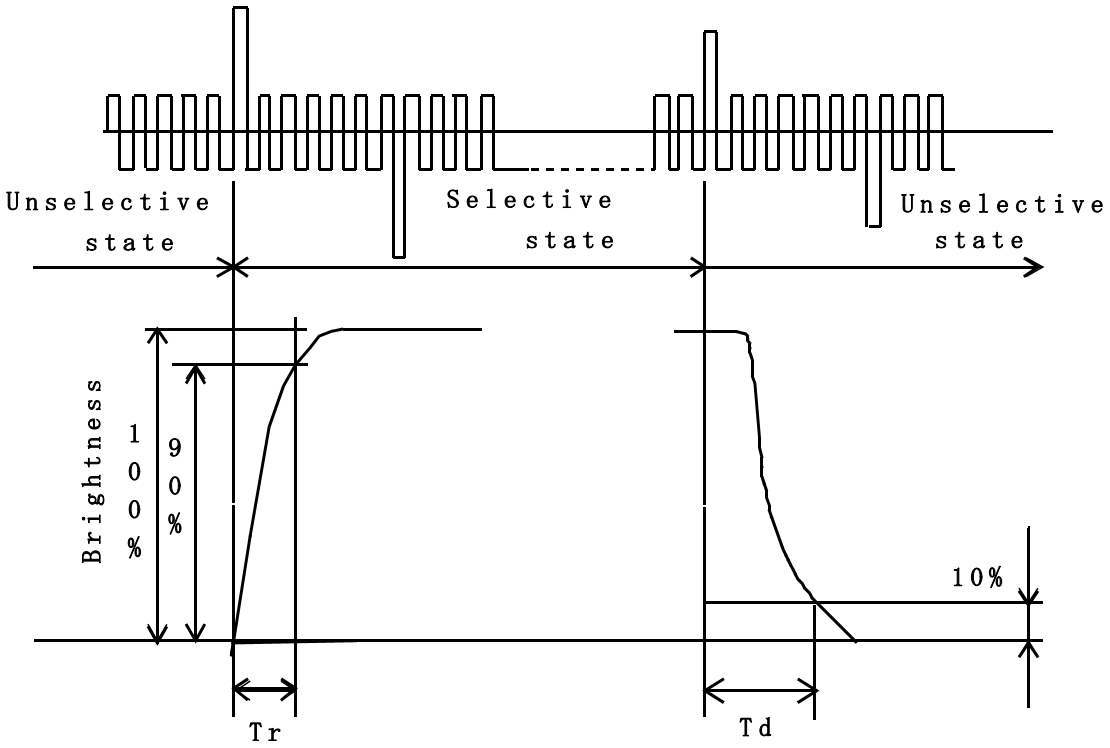
6-1. Contrast ratio is defined as follows:

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

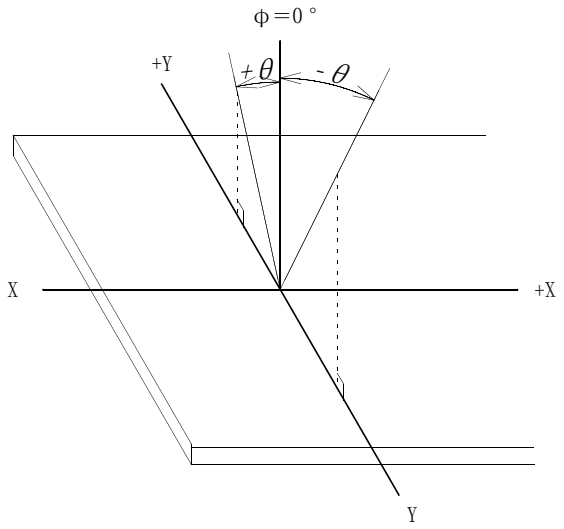
6-2. Definition of Vop



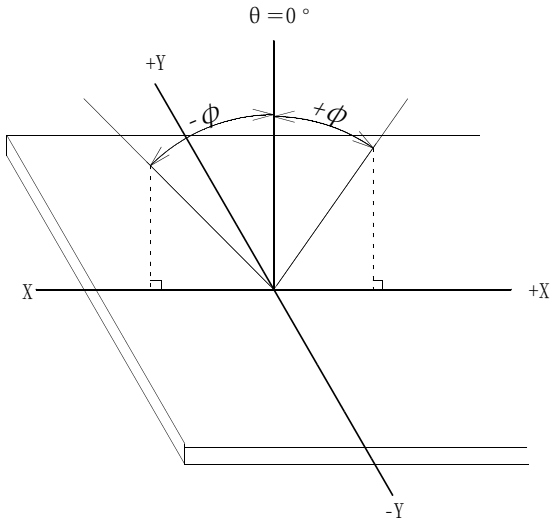
6-3. Definition of response time



6-4. Definition of viewing angle

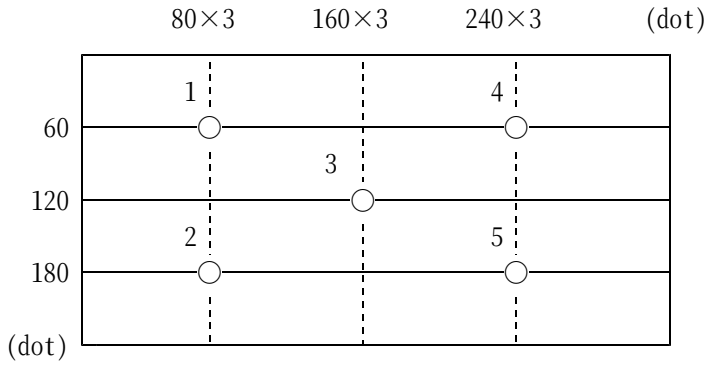


(θ direction)



(φ direction)

6-5. Measuring points



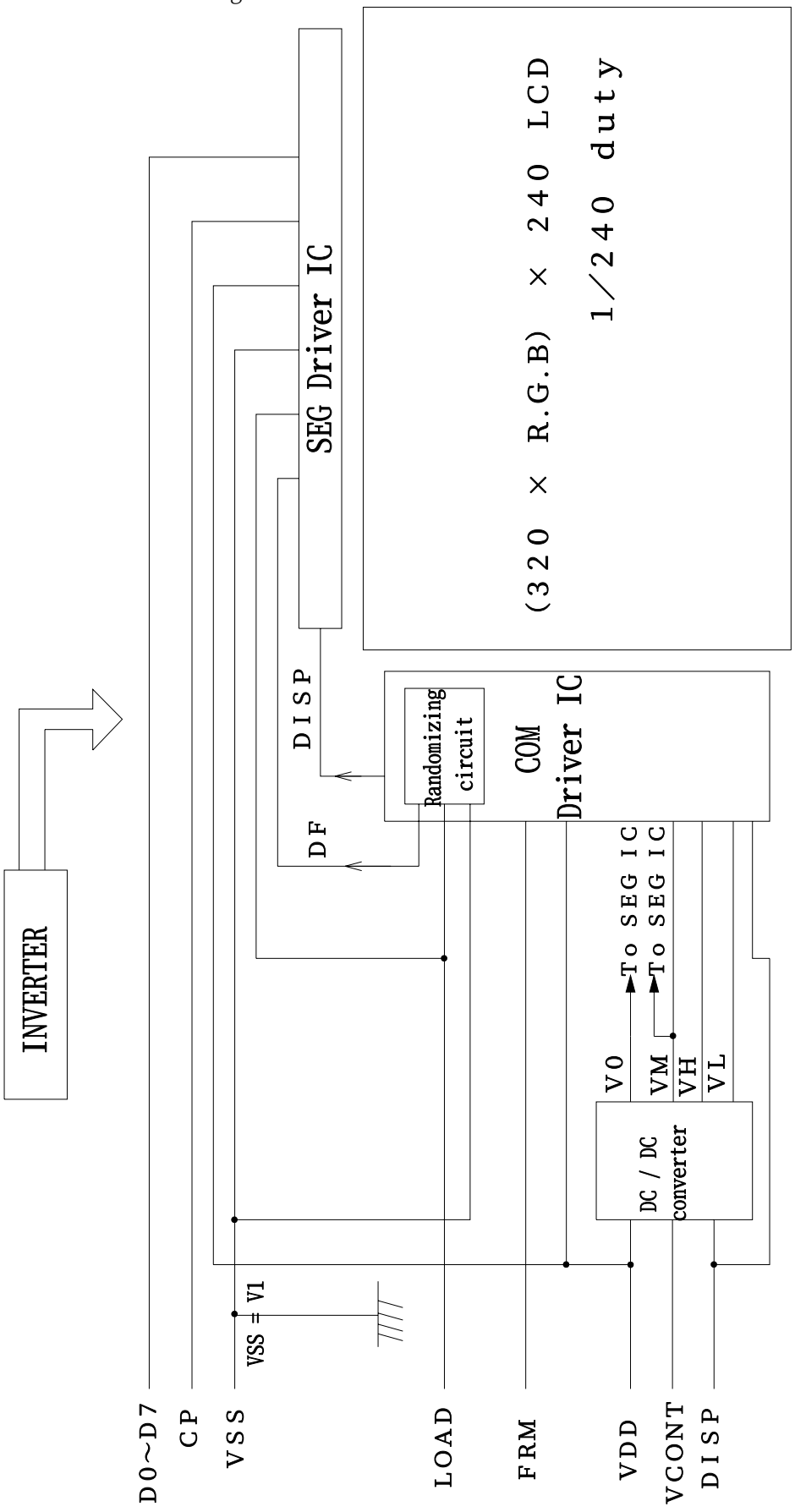
1) Rating is defined as the average brightness inside the viewing area.

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

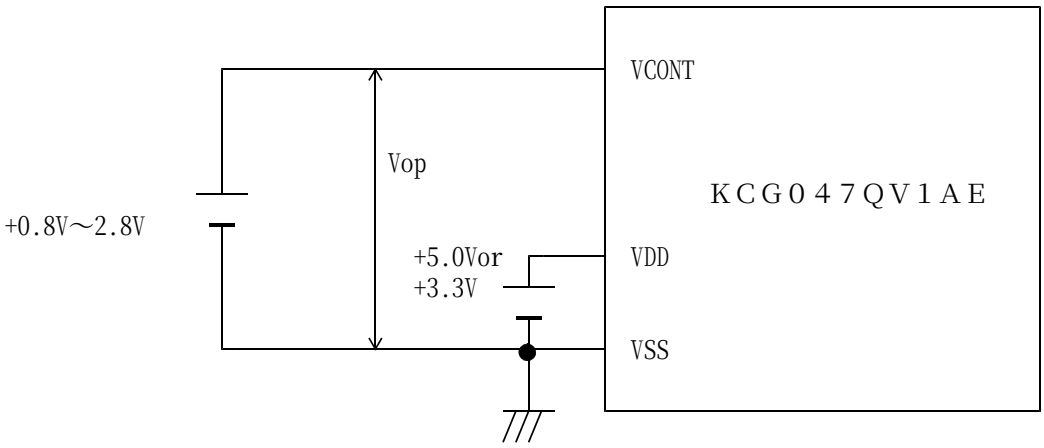
3) The inverter should meet the rating of the CFL;
-Sine, symmetric waveform without spike in positive and negative.

4) Measuring Inverter : PH-BLC08-K3 (HITACHI MEDIA ELECTRONICS)

7. Circuit Block Diagram



7-1. Power supply



8. Interface signals

8-1. LCD

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 FFC or FPC: 0.5mm pitch

8-2. CFL

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

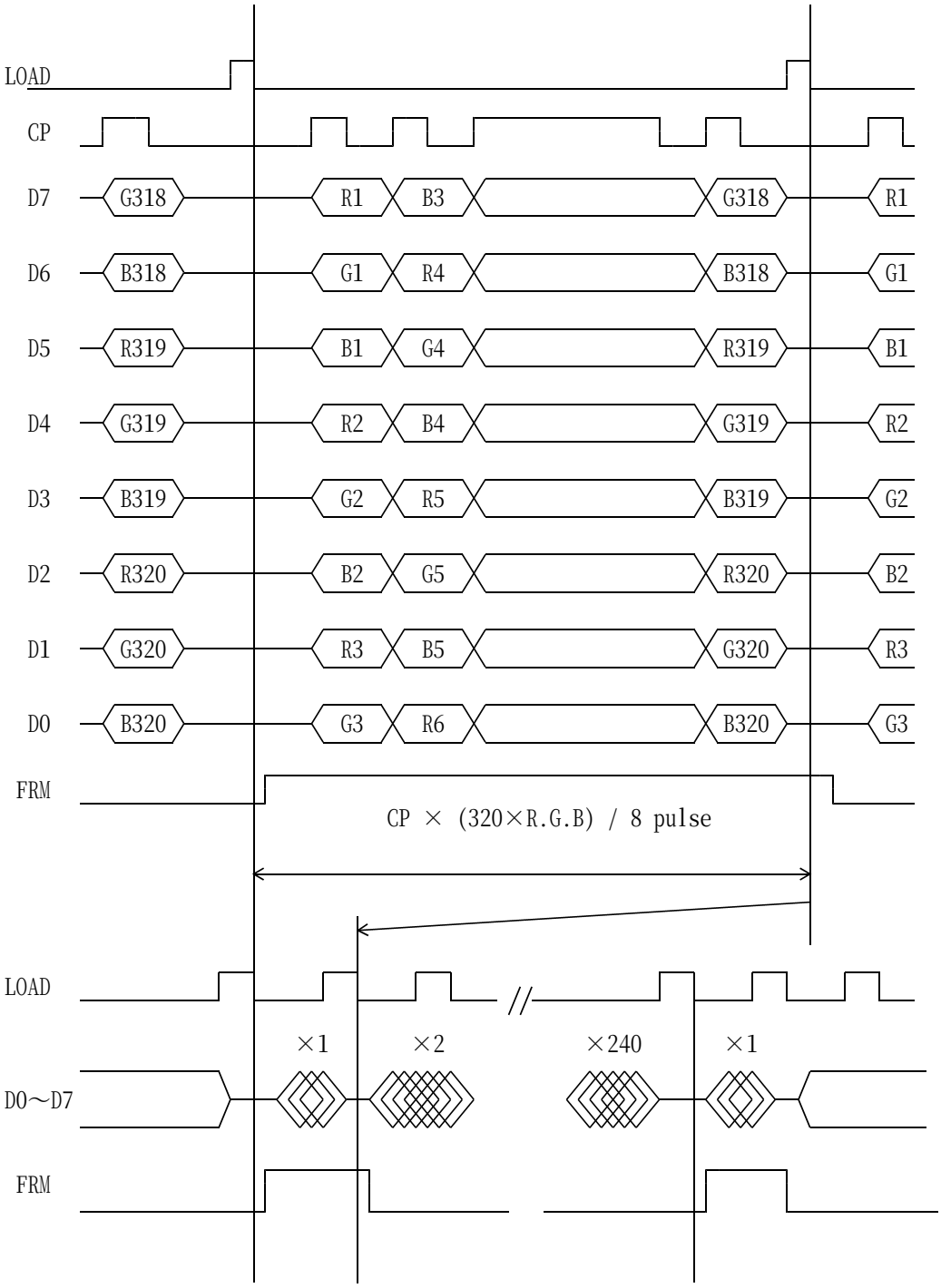
LCD side connector : BHR-03VS-1 (JST)
Recommended matching connector : SM02(8.0)B-BHS-1 (JST)
: SM02(8.0)B-BHS-1-TB(LF)(SN) (JST)···(RoHS Compliant)

8-3. 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

LCD side FPC : 1.25mm pitch

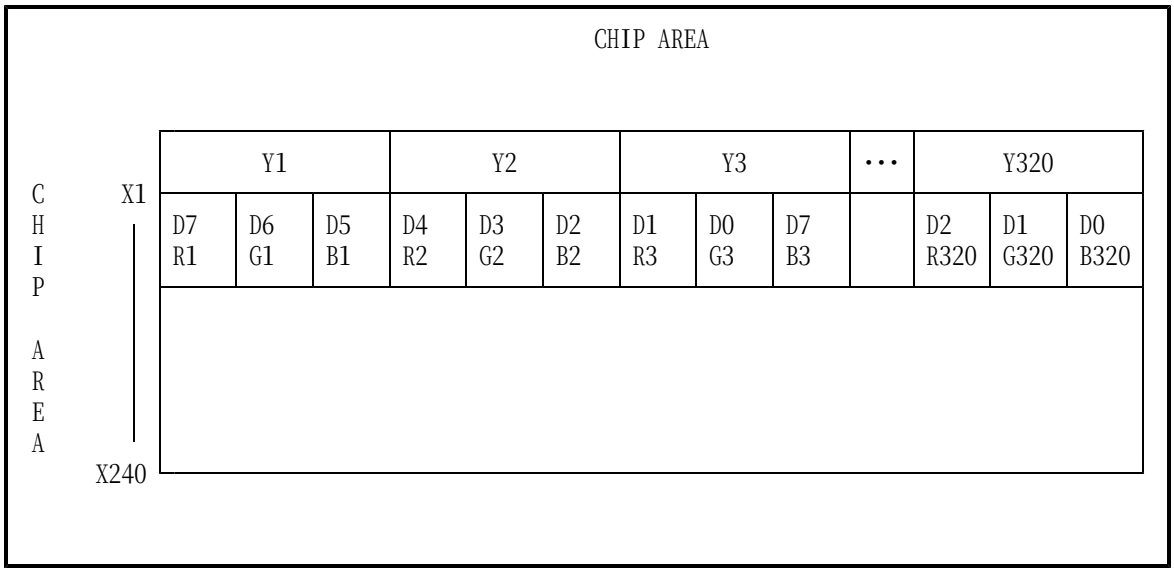
9. Interface Timing Chart



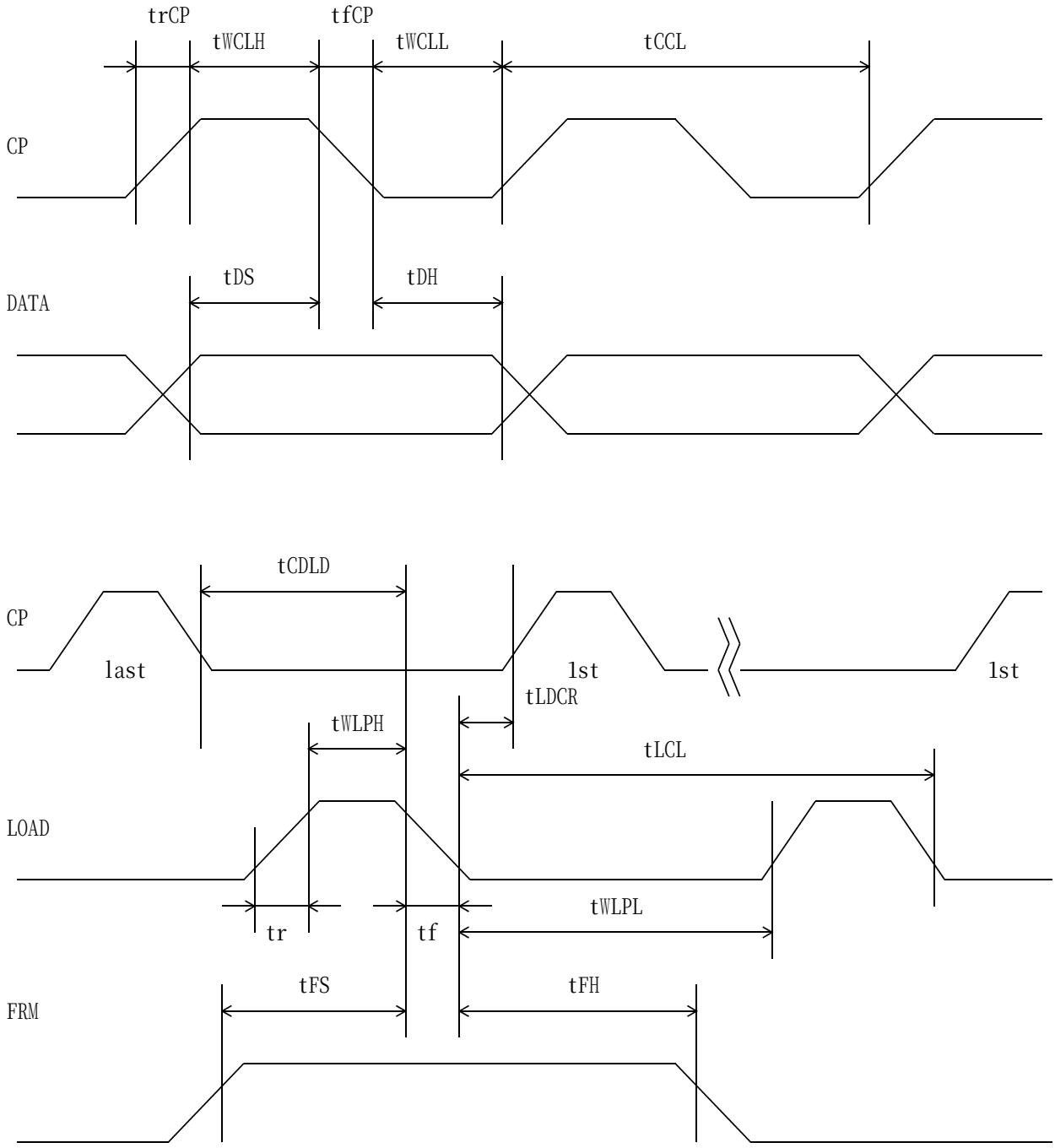
* The cycle of load signal should be stable and continuously applied without interruption.

* The above-mentioned timing chart shows a reference to set up a LCD module, not an electrical rating.

10. Data and Screen



11. Input Timing Characteristics



11-1. Switching characteristics (VDD = 5.0V)

Input Characteristics ; VDD = +5.0V ± 5%, Temp. = 25 °C

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	40	—	ns
LOAD "L" Pulse Width	tWLPL	400	—	ns
LOAD Cycle *2	tLCL	500	—	ns
CP Down→LOAD Down Dalay Time	tCDLD	60	—	ns
LOAD Down→CP Rise Dalay 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	120	—	ns
FRM Data Hold Time	tFH	30	—	ns

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

*2 LOAD Cycle is const.

11-2. Switching characteristics (VDD = 3.3V)

Input Characteristics ; VDD = +3.3V ± 0.3V, Temp. = 25 °C

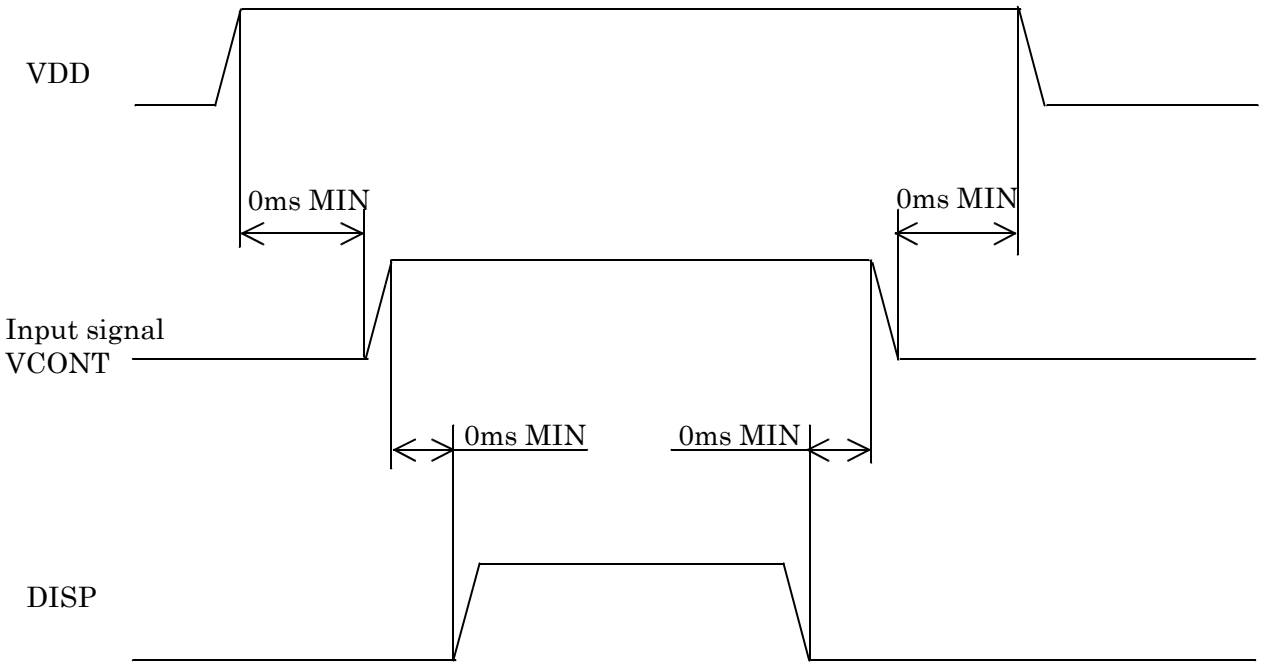
ITEM	SYMBOL	MIN.	MAX.	UNIT
CP Cycle *1	tCCL	100	—	ns
CP "H" Pulse Width	tWCLH	40	—	ns
CP "L" Pulse Width	tWCLL	40	—	ns
CP Rise Up Time	trCP	—	20	ns
CP Fall Down Time	tfCP	—	20	ns
Data Set Up Time	tDS	35	—	ns
Data Hold Time	tDH	35	—	ns
LOAD "H" Pulse Width	tWLPH	50	—	ns
LOAD "L" Pulse Width	tWLPL	400	—	ns
LOAD Cycle *2	tLCL	500	—	ns
CP Down→LOAD Down Dalay Time	tCDLD	60	—	ns
LOAD Down→CP Rise Dalay 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	120	—	ns
FRM Data Hold Time	tFH	30	—	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,D0～D7
  Each signal (CP,LOAD,FRM) is constant.

* 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°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	NOTE
Starting discharge Voltage *1	VS	—	—	745 Vrms	0 °C
		—	—	495 Vrms	25 °C
Discharging tube current *2,*3	IL	2.0 mArms	5.0 mArms	6.0 mArms	—
Discharging tube voltage	VL	—	305 Vrms	—	—
Operating life *4 (IL=5.0 mArms)	T	36,000 h	54,000 h	—	—
Operating frequency	F	40 kHz	—	100 kHz	—

*1 The Non-load output voltage (VS) of the inverter should be 1.3 times the maximum VS at the low temperature to provide margin to assure that the CFL will start, because actual VS may increase due to leakage current from the CFL cables. (Reference value: 970 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 6.0mA 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.

* Prolonged storage in darkness and/or low temperature may slow the ignition and rise to full brightness of the CFL in an LCD Module. Please use an inverter designed to provide sufficient driving voltage for more than 1 second. Also a decreased Starting Discharge Voltage or shortened ignition time may not turn ON the CFL lamp.

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 of 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 Caribration" may be needed with long term using.
   Include "User Caribration" 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.

KCG047QV1AE-G00- □ □-□ □ -□ MADE IN □□□□□

① ② ③ ④ ⑤

① YEAR
② MONTH
③ DATE
④ Version Number.
⑤ Country of origin(Japan or China)

YEAR	2007	2008	2009	2010	2011	2012
CODE	7	8	9	0	1	2

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. Please ground either of the mounting (screw) holes located at each corner of an LCD module, in order to stabilize brightness and display quality.
2. A transparent protection plate shall be added to protect the LCD and its polarizers.
3. The LCD shall be installed so that there is no pressure on the LSI chips.
4. The LCD shall be installed flat, without twisting or bending.
5. The display window size should be the same as the effective viewing area.
6. 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.
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. We do not warranty optical performance outside of the active viewing area. Please ensure that the bezel / housing minimizes area outside of "active viewing area" viewed by the end user."
9. 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.
6. Do not disassemble LCD module because it will result in damage.
7. Please do not use solid-base image pattern for long hours because a temporary afterimage may appear. We recommend to use screen saver etc. in cases where a solid-base image pattern must be used.
8. Liquid crystal may leak when the module is broken. Be careful not to let the fluid go into your eyes and mouth. In the case the fluid touches your body, rinse it off right away with water and soap.

18. Reliability Data / Environmental Test

TEST ITEM	TEST CONDITION	TEST TIME	RESULT
High Temp. Atmosphere	60°C	240 h	Display Quality : No defect Display Function : No defect Current Consumption : No defect
Low Temp. Atmosphere	-20°C	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°C 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°C 0.5 h R.T. 0.5 h 60°C 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	50°C Vop	500 h	Display Quality : No defect Display Function : No defect Current Consumption : No defect
Point Activation life	Polyacetal stylus (R0.8) Hitting force 3N Hitting speed 2 time/s	one million times	Display Quality : No defect Current Consumption : No defect

* Each test item uses a test LCD only once. The tested LCD is not used in any other tests.

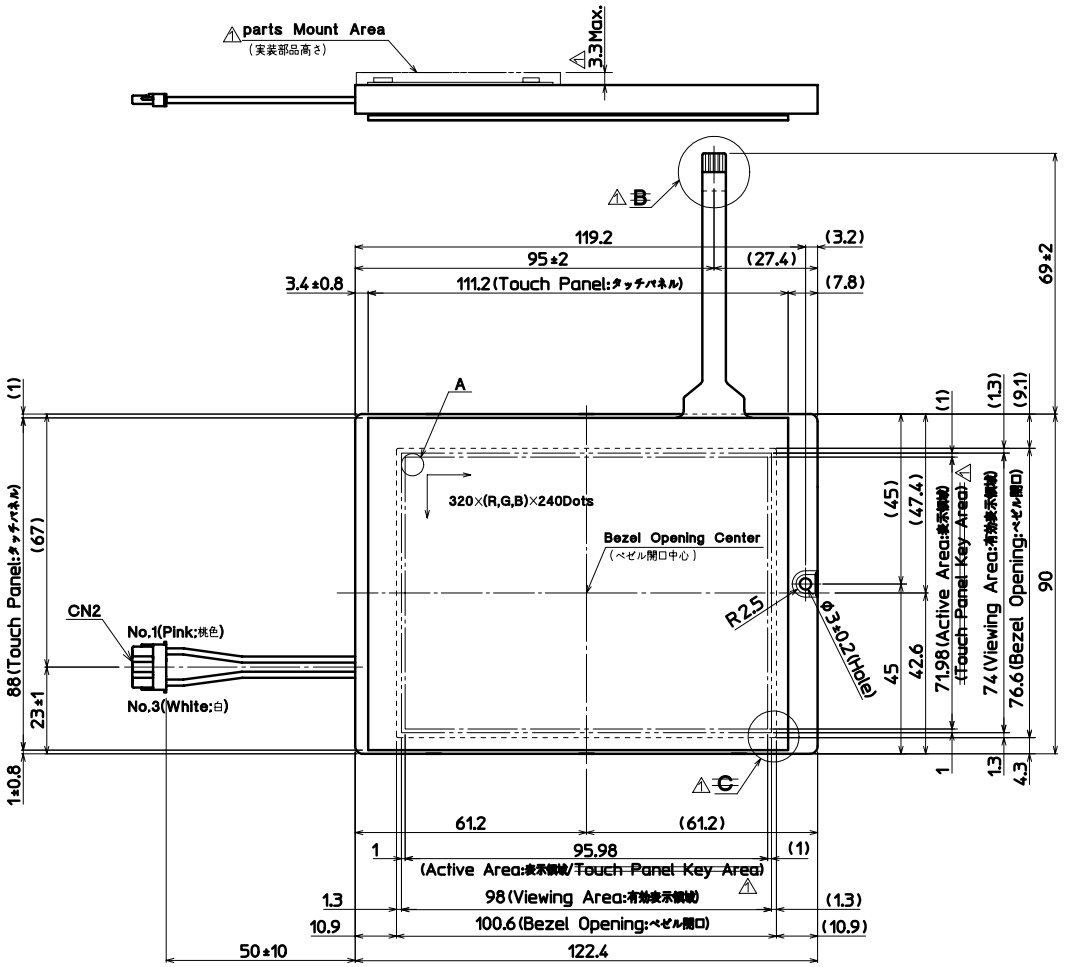
* The LCD is tested in circumstances in which there is no condensation.

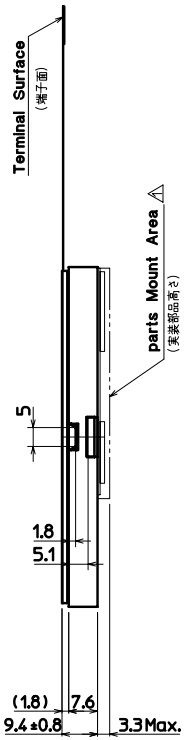
* The tested LCD is inspected after 24 hours of storage at room temperature and room humidity after each test is finished.

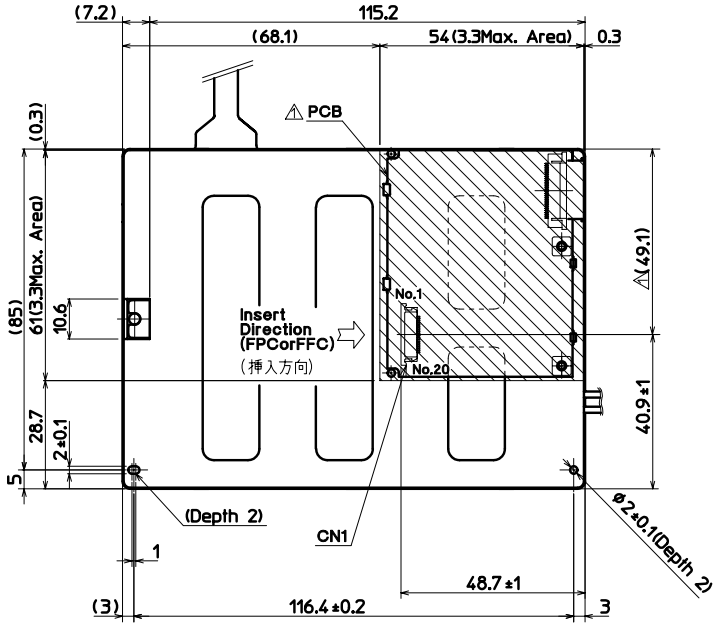
* The reliability test is not an out-going inspection.

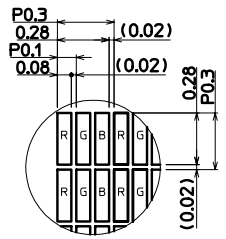
* The results of the reliability test are for your reference purpose only.
The reliability test is conducted only to examine the LCD's capability.

No	Description	Drawn	Checked	Checked	Approved
⚠	・Delete T.P. Key Area (タッチパネルキーエリア削除) ・Delete DETAIL B,C (DETAIL B,C削除) ・Delete T.P.Pin-assign (T.P.ピンアサイン図削除) ・Add dimension(寸法追記) ・Add Japanese comment (日本語併記)	'04.12.21 堀	'05.01.06 今村		'05.01.07 阿部
⚠	・Change Connector name (コネクター変更:鉛フリー品へ) ・Add Matching Connector(LEAD FREE) (適合コネクター追記:鉛フリー品)	'05.03.09 堀	'05.03.10 今村		'05.03.10 阿部

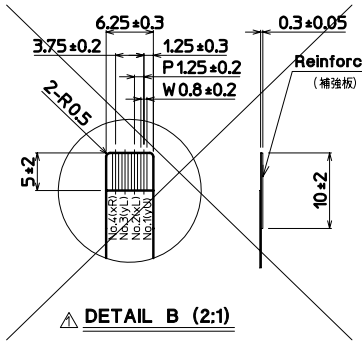




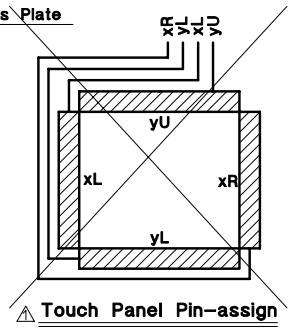




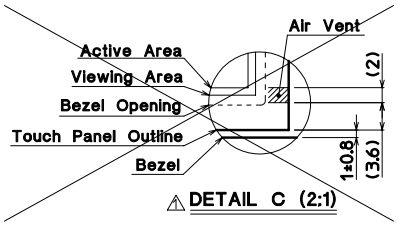
DETAIL A (Dot Size)
(NTS)



⚠DETAIL B (2:1)



⚠Touch Panel Pin-assign



⚠DETAIL C (2:1)

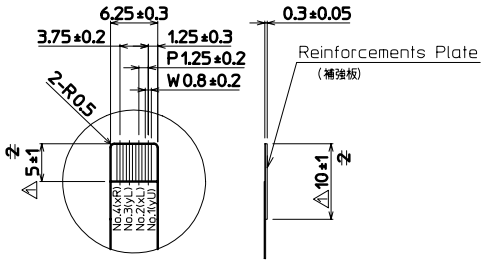
Note.(注記) ~~08-6210-020-340-800~~ ⚠
1 Connector CN1:08-6210-020-340-800+(ELCO)
(コネクター) CN2:BHR-03VS-1(JST)
2 Matching Connector CN2:SM02(8.0)B-BHS-1(JST)
(適合コネクター) ⚠SM02(8.0)B-BHS-1-TB(LF)(SN) (JST)
3 Recommended Matching Connecter(Touch Panel)
(タッチパネルインターフェース推奨コネクター)
:Series 6216(ELCO) :Series FE,FFS(JST)
:Series SFD(FCI)
4 The drawing is the front view of the LCD. Information is displayed starting at the upper left hand corner, moving right then down to the lower right hand corner.
(LCDの正面図において、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.)
5 Tolerance without indication: ±0.5
(指示無き公差)

Material 材質	Treatment 処理	Approved '03.01.14.	Checked	Checked '03.01.14.	Drawn	Scale 1:1(2:1,NTS)	Title KCG047QV1AE	KYOCERA	Year-Month-Day '03.01.11. / Size 2
Quantity 製作数	Description; 備考 RoHS 03009AAA	朝倉		阿部	今村		Outline Dimensions	Drawing No. 121A5021200-2	1/2

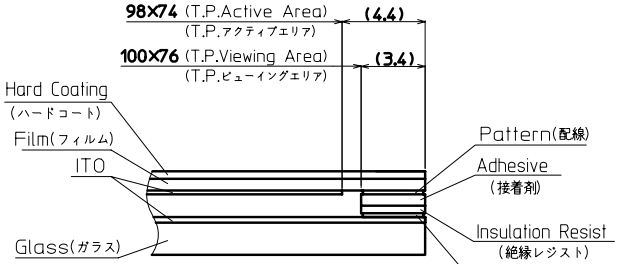
No	Description	Drawn	Checked	Checked	Approved
△1	・Add T.P. Outline Dimensions (タッチパネル外形図追加) ・Change Tolerance Reinforcements Plate ±2→±1 (補強板公差変更 ±2→±1) ・Change Tolerance Terminal length ±2→±1 (端子長さ公差変更 ±2→±1)	'04.12.21 堀	'05.01.06 今村		'05.01.07 阿部
△2	Change 1/2	'05.03.09 堀	'05.03.10 今村		'05.03.10 阿部

Note(注記)

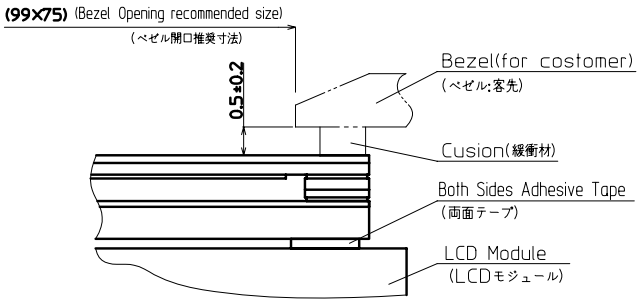
	Name(名称)	Explanation(説明)
1	T.P.	Touch panel (タッチパネル)
2	T.P. Active Area (T.P.アクティブエリア)	Operating area of touch panel (タッチパネルの動作範囲)
3	T.P. Viewing Area (T.P.ビューイングエリア)	Warranty area of touch panel's appearance (タッチパネルの外観(傷・異物等)保証範囲)
		By giving pressure between the active area and the effective viewing 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。)

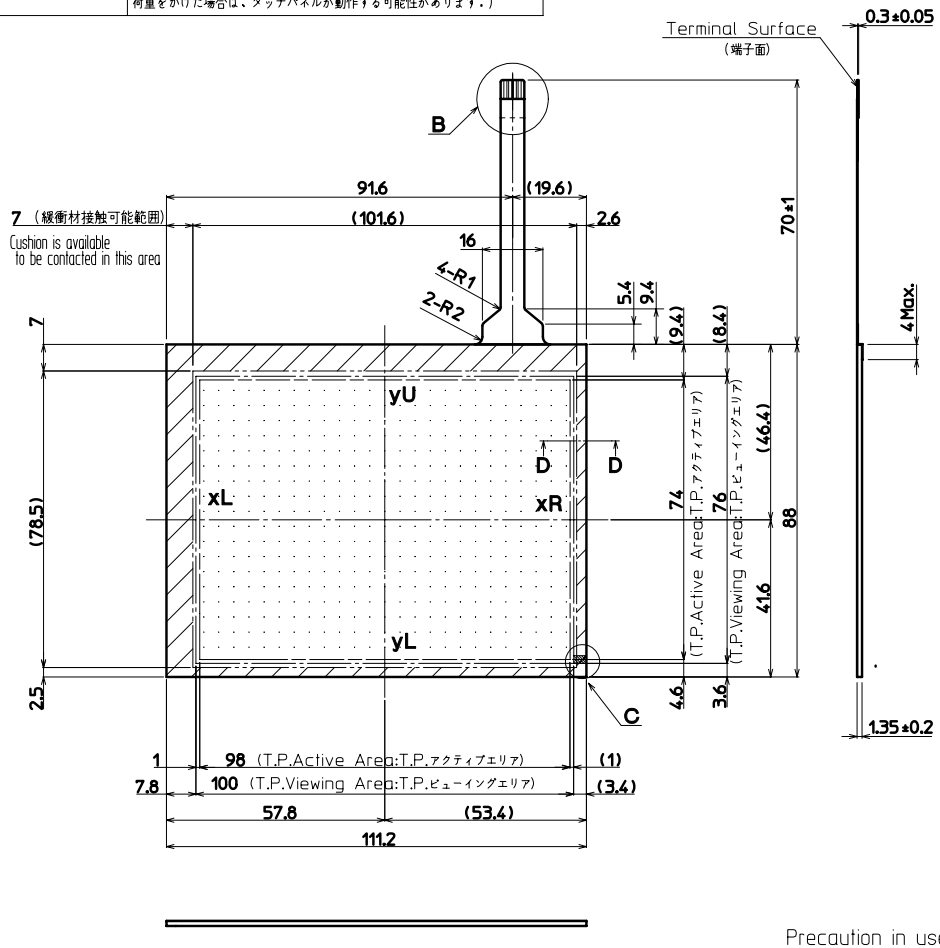


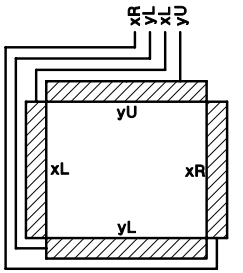
DETAIL B (2:1)



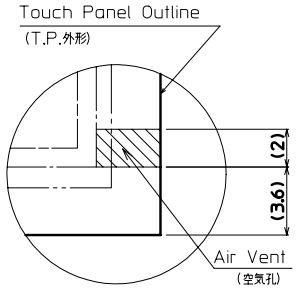
SECTION D–D(NTS)







Touch Panel Pin–assign
(タッチパネルピンアサイン)



DETAIL C(5:1)

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。)

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
		'03.01.14. 朝倉		'03.01.14. 阿部	今村	1:1(2:1,5:1,NTS)	KCG047QV1AE	KYOCERA	'03.01.11.	2
Quantity 製作数	Description; 備考 03009AAA						T.P. Outline Dimensions	Drawing No.	121A5021200–2	2/2

SPEC.NO.	TQ3C-8EAC0-E2CUQ06-00
DATE	January 16,2003

FOR:

KYOCERA INSPECTION STANDARD

TYPE : KCG047QV1AE-G00

KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

Original Issue Data	Designed by :Engineering Dept.			Confirmed by :QA Dept.	
	Prepared	Checked	Approved	Checked	Approved
January 16,2003	K. Baba	M. Fujitani	H. Ohno	Y. Yoshida	S. Hayashi

Revision Record

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

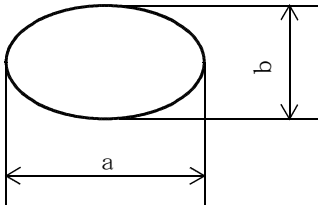
Rev. No.	Date	Page	Descriptions

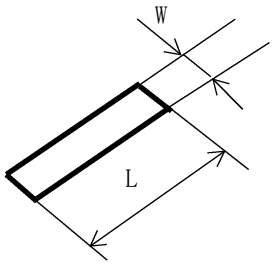
Visuals specification

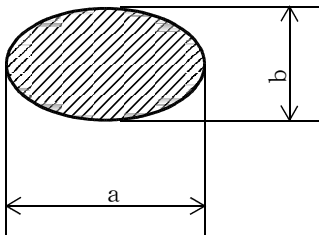
1)Note

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 does 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.

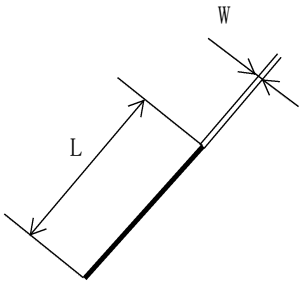
2)Standard

<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>


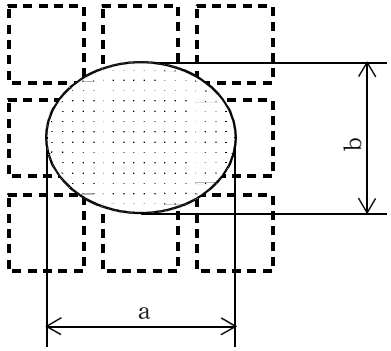
<table>
<tr><th></th><th>Width (mm)</th><th>Length (mm)</th><th>Acceptable No.</th></tr>
<tr><td>A</td><td>W ≦ 0.03</td><td>—</td><td>neglected</td></tr>
<tr><td>B</td><td rowspan="3">0.03＜ W ≦0.1</td><td>L ≦ 2.0</td><td>neglected</td></tr>
<tr><td>C</td><td>2.0 ＜ L ≦ 4.0</td><td>3</td></tr>
<tr><td>D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

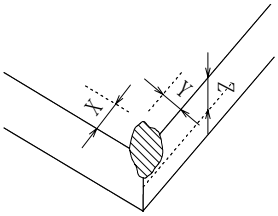
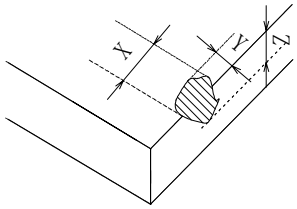
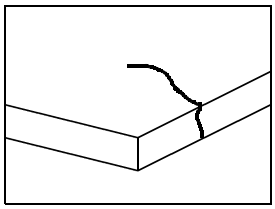
	Width (mm)	Length (mm)	Acceptable No.
A	W ≦ 0.1	—	neglected
B	0.1 < W ≦0.3	L ≦ 5.0	neglected
C		5.0 < L	0
D	0.3 < W	—	0

(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,
Foreige particle
(Touch Screen portion)</td><td>
(D = Average Diameter = (major axis + minor axis)／2
<table>
<tr><th></th><th>Width(mm)</th><th>Length(mm)</th><th>Acceptable No.</th></tr>
<tr><td rowspan="4">Scratch</td><td>0.1≧W＞0.08</td><td>4≧L</td><td>1pcs within φ30mm</td></tr>
<tr><td>0.08≧W＞0.05</td><td>6≧L</td><td>2pcs within φ20mm</td></tr>
<tr><td>0.05≧W＞0.03</td><td>10≧L</td><td>2pcs within φ20mm</td></tr>
<tr><td>0.03≧W</td><td>20≧L</td><td>neglected</td></tr>
<tr><td rowspan="2">Foreige (line like)</td><td>0.1≧W＞0.05</td><td>5≧L</td><td>2pcs within φ30mm</td></tr>
<tr><td>0.05≧W</td><td>neglected</td><td>neglected</td></tr>
<tr><td rowspan="2">Foreige (circle like)</td><td colspan="2">0.3≧D＞0.2</td><td>2pcs within φ30mm</td></tr>
<tr><td colspan="2">0.2≧D</td><td>neglected</td></tr>
</table>
Above are applied to the visible area.
Unless there are foreign particles and damage affected seriously to the electrical performance in the visible area, we approve of this product.
</td></tr>
<tr><td>Glass crack
(Touch Screen portion)</td><td>
<table>
<tr><td rowspan="4">Judgement standard</td><td colspan="3">Corner crack
  </td><td colspan="3">Cracks in other area than in corner
  </td></tr>
<tr><td>X</td><td>Y</td><td>Z</td><td>X</td><td>Y</td><td>Z</td></tr>
<tr><td>≦3</td><td>≦3</td><td>＜t</td><td>≦5</td><td>≦1.5</td><td>＜t</td></tr>
<tr><td colspan="3">2pcs/panel</td><td colspan="3">2pcs/side</td></tr>
</table>
<table>
<tr><td rowspan="2">Judgement standard</td><td>Progressive crack
  </td></tr>
<tr><td>0pcs(NG even 1pcs)</td></tr>
</table>
Above are applied to the visible area.
Unless there are foreign particles and damage affected seriously to the electrical performance in the visible area, we approve of this product.
</td></tr>
</table>