

FCC COMPLIANCE STATEMENT:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

INFORMATION TO USER:

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation; if this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- 1. Reorient / Relocate the receiving antenna.*
- 2. Increase the separation between the equipment and receiver.*
- 3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- 4. Consult the dealer or an experienced radio/TV technician for help.*

CAUTION: Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment

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2.2 Power Requirements

2.2.1 General (Input Power)

This display device shall maintain the specified performances in the range described below :

Frequency : 47~63Hz
Voltage : 100 ~ 240 VAC

The following consumption requirements shall be met :

Power Consumption : 35W (max absolute value)
Current consumption : < 1.2 Aac RMS
Input Voltage : 100~240Vac, 47~63Hz
Input Current : Max 1.2A (Vin : 90Vac, 50Hz)
Inrush Current : 20 Apeak (At 100Vac Max.Load)
40 Apeak (At 240Vac Max. Load)
Output Voltage : 11.4~12.0Vdc (At 100V/240V Vac Max.Load)
Output Current : 3.5Adc

2.2.2 Power Management

The monitor requires a signal based on VESA DPMS (Display Power Management Signaling) protocol, and runs in four stages :

On : Normal Operation
Stand by : State of Minimal power reduction with quick recovery time
Suspend : State of Substantial power reduction with longer recovery time
Off : Non Operation

This monitor shall comply with the following specifications.

State	Signal			Power Consumption	Recovery time	LED Description
	H-Sync	V-Sync	Video			
On	Pulses	Pulses	Active	Less than 35W	-	Green On
Stand by	no pulse	Pulses	Blanked	Less than 5W	Within 2 sec	Green On
Suspend	Pulses	No pulse	Blanked	5W	Within 2 sec	Green On
Off	no pulses	no pulses	Blanked	Less than 0W	Within 2 sec	Orange On

Table 3.03 - Power Management

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2.3 R.G.B-Video Signal (VGA)

The input signal shall be applied to the display device through a signal cable, which must be informed as part of the monitor.

A signal connector shall be a shielded 15pin D-Sub connector and signal cable shall be Black or Ivory 1,800 ± 50 cm long.

The interfacing method described above requires 7 input lines :

- 1 - Red (red video)
- 2 - Green (green video)
- 3 - Blue (blue video)
- 4 - H-Sync (horizontal synchronization)
- 5 - V-Sync (vertical synchronization)
- 6 - SDA (DDC)
- 7 - SCL (DDC)

The reference video controller (the device used for adjustment and test) will guarantee the performances described below (measured on the output connector).

2.3.1 Video Input

Video signals on 75 ohm termination to the ground
Red, Green & Blue Video (refer to Fig.3.01)
Level : 0 to 0.700 Vpp
Polarity : Positive



Fig. 2.01 - Video Signal

Maximum Dot Clock : 80 Mhz
Rise/Fall Time :
Rise : Less than 25ns Fall : Less than 30ns
Rise and fall times are measured 10% to 90% using less than 5pF probe.
Display colors : 16,581,375 (8bit)

2.3.2 Synchronization signals

Polarity : Positive or Negative

This monitor shall not be damaged by improper sync timing and pulse duration, absence of sync, or abnormal input amplitude (video and/or sync too large too small).

Horizontal Deflection
Hsync Frequency : 31.47 ~ 60.34 KHz

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Vertical Definition

Scanning Frequency : 50-60 ~ 75.00Hz

Support Video Timing

This monitor shall be capable of displaying following video timing chart:

• Timing Chart

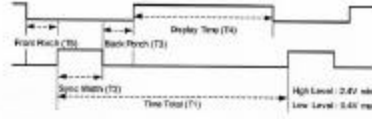


Fig. 2.02 - H-Sync

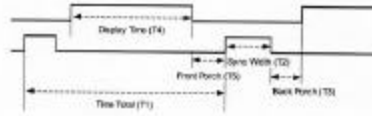


Fig. 2.03 - V-Sync

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Support Modes

Mode	Resolution	H Frequency (kHz)	V freq (Hz)	H polarity	V polarity	Dot Clock (MHz)
VGA	640 x 350	31.469	70.087	+	+	25.175
	720 x 480	31.469	70.087	-	+	28.321
	640 x 480	31.469	59.940	-	-	25.175
	640 x 480	37.861	72.830	+	-	31.560
	640 x 480	37.860	75.000	-	-	31.560
SVGA	800 x 600	35.156	60.250	+	+	38.000
	800 x 600	37.879	60.317	+	+	40.000
	800 x 600	48.077	72.188	+	+	50.000
	800 x 600	48.879	75.000	+	+	49.500
XGA	1024 x 768	48.363	60.004	-	-	65.000
	1024 x 768	60.476	70.069	-	-	75.000
	1024 x 768	80.023	75.029	+	+	78.750
Macintosh	840 x 480	35.000	66.667	-	-	30.000
	1024 x 768	80.261	74.007	+	+	80.000

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Preset Timing

The timing shown in the following table will be factory preset for display.

Horizontal	Pixel	840	848	848	848	848	720	800	800	800	800	1024	1024
Frequency	Hz	31.492	31.492	31.492	31.492	31.492	31.492	31.492	31.492	31.492	31.492	31.492	31.492
Period (T _H)	ms	31.778	31.778	31.778	31.778	31.778	31.778	31.778	31.778	31.778	31.778	31.778	31.778
Active (T _A)	ms	25.420	25.420	25.420	25.420	25.420	25.420	25.420	25.420	25.420	25.420	25.420	25.420
Sync Width (T _S)	ms	3.813	3.813	3.813	3.813	3.813	3.813	3.813	3.813	3.813	3.813	3.813	3.813
Back Porch (T _B)	ms	1.907	1.907	1.907	1.907	1.907	1.907	1.907	1.907	1.907	1.907	1.907	1.907
Front Porch (T _F)	ms	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954

Vertical	Lines	380	380	380	380	380	380	380	380	380	380	768	768
Frequency	Hz	76.047	76.047	76.047	76.047	76.047	76.047	76.047	76.047	76.047	76.047	76.047	76.047
Period (T _V)	ms	13.150	13.150	13.150	13.150	13.150	13.150	13.150	13.150	13.150	13.150	13.150	13.150
Active (T _A)	ms	11.120	11.120	11.120	11.120	11.120	11.120	11.120	11.120	11.120	11.120	11.120	11.120
Sync Width (T _S)	ms	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964
Back Porch (T _B)	ms	1.907	1.907	1.907	1.907	1.907	1.907	1.907	1.907	1.907	1.907	1.907	1.907
Front Porch (T _F)	ms	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954
Interlocked	Y/N	N	N	N	N	N	N	N	N	N	N	N	N
Sync Polarity	H	+	+	+	+	+	+	+	+	+	+	+	+

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Table 2.01 - Preset Timings

The monitor is compatible with additional modes within the one of following specified frequency ranges as follows.

Horizontal frequency	: 15 kHz (* Now we are improving this point)
Vertical frequency	: 4 kHz

Plug & Play : DDC /DS (DDC Version : 1.0) : VESA Standard

2.4 TV Function (OPTION)

- 2.4.1 Broadcasting system
 - PAL, DK, PALI
 - NTSC 3.58MHz
- 2.4.2 Receiving channel
 - UHF : E2-E12
 - UHF : E21-E59
 - CATV / HYPER : S1-S41
- 2.4.3 Tuning method
 - 110 ch Program
- 2.4.4 Speaker output
 - Impedance : 8ohm
 - Output : STEREO (2.0W + 3.0W)
- 2.4.5 OSD Control
 - With Remote-control

2.5 External Connection

- 2.5.1 Input
 - AV1 : NTSC M Receiving (Option : PAL) (OPTION)
 - AV2 : NTSC 3.58 MHz Composite Signal and Audio L+R Input (OPTION)
 - AV3 : Y, Cb, Cr Video Signal and Audio L+R Input (OPTION)
 - VGA-IN : VGA Signal Input (STANDARD)
 - SOUND-IN : Stereo Input (STANDARD)
- 2.5.2 Output
 - SOUND-OUT : Stereo Output for External Speaker (STANDARD)

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3 USER INTERFACE

3.1 User Controls

This display device shall have following On-Screen Display controls.

3.1.1 Front Side

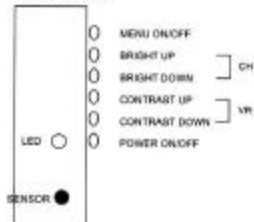


Fig. 3.01 - Front Side

3.1.2 Remote-control (Option 1)



PWR : POWER ON/OFF
M : MENU
RET CH : RETURN CHANNEL
MODE SEL : MODE(INPUT) SELECTION
VGA,TV(AV1), VIDEO(AV1), DVD(AV2)

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Fig. 3.02 - Remote-Control (option 1)
(Option 2)



POWER on/off
M : Menu
RET CH : RETURN CHANNEL
INPUT SEL : INPUT SELECTION
VGA,TV(AV1), VIDEO(AV1), DVD(AV2)

Fig. 3.03 - Remote-Control (option 2)

3.1.3 Rear Side

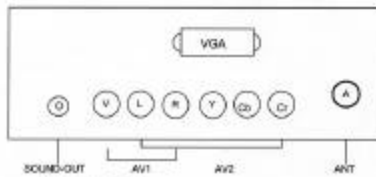


Fig. 3.04 - Rear Side

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3.2 OSD MENU

VGA

(MENU Page #1)

Horizontal Position

Vertical Position

Horizontal Size

Phase

Brightness

Contrast

Colour

- Red

- Green

- Blue

Video Mode

Resolution

1024 X 768

H. Frequency

60.2 Khz

V. Frequency

60 Hz

Factory Preset

OSD Language

Eng	Deu	Ita	Fre	Esp
-----	-----	-----	-----	-----

(MENU Page #2)

Audio

- Volume

- Balance

- Treble

- Bass

- Mute

- Stereo

Input Selection

VGA, TV(AV1), VIDEO(AV1), DVD(AV2)

Automatic Adjustment

TV

MENU

SETUP

INPUT SELECTION

VGA

TV

VIDEO

DVD

DARK

NORMAL

BRIGHT

BACK LIGHT

PICTURE

BRIGHTNESS

CONTRAST

COLOUR

HUE

SHARPNESS

SOUND

TREBLE

BASS

BALANCE

STEREO

PSEUDO

LINEAR

MONO

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CHANNEL

FINE TUNE

SCAN

ADD

ERASE

TV / CATV

TV

CATV

VIDEO

MENU

SETUP

INPUT SELECTION

VGA

TV

VIDEO

DVD

DARK

NORMAL

BRIGHT

BACK LIGHT

PICTURE

BRIGHTNESS

CONTRAST

COLOUR

HUE

SHARPNESS

SOUND

TREBLE

BASS

BALANCE

STEREO

PSEUDO

LINEAR

MONO

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4 VISUAL CHARACTERISTICS

4.1 Test Condition

The display shall be set as described below before any visual output test is performed. Particular instructions are specified anywhere additional setting or different patterns are required.

Resolution	1024x768 at H: 60 Hz V: 75 Hz
Input level	700cd/m ²
Pattern	Central white box covering 30% of the data area
Brightness Control	Default Position
Contrast Control	Adjust to 150cd/m ² of luminance (center of the white field)

Unless otherwise specified, the display shall meet the requirements of this section under any combination of the following operation ranges:

Image duty cycle	10% to 90%
Input power	As per section 2.2.1
Operating temperature	As per section 7.1
Humidity	As per section 7.1

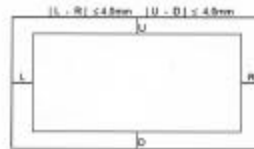
4.2 Display Dimensions

The dimensions of the data area, measured along the horizontal and vertical axes of the screen, shall be as follows:

Width	: 508.5mm
Height	: 231.7mm
This check shall be performed using the pattern described in figure 4.01.	

4.3 Display Centering

Figure 4.01 describes the pattern for this test (The test is made by XGA resolution). Basically it is composed by a single pixel white line around the perimeter of the data area, with marks for the horizontal and vertical axes. The background is black. The maximum variation of the display centering shall be such that the following relationship shall be met:



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Fig. 4.01 - Display Centering

4.4 Jitter, Ripple, Swinging

Not perceivable jitter will be present on the display, when displaying a cross-hair pattern, at a distance of 500mm from the screen. In any case it is not admitted a measured jitter, ripple, swinging value greater than 0.1mm (both on X- axis and on Y- axis).

4.5 White Color Adjustment

The chromaticity coordinates of the white color shall be verified with standard full white screen (at 25° C) at 700cd/m² input level with brightness control at off point and contrast control adjusted to 75cd/m² of luminance on the center of the screen. The 1931 CIE chromaticity diagram (x, y) coordinates for the screen center shall be:

$$X = 0.310 \pm 0.020 = X_{ref}$$
$$Y = 0.340 \pm 0.020 = Y_{ref}$$

4.6 Brightness Uniformity

The variation in average display luminance, between any area (with dimension approximate 2cm of diameter) on standard full white screen, must be less than 30% of the luminance of the brightest area. The screen has to be set to 70cd/m² in the center using the standard white pattern as described in section 4.7.

Brightness Color Tracking Error

The initial setting shall be as follows:

Pattern	: full white field
Input level	: 700cd/m ²
Brightness control	: maximum
Contrast control	: adjust to 75cd/m ² of screen luminance in the center of the LCD

The contrast control shall be moved from 75cd/m² (max) and 20cd/m² (min) of screen luminance or to the mechanical stop if the limits cannot be reached. The white color coordinates in the center of the LCD at all the allowed settings of the brightness control shall be:

$$X = X_{ref} \pm 0.020$$
$$Y = Y_{ref} \pm 0.020$$

4.7 Stroke Width

The width of any stroke 1 pixel width displayed in resolution 1024 x 768 / 75Hz with Green color shall be less than 0.5mm (center) and 0.2mm (corner).

Width is measured with a surface (straight line) fit or a Gaussian fit method at 60% of peak luminance.

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Luminance shall be set on white area in the center of a black screen, with input signals at 700 cd/m², brightness control adjusted to the background cut-off and contrast at maximum level.

4.8 Moire

While displaying a white raster, no Moire effect shall be visible at any luminance setting within 90 to 100cd/m² on the four resolutions, in the same conditions, when the displayed image is changed to a full screen of the critical pattern described in figure 4.82 and in figure 4.83, the clouding effect shall not rise to disturbing levels anywhere on the screen, at any luminance setting of the displayed patterns.

A reference monitor may be signed for check purpose.



Fig. 4.82 - Chess Board Pattern



Fig. 4.83 - Line Pattern

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5 DISPLAY PANEL CHARACTERISTICS

5.1 General Description

This display unit shall employ a TFT LCD module complying with the following specifications.

Items	Description
Display Size	367.5(w) x 230.4(h) mm 15.1 inch diagonal
Drive System	a-Si TFT active matrix
Display Color	6 bit, 16,581,375 colors
Number of pixels	1324 x 768
Pixel arrangement	RGB vertical stripe
Pixel pitch	0.35(w) x 0.35(h) mm
Module Size	382.6(w) x 234.6(h) x 15.7(hyp) mm
Weight	1,580 g (typ)
Contrast ratio	290 : 1 (typ)
Viewing angle	Horizontal : +/- 86, Vertical : +/- 43,
Response time	40 msec (typ)
Luminance	200 cd/m ² (typ)
Signal system	Analog RGB signals, Synchronous signal(H,V sync) Out Clock(CLK)
Supply voltage	5.0V
Back Light	CCFL
Power consumption	7.5 W (typ)

Table 5.01 LCD Module Specifications

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5.2 Electrical Characteristics

Parameter		Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	V _{CC}	4.75	5.0	5.25	V	Note 1
Power Supply Current	I _{CC}		1000	1500	mA	
Data Low Input Voltage	V _{IL}	-0.5		0.33V _{CC}	V	
Data High Input Voltage	V _{IH}	0.70V _{CC}		V _{CC} -0.5	V	
Back-Light Input Voltage	V _{BL}	625	650	625	Vrms	
Back-Light Input Current	I _{BL}	5.0	8.8	9.8	mA	Note 2
Back-Light Lamp Operating Frequency	f _L	30	50	80	KHz	
Lamp Kick-Off Voltage		1.240			Vrms	(95°C)
		1.280				(90°C)
Lamp Life		10,000			Hrs	Note 3

Table 5.02 Electrical Characteristics

- Notes : 1. The input current shall be measured at V_{CC} of 3.3 V at 25°C, refresh rate of 60Hz, and clock frequency of 65MHz under 0 gray pattern.
 2. The back-light input current shall be measured at the ground cable and does not include loss of external inverter.
 3. The life time is defined as the time at which brightness of lamp is 50 % compare to that of initial value at the typical lamp current.

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5.3 Optical Specification

Parameter	Symbol	Min.	Typ.	Max.	Units	Remarks
Contrast Ratio	CR	150	200	-	-	
Average Brightness, white	B _{ave}	170	200	-	cd/m ²	
Brightness Variation	SBv	-	-	30	%	
Response Time	T _r	-	40	60	ms	
Rise Time	T _{ris}	-	10	15		
Decay Time	T _{dis}	-	30	40		
Color Coordinates						
Red	X _R	0.630	0.630	0.660		
	Y _R	0.310	0.340	0.370		
Green	X _G	0.270	0.300	0.330		
	Y _G	0.670	0.600	0.630		
Blue	X _B	0.710	0.140	0.170		
	Y _B	0.070	0.105	0.130		
White	X _w	0.290	0.305	0.350		
	Y _w	0.310	0.340	0.370		
Viewing Angle By CR : 10					Degree	
x axis, right (θ=0°)	θ	55	60	-		
x axis, left (θ=180°)	θ	55	60	-		
y axis, up (θ=90°)	θ	40	45	-		
y axis, down (θ=270°)	θ	40	45	-		
Cross talk				4	%	
Gamma value		-	-	-		

Table 5.03 Optical Specification

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8 MECHANICAL CHARACTERISTICS

8.1 Power Cord

Power shall be applied to A/D adapter through detachable power supply cord conforming to Electrical Appliance and Material Control Law of Japan.
This cord shall be Black, VCTF-3C X 0.75 mm² and 1,800 ± 50 mm long.

8.2 Signal Cable

Signal shall be supplied to the display device through a shielded cable 1,800 ± 50mm long which must be intended as part of the monitor. This cable shall be of a suitable type in order to comply with any specification item, and shall be terminated in a 15 pin D-sub male connector type or equivalent, with pin assignment as follows:

Pin No.	Assignment	Composite
1	Red	Red
2	Green	Green
3	Blue	Blue
4	GND	GND
5	DDC Return	DDC Return
6	GND-R	GND-R
7	GND-G	GND-G
8	GND-B	GND-B
9	NC	NC
10	Logic GND	Logic GND
11	GND	GND
12	SDA	SDA
13	H-sync (TTL)	H-sync (TTL)
14	V-sync (VCLK)	V-sync (VCLK)
15	SCL	SCL

Table 6.01 15 pin mini D-sub Male Connector

8.3 Accessory Cable (OPTION)

F-Type Cable : 1,500 mm
RCA Audio Cable : 1,800 mm
Stereo Jack Cable : 1,800 mm

8.4 Internal Signal Cable

Up on the A/D Manual

8.5 Internal Connectors

All internal connectors for the interconnection of sub assemblies must be distinct in their physical characteristics or polarization so as to prevent any misconnection, which may cause permanent damage to the display.

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8.6 Monitor Enclosure

The monitor, intended as a finished product, shall comply with any ergonomic and safety specification contained therein. In particular, the mechanical and physical characteristics of the plastic cabinet shall conform to any regulation of the Agencies which the monitor or the complete system shall be submitted to.
In particular, plastic materials must not include harmful substances. The supplier must explicitly declare absence of the following substances.

- 1 - Polybrominated diphenyl ether
- 2 - Polybrominated diphenyl oxide
- 3 - Polybrominated biphenyl

8.7 Flammability and safety

- A) The enclosures shall meet the requirements of the safety UL 94V-0 (batter)
- B) PCB's shall meet the requirement of the safety (UL95A)
- C) Finished enclosures shall meet the requirement of the safety (UL95A)

8.8 Weight

- A) Net Weight : 7.8kg (with Driver Assy)
- B) Gross Weight : 8.0kg

8.9 Dimension

- A) Picture Size should be :
Nominal Height : 305.5 mm
Nominal Width : 231.7 mm
- B) Bare enclosure size should be :
Width : 338 +0/- 3 mm
Height : 355 +0/- 3 mm
Length : 138 +0/- 3 mm
- C) Packaged size should be :
Width : 443 +0/- 3 mm
Height : 438.5 +0/- 3 mm
Length : 210 +0/- 3 mm

8.10 Tilt Assy

- A) Tilt range : 5° (down), 30° (up) from the cover front
- B) Tilt Operation Force
- C) Tilt : 1-2kg

8.11 Label and Marking

- A) Brand Logo : silk printing on center / bottom area of front bezel with () color.
- B) Label - Rating
Location : The right & left side of rear - cover
Tilt : Label shall not tilt more than 0.5°
Label material : Polyester Film T 0.05 mm
Base Color : Silver
- C) Caution statement : Molded in negative characters on rear cover.

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6.12 Packaging

A) Carton P.E.

Material : S4 HD (LLS4 same class)

Weight : 290 ~ 290 g

Irregularities : broken area

B) Packing - Case (This may vary according to Buyer)

Color : Base color ----- Black

Material : SW - 3

Press strength ----- 298kg/w

Bursting strength ----- 13,00kg/cm²

Box Taping : The top and bottom of the carton will be taped with W50 clear masking tape.

6.15 Loading Quantity

A) Individual Loading (Standard) :

20ft Container : Sets

40ft Container : Sets

B) Palletized Loading (Option) : refer to Attachment 3.3.2

20ft Container : 384 Sets / 16 cotton = 32sets / 1 Pallet, 12 pallet

40ft Container : 832 Sets / 16cotton = 32 sets / 1 Pallet, 26 Pallet

6.14 Cabinet Mounting and Tolerance

A) Lens - LED

Gap : Less than 0.15 mm around entire LED - Lens

Mismatch : The surface of lens - led don't protrude more than 1.0 mm from that of Cover - front, and will remain in place after drop and vibration test.

B) Knob - Power

Tilt : The gap of maximum value from minimum is under 0.2 mm at all around.

Mismatch : The surface of Knob - Power don't protrude more than 1.0 mm from that of Cover - front, and doesn't sink less than 0.3 mm.

External Appearance : refer to the appearance document and sample.

C) Knob - Function

Tilt : The gap of maximum value from minimum is under 0.5 mm

Mismatch : The surface of this don't protrude more than 2 mm, and the gap with Function-Button is not 0.5 mm

External Appearance : refer to the appearance document and sample.

D) Gap between LCD and Cover - Front (Max.)

Less than 1.0mm around entire Cover - Front.

E) Cover - Front and Cover - Rear

Mismatch (+) : The surface of Cover - Rear doesn't sink more than that of Cover - Front.
The each surface of them must be no greater than 0.8mm.

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7 ENVIRONMENTAL CHARACTERISTICS

The following sections will define the interference and susceptibility condition limits that can occur between external environment and the display device.

7.1 Temperature, Humidity and Altitude

A) Operating Conditions

Temperature : 5 ~ 35°C

Humidity : 20 ~ 80% (without condensation)

Altitude : 0 ~ 3,000m

B) Transport Conditions (1 month packed)

Temperature : - 5 ~ 50°C

Humidity : 5 ~ 90% (without condensation)

Altitude : 0 ~ 12,000m

C) Storage Conditions

Temperature : - 5 ~ 50°C

Humidity : 5 ~ 90% (without condensation)

Altitude : 0 ~ 15,000m

7.2 Reliability Specification

A) Drop Test

Height : 40 Cm

Method : 4 times drops in the other of 2 corner, 2 side edges and 8 faces

Check the test based on the "Specification of reliability test."

B) Vibration test

Vibration frequency : 10 ~ 55Hz, 6.05 min/Cycle

Acceleration : 1.4 G's

Test time : 60 minutes

Direction : 20 minutes each X / Y / Z directions

7.3 Electromagnetic Disturbances

The display must conform to the following requirements.

A. Electrostatic discharges

The display must operate correctly when the accessible parts are subjected to electrostatic discharges of 15kV minimum. The source of the discharge is a capacitor of 150pF with a series resistor of 250 ohm. No damage will occur with a discharge of 4kV minimum.

B. Radiated disturbances

The display must operate correctly in the presence of sinusoidal electromagnetic field of frequencies from 30 to 500MHz with effective field strength 3 volts of a distance of 1m from the source of radiation.

C. Conducted disturbances

The display must operate correctly in the presence of disturbances conducted through the power supply network. These disturbances will consist of :

1) Positive and negative pulses with a peak amplitude less than 1500 volt and a repetition rate of 50Hz. These pulses will have a rise time of 5ns and a pulse width at 50% of 100ns and may be

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pressed from 0 to 360° with respect to the network sinusoid.

2) Positive and negative pulses with peak amplitude less than 1400 volt and a repetition rate of 6Hz. These pulses will have a rise time of 300ns and a pulse width at 50% of 50µs and may be pressed from 0 to 360° with respect to the network sinusoid.

3) Oscillatory exponentially decaying pulse with amplitude 1400 volt having a period of 1µs & 20% duration of 3 to 6 period and 55% of initial peak amplitude after duration time. These pulses will be applied at a repetition rate of 400Hz.

7.4 Power Source Disturbances

The display device must function correctly in the presence of random reductions of the power within the following limits :

- A) Reduction of 100% duration : 20ms
- B) Reduction of 25% duration : 500ms

7.5 Magnetic Disturbances

The display must function correctly in the presence of another monitor of equal leakage magnetic field, placed at a distance of 30cm, even with difference working timings.

7.6 Acoustic Noise

With the display operating, the issue of sound measured according to the DIN 45635 standard must be contained within 32dB(A in the audible field).

7.7 Ionogenic Radiation

With the display operating in failure mode and without enclosure, the issue must be contained within 0.1mSv/h at 0.1m distance, under maximum operating conditions.

7.8 Inrush Current

The power supply input circuitry will employ a suitable device in order to limit the inrush current to less than 50 Amperes for no more than 1 sec at AC 220V, with an input line impedance of not more than 2.4×10^{-25} ohm at the time of cold switch-on.

7.9 Electric and/or Magnetic Fields in Nearby Environment

With the display operating the electric and/or magnetic fields existing in the immediately surrounding environment must be of such intensity as as not to disturb the correct operation of any of the system element in contact with the casing (i.e. mini floppy disk, keyboard, mouse, etc.).

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8 RELIABILITY

The equipment design shall employ existing and available state of art techniques and shall utilize circuits, mechanisms, parts, etc., having histories of reliable operation in similar applications. Design shall be such that no failure of the supplied equipment shall cause damage to interfacing equipment and no permanent damage shall occur due to mis-adjustment of operator controls while the display device is operated within the ranges specified in sections 3.0 and 4.0 above.

8.1 Phosphor Protection

The display device shall employ sufficient protection against the burning of phosphors in case of repetitive power cycling and absent or incorrect synchronization signals.

8.2 LCD Flashover

This display device must be capable to withstand all spontaneous LCD flashover without damage to the display device. Moreover it must not conduct or radiate the energy of such a flashover into any connected equipment or power system.

8.3 Hypothesis of Use

The following is the hypothesis of use :

Active hours / day : 8
Working days / year : 250
Active years : 5

8.4 Mean Time Between Failure

MTBF = 10,000 hours (excluding LCD's life)

The MTBF target value will be verified by means of a life test.

8.5 Useful Life

The equipment shall be designed for a useful life of 5 years with normal preventive maintenance, calibration, and repair to maintain specified performance.
LCD Life = 15,000 hours (with LCD brightness defined at 40% of the initial value).

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9 ERGONOMICS

This display device must meet all performance requirements without regard to the orientation in either X, Y, or Z - axis after internal automatic degaussing.

9.1 Operator Controls

The operator will have access to two external luminance controls, which will allow adjustment of the brightness and the contrast of the image. Other external controls are present in the monitor for guarantee the best output request.

9.2 Anti Reflection

In order to reduce reflections, the LCD Bezelplate must be treated with a chemical etching process. The resulting etched surface must not produce any distortion or artifact in the display when viewed from a 25cm distance with an unaided eye. The non- glare surface of the LCD must have a range of 55-75 Gloss units as measured with a Gardner Glossmeter.

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