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CUSTOMER                      ACCEPTANCE                      SPECIFICATIONS

MODEL NO. :

20240(EL TYPES)

FOR MESSRS :

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CUSTOMER'S APPROVAL

DATE :

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BY :

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EMERGING DISPLAY  
TECHNOLOGIES CORPORATION

MODEL NO. 20240(EL TYPES)	VERSION 1
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RECORDS OF REVISION	DOC . FIRST ISSUE MAR.07,2003
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DATE	REVISED PAGE NO.	SUMMARY

NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	EL	E
Transmissive	EL	F

Backlight Color	Code Value
White	W
Blue-Green	B

E W 2 0 2 4 0 Y E B U

Viewing direction
NIL : 6 o'clock
U : 12 o'clock

LCD type + color	Code Value
STN + Yellow-Green	Y
STN + Gray	G
STN + Blue	B

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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS  
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :  
EU - 002 A

1.2 APPLICATION NOTES FOR CONTROLLER / DRIVER : HD44780U  
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :  
EU - KS0066

1.3 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL  
SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF CHARACTER ----- 20 CH \* 2 LINES
- (2) MODULE SIZE ----- 116.0W \* 37.0H \* 10.0D (max.) mm
- (3) EFFECTIVE AREA ----- 83.0W \* 18.6H mm
- (4) CHARACTER FONT ----- 5 \* 7 DOTS + CURSOR
- (5) CHARACTER SIZE ----- 3.20W \* 5.55H mm
- (6) CHARACTER PITCH ----- 3.70W \* 5.95H mm
- (7) DOT SIZE ----- 0.60W \* 0.65H mm
- (8) DOT PITCH ----- 0.65W \* 0.70H mm
- (9) LCD TYPE \*
- (10) DRIVING METHOD ----- 1 / 16 DUTY MULTIPLEX DRIVE
- (11) VIEWING DIRECTION \*
- (12) BACK-LIGHT \*

\* PLEASE REFER TO NUMBERING SYSTEM

### 3. ABSOLUTE MAXIMUM RATINGS

#### 3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS . ( AT Ta = 25 °C )

PARAMETER	SYMBOL	MIN .	MAX .	UNIT	REMARK
POWER SUPPLY FOR LOGIC	VDD – VSS	0	7.0	V	
POWER SUPPLY FOR LCD DRIVE	VDD – VO	0	13.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
POWER SUPPLY FOR EL BACKLIGHT	VEL	—	AC200	Vrms	fEL=1.0KHZ 60 SEC . MAX
	fEL	—	2.0	KHZ	AC115 Vrms 60 SEC . MAX

NOTE (1) : TEST METHOD AND CONDITIONS :  
AFTER CHARGING UP 200 PF CAPACITOR BY STATED VOLTAGE ,  
THE CAPACITOR IS CONNECTED WITH INTERFACE PINS OF THE  
MODULE .

#### 3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS .

I T E M	OPERATING		STORAGE		REMARK
	MIN .	MAX .	MIN .	MAX .	
AMBIENT TEMPERATURE	-20°C	50°C	-30°C	60°C	NOTE (2), (3)
HUMIDITY	—	90 % RH	—	90 % RH	WITHOUT CONDENSATION
VIBRATION	—	4.9 m/s <sup>2</sup> (0.5 G)	—	19.6 m/s <sup>2</sup> (2 G)	
SHOCK	—	29.4 m/s <sup>2</sup> (3 G)	—	490.0 m/s <sup>2</sup> (50 G)	XYZ DIRECTIONS
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT -30°C : 48HR MAX .  
60°C : 168HR MAX .

NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE .

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C

VDD = 5.0 ± 0.25 V

PARAMETER	SYMBOL	CONDITION	MIN .	TYP .	MAX .	UNIT
H LEVEL INPUT VOLTAGE	VIH	—	2.2	—	—	V
L LEVEL INPUT VOLTAGE	VIL	—	—	—	0.6	V
H LEVEL OUTPUT VOLTAGE	VOH	-IOH = 0.2 mA	2.4	—	—	V
L LEVEL OUTPUT VOLTAGE	VOL	IOL = 1.2 mA	—	—	0.4	V
POWER SUPPLY CURRENT (LOGIC)	IDD	VDD = 5.0 V	—	1.0	3.0	mA
RECOMMENDED LCD DRIVING VOLTAGE	VDD - VO ∅ = 10° , θ = * DUTY = 1/16	Ta = - 20 °C	4.1	4.4	4.7	V
		Ta = 25 °C	4.1	4.4	4.7	V
		Ta = 50 °C	4.1	4.4	4.7	V
CLOCK OSCILLATION FREQUENCY	FOSC	Ta = 25 °C	—	270	—	KHZ
POWER SUPPLY FOR EL BACKLIGHT	VEL	fEL=400HZ	—	100	—	Vrms
	IEL	VEL=100V fEL=400HZ	—	2.9	—	mArms

\* θ = 0° WHEN VIEWING DIRECTION IS 6 O'CLOCK  
θ = 180° WHEN VIEWING DIRECTION IS 12 O'CLOCK

5. OPTICAL CHARACTERISTICS .

Ta = 25 °C

VDD = 5.0 V

I T E M	SYMBOL	CONDITION	MIN .	TYP .	MAX .	UNIT	NOTE
VIEWING AREA	Ø2 - Ø1	$K \geq 1.4$	3 0	—	—	deg.	1
CONTRAST RATIO	K	$\varnothing = 10^\circ, \theta = *$	5	—	—	—	1
RESPONSE TIME	tr ( rise )	$\varnothing = 10^\circ, \theta = *$	—	228	—	ms	1
	tr ( fall )		—	174	—		
THE BRIGHTNESS OF MODULE	B	$\varnothing = 10^\circ, \theta = *$	0.4	—	—	cd/m <sup>2</sup>	1, 2
			3.5	—	—		1, 3

\*  $\theta = 0^\circ$  WHEN VIEWING DIRECTION IS 6 O'CLOCK

$\theta = 180^\circ$  WHEN VIEWING DIRECTION IS 12 O'CLOCK

NOTE ( 1 ) : PLEASE REFER TO :

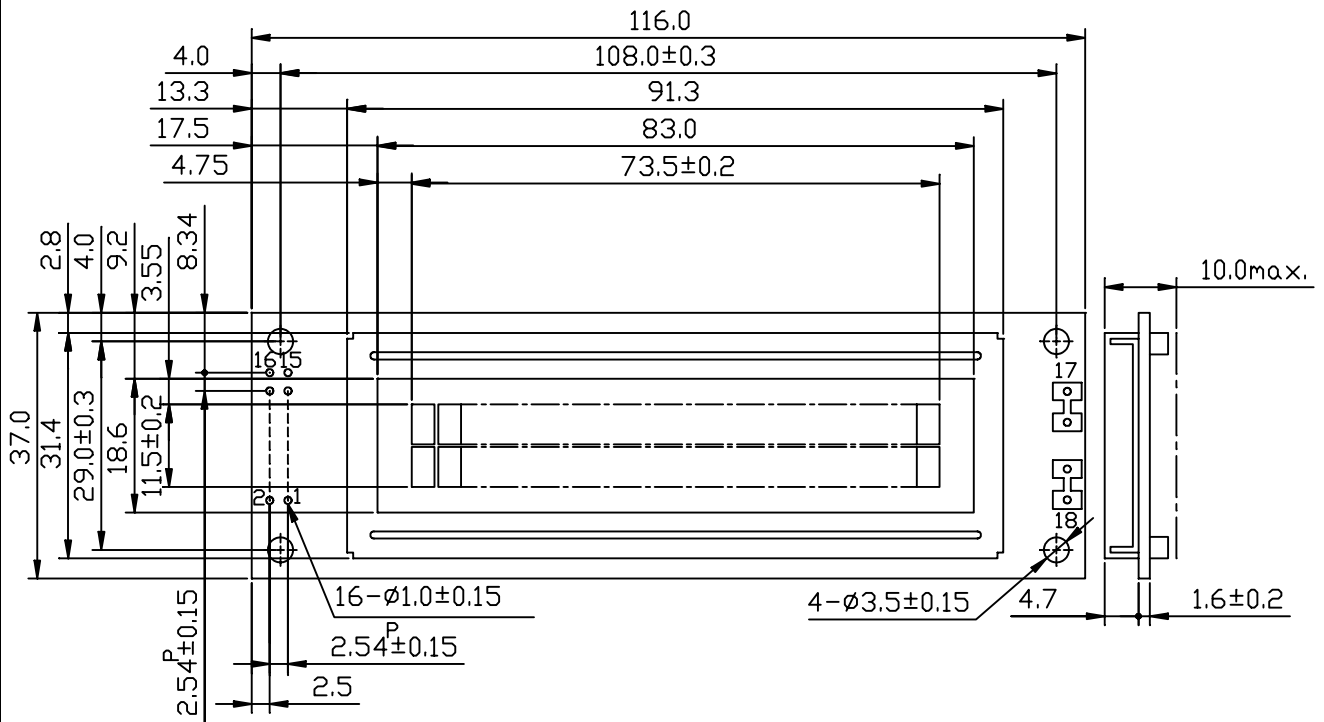
CUSTOMER ACCEPTANCE STANDARD SPECIFICATION : EU-002A

NOTE ( 2 ) : POLARIZER MODE : TRANSFLECTIVE

NOTE ( 3 ) : POLARIZER MODE : TRANSMISSIVE

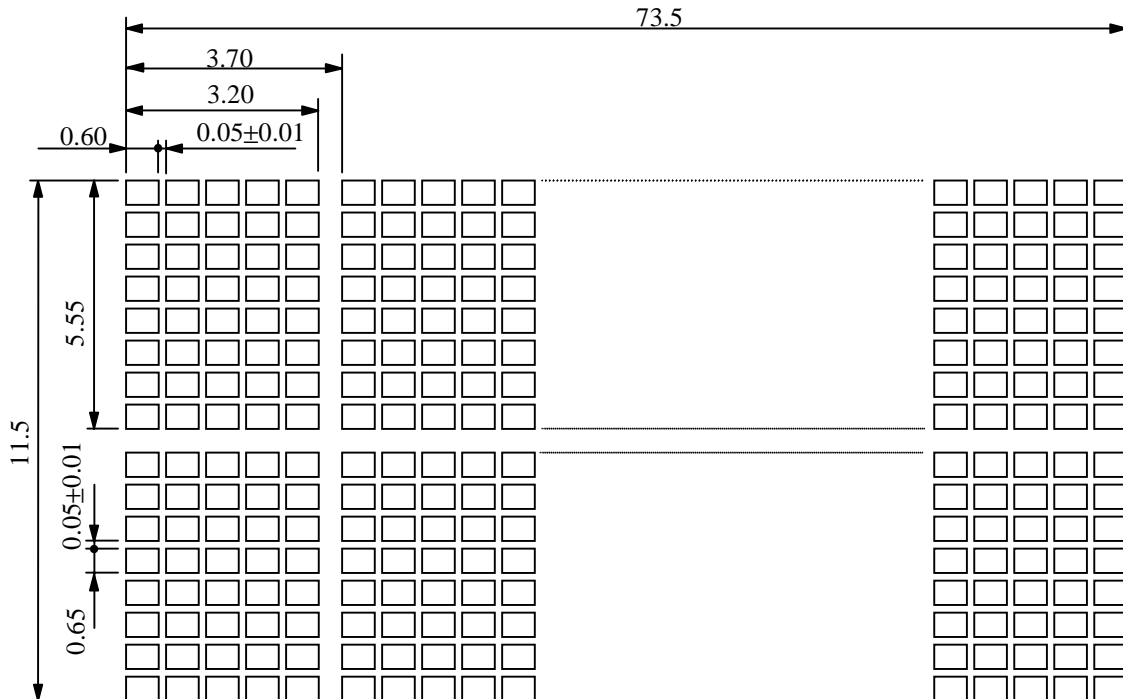


6. OUTLINE DIMENSION



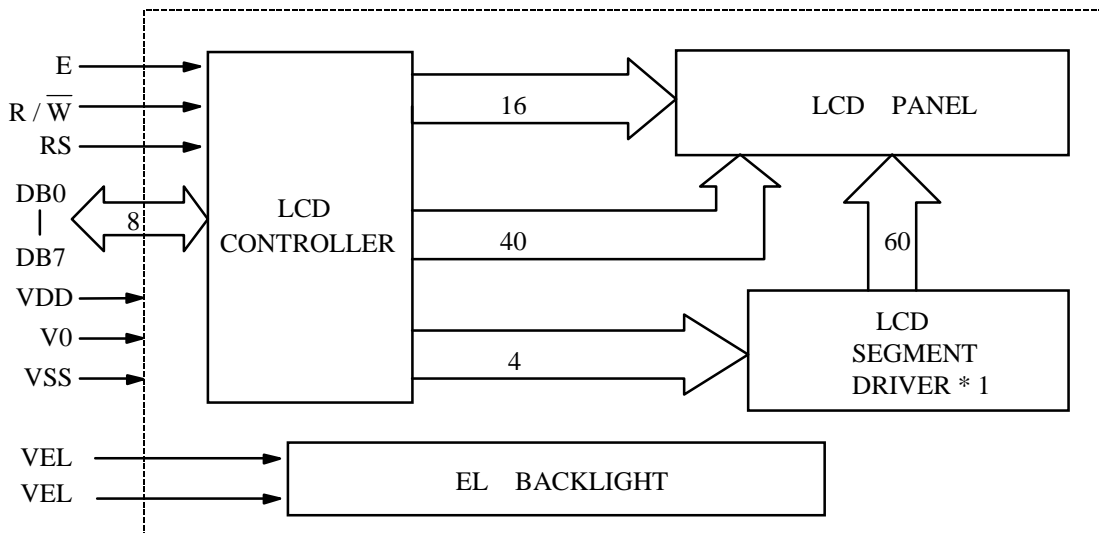
UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS ± 0.5

7. DETAIL DRAWING OF DOT MATRIX



UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS  $\pm 0.1$ mm

8. BLOCK DIAGRAM

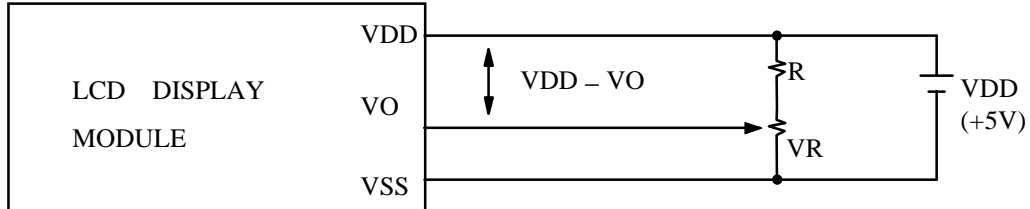


9. INTERFACE SIGNALS

PIN NO.	SYMBOL	DESCRIPTION	FUNCTION
1	VSS	GROUND	0V(GND)
2	VDD	POWER SUPPLY FOR LOGIC CIRCUIT	+5V
3	VO	LCD CONTRAST ADJUSTMENT	
4	RS	INSTRUCTION/DATA REGISTER SELECTION	RS = 0 : INSTRUCTION REGISTER RS = 1 : DATA REGISTER
5	R / $\overline{W}$	READ/WRITE SELECTION	R / $\overline{W}$ = 0 : REGISTER WRITE R / $\overline{W}$ = 1 : REGISTER READ
6	E	ENABLE INPUT	
7	DB0	DATA INPUT/OUTPUT LINES	4 BIT / 8 BIT SELECTABLE  4 BIT : DB4 – DB7 5 BIT : DB0 – DB7
8	DB1		
9	DB2		
10	DB3		
11	DB4		
12	DB5		
13	DB6		
14	DB7		
15	VEL	POWER SUPPLY FOR EL BACKLIGHT	
16	VEL		
17	VEL		
18	VEL		

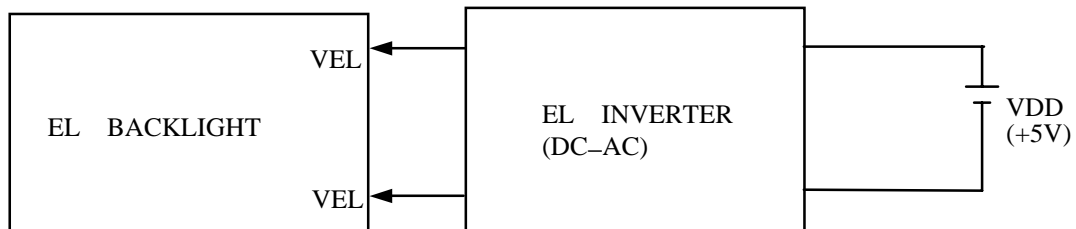
10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCD MODULE



VDD - VO : LCD DRIVING VOLTAGE  
VR : 10KΩ ~ 20KΩ  
RECOMMENDED RESISTOR R : VDD - VO ≥ 1.5 V

10.2. POWER SUPPLY FOR EL BACK-LIGHT



RECOMMENDED INVERTER : SOUN50350 (SUPER OPTICS)

11. DISPLAY DATA RAM ADDRESS

CHARACTER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
LINE 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90	91	92	93
LINE 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF	D0	D1	D2	D3