SPECIFICATION

顧 客(CUSTOMER)：

型 號(TYPE)：EDC5190DTC1P15A

發貨日期(DATE)：2004-02-02

INSPECTED	CONFIRMED	APPROVED
Shi Jianhua	Li Taoli	Xu Shihong

WORLDTECH LCD LTD

CONTENT

1 APPLICABLE SCOPE

THIS DOCUMENT DEFINES THE PERFORMANCE, QUALITY AND RELIABILITY STANDARD OF LIQUID CRYSTAL DISPLAY (LCD).

2 MODEL

NAME:EDC5190DTC1P15A

3 DRIVE CONDITIONS AND DISPLAY CHARACTERISTICS

3.1	OUTSIDE DIMENTION AND LOGIC	SEE FOLLOWED GRAH
3.2	LINE-CONNECTION	SEE FOLLOWED GRAH
3.3	POLARIZER TYPE AND DISPLAY MODE	REFLECTIVE / POSITIVE
3.4	DRIVING METHOD	1/4 DUTY, 1/3 BIAS
3.5	DRIVING VOLTAGE	3 V （ 25℃ ）
3.6	LCD SORT	TN
3.7	VIEWING ANGLE	12：00
3.8	PIXEL COLOR	BLACK
3.9	LCD BACKGROUND COLOR	GRAY

4.ABSOLUTE MAXIMUM RATING

NO.	ITEM	VALUE	UNIT	REMARK
1	AC APPLIED VOLTAGE	12 LESS THAN 1 HOUR	V	
2	DC APPLIED VOLTAGE	50	mV	
3	MAXIMUM SUPPLY VOLTAGE	3.2	V	
4	MAXIMUM HUMIDITY FOR GLASS AND POLARIZER	85%	RH	
5	OPERATING EMPERATURE	-20～+60	℃	
6	STORAGE TEMPERATURE	-20～+60	℃	

5. LIFE

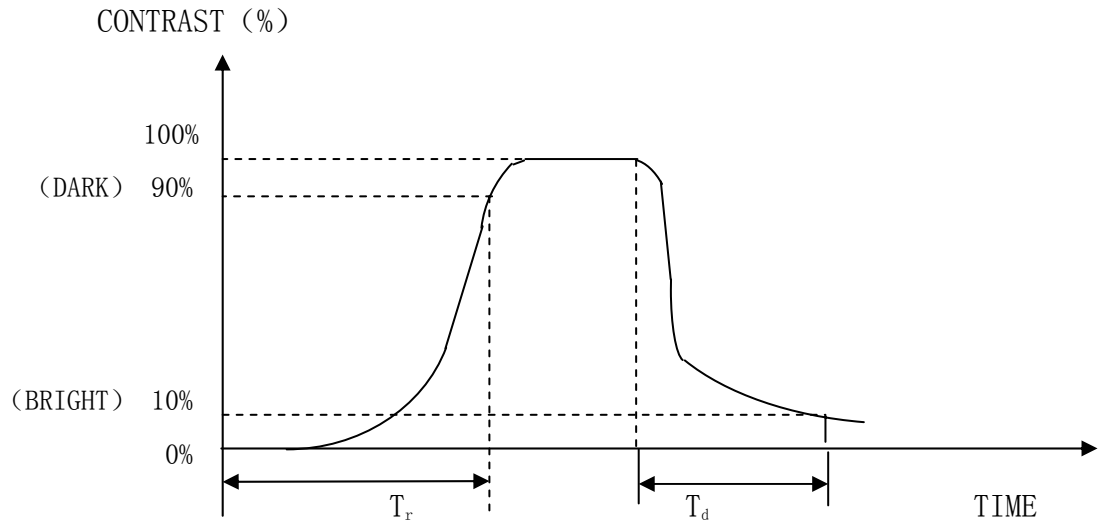
USEFUL LIFE OF THE LCD SHALL NOT BE LESS THAN 100,000 HOURS UNDER ANY COMBINATION OF OPERATING AND STORAGE DURATION.

6 ELECTRO-OPTICAL CHARACTERISTICS

NO.	ITEM	SYMBOL	TEMP. (℃)	CONDITION	SPEC. VALUE			UNIT	NOTE
					MIN.	STD.	MAX.		
1	OPERATING VOLTAGE	V	-25	θ =0 Cr=MAX	3.1	3.0	—	V	
			25		3.0	3.0	—		
			70		2.9	3.0	—		
2	RESPONSE TIME	T_r	25	θ =0 Vop=5V	—	30	—	ms	NOTE 1
		T_d	25	θ =0 Vop=5V	—	50	—		
3	FRAME FREQUENCY	f_F	25	—	—	64	—	HZ	
4	CURRENT	I_{AC}	25	ALL SEGMENT	8.5	—	11.8	μA	NOTE2
5	CONTRAST RATIO	C_r	25	—	—	—	20:1	—	NOTE3
6	OPTIMUM VIEWING AREA	θ	25	VERTICAL	θ1 45	—	θ2 10	deg	NOTE 4
		ϕ		HORIZONTAL	ϕ1 30	—	ϕ2 30		
7	VIEWING ANGLE	—	—	—	12:00			—	NOTE 4

6.1 SPECIFICATION

＊ NOTE1: RESPONSE TIME



① T_r: THE TIME REQUIRED WHICH THE BLACKING RATIO OF SEGMENT BECOMES 90% FROM 0% WHEN WAVEFORM IS SWITCHED TO SELECTED ONE. THIS SHOULD BE MEASURED AT OPERATING VOLTAGE θ =0° , 64 Hz, 25℃。

② Td: THE TIME REQUIRED WHICH THE BLACKING RATIO OF SEGMENT BECOMES 10% FROM 10 0% WHEN WAVEFORM IS SWITCHED TO SELECTED ONE. THIS SHOULD BE MEASURED AT OPERATING VOLTAGE θ=0° , 64 Hz, 25℃。

*** NOTE2: CONDITION OF CURRENT CONSUMPTION IAC MEASUREMENT**

THIS VALUE SHOULD BE MEASURED WHEN ALL SEGMENT-ON AT 25℃, 64 HZ, 3V。

*** NOTE3: DEFINITION OF CONTRAST RATIO Cr**

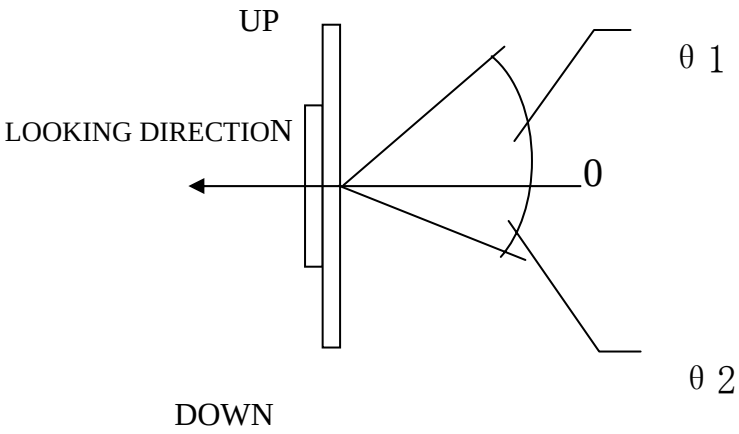
Cr = Y1/Y2

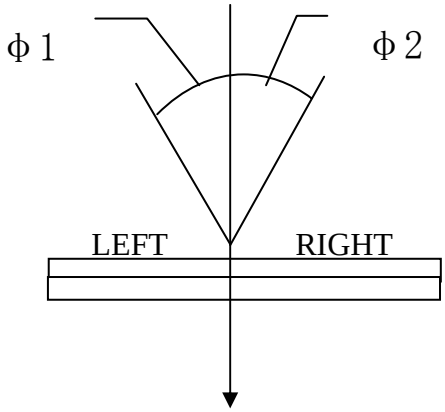
Y1 = SEGMENTS BRIGHTNESS IN CASE OF NON-SELECTED WAVEFORM

Y2 = SEGMENTS BRIGHTNESS IN CASE OF SELECTED WAVEFORM

CONDITION: θ=0° , f_F =64 Hz, 25℃,AT OPERATING VOLTAGE.

*** NOTE 4: DEFINITION OF VIEWING ANGLE**





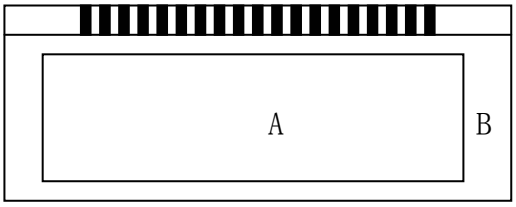
12: 0 0

MODEL	EDC5190DTC1P15A	SPECIFICATION FOR THE PRODUCTION

7. THE DEFINITION OF “VISIBLE” AND “DOMAIN”

A area: visible domain

B area: invisible domain



Basic principle:

If the defects in B area and which doesn’t influence the assembling are acceptable.

When the user doesn’t accept the criteria, we can consult then we will reach an acceptable criteria. We must add new items when necessary.

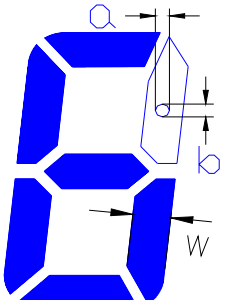
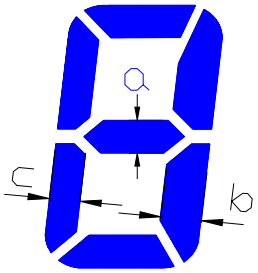
8. QUALITY LEVEL

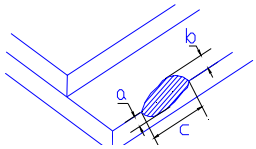
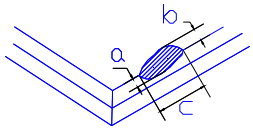
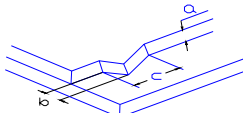
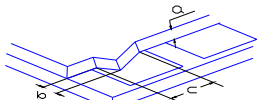
It shall be based on MIL-STD-105, apply level Ⅱ, normal inspections by single sampling。

RANK	ITEM	AQL	NOTE
fatal	segment short , segment missing outside dimension.	0.65	
slight	black spots, white spots, pinhole, air bubbles between glass & polarizer, scratches (glass & polarizer), segment defect。 color variation, glass chips, other viewal defect.	1.5	
TOTAL		1.5	

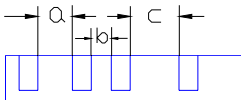
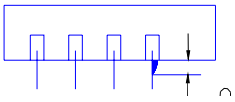
9. TESTING STANDARD

All the data' s units below are millimeter(mm).

um.	Details	Classification	Standard/Acceptable pcs.	Defect class
1	Electric performance		Φ= (length+width) /2	
1.1	None or partial lighting due to pin holes or short		Not allowable	fatal
1.2	Lighting by leakage		Not allowable	fatal
1.3	Partial missing due to pin holes , disconnected or wrong orientation		Φ ≤ 0.1 ok. Φ = MAX 0.2 a ≤ w/3, b ≤ w/3 acceptable pcs.: 2 /cell	slight
1.4	The lines are not well-proportioned		a: standard width b ≤4a/3 c ≥2a/3	slight
2	LCD dimension		Design dimension±0.25	slight
3	glass			
3.1	Glass cracks			slight
	Cracks between two layer glass		Should be outside of the seal ring	
	Cracks on one layer (not extend to ITO)		Acceptable within 1.0	
	Cracks on one layer (extend to ITO)		Acceptable within 1.0, the crack should be 0.4 or more far from ITO	
	Cracks at seal part		Not acceptable	

Num.	Details	Classification	Standard/Acceptable pcs.	Defect class
3.2	Chip on glass			slight
	Chip on the one layer glass		a≤0.5, b≤0.3, c ok. a≤0.5, b≤2.0, c≤5.0 a≤t , b≤1.0, c≤5.0 t :thickness of glass	
	Chip between the two layer glass		a≤0.5, b≤0.3, c ok. a≤0.5, b≤1.5, c≤5.0 a≤t , b≤1.0, c≤5.0	
	Chip on corner of one or two layer of glass		a≤0.5, b, c ok. a≤t , b≤2.0, c≤5.0	
	Chip at the ITO area		Over 3/4 of ITO are kept	
3.3	Remains of glass		a: depth b: width c: length	slight
	Remains on the one layer glass (out of ITO)		a, c ok. b≤0.3	
	Remains on the one layer ITO		a, C ok. b≤0.3 Over 3/4 of ITO are kept	
	Other remains		Within the tolerance limit of external size	
4	Internal defect			
4.1	Black or white spots due to air bubbles , foreign objects or wrong orientation in glass or polarizer.	Common standard: Φ≤0.1 0.1<Φ≤0.2 0.2<Φ≤0.25 0.25<Φ total defects	 Ok. 3 2 0 3	slight
		High standard: Φ≤0.1 0.1<Φ≤0.2 0.2<Φ≤0.25 total defects	 Ok. 2 0 2	
	Density of black or white spots	Φ≤0.1 Φ>0.1	Ok. Far from 1.0	

Num.	Details	Classification	Standard/Acceptable pcs.	Defect class
4.2	Black or white lines due to air bubbles , foreign objects or wrong orientation in glass or polarizer.	w≤0.01 0.01< w≤0.03 0.03< w≤0.05 0.05< w	Ok. L≤3.0 (2) L≤2.0 (2) According to 4.1	slight
4.3	Discoloration or wrong orientation		According to sample	slight
5	polarizer			
5.1	Scratch on the polarizer (protecting film is excluded)	φ≤0.1 0.1<φ≤0.25 0.25<φ	Ok. 2 0	slight
		w≤0.01 0.01< w≤0.03 0.03< w≤0.05 0.05< w	Ok. L≤3.0 (2) L≤2.0 (2) According to 4.1	
5.2	Bubble between glass and polarizer	φ≤0.15 0.15<φ≤0.3 0.3<φ≤0.5 0.5<φ	Ok. 2 1 0	slight
5.3	Polarizer is turned up or fell off		Not allowable	slight
5.4	Stained polarizer		Not allowable	slight
5.5	Stained protect film		Ok.	slight
5.6	Film turned up		Resume after pressing	slight
5.7	Film break		Ok. If polarizer is good	slight
6	Pin and pin glue			
6.1	Pin broken		Not allowable	fatal
6.2	Pin rusted		Not allowable	fatal
6.3	Length of pin		Within the tolerance	slight

Num.	Details	Classification	Standard/Acceptable pcs.	Defect class
6.4	Insert error of pin		a: regular dimension b≥a/2 c≤3a/2	slight
6.5	Foreign objects on the pin glue		Not cause any short	slight
6.6	Pin glue flow out		A≤1.5	slight
6.7	Pin glue excessive		Not over the protecting film	slight
6.8	Lack of pin glue	Front side Back side	ITO is exposed. Ok . If 1/2 of ITO is coated	slight
6.9	Bubble in pin glue		Ok.	slight
7	Seal ring resin			
7.1	Seal resin leakage		Out of the viewing area	slight
7.2	Lack of seal resin		There must be 0.2 resin at the entrance	slight
7.3	Crack of seal resin		Can't be drop by finger	slight
7.4	Seal extension		According to sample	

10. RELIABILITY

10.1 Damp heat, steady state

The LCD will be put at a place which temperature is 70℃ and it's humidity is 90%RH. It takes 200 hours to test the LCD. When it resumed , it's performance should be normal.

10.2 Low temperature

The LCD will be put at a place which temperature is -25±3℃, it takes 24 hours to test the LCD . When it resumed, it's performance should be normal.

10.3 Change of temperature

The LCD will be put into water which temperature is 100℃,it takes 10 minutes to test the LCD; then put it into ice water which temperature is 0 ±3℃,lasting 10 minutes .Repeat this for 10 times .And when it resumed ,it's performance should be normal.

10.4 Pin intension

Put a force about 1 kg on the same axe of pins , lasting 10 seconds , the pin should not be broken ,loosen or removed relatively.

11. PART IDENTIFICATION

Parts shall be stamped with either customer or factory part number and date coded.

12. PACKING AND HANDLING

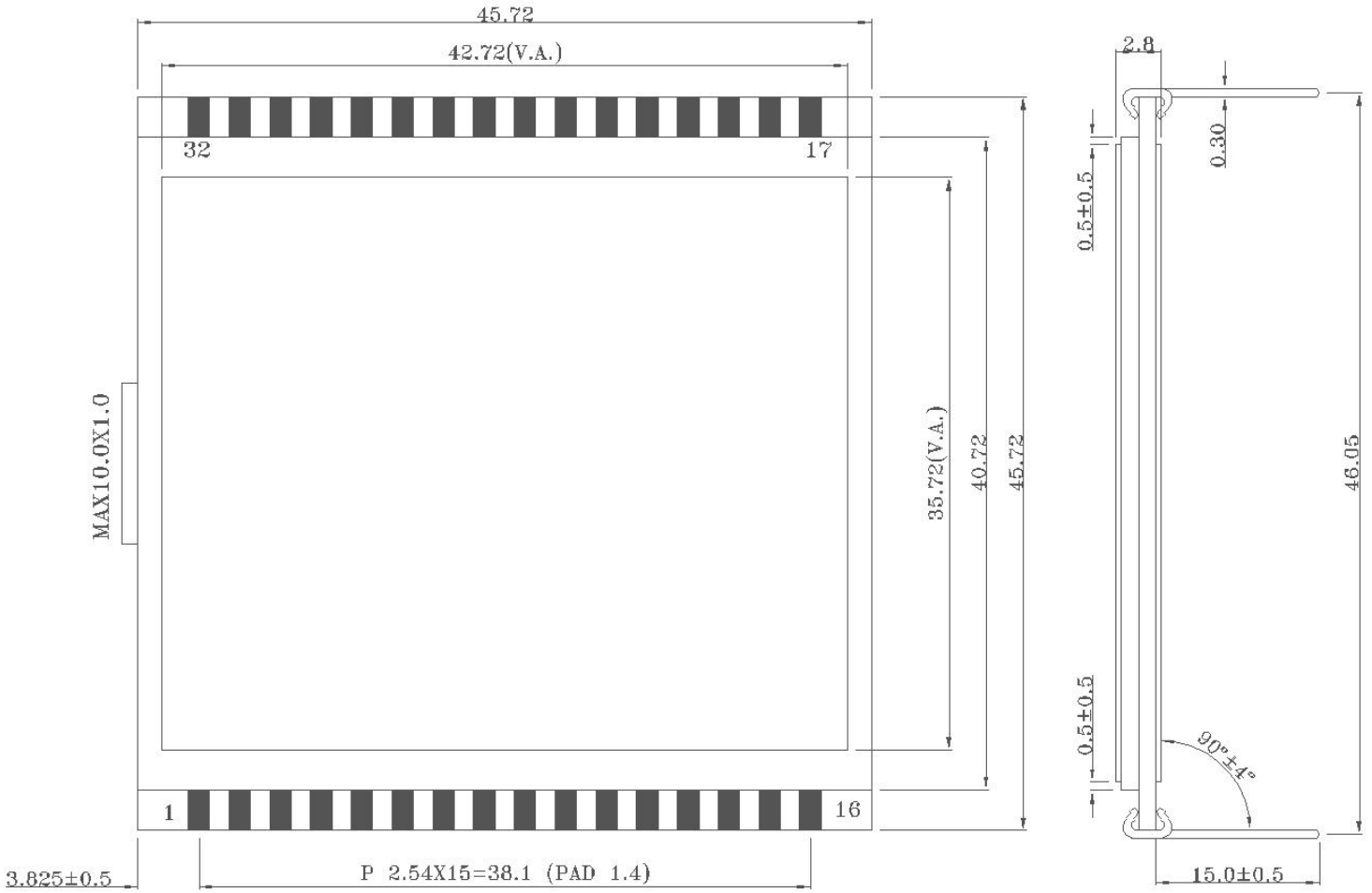
Products shall be properly packaged to ensure an adequate level of protection against mechanical damage encountered during shipment from supplier's plant to the customer's dock.. Products shall be free of finger prints, adhesive residual, and any dust or dirt.

13. QUALITY ASSURANCE

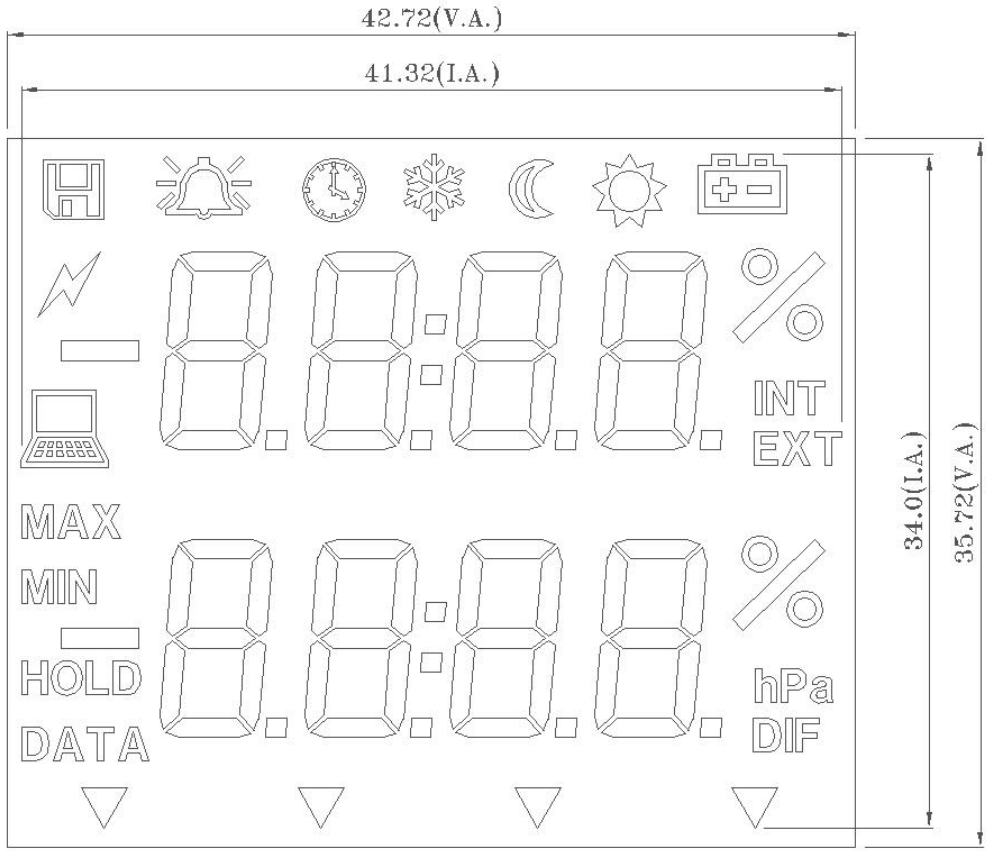
After the approval of the original samples and prototypes, the subsequent production parts shall be identical in both aesthetic and performance to those samples and prototypes. No change in artwork, material or process is allowed without the written consent of the customer.

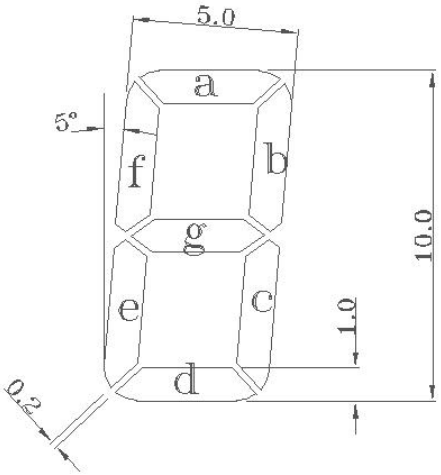
REFERENCE:

1. American standard Q100288
2. Production criteria of Nippon electrics corporation
   《液晶セルの品质基准书》
3. International electro-technical committee standard IEC 61747



CUSTOMER:		
MODEL:		DRAWN BY
SCALE:	APPROVED BY:	
DRAWING NUMBER:	EDC5190	
DATE: 2004.1.18	SHEET 1 OF 3	REV.
WORLDTECH		





CUSTOMER:		
MODEL:		DRAWN BY
SCALE:	APPROVED BY:	
DRAWING NUMBER:	EDC5190	
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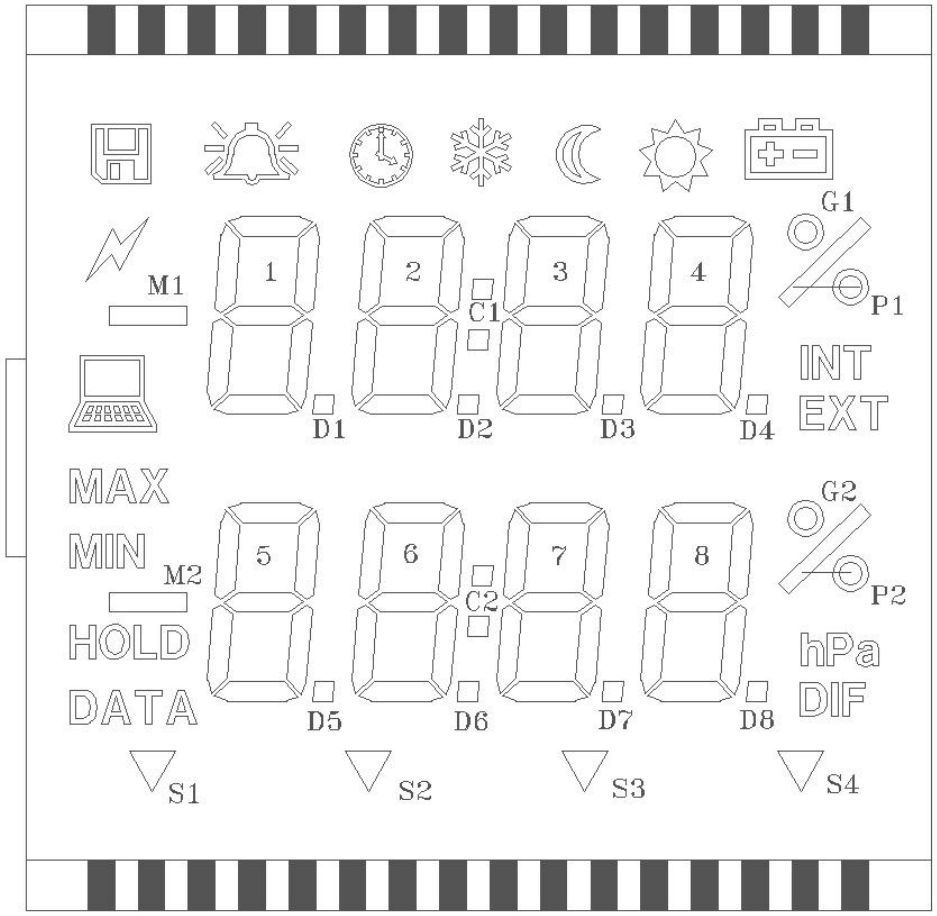

PIN	COM1	COM2	COM3	COM4	PIN	COM1	COM2	COM3	COM4
1		COM2			17				COM4
2	MIN	MAX			18	G1	P1	INT	EXT
3	M2	HOLD	DATA	S1	19	4a	4b	4c	D4
4	5f	5g	5e	5d	20	4f	4g	4e	4d
5	5a	5b	5c	D5	21				
6				S2	22	3a	3b	3c	D3
7	6f	6g	6e	6d	23	3f	3g	3e	3d
8	6a	6b	6c	D6	24	C1			
9	7f	7g	7e	7d	25				
10	7a	7b	7c	D7	26	2a	2b	2c	D2
11				S3	27	2f	2g	2e	2d
12	8f	8g	8e	8d	28				
13	8a	8b	8c	D8	29	1a	1b	1c	D1
14			DIF	S4	30	1f	1g	1e	1d
15	C2	G2	P2	hPa	31			M1	
16			COM3		32	COM1			

EDC5190 LOGICS

CUSTOMER:		
MODEL:		*DRAWN BY*
SCALE:	*APPROVED BY:*	
DRAWING NUMBER:	*EDC5190*	
DATE: 2004.1.18	*SHEET 3 OF 3*	*REV.*
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