

LJ64EU34

El Display Module

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SHARP

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PAGE 22

APPLICABLE DIVISION

- DUTY DEVELOPMENT CENTER
 TFT DEVELOPMENT CENTER
 LCD PRODUCTS DEVELOPMENT CENTER
 EL PRODUCTION DEPT.

APPROVED BY: DATE

NARA LIQUID CRYSTAL DISPLAY GROUP
SHARP CORPORATION

SPECIFICATION

SPECIFICATION FOR

EL Display Module

MODEL No. L J 6 4 E U 3 4

 CUSTOMER'S APPROVAL

DATE _____

BY _____

PRESENTED

BY *H. Kishishita*

H. Kishishita
Department General Manager
EL Production Department
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SHARP CORPORATION

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MODEL No

LJ64EU34

DOC. FIRST ISSUE

IDENT. DATA No.

RECORDS OF REVISION

DATE	REF. PAGE PARAGRAPH DRAWING No.	REVISED No	SUMMARY	CHECK & APPROVAL
Aug. 22. '96			New	<i>[Signature]</i>

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1. Application

This data sheet is to introduce the specification of EL display module, LJ64EU34.

2. Overview

The Sharp EL display module consists of a thin film EL panel, high voltage MOSICs for panel driving and a display control circuit. By supplying five input signals of LS TTL level and two DC power supplies of 15 V and +12 V arbitrary graphs and characters can be displayed.

3. Mechanical Specifications

Parameter	Specification			Unit
	Width	Height	Depth	
Outline	246	x 158	x 26 (Note 1)	mm
Number of matrix electrodes	640	x 400		--
Active area	191.9	x 119.9		mm
Dot pitch	0.3	x 0.3		mm
Dot pitch ratio	1	x 1		--
Dot size	0.22	x 0.22		mm
Mass	450			g

Note 1) Details of outline dimensions are shown at Page 11.

4. Absolute Maximum Ratings

4-1 Electrical absolute maximum ratings

(Ta=25 °C)

Parameter	Symbol	Rating	Unit
Interface signal (Logic "H")	V_{IH}	$V_L+0.3$	V
Interface signal (Logic "L")	V_{IL}	-0.3	V
Supply voltage (Logic)	V_L	+7	V
Supply voltage (panel drive)	V_D	+14	V

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4 - 2 Environmental conditions

Parameter	Tstg		Topr Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-40 °C	+80 °C	-5 °C	+55 °C	
Humidity	Note 2)		Note 2)		No condensation
Vibration	Note 3)				No operating
Shock	Note 4)				No operating

Note 1) Survival temperature: -20 °C to +65 °C

No permanent damage will occur.

Note 2) $T_a \leq 40$ °C 95 % RH Max

$T_a > 40$ °C Absolute humidity shall be less than
 $T_a = 40$ °C / 95 % RH.

Note 3) 5 ~ 55 Hz Frequency range

Sweep time ; 15 min each axis

Dwell at resonance ; 10 min each resonance

Peak-to-peak

amplitude ; 3.17 mm over 5 ~ 10 Hz range

; 1.52 mm over 10 ~ 25 Hz range

; 0.38 mm over 25 ~ 55 Hz range

55 ~ 500 Hz Frequency range

Sweep time ; 120 min each axis

Dwell at resonance ; 30 min each resonance

Peak-to-peak

amplitude ; 30 m/s² peak acceleration

Note 4) Acceleration ; 981 m/s²

Pulse width ; 4 ms

3 times for each direction of $\pm X/\pm Y/\pm Z$.

5. Electrical Characteristics

(Ta=25 °C)

Parameter	Symbol	Rating			Unit
		Min.	Typ.	Max.	
Supply voltage (Logic)	V_L	+ 4.75	+ 5.0	+ 5.25	V
Supply current (Logic, $V_L = +5$ V)	I_L	20	—	350	mA
Supply voltage (Panel drive)	V_D	+ 11.4	+ 12.0	+ 12.6	V
Supply current (Panel drive, $V_D = +12$ V)	I_D	40(≧1)	—	1350	mA
Total power ($V_L = +5$ V, $V_D = +12$ V)	P_T	—	11	—	W

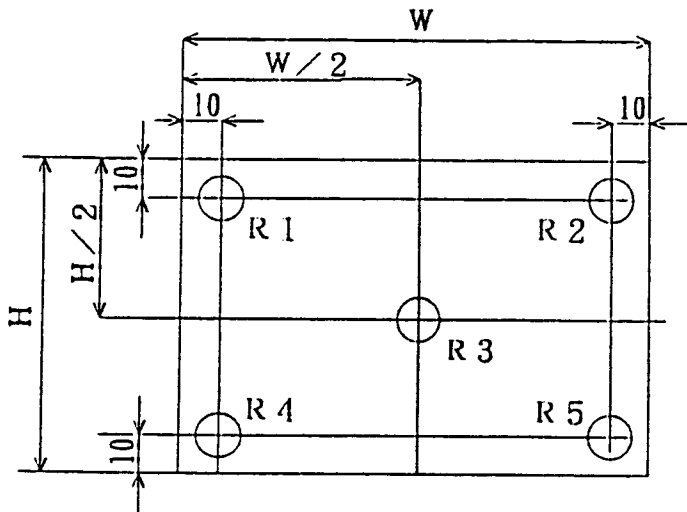
(≧1) 10 mA in condition with no signals nor V_L supplying.

6. Optical Characteristics

(Ta=25 °C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Luminance	L_{ON}	All dots lit	68.5	115	—	cd/m ²	Note 1)
OFF luminance	L_{OFF}	All dots turned off	—	—	3.4	cd/m ²	
Luminance distribution	ΔL_{DIS}	All dots lit	—	—	30	%	
Fill factor			—	0.54	—		Note 2)
Shadowing characteristics	ΔL_{SD}	fixed pattern	—	2	—	%	Note 3)
Viewing angle			—	160	—	°	

Note 1) Average luminance measured at the five circular windows (R1~R5) shown in Fig. 1 (Circular window diameter: $\phi 13$ mm)



H 119.9 : Height of active area
 W 191.9 : Width of active area
 Unit : mm
 Tolerance: $\pm 10\%$

Fig. 1

The following formula defines the luminance distribution:

$$\Delta L_{DIS} = \left(1 - \frac{L_{MIN}}{L_{MAX}} \right) \times 100 (\%)$$

where L_{MAX} is the maximum luminance and L_{MIN} is the minimum luminance taken at the five locations in Fig. 1.

- Note 2) The ratio of the emission area the display area. SHARP's EL has comparatively high fill factor, and therefore, the visibility of display is excellent.
- Note 3) Shadowing characteristics means the variation of luminance according to the number of dots lit on a scanning line.

Thanks to the addition of the shadowing compensation circuit, the display quality of SHARP's EL is improved.

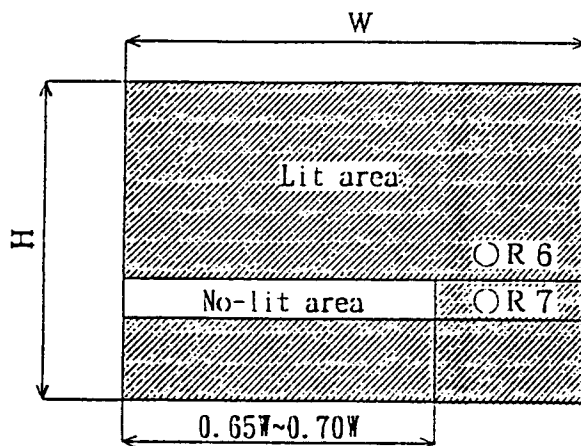


Fig. 2

The following formula defines the shadowing characteristics:

$$\Delta L_{SD} = \left(\frac{L_N}{L_L} - 1 \right) \times 100 (\%)$$

where L_L is the luminance at R6, L_N at R7.

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7. Timing Characteristics

7-1 Input signal

This module is driven by line-at-a-time scanning method with the following 5 input signals fed at LS TTL level.

Parameter	Symbol	Description
Data transfer clock	C K _o	The signal control sampling and transferring data signal.
Data signal	D _{IN 0}	The signal are sampled at every rising edge of data transfer clock.
	D _{IN 1}	The display is on while the logic is "H" and off while the logic is "L".
Horizontal sync. signal	$\overline{\text{H. D}}$	The signal control the timing of line-at-a-time scanning. The display data remain in effect while the logic is "H" and blanking while the logic is "L".
Vertical sync. signal	$\overline{\text{V. D}}$	The signal controls frame frequency. Typ. 60 Hz Frame starts when the logic rises to "H" from "L".

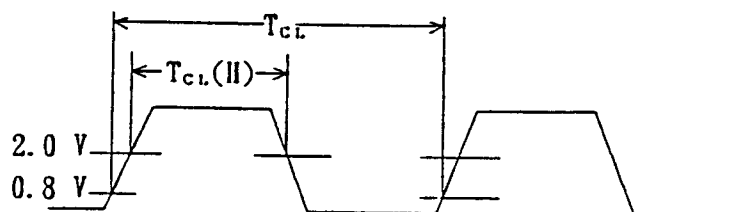
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7-2 Input signals timing characteristics

(T_a=25 °C)

Parameter	symbol	Min.	Typ.	Max.	Unit
Clock frequency	1/T _{cl}	7.5	—	11.5	kHz
Clock duty Note 1)	T _{cl(H)} /T _{cl} x100	45	—	55	%
Horizontal sync. signal cycle time	T _H	40	—	45	μs
Horizontal sync. signal blanking time	t _{HB}	2	—	—	μs
Vertical sync. signal blanking time	t _{VB}	1	—	N x T _H	μs
Vertical sync. signal valid time Note 2)	t _{VA}	400xT _H	—	—	μs
Frame Frequency	1/T _v	55	60	62	Hz
Data signal set up time	t _{DS}	20	—	—	ns
Data signal hold time	t _{DH}	20	—	—	ns
Horizontal sync. signal set up time	t _{HS}	20	—	T _{cl} /2	ns
Horizontal sync. signal hold time	t _{HD}	20	—	T _{cl} /2	ns
Vertical sync. signal rise wait time	t _{VR}	4x40	—	—	μs
Vertical sync. rise timing	t _{VH}	40	—	T _H -t _{HB} +35	μs

Note 1)



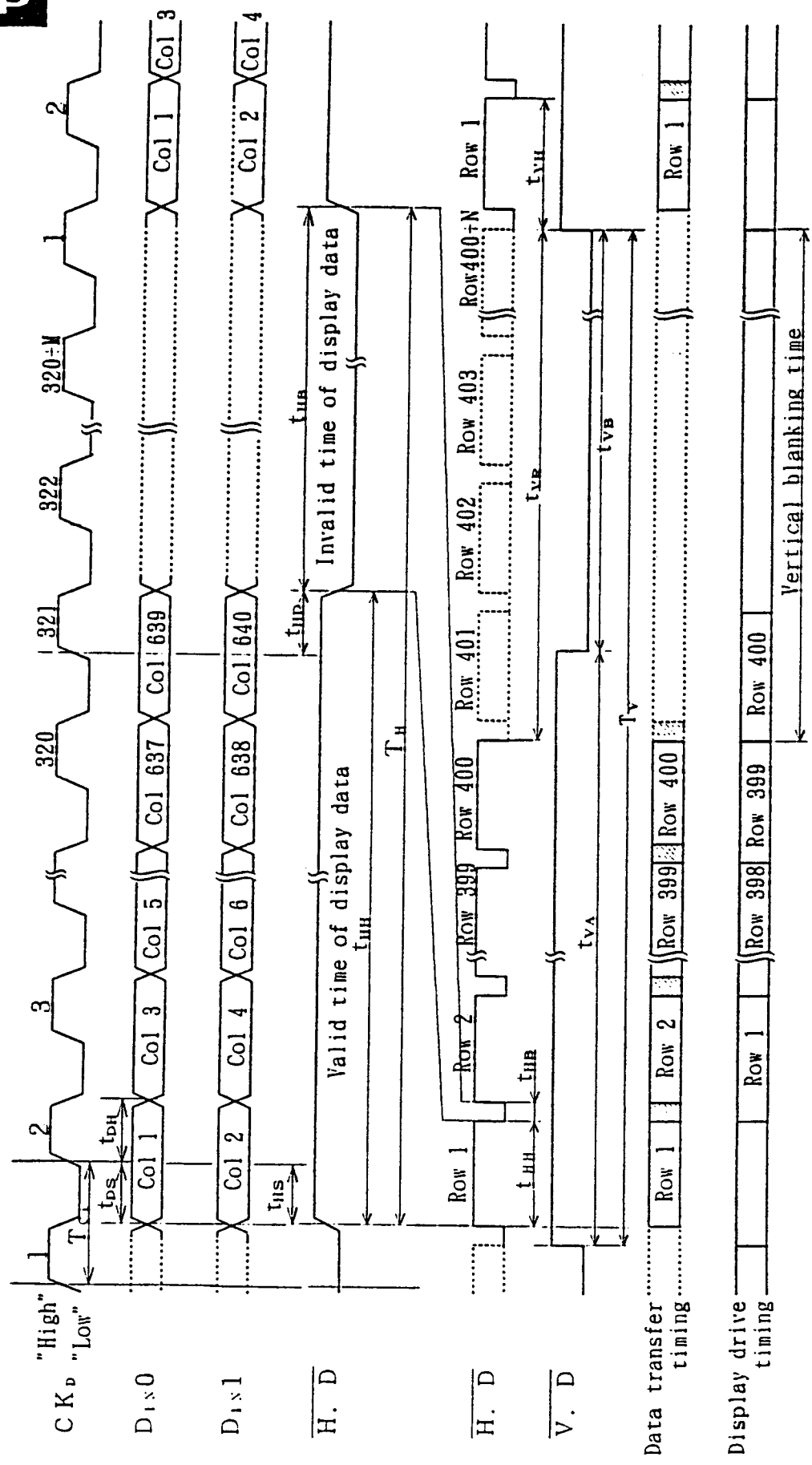
Note 2) The condition of $t_{VA} \geq 400 \times T_H$ shall be strictly obeyed. Negligent of this condition can cause troubles of the module even if the other conditions listed above are followed.

Note 3) Keep the Valid time of display data (t_{DH}) to $320 \times T_{cl}$.



8. Timing Chart

Interface Timing and Display drive timing



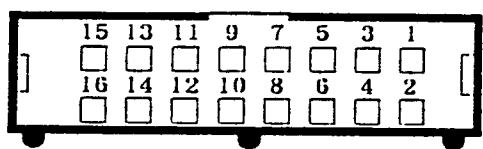
- Note 1) Logic level is not necessary to be specified in dotted line portion.
- Note 2) $t_{UH} \geq 2 \mu s$ shall be kept. ($t_{UH} = M \times T_{Cl}$)
- Note 3) $N \geq 4$ shall be kept.



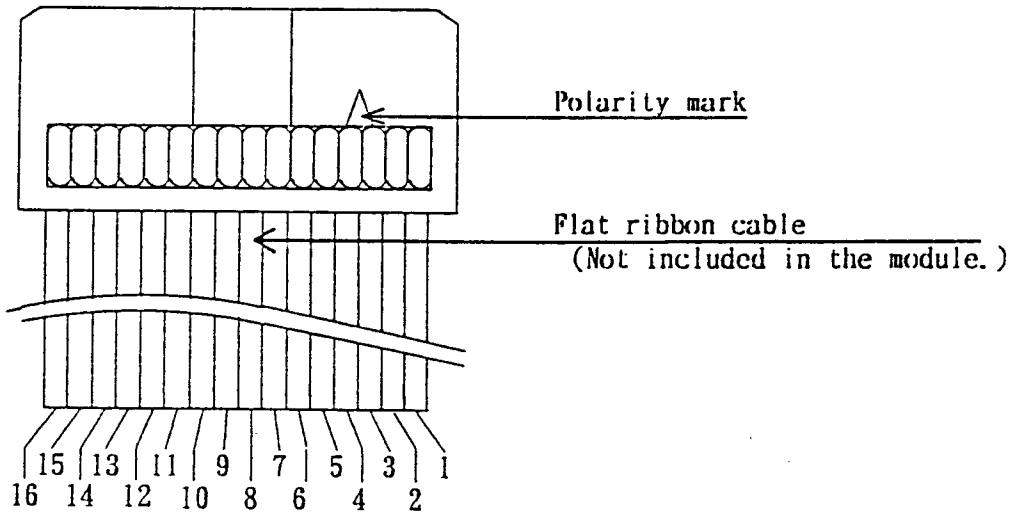
9. Interface signal and power Supply Connectors

Terminal No.	Signal name	Terminal No.	Signal name
15	Data signal for odd column (D _{1,N0})	16	Data signal for even column (D _{1,N1})
13	Data transfer clock (CK _D)	14	GND
11	Horizontal sync. signal (H.D)	12	GND
9	Vertical sync. signal (V.D)	10	NC
7	GND	8	GND
5	NC	6	NC
3	V _L (+5 V)	4	V _L (+5 V)
1	V _D (+12 V)	2	V _D (+12 V)

Module-side pin header (16-pin board)



Fitting socket (16-pin solderless type, it's not included in the module.)



SHARP**Conenectors**

	Model No.	Maker
Module-side pin header	HIF3FC-16PA-2.54DS or equivalents	HIROSE ELECTRIC CO.
Fitting socket	HIF3BA-16D-2.54R or equivalents	- ditto -

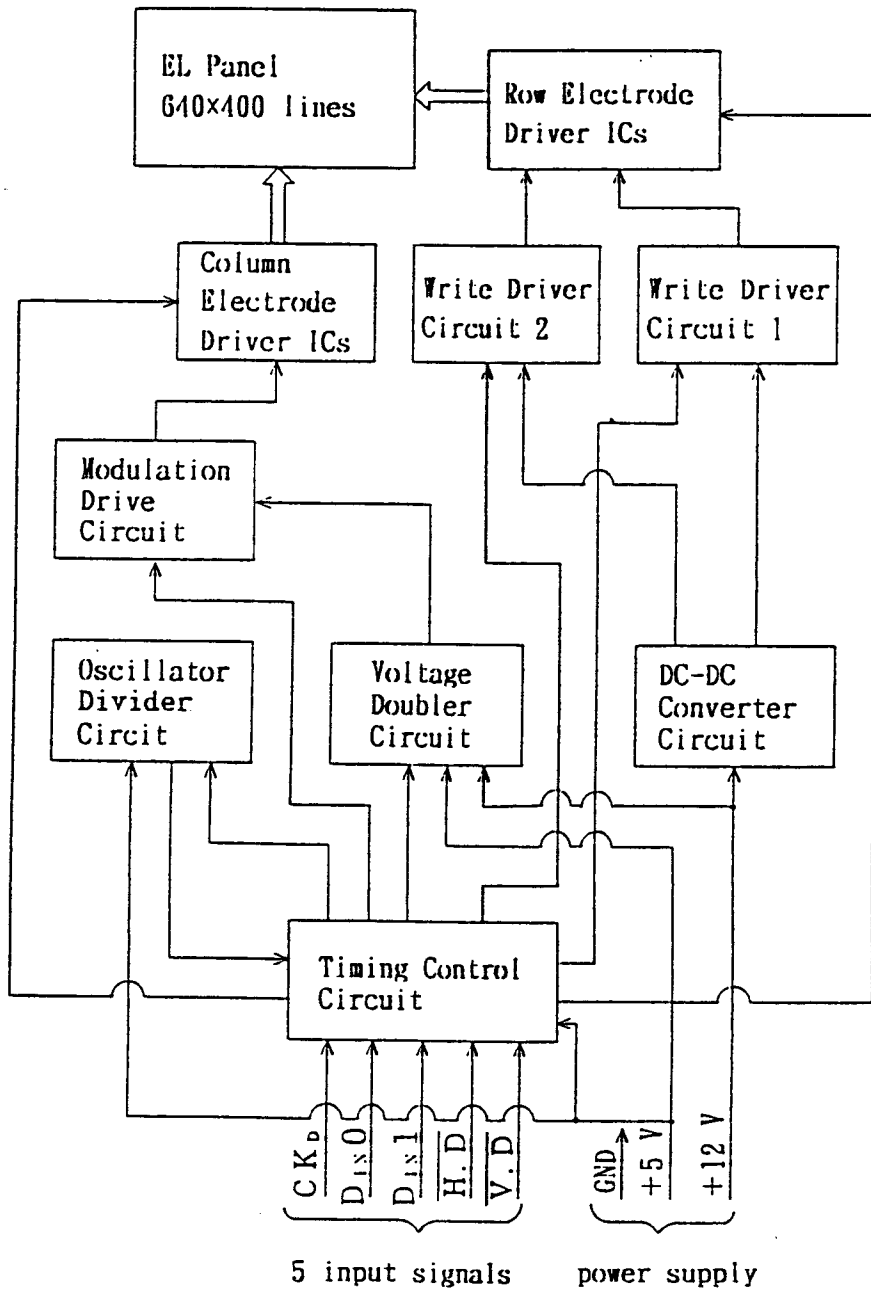
Note 1) The length of the cable shall not exceed 50 cm.

Note 2) This module is not supplied with the socket and the cable.

Note 3) Please connect all of each terminal of the above-mentioned input signal, supply voltage, and GND.

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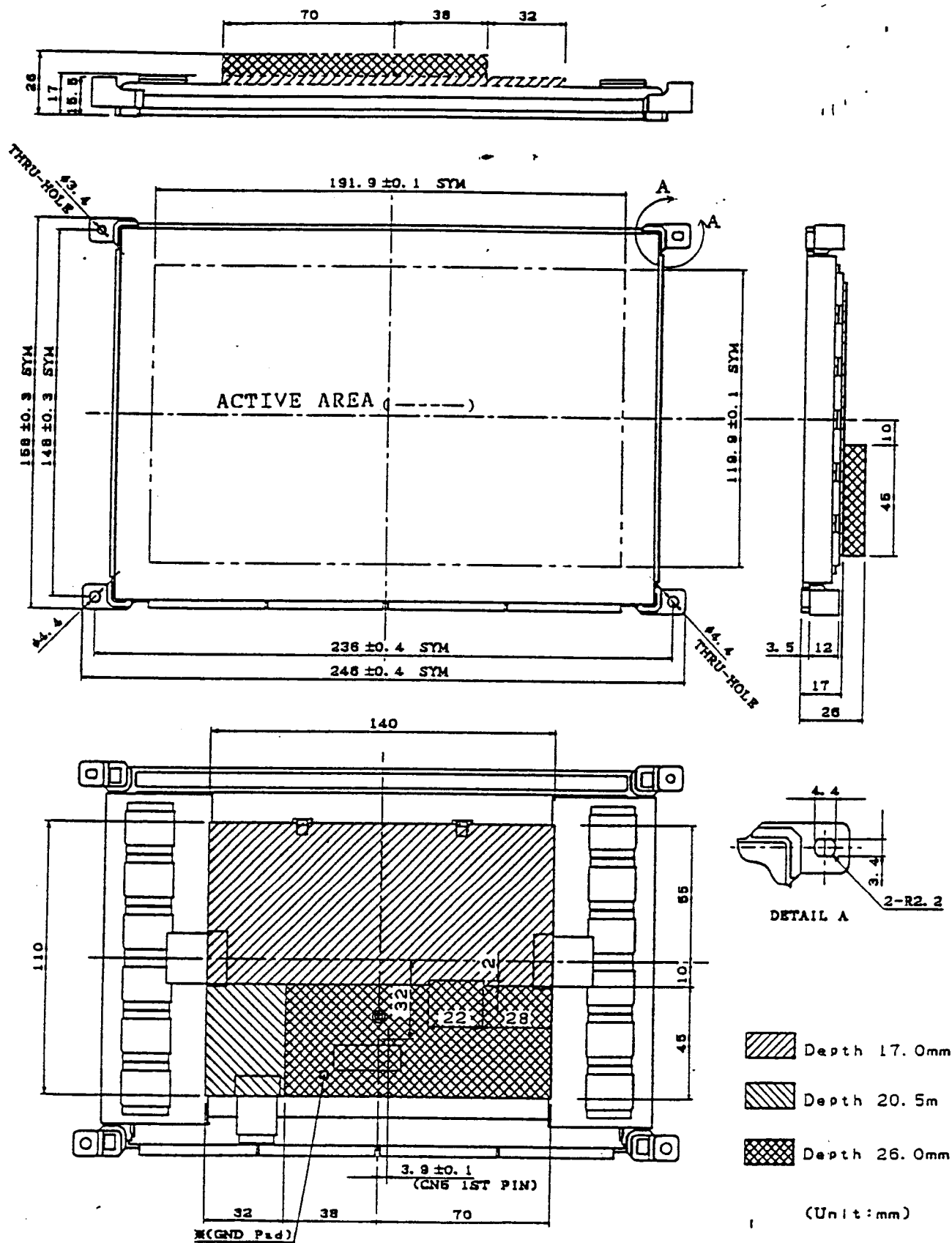
10. Functional Block Diagram



5 input signals power supply

11. Outline of the module configuration

this module is shipped with the form drawing below.



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12. Handling Instructions and Cautions for Operation

1. Handle the module with care of ESD, The operator and the place around him must be guard against ESD. Especially, please note that the module might be destroyed by ESD when you directly touch the IC or the wiring pattern in the EL display module.
Hold the mounting arms of 4 corners (of the module) when you handle it, to protect you from electric shock prevention etc.
2. Since the EL panel is made of glass, care shall be taken to avoid the breakage caused by dropping or bumping it.
3. Please avoid detaching and decomposing the display control board or the flat cable because these cause the breakdown.
4. Do not insert nor extract the input cable when the power is supplied.
5. When you return the module to us, and you are forced to pack it in different manner with our specification, use enough amount of packing cushion to prevent stress to the panel.
6. Do not touch the display control PWB on the rear side of the module while in operation. There is risk of electric shock, because it generates AC pulses of about 200V.
And even after the power off, do not touch components on the PWB because high voltage might be contained in circuits.
7. Please use the module within the rated operational voltage and temperature specified in this literature, because the breakdown is caused by using which exceeds regulated operation voltage and temperature.
The operation temperature is specified by ambient temperature.
Test carefully the inner temperature of your product (module ambient temperature), and decide operational temperature of your products.
8. Please avoid the operation in water dew because if water dew covers connectors or circuits even a little, it may cause mis-operation and sometimes it breaks the module.
9. If your product is used in dusty air, or covered by oil dew, or by acid alkaline mist, protect PWB of the module by filter etc.
10. Do not use the module in corrosive gas. Do not use packing that contains sulfur, or spaser that contains sulfur rubber for mounting filter.

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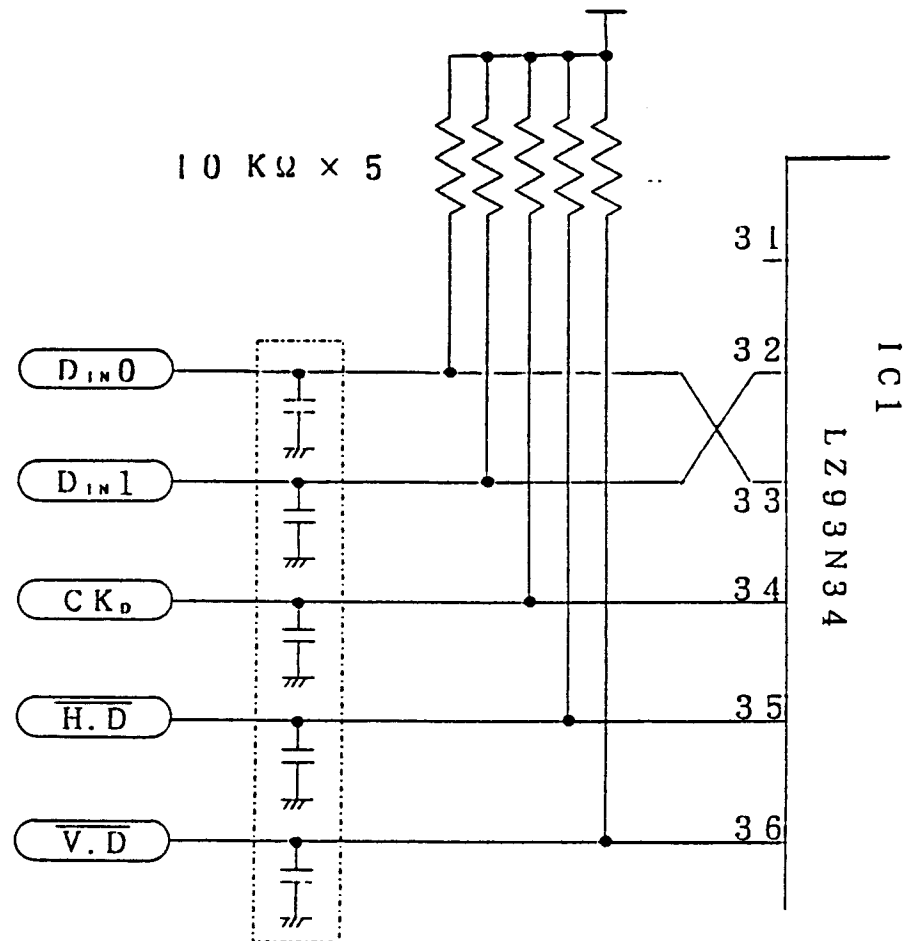
11. To avoid the image retention caused by the luminance change due to time lapse, and to extend the panel life, please pay attention to the design of display, so that a fixed pattern may not be displayed as possible as you can, and by using all parts of the viewing area evenly. Also, we would recommend to use the module at the ambient temperature as low as you can because the temperature is one of the causes of acceleration of the luminance change due to time lapse.
12. To prevent smoke or fire in abnormal status, this module installs the fuses. But the fuses may not be melt down, and the temperature of the parts can rise, depending on the conditions of the usage, characteristic of power supply's current capacity, or defect mode. Therefore, take care that combustibles shall be set away from the module.
13. Cable for the interface and power supplies shall be flat ribbon cable of 16 wires of 1.27 mm pitch (conductor AWG #28) or it's equivalent.
14. This module may occur the visible noise in case you set up it in a metal case. It is caused by the capacitance coupling between panel electrodes and a metal case.
In such a case, you should connect the wire from module's GND with a metal case.
15. Never apply stress on the lower part of the EL module with which driver IC is connected.
16. Please observe the notes for usual electronic components strictly.

Others

If any problem should arise from this specification, the supplier and user should work out a mutually acceptable solution.

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13. Circuit scheme of the signal input block



NFA81R00C220

(22 pF)

(Maker: MURATA MANUFACTURING COMPANY LIMITED)

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14. Power supply input circuit

(a) Over current protection

This module equips fuses in power supply input circuit protecting fire accident rising from over current in internal circuit, so the fuse may melt down when the specifications are not kept or in case of short circuit.

Fuse specifications

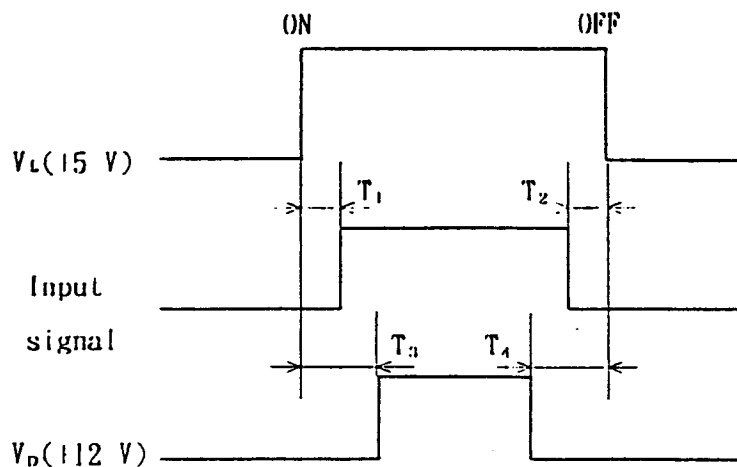
Parts No.	Model No.	Ratings	Weld type	Authorization Standard
F 1	TE 5 19396 \equiv	800 mA	slow	UL, CSA
F 2	TE-5 19396 \equiv	1.25 A	slow	UL, CSA
F 3	TE-5 19396 \equiv	1.6 A	slow	UL, CSA

\equiv : or equivalents

Maker : Wickmann

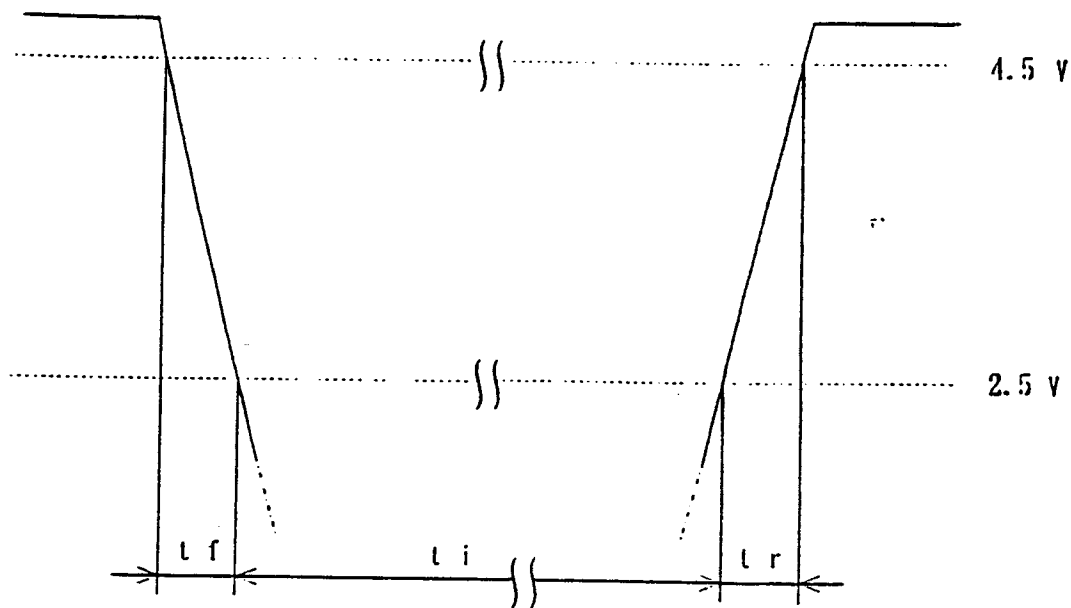
Note) Fuses is not open in the case current capacity of power supply is small. Or fuses is open by surge current in case of current capacity of power supply is big. In consequence please you thoroughly investigate the module.

(b) Recommendation : Power on/off sequence



Note) $T_{1-4} \geq 0$

(c) Take account of the scheme below for 5 VDC input
rising up time and falling down time of 5 VDC

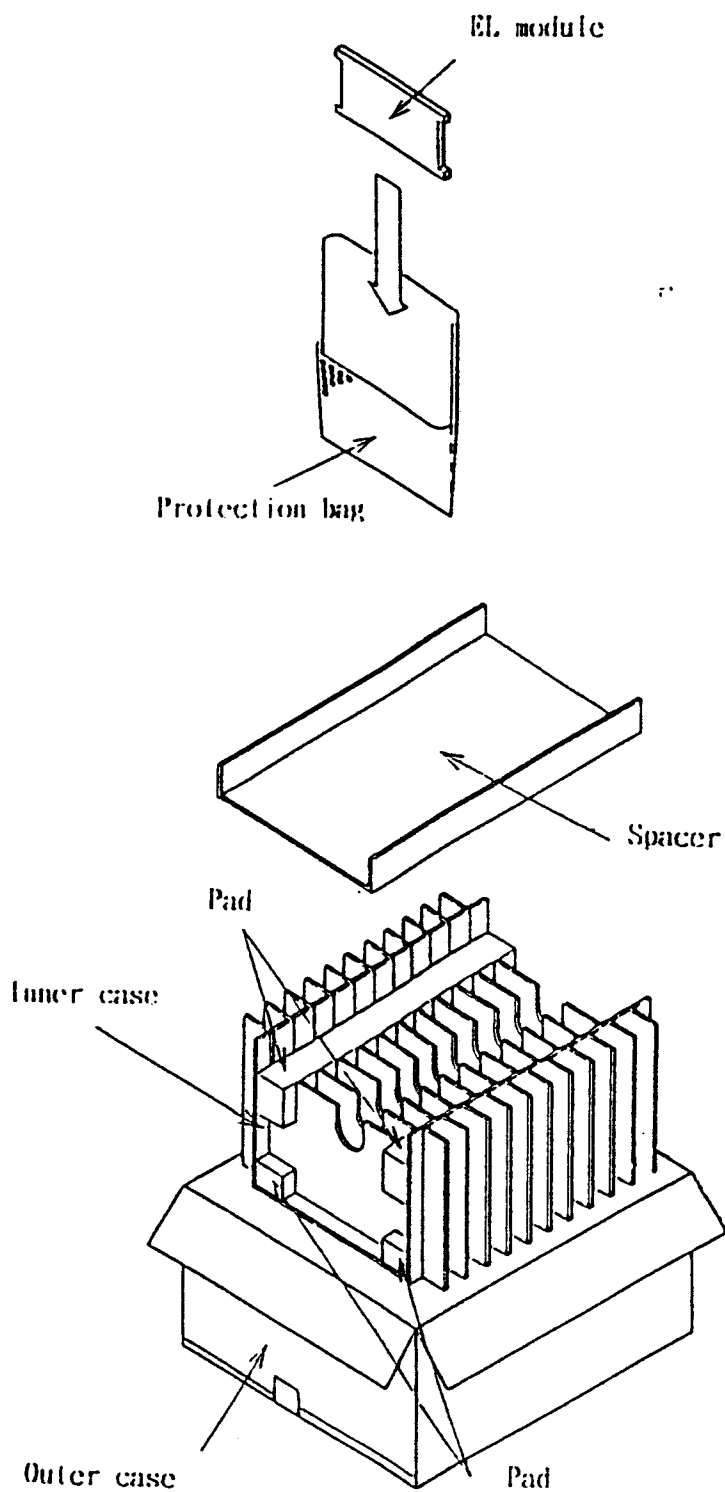


t_f = falling down time t_r = rising up time

- (1) $t_f, t_r \cong 100 \text{ ms}$ is better to be kept.
- (2) $t_i \cong 1 \text{ ms}$ shall be kept.

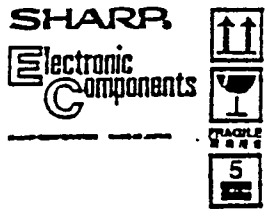
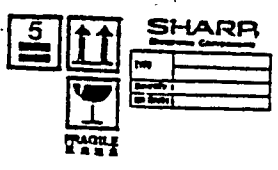
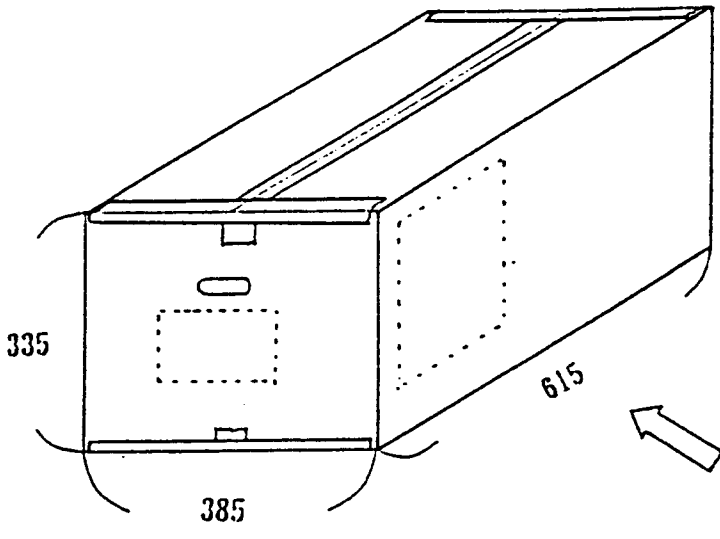
15. Packing Specification

10pcs. /packing



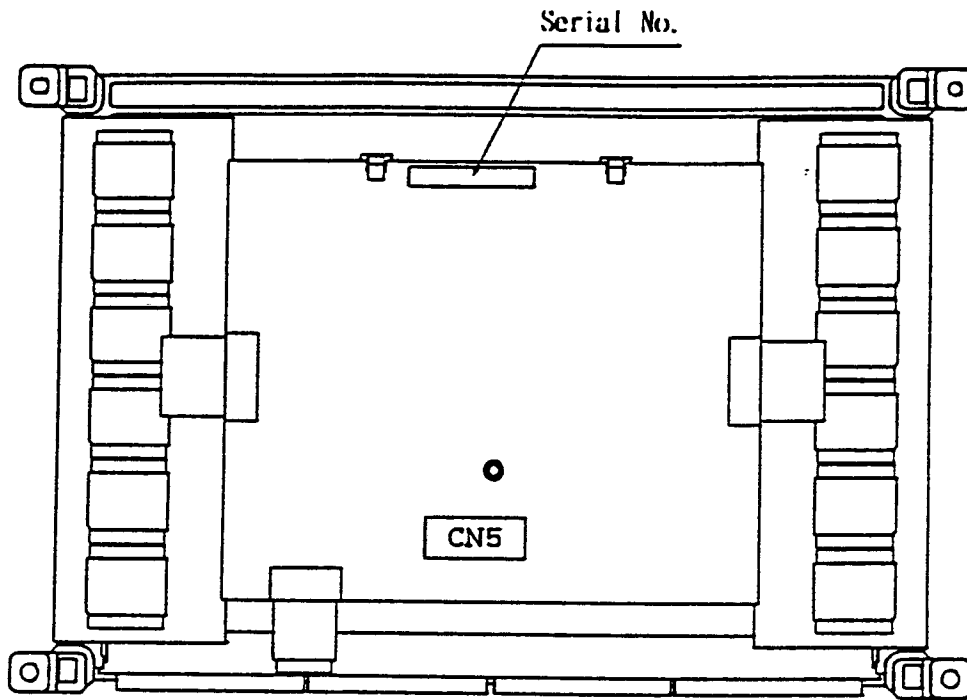
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Outline

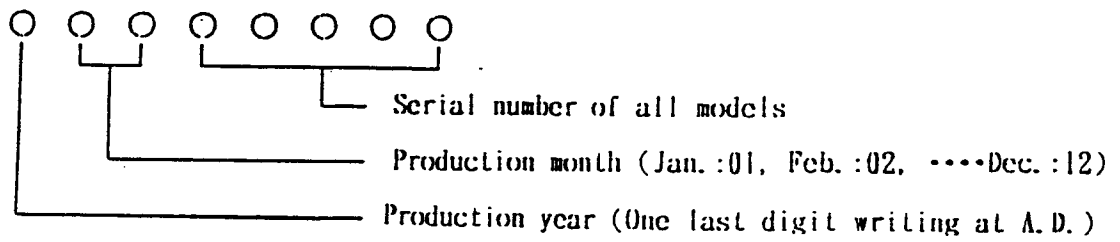


16. Serial number

(1) Position



(2) Content



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