

**NEC** NEC LCD Technologies, Ltd.

# **INVERTER**

## **121PW161**

### **DATA SHEET**

**DOD-PD-0932 (1st edition)**

**All information is subject to change without notice.  
Please confirm the sales representative before  
starting to design your system.**

**INTRODUCTION**

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NEC products are classified into the following three quality grades:  
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The *"Specific"* quality grade applies only to applications developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a product depend on its quality grade, as indicated below. Customers must check the quality grade of each application before using it in a particular application.

- Standard:* Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
- Special:* Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
- Specific:* Military systems, aircraft control equipment, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems (medical equipment, etc.) and any other equipment

The quality grade of this product is *"Standard"* unless otherwise specified in this document. If customers intend to use this product for applications other than those specified for *"Standard"* quality grade, they should contact NEC sales representative in advance.

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**1. DESCRIPTION**

121PW161 is type name of inverter. And the inverter consists of inverter circuit board, transformer and electric parts. Adaptable module is as follows.

Adaptable LCD module
NL8060BC31-20

This inverter has luminance control functions.

- Two steps control by BRTHL terminal.
- Variable steps control by a voltage or variable resistor.

**2. SPECIFICATION**

**2.1 GENERAL SPECIFICATIONS**

Item	Specification	Unit
Size	$26.0 \pm 0.8$ (H) $\times$ 125 <sup>+1.0</sup> (V) $\times$ 12 max. (D) Note1	mm
Weight	21 (typ.), 25 (max.)	g
Delivery unit	10 (min.)	set

Note1: See "5.OUTLINE DRAWINGS".

**2.2 ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Rating	Unit	Remarks
Storage temp.	Tst	-20 to +60	°C	-
Operating temp.	Top	0 to +60	°C	-
Supply voltage	VDDDB	15	V	Ta= 25°C
Relative Humidity Note 1	RH	≤ 95	%	Ta ≤ 40°C
		≤ 85		40 < Ta ≤ 50°C
Absolute Humidity Note 1	AH	≤ 70 Note2	g/m <sup>3</sup>	Ta > 50°C

Note1: No condensation

Note2: Water amount at Ta= 50°C and RH= 85%

2.3 ELECTRICAL CHARACTERISTICS

(Ta= 25°C)

Parameter	Symbol	min.	typ.	max.	Unit	Remarks	
Power supply voltage	VDDB	11.4	12.0	12.6	V	Note1, Note2	
Power supply current	IDDB	-	600	700	mA	VDDB = 12.0V Note2 (at the maximum luminance control)	
Output voltage	Open lamp voltage	VO	1,600	-	-	Vrms	Ta= 0 to +60°C
	Lamp voltage (at steady state)	VL	-	600	-	Vrms	-
Output current	Lamp current (per lamp)	IL	4.0	5.0	6.0	mArms	-
Oscillation frequency	FO	58	65	69	kHz	-	
Luminance control frequency	FB	260	270	280	Hz	-	

Note1: When designing of the power supply, take the measures for the prevention of surge voltage.

Note2: The power supply lines (VDDB and GNDB) have large ripple voltage during luminance control of LCD lamps. There is the possibility that the ripple voltage produces acoustic noise and signal wave noise in audio circuit and so on. Put a capacitor (5,000 to 6,000μF) between the power supply lines (VDDB and GNDB) to reduce the noise, if the noise occurred in the circuit.

2.4. FUSE

Parameter	Fuse		Rating	Fusing current	Remarks
	Type	Supplier			
VDDB	11CT1A	SOC Corporation	1.0A	2.0A	Note1
			72V		

Note1: The power supply capacity should be more than the fusing current. If it is less than the fusing current, the fuse may not blow in a short time, and then nasty smell, smoke and so on may occur.

2.5 INTERFACE PIN CONNECTIONS

CN1 socket (Inverter side): FI-S5P-HFE (Japan Aviation Electronics Industry Limited (JAE))  
 Adaptable plug: FI-S 5S (Japan Aviation Electronics Industry Limited (JAE))

Pin No.	Symbol	Function	Remarks
1	VDDB	12V ± 5%	Note1
2	VDDB	12V ± 5%	
3	GNDB	Ground	
4	GNDB	Ground	
5	BRTHL	Luminance control	Note2

Note1: All GNDB and VDDB terminals should be used without any non-connected lines.

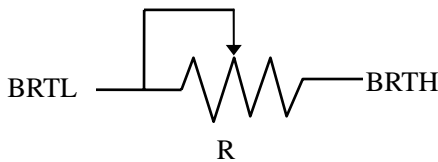
Note2: BRTHL= “+5V” or “Open”: Maximum luminance (100%)  
 BRTHL= “GNDB level”: Minimum luminance (20% typ.)

CN3 socket (Inverter side): IL-Z-3PL-SMTYE (Japan Aviation Electronics Industry Limited (JAE))  
 Adaptable plug: IL-Z-3S-S125C3 (Japan Aviation Electronics Industry Limited (JAE))

Pin No.	Symbol	Function	Remarks
1	BRTC	Backlight ON/OFF	Note1
2	BRTH	Luminance control input	Note2, Note3
3	BRTL	Luminance control input	

Note1: BRTC= “+5V” or “Open”: Backlight “ON”  
 BRTC= “GNDB level”: Backlight “OFF”

Note2: A way of luminance control by a variable resistor.  
 This way works when BRTHL (No.5 pin) of CN1 is opened.



Mating variable resistor: 10kΩ ± 5%  
 R= 0Ω: Minimum luminance (20% typ.)  
 R= 10kΩ: Maximum luminance (100%)

Note3: A way of luminance control by a voltage.  
 This way works when BRTL and BRTHL are opened.  
 The range of input voltage between BRTH and GNDB are as follows.

3.45V: Minimum luminance (20% typ.)  
 ≤ 1.0V: Maximum luminance (100%)

CN2 socket (Inverter side): SM03(4.0)B-BHS-1-TB(LF)(SN)  
 Adaptable plug: BHR-03VS-1 (J.S.T TRADING COMPANY, LTD.(JST))

Pin No.	Symbol	Function	Remarks
1	V <sub>LOW</sub>	Low voltage terminal (Cold)	-
2	V <sub>HIGH</sub>	High voltage terminal (Hot)	
3	V <sub>HIGH</sub>	High voltage terminal (Hot)	

Note1: V<sub>HIGH</sub> and V<sub>LOW</sub> must be connected correctly. Wrong connections will cause electric shock and also break down of the product.


3. RELIABILITY TEST

This test is in accordance with the Reliability Test of the adaptable LCD module. Refer to Reliability Test of the adaptable LCD module.


4. PRECAUTIONS

4.1 MEANING OF CAUTION SIGNS


The following caution signs have very important meaning. **Be sure to read "4.2 CAUTIONS" and "4.3 ATTENTIONS", after understanding these contents!**


	This sign has the meaning that customer will be injured by himself or the product will sustain a damage, if customer has wrong operations.
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	This sign has the meaning that customer will get an electrical shock, if customer has wrong operations.
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	This sign has the meaning that customer will be injured by himself, if customer has wrong operations.
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4.2 CAUTIONS

	<ul style="list-style-type: none"> <li>* <b>Do not touch the inverter while the inverter is working, because there is a danger of an electric shock.</b></li> <li>* <b>Do not remove the inverter protection sheet, because there is a danger of an electric shock.</b></li> <li>* <b>Be sure to wait some time after turning power OFF before starting replacement work, because the inverter is charged at a high voltage after working.</b></li> </ul>
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	<ul style="list-style-type: none"> <li>* <b>Be sure to wait some time after turning power OFF before starting replacement work, because the inverter is hot after working.</b></li> <li>* <b>Do not shock the inverter, because there is a danger of breaking.</b></li> </ul>
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4.3 ATTENTIONS



4.3.1 Handling of the product

- ① Take hold of both ends without touching the circuit board when the product (LCD module) is picked up from inner packing box to avoid broken down or misadjustment, because of stress to mounting parts on the circuit board.
- ② When handling the product, take the measures of electrostatic discharge with such as earth band, ionic shower and so on, because the product may be damaged by electrostatic.
- ③ Do not push nor pull the interface connectors while the product is working.
- ④ Do not hook nor pull cables such as lamp cable, and so on, in order to avoid any damage.
- ⑤ Properly connect the adaptable plug (backlight side) to socket (inverter side) without incomplete connection. After connecting, be careful not to hook the lamp cables because incomplete connection may occur by hooking the lamp cables. This incomplete connection may cause abnormal operation of high voltage circuit.

#### 4.3.2 Environment

- ① Do not operate or store in high temperature, high humidity, dewdrop atmosphere or corrosive gases. Keep the product in packing box with antistatic pouch in room temperature to avoid dusts and sunlight, when storing the product.
- ② In order to prevent dew condensation occurring by temperature difference, the product packing box should be opened after enough time being left under the environment of an unpacking room. Evaluate the leaving time sufficiently because a situation of dew condensation occurring is changed by the environmental temperature and humidity. (Recommended leaving time: 6 hours or more with packing state)
- ③ Do not operate in high magnetic field. Product may be broken down by it.
- ④ This product is not designed as radiation hardened.

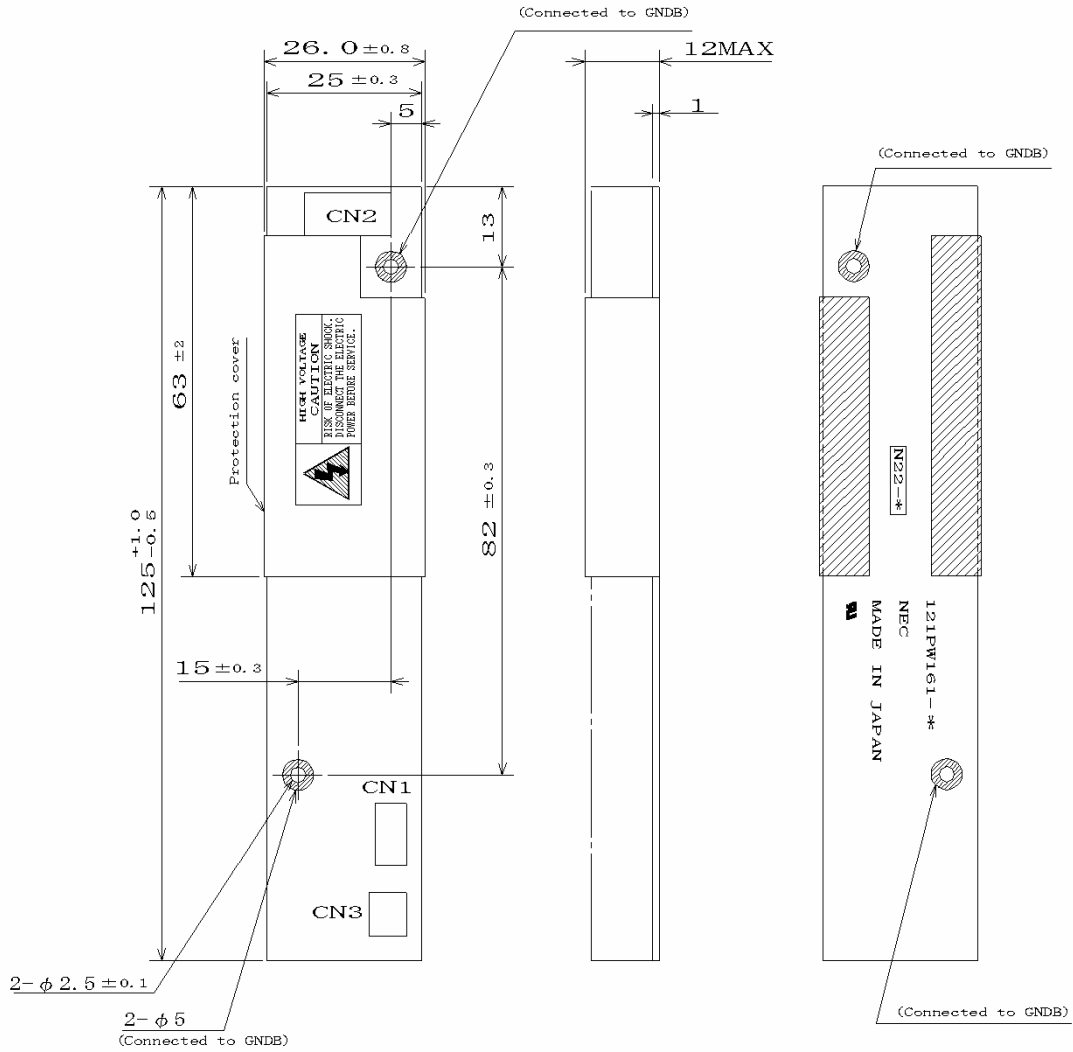
#### 4.3.3 Other

- ① All GNDB and VDDB terminals should be used without any non-connected lines.
- ② Do not disassemble a product.
- ③ Pack the product with original shipping package, in order to avoid any damages during transportation, when returning the product to NEC for repair and so on.
- ④ Put the spacer of 1.0mm thickness or more on a product rear side, because of the protection for contortion.

Spacer example: Thickness= 1.0mm (min.)  
Diameter ( $\phi$ ) = 5.0mm (Recommendation)



**5. OUTLINE DRAWINGS**



(Unit: mm)