

# **INVERTER**

## **121PW181**

### **DATA SHEET**

**DOD-PD-0765 (2nd edition)**

**This DATA SHEET is updated document from  
DOD-PD-0348(1).**

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

## INTRODUCTION

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**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, 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. OUTLINE**

This 121PW181 inverter is for LCD module. Adaptable LCD modules are as follows.

Adaptable LCD modules
NL10276BC24-13
NL8060BC31-27
NL8060BC31-28D

**2. SPECIFICATION**

**2.1 GENERAL SPECIFICATIONS**

Item	Specification	Unit
Size	See "5.OUTLINE DRAWINGS".	mm
Weight	23 (max.)	g
Delivery unit	10 (min.)	set

**2.2 ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Rating	Unit	Remarks
Power supply voltage	VDDB	0 to +14.0	V	Ta = 25°C
Input voltage	BRTC signal VBC	-1.0 to VDDB+1.0	V	
	BRTI signal VBI	0 to +16.0	V	
Storage temperature	Tst	-30 to +85	°C	-
Operating temperature	Top	-10 to +70	°C	-
Relative humidity Note1	RH	≤ 95	%	Ta ≤ 40°C
		≤ 85	%	40 < Ta ≤ 50°C
Absolute humidity Note1	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	800	mA	(at the maximum luminance control.) Note2	
Input voltage	BRTC signal	High	VBCH	2.5	-	VDDB	V	-
		Low	VBCL	0	-	0.4	V	
	BRTI signal		VBI	0	-	2.5	V	
Output voltage	Open lamp voltage		VO	1,600	-	-	Vrms	Ta = -10 to +70
	Lamp voltage (at steady state)		VLH	-	570	-	Vrms	-
	AM signal	High	VAMH	4.5	5.0	5.5	V	at malfunction
		Low	VAML	-	-	0.5	V	at normal
Output current	Lamp current (per lamp)		IBL	4.5	5.0	5.5	mArms	-
Oscillation frequency		FO	58	63	68	kHz	-	
Luminance control frequency		FB	310	340	370	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) occurs large ripple voltage while 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 source 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	CCP2E20HTTE	KOA Corporation	1.0A	2.0A	Note1
			72V		

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

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2.5 CONNECTIONS AND FUNCTIONS FOR INTERFACE PINS

CN1 socket (Inverter side): 53261-0971 (MOLEX Inc.) ☆  
 Adaptable plug: 51021-0900 (MOLEX Inc.)

Pin No.	Symbol	Function	Remarks
1	VDDB	Power supply	Note1
2	VDDB	Power supply	
3	GNDB	Ground	
4	GNDB	Ground	
5	BRTC	Backlight ON/OFF signal	High or Open: Backlight ON Low: Backlight OFF This pin is pulled-up to VDDB in the product. Pull-up resistance: 130 kΩ
6	BRTI	Luminance control terminal	Note2
7	BRTH	Luminance control terminal	Note2
8	AM	Alert signal for malfunction	+5.0V output at malfunction Note3
9	RSVD	-	Keep this pin Open.

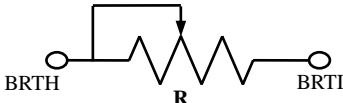
Note1: All GNDB and VDDB terminals should be used without any non-connected lines. ☆  
 Note2: See "**2.6 LUMINANCE CONTROL**".  
 Note3: If anyone of terminals Pin No.1, 2 or 4 (CN2) opens, then the alert signal (+5.0V) is output.

CN2 socket (Inverter side): SM03 (7-D1) B-BHS-1-TB(LF)(SN) (J.S.T. Mfg Co., Ltd.) ☆  
 Adaptable plug (Backlight side): BHR-04VS-1 (J.S.T. Mfg Co., Ltd.)

Pin No.	Symbol	Signal	Remarks
1	VBLH	High voltage (Hot)	-
2	VBLH	High voltage (Hot)	-
3	N. C.	-	Keep this pin Open.
4	VBLC	Low voltage (Cold)	-

Note1: VBLH and VBLC must be connected correctly. If customer connects wrongly, customer will be hurt and the module will be broken. ☆

2.6 LUMINANCE CONTROL

Method	Adjustment and luminance ratio						
Resistor control	<ul style="list-style-type: none"> <li>• Adjustment                             <p>The variable resistor (<b>R</b>) for luminance control should be 10kΩ ±5%, B curve, 1/10W. Minimum point of the resistor is the minimum luminance. Also maximum point of the resistor is the maximum luminance.</p> <p>The resistor (<b>R</b>) must be connected between BRTH-BRTI terminals.</p>  </li> <li>• Luminance ratio Note1                             <table border="1" data-bbox="536 775 1370 916"> <thead> <tr> <th>Resistance</th> <th>Luminance ratio</th> </tr> </thead> <tbody> <tr> <td>0Ω</td> <td>20% (Min. Luminance)</td> </tr> <tr> <td>10kΩ</td> <td>100% (Max. Luminance)</td> </tr> </tbody> </table> </li> </ul>	Resistance	Luminance ratio	0Ω	20% (Min. Luminance)	10kΩ	100% (Max. Luminance)
Resistance	Luminance ratio						
0Ω	20% (Min. Luminance)						
10kΩ	100% (Max. Luminance)						
Voltage control	<ul style="list-style-type: none"> <li>• Adjustment                             <p>Voltage control method works, when BRTH terminal is 0V and VBI voltage is input between BRTI and BRTH terminal. This control method can carry out continuation adjustment of luminance.</p> <p>Luminance is the maximum when BRTI terminal is Open.</p> </li> <li>• Luminance ratio Note1                             <table border="1" data-bbox="536 1178 1370 1319"> <thead> <tr> <th>BRTI signal (VBI)</th> <th>Luminance ratio</th> </tr> </thead> <tbody> <tr> <td>0V</td> <td>20% (Min. Luminance)</td> </tr> <tr> <td>2.5V</td> <td>100% (Max. Luminance)</td> </tr> </tbody> </table> </li> </ul>	BRTI signal (VBI)	Luminance ratio	0V	20% (Min. Luminance)	2.5V	100% (Max. Luminance)
BRTI signal (VBI)	Luminance ratio						
0V	20% (Min. Luminance)						
2.5V	100% (Max. Luminance)						

Note1: These data are the target values.


3. RELIABILITY TEST

This test is in accordance with the adaptable LCD module. Refer to Reliability Test of the 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 that customer will get an electric shock.</b></li> <li>* <b>Do not remove the inverter protection sheet, because there is a danger that customer will get an electrical 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

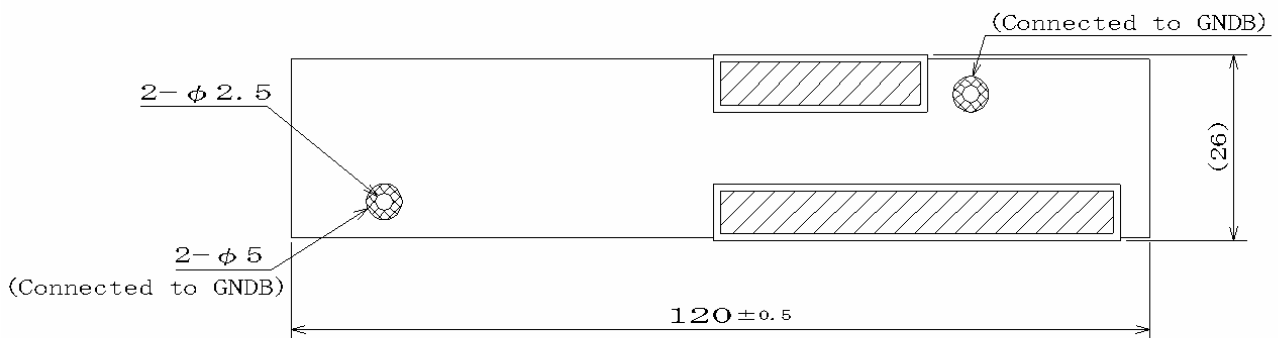
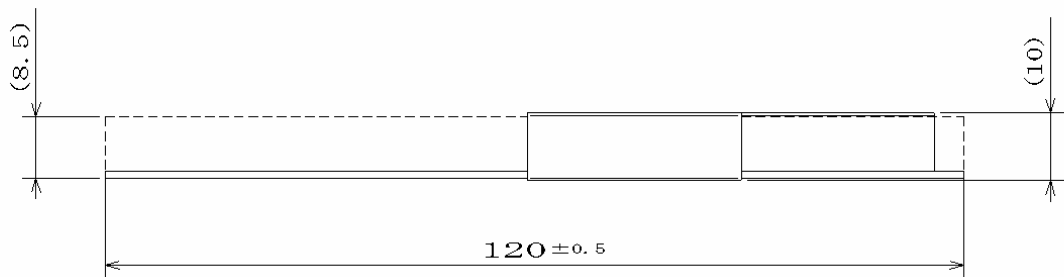
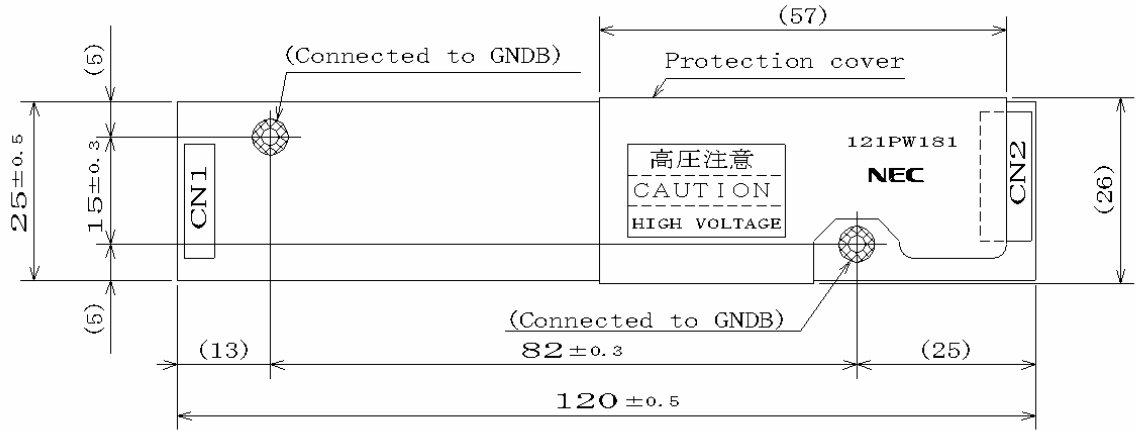
- ① Take hold of both ends without touch the mounting parts when customer pulls out products from packing box. If customer touches it, products may be broken down or out of adjustment, because of stress to mounting parts.
- ② Take the measures of electrostatic discharge such as earth band, ionic shower and so on, when customer deals with the product, because products may be damaged by electrostatic.
- ③ Do not push-pull the interface connectors while the product is working, because wrong power sequence may break down the product.
- ④ Do not hook cables nor pull connection cables such as lamp cable and so on, for fear of 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.



5. OUTLINE DRAWINGS

(Unit: mm)

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Note1: The values in parentheses are for reference.