

NLV-4001

CCD Barcode Scanner



This manual provides specifications for
The NLV-4001 fixed position 1D imager scanner.

The information in this document is subject to change without notice.

Document History

Model Number:	NLV-4001	Specification Number:	SS16014
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Edition	Date	Page	Section	Description of Changes		
1 st	2016/3/28	-	-	Initial release		
2 nd	2019/5/10	-	-	Update the cover image.		
		3	3	Revise Regulatory Compliance, LED safety: IEC 62471-1:2006 (Exempt_Group) → IEC 62471 Exempt Risk Group, delete note. Revise Regulatory Compliance: EMI/RFI → EMC VCCI Class B, EN55022, FCC Class B → VCCI クラス B / FCC Class B / EN 55032 Class B, EN 55024 Delete Regulatory Compliance Electromagnetic compatibility		
		4	4	Change: Detail View → Detailed View Delete dimensions		
		5	5	Change: the indicators (buzzer / OK LED) → the indicators (buzzer / Status LED) Update Figure 2: Configuration Diagram		
		9	7.2	Correct distance: 47 → 86 mm Update Figure 7: Aiming Pattern and Imaging Range		
		11	8.2	Update Figure 8: Scan Area and Depth of Field		
		12	8.5	Update Figure 9: Pitch, Skew and Tilt		
		13	8.6	Update Figure 10: Curvature		
		18	11	Update Figure 15: Product Label Delete label dimension		
		19	12.1	Update Figure 16: Individual packaging		
		20	12.2	Update Figure 17: Collective packaging		
		21	13.1	13.1	Update: IEC 62471-1:2006 Exempt_Group → IEC 62471:2006 Exempt Risk Group	
				13.2	Update: EN55024 → EN 55024:2010 Update: EN55032 → EN 55032:2012 +AC:2013 Class B Update: VCCI Class B → VCCI クラス B, and additional note.	
					13.4	Update RoHS
		25	15.3	15.3	Delete “Auto trigger stand detection” and “Status LED indicate mode”	
				15.6	Change reference: 9.6 → 8.5	
				15.6	Update Figure 18: Auto Trigger	
		30	16	16	Change “Mechanical Drawing” to “Physical Features”. Change Dimensions and Weight to section. 16.1 Dimensions 16.2 Weight 16.3 Mechanical Drawing	
				16.1	Correct dimensions order: WDH → DWH	
				16.3	Update Figure 19: Mechanical drawing.	
		-	-	-	-	Correct errors, adjust format.

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1 Abstract

This manual provides specifications for the NLV-4001 Barcode scanner.

2 Overview

- The NLV-4001 is a Barcode scanner with a built-in 1D CCD linear imager.
- The scanner can read bar codes from LCD screens.
- A single red LED aiming line toward a target bar code can help the users find the appropriate scanning position.
- Supported symbologies are:
EAN / JAN / UPC-A / UPC-E/ Industrial 2 of 5 / IATA / Interleaved 2 of 5 / Codabar(NW-7) / Code 39 / Code 93 / Code 128 / MSI/Plessey.
ISBN code (JAN-13 + 5-digit add-on) / GS1 Data Bar (formerly RSS-14) Family are readable by the setting.
- High resolution barcode 0.076 mm (3 mil) is readable.
- The scanner is capable of scanning bar codes consisting of white bars on black spaces (negative bar code).
- The scanner is a RoHS compliant product declared by OPTOELECTRONICS CO., LTD.

3 Basic Specification

Item		Specification		Note	
Control Section	CPU	32 bit CISC		Core: 96 MHz	
	SRAM	96 KB			
	Flash ROM	512 KB + 32 KB			
Interface	RS-232C	300bps to 115200bps		Default: 9600bps	
	USB	Full Speed 12 Mbps			
Optical Section	Scan method	CCD linear image sensor			
	Light source	1 red LED		624 nm	
	Effective pixels	1500 pixels			
	View angle	Horizontal: about 50°			
Technical specification	Symbologies	UPC-A, UPC-A Add-on, UPC-E, UPC-E Add-on, EAN-13, EAN-13 Add-on, EAN-8, EAN-8 Add-on, Code 39, Tri-Optic, Codabar(NW-7), Industrial 2 of 5, Interleaved 2 of 5, Code 93, Code 128, GS1-128, S-Code, MSI/Plessey, UK/Plessey, TELEPEN, Matrix 2of5, Chinese Post Matrix 2of5, IATA, GS1 DataBar, GS1 DataBar Limited, GS1 DataBar Expanded, Code 11, Korean Postal Authority code			
	Minimum resolution	0.076 mm (3 mil)		Code 39 PCS 0.9 Illumination LED on	
	Curvature	Radius ≥ 15 mm (JAN-8) Radius ≥ 20 mm (JAN-13)		PCS 0.9, Illumination LED on	
	Depth of Field	Resolution (1.0)	85 - 500 mm		Code 39 PCS 0.9 Ambient light 300 to 500 lx Illumination LED on (Temperature: -5 to 50° C)
		Resolution (0.5)	60 - 325 mm		
		Resolution (0.127)	60 - 160 mm		
	Scan angle	Skew	±65°(exc dead zone)		PCS 0.9 JAN-13 Resolution 0.26 mm Illumination LED on
		Pitch	±45°		
		Tilt	±25°		
	Wide bar code	110 mm width		Code 39 Resolution 0.2 mm Illumination LED on	
	Minimum PCS	0.3 or higher		MRD 32% or higher	
Scanning from LCD screen	White brightness	30 cd/m ² or more		Illumination LED off	
	Contrast ratio	100:1 or more			
Power Section	Operating voltage	4.5 - 5.5 V: USB / RS-232C		(Rated voltage)	
	Operating current (*)	180 mA(Typ)		USB/RS-232C	
	Standby current (**)	50 mA(Typ)			

(*) For the RS-232C, a D-sub 9-pin connector is connected to a host device.

(**) The current values may vary depending on the host device.

Item		Specification	Note	
Environmental Specification	Temperature	Operating	-5 to 50°C	
		Storage	-20 to 60°C	
	Humidity	Operating	10 to 90% (No condensing, no frost)	
		Storage	5 to 95% (No condensing, no frost)	
	Ambient light immunity		10,000 lx or less	JAN-13 (resolution 0.26 mm) DOF 59 mm
	Vibration		Increase the frequency of the vibration from 10 Hz to 100 Hz at an accelerated velocity of 19.6m/s ² for 60 minutes once each in X, Y and Z-direction	
	Drop		Drop the scanner 18 times (6 faces x 3) from the height of 75 cm onto a concrete floor	* Excluding the part where the interface cable is attached
Dust and drip proof		IP65 equivalent		
Regulatory Compliance	LED safety		IEC 62471 Exempt Risk Group	
	EMC		VCCI クラス B / FCC Class B / EN 55032 Class B, EN 55024	For residential, commercial and light-industry environments
	European conformity		CE marking	
Immunity Test	Electrostatic discharge	No destruction	Contact discharge (direct / indirect): ±8 kV Air discharge (direct): ±15kV	Conditions: IEC61000-4-2 compliant
		No malfunction	Contact discharge (direct / indirect): ±4 kV Air discharge (direct): ±8kV	
	Radiated radio frequency electromagnetic Field immunity	Frequency	80 to 1000 MHz	Conditions: IEC61000-4-3 compliant
		Level	3 V/m	
		AM	80% (AM)	
Power frequency magnetic field immunity	LEVEL	1A/m	Conditions: IEC61000-4-8 compliant	

4 Detailed View

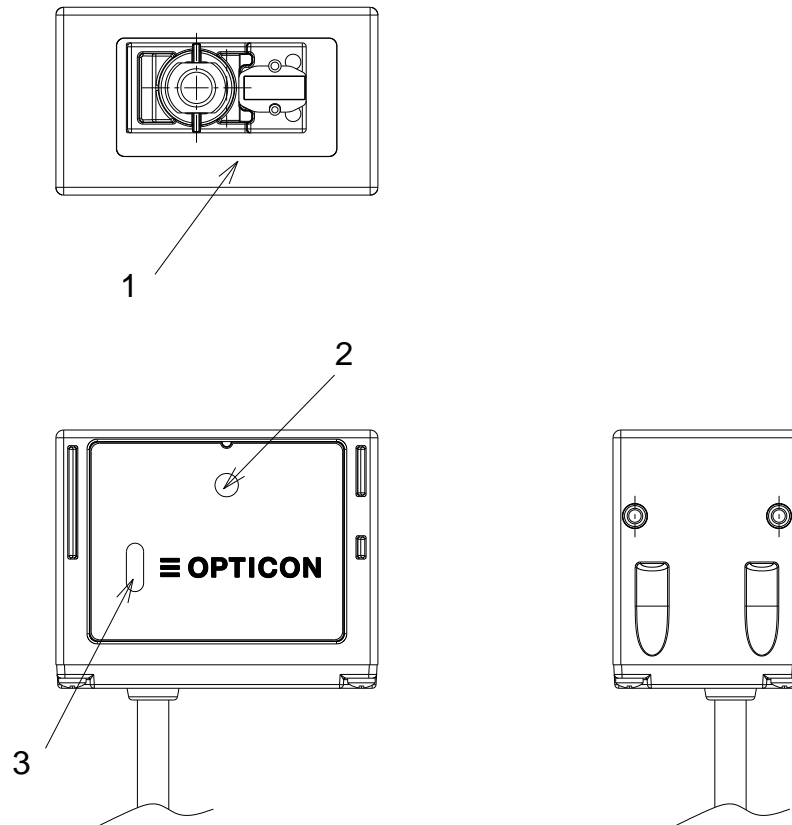


Figure 1: Detail View of NLV-4001

No.	Name	Description
1	Scan window	Light paths of the LED illumination. Ensure that the lens is not exposed to dust and dirt before scanning.
2	Status LED	Green LED light indicates good read.
3	Buzzer holes	Sound from a built-in buzzer comes out through these holes. When they are covered, the buzzer sound may not be able to be heard. The sound varies depending on the status. Buzzer settings are configurable for volume and duration.

5 Electrical specifications

<Configuration>

The scanner consists of

- CCD Module section; where the 1500-pixel CCD sensor, illumination LED, light receiving lens and illumination lens are mounted, and
- Main PCB; where the CPU (decode/communication controller which processes bar code signals are combined), the power supply section that converts the main power to 3.3 V, the communication interface section to output the decoded data, the indicators (buzzer / status LED)

The USB interface models are bus powered so no external power supply is needed, while the RS-232C interface model needs a DC 4.5-5.5V power supply.

For the RS-232C model, make sure that the host device is powered off when connecting to the host device and inserting.

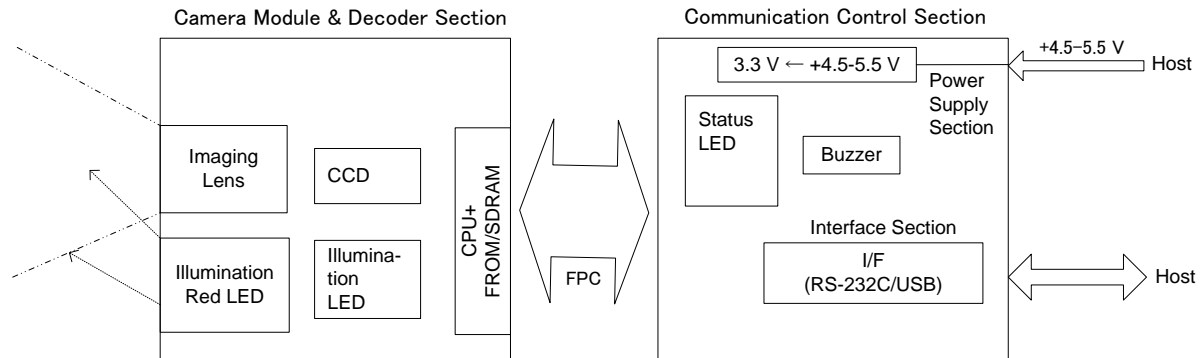


Figure 2: Configuration Diagram

5.1 USB Specification

Bus-Power Class	: 500 mA max (Hi-Power)
Current consumption*	: 50 mA (Typ.) in stand-by mode
	: 180 mA (Typ.) during reading operation

* The current consumption was measured at 25°C.

* The current consumption may vary depend by the connected host device.

5.2 RS-232C Specification

Input power supply voltage	: DC 5.0 V
Range of working voltage	: 4.5 - 5.5 V
Maximum current	: 0.5 A (max)
Current consumption*	: 50 mA in stand-by mode
	: 180 mA (typ) during reading operation

* The current consumption was measured at 25°C.

* The current consumption may vary depend by the connected host device.

6 Interface Specification

The NLV-4001 supports two types of interfaces; RS-232C, USB-COM

6.1 USB Interface

The USB interface has COM (Communication Device Class).

The VCP allows for virtual serial communication and therefore command transmission from the host device to the scanner.

For the USB-COM interface type, our USB-COM driver must be installed on your host device. Please use the latest version driver.

After NLV-4001 and host device are connected, while communication setting is on process, the status LED flashes. During this time, scanning operation is unable.

When use with USB-COM specification, if host device side COM port corresponded to the NLV-4001 is close, scan data transport fail and NLV-4001 makes error sound.

6.1.1 USB Interface Specifications

Bus-power class : 500 mA (high-power)
 Speed : Full speed (12 Mbps)
 Interface : COM (Virtual COM Port)

* The USB interface models are bus powered

* Make sure to connect to a high power bus (500 mA) USB terminal.

Item	Explanation
Transfer Speed	USB2.0 Full Speed
Vendor ID	065A
Product ID	0009 (COM)

6.1.2 USB Connector

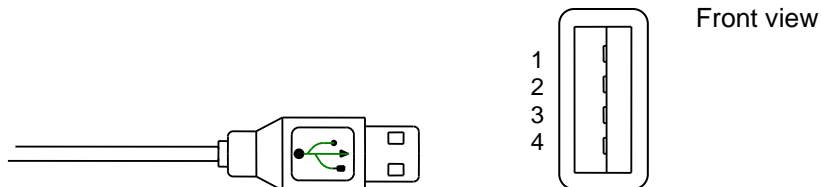


Figure 3: USB Plug (A) Pin Assignment

Pin No.	Signal name
1	VCC
2	- Data
3	+ Data
4	GND

6.1.3 Interface Circuit

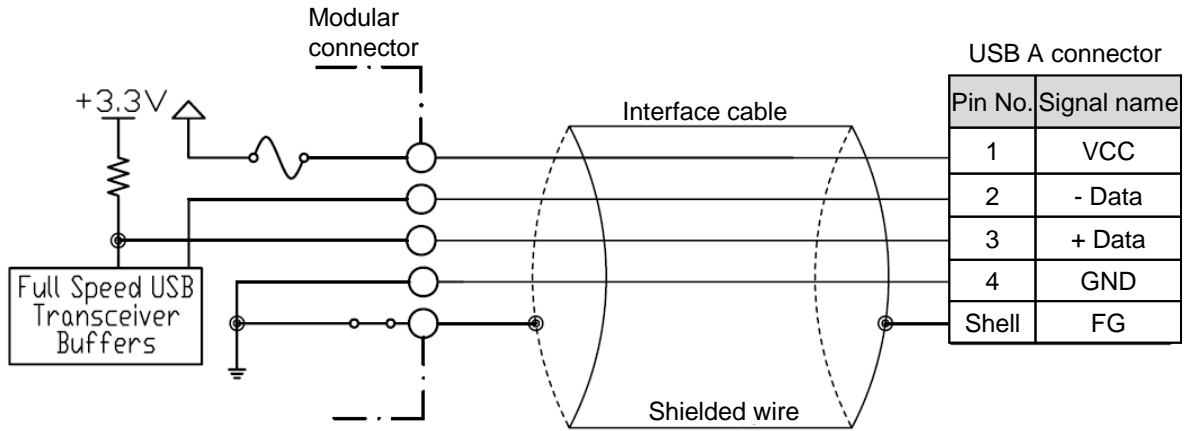


Figure 4: Interface Circuit (USB)

6.1.4 USB Interface Cable

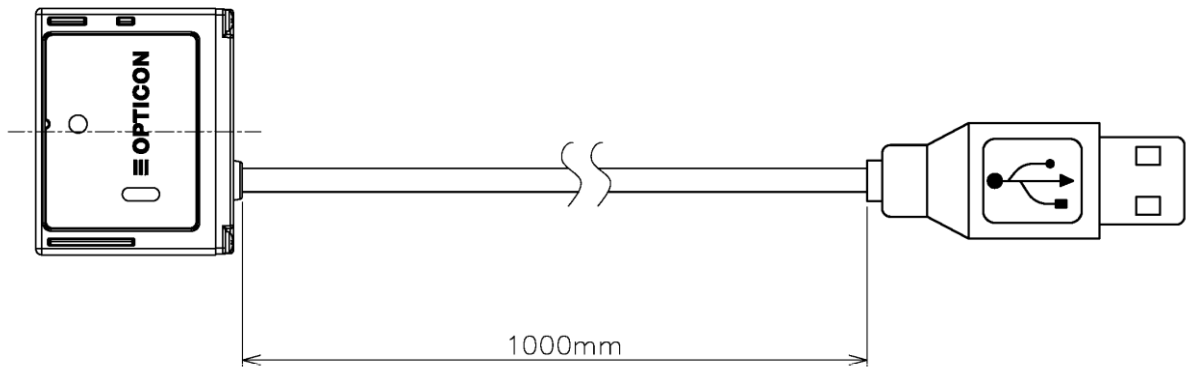


Figure 5: Cable (USB)

6.2 RS-232C Interface

6.2.1 Communication Setting

- Baud rate : 300 to 115200 bps
- Data length : 7 / 8 bits
- Parity bits : No / Even / Odd parity
- Stop bits : 1 / 2 bit

6.2.2 Signal Level and Pin Assignment

Signal names are based on the signals transmitted from the scanner to the host.

Signal Name	Pin No.	Note
VCC	1	Red
GND	2	Black
RTS	3	Gray
CTS	4	Blue
TxD	5	Green
RxD	6	White
Shield GND	7	Black
NC	8	Brown

Signal Level

Signal Name	IN/OUT	Voltage(V)	
		Mark	Space
TxD	OUT	-5 to -15	+5 to +15
RxD	IN	-3 to -15	+3 to +15
RTS	OUT	-5 to -15	+5 to +15
CTS	IN	-3 to -15	+3 to +15

6.2.3 RS-232C Interface Cable

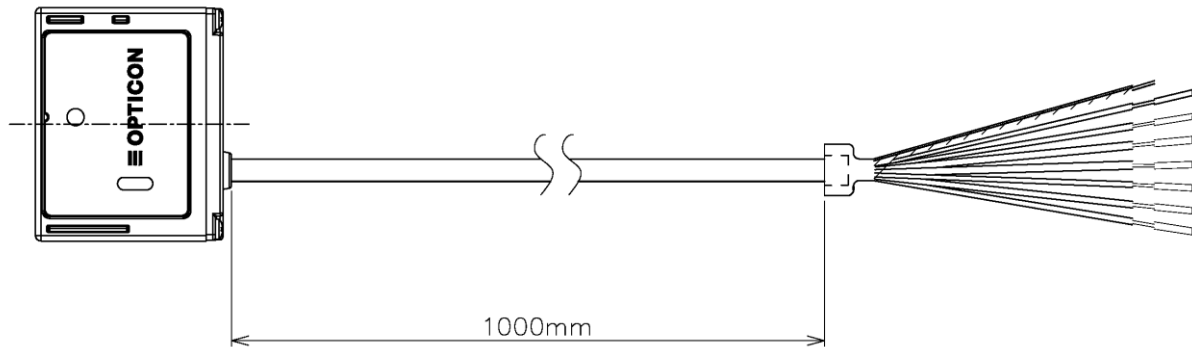


Figure 6: Cable (RS-232C)

7 Optical Specifications

7.1 Basic Specifications

Item		Characteristics
Scan method	CCD linear image sensor	-
Effective pixel	Horizontal	1500 dots
Image capture speed (*1)	Scan rate	300 scans/sec
View angle	Horizontal	Approx. 50°
Light source	Red LED	-
	Peak wavelength	624 nm
	Maximum radiation output (*2)	12 lm

*1 The fastest speed of image capture.

*2 Reference value based on the datasheet.

(Ambient air temperature 25°C, luminous efficacy 60lm/W, If = 100 mA)

7.2 Aiming Pattern

The aiming is used for the following purpose:

1. Light source for bar code reading
2. Light source to indicate the appropriate reading range

The aiming specifications are as follows:

- An optical axis of imaging field of view and the center of horizontal aiming width coincide at a distance of $L=86\pm 10$ mm from the front edge of the scanner.
- The horizontal aiming width to the horizontal width of imaging field of view at a distance of $L=86$ mm is $100\%\pm 10\%$.

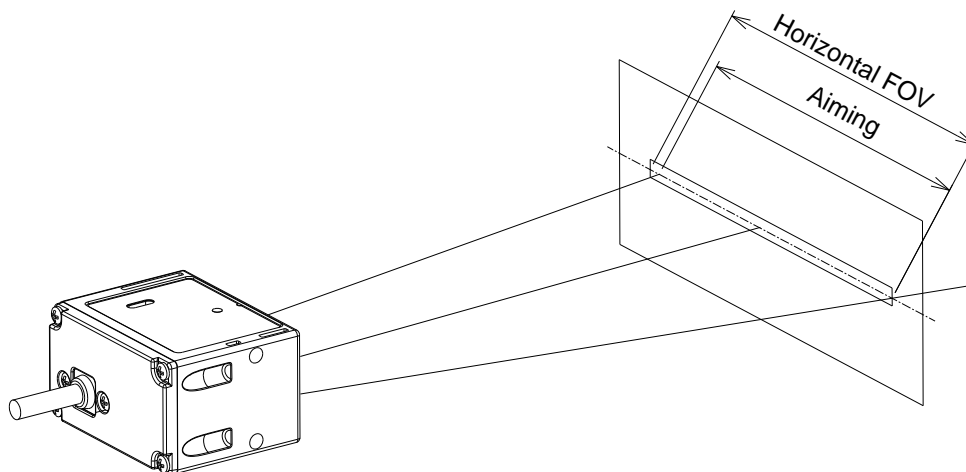


Figure 7: Aiming Pattern and Imaging Range

8 Technical Specifications

The conditions for technical specifications are as follows unless otherwise specified in each section.

<Conditions>

Temperature and humidity	Room temperature, room humidity
Illumination LED	ON
Ambient light	300 to 500 lx
Bar codes	Refer to Section 8.1.
Power supply voltage	Rated voltage 5.0 V
Reading test	1 read in 0.5 sec or less. Accept the performance with 10 consecutive successes.

8.1 Bar Code Test Sample

<Code 39>

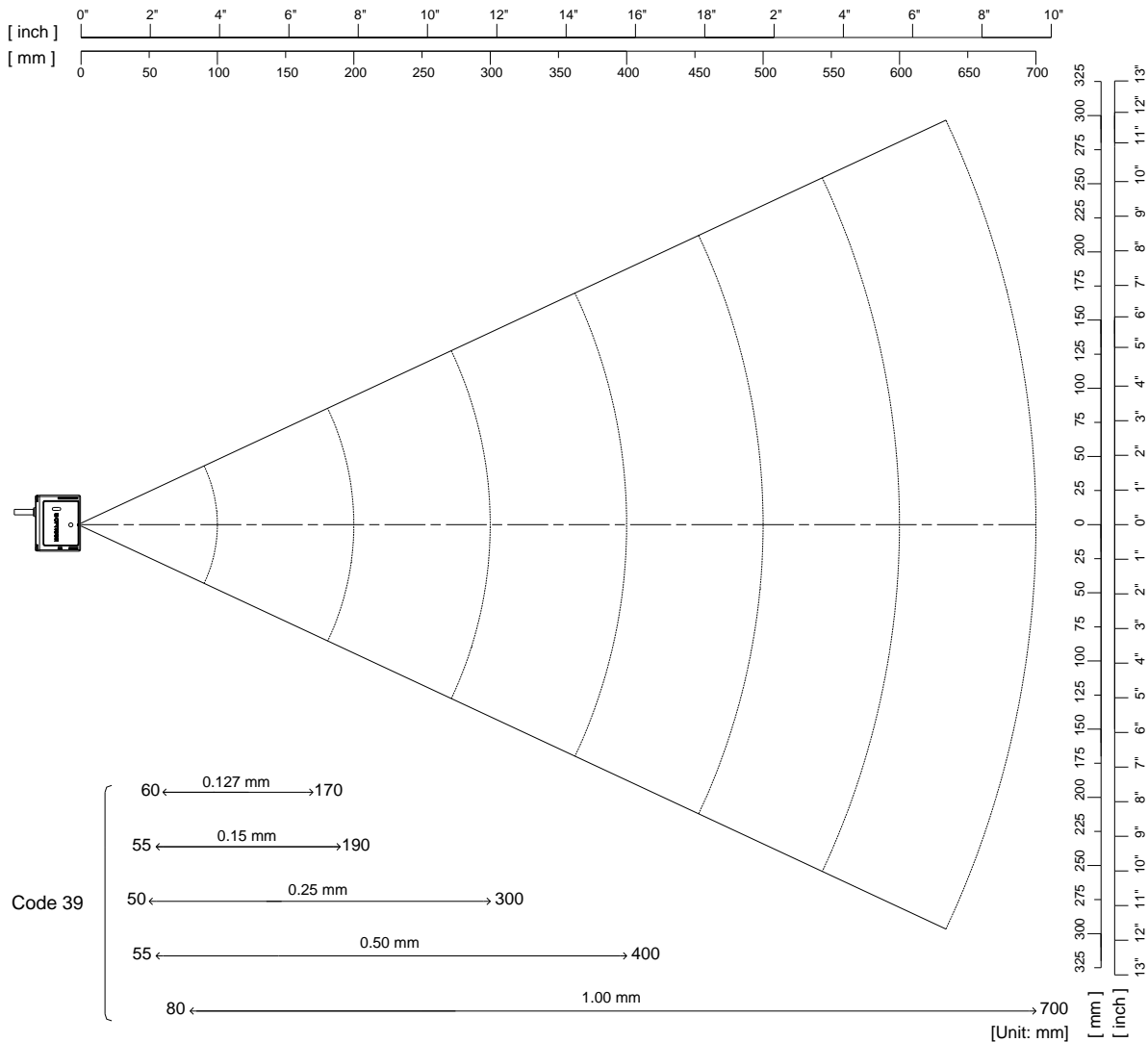
Resolution	Symbology	PCS	Quiet Zone	No. of Digits
1.0 mm	Code 39	0.9	25 mm	1
0.5 mm			18 mm	3
0.25 mm			10 mm	8
0.2 mm			10 mm	31
0.15 mm			7 mm	10
0.127 mm			5 mm	4
0.076 mm			5 mm	20

<JAN>

Resolution	Symbology	PCS	Quiet Zone	No. of Digits
0.26 mm	JAN	0.9	10 mm	13
0.26 mm			10 mm	8
0.33 mm			10 mm	13
0.26 mm		0.3	10 mm	13

8.2 Scan Area and Depth of Field

The scan area is within the arc centered on the scan origin as shown in each resolution, which is measured from the front edge of the scanner.



(Code39, Environment illumination=500 lux, Temperature = 25°C)

Figure 8: Scan Area and Depth of Field

8.3 Printed Contrast Signal (PCS)

0.3 or higher

<Conditions>

- MRD : 32 % or higher (70% or higher reflectivity of space and quiet zone)
- Distance : 59 mm from the front edge of the scanner
- Bar code : JAN-13, resolution 0.26 mm, PCS 0.3 specified in Section 8.1.

MRD = Minimum reflectance of white space - Maximum reflectance of black bar

$$PCS = \frac{\text{Reflectance of white space} - \text{Reflectance of black bar}}{\text{Reflectance of white space}}$$

* Be sure to keep the optical window clean without dirt or scratches, or it may have a bad effect on the reading characteristics.

8.4 Minimum Resolution

Resolution 0.076mm or more

<Conditions>

- Bar code : 20digit Code 39, resolution 0.076 mm, PCS 0.9 specified in Section 8.1.
- Distance : 50 mm from the front edge of the scanner
- Angle : $\alpha = 0^\circ$, $\beta = +15^\circ$, $\gamma = 0^\circ$ (refer to Section 8.5.)
- Curvature : $R = \infty$ (refer to Section 9.7.)

8.5 Pitch, Skew and Tilt

- Pitch : $\alpha \leq \pm 45^\circ$
- Skew : $\beta \leq \pm 65^\circ$
- Dead zone : $\beta \leq \pm 8^\circ$
- Tilt : $\gamma \leq \pm 25^\circ$

<Conditions>

- Bar code : JAN-13, resolution 0.33 mm, specified in Section 8.1.
- Distance : 59 mm from the front edge of the scanner
- Curvature : $R = \infty$
- Angle : Pitch $\beta = +15^\circ$, $\gamma = 0^\circ$
- Skew, Dead zone $\alpha = 0^\circ$, $\gamma = 0^\circ$
- Tilt $\alpha = 0^\circ$, $\beta = +15^\circ$

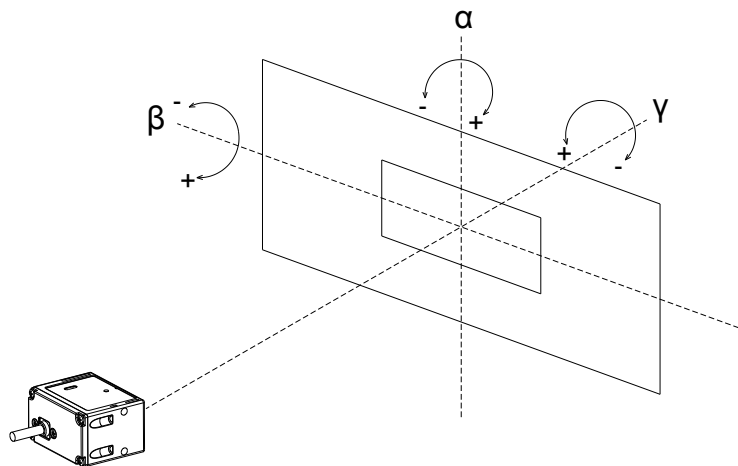


Figure 9: Pitch, Skew and Tilt

8.6 Curvature

0.26 mm 8-digit JAN : $R \geq 15$ mm
 0.26 mm 13-digit JAN : $R \geq 20$ mm

<Conditions>

Bar code : JAN, resolution 0.26 mm, specified in Section 8.1.
 Distance : 114 mm from the front edge of the scanner
 Angle : $\alpha = 0^\circ$, $\beta = +15^\circ$, $\gamma = 0^\circ$ (refer to Section 8.5.)

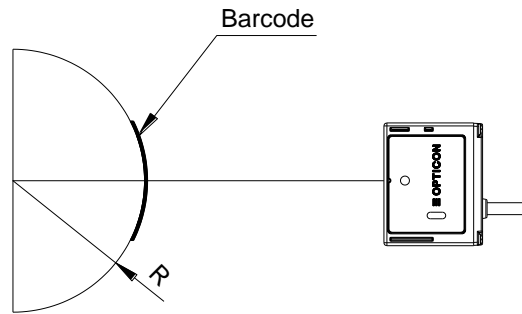


Figure 10: Curvature

* The reading characteristics may deteriorate due to the specula reflection of LED illumination when the reflectivity is high.

8.7 Scanning from LCD Screen

Bar codes displayed on LCD screens (brightness of white part 30 cd/m^2 or more, contrast ratio 100:1 or more) can be read.

<Conditions>

Bar code : JAN-13, resolution 0.26 mm specified in Section 8.1.
 Ambient light : 100 lx or less
 Distance : 114 mm from the front edge of the scanner
 Angle : $\alpha = 0^\circ$, $\beta = 0^\circ$, $\gamma = 0^\circ$
 LCD screen type : Transmissive (backlight) TFT

$$\text{Contrast ratio} = \frac{\text{Brightness of white parts}}{\text{Brightness of black parts}}$$

* The bar code resolution is the value when displayed on the LCD screen.
 * The width of bar code element is an integral multiple of pixel width of LCD screen.
 * The reading characteristics may deteriorate due to the specula reflection of LED illumination when the reflectivity is high.

9 Environmental Specifications

9.1 Operating Temperature and Humidity

Temperature: -5 to 50° C
Humidity: 10 to 90% RH (Non Condensing)

9.2 Storage Temperature and Humidity

Temperature: -20 to 60° C
Humidity: 5 to 95% RH (Non Condensing)

9.3 Static Electricity

Air discharge:	± 8 kV MAX (No malfunction) ± 15 kV MAX (No destruction)
Contact discharge:	± 4 kV MAX (No malfunction) ± 8 kV MAX (No destruction)

9.4 Ambient Light Immunity

Scanning performance is guaranteed when the range of illumination on a bar code surface is between zero and 10,000 lx.

<Conditions>

Bar code : UPC 0.33 mm specified in Section 9.1.
Distance : 59 mm from the front edge of the scanner
Angle : $\alpha = 0^\circ$, $\beta = +15^\circ$, $\gamma = 0^\circ$
Curvature : $R = \infty$

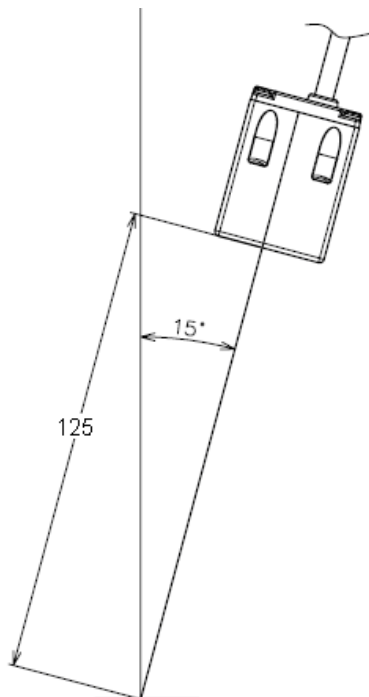


Figure 11: Ambient Light Immunity

* Avoid direct or specula reflection from the light source as it may blind the scanners optical receiver.

9.5 Vibration Strength (without packing)

There shall be no sign of malfunction after the following vibration test.

Vibration test: Increase the frequency of the vibration from 10Hz to 100Hz at an accelerated velocity of 19.6m/s^2 (2.0 G) for 30 minutes (60 minutes per cycle) in the non-operating state. Repeat this in each X, Y and Z direction.

9.6 Vibration Strength (in individual packing)

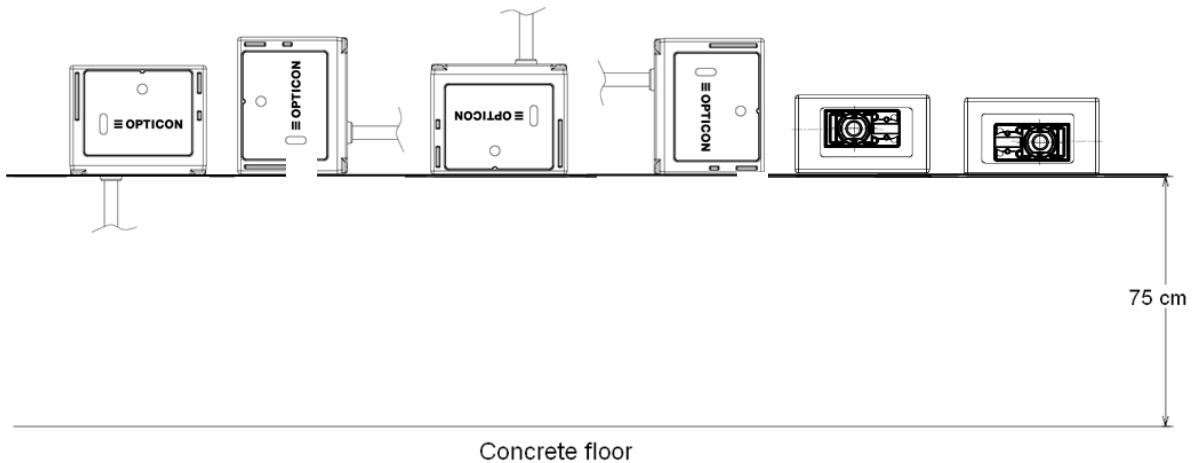
There shall be no sign of malfunction after the following vibration test.

Vibration test: Increase the frequency of the vibration from 10Hz to 100Hz at an accelerated velocity of 19.6m/s^2 (2.0 G) for 30 minutes (60 minutes per cycle) in individually packaged state. Repeat this in each X, Y and Z direction.

9.7 Drop Impact Strength (without packaging)

There shall be no sign of malfunction after the following drop test.

Drop test: Drop the scanner 18 times in total (3 times at each 6 face), from a height of 75 cm onto a concrete floor as shown below.



Concrete floor
Figure 12: Drop Test

9.8 Drop Impact Strength (in individual packaging)

There shall be no sign of malfunction after the following drop test.

Drop test: Drop an individually packaged scanner 10 times in total, at any of 1 corner, 3 edges, and 6 faces, from a height of 100 cm onto a concrete floor.

9.9 Dust and Drip Proof

IP65

Dust Prevention

Level	Details
6	No ingress of dust; complete protection against contact

Water Prevention

Level	Details
5	Water projected by a nozzle (6.3mm) against enclosure from any direction shall have no harmful effects.

9.10 Cable Strength

There shall be no sign of malfunction after the following cable strength test.

Cable Strength Test: Affix the scanner to an immovable object and pull it using a force of 24.5 N (2.5 kgf static loading) for 1 second. Repeat this 20 times continuously.

9.11 Cable Bending Strength

There shall be no sign of malfunction after the following cable bending test.

Cable Bending Test: Add a load of 4.9 N (500 gf) to a cable and bend it at an angle of 60° to both right and left. Repeat this 1000 times continuously.

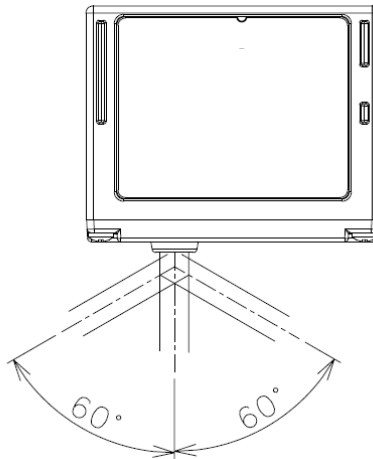


Figure 13: Cable Bending

10 Universal Command

This scanner can be configured through the RS-232 interface or the USB interface (provided it is configured as USB-COM). Unlike Universal menu labels, Universal commands are executed immediately but are not stored in non volatile memory. Only when a special command (The <Z2> command) is sent, all options configured are stored in non volatile memory.

To configure via the RS-232 port proceed as follows:

- transmit <ESC><Command string 1><CR>
- transmit <ESC><Command string 2><CR>
- ...
- transmit <ESC><Command string n><CR>
- transmit <ESC>Z2<CR>

Universal ID	Description
<ESC>	ASCII escape character (Hex 1B)
<Command string>	ASCII command with accompanying parameters. ASCII command strings are the same as command strings from Universal menu labels. i.e. <ESC>M41B<CR> configures the ASCII control code <STX> as the prefix for Code 39. Example: 1B 4D 34 31 42 0D Each 3-character command should be preceded by the '[' character (Hex 5B) i.e. <Esc>[BCM<CR> is used to enable all 1D code. Each 4-character command should be preceded by the ']' character (Hex 5D).
<CR>	ASCII CR character (Hex 0D)
<Z2>	The Z2 command, when sent via RS-232, stores the settings in non volatile memory. Some options, like baud rate settings, are only activated after the reception of this Z2 command.

The following are commonly used command strings:

- "B" sound a good read beep
- "E" sound an error beep
- "L" switch on good read LED
- "Y" de-trigger the reader
- "Z" trigger the reader

The characters transmitted must be separated by an inter character delay to allow this scan engine to process each character received and to execute the command string.

11 Product Label

The product label is affixed to the scanner as shown below.

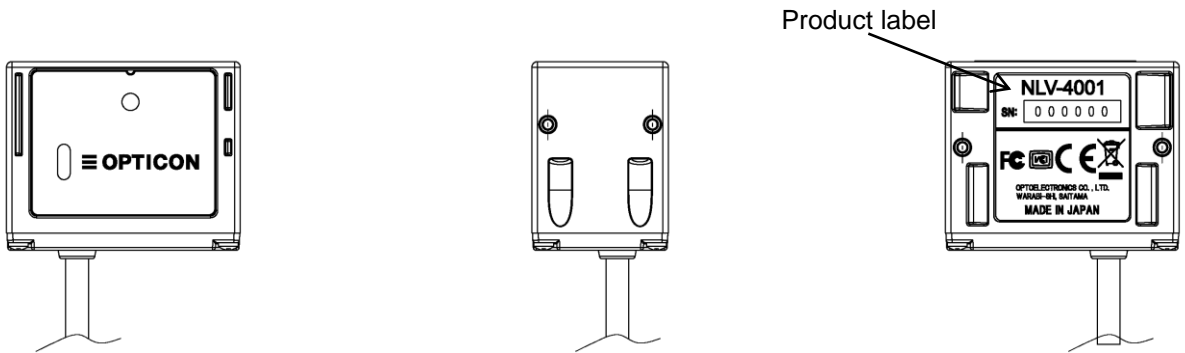


Figure 14: Product Label

Label material:

Laminate: PET film, White, thickness 50 µm.

RoHS compliant



Figure 15: Product Label

12 Packaging Specifications

12.1 Individual Packaging Specification

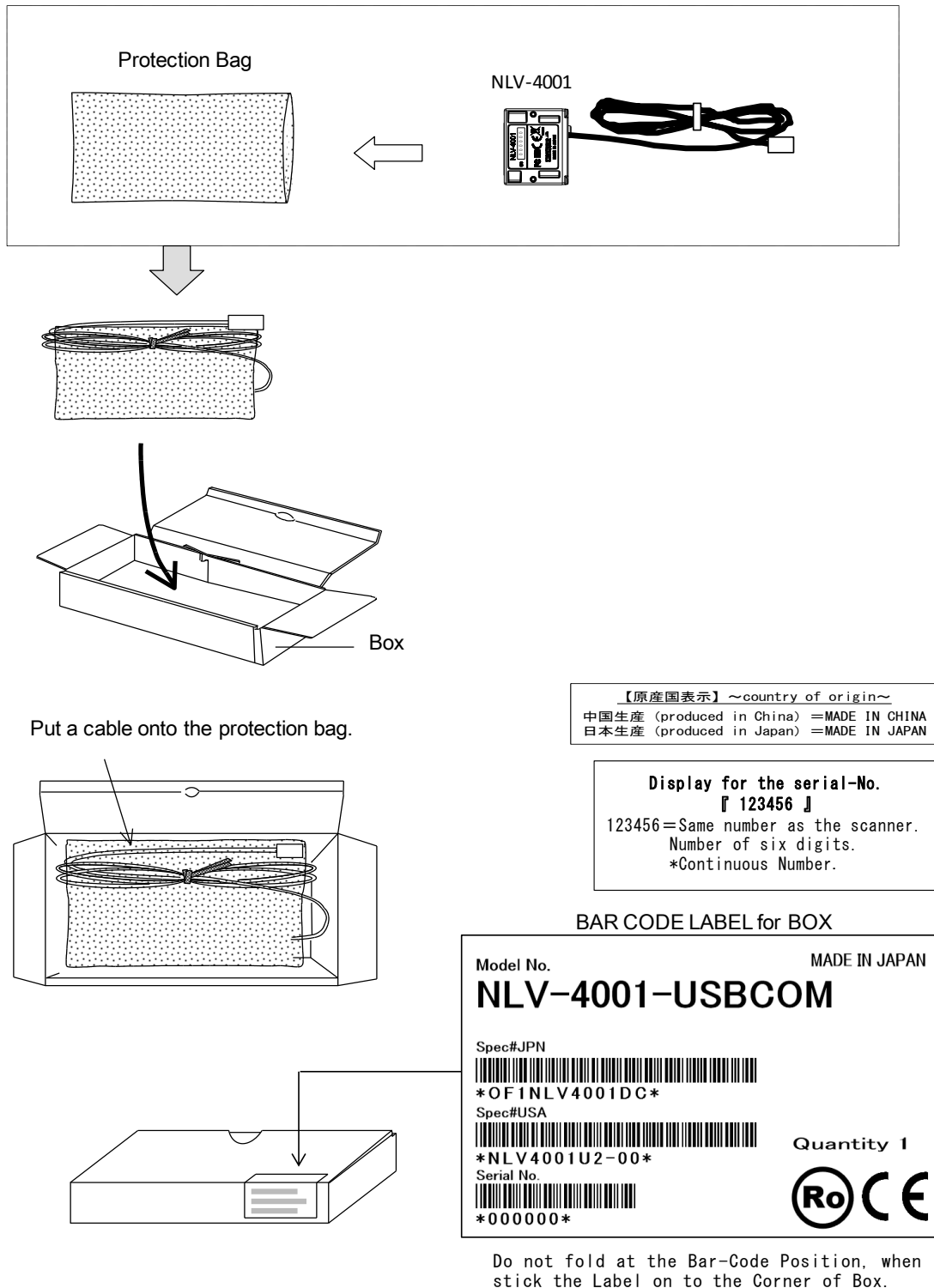
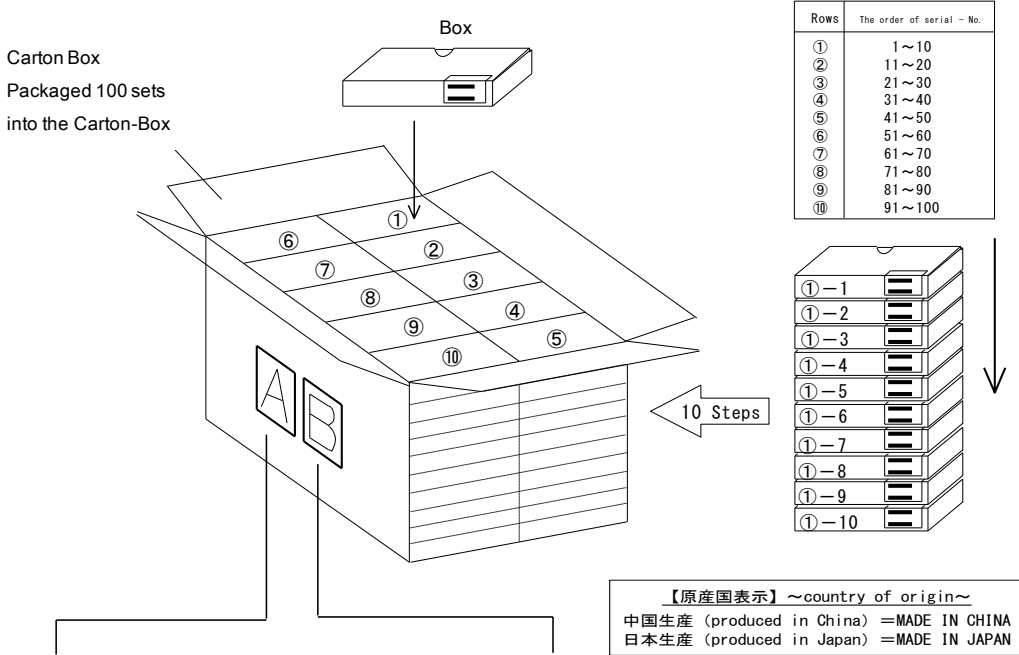


Figure 16: Individual packaging

12.2 Collective Packaging Specification



A : Barcode Serial Label for Packaging Box:
Stick the labels on both front and back side of the box.

B : Missing Serial Number Label:
Attach this label when there are more than 3 labels of which serial numbers are out of order (not in a correct sequence).

OSE C/No. ?????? MADE IN JAPAN

Product **NLV-4001-USBCOM**

PO# *000000000000*

Spec#JPN *OF1 NLV4001 DC*

Spec#USA *NLV4001 U2-00*

Q'ty *000* S/N(from) *000000*

??? / ??? S/N(to) *000000*

Missing Serial Number	Missing Q'ty	???
1	*000000*	2
2	*000000*	

ROM-Ver(Module CPU) ??????

Shipping Date ??? / ?? / ??

Ro

OPTOELECTRONICS CO.,LTD

OSE C/No. ?????? MADE IN JAPAN

Missing Serial Number	Missing Q'ty	???
3	*000000*	
4	*000000*	
5	*000000*	
6	*000000*	
7	*000000*	
8	*000000*	
9	*000000*	
10	*000000*	
11	*000000*	
12	*000000*	

OPTOELECTRONICS CO.,LTD

Figure 17: Collective packaging

Note: The “RO” mark labeled on the package tray or package box guarantees that the applicable product has passed our test of RoHS restrictions compliance (the restriction of the use of certain hazardous substances in electrical and electronic equipment, 2001/65/EU). However, this document does not have any legal weight in the European Union.

13 Regulatory Compliance

13.1 LED Safety

IEC 62471:2006 Exempt Risk Group

13.2 EMC

EN 55024:2010

EN 55032:2012 +AC:2013 Class B

FCC Part 15 Subpart B Class B

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful Interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

VCCI クラス B

この装置は、クラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。取扱説明書に従って正しい取り扱いをして下さい。

V C C I - B

13.3 WEEE

Waste Electrical and Electronics Equipment Directive, 2012/19/EU.



Following information is only for EU-member states:

The use of the symbol indicates that this product may not be treated as household waste. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

13.4 RoHS

RoHS directive

RoHS: The restriction of the use of certain hazardous substances in electrical and electronic equipment.

Directive 2011/65/EU

Commission Delegated Directive (EU) 2015/863

14 Safety Precautions

Handle this product carefully. Do not deliberately subject it to any of the following.

14.1 Installation Environment

Do not use the product in environments containing flammable or explosive gases.

Do not use the product in environments containing corrosive or combustible gases.

Do not use the product in environments containing salt, or metallic powders.

Do not use the product in environments containing oil or chemical agents.

Do not install or use the product outdoors.

For the purpose of ensuring safe operation and maintenance, do not install the product close to High-voltage devices or electrically powered devices.

14.2 Power supply, connection, and wiring

Use a DC power supply with countermeasures against high voltages (safe extra low-voltage circuits on the secondary side).

Do not connect a voltage or AC power supply that has a voltage exceeding the rating voltage (5V+/- 10%).

Avoid reverse connection of power supply.

Be sure to turn the power OFF before connecting or disconnecting a cable.

Connecting or disconnecting a cable while the power is ON may cause failure.

Do not tie together other cables which have high-voltage line or power line to the cable of the product.

Tighten the fixing screws at the torque specified in this guide. ("M" screw tightening torque: 0.15Nm)

14.3 Other

Do not use the product in a safety circuit for nuclear or life-support systems.

Never attempt to disassemble, repair modify, deform by applying pressure, or burn the product.

Dispose of the product as industrial waste.




If the product becomes extremely hot or when smoke comes out, stop using the product immediately and turn the power OFF.

Do not swing the cable around.

15 Factory Setting


15.1 Default Menu Bar Codes

The scanner is reset to each interface's factory default by reading the following menu bar codes.


Function	Menu Label	Menu Code
SET		ZZ
Default setting*		BAP
END		ZZ

(*) The default settings are as follows.

RS-232C Default

Function	Menu label	Menu code
RS-232 Default		U2

USB Default

Function	Menu label	Menu code
USB Default		C01

15.2 Default Setting (Part 1: Readable Codes)

Code type	Read	Transmit code length	Transmit CD	Calculate CD	Prefix	Suffix	Transmit other
UPC-A	○	×	○	○	-	CR	
UPC-A Add-on	×	×	○	○	-	CR	
UPC-E	○	×	○	○	-	CR	
UPC-E Add-on	×	×	○	○	-	CR	
EAN-13	○	×	○	○	-	CR	
EAN-13 Add-on	×	×	○	○	-	CR	
EAN-8	○	×	○	○	-	CR	
EAN-8 Add-on	×	×	○	○	-	CR	
Code 39	○	×	○	×	-	CR	Not transmit ST/SP
Tri-Optic	○	×	-	-	-	CR	Not transmit ST/SP
Codabar(NW-7)	○	×	○	×	-	CR	Not transmit ST/SP
Industrial 2 of 5	○	×	○	×	-	CR	
Interleaved 2 of 5	○	×	○	×	-	CR	
Code 93	○	×	-	○	-	CR	
Code 128	○	×	-	○	-	CR	
GS1-128 *1	×	×	-	○	-	CR	
S-Code	○	×	○	×	-	CR	
MSI/Plessey	○	×	OCD1	OCD1	-	CR	
UK/Plessey	○	×	○	○	-	CR	
TELEPEN	○	×	×	○	-	CR	
Matrix 2 of 5	×	×	○	×	-	CR	
Chinese Post Matrix 2 of 5	×	×	○	×	-	CR	
IATA	○	×	○	×	-	CR	
GS1 DataBar Omnidirectional *2	×	×	○	○	-	CR	
GS1 DataBar Limited *3	×	×	○	○	-	CR	
GS1 DataBar Expanded *4	×	×	-	○	-	CR	
Code 11	×	×	×	○	-	CR	
Korean Postal Authority code	×	×	×	○	-	CR	

- (1) "Reading" column ○ Read × Not read - Not supported
(2) "Transmit code length" column ○ Transmit × Not transmit - Not supported
(3) "Transmit CD" column ○ Transmit × Not transmit - Not supported
(4) "Calculate CD" column ○ Calculate × Not calculate - Not supported
(5) "Prefix" column - No prefix setting
(6) *1 Former EAN-128, *2 Former RSS-14, *3 Former RSS-Limited, *4 Former RSS-Expanded

15.3 Default Setting (Part 2: Read Options, Illumination LED, Trigger, Buzzer)

Item	Default
Setting of number of characters	Off all codes
Read mode	Single read
Multiple read reset time	500 msec
Add-on wait mode	500 msec
Multiple label read (code only)	Disable
Multiple column read	Disable
Redundancy (*1)	Read 1 time (redundancy = 0)
Illumination LED	Enable
Trigger repeat	Disable
Read time	2 sec
Margin check	Normal
Buzzer duration	50 msec
Buzzer tone	3 kHz (single tone)
Buzzer loudness	Volume 1 (Maximum.)
Buzzer timing	Before transmission
Startup buzzer	Enable
Status LED duration	200 msec

(*1) The redundancy count for the following specific digits of bar codes will be [the set number of times + 1].

Symbology	No. of Digits
Code 39	5 or less
Codabar(NW-7)	All
IATA	8 or less
Industrial 2 of 5	8 or less
Interleaved 2 of 5	8 or less
MSI/Plessey	4 or less
Code 11	5 or less
TELEPEN	8 or less
S-Code	7 or less
Matrix 2 of 5	8 or less
Chinese Post Matrix 2 of 5	8 or less

15.4 Default Setting (Part 3: Communication Settings)

15.4.1 USB Interface

Item	Default
Send 'Enter key' after scanned data	Enable
Send 'Tab key' after scanned data	Disable
Send 'Right arrow key' after scanned data	Disable
Other	CDC/ACM compliant (USB-VCP)

*To use in USB-COM, OPTOELECTRONICS USB-COM driver needs to be downloaded.

15.4.2 RS-232C Interface

Item	Default
Baud rate	9600 bps
Parity bit	None
Data bit	8 bits
Stop bit	1 bit
Handshaking	No
ACK / NAK	No
CTS time out	Indefinitely
ACK / NAK time out	1 sec
Command header	ESC or STX
Command terminator	CR or ETX
Response to command	Disable

15.5 Other Settings: Illumination LED

On-off switching of illumination LED may affect the improvement of reading performance. The following modes are configurable.

- Enable illumination LED : The scanner reads a bar code with the illumination LED turned ON. This mode is default.

- Disable illumination LED (Scanning from LCD) : The scanner reads a bar code using the LCD backlight as illumination source and without turning on the illumination LED.

- Alternating illumination LED : The scanner reads a bar code with the illumination LED turned ON and OFF.

- Alternating illumination LED (for preventing specular reflection) : This mode is for scanning a barcode on a glossy surface. When the barcode is scanned with the illumination LED ON and the captured image is too bright to read, then the scanner will turn the illumination LED OFF and scan the bar code again. The mode is not suitable for scanning in a dark place.

Function	Menu label	Menu code
SET		ZZ
Enable illumination LED		D39
Disable illumination LED (Scanning from LCD)		D3A
Alternating illumination LED		D3B
Alternating illumination LED (for preventing specula reflection)		D3Q
END		ZZ

15.6 Other Settings: Auto Trigger

The scanner has an optional auto trigger mode in which it starts to read a bar code automatically when it detects one.

When auto trigger mode is enabled, the scanner tries to detect bars at regular intervals and when it detects 9 or more bars, it enters read mode in which it tries to decode a bar code. When the scanner continues to detect bars after the reading has been done, it will assume those bars are from the same bar code as the previous one and will not attempt to read it. When the detecting conditions are not met, the scanner will perform the intermittent scanning again until the next bar code is detected.

<Conditions>

- Angle of paper : Skew angle, excluding pitch angle and dead zone, specified in Section 8.5.
- Temperature / Humidity : Room temperature / room humidity
- Ambient light : 500 lx or more

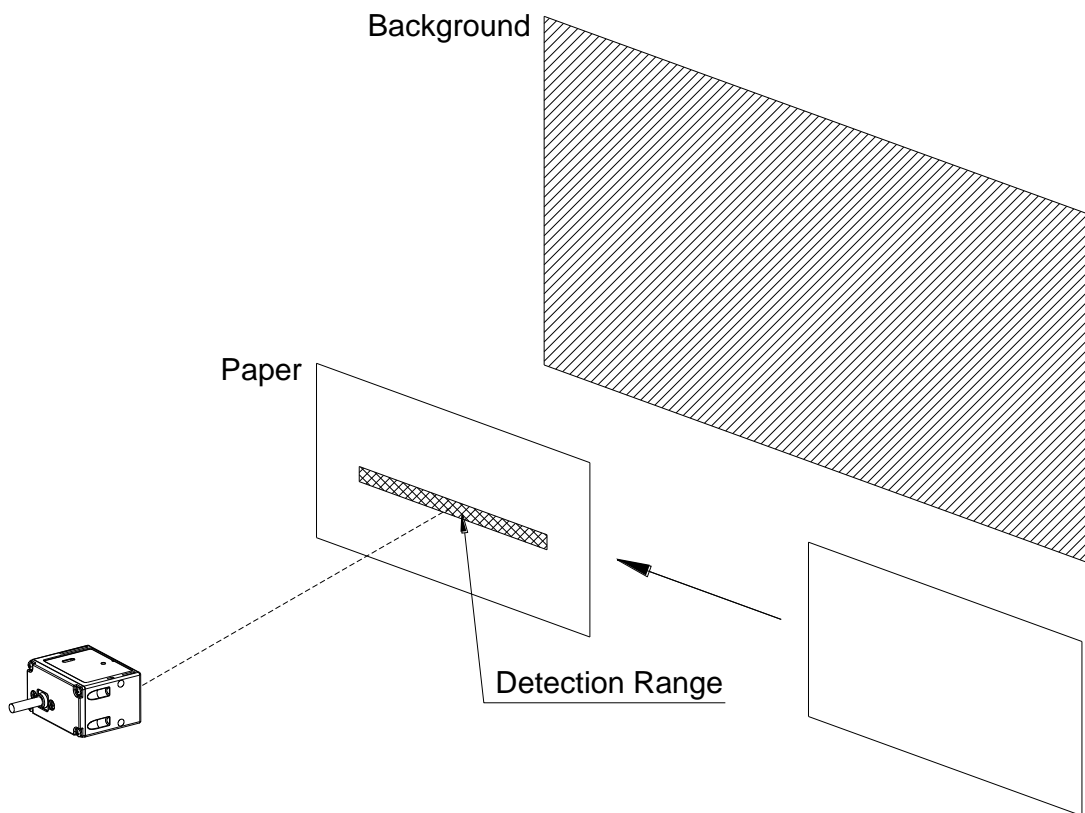


Figure 18: Auto Trigger

Enable auto trigger all time.

Function	Menu label	Menu code
SET	 z z	ZZ
Auto trigger always	 + I	+I
END	 z z	ZZ

Only trigger manually

Function	Menu label	Menu code
SET	 z z	ZZ
Manual trigger (Disable auto trigger)	 + F	+F
END	 z z	ZZ

16 Physical Features

16.1 Dimensions

Approx. 33.0 mm x 41.1 mm x 24.0 mm (DWH)

16.2 Weight

Approx. 50 g (RS-232C type include Cable) 55 g (USB type include cable)

16.3 Mechanical Drawing

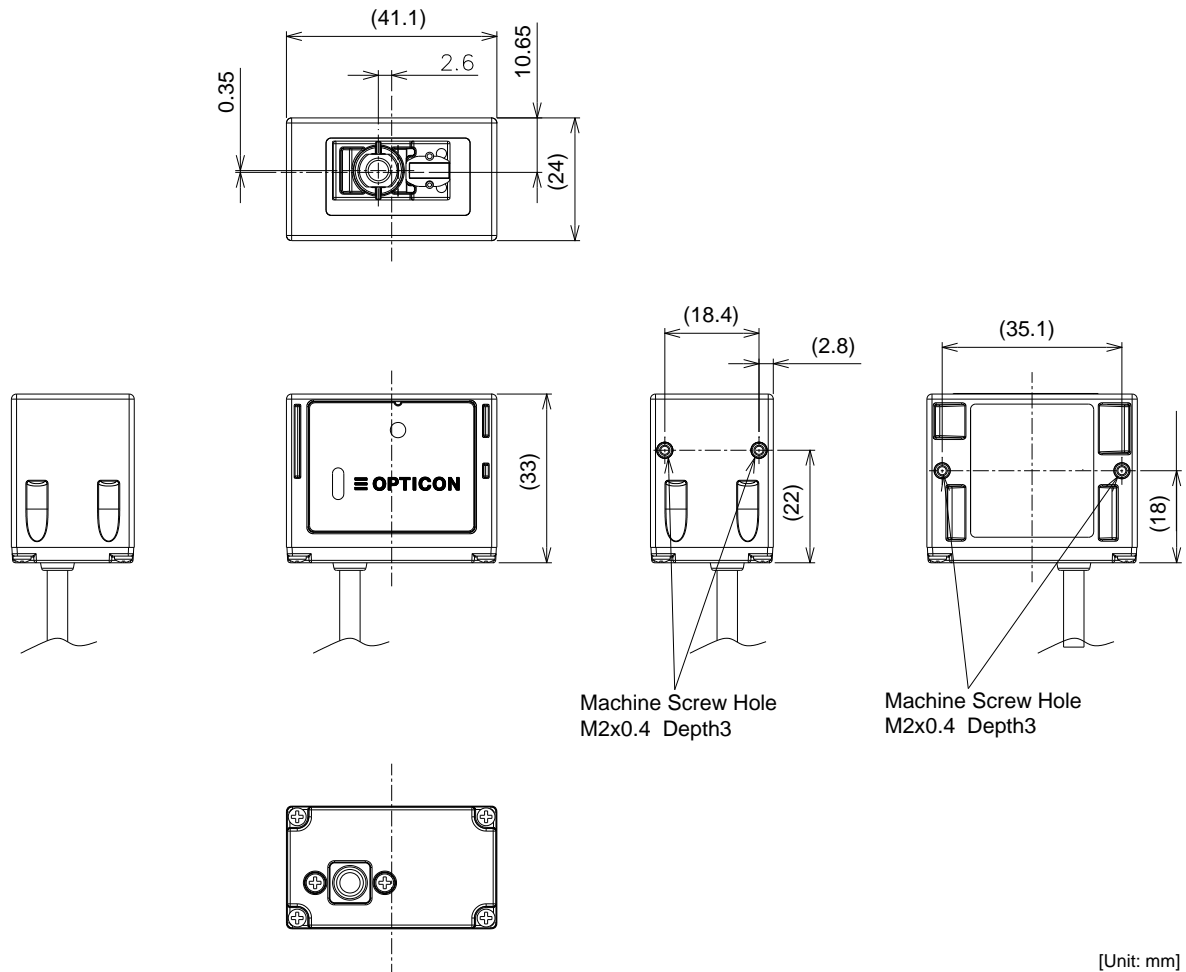


Figure 19: Mechanical drawing