OPTICON

Fixed-position Laser Barcode Scanner

NLV 2001

The NLV 2001 is a fixed-position laser barcode scanner that uses a short-wavelength red laser beam.

Specifications Manual

All information subject to change without notice.

Document History

Model Number:	NLV 2001	**Specification Number:**	SS07077
Edition:	2	**Original Spec Number:**	SS06124
Date:	2007-08-01		

Copyright 2008 Opticon. All rights reserved.

Limited Warranty and Disclaimers

PLEASE READ THIS MANUAL CAREFULLY BEFORE INSTALLING OR USING THE PRODUCT.

Serial Number

A serial number appears on all Opticon products. This official registration number is directly related to the device purchased. Do not remove the serial number from your Opticon device. Removing the serial number voids the warranty.

Warranty

Unless otherwise agreed in a written contract, all Opticon products are warranted against defects in materials and workmanship for two years after purchase. Opticon will repair or, at its option, replace products that are defective in materials or workmanship with proper use during the warranty period. Opticon is not liable for damages caused by modifications made by a customer. In such cases, standard repair charges will apply. If a product is returned under warranty and no defect is found, standard repair charges will apply. Opticon assumes no liability for any direct, indirect, consequential or incidental damages arising out of use or inability to use both the hardware and software, even if Opticon has been informed about the possibility of such damages.

Packaging

The packing materials are recyclable. We recommend that you save all packing material to use should you need to transport your scanner or send it for service. Damage caused by improper packaging during shipment is not covered by the warranty.

Trademarks

Trademarks used are the property of their respective owners.

Opticon Inc. and Opticon Sensors Europe B.V. are wholly owned subsidiaries of OPTOELECTRONICS Co., Ltd., 12-17, Tsukagoshi 4-chome, Warabi-shi, Saitama, Japan 335-0002. TEL +81-(0) 48-446-1183; FAX +81-(0) 48-446-1184

SUPPORT

USA

Phone: 800-636-0090

Email: support@opticonusa.com

Web: www.opticonusa.com

Europe

Email: support@opticon.com

Web: www.opticon.com

Contents

Table of Figures

1. Abstract

This manual provides specifications for the NLV 2001 fixed-position laser barcode scanner.

2. Overview

The NLV 2001 is a fixed-position laser barcode scanner.

- The scannable width at the minimum scan distance is 44 millimeters and the scan angle is 44° degrees.

- A short-wavelength red laser improves the visibility of the scan line.

- The NLV 2001 outputs scanned and decoded data via RS-232C, USB, or Wedge interfaces.

- The NLV 2001 complies with RoHS.

Supported symbologies:

Linear (1D)	Postal Code	2D
JAN/UPC/EAN (WPC), incl. add-on	Chinese Post	Composite codes
Codabar/NW-7	Korean Postal Authority code	MicroPDF417
Code 11		PDF417
Code 39		
Code 93		
Code 128		
GS1-128(EAN-128)		
GS1 DataBar (RSS)		
IATA		
Industrial 2of5		
Interleaved 2of5		
ISBN-ISMN-ISSN		
Matrix 2of5		
MSI/Plessey		
S-Code		
Telepen		
Tri-Optic		
UK/Plessey		

3. Physical Features

3.1. Dimensions

W 46.0 x D 58.0 x H 24.5 mm

3.2. Weight

120 g (max.) excluding the cable

4. Environmental Specifications

4.1. Ambient Light Immunity

Decoding performance is guaranteed when the range of illumination on a barcode surface is between zero and the following values:

Incandescent light	3,000 lx
Fluorescent light	3,000 lx
Sunlight	50,000 lx

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS:	0.9
Resolution:	0.25 mm
Symbology:	9-digit Code 39
Quiet Zone:	10 mm
N/W Ratio:	1:2.5
Distance:	100 mm
Angle (see note below):	α = 0° β = 15° γ = 0°
Curvature:	R = ∞
Power Supply Voltage:	5.0 V

Direct light or specular reflection light from a source should be prevented from entering the acceptance area.

Note: α, β and γ respectively represent pitch, skew and tilt. Please see section 7.4 for how these values are defined.

5. Electrical Specifications

5.1. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Power supply voltage (VDD to GND)	V_{DD}	-0.5 to 6.5	V
Input voltage	V_{IN}	-0.5 to +0.5	V
Power ripple		0.1 V p-p (10–100 kHz)	V

5.2. Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit	Conditions
Power supply voltage	V_{DD}	4.5	5.0	5.5	V	
Operating temperature	Ta	-10	–	45	°C	No condensing
Input voltage	V_{in}	0	–	V_{DD}	V	
Output voltage	V_{out}	0	–	V_{DD}	V	

5.3. Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Operating current	I_{OP}	–	85	150	mA
Rush current peak	I_{PEAK}	–	400	1500	mA
Stand-by current	I_{PRE}	–	35	70	mA
Startup time	T_D	–	100	–	ms

Conditions

- Connect 1Ω resistance to a power supply line in series and measure the current by the voltage between both ends of resistance.

- Power supply voltage is measured at a connector terminal area.

- The current value depends on the interface type and host computer to which the device is connected.

6. Optical Specifications

Parameter	Specification	Unit
Light-emitting element	Red laser diode	–
Emission wavelength	650 ±10 (25° C)	nm
Light output	1.0 or less	mW
Scanning method	Bi-directional scanning	–
Scanning speed	100 ±20	scans/s
Scan angle	Scan angle: 54 ±5	°
	Read angle: 44 (Min)	°

7. Technical Specifications

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

Conditions

Ambient temperature and humidity:	Room temperature (5 to 35º C)
	Room humidity (45% to 85% RH)
Ambient light:	500 to 900 lx
Background:	Barcode = black
	Space = white
	Margin = white
	Background of label = black
Power supply voltage:	5.0 V
Decoding test:	Approve the performance when decoding is successful in all ten tests.
	(Decoding is deemed successful when completed in 0.5 seconds or less.)

7.1. Print Contrast Signal

0.45 or higher (over 70% of reflectivity of space and quiet zone).

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

Scanning performance may decline if dirt or scratches mar the optical window. Keep the optical window clean.

7.2. Minimum Resolution

0.127 mm

7.3. Scan Area and Resolution

7.3.1. Depth of Field

The scan area is a circular area centered around the beam, which appears at various resolutions.

Resolution

0.127	60~100
0.15	50~130
0.25	50~240
0.5	50~400
1.0	70~630

(in millimeters)
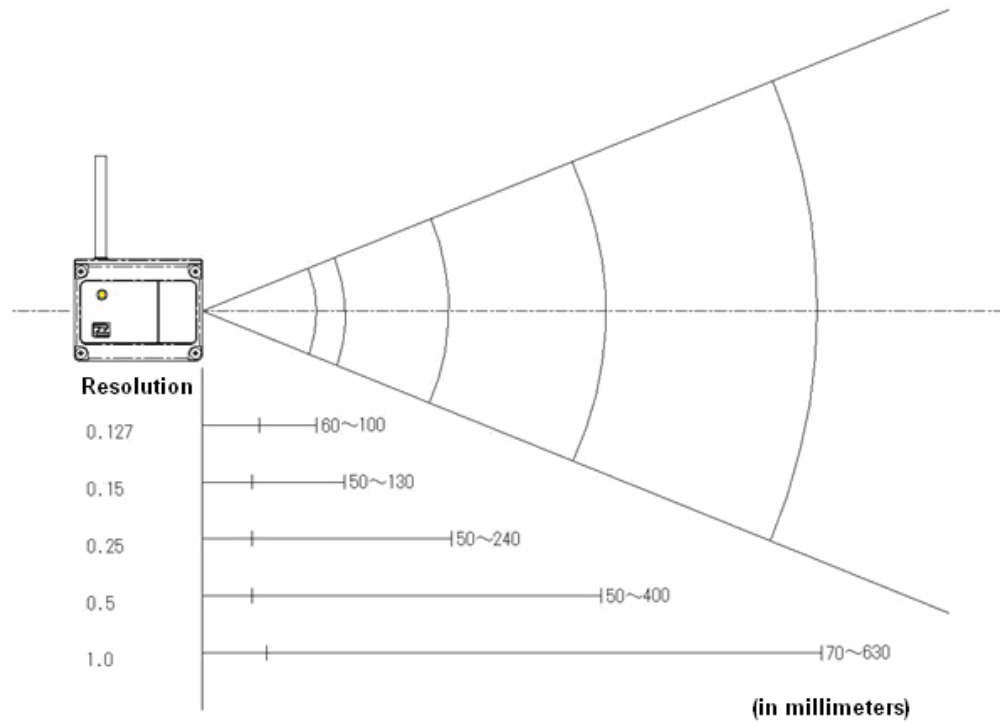
Figure 1: Depth of field and resolution (NLV 2001 I-Type)

The depth of field is measured from the front edge of the scanner.

PCS	Resolution (mm)	Decode Depth (mm)
0.9	1.0	70–630
	0.5	50–400
	0.25	50–240
	0.15	50–130
	0.127	60–100

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

N/W Ratio   1:2.5

Angle $\alpha = 0°$, $\beta = 15°$, $\gamma = 0°$

Curvature $R = \infty$

Resolution	Symbology	PCS	Quiet Zone	Digit
1.0 mm	Code 39	0.9	25 mm	1
0.5 mm	Code 39	0.9	18 mm	3
0.25 mm	Code 39	0.9	10 mm	8
0.15 mm	Code 39	0.9	7 mm	10
0.127 mm	Code 39	0.9	5 mm	4

7.4. Pitch, Skew, and Tilt

7.4.1. Pitch Angle

$\alpha \leq \pm 35°$

Figure 2: Pitch (NLV 2001 I-Type)

7.4.2. Skew Angle and Dead Zone

Skew angle: β ≤ ±50° (Excluding dead zone)

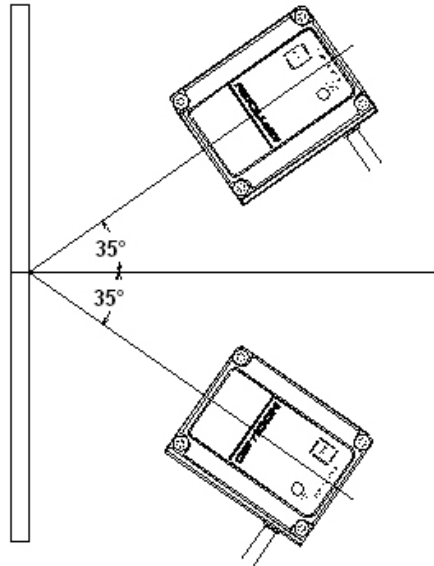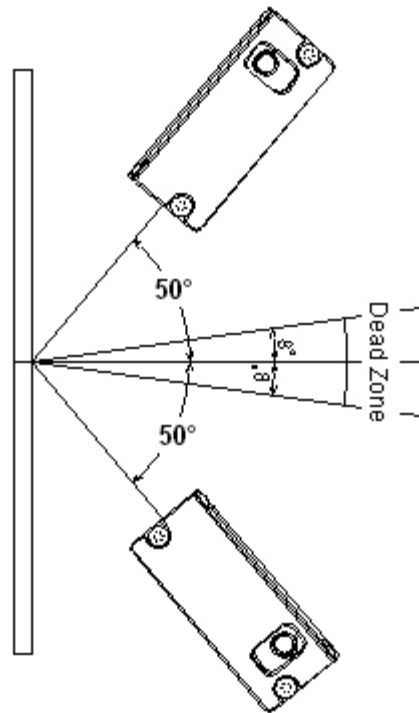Dead zone: β = ±8° (There are some areas in which decoding fails due to specular reflection)

Figure 3: Skew angle and dead zone (NLV 2001 I-Type)

7.4.3. Tilt Angle

γ ≤ ±20°
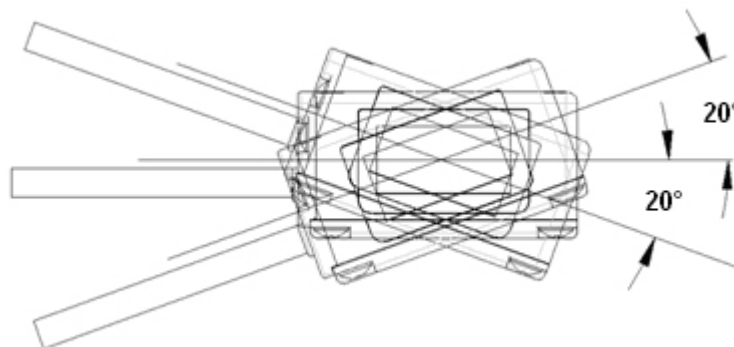
Figure 4: Tilt angle (NLV 2100 I-Type)

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

Distance	100 mm from the edge of the scanner
Label	**Pitch, Skew Angle, Dead Zone**
	PCS = 0.9, Resolution = 0.25 mm, Symbology = 9-digit Code 39, Quiet Zone = 10 mm, N/W Ratio = 1:2.5
	Tilt Angle
	PCS = 0.9, Resolution = 0.26 mm, Symbology = 13-digit JAN, Quiet Zone = 10 mm
Angles	**Pitch angle**: Skew angle: β = +15°, Tilt angle: γ = 0°
	Tilt angle: Pitch angle: α = 0°, Skew angle: β = +15°
	Skew angle, Dead zone: Pitch angle: α = 0°, Tilt angle: γ = 0°
Curvature	R = ∞

7.5. Curvature

With 8-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when R≥15 mm.

With 13-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when R≥20 mm.

Figure 5: Curvature (NLV 2001 I-Type)

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS = 0.9, Resolution = 0.26 mm, Quiet Zone = 10 mm

Distance	100 mm from the edge of the scanner
Angle	Skew Angle β = +15°

8. Interface Specifications

8.1. RS-232C Interface Spec

8.1.1. Settings and Communication
Reading the menu barcodes in section 10.1 can set the RS-232C interface default.

Item	[U2] setting
Baud rate	9600 bps
Start/stop bits	1 bit
Data bits	8 bits
Parity bits	No parity
Handshaking	No handshake
Flow control time out	Indefinitely

You can change the communication condition using the menu barcode.

8.1.2. Signal Level

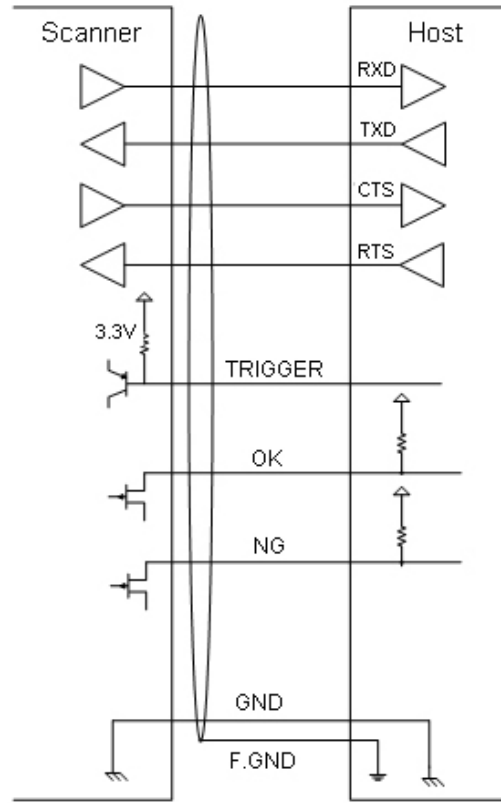| Signal Name	I/O	RS-232C Level (V)	
		Bars/OFF	Space/ON
TxD	OUT	-5 to -15	+5 to +15
RxD	IN	-3 to -15	+3 to +15
RTS	OUT	-5 to -15	+5 to +15
CTS	IN	-3 to -15	+3 to +15

8.1.3. Interface Circuit

Figure 6: Interface circuit

8.1.4. Character Format
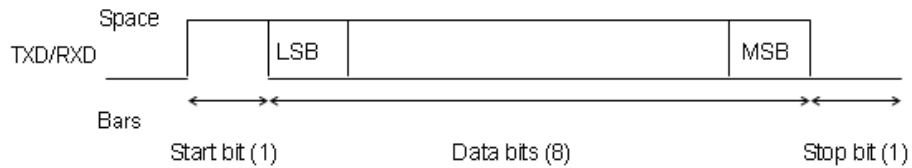
Figure 7:Character format (same for both sending and receiving)

8.1.5. Communication Format
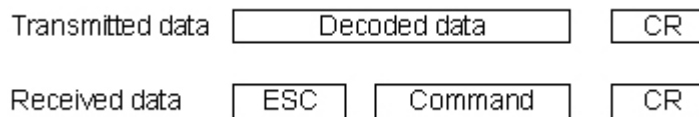
Figure 8: Communication format

8.1.6. Handshaking

Select handshaking options using the menu or command listed below.

Handshaking	Menu/Command
No handshake	P0
BUSY/READY	P1
MODEM	P2
ACK/NAK	P3
ACK/NAK NO RESPONSE	P4

a) No Handshaking

The scanner attempts the communication regardless of the state of the host computer.
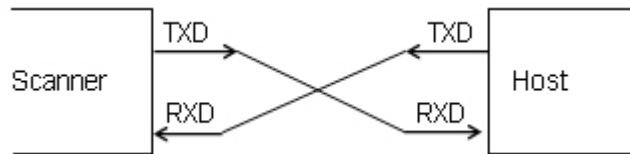
Figure 9: No handshaking

b) BUSY/READY

The scanner and the host computer notify each other of their state and whether they can receive data with BUSY/READY through an RTS line. They can communicate state to each other through a CTS line when connected as in the following figure.
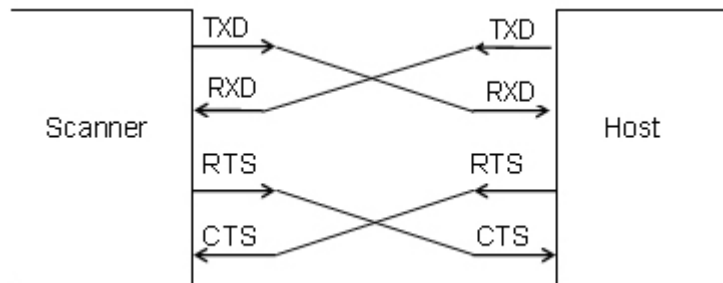
Figure 10: Busy/Ready communication

The scanner stays ON (is able to receive data) except during certain parts of the process, such as receiving data (buzzer command execution), transmitting data, and menu processing. The scanner checks the CTS line before transmitting data. When it is ON, the scanner transmits data. When it is OFF, the scanner waits for it to turn ON within a set time. The scanner will abort transmission with an error indication (buzzer) when the CTS line is not ON within a specified period. The Flow Control time-outs are as follows, and the default setting is "indefinitely" (I0).

Flow Control Time Out	Menu/Command
Indefinitely	I0
100 ms	I1
200 ms	I2
400 ms	I3
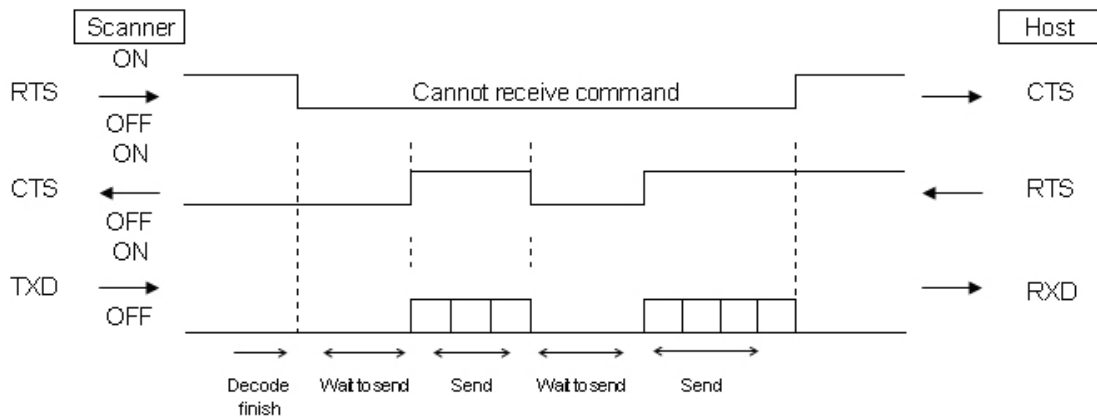
Figure 11: Cannot receive command

CTS, TXD signal timing

When the CTS line (RTS signal of the host) is turned OFF while sending a TXD signal, the scanner transmits one character and waits. When the CTS signal is turned ON while transmitting a character, the character will be transmitted.

Figure 12: Signal timing

Note: When using loopback (wire connection) for RTS, CTS line of the scanner in this setting, *No handshake* is not enabled.

c) MODEM

The scanner turns CTS line ON before transmitting data. Other processes are the same as BUSY/READY.
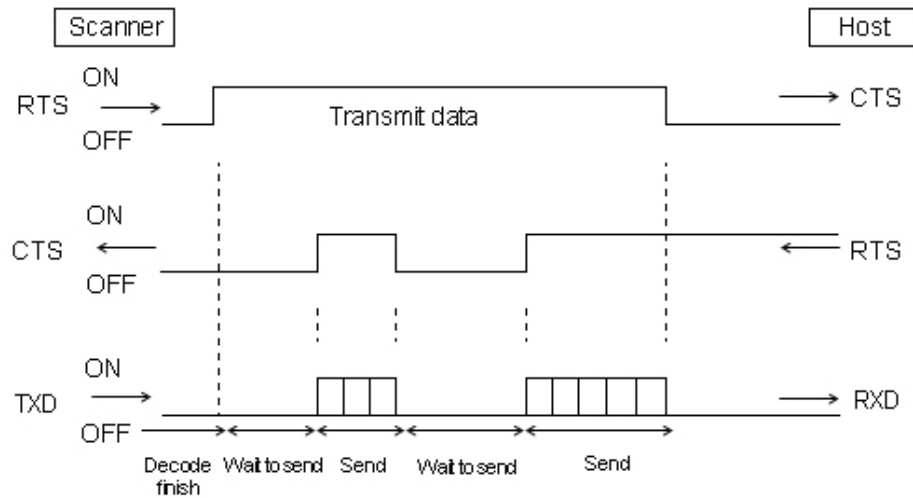
Figure 13: Modem transmit data

d) ACK/NAK

After data has been transmitted, the scanner expects to receive one of the following responses from the host:

- ACK response—Action: The scanner completes transmission with the good-read buzzer and returns to the initial state.

- NAK response—Action: The scanner sends the data again and waits for the response from the host.

- DC1 response—Action: The scanner returns to waiting for the trigger, if it has a trigger (the initial state).

- None response—Action: The scanner sounds the error buzzer and returns to the initial state.

ACK/NAK timeout can be set as follows using the menu or commands.

ACK/NAK timeout	Menu / Command
Indefinitely (default)	XI4
100 ms	XI5
500 ms	XI6
1000 ms	XI7
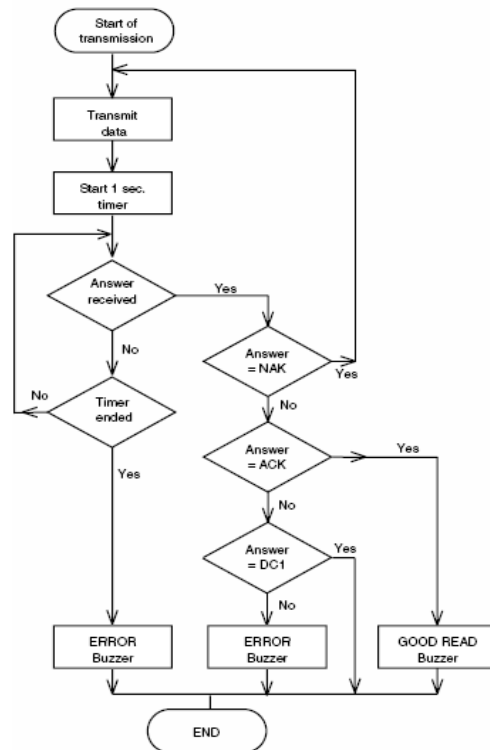
Figure 14: ACK/NAK

e) ACK/NAK NO RESPONSE

When no response from the host is received within the setting time, the scanner assumes an ACK response, and returns to the initial state without the error buzzer. The other actions are the same as ACK/NAK.
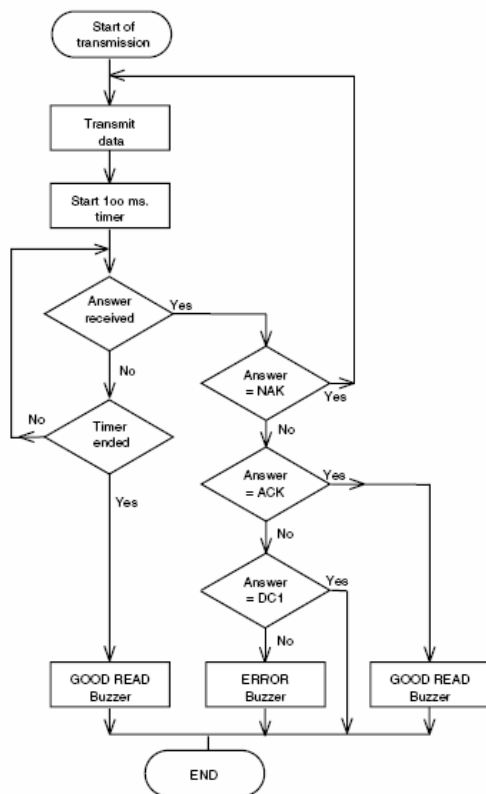
Figure 15: ACK/NAK—No response

8.2. USB Interface Specifications

The interface is full-speed USB version 1.1.

Set the language for the scanner and PC keyboard to the same language before use; otherwise, the output may not be correct.

Using the keyboard while the scanner is transmitting the data to the host may cause failure in data transactions.

8.2.1. Settings

Reading the menu barcodes in section 10.1 can set the USB interface default.

8.2.2. Interface Circuit
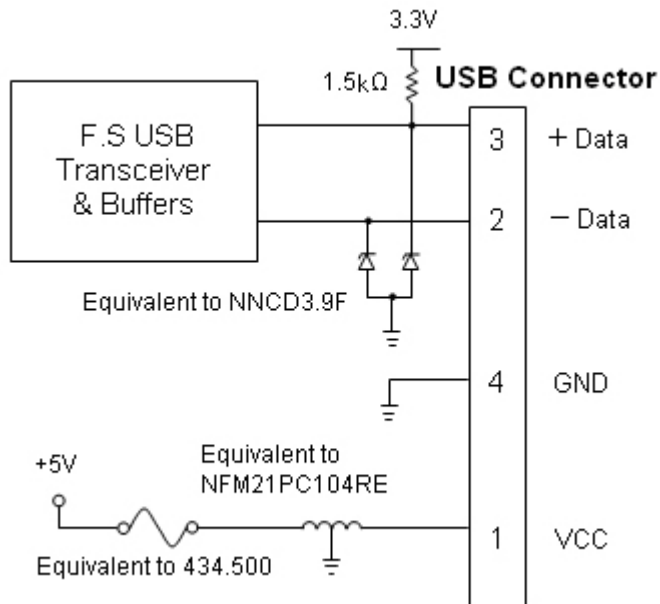
Figure 16: Interface circuit

8.3. DOS/V Wedge Interface Specification

Reading the menu barcodes in section 10.1 can set the DOS/V Wedge interface default.

Set the language for the scanner and PC keyboard to the same language before use; otherwise, the output may not be correct.

Using the keyboard while the scanner is transmitting the data to the host may cause failure in data transactions.

9. Cable and Connector

9.1. RS-232C Cable

9.1.1. Standard Specification

Figure 17: RS-232C — cable 1

Type:	Straight
Diameter:	φ3.8 ±0.5 mm
Length:	1500 ±50 mm or 500 ±50 mm
Cores:	8 insulated wires, 1 conductive wire
Weight:	Approximately 45 g

9.1.2. DB9 Connector
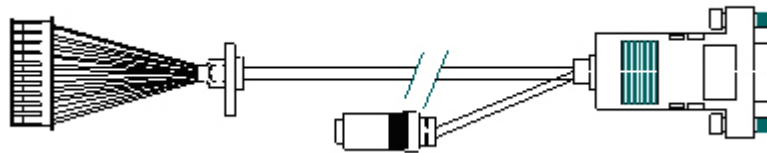
Figure 18: DB9 connector

Type:	Straight
Diameter:	φ3.8 ±0.5 mm
Length:	1500 ±50 mm or 500 ±50 mm
Cores:	8 insulated wires, 1 conductive wire
Weight:	Approximately 65 g

9.1.3. Pin Assignment

a) Standard Specification

Wire Color	Signal	Remarks
Shield (Black)	F.GND	Cover the shield wire with the heat shrink tube.
Black	GND	
Red	VCC	
Green	TxD	
White	RxD	
Grey	RTS	
Blue	CTS	
Orange	NG	
Yellow	OK	
Brown	TRIGGER	

b) D-sub Specification

Pin	Signal	Remarks
1	F.GND	Cover the shield wire with the heat shrink tube.
2	TXD	
3	RXD	
4	NC	Connected to pin 6 with jumper cable.
5	GND	
6	NC	Connected to pin 4 with jumper cable.
7	CTS	
8	RTS	
9	NC	

c) DC Jack Specification

Pin	Signal	Remarks
1	VCC	Inside
2	GND	Outside

9.2. USB Cable

9.2.1. Standard Specification

Figure 19: USB cable

Type:	Straight
Diameter:	φ3.8 ±0.5 mm
Length:	1500 ±50 mm
Cores:	4 insulated wires, 1 conductive wire
Weight:	Approximately 50 g

9.2.2. Connector
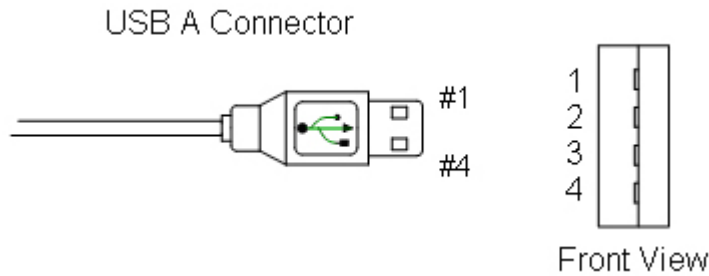
Figure 20: USB "A" connector

9.2.3. Pin Assignment

Pin	Signal
1	VCC
2	-DATA
3	+DATA
4	GND

9.3. Wedge Cable

9.3.1. Standard Specification
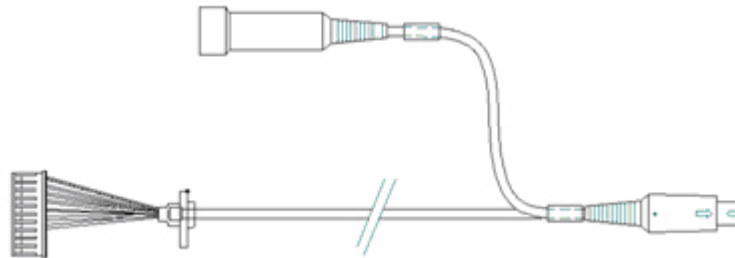
Figure 21: Wedge cable

Type:	Y cable
Diameter:	φ3.8 ±0.5 mm
Length:	1500 ±50 mm
Cores:	6 insulated wires, 1 conductive wire
Weight:	Approximately 60 g

9.3.2. Wedge Connector
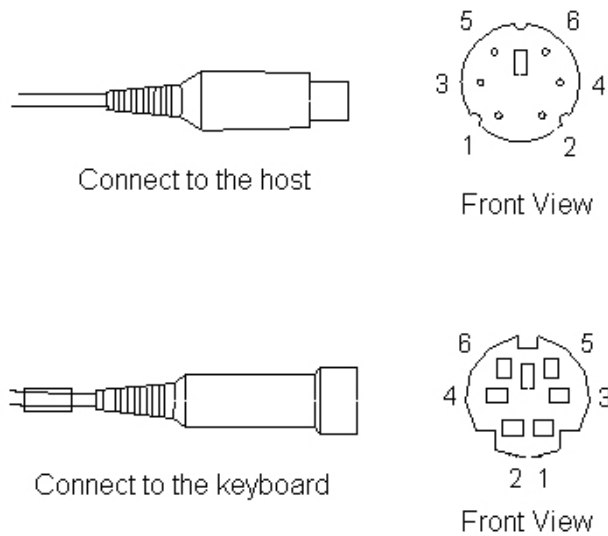
Figure 22: Wedge connector

9.3.3. Pin Assignment

Pin	Host Connector	Keyboard Connector
1	CPU DATA	KEY DATA
2	OPEN	OPEN
3	GND	GND
4	VCC	VCC
5	CPU CLOCK	KEY CLK
6	OPEN	OPEN

9.4. Connector Specification (Scanner Side)

CN 1 (10-pin)

Pin	Signal per Interface		
	RS-232C	**USB**	**Wedge**
1	TRIGGER	NC	NC
2	OK	NC	NC
3	NG	NC	NC
4	CTS	NC	KEY DATA
5	RTS	NC	KEY CLOCK
6	R×D	USB-	CPU DATA
7	T×D	USB+	CPU CLOCK
8	VCC	VCC	VCC
9	GND	GND	GND
10	SHIELD	SHIELD	SHIELD

Connector used: BM10B –SRSS–TB–LFSN (or equivalent product)

10. Default Settings

10.1. Set Default Interface

Scan the following menu barcodes to return to the default settings.

RS-232C

Functions	Menu labels	Menu codes
SET		ZZ
RS-232C		U2
END		ZZ

USB-HID

Functions	Menu labels	Menu codes
SET		ZZ
USB-HID		SU
END		ZZ

USB-VCP

Functions	Menu labels	Menu codes
SET		ZZ
USB-VCP		C01
END		ZZ

Wedge (with external keyboard)

Functions	Menu labels	Menu codes
SET		ZZ
AT-Wedge		UB
With keyboard		KM
END		ZZ

Wedge (without external keyboard)

Functions	Menu labels	Menu codes
SET		ZZ
AT-Wedge		UB
Without keyboard		KL
END		ZZ

10.2. Default Settings 1: Readable Codes

Symbology	Read	Transmit Code Length	Transmit CD	Calculate CD	Set Prefix	Set Suffix	Other
UPC-A	■	X	■	■	__	CR	
UPC-A Add-on	X	X	■	■	__	CR	
UPC-E	■	X	■	■	__	CR	
UPC-E Add-on	X	X	■	■	__	CR	
EAN-13	■	X	■	■	__	CR	
EAN-13 Add-on	X	X	■	■	__	CR	
EAN-8	■	X	■	■	__	CR	
EAN-8 Add-on	X	X	■	■	__	CR	
Chinese Post	X	X	■	X	__	CR	
Codabar / NW-7	■	X	■	X	__	CR	Not transmit

Symbology	Read	Transmit Code Length	Transmit CD	Calculate CD	Set Prefix	Set Suffix	Other
							ST/SP
Code 11	X	X	X	■	—	CR	
Code 39	■	X	■	X	—	CR	Not transmit ST/SP
Code 93	■	X	X	■	—	CR	
Code 128	■	X	X	■	—	CR	
EAN-128	X	X	X	■	—	CR	
IATA	■	X	■	X	—	CR	
Industrial2of5	■	X	■	X	—	CR	
Interleaved2of5	■	X	■	X	—	CR	
Matrix2of5	X	X	■	X	—	CR	
MicroPDF417	X	X	—	—	—	CR	
PDF417	X	X	—	—	—	CR	
MSI/Plessey	■	X	■CD1	■CD1	—	CR	
UK/Plessey	■	X	■	■	—	CR	
RSS-14	X	X	■	■	—	CR	
RSS-limited	X	X	■	■	—	CR	
RSS-expanded	X	X	■	■	—	CR	
S-Code	■	X	■	X	—	CR	
Telepen	■	X	X	■	—	CR	
Trioptic	■	X	■	X	—	CR	Not transmit ST/SP

Notes:

- In the "Reading" column, "■" means "Enable reading" and "X" means "Disable reading."

- In the "Transmit code length" column, "■" means "Transmit code length" and "X" means "Do not transmit code length."

- In the "Transmit CD" column, "■" means "Transmit check digit" and "X" means "Do not transmit check digit."

- In the "Calculate CD" column, "■" means "Calculate check digit" and "X" means "Do not calculate check digit."

- "— " means "not supported."

- In the "Prefix" column, "—" means "there is no prefix setting."

10.3. Default Settings 2: Read Options, Trigger, Buzzer

Item		Default Setting
Setting the number of characters		Fixed length OFF all codes
Read mode		Multiple read
Multiple read reset time		500 ms
Add-on wait mode		500 ms
Multiple label read		Disable
Multiple column read		Disable
Redundancy	Default option ([X0] setting)	Read 1 times, redundancy = 0
	Other options ([X1 .. X3] setting) ([BS .. BW] setting)	Read n times, redundancy = n+1 for the following symbologies and lengths: ● Code 11 with length <= 5 ● Code 39 with length <= 5 ● IATA,Industrial 2of5, Interleaved 2of5 with length <= 8 ● Matrix 2of5 (& Chinese Post), Scode with length <= 8 ● MSI/Plessey with length <= 4 ● NW-7 (Codabar) with all lengths
Trigger switch		Enable
Trigger repeat		Disable
Auto trigger		Disable
Read time		2 seconds (when trigger enabled)
Margin check		Normal
Buzzer duration		50 ms
Buzzer tone		Single tone (3 kHz)
Buzzer loudness		Maximum
Buzzer transmission		Before transmission
Startup buzzer		Enable
Good read LED		Indicator duration 200 ms

10.4. Default Settings 3A: Serial Communication Settings—RS-232C, USB-VCP

Parameter	"U2" and "C01" Default Setting
ACK/NAK	No handshaking
Flow control time out	Indefinitely
Flow control	Disabled
Command header	ESC/STX
Command terminator	CR/ETX

11. Serial Number

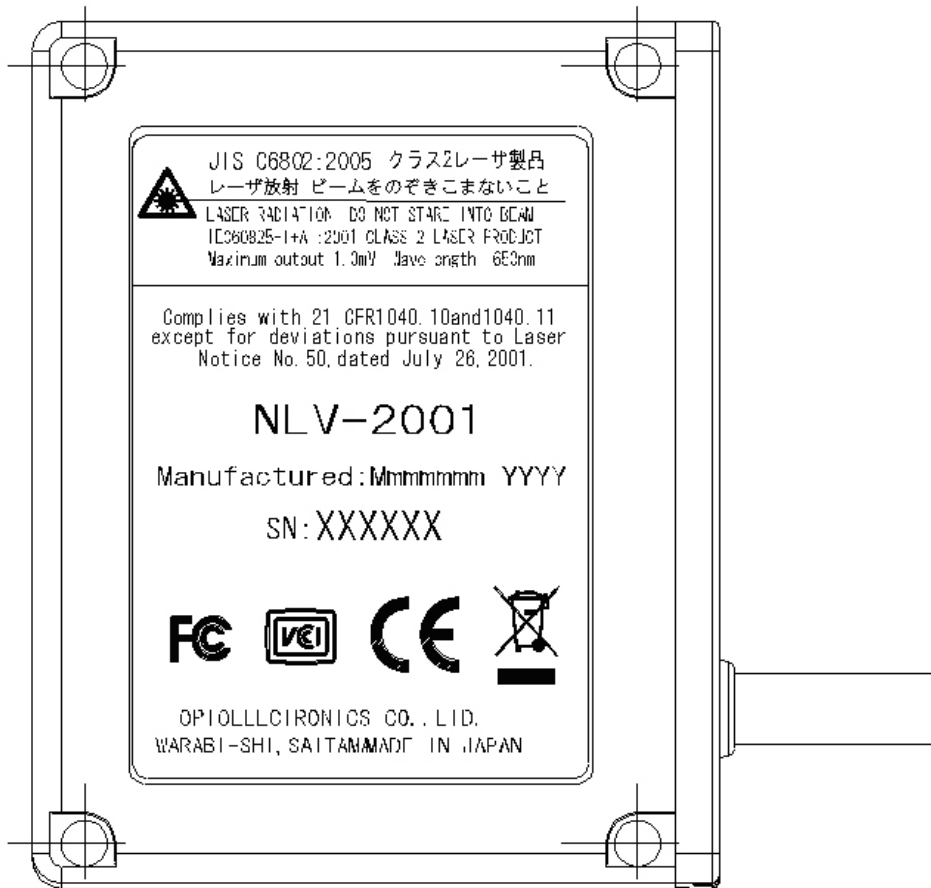The serial number shown below is affixed to the scanner.

Figure 23: Serial number diagram

12. Packaging Specifications

12.1. Individual Packaging Specification

Put the scanner in a protective foam bag and place it in an individual packing box.

Size of the package (after assembly: (W) 245 mm x (D) 110 mm x (H) 38 mm

12.2. Collective Packaging Specification

Put 50 individually packaged scanners in a collective packaging box.

Size of the package (after assembly: (W) 560 mm x (D) 490 mm x (H) 195 mm
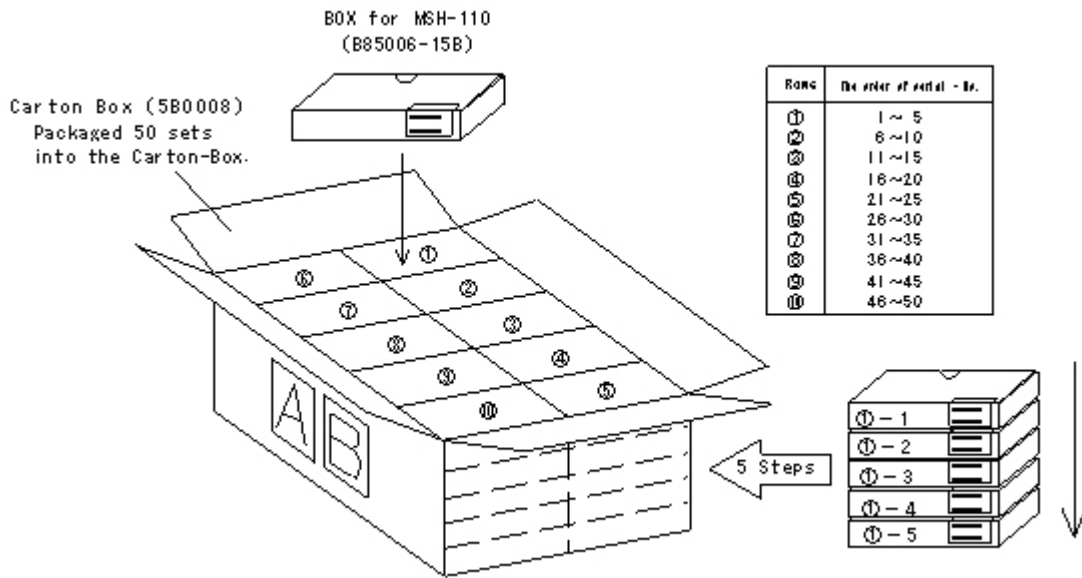

Figure 24: Collective packaging

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, 2002/95 EC). However, this document does **not** have any legal weight in the European Union.

13. Durability

13.1. Electrical Noise

No malfunction occurred when sinusoidal electrical noise (50Hz -100kHz, < 0.1Vp-p) was added to a power supply line.

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS	0.9
Resolution	0.25 mm
Symbology	9-digit Code 39
Quiet Zone	10 mm
N/W Ratio	1:2.5
Distance	150 mm
Angle	$\alpha = 0°$ $\beta = 15°$ $\gamma = 0°$
Curvature	$R = \infty$
Power Supply Voltage	5.0 V

13.2. Static Electricity

Air discharge	8 kV MAX (No malfunction) 10 kV MAX (No destruction)
Measurement environment	Use electrostatic testing device compliant with IEC 61000-4-2
Discharge resistance	330 Ω
Capacitor charging	150 pF

13.3. Shock: Drop Test

No malfunction occurred after the following drop test.

Drop Test: Drop the scanner from a height of 75 cm onto a concrete floor (three times in each of 6 angles).

13.4. Vibration Strength

No malfunction occurred after the following vibration test.

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

13.5. Dust and Drip Proof

IEC IP67

13.6. Cable Bending

Defects occurring due to bending the cable are not covered under warranty.

14. Reliability

MTBF (Mean Time Between Failures) of this product is 10,000 hours.

The estimate of MTBF and product life cycle is based on standard operation of the product within the recommended temperature range and without extreme electronic or mechanical shock.

15. Trigger and Read Options

The NLV 2001has read and trigger settings as follows:

15.1. Auto Trigger Sensor

When auto trigger is used, the scanner starts barcode reading after detecting a change in reflection in the detection area. The scanner will be triggered if the sensors detect changes in brightness in the detection area.

Auto trigger distance: 50 ±10 mm from the edge of the scanner.

Conditions

|	
Moving speed:	100 ±10 mm/s
Angle:	Vertical to the edge of the scanner
Environmental temperature and humidity:	Room temperature and humidity
Environmental illuminance:	500 to 900 lx

Conditions for the auto trigger:	1. Barcode sheet: OPTOELECTRONICS Test Sheet (white)
	     Background: OPTOELECTRONICS Test Sheet (black)
	2. Barcode sheet: OPTOELECTRONICS Test Sheet (black)
	     Background: OPTOELECTRONICS Test Sheet (white)
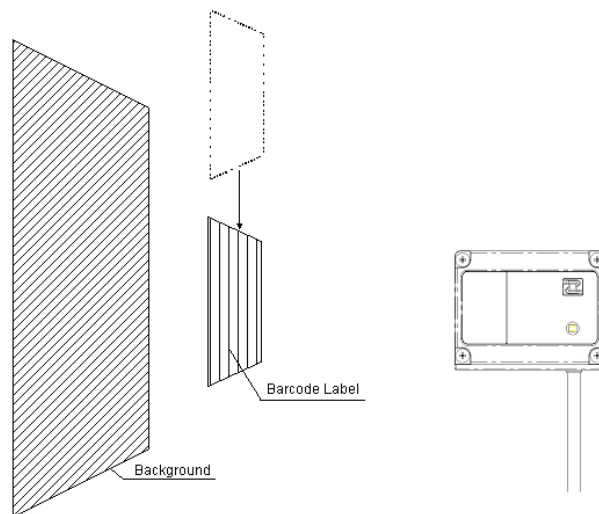
Figure 25: Auto trigger option (NLV 2001 I-Type)

15.2. Auto Trigger Enable/Disable Settings

Use the following settings to enable or disable the auto trigger. (Auto trigger is disabled by default).

To enable auto trigger, scan "ZZ", "+I" and "ZZ" in that order.

To disable auto trigger, scan "ZZ", "+F" and "ZZ" in that order.

Functions	Menu labels	Menu codes
SET		ZZ
Disable auto trigger		+F
Enable auto trigger		+I
END		ZZ

16. Regulatory Compliance

16.1. Laser Safety

The scanner emits laser beams.

JIS C6802: 2005: Laser class 2

IEC 825-1/EN 60825-1: Laser class 2

FDA CDRH Laser class II. Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50 dated June 24, 2007.

Class II laser devices are not considered to be hazardous when used for their intended purpose. Avoid staring into the laser beam.

16.2. Product Safety

EN60950-1: 2001

IEC60950-1: 2001

16.3. EMC

EN55022

EN55024

VCCI Class B: This is a Class B product, to be used in a domestic environment based on the Technical Requirement of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Please install and use the equipment according to the instruction manual.

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.

16.4. RoHS

RoHS: The restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95 EC.

17. Safety

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

17.1. Shock

Do not throw or drop the scanner.

Do not place heavy objects on the cables.

17.2. Temperature Conditions

Do not use the scanner at temperatures outside the specified range.

Do not pour boiling water on the scanner.

Do not throw the scanner into the fire.

Do not forcibly bend the cables at low temperatures.

17.3. Foreign Materials

Do not immerse the scanner in liquids.

Do not subject the scanner to chemicals.

17.4. Other

Do not plug/unplug the connectors before disconnecting the power.

Do not disassemble this product.

Do not place the product near a radio or a TV receiver, as the scanner may cause reception problems.

The scanner may be damaged by voltage drops.

The scanner may not perform properly in environments when placed near a flickering light, such as a computer monitor, television, etc.
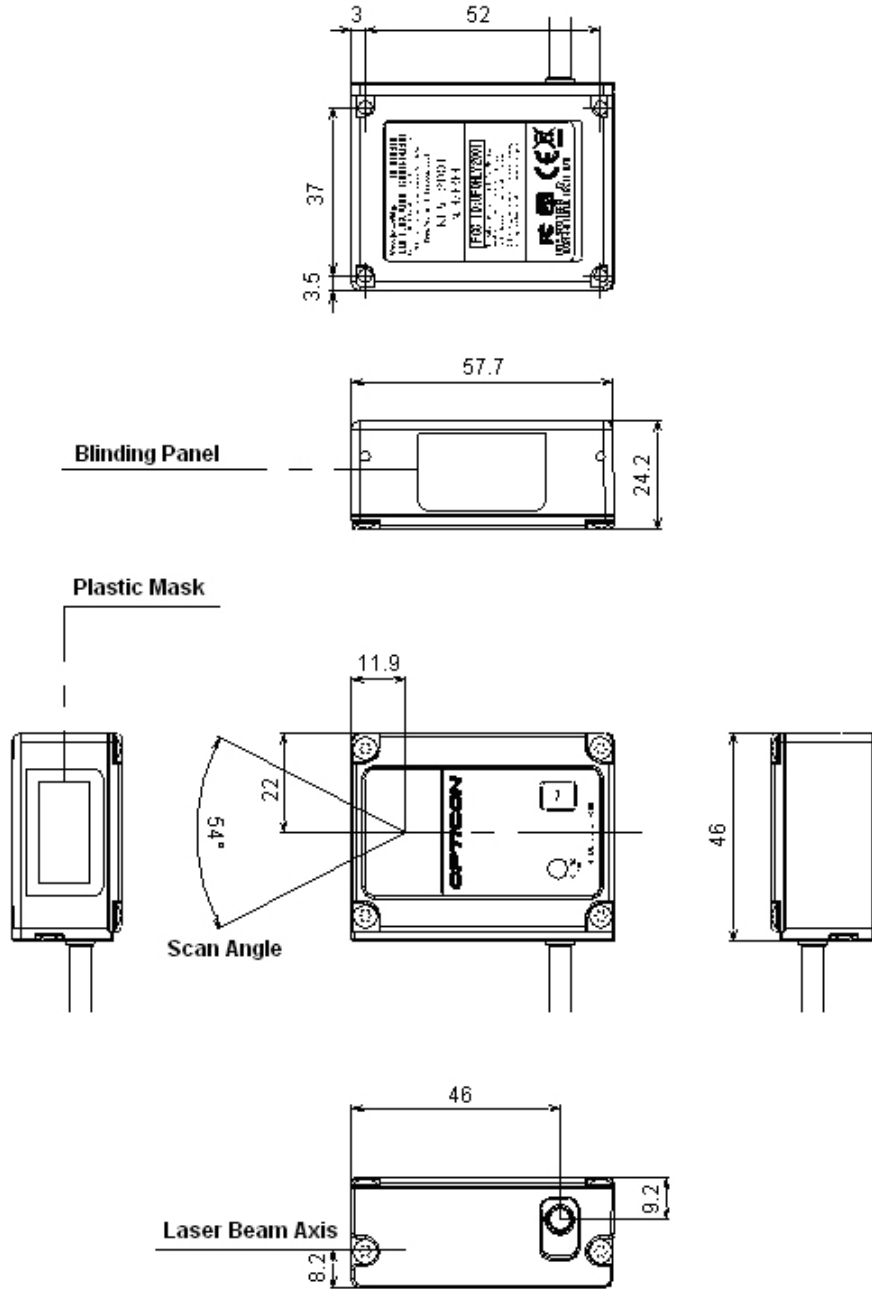
18. Mechanical Drawing

Figure 26: Mechanical drawing (NLV 2001 I-Type)