OPTICON

Fixed Position Laser Barcode Scanner

NLB / RLB-1000

This manual provides specifications for the NLB/RLB-1000 fixed position laser scanner.

Specifications Manual

All information subject to change without notice.

Document History

Model Number:	**NLB/RLB-1000**	**Specification Number:**	**SS07076**
Edition:	**8th**	**Original Spec Number:**	**SS07075**
Date:	**2022-03-xx**		

Copyright 2010 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	Rest of World
Phone: 800-636-0090	**Phone: +31235692728**
Email: support@opticonusa.com	**Email: support@opticon.com**
Web: www.opticonusa.com	**Web: www.opticon.com**

Revision History

Specification No. : SS07076
Product name : NLB/RLB-1000

Edition	Date	Page	Section	Description of Changes
1st	2008/01/31			Initial release
2nd	2009/02/03		2	Added the supported symbologies: GS1 DataBar (RSS) (incl. CC-A/B); Omnidirectiona l/ Truncated / Stacked / Limited/Expanded, MicroPDF417, PDF417 (less than 6 security levels)
			7.1.	Added the definition of PCS.
			7.2.	Added the supported minimum bar code resolution.
			7.3.	Added 'Scan Area'.
			8.1.8.(e)	Added a flow chart of ACK/NAK.
17.2			8.1.8.(f)	Added a flow chart of ACK/NAK NO RESPONSE.
			9.4.	Changed USB interface clamp core.
			10	(1) Default Settings 1: added the supported symbologies. (2) Default Settings 2: added the Redundancy time.
			12	(1) Moved the items"Trigger" and "Scanning Bar codes" from Section 11. (2) Added details of Trigger and read options. (3) Changed the section numbers after 12.
			13	Changed the order of items.
			20	Added Laser-related caution.
3rd	2010/04/02		5	Changed the power supply voltage: DC 5V-10% -> DC6V+10%
4th	2011/01/07		7-3	Modified the drawing (figure 1)
			15-1	Changed the conformity with laser safety standard.
			17-2	Changed the laser caution / CDRH labels
			20-1	Changed the conformity with laser safety standard.
			Appendix 1	Modified the drawing
5th	2011/03/10		Appendix 1	Modified the drawing
6th	2017/06/14		15	Changed the conformity with laser safety standard.
			17-2	Changed the laser caution / CDRH labels
			19	Changed the conformity with laser safety standard.
7th	2021/11/24		2, 10	Deleted stacked code (PDF417 etc.)
8th	2022/03/xx		2, 5, 8, 9, 10	Deleted USB
			15.1	Updated laser safety
			17.2	Updated label

Contents

1. Abstract

This manual provides specifications for the NLB/RLB-1000 fixed position laser scanner which provides smooth and fast scanning performance.

2. Overview

・ The NLB-1000 and the RLB-1000 series scanners utilize a polygon mirror to realize scan rate of 1000 scans/per second. Those scanners output decoded data via RS232C interface.
・ The NLB-1000 is a single scan model whereas the RLB-1000 is a raster scan model.
・ Possible to configure settings of the NLB-1000 and the RLB-1000 scanners by sending specific commands or scanning menu bar codes.
・ The NLB-1000 and the RLB-1000 scanners emit IEC/EN 60825-1:2007 (2nd Edition) Class 2 laser beam.
・ The dust and drip proof performance of the NLB-1000 and the RLB-1000 scanners satisfy IP-54.
・ The NLB-1000 and the RLB-1000 series scanners are all compliant to RoHS.
・ Supported symbologies:

Linear (1D)

JAN/UPC/EAN, incl. add-on

Chinese Post Matrix 2 of 5

Codabar/NW-7

Code 11

Code 39

Code 93

Code 128

GS1-128 (EAN 128)

IATA

Industrial 2of5

Interleaved 2of5

ISBN-ISMN-ISSN

Korean Postal Authority code

Matrix 2of5

MSI/Plessey–UK/Plessey

GS1 DataBar (RSS)(incl. CC-A/B); Omnidirectional/Truncated/Stacked/Limited/Expanded

S-Code

Telepen

Tri-Optic

3. Physical Features

3.1. Dimensions

34.5mm (D) x 29mm (W) x 17mm (H)
Please refer to "Mechanical Drawings" for details.

3.2. Weight

30 g (Maximum) excluding the cable.

3.3. Installation

Two mounting holes on bottom and side of the product are available. Please refer to "Appendix 1: Mechanical Drawings" for details.

4. Environmental Specifications

4.1. Operating Temperature and Humidity

0 to 45 degrees C
5 to 90% RH (no condensing)

4.2. Storage Temperature and Humidity

-20 to 65 degrees C
5 to 90% RH (no condensing)

5. Electrical Specifications

Power of DC 5V-10% to DC6V+10% is supplied to the scanner. [*1]

[*1] OPTOELECTRONICS does not guarantee any troubles or scanner malfunctions caused by the use of the AC adapters which are not provided by OPTOELECTRONICS.

Item	Mark	Min.	Typ.	Max.	Unit	Notes
Power supply voltage	VDD	4.5	6.0	6.6	V	
In-rush Current	Ipeak	-		2000	mA	
Operating Current	Iop	-	205	500	mA	
Stand-by Current	IPRE	-	145		mA	Laser OFF, Polygon mirror ON
Start-up Time	Td	-		1.5	sec	Scans at a rate of 800 scans/sec to 1200 scans/sec carried out within 1.5 seconds after the polygon mirror gets activated. [*2]

Conditions:
• Connect 1 ohm 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.

[*2] If the current value does not get stable within 1.5 seconds after activating the polygon mirror, this scanner detects the system error and stop the polygon mirror and blinks green and red LEDs.

6. Optical Specifications

Item	Specification	Unit
Light-emitted element	Red laser diode	nm
Emission wavelength	650±10 (at 25 degrees C)	mW
Light output	1.0 or less	
Scan method	Octahedron polygon mirror	
Scan rate	1000±60 (at 25 degrees C)	scan/sec
Scan angle	70° (typical)	deg
Effective scan angle	40° (typical)	deg
Vertical scan width of NLB-1000 (single scan)	Less than 8 (500 mm from the front face of the scanner)	mm
Vertical scan width of RLB-1000 (raster scan)	8 to 20 (500 mm from the front face of the scanner)	mm

7. Technical Specifications

Conditions

Ambient Temperature	: 25 degrees C or lower
Ambient Humidity	: 85%RH or lower
Ambient Light	: 500 to 1000lx
Power Supply Voltage	: 6.0 V
Background	: Black
Scanning Performance Test	: Scanner is approved when scanning is successful in 70% of the tests.
Scan Origin	: From the front face of the scanner

7.1. Print Contrast Signal (PCS)

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

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

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

7.2. Resolution

0.15 mm

7.3. Scan Range

7.3.1. Scan Area

The scannable area depends on the bar code type (PCS, resolution, length, etc.) and the direction of the bar code surface. However, the bar code should be set within the following area.
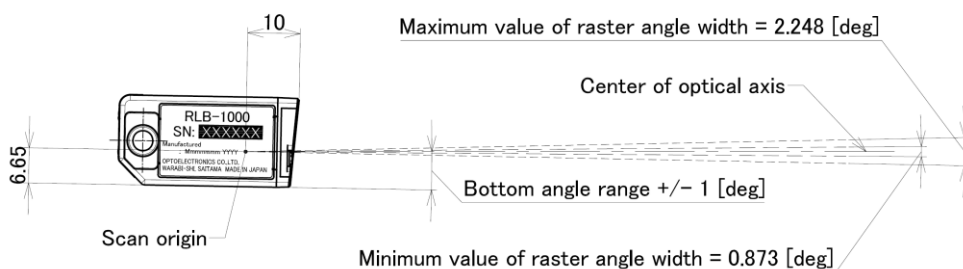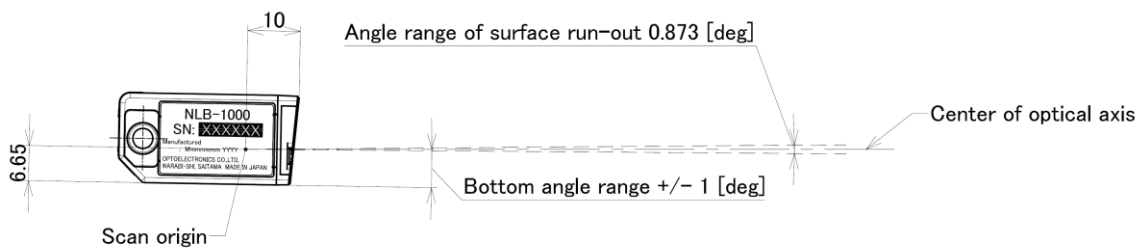
7.3.2. Depth of Fields

The depth of field is measured from the front face of the scanner. The scanning area is rectilinear near the exit window and expands in an arc centered on a virtual reference point in the distance.
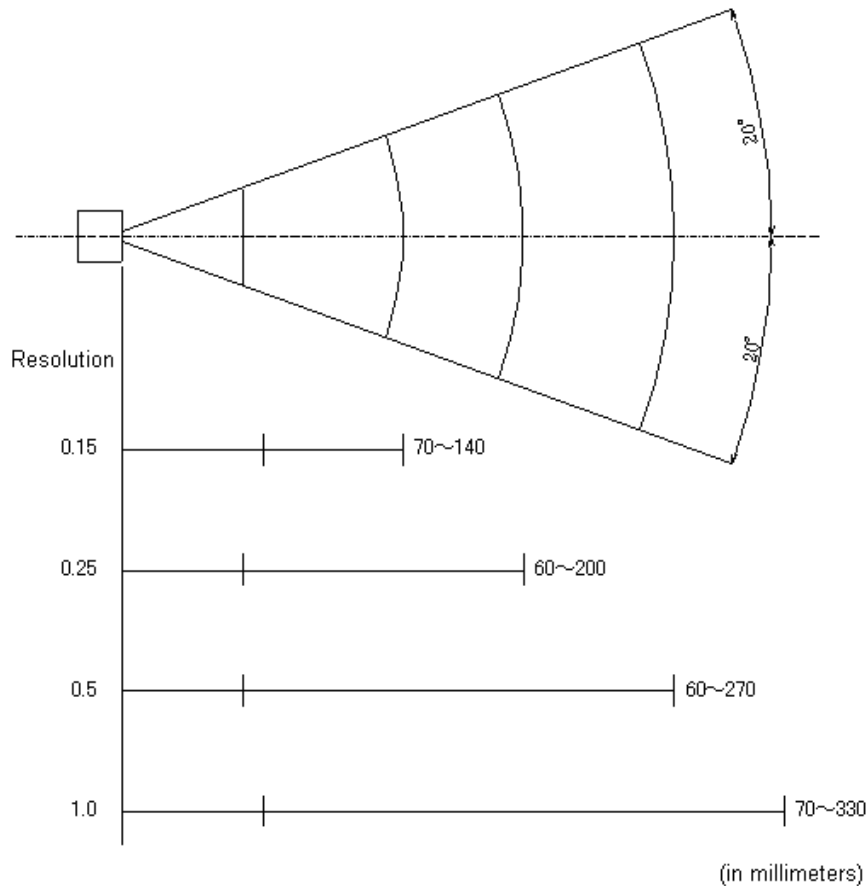

Figure 2: Depth of Field

7.3.3. Scan Range and Bar Code Conditions

Resolution	Symbology	PCS	Quiet Zone	No. of Digits
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

Bar code sample: Optoelectronics test sample

Angle: α = 0°, β = 15°, γ = 0°

Curvature: R = ∞

7.4. Pitch, Skew and Tilt

Pitch Angle $\alpha \leq \pm 30°$
Skew Angle $\beta \leq \pm 60°$ (excluding the dead zone)
Dead Zone $\beta \leq -7° \sim +9°$ (NLB-1000)
                        $\beta \leq -8° \sim +10°$ (RLB-1000)
                        There are some areas in which scanning may fail due to specular reflection.
Tilt Angle $\gamma \leq \pm 25°$

<Conditions>
Bar code sample : Optoelectronics Test Sample
                        [Pitch angle, Skew angle and 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

Distance   : 110 mm from the front face of the scanner
Angle   : Pitch and Tilt are calculated based on skew angle $\beta = +15°$

Curvature   : R = ∞

7.4.1. Definitions of Pitch, Tilt and Skew Angles

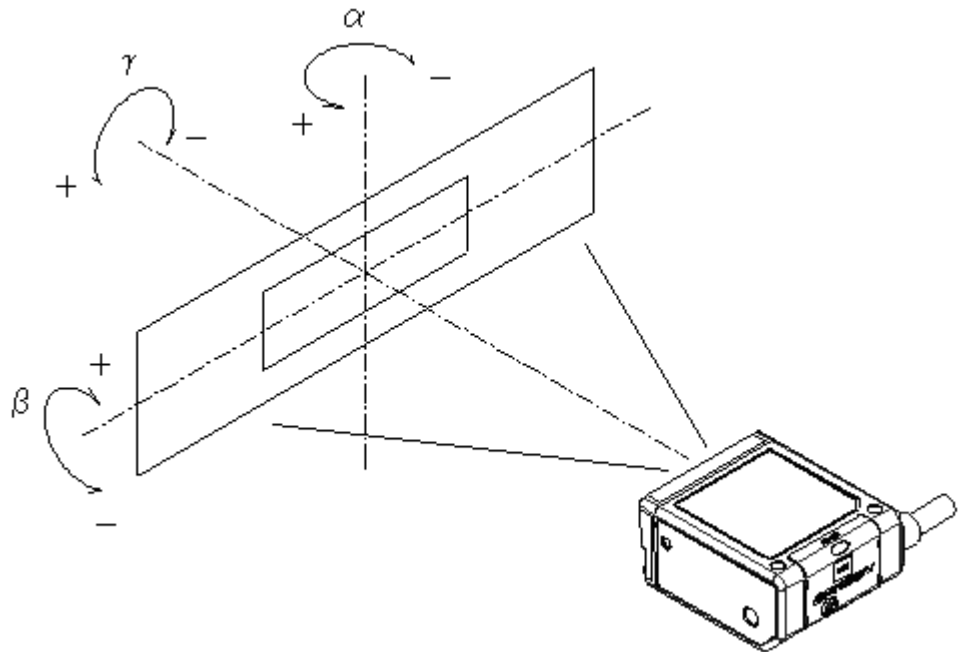*Figure 3: Pitch, Tilt and Skew Angles*

7.5. Curvature

8-digit JAN   : R ≥ 15 mm.
13-digit JAN   : R ≥ 20 mm.

<Conditions>
Bar code sample   : Optoelectronics Test Sample
                        PCS = 0.9, Resolution = 0.26 mm, Quiet zone = 10 mm
Distance   : 110 mm from the front face of the scanner
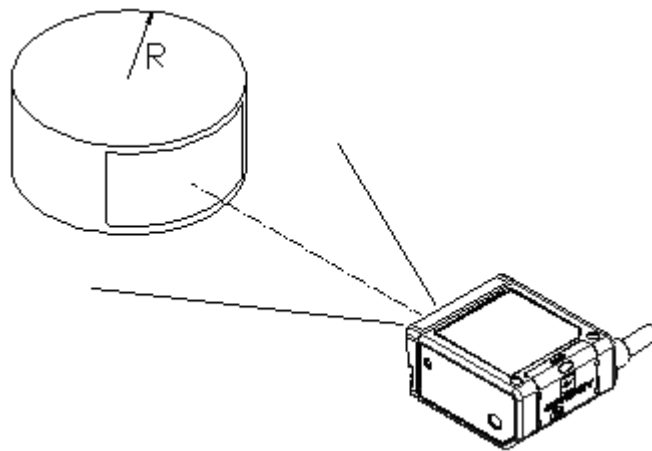Angle   : Skew angle: β = + 15°

Figure 4: Curvature

8. Interface

8.1. RS-232C Interface

The NLB / RLB-1000 support 3 different specifications for RS-232C interface: 9-pin D-SUB, 25-pin D-SUB, and without a connector

8.1.1. Setting

Read menu bar codes [ZZ] + [U2] + [ZZ] to set to RS-232C interface default.

8.1.2. Signal Level

Signal Name	IN/OUT	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. Pin Assignment

(1) 9-pin D-SUB Connector and Interface Circuit

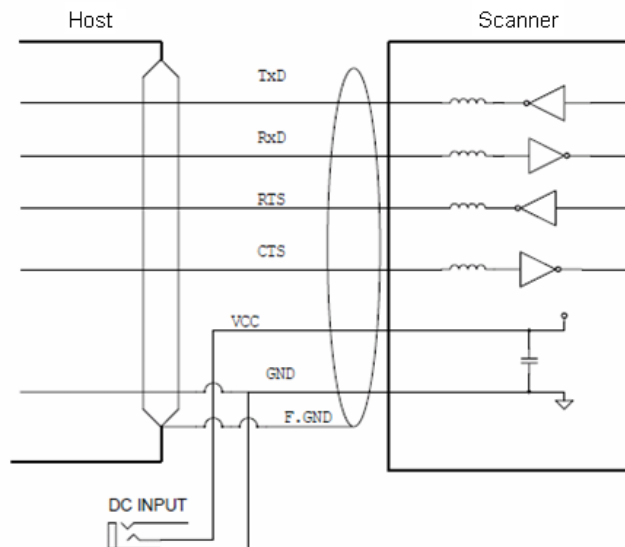| Signal Name	Pin No.	Notes
FG	1	Shield
TXD	2	
RXD	3	
-	4	Connected to pin 6 with jumper cable.
GND	5	
-	6	Connected to pin 4 with jumper cable.
CTS	7	
RTS	8	
NC	9	Open (not connected)

Connector: D-SUB, 9-pin, female (INCH SCREW)

Figure 5: Interface Circuit (D-SUB 9pin connector)

14

(2) 25-pin D-SUB Connector and Interface Circuit

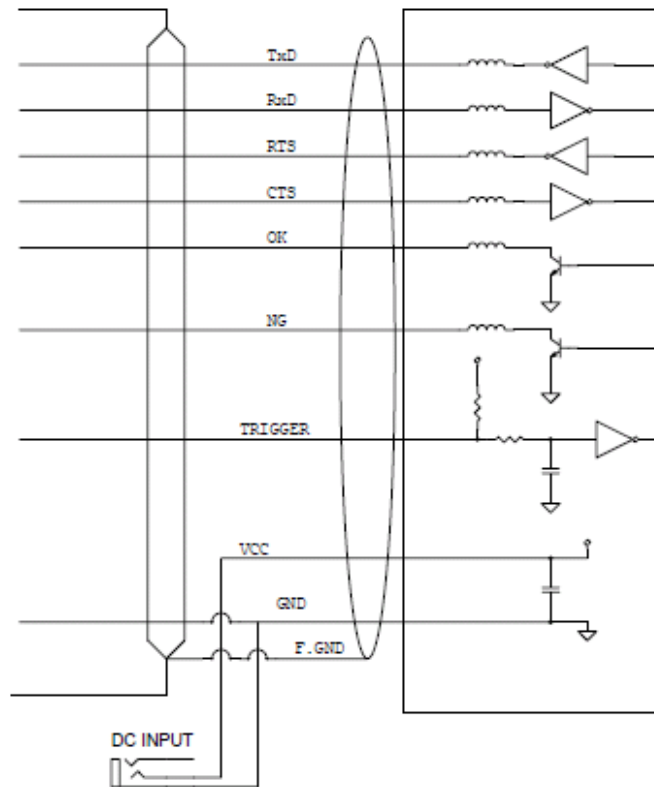| Signal Name	Pin No.	IN/OUT	Notes
FG	1		
RXD	2	OUT	
TXD	3	IN	
CTS	4	IN	
RTS	5	OUT	
GND	7		
TRIGGER	11	IN	H-level: Open, L-level (GND): Trigger
OK	12	OUT	NPN Open Collector (DC24V, 30mA）
NG	13	OUT	NPN Open Collector (DC24V, 30mA）

Connector: D-SUB, 25-pin, female (INCH SCREW)

Figure6: Interface Circuit (25pin D-SUB connector)

(3) No Connector and Interface Circuit

Wire Color	Pin No.	IN/OUT	*Notes*
Green	TXD	OUT	
White	RXD	IN	
Gray	RTS	OUT	
Blue	CTS	IN	
Red	VCC	-	*6V Input*
(Tube)	Shield	-	*Shield (shrinkable tube)*
Black	GND	-	*GND*
Brown	Trigger	IN	*H-level: Open, L-level (GND): Trigger*
Yellow	OK	OUT	*NPN Open Collector (DC24V, 30mA)*
Orange	*NG*	*OUT*	*NPN Open Collector (DC24V, 30mA)*

Note: You can change the sequencer (OK or NG) settings using the menu bar code. However, for a certain period of time, it will remain to be OK when H-level signals are sent and NG when L-level signals are sent.
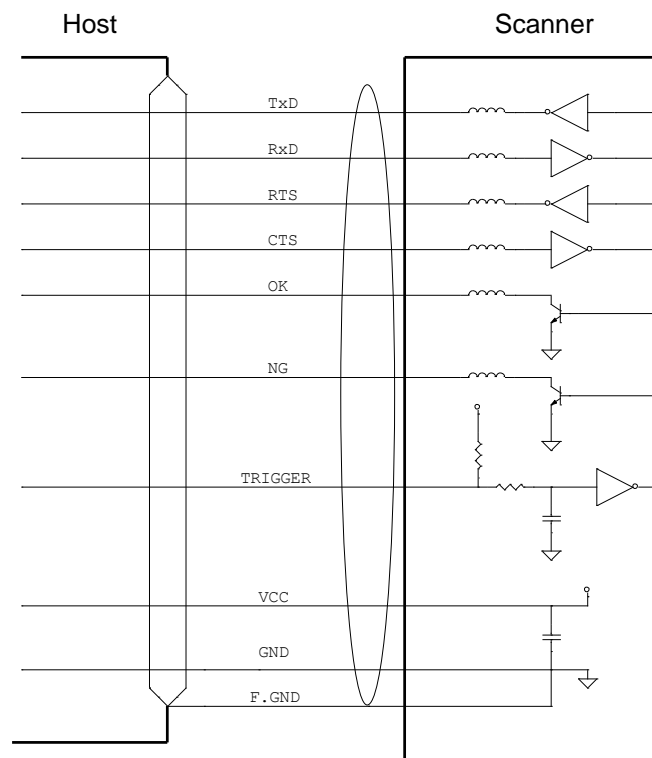

Figure 7: Interface Circuit (No connector)

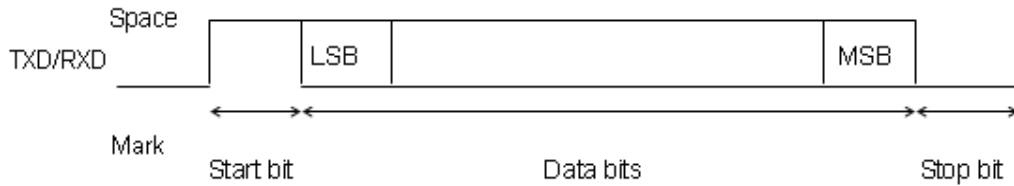### 8.1.4. Character Format (for send / receive data)

Figure 8: Character Format
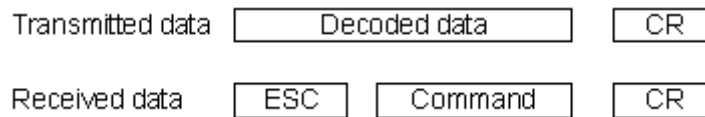
8.1.5. Communication Format

Figure 9: 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 makes communications regardless of the state of the host system.
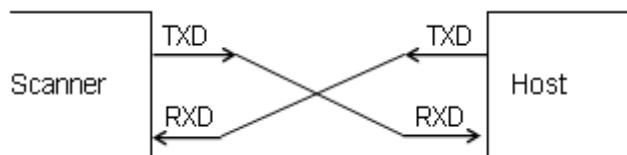

Figure 10: No handshaking

b) BUSY / READY

The scanner and the host system notify each other if they are able to receive data (BUSY/READY) via their RTS line. When they are connected as shown in the figure below, the CTS line can be used to check if the other side is busy (off) or ready to receive data (on).
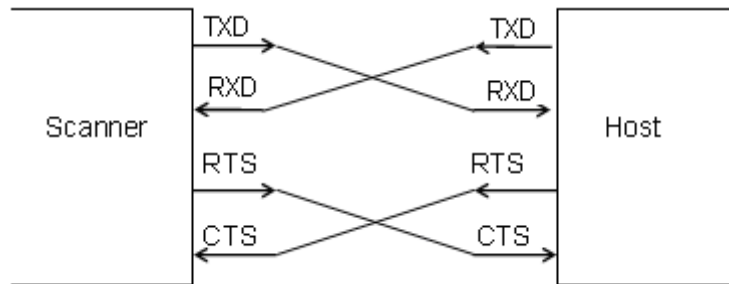

Figure 11: BUSY/READY

The scanner's RTS is normally on (so ready to receive data) except during the processing of received data, while transmitting data, and while it is busy processing menu labels. When the scanner wants to send data, it first has to check if its CTS line is on (to be sure that the host is ready to receive data) When the CTS line is off, the scanner does not send the data but waits for a specific timeout period until the CTS line is tuned on. When the CTS line is not turned on within the time specified, the data transmission will be aborted. The default is "Indefinitely" (I0).

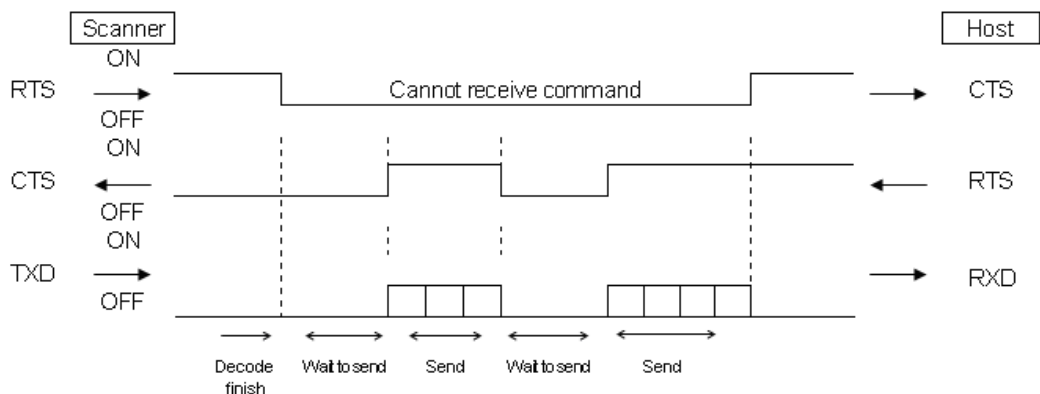| Flow Control Time Out	Menu / Command
Indefinitely	I0
100 msec	I1
200 msec	I2
400 msec	I3

Figure 12: Cannot Receive Command

c) CTS, TXD signals timing

When the CTS line (RTS signal on the host side) is turned off during a TXD signal transmission, the scanner transmits one charactersand waits. When the CTS signal is turned on during a character transmission, the character will be transmitted.
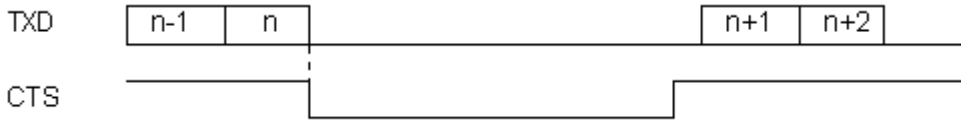

Figure13: Signals Timing

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

d) MODEM

The scanner's RTS is OFF as soon as power is supplied to the scanner. The scanner will turn RTS ON when it wants to transmit data to the host. The host should respond by putting CTS ON when it is ready to receive data. While CTS is ON the scanner is allowed to transmit data. When all data has been transmitted, the scanner will turn RTS OFF. In response, the host should turn OFF the scanner's CTS. If, while RTS is ON, the CTS line is not ON for a certain configurable period, the scanner will terminate the transmission with an error indication of the buzzer.
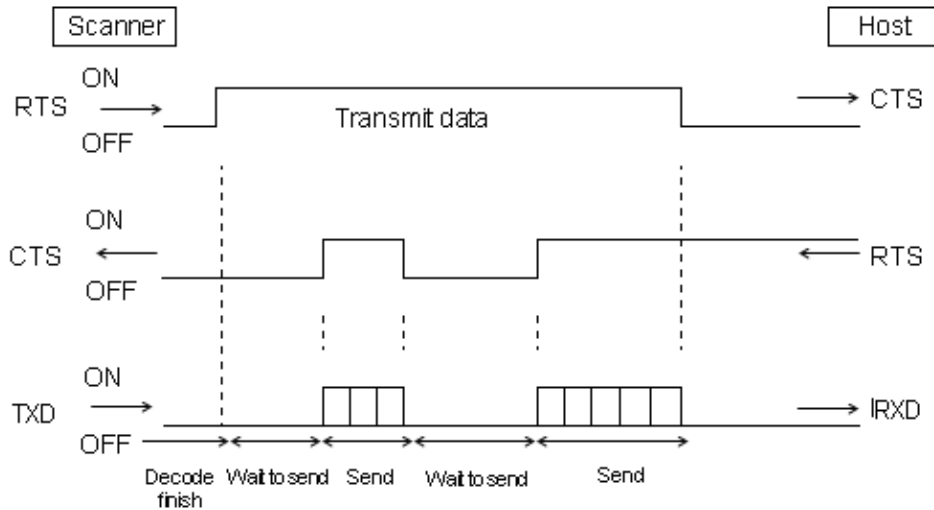

Figure 14: MODEM

e) ACK/NAK

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

ACK response	The scanner completes transmission successfully with the good-read buzzer and returns to the initial state.
NAK response	The scanner sends the data again and waits for the response from the host.
DC1 response	The scanner returns to waiting for the trigger, if it has a trigger (the initial state).
None response	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.

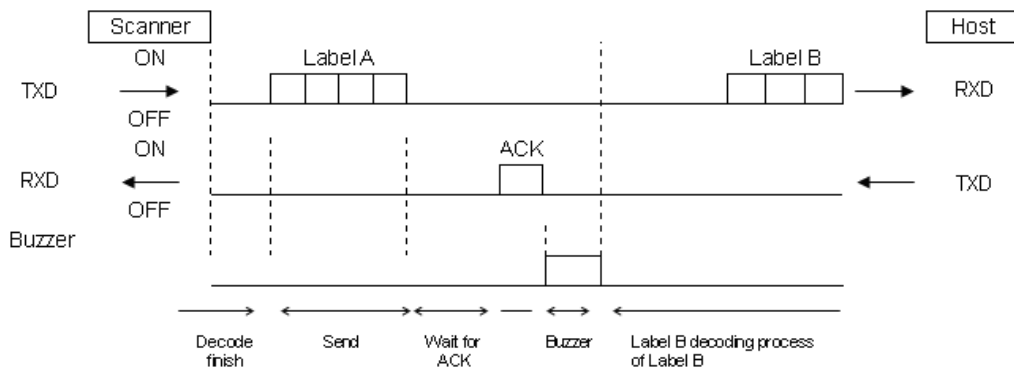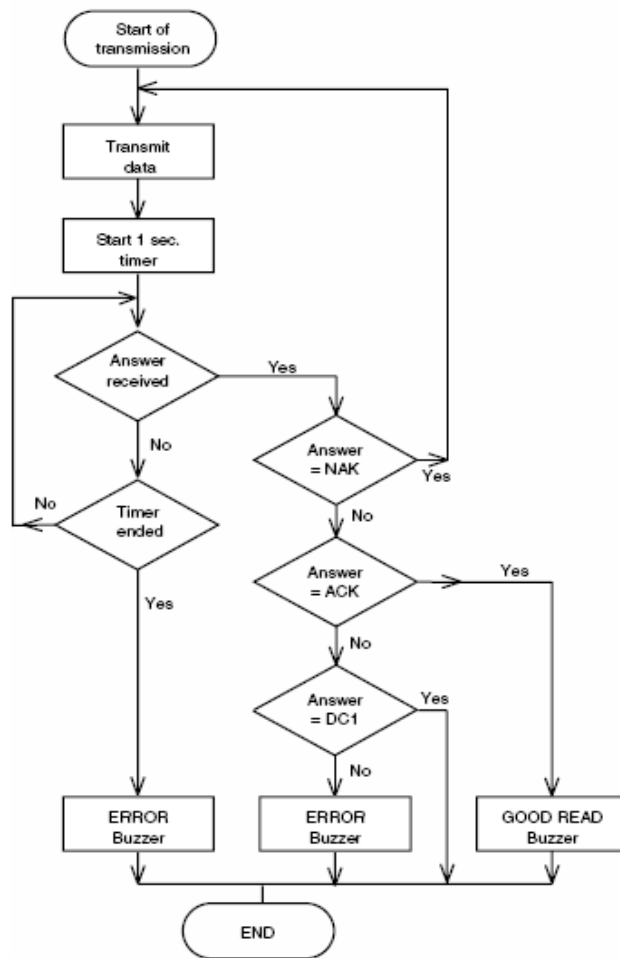| *ACK/NAK timeout*	*Menu / Command*
Indefinitely (default)	XI4
100 ms	XI5
500 ms	XI6
1000 ms	XI7

Figure 15-1: ACK Timing Chart

Figure 15-2: ACK/NAK Flow Chart
Figure 15: ACK/NAK

f) ACK/NAK NO RESPONSE

When no response from the host is received within a specified time, the scanner assumes that the host properly received the data. The other actions are the same as ACK/NAK.
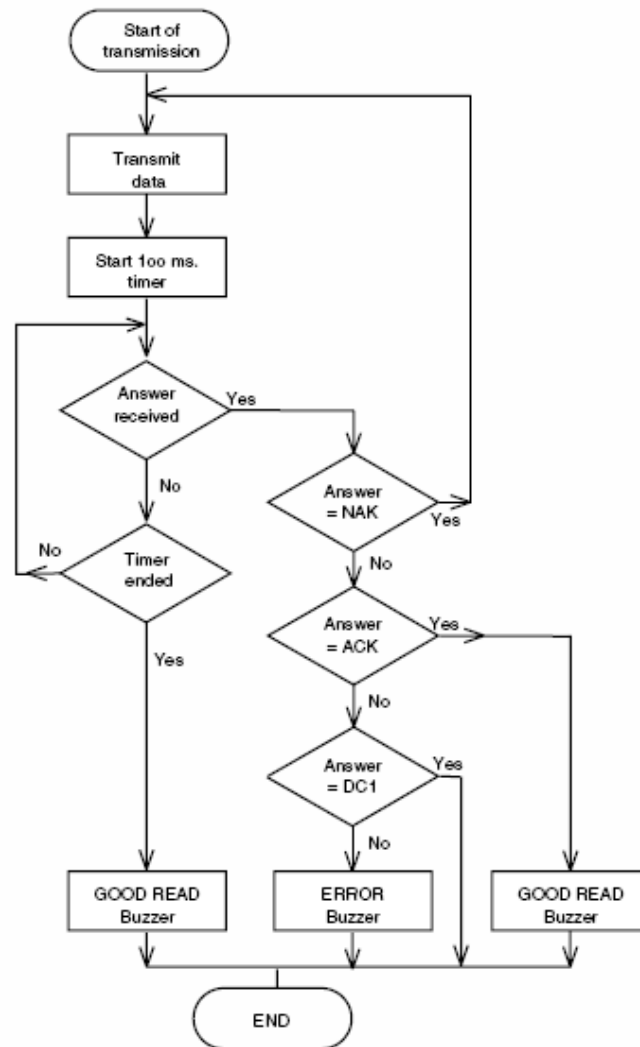

Figure 16: ACK/NAK-No Response

9. Cable and Connector

9.1. RS-232C Interface (9-pin D-SUB Female)

<Basic Specification>
Type   : Straight
Diameter   : Φ3.8 mm (main cable), Φ3 mm (AC adapter cable)
Length   : 1500 ±50 mm (main cable, excluding connector)
              100 ±10 mm (AC adapter cable, excluding jack)

Figure 17: RS-232C Cable (D-SUB 9-pin)

9.2. RS-232C Interface (25-pin D-SUB Female)

<Basic Specification>
Type   : Straight
Diameter   : Φ3.8 mm (main cable), Φ3 mm (AC adapter cable)
Length   : 1500 ±50 mm (main cable, excluding connector)
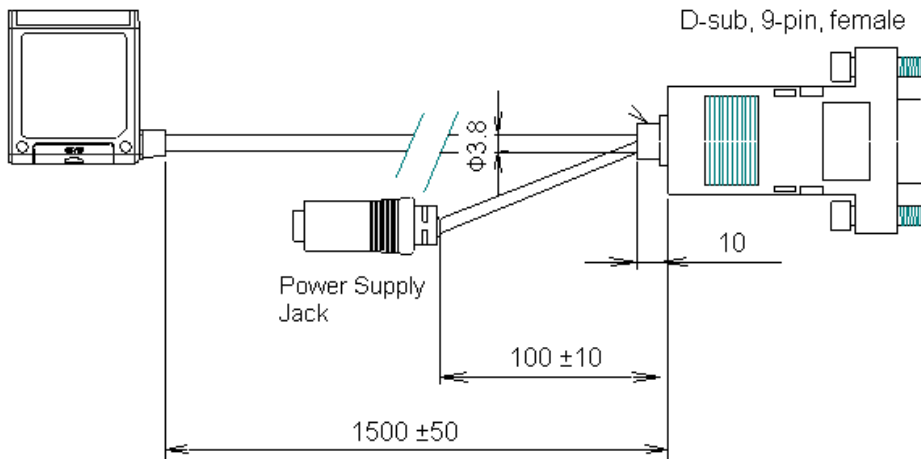   100 ±10 mm (AC adapter cable, excluding jack)
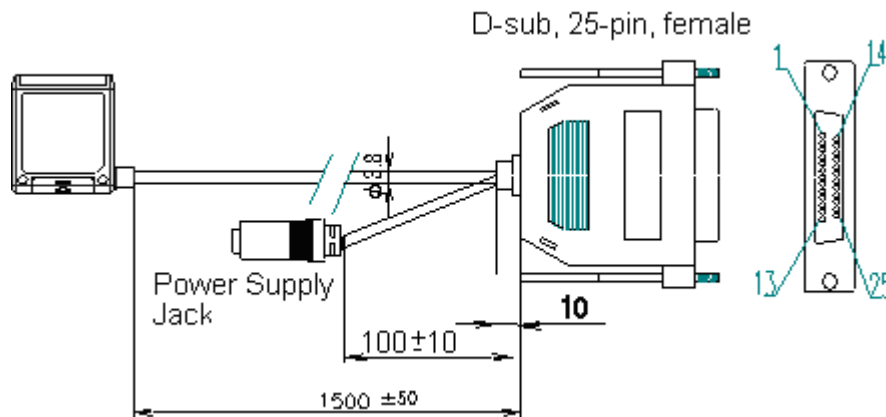
Figure 18: RS-232C Cable(D-SUB 25pin)

9.3. RS-232C Interface Cable (No Connector)

<Basic Specification>
Type   : Straight
Diameter   : Φ3.8 mm (main cable)
Length   : 1500 ±50 mm (main cable, excluding connector)

Figure 19: RS-232C Cable (No connector)

10. Default Settings

Menu bar codes are prepared for the default setting to make the setting easier.

RS-232C Default

Function	Menu label	Menu code
SET	‖‖‖‖‖‖‖‖‖‖‖‖‖ Z Z	ZZ
RS232 Default	‖‖‖‖‖‖‖‖‖‖‖‖‖ U 2	U2
END	‖‖‖‖‖‖‖‖‖‖‖‖‖ Z Z	ZZ

Default Settings 1: Readable Codes

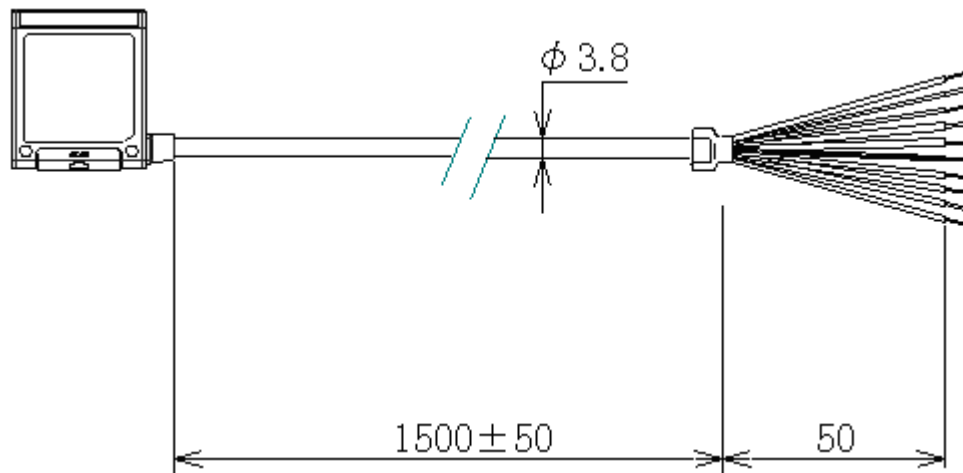| Code type	Reading	Transmit code length	Transmit CD	Calculate CD	Transmit others	Prefix	Suffix
UPC-A	○	✕	○	○		-	CR
UPC-A Add-on	✕	✕	○	○		-	CR
UPC-E	○	✕	○	○		-	CR
UPC-E Add-on	✕	✕	○	○		-	CR
EAN-13	○	✕	○	○		-	CR
EAN-13 Add-on	✕	✕	○	○		-	CR
EAN-8	○	✕	○	○		-	CR
EAN-8 Add-on	✕	✕	○	○		-	CR
Code 39	○	✕	○	✕	Not transmit ST/SP	-	CR
Tri-Optic	○	✕	○	✕	Not transmit ST/SP	-	CR
Codabar / NW-7	○	✕	○	✕	Not transmit ST/SP	-	CR
Industrial 2of5	○	✕	○	✕		-	CR
Interleaved 2of5	○	✕	○	✕		-	CR
Code 93	○	✕	-	○		-	CR
Code 128	○	✕	-	○		-	CR
GS1 128 (EAN 128)	○	✕	-	○		-	CR
S-Code	○	✕	○	✕		-	CR
MSI/Plessey	○	✕	○CD1	○CD1		-	CR
UK/Plessey	○	✕	○	○		-	CR
Telpen	○	✕	✕	○		-	CR
Matrix2of5	✕	✕	○	✕		-	CR
Chinese Post Matrix 2of5	✕	✕	○	✕		-	CR
IATA	○	✕	○	✕		-	CR
CODE11	✕	✕	✕	○		-	CR
GS1 DataBar Omnidirectional (RSS-14)	✕	✕	○	○	Transmit AI	-	CR
GS1 DataBar Stacked Omnidirectional (RSS-14 Stacked Omnidirectional)	✕	✕	○	○	Transmit AI	-	CR
GS1 DataBar Expanded (RSS-Expanded)	✕	✕	○	○		-	CR
GS1 DataBar Expanded Stacked (RSS-Expanded Stacked)	✕	✕	○	○		-	CR
GS1 DataBar Limited (RSS Limited)	✕	✕	○	○	Transmit AI	-	CR
GS1 DataBar Truncated (RSS-14 Truncated)	✕	✕	○	○	Transmit AI	-	CR
GS1 DataBar Stacked (RSS-14 Stacked)	✕	✕	○	○	Transmit AI	-	CR

Notes:
(1) "Reading" column : "○" -> Enable reading, "×" -> Disable reading.
(2) "Transmit code length" column : "○" -> Transmit code length" , "×" -> Do not transmit code length ,
    "-" -> Unsupported.
(3) "Transmit CD" column : "○" -> Transmit check digit ,"×" -> Do not transmit check digit.
(4) "Calculate CD" column : "○" -> Calculate check digit, "×" -> Do not calculate check digit.
(5) "Prefix" column : "-" -> No prefix setting
(6) GS1 128 (EAN 128) bar codes are processed as Code-128 and "FNC1" data will be ignored.

Default Settings 2: Read Options, Trigger, Buzzer

Item	Default Setting
Setting the number of characters	Fixed length OFF all codes
Read mode	Single read
Multiple read reset time	500 msec
Add-on wait mode	500 msec
Redundancy [1]	Read 1 times, redundancy = 0 ([X0] setting)
Inter-character gap check	Character 1>
Multiple columns read	Disable multiple columns read
Limitation of Decode Time [2]	Disable
Read time	2seconds
Buzzer durations	50msec
Buzzer tone	2.6kHz
Buzzer loudness	Loud (maximum)
Indicator duration (Green LED)	200msec
Code-39 minimum digit	1 digit
NW-7 minimum digit	5 digits
Industrial 2of5 minimum digit	5 digits
Interleaved 2of5 minimum digit	6 digits
MSI/Plessey minimum digit (only when enabled)	3 digits

[1] In case of the following symbologies ,because of the prevention of mis-decording , the reading times is increased once and redundancy is also increased once .
- Code 39 with length <= 5
- MSI/Plessey with length <= 4
- IATA, Industrial 2of5, Interleaved 2of5 with length <= 8
- Codabar (NW-7) with all lengths
- Code 11 with length <= 5

[2] Refer to 12-4. Scanning Bar Codes on Moving Items

[U2] Communication Settings

Item	Default 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

Note: The communication condition can be changed by using the menu bar code.

11. Other Functions

11.1. LEDs

There are red LED and green LED on the NLB-1000 and the RLB-1000.

1) A green LED lights up for a specific period of time after successful scanning. You can configure the settings when the green LED is blinking.

2) A red LED lights up when any unsupported menu is read in the menu mode (200ms).

3) Both green and red LEDs light up at the same time when either of the following occurs:
   - There is not scanning operation at the scan rate of 800scans/sec to 1200scans/sec carried out within 1.5 seconds after the polygon mirror gets activated.
   - There is not scanning operation at the scan rate of 800scans/sec to 1200scans/sec carried out while the polygon mirror is operating.
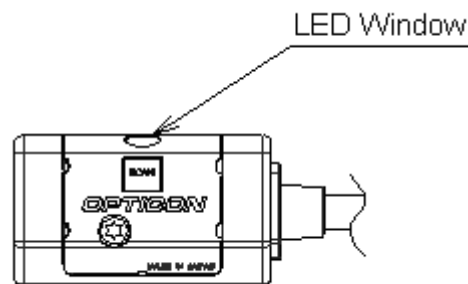

Figure 20: LED

11.2. Buzzer

The NLB-1000 and the RLB-1000 scanners have buzzer function and the buzzer loudness is below 65dB. The buzzer sounds:

1) After successful scanning at the power activation.

2) After successful scanning.

3) After reading a valid menu bar codes or when the scanner reads an unsupported bar code.

4) When there is a malfunction of the motor.

However, it is possible to disable the buzzer by reading specific menu bar codes.

12. Trigger and Read Options

12.1. Trigger Switch

The trigger switch of the NLB-1000 and the RLB-1000 is on the back side of the scanner. It is written "SCAN" on the switch as shown in the figure below. You can start the scanning operation by pressing this switch as far as the read options of the scanner is not configured otherwise. (In the default settings, manual scanning is enabled.)
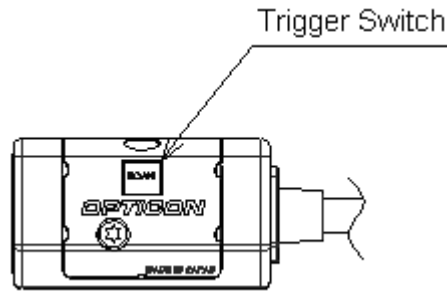

Figure 21: Trigger Switch

12.2. Trigger Mode

Disabled	When this option is selected, the reader will stay on all the time.
Enabled	After receiving a trigger signal, the bar code reader will turn on and the read cycle starts. The reader will stay on for a time as set in 'Read time options'.

The trigger signal can be initiated in the following ways:

Manual mode	When the trigger key is pressed, the read cycle starts.
Serial mode	The read cycle starts at the time set in 'Read time options' after a serial command (<ESC>Z<CR>) is received.
Hardware mode	For no RS232C connector specification, the read cycle starts at the time set in 'Read time options' after an electrical pulse (low).

12.3. Read Mode

Single read mode:
When a symbol has been decoded, the reader will be turned off. The reader must be triggered again to read another symbol.

Multiple read mode:
When a symbol has been decoded, the reader will stay on for a time (set by 'Read time options') or indefinitely, if the trigger switch has been disabled. The same symbol can only be decoded again after the symbol has not been detected for a set number of scans (multiple read reset time).

Continuous read mode:
The reader will produce as much data as it can decode even if it is reading the same symbol. This mode is mainly used for demonstration and diagnosis.

12.4. Scanning Bar Codes on Moving Items

NLB-1000 and RLB-1000 are capable of scanning low printing quality bar codes since the decoding process has a priority over the scanning process. While they can read the low quality bar code, it may take time for decoding. When a label of a certain level of quality attached to a moving item is read, the decoding time should be limited giving priority to scanning so that reading may be more successful.

The following option is provided to limit the decoding time.

Functions	Menu labels	Menu codes
SET	Z Z	ZZ
Enable decoding time limit	E 7 K	E7K
END	Z Z	ZZ

The improvement of scanning performance by such setting differs depending on the scan rate and the redundancy configurations.

The decoding time can return to default by reading the following menu label.

Functions	Menu labels	Menu codes
SET	Z Z	ZZ
Disable decoding time limit	E 7 J	E7J
END	Z Z	ZZ

13. Durability

13.1. Ambient Light Immunity

Reading performance is guaranteed when the illuminance on the bar code surface is between zero and the following values:

Incandescent   : 4,000lx
Fluorescent   : 4,000lx
Sunlight   : 80,000lx

<Conditions>
Bar code 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   : 110 mm from the front face of the scanner
Angle   : α = 0°, β = 15°, γ = 0°
Curvature   : R = ∞

13.2. Power Noise Immunity

Bar code reading and data transmission are possible when sinusoidal noise (50Hz to 100kHz, less than 0.1Vp-p) is applied to a power supply line.

<Conditions>
Bar code 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 from the front face of the scanner
Angle   : α = 0°, β = 15°, γ = 0°
Curvature   : R = ∞

13.3. Electrostatic Discharge Immunity

No destruction   ± 15kV (air discharge), ± 8kV (contact discharge)
No malfunction   ± 8kV (air discharge), ± 4kV (contact discharge)
Environment   Use electrostatic testing device compliant with IEC 61000-4-2
Discharge resistance   330 ohms
Capacitor charging   150pF

13.4. Drop Impact Resistance

13.4.1. Drop Impact Resistance (in individual packaging)

There shall be no sign of malfunction of the scanner after the following drop test.
***Drop Test*:** Drop the scanner once, at each 6 face, from a height of 60cm onto a concrete floor.

13.4.2. Drop Impact Resistance (without packaging)

There shall be no sign of malfunction of the scanner after the following drop test.
Drop Test: Drop the scanner once, at each 6 face, from a height of 30cm onto a concrete floor.

13.5. Vibration Strength

13.5.1. Vibration Test (in individual packaging))

There shall be no sign of malfunction of the scanner after the following vibration test.
__Vibration Test:__ Increase the frequency of the vibration from 10Hz to 100Hz at an accelerated velocity of 19.6m/s2 (2.0G) for 30 minutes (60 minutes for a cycle) in the non-operating state. Repeat this in each X, Y and Z direction.

13.5.2. Vibration Test (without individual packaging)

There shall be no sign of malfunction of the scanner after the following vibration test.
__Vibration Test__: Increase the frequency of the vibration from 10 to 100 Hz with accelerated velocity 19.6m/S^2 (2G) and sweep for 30 minutes (60 minutes in one cycle). Repeat this routine in each X, Y, Z direction.

13.6. Dust and Drip Proof

IP-54
IEC60529
JIS C0920

13.7. Cable Strength

13.7.1. Cable Strength

No malfunctions occurred to the cable's performances after the following stretch tests.
__Cable Strength Test:__ Affix the scanner to an immovable object and pull it using a force of 24.5N (2.5kgf static loading) for 1 second. Repeat this 20 times continuously.

13.7.2. Cable Bending Strength

No malfunctions occurred to the cable's performances after the following bending tests.
__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..
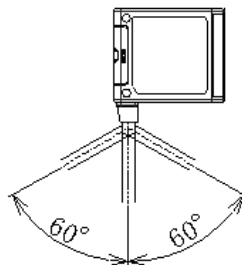

Figure 22: Cable Tail Bending Test

14. Reliability

MTBF of the NLB/RLB-1000 is 30,000 hours excluding the laser diode and scan unit.

Laser Diode MTBF   10,000 hours
Mirror Scan Unit MTBF   20,000 hours

* The values are calculated under normal operational conditions; without giving electric / mechanical shocks within the operating temperature range.

15. Regulatory Compliance

15.1. Laser Safety

IEC 60825-1:2014   EN 60825-1:2014
JIS C6802:2014
FDA CDRH Class 1 Complies with 21 CFR 1040 except as permitted in LN56,5/8/2019

15.2. EMC

EN55032
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.

F
FCC Part15 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. RoHS

The NLB-1000 and the RLB-1000 are RoHS compliant products.

> RoHS: The restriction of the use of certain hazardous substances in electrical and electronic equipment, 2011/65/EC.

17. Product Labels

17.1. Serial Label

The serial number is stated on a serial label shown below. Letters are printed on a matte-black background and serial numbers in black on a white background.
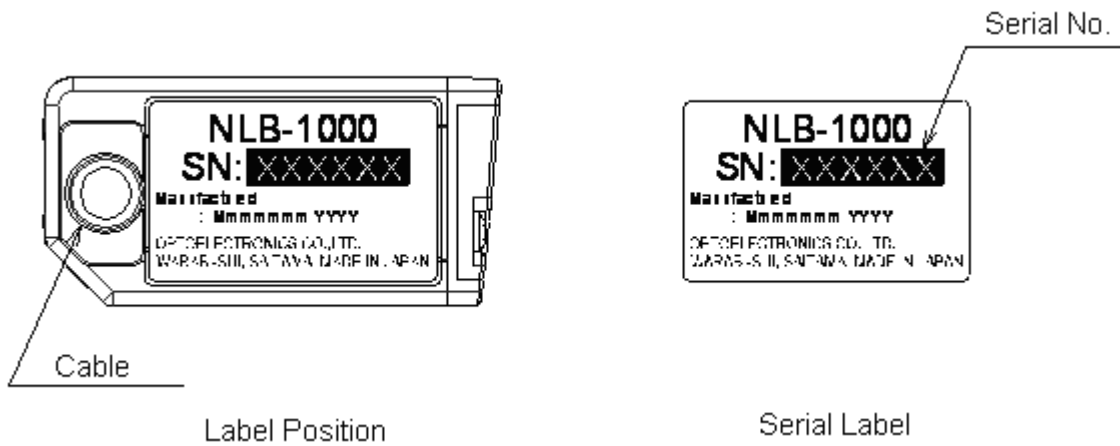

Figure 23: Serial Label

17.2. Laser Caution / CDRH Label

The laser caution/CDRH labels are attached on the upper side of the scanner.
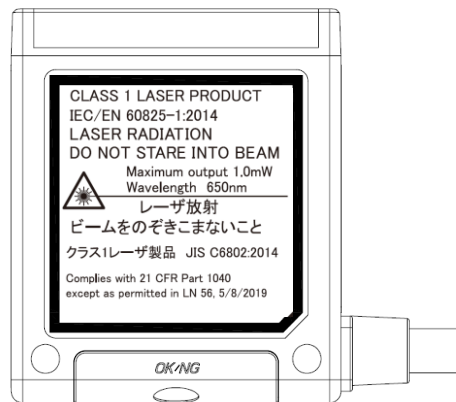Letters are printed in black on a yellow background.

Figure 24: Laser Caution Label

17.3. Certification Logo Label

The certification logo label is attached on the opposite side of the cable.
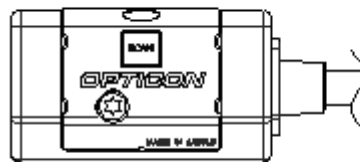Each mark is printed in white on a matte-black background.

Label Position

Certification Logo Label

17.4. Back Side Label

Each letter and mark is printed white on a dark blue background.

Label Position

Backside Label

Figure 25: Back Side Label

18. Packaging Specifications

18.1. Individual Packaging Specifications

Put the scanner in a protective foamed bag and put it in the individual packaging box.
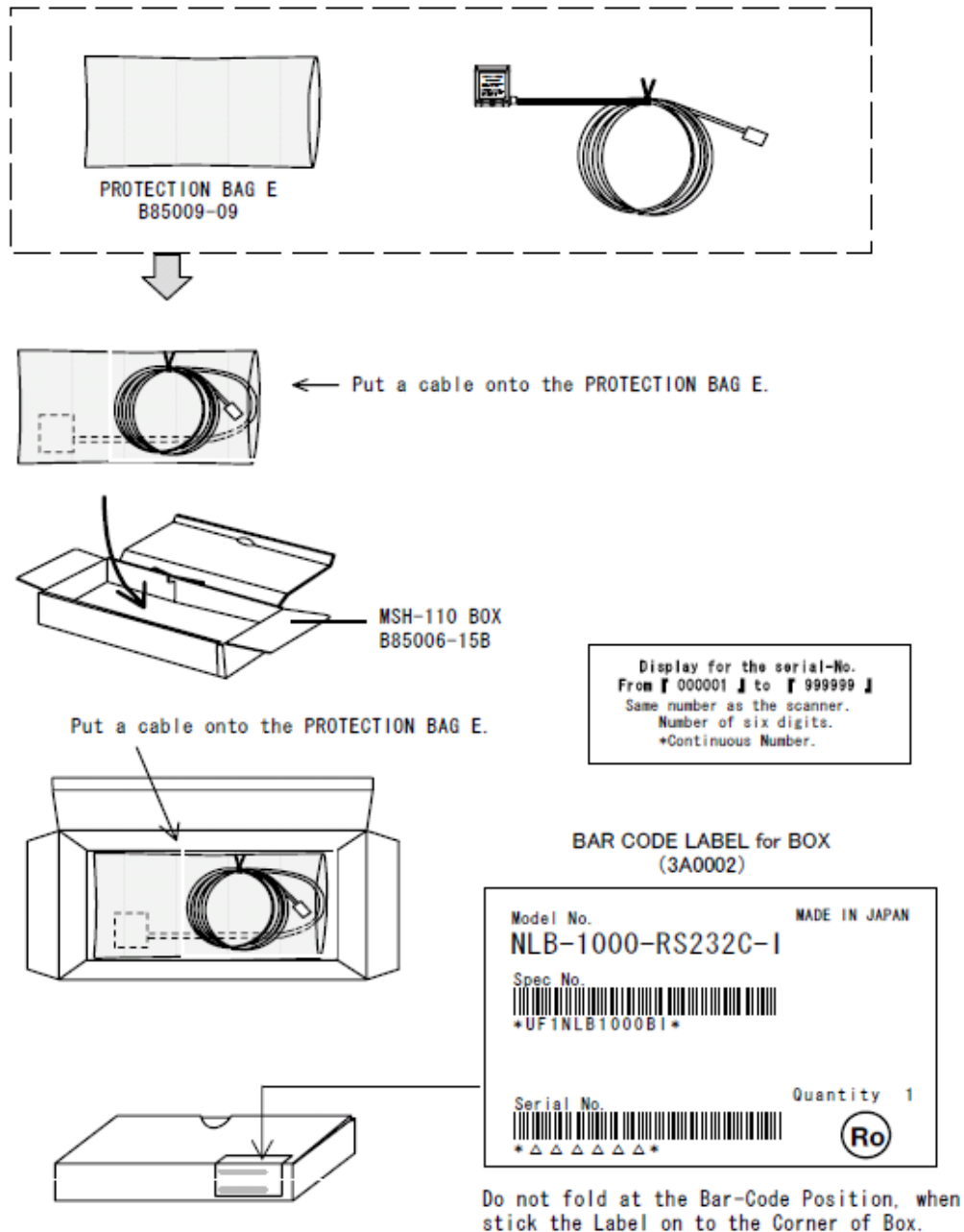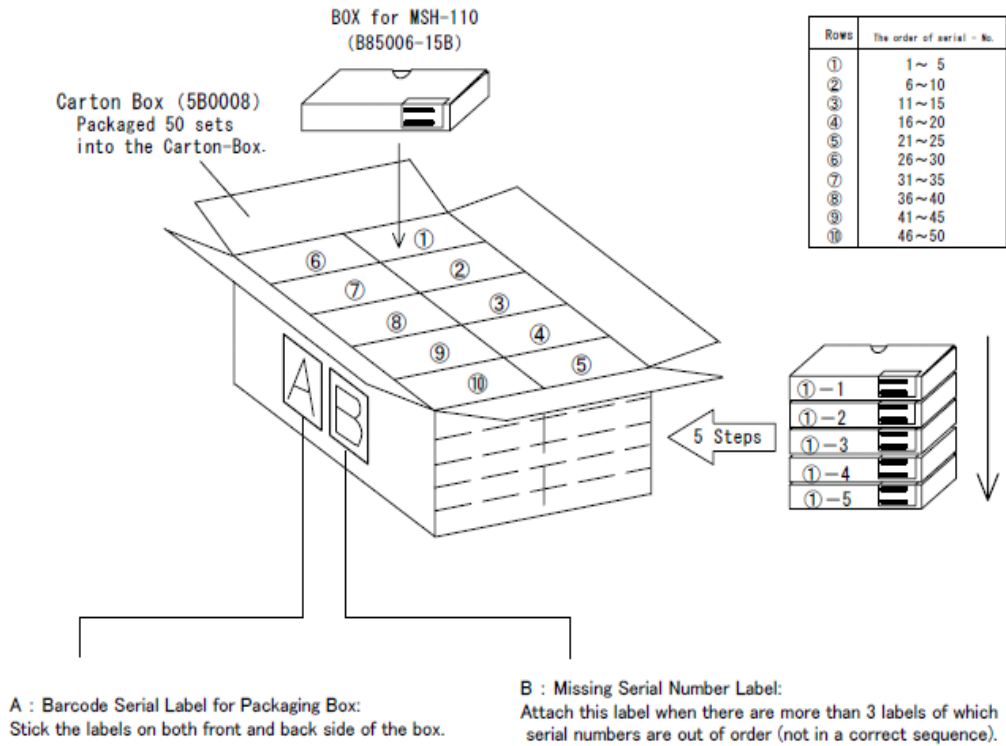Dimensions (Assembled State): 245 mm (W) x 110 mm (D) x 40 mm (H)

Figure 26: Individual Packaging Specifications

18.2. Collective Packaging Specifications

Put 50 individually packaged scanners in a collective packaging box.
Dimensions (Assembled State): 600 mm (W) x 520 mm (D) x 250 mm (H)

Figure 27: Collective Packaging Specifications

Note: 'Ro mark' on the boxes for the products indicates that the product is RoHS compliant, which is declared by Optoelectronics Co., Ltd.

19. Precautions

19.1. Precaution against Laser Light

*Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

⚠️ Safety Precautions

This device complies with IEC 60825-1:2007, IEC 60825-1:2014
CDRH 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50 dated June 24, 2007.

Please observe the following precautions when using the device.

☢️ Laser-related Caution

Do not stare into the laser light from a scanning window. It may harm your eyes.
Do not point the laser directly at others' eyes. It may harm your eyes.
Do not stare into the beam with optical instruments. It may harm your eyes.

🚫 Do Not Disassemble

Do not disassemble this device.
The laser light may output when the device is disassembled connecting to power source.
This device is designed to require no internal maintenance.

19.2. Use of AC Adapter

OPTOELECTRONICS shall not be held responsible for any damages caused by using an AC adapter which was not provided by OPTOELECTRONICS.

19.3. Handling

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

19.3.1. Shock

・Do not drop this product from a height greater than specified in this manual.
・Do not swing the cable around.
・Do not place this product under or between any heavy items.

19.3.2. Temperature Conditions

・Do not use this product at temperatures outside the specified range.
・Do not pour boiling water on this product.
・Do not throw this product into a fire.
・Do not bend the cable at extremely low temperature.

19.3.3. Foreign Materials

・Do not immerse this product in water or other liquid.
・Do not expose this product to chemicals.

19.3.4. Other

・Do not insert and remove a cable before the power is disconnected..
・Do not disassemble this product.
・Do not use this product near a radio or a TV. It may cause reception problems.
・This product may be affected by a momentary voltage drop caused by lightning.
・This product may not perform properly in environments when placed near a flickering light, such as a CRT (computer monitor, television, etc.).

> * This specification manual is subject to change without prior notice.

Appendix 1: Mechanical Drawing