KEYENCE

96M11216

Hand-held
Laser Barcode Reader

BL-N70 Series

User's Manual

Read this manual before using the system in order to achieve maximum performance.
Keep this manual in a safe place after reading it so that it can be used at any time.

Introduction

This manual contains information about procedures for handling, operations, warnings, and precautions about the "Hand-held Laser Barcode Reader BL-N70 Series".
Be sure to read this section thoroughly before use. Keep this manual in a safe place for future reference.

● Symbols

The following symbols and conventions alert you to important messages.
Be sure to read these messages carefully.

⚠ **WARNING**	Failure to follow instructions may lead to physical injury, such as electric shock or burns.

⚠ **CAUTION**	Failure to follow instructions may lead to product damage.

Note	Provides additional information on proper operations.

Reference	Provides advanced and useful information for operation.

📖 Indicates reference pages in this or another manual.

● General Cautions

- Do not modify the BL-N70 series, or use it in any way other than described in the specifications.
- When the BL-N70 series is used in combination with other devices, functions and performance may be degraded, depending on the operating conditions and surrounding environment.
- Do not use the BL-N70 series for the purpose of protecting the human body.

● Trademarks

- Windows Vista/XP/2000/98 are the registered trademarks of Microsoft Corporation, U.S.A.

Safety Precautions

● Safety Precautions on Laser Apparatus

The "Hand-held Laser Barcode Reader BL-N70 Series" employs a visible red semiconductor laser for its light source. This laser has a wavelength of 650 nm and is classified as a Class 1 laser under IEC60825-1 (Safety of laser products). Do not disassemble or modify the BL-N70 series.

⚠ **CAUTION**	Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure. Exposure to laser light may cause damage to eyes.

Item	BL-N70 series
Wavelength	650 nm
Output	40 μW
Pulse width	1.5 ms
Class	Class 1 (IEC 60825-1)

⚠ **WARNING**	• Do not look directly into laser light or reflected laser light from a mirrored surface. Otherwise, eye injury may result. Laser light will not cause damage if it strikes exposed skin, but laser light should not deliberately be aimed towards a human body. • Do not disassemble the BL-N70 series. The BL-N70 series does not automatically stop emitting the laser when the reader is disassembled. Therefore, if someone disassembles the reader, he/she may be exposed to the laser beam and may suffer eye injury. • Be sure to stop the laser emission before cleaning the portion of the laser scanner where laser light is generated and received (emitter/receiver). Otherwise, exposure to the laser may cause eye injury. • Be careful of the path of the laser beam. Be especially careful of reflected laser light from a mirrored surface. Do not use the BL-N70 series where the path of the laser beam is at the same height as that of the human eye.

Operating Precautions

⚠ CAUTION

● Operations

- Do not use a voltage other than 5V DC with the BL-N70 series. Doing so may lead to breakdown on the unit. When using the dedicated power sources BL-U1, BL-U2, or N-42 use a power supply within the appropriate range for each communication unit.
- Be sure to turn the power off to devices attached to the BL-N70 series when you plug or unplug the cables. Failure to do so may cause damage to the BL-N70 series.
- Do not disassemble or modify the BL-N70 series. Doing so may lead to breakdown on the unit.
- Keep the cables away from high-tension cables or power sources. Otherwise, noise could cause malfunctions or accidents.
- The BL-N70 series passes the drop impact resistance test, but take care not to expose the unit to excessive shock.
- Do not hold the BL-N70 series by its cable. The unit may become damaged.

● Cleaning

- Do not allow water, oil, dust, or other foreign substance to stick to the laser emitter/receiver. This may cause read errors. When the BL-N70 series becomes dirty or stained, clean the surface using an eyeglass cleaning cloth or a soft cloth that has been dampened with a specialty cleaner for plastics that can handle acrylic.
  (Substances such as ethanol can make acrylics cloudy.)

● Operation Environment/Conditions

To use the BL-N70 series correctly and safely, avoid installing it in the following locations. Failure to do so may cause fire, electric shock, damage, accidents, or malfunctions.

- Locations where the BL-N70 series is exposed to direct sunlight
- Locations where the ambient temperature drops below 0°C or exceeds +40°C
- Locations where the ambient humidity goes outside of the range of 35 to 85%RH
- Locations where the temperature changes rapidly, causing condensation
- Locations where there are flammable or corrosive gases
- Locations where there is a large amount of airborne dust, salt, iron, and greasy fumes
- Locations where the ambient lighting exceeds the regulation range
- Locations where the unit may be directly subjected to vibration or impact
- Locations where water, oil or chemicals may splash onto the unit
- Locations where a strong magnetic or electric field is generated.

● Procedures during Malfunction

Turn off the dedicated power source immediately in the following cases. Using the unit in abnormal conditions could cause fire, electric shock, or accidents. Contact your nearest KEYENCE office (listed at the end of the manual) for repair if :

- chemicals, debris, or liquids, including water, enter the BL-N70.
- the BL-N70 is damaged.
- smoke or abnormal odors are emitted from the BL-N70 series.

● For Obtaining the UL Certification

Use the NEC Class 2 output power supply for UL application.

Organization of the Manual

1	**Getting Started**	This chapter explains the package contents, the names and functions of each part, and the basic methods for operation.
2	**Connections**	This chapter describes how to connect various BL-N70 series scanners.
3	**Scanning Barcodes**	This chapter describes reading data, the format for sending read data, and the connection interfaces.
4	**Programming BL-N70 Settings**	This chapter describes how to change settings on the BL-N70 series.
	Appendices	This chapter provides specifications, dimensions, settings, and information about replacing the communication cable.

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Appendices

1

Getting Started

This chapter explains the package contents, the names and functions of each part, and the basic methods for operation.

1-1 Package Content

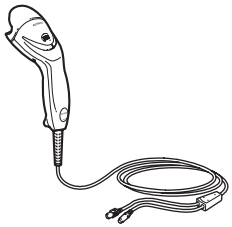
The BL-N70 series comes with the following items. Check that all of the items are included.

Hand-held Laser Barcode Reader BL-N70 Series

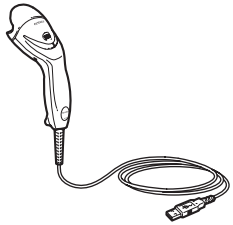
- **BL-N70 unit**

Model	Communication interface
BL-N70VE	Keyboard interface
BL-N70UBE	USB interface
BL-N70RE	RS-232C interface
BL-N70RKE	Keyence RS-232C interface

◆BL-N70VE

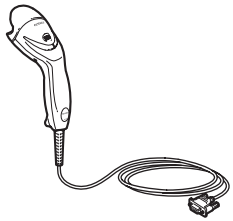


◆BL-N70UBE

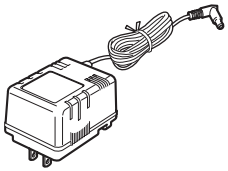


◆BL-N70RE

◆BL-N70RKE



- **AC adapter (BL-N70RE only)**

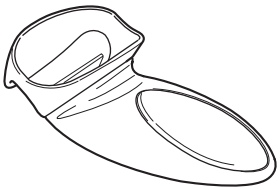


- **User's Guide**

Optional

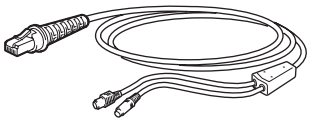
- **Stand**

  ◆OP-77470: Use this stand when placing the BL-N70 series on a table top.

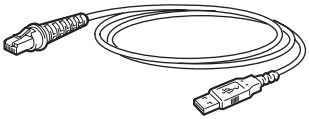


- **Replacement cables**

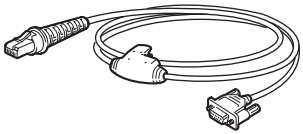
  ◆OP-77466: For BL-N70VE



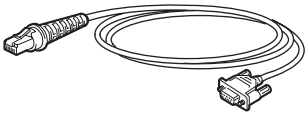
  ◆OP-77467: For BL-N70UBE



  ◆OP-77468: BL-N70RE



  ◆OP-77469: For BL-N70RKE

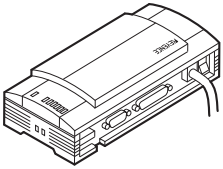


Reference	For the procedure to replace the cable, see "A-5 Replacing the Communication Cable" on page A-14.

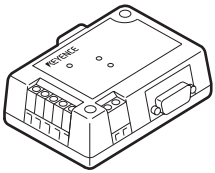
● Communication unit (for BL-N70RKE only)

Model	Power supply	Communication interface
BL-U1	100 to 240 V AC	Select RS-232C or RS-422A
BL-U2	24 V DC	RS-232C
N-42	24 V DC	RS-422A

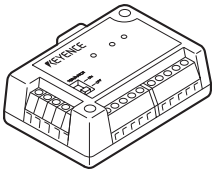
◆BL-U1



◆BL-U2

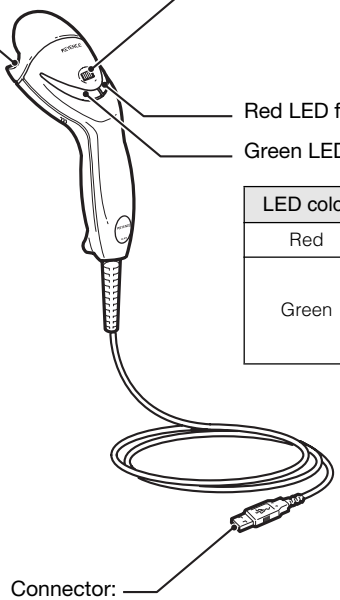


◆N-42



1-2 Identifying Part Names and Functions

This chapter describes names and jobs of each part of the BL-N70 series.



LED color	LED lighting
Red	When laser emits
Green	When the power is turned on While reading the barcode

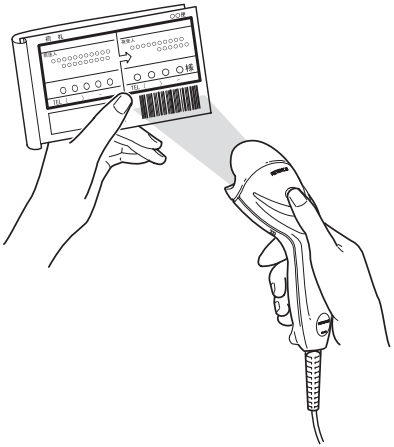
Connector:
Use the connector to connect to a computer or to a reader port with a dedicated power source.
The shape of the connector is different for each model.

1-3 Using Basic Operations

This section explains basic methods for operating the barcode reader.

Reading a barcode

Point the laser emitter/receiver towards the barcode and press the trigger switch about 100 mm (4") from the barcode.



- The green status LED lights up when the barcode has been read correctly. A buzzer sounds after the reading is complete or after read data is sent.
  (The buzzer can be disabled. see 📖 page 4-14)
- Barcode data is sent to the connected computer or other device.

● Precautions for reading

Adjust the scan line so it completely covers the barcode from end to end.

◆Correct scan method

◆Incorrect scan method

You cannot specify which barcode to read.

2

Connections

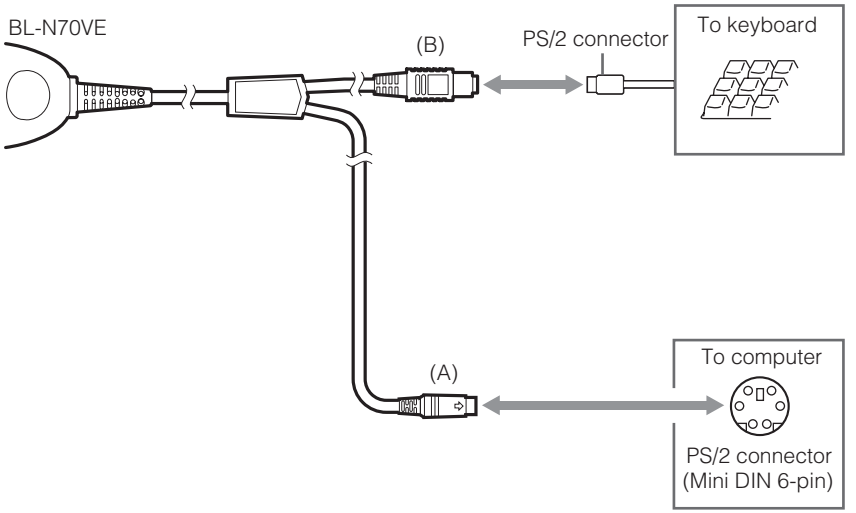
This chapter describes how to connect various BL-N70 series scanners.

2-1 Connecting the BL-N70V

Turn off main power to the PC before proceeding.
Power for the BL-N70VE will be supplied through the computer's keyboard receptacle.
(BL-N70VE is compatible with PC's running Windows Vista, XP, 2000 or 98)

Connect the 6 pin Mini DIN plug (A) to the computer's Keyboard receptacle.
Connect the 6-pin Mini DIN receptacle (B) to the plug from a Keyboard (if desired).

⚠ CAUTION	Do not remove the cables while the computer is turned on as this may cause the computer or BL-N70VE to malfunction.



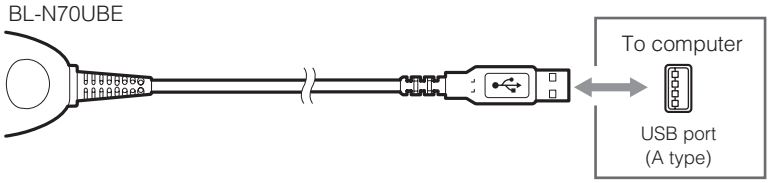
Reference	When connecting a keyboard connector plug to an AT connector, use a commercial AT to PS/2 keyboard conversion adapter for the connection.

● Precautions when using the computer

- DO NOT USE THE KEYBOARD WHEN SCANNING BARCODES ! Typing while scanning barcodes will corrupt the data string.
- If the computer has multiple language settings, make sure that the input mode is set for half-width alphanumeric characters.
- The keyboard specifications can be selected (page 3-7).

2-2 Connecting the BL-N70UBE

The BL-N70UBE connects to a PC's USB port, power is supplied through the USB port. (BL-N70UBE is compatible with PC's running Windows Vista, XP, 2000 or 98)



- **Precautions when using the computer**
  - DO NOT USE THE KEYBOARD WHEN SCANNING BARCODES ! Typing while scanning barcodes will corrupt the data string.
  - If the computer has multiple language settings, make sure that the input mode is set for half-width alphanumeric characters.
  - The keyboard specifications can be selected (page 3-7).

Installing the USB Driver

When BL-N70UBE is first connected to a computer running Windows 98, the USB driver installation screen appears. Install the driver by following the directions given on the screen. (This procedure is not necessary when using a computer running Windows Vista/XP/2000).

Note	Connect the barcode reader after turning on the computer to ensure that it is properly detected.

Procedure

1 The "Add New Hardware Wizard" dialog appears and the message "This window searches for new drivers for: USB human interface device" is displayed. Click on the [Next] button.

2 The message "What do you want Windows to do?" is displayed. Select [Search for the best driver for your device (Recommended).] and click on the [Next] button.

3 Click on the [Next] button. "USB human interface device" is displayed and the message "Windows driver search for the device:" appears. Click on the [Next] button.

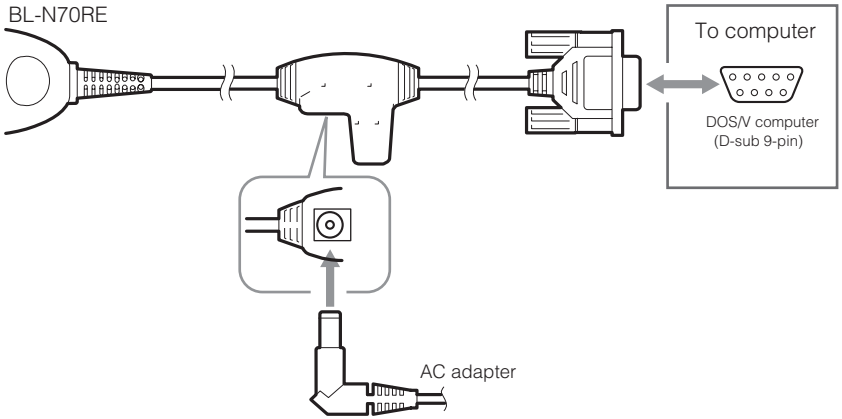
Note	The CD-ROM (Windows) may be required at this point.

4 Windows begins installing the driver. When installation is complete, the message "Windows has finished installing the software that your new hardware device requires." appears. Click on the [Finish] button.

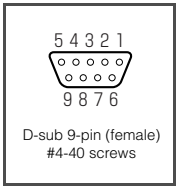
2-3 Connecting the BL-N70RE

The BL-N70RE directly connects to the serial port (RS-232C D-sub 9-pin connector) of a DOS/V computer.
Supply power by using the included AC adapter.

⚠ CAUTION	• Be sure to use the AC adapter provided with the device. Connecting to other power sources may cause damage. • Supply the AC adapter with a power source of AC 120 V ±10%. Using other power sources may cause damage.



◆Connector pins for BL-N70RE



Pin No.	Symbol	Description	Signal direction
2	SD (TXD)	Sends data	Output
3	RD (RXD)	Receives data	Input
4	-	N/C	-
5	SG	Signal ground	-
6	-	N/C	-
7	CS (CTS)	Ready to send data	Input
8	RS (RTS)	Request to send data	Output

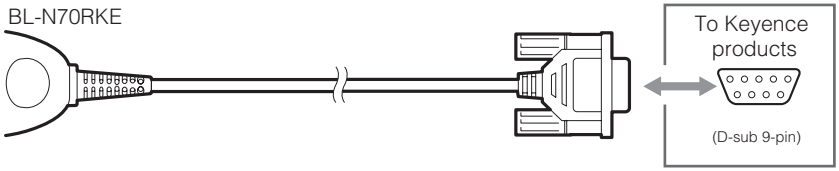
● Communication Settings

The following values represent factory settings for the BL-N70RE. The settings can be changed (page 4-22). Make sure that the settings for BL-N70RE and the connected computer are the same.

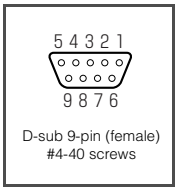
- Baud rate : 9600 bit/s
- Data length : 7 bits
- Parity : Even
- Stop bit : 1 bits
- Communication protocol : No protocol

2-4 Connecting the BL-N70RKE

BL-N70RKE can be connected to the AutoID data controller DV-90 and to the dedicated communication units BL-U1, BL-U2, and N-42. These components have a regulated 5VDC power supply on Pin 9 of the D-sub connector.



◆Connector pins for BL-N70RKE



Pin No.	Symbol	Description	Signal direction
2	RD (RXD)	Receives data	Input
3	SD (TXD)	Sends data	Output
4	-	Does not make any connection	-
5	SG	Signal ground	-
6	-	Does not make any connection	-
7	RS (RTS)	Request to send data	Output
8	CS (CTS)	Ready to send data	Input
9	Vcc	Inputs +5V DC power supply	Input

⚠ CAUTION	Although it may be possible to connect the BL-N70RKE to external power supplies, it is not recommended. Applying more than 5VDC +/-5% may damage the scanner.

● Communication Settings

The following values represent factory settings for the BL-N70RKE. The settings can be changed (page 4-22). Make sure that the settings for BL-N70RKE and the connected equipment are the same.

- Baud rate : 9600 bit/s
- Data length : 7 bits
- Parity : Even
- Stop bit : 1 bits
- Communication protocol : No protocol

3

Scanning Barcodes

This chapter describes reading data, the format for sending read data, and the connection interfaces.

3-1 Scanning

The laser turns on when the trigger switch on the BL-N70 is pressed. While holding the trigger switch, bring the BL-N70 scanner towards the barcode to a distance that complies with the reading range characteristics on page A-3. Ensure that the entire code fits within the scan line.

Note	• Only shine the laser light on one barcode at a time. To enter two or more barcodes, read each barcode separately one after the other.  • Do not shine the laser light on the barcode label at an angle. The reader may not be able to read the barcode.

● Trigger modes

There are three modes that can be used when pressing the trigger switch. Choose the most appropriate mode for the situation (page 3-4).

- Trigger switch mode – Laser OFF until trigger is depressed. Barcodes scanned only while trigger is depressed
- Continuous emission mode – Laser always ON. Barcodes scanned only while trigger is depressed
- Continuous reading mode – Laser always ON. Barcodes always scanned. No trigger required.

● Data Send Format

Read data is sent to the connected computer or other device.

- For the format of the sent data, see page 3-5.
- For information about the communication protocols when using BL-N70RE/RKE, see page 3-7.

● Duplicate prevention function

When the laser light runs for a period of time, the reader may accidentally read the same barcode two or more times. This function will ignore the second reading and any later readings.

- Factory setting: 0.3 s (This value can be changed. page 4-16)
- After a barcode had been read correctly, to read the same barcode again, either turn off the laser light temporarily or distance the barcode from the reading window for about one second to clear the reread prevention time.

● Digit Limit Function

This function will only scan barcodes of a fixed number of characters. Any barcode with more or fewer characters will not be read and data will not be sent. By default, there are no limitations.

The two limit functions are:

- Limit All: Assigns a fixed limit to ALL symbologies (ITF, UPC, etc.)
- Limit individual: Assigns a fixed limit to selected symbologies.

● Seven tone buzzer

- The buzzer that signals the completion of reading can be muted or set to seven different tones (page 4-14).

The buzzer patterns change according to the following conditions.

- During reading : When reading is complete, the buzzer sounds once.
- During program mode : The buzzer sounds 1 to 3 times depending on the settings. During program mode, an error alarm sounds when a barcode other than the specified target code is read.

Note	The buzzer used during program mode cannot be muted.

3-2 Trigger Modes

Select one of the following operation modes depending on the application.

● Trigger mode (Default)

Barcodes are read continuously while the trigger switch is pressed down.

- The laser will continue to emit for a set period of time after the trigger switch is released. During this time, press the trigger switch again to read a barcode. The laser will continue to emit for a set period of time starting from the point when the trigger switch is released.
- The factory default set time is 0.5 s. The setting can be changed (page 4-13).
- Even if the trigger switch is pressed down, the laser light will automatically stop emitting if a barcode is not read for a period of time (about one minute).

● Continuous emission mode

The laser normally stays lit. Press the trigger switch to read a barcode.

- This mode is effective when reading multiple barcodes.

● Continuous reading mode

The laser normally stays lit. When a barcode is recognized, it is automatically read.

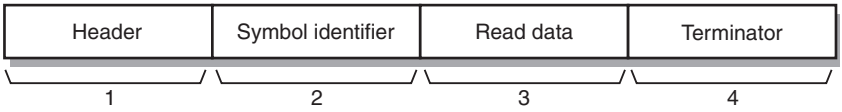
3-3 Data Send Format

When a barcode is scanned, the data is sent to the host device (PC, DV-90, PLC, etc.) according to the following format:

Header, Symbology Identifier, Read Data and Terminator

If a barcode is unreadable, no data will be transmitted.

Data format



* Special characters are not needed to divide the data into segments 1 to 4.

◆Factory default values

- Header : None
- Symbol identifier: None
- Terminator : [CR]

These settings can be changed (page 4-20).

● Details

1 Header

A character can be added to indicate the start of data.

- This parameter can be set to None, [STX], or [TAB] (HT).

2 Symbology identifier

A symbology identifier can be added to the barcode.

Symbology	Data specifications	Symbology identifier
CODE39	No check digit	]A0
	Inspect check digit (Sent)	]A1
	Inspect check digit (Not sent)	]A3
ITF	No check digit	]I0
	Inspect check digit (Sent)	]I1
	Inspect check digit (Not sent)	]I2
CODABAR	–	]F1

Symbology	Data specifications	Symbology identifier
UPC/EAN	UPC/EAN 13 digits	]E0
	UPC/EAN 8 digits	]E4
	UPC-A 13 digit format	]E0
	UPC-A 12 digit format	
	UPC-E	]X0
CODE128	No FNC1	]C0
	Has EAN-128	]C1
	Second digit of data is FNC1	]C2
CODE93	–	]G0
GS1 Databar	–	]e0

3 Read data
These digits contain the read barcode data.

4 Terminator
A character can be added to indicate the end of data.
• This parameter can be set to [CR], [CR][LF], [TAB], or [ETX].

Note	"None" is not an option. There must be a terminator.

Inter character delay

The time between each character can be set to three levels for the data sent from the BL-N70 series to the computer (page 4-21).

If the processing speed on the computer is slow, set a longer value for the inter character delay. If the delay is not set long enough, the computer processing speed may fall behind and digits may be dropped from the data. Adjust the inter character delay so that data is received correctly from the reader.

3-4 Interface Settings for RS-232C or Keyboard/USB

Keyboard/USB settings (BL-N70VE/UBE)

● Localized settings

The keyboard specifications can be selected (page 4-22).
BL-N70VE/UBE are compatible with the following languages for the keyboard.

- JAPANESE : Japanese specifications
- USA : American specifications

RS-232C settings (BL-N70RE/RKE)

The RS-232C communication protocol can be set to no protocol, RTS/CTS, or ACK/NAK (page 4-23).

● No protocol

There is no procedure used for communication. Once the barcode is read, the data is sent in sequence.

● RTS/CTS

The CTS signal for RS-232C (RTS on the host side) can wait to send data by using the following methods.

- CTS signal off (Low) : Waits to send data.
- CTS signal on (High): Sends data.

Barcodes cannot be read while waiting to send data.

Reference	RTS signal for RS-232C • The RTS signal is normally set to "Always on (High)". • The setting can be changed to "On only when sending data".

● ACK/NAK

The reader sends data between the host by using the following procedure.

1 Read data is sent to the host from BL-N70RE/RKE.
BL-N70RE/RKE waits for a response from the host. During this time, a new barcode cannot be scanned.

2 The response is sent from the host to BL-N70RE/RKE.
- If ACK [06h] is received, data transmission has completed successfully, and the BL-N70 is ready to scan a new barcode.
- If NAK [15h] is received, the BL-N70 resends the same data and waits for ACK [06h].

4

Programming BL-N70 Settings

Out of the box, the BL-N70 family of handheld barcode scanners is ready to read barcodes. However, your application may require modifications to the factory default settings to function or communicate properly. Changes to the BL-N70 family program settings are made by scanning the setup codes found in this chapter.

4-1 Using Program Mode

Program mode allows you to make changes to the BL-N70 family default settings. To initiate program mode, the Start / End Programming Mode barcode must be the first code scanned after power-up. If additional codes have been scanned, you must reset power to the scanner.

Setting procedure

Use the following procedure to change the settings.

1 Scan the barcode for "Start / End Programming Mode."

The buzzer sounds three times, the laser light begins emitting, and the reader enters program mode.

2 Scan all of the barcodes for items that you want to change.

To initialize the unit to factory settings, read the "Initialize" barcode.

3 To save the settings and return to RUN mode, read the barcode for "Start / End Programming Mode."

The buzzer sounds three times, the laser light stops emitting, and the reader exits program mode.

Note	• To enter program mode, the "Start / End Programming Mode" barcode must be read directly after turning on power to the reader. To perform normal reading operations, turn off and on the power to the BL-N70 series. • During program mode, an error alarm sounds when a barcode other a program barcode is read. Do not read a barcode other than a program barcode during program mode. • If a program barcode is not read for about one minute during program mode, a buzzer sounds three times, the set information is lost, and program mode ends. Restart the settings from the beginning to make changes.

4-2 Starting and Ending Program Mode

Start / End Programming Mode

To start or end the settings, read the barcode for "Start / End Programming Mode."

Initialize

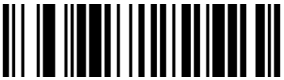
Read this barcode to return all of the settings to the factory defaults.

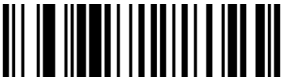
4-3 Activating / Deactivating Barcode Symbologies

Scan the desired barcodes in order to activate or deactivate certain symbologies.
Settings surrounded by < > are factory default.

Symbology settings

◆UPC/EAN


<ON>

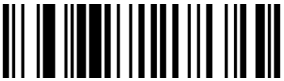

OFF

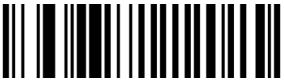
◆CODE128


<ON>


OFF

◆CODE39


<ON>

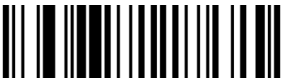

OFF

◆ITF


<ON>


OFF

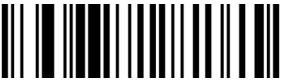
◆2of5 (Standard 2of5)


<ON>


OFF

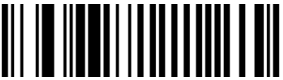
◆CODABAR


<ON>


OFF

◆CODE93

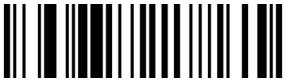

<ON>

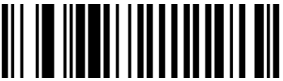

OFF

Settings for reading GS1 Databar

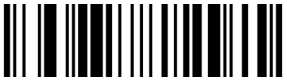
GS1 Databar has several formats. If you are using RSS, but are not sure which format, then enable (ON) all of the following formats below.

◆Supported GS1 Databar


ON

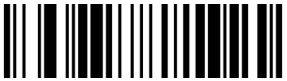

<OFF>

◆GS1 Databar Omnidirectional


ON


<OFF>

◆GS1 Databar Limited


ON


<OFF>

◆GS1 Databar Expanded


ON


<OFF>

UPC/EAN detailed settings

◆UPC-A


<ON>


OFF

◆Extend UPC-A to EAN-13 digit


<ON>


OFF

◆Send UPC-A check digit


<ON>


OFF

◆UPC-E


<ON>


OFF

◆Send UPC-E check digit


ON


<OFF>

◆Add the UPC-E system code "0"


ON


<OFF>

◆EAN13


<ON>


OFF

◆Send EAN13 check digit


<ON>


OFF

◆EAN8


<ON>


OFF

◆Send EAN8 check digit


<ON>


OFF

◆Read EAN/UPC 2 digit Supplemental


ON


<OFF>

◆Read EAN/UPC 5 digit Supplemental


ON


<OFF>

◆Read only EAN/UPC Supplemental

Standard EAN/UPC code cannot be read if this setting is turned on.

ON

<OFF>

CODE128 detailed settings

◆EAN128

<ON>

OFF

◆Send]c1 symbology identifier

<ON>

OFF

◆Group separator settings

When using BL-N70VE/UBE, set this parameter to [SPC] (space).

<[GS]>

[SPC]

CODE39 detailed settings

◆Send start character and stop character

ON

<OFF>

◆Check digit inspection

"Module 43" is used as the method to calculate the CODE39 check digit.

ON

<OFF>

◆Send check digit

<ON>

OFF

CODABAR detailed settings

◆Send start character and stop character


ON


<OFF>

◆Uppercase or lowercase start character and stop character


<Upper case>


Lower case

◆Check digit inspection

"Module 16" is used as the method to calculate the CODABAR check digit.


ON


<OFF>

◆Send check digit


<ON>


OFF

ITF detailed settings

◆Check digit inspection

"Module 10/3" is used as the method to calculate the ITF check digit.

ON

<OFF>

◆Send check digit

<ON>

OFF

GS1 Databar Omnidirectional detailed settings

◆Send check digit

<ON>

OFF

◆Send application identifier

<ON>

OFF

◆Send symbology identifier

<ON>

OFF

GS1 Databar Limited detailed settings

◆Send check digit


<ON>


OFF

◆Send application identifier


<ON>


OFF

◆Send symbology identifier


<ON>


OFF

GS1 Databar Expanded detailed settings

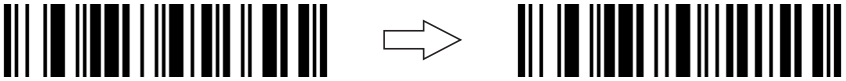
◆Send symbology identifier


<ON>


OFF

4-4 Trigger Mode Settings

● Trigger switch mode



◆Setting the laser off time

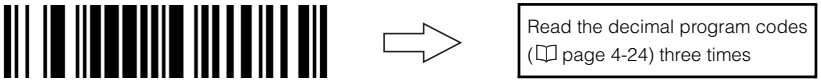
After reading the "Trigger switch mode" barcode above, use the following method to set the laser off time setting.

- To set the time, read three barcodes for the decimal program code (page 4-24). The time can be set between 500 and 15,000 ms in 100 ms intervals.

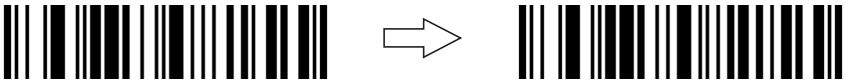
Example: To set the trigger off time to 3 seconds (3000 ms):

1. Read the "Laser off time setting" barcode.
2. Read the decimal program code "0." The buzzer sounds once.
3. Read the decimal program code "3." The buzzer sounds two times.
4. Read the decimal program code "0." The buzzer sounds three times.

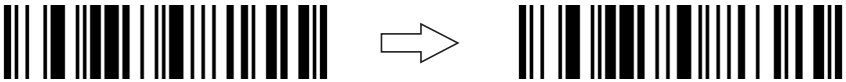
Laser off time setting



● Continuous emission mode



● Continuous reading mode



4-5 Buzzer Settings

Tone selection


<Tone 0>


Tone 1


Tone 2


Tone 3


Tone 4


Tone 5


Tone 6


Buzzer Off

Buzzer timing


<Sound after reading>


Sound after sending data

4-6 Decode Settings

Decode Match Count settings

When the trigger is activated, the BL-N70 laser scans approximately 76 times per second. By default, the BL-N70 must decode a barcode 2 times within a trigger period before it is considered valid and data can be sent. If poor print quality, or other conditions are causing problems with decode reliability, try setting the Decode Match Count to a number higher than 2.

If your application requires more speed, you can set the Decode Match Count to 1.

For most applications, the default value of 2 is sufficiently fast and reliable and does not need to be changed.

1

<2>

3

4

5

6

7

8

Duplicate Read Prevention settings


<Start duplicate read prevention time settings>


No reread prevention

After reading the "Start duplicate read prevention time settings" barcode above, read three barcodes for the decimal program code (page 4-24) to set the time. The time can be set between 50 and 6350 ms in 50 ms intervals. (The factory default time is 300 ms.)

Example: To set the reread prevention time to 1 second (1000 ms):
1000ms/50ms=20

1. Read the "Start reread prevention time settings" barcode.
2. Read the decimal program code "0." The buzzer sounds once.
3. Read the decimal program code "2." The buzzer sounds two times.
4. Read the decimal program code "0." The buzzer sounds three times.

4-7 Digit Limit Function Settings

The Digit Limit Function is useful if you are scanning barcodes with a certain number of digits *n* and want to ignore barcodes with more or fewer digits.
Depending on the application, the BL-N70 family offers two Digit Limit Options:

● LIMIT ALL

Applies to ALL enabled symbologies. All barcodes of length n characters, will be scanned. Any barcode with < > *n* characters will be ignored.
To set the number of digits, scan three decimal barcodes from page 4-24.

● LIMIT SELECT

Up to 7 different limits can be activated at the same time. For example, you can limit all ITF codes to 14 digits. At the same time, you can limit all Code 128 barcodes to 26 characters. All ITF codes <>14 digits are ignored. All Code128 codes <>26 digits will be ignored.

Conditions:

- Can set up to 7 total limits
- Can use multiple limits for same symbology:
  example: Allow Code 39 barcodes of length 7 to 10 digits (4 limits used; 7, 8, 9, 10)
- Individual limits must be scanned in order, starting with limit #1 codes first, then #2 and so on. Do not jump around.

Example 1: Read 10 digits for CODE39 and 14 digits for ITF

Limit #1 settings

1. Read the "Limit #1 – digit settings" barcode.
2. Read the decimal program codes "0," "1," and "0."
3. Read the "Limit #1 – symbology settings" barcode.
4. Read the decimal program codes "0," "8," and "0."

Limit #2 settings

5. Read the "Limit #2 – digit settings" barcode.
6. Read the decimal program codes "0," "1," and "4."
7. Read the "Limit #2 – symbology settings" barcode.
8. Read the decimal program codes "0," "8," and "2."

Example 2: Read only 8 to 10 digits for CODABAR.

Limit #1 settings

1. Read the "Limit #1 – digit settings" barcode.
2. Read the decimal program codes "0," "0," and "8."
3. Read the "Limit #1 – Symbology settings" barcode.
4. Read the decimal program codes "0," "8," and "1."

Limit #2 settings

5. Read the "Limit #2 – digit settings" barcode.
6. Read the decimal program codes "0," "0," and "9."
7. Read the "Limit #2 – Symbology settings" barcode.
8. Read the decimal program codes "0," "8," and "1."

Limit #3 settings

9. Read the "Limit #2 – digit settings" barcode.
10. Read the decimal program codes "0," "1," and "0."
11. Read the "Limit #2 – Symbology settings" barcode.
12. Read the decimal program codes "0," "8," and "1."

● LIMIT ALL – settings

Start limit all settings

Read the decimal program codes (page 4-24) three times

● LIMIT SELECT – settings

◆Limit #1 settings

Limit #1 — digit settings

Limit #1 — symbology settings

◆Limit #2 settings

Limit #2 — digit settings

Limit #2 — symbology settings

◆Limit #3 settings

Limit #3 — digit settings

Limit #3 — symbology settings

◆Limit #4 settings

Limit #4 — digit settings

Limit #4 — symbology settings

◆Limit #5 settings

Limit #5 — digit settings

Limit #5 — symbology settings

◆Limit #6 settings

Limit #6 — digit settings

Limit #6 — symbology settings

◆Limit #7 settings

Limit #7 — digit settings

Limit #7 — symbology settings

4-8 Communication Data Format Settings

Data format

- **Header**

  To set the header to "None", set "STX disabled" and "TAB disabled."

STX enabled

<STX disabled>

TAB enabled

<TAB disabled>

- **Symbol identifier**

ON

<OFF>

- **Terminator**

  To set CR + LF, set both "CR enabled" and "LF enabled."
  Do not set two or more options to "enabled" except to set the CR + LF combination mentioned above.

<CR enabled>

CR disabled

LF enabled

<LF disabled>


TAB enabled


<TAB disabled>


ETX enabled


<ETX disabled>

Inter character delay settings


<1 ms>


10 ms


25 ms

4-9 Communication Interface Settings

Keyboard/USB settings


JAPANESE


<USA>

RS-232C settings

- **Baud rate**


38400 bit/s


19200 bit/s


<9600 bit/s>


4800 bit/s


2400 bit/s


1200 bit/s


600 bit/s


300 bit/s

- **Data length**


8 bits


<7 bits>

● Stop bit length


<1 bit>


2 bits

● Parity check


No parity


Odd


<Even>

● Communication protocol

To set the header to no protocol, set "RTS/CTS disabled" and "ACK/NAK disabled."


RTS/CTS enabled


<RTS/CTS disabled>


ACK/NAK enabled


<ACK/NAK disabled>

4-10 Decimal Program Code

Use these barcodes to set the laser off time for trigger switch operation mode (page 4-13), reread prevention time
(page 4-16), the number of digits for the limit read digits function, and when setting the code type (page 4-17).

After reading the barcode to start the settings for each parameter, scan three numbers to perform the setting.

- Read the first decimal program code : The buzzer sounds once.
- Read the second decimal program code : The buzzer sounds twice.
- Read the third decimal program code : The buzzer sounds three times.


0


1


2


3


4


5


6


7


8


9

4-11 Symbology List

Use these codes when setting the individual limits for the digit limit function (page 4-17).

Code type	Setting value
UPC-A	004
UPC-E	002
EAN-8 digits	003
EAN-13 digits	005
CODE39	080
CODABAR	081
ITF	082
CODE128	083
CODE93	084
GS1 Databar Omnidirectional GS1 Databar Stacked GS1 Databar Stacked Omnidirectional GS1 Databar Truncated	101
GS1 Databar Limited	102
GS1 Databar Expanded	103

MEMO

Appendices

This chapter provides the specifications, the dimensions, the list of settings, and information about replacing the communication cable.

A-1 Specifications

● General specifications

Model		BL-N70VE	BL-N70UBE	BL-N70RE	BL-N70RKE
Interface		Keyboard interface	USB	RS-232C	RS-232C* For connection to Keyence products
	Connector shape	Mini DIN 6-pin	USB (A type)	D-Sub 9-pin (male)	
Light source		Visible light semiconductor laser (Wavelength 650 nm)			
	Output	40 µW			
	Pulse width	1.5 ms			
	Class	Class 1 (IEC 60825-1)			
Reading distance		See the characteristic range for reading below.			
Reading width		See the characteristic range for reading below.			
Minimum resolution		0.125 mm or more			
PCS		0.35 or more			
Scan rate		72 scans per second			
Supported code		UPC(A,E)/EAN, CODE39, CODE128/EAN128, CODABAR, CODE93, ITF, 2of5, GS1 Databar Omnidirectional, GS1 Databar Truncated, GS1 Databar Stacked, GS1 Databar Stacked Omnidirectional, GS1 Databar Limited, GS1 Databar Expanded, GS1 Databar Expanded Stacked			
Number of digits for reading		3 to 40 digits (80 digits with CODE128: CODE C)			
Environ-mental resistance	Ambient light	4800 lx			
	Ambient temperature	0 to 40 °C (32 to 104° F)			
	Ambient humidity	35 to 85% RH (No condensation)			
Rating	Operating atmosphere	No dust or corrosive gas			
	Power supply voltage	5 V DC ±5%			
	Current consumption	200 mA or less			
EMI		EN55022 Class B			
Weight		Approx. 101 g			

* An AC adapter is included for BL-N70RE. The power supply voltage for the included AC adapter is 125 V AC ±10% (6 VA). BL-N70RE does not comply with the requirements on CE Marking.

● Interface specifications

◆USB

USB version	Ver 1.1
Compliant OS	Windows 98, 2000, XP, Vista
Format of sent data	Same as data sent from keyboard

◆Keyboard

Compliant languages	106 Japanese, 101 English

∗ Keyboard input cannot be accepted while reading the barcode

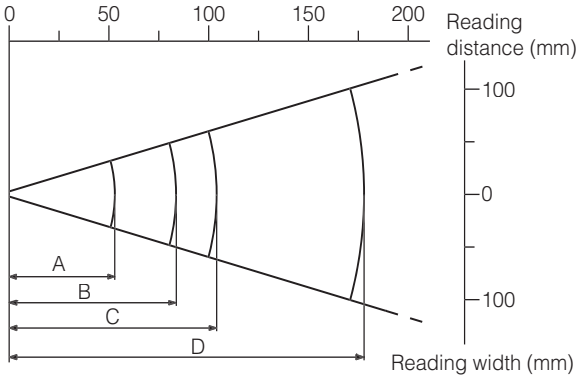
◆RS-232C

Synchronization method	Start-stop synchronization
Transmission code	ASCII code
Baud rate	300, 600, 1200, 2400, 4800, 9600, 19200, 38400 bit/s
Data length	7/8 bit
Parity check	None/Even/Odd
Stop bit	1/2 bit

● Reading range characteristics (typical)

(units: mm)

Code type	Code type	Narrow bar width	Reading distance
A	CODE39	0.125	53
B	CODE39	0.19	83
C	CODE39	0.25	104
D	CODE39	0.66	178



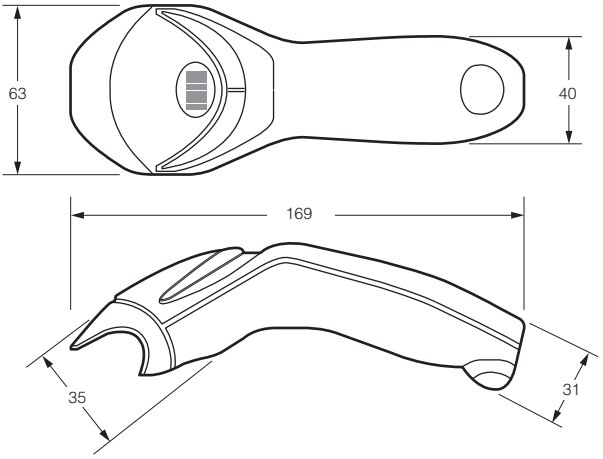
◆Measurement condition

- Measured using the Keyence standard barcode
- Ratio of narrow bar to wide bar = 1:2.5
- Skew : 15°
- Pitch : 0°
- Tilt : 0°

A-2 Dimensions

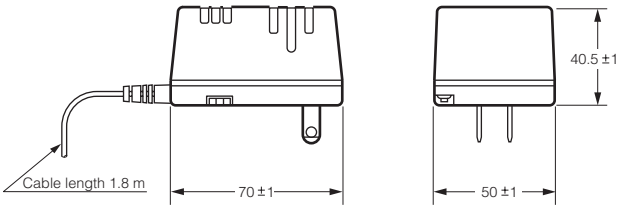
● BL-N70 Series

(units: mm)



● AC adapter

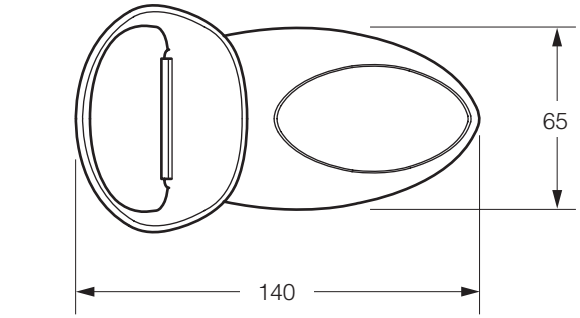
(units: mm)



● Stand

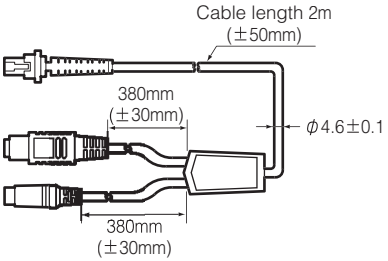
(units: mm)

◆OP-77470

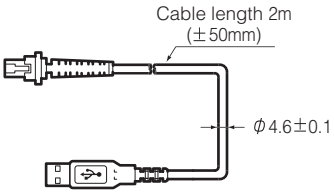


● Replacement cables

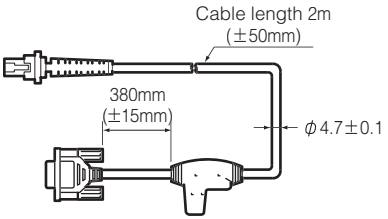
◆OP-77466



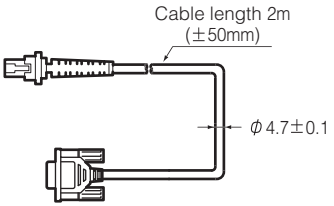
◆OP-77467



◆OP-77468



◆OP-77469



A-3 ASCII Code Table

			First 4 bits							
	Hexa-decimal		0	1	2	3	4	5	6	7
		Binary	0000	0001	0010	0011	0100	0101	0110	0111
Last 4 bits	0	0000		DLE	(SP)	P	@	P	`	p
	1	0001	SOH	DC1	!	Q	A	Q	a	q
	2	0010	STX	DC2	"	R	B	R	b	r
	3	0011	ETX	DC3	#	S	C	S	c	s
	4	0100	EOT	DC4	$	T	D	T	d	t
	5	0101	ENQ	NAK	%	U	E	U	e	u
	6	0110	ACK	SYN	&	V	F	V	f	v
	7	0111	BEL	ETB	'	W	G	W	g	w
	8	1000	BS	CAN	(	X	H	X	h	x
	9	1001	HT	EM	)	Y	I	Y	i	y
	A	1010	LF	SUB	:	Z	J	Z	j	z
	B	1011	HM	ESC	;	[	K	[	k	{
	C	1100	CL	FS	<	¥	L	\	l	|
	D	1101	CR	GS	=	]	M	]	m	}
	E	1110	SO	RS	>	^	N	^	n	~
	F	1111	SI	US	?	_	O	_	o	del

A-4 Settings and the Factory Default Values

Barcode symbology settings

Highlighted items indicate factory defaults.

Setting item	Setting content
UPC/EAN	ON (Enabled)
	OFF (Disabled)
CODABAR	ON (Enabled)
	OFF (Disabled)
CODE39	ON (Enabled)
	OFF (Disabled)
ITF	ON (Enabled)
	OFF (Disabled)
2of5 (Standard 2of5)	ON (Enabled)
	OFF (Disabled)
CODE93	ON (Enabled)
	OFF (Disabled)
CODE128	ON (Enabled)
	OFF (Disabled)
GS1 Databar Omnidirectional	ON (Enabled)
	OFF (Disabled)
GS1 Databar Limited	ON (Enabled)
	OFF (Disabled)
GS1 Databar Expanded	ON (Enabled)
	OFF (Disabled)

● Detailed symbology settings

Setting item		Setting content
UPC/EAN	EAN13	ON (Enabled)
		OFF (Disabled)
	EAN8	ON (Enabled)
		OFF (Disabled)
	UPC-A	ON (Enabled)
		OFF (Disabled)
	UPC-E	ON (Enabled)
		OFF (Disabled)
	Extended UPC-A	Send 12 digits
		Send 13 digits
	UPC-E settings	System code 0 omitted
		System code 0 added
	Handling Supplementals	2 digit add-on enabled
		2 digit add-on disabled
		5 digit add-on enabled
		5 digit add-on disabled
	Reading the Supplemental codes only	ON (Enabled)
		OFF (Disabled)
	Check digit	Send the UPC-A check digit
		Do not send the UPC-A check digit
		Send the UPC-E check digit
		Do not send the UPC-E check digit
		Send the EAN 8 digit check digit
		Do not send the EAN 8 digit check digit
		Send the EAN 13 digit check digit
		Do not send the EAN 13 digit check digit
CODE128 (EAN128)	EAN128	ON (Enabled)
		OFF (Disabled)
	Sending]c1	Send
		Do not send
	Group separator	[GS]
		[SPC]

Highlighted items indicate factory defaults.

Setting item		Setting content
CODE39	Start/stop character transmission	ON (Enabled)
		OFF (Disabled)
	Check digit inspection	ON (Enabled)
		OFF (Disabled)
	Check digit transmission	ON (Enabled)
		OFF (Disabled)
CODABAR	Start/stop character transmission	ON (Enabled)
		OFF (Disabled)
	Start/stop character lower case/ upper case	Lower case
		Upper case
	Check digit inspection	MOD16 enabled
		MOD16 disabled
	Check digit transmission	ON (Enabled)
		OFF (Disabled)
ITF	Check digit inspection	ON (Enabled)
		OFF (Disabled)
	Check digit transmission	ON (Enabled)
		OFF (Disabled)
GS1 Databar Omnidirectional	Check digit transmission	ON (Enabled)
		OFF (Disabled)
	Application identifier	Send
		Do not send
	Symbology identifier	Send
		Do not send
GS1 Databar Limited	Check digit transmission	ON (Enabled)
		OFF (Disabled)
	Application identifier	Send
		Do not send
	Symbology identifier	Send
		Do not send
GS1 Databar Expanded	Symbology identifier	Send
		Do not send

Highlighted items indicate factory defaults.

Operation settings

Setting item		Setting content
Trigger switch operation mode		Trigger switch mode
		Continuous emission mode
		Continuous reading mode
	Laser off time	500 ms to 15000 ms (100 ms increments) Factory Default 500 ms
Buzzer	Tone selection	Tone 0
		Tone 1
		Tone 2
		Tone 3
		Tone 4
		Tone 5
		Tone 6
		No buzzer tone
	Buzzer timing	After reading
		After sending data
Frequency of matching readings		1 time
		2 times
		3 times
		4 times
		5 times
		6 times
		7 times
		8 times
Reread prevention time		500 ms to 6350 ms (50 ms increments) Factory Default 300 ms
	Reread prevention time settings	Set
		Do not set

Highlighted items indicate factory defaults.

Setting item		Setting content
Function to limit the number of digits for reading	Limit all settings	Disabled
		Enabled
		Limited digits (003 to 099)
	Limit block 1	Digits (003 to 099)
		Code types (002 to 005, 080 to 084, 101 to 103)
	Limit block 2	Digits (003 to 099)
		Code types (002 to 005, 080 to 084, 101 to 103)
	Limit block 3	Digits (003 to 099)
		Code types (002 to 005, 080 to 084, 101 to 103)
	Limit block 4	Digits (003 to 099)
		Code types (002 to 005, 080 to 084, 101 to 103)
	Limit block 5	Digits (003 to 099)
		Code types (002 to 005, 080 to 084, 101 to 103)
	Limit block 6	Digits (003 to 099)
		Code types (002 to 005, 080 to 084, 101 to 103)
	Limit block 7	Digits (003 to 099)
		Code types (002 to 005, 080 to 084, 101 to 103)

Highlighted items indicate factory defaults.

Communication data format

Setting item		Setting content
Header		None
	STX	Add
		Do not add
	TAB (HT)	Add
		Do not add
Symbology identifier		Add
		Do not add
Terminator	CR	Add
		Do not add
	LF	Add
		Do not add
	TAB (HT)	Add
		Do not add
	ETX	Add
		Do not add
Inter character delay		1 ms
		10 ms
		25 ms

Highlighted items indicate factory defaults.

Communication interface settings

● Keyboard/USB settings (BL-N70VE/BL-N70UBE)

Setting item	Setting content
Localized settings	Japanese
	USA

● RS-232C (BL-N70RE/BL-N70RKE)

Setting item	Setting content
Baud rate	38400
	19200
	9600
	4800
	2400
	1200
	600
	300
Data length	7 bit
	8 bit
Parity	None
	Odd
	Even
Stop bit length	1 bit
	2 bit
Protocol	No protocol
	ACK/NAK
	RTS/CTS

Highlighted items indicate factory defaults.

A-5 Replacing the Communication Cable

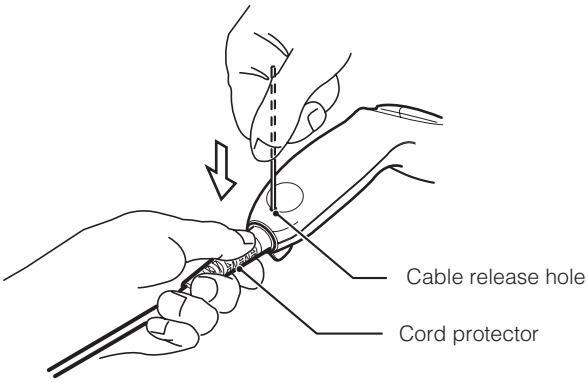
⚠ CAUTION	Do not replace the communication cable while power is being supplied to the BL-N70 series. Doing so may cause damage or failure in the product. Make sure that power is not being supplied to the BL-N70 series when replacing the communication cable.

● Removing the communication cable

Procedure

1 Remove the BL-N70 series from the connected computer or controlling device. If the BL-N70 series uses an AC adapter as the power source, cut off the power supply.

2 Insert one end of a paper clip in the direction of the arrow into the cable release hole on the back of the BL-N70 series and press down.

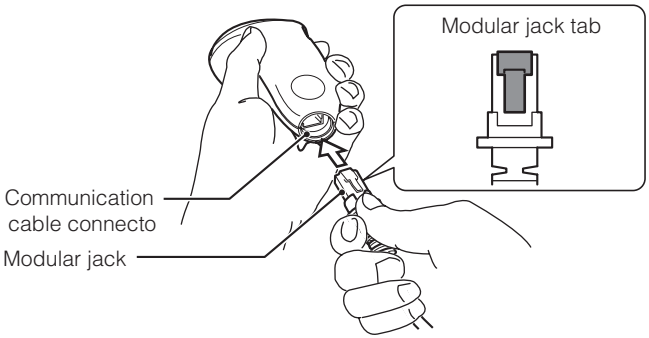


3 With the wire pressing into the hole as described in Step **2**, grab the cord connector on the cable and slowly pull it out.

● Connecting the communication cable

1 Insert the modular jack for the replacement communication cable into the connector for the BL-N70 cable.

Grasp the cord protector for the communication cable and insert it forcefully into the connector until you hear a clicking sound.



Gently pull on the cord protector for the connection cable to verify that it is locked into place. Connection is complete.

MEMO

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