NLV-5201

Fixed Mount 2D Imager Scanner

Specifications Manual

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Revision History

Product Name: NLV-5201

Specification Number: SS17137 (Original Specification Number: SS17136)

Edition	Date	Page	Section	Description of Changes
2nd	May 22, 2020	-	-	Applied new template. Rewrote text for clarity.
1st	September 17, 2018	-	-	Initial release.

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1 Overview

This manual provides specifications for the NLV-5201, a fixed-mount 2D imager scanner that includes these focus ranges:

- Standard range (SR)
- High-density (HD)
- Ultra high-density (UD)

Use these specifications to smoothly integrate the NLV-5201 2D imager scanner with your product and maximize performance of the imager scanner.

The NLV-5201 contains these features. Unless otherwise noted, all features apply to all models:

- **High-speed reading:** The high-speed CMOS sensor and CPU ensure efficient scanning and fast response, even in environments with movement (vibration) and poor lighting.
- **Integrated Tune function:** The Tune function computes settings based on the target environment, which allows for the fastest possible decodes. To enable tuning, you press the mode key and monitor the 3-color indicators. For more information, see the *NLV-5201 User's Manual*.
- **Motion tolerance:** Capable of accurately scanning moving barcodes.
- **Data Edit Programming:** Capable of batch reading 1D barcodes (up to 16 barcodes), 2D barcodes, and OCR. The combined output is highly configurable using regular expressions. Also supports GS1 data conversion and code coordinate output.
- **Green LED aiming and Warm-White LED Illumination:** A well-defined, single line of green LED light and efficient warm-white LED illumination makes it easy to aim while providing safety and long life.
- **RoHS compliance:** The 2D imager scanner is a RoHS compliant product, as declared by Optoelectronics Co., Ltd.

2 About the NLV-5201 2D Imager Scanner

Before configuring or using the NLV-5201 2D imager scanner, make sure that you are familiar with its physical details and specifications.

2.1 Model Details

The 2D imager scanner model is a combination of the model name, focus, interface, cable length, and optional AC adapter.

2D Imager Scanner Model Details

Model Name	Focus	Interface
NLV-5201	SR, HD, UD	RS232C(LE), USB, USB-COM, RS232C(9P)
NLV-5201	SR, HD, UD	RS232C (+PS optional AC adapter)

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Focus Description

Symbol	Description
None	Standard Range (113 mm)
-HD	High-Density (63 mm)
-UD	Ultra High-Density (43 mm)

Interface Cable Description

Symbol	Description
-RS232C(LE)	RS-232C loose-end cable
-USB	USB cable, USB-HID is the default interface setting
-USB-COM	USB cable, USB-COM is the default interface setting
-RS232C(9P)	RS-232C cable, power supply input is connected to D-sub 9 pin 9
-RS232C	RS-232C cable, external AC adapter power supply specification is used

Cable Length Description

Symbol	Description
None	1.5 mm is the standard cable length

Optional AC Adapter Description

Symbol	Description
None	AC adapter not included
+PS	AC adapter for the RS-232C power supply is included

2.2 Standard Product Description

The standard 2D imager scanner has these configurations. Additional configurations are available by special order. For help, contact your Opticon Sales Representative.

Configuration	Description
NLV-5201-RS232C(LE)	Standard focus, RS-232C loose-end cable
NLV-5201-USB	Standard focus, USB-HID

3 Physical Features

This section describes the physical features of the NLV-5201.

Feature	Description	Notes
Dimensions	W: 41.1 mm × D: 33.0 mm × H: 24.0 mm	Excludes the protruding part of the 2D imager scanner.
Weight	Approximately 125 g	Excludes the cable.
Housing material	Zinc alloy diecasting	

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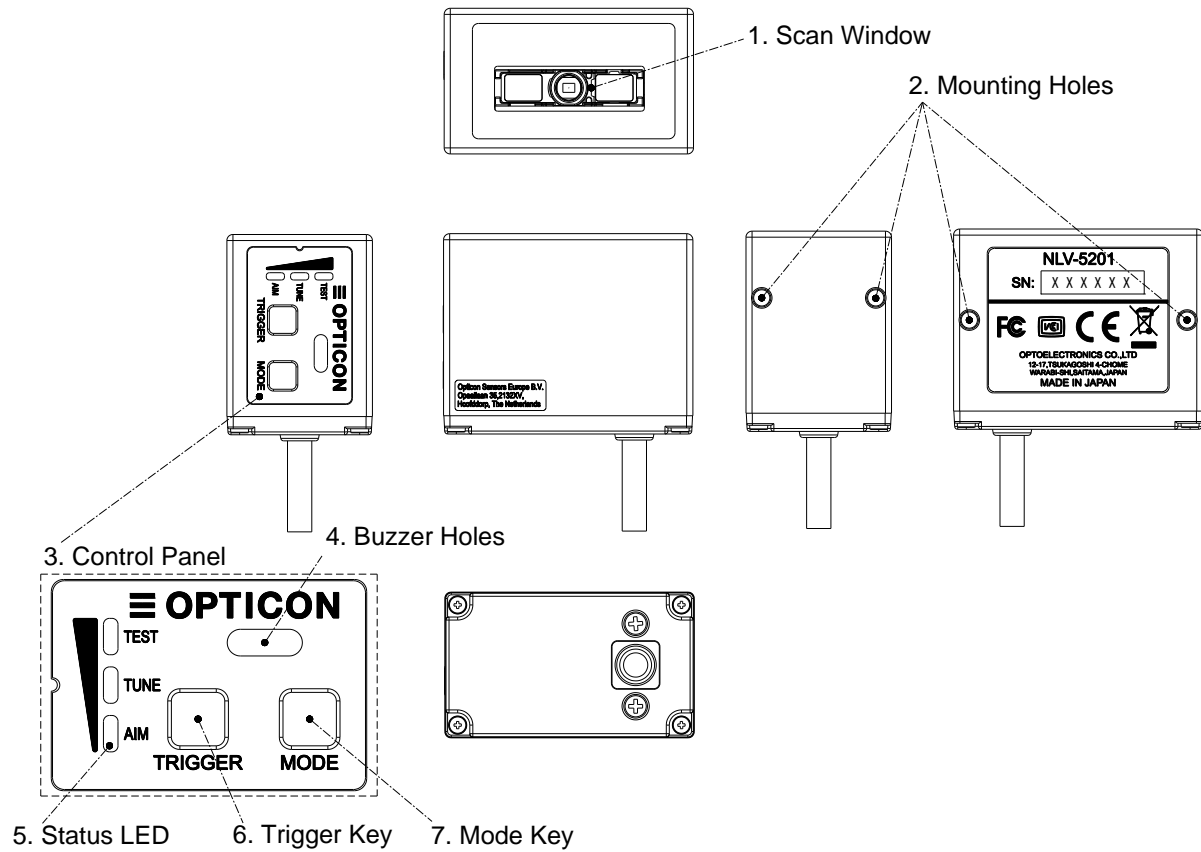
4   Detailed View

Figure 1: Detailed View of NLV-5201

1. Scan Window
2. Mounting Holes
3. Control Panel
4. Buzzer Holes
5. Status LED
6. Trigger Key
7. Mode Key

NLV-5201 Components

Callout	Name	Description
1	Scan Window	Light paths of the imager scanner, LED illumination, and aiming. Make sure that the lens is free from dust and dirt before scanning. For more information, see **"Cleaning the NLV-5201" on page 37**.
2	Mounting Holes	Screw holes (two on the bottom and two on the side) that you can use to mount the imager scanner. 2 holes on the bottom and side. For the mounting hole dimensions, see **"Mechanical Drawing" on page 41**.
3	Control Panel	Use the control panel to run Test mode, Tune mode, and Aim mode. You can also select the bank. For more information, see **"Control Panel Operation Specifications" on page 7**.
4	Buzzer Holes	Sound from a built-in buzzer comes out through these holes. When the holes are covered, the buzzer sound is diminished. The sound varies depending on the settings. You can configure the frequency, loudness, and duration of the buzzer.
5	Status LED	Indicates status with 3-color LEDs: red, orange, and green. For more information, see **"LED Indicator Specifications" on page 8**.
6	Trigger Key	The default key is the trigger key. When you select a mode from the control panel, the trigger key operates as an execution key.
7	Mode Key	Use the mode key to select and cancel the mode. Press and hold the mode key to return to saved settings bank select mode.

5   Basic Operation Mode

Make sure you understand the symbols used to indicate the states of the status LED indicator.

Symbol	Description
▯	OFF
▯	Blinking
▮	ON

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5.1   Exposure Control

Exposure Control determines shutter speed and illumination parameters. Exposure Control can be set to:

- Automatic Adjustment
- Tuning

5.1.1   Automatic Adjustment Exposure Control

By default, Exposure Control is set to Automatic Adjustment. Exposure is automatically adjusted when the reading distance and the barcode to read is not fixed. Example of use: Holding a product to read the barcode.
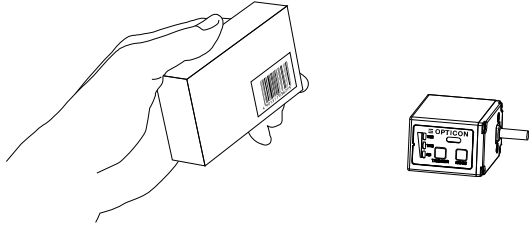
Figure 2: Automatic Adjustment Exposure Control

5.1.2   Tuning Exposure Control

When the reading distance and the barcode to read is fixed, barcode reading is optimized by setting the exposure parameters. Example of use: Product barcodes moving along a factory line.
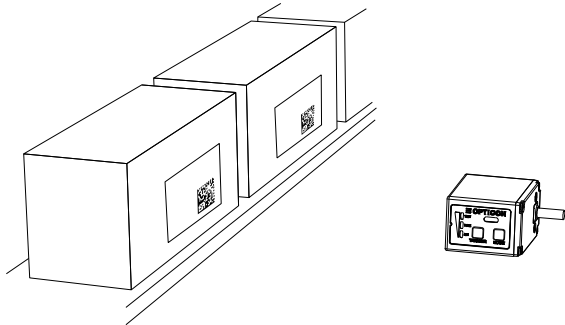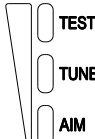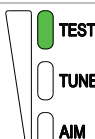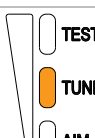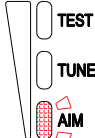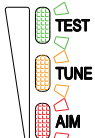
Figure 3: Tuning Exposure Control

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5.2   Operation Modes and Status

Mode	Mark	Description
Normal	-	When the imager scanner is in a read mode, these conditions are used to trigger barcode reading: • Command trigger by serial communication (USB-COM/RS-232C) • External trigger signal (RS-232C) • Auto trigger • Trigger key
Test mode	TEST	Test mode is used to test the read rate. The read rate is displayed on the LED indicator every 10 successful reads.
Tune mode	TUNE	Used to determine and set the optimum exposure. When tuning is finished, the barcode limits, exposure setting, etc. are saved to the current saved settings bank. The read rate is also displayed on the LED indicator.
Saved settings bank	-	The bank is the area to save the exposure (from 1 to 7, default = 1) adjusted in tune mode.
Aim mode	AIM	Aim mode controls the aiming LED and indicates whether the barcode is close to the center coordinate of the image sensor to LED indicator.

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5.3 Control Panel Operation Specifications
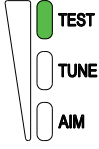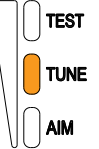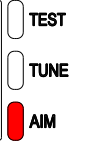
This section describes the operation of the control panel on the side of housing.

LED Indicator	Mode Key	Trigger Key	Operation Mode	Operation Description
TEST / TUNE / AIM		Trigger Key for reading	Normal	Normal operation status.
TEST / TUNE / AIM	Press once (within 2 sec)	Mode transition by pressing once	Test	Used when testing the read rate.
TEST / TUNE / AIM	Press twice (within 2 sec)	Mode transition by pressing once	Tune	Automatically finds the optimum exposure settings based on the current barcode reading environment. When tuning is finished, the barcode symbology type is limited, and the exposure settings are saved to the current saved settings bank. The read rate is also displayed on the LED indicator.
TEST / TUNE / AIM	Press 3 times (within 2 sec)	Mode transition by pressing once	Aim	Controls the aiming LED and indicates whether the barcode is close to the center of the image sensor view.
	Press 4 times (within 2 sec)			
TEST / TUNE / AIM	Press for 2 seconds or more (Press again to select)	Mode transition by pressing once	Bank selection	To display the currently used saved settings bank on the LED, press and hold the mode key for more than 2 seconds.
				To cycle through the saved settings banks, in order, press the mode key again.
				To select and use the currently displayed saved settings bank, press the trigger key.
TEST / TUNE / AIM	Press both keys at the same time for 5 seconds to enter "initialization standby." Press the trigger key again to initialize.		Initialize	To enter initialization standby, press the mode key and trigger key at the same time and hold for 5 seconds.
				To initialize, press the trigger key.
				To cancel initialization standby, press the mode key.

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5.4 LED Indicator Specifications
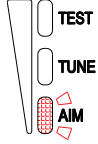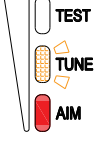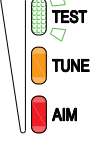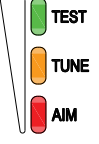
The status LED's indicate the read result and USB communication status. In read rate mode, the reading success rate is indicated by these three 3-color LED's.

Normal Mode Status LED Indication

Status	Reading Success	Waiting for USB Communication	Communication/ Reading Error
LED Indication			
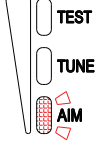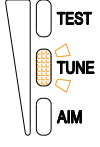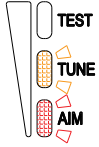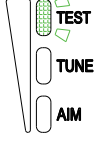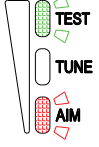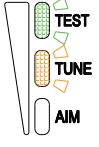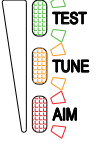
"Test mode", "Tune mode" and "Aim mode" LED Indication

Test and tuning display the read rate 10 times.

Read Rate	0 - 40 %	50 - 70 %	80 - 90%	100%
Central Coordinate	Far from the center	⇒		Close to the center
LED Indication				

"Saved Settings Bank No." LED Indication

The number of the currently used saved settings bank blinks when you press the mode key for more than 2 seconds. Values (from 1 to 7) are in binary.

Bank No.	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
LED Indication							

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6 Electrical Specifications

The NLV-5201 consists of these components:

- Decoder Section: Decodes 1D and 2D barcodes and OCR fonts from an image scanned by the CMOS sensor camera module.
- Communication Control Section: Communicates with a host device.
- SUB Board: Electrical distribution board for the main power supply conversion.

The RS-232C interface model requires an external DC 5.0 V power supply. The USB interface model is powered through the USB cable, so no external power supply is needed.
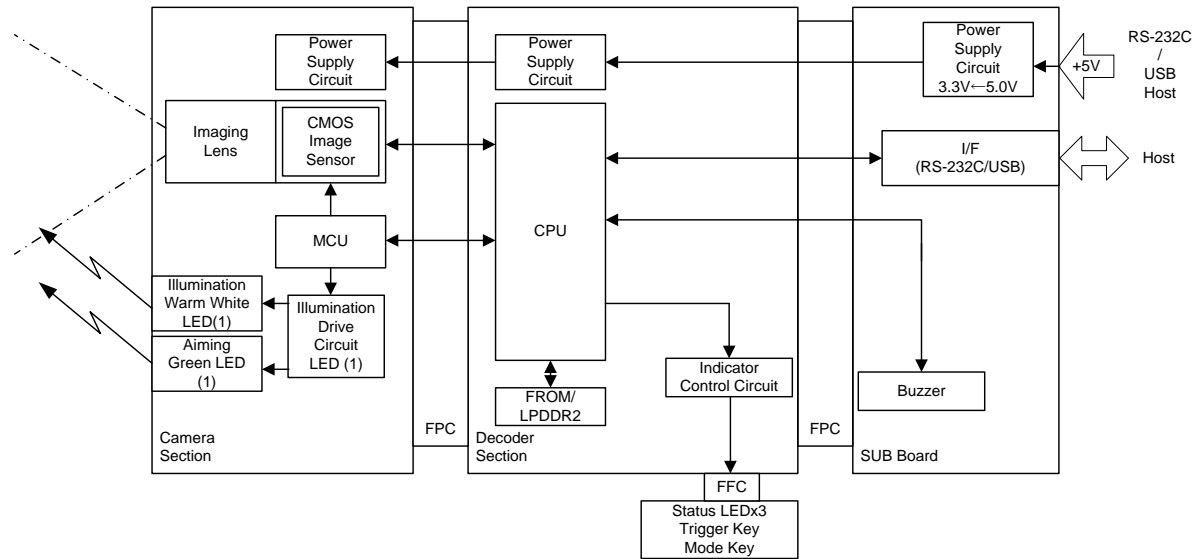
Figure 4: Electrical Configuration Diagram

7 Power Specifications

Reference temperature for current consumption is 25° C.

Power Specifications

Specification	Value
Range of Operating Voltage	4.5 V to 5.5 V
Current Consumption	Maximum: 450 mA
	Reading: 265 mA (Typ.)
	Auto trigger standby: 190 mA (Typ.)
	Standby: 40 mA (Typ.)

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8   Interface Specification

The NLV-5201 uses these interfaces:

- RS-232C
- USB (COM/HID)

8.1   RS-232C Interface

This section describes RS-232C serial communications between the imager scanner and a host computer. If the host COM port is not open, the imager scanner cannot send data and will emit an error sound.

Note: With the RS-232C interface, the imager scanner can transfer images.

8.1.1   RS-232C Communication Settings

Base Communication Settings

Setting	Value	Default
Baud rate	300 to 115200 bps	9600 bps
Data length	7 bits, 8 bits	8 bits
Parity bits	None, Even, Odd	None
Stop bits	1 bit, 2 bits	1 bit

8.1.2   Interface Signals

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

Interface Signals

Name	Cable Color	Notes
VCC	Red	Power-supply voltage 4.5 V to 5.5 V (Typ. 5 V)
Trigger	Brown	External trigger input terminal
OK	Yellow	External OK output terminal
NG	Orange	External NG output terminal
S-GND	Black	
RTS	Gray	
CTS	Blue	
TxD	Green	
RxD	White	
Shield GND	(Black)	Heat shrink tube

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8.1.3   Signal Level

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

Signal Levels

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

Signal Level Sequencer Signal (Loose End, Only)

Name	IN/Out	Voltage (V)	
		L Level	Space/ON
Trigger	IN	-0.3 V - 0.6 V	3 V - Vcc+0.3 V
OK	OUT	0.3 V/10 mA	Vcc
NG	OUT	0.3 V/10 mA	Vcc
Trigger	IN	-0.3 V - 0.6 V	3 V - Vcc+0.3 V

8.1.4   RS-232C Interface Circuit
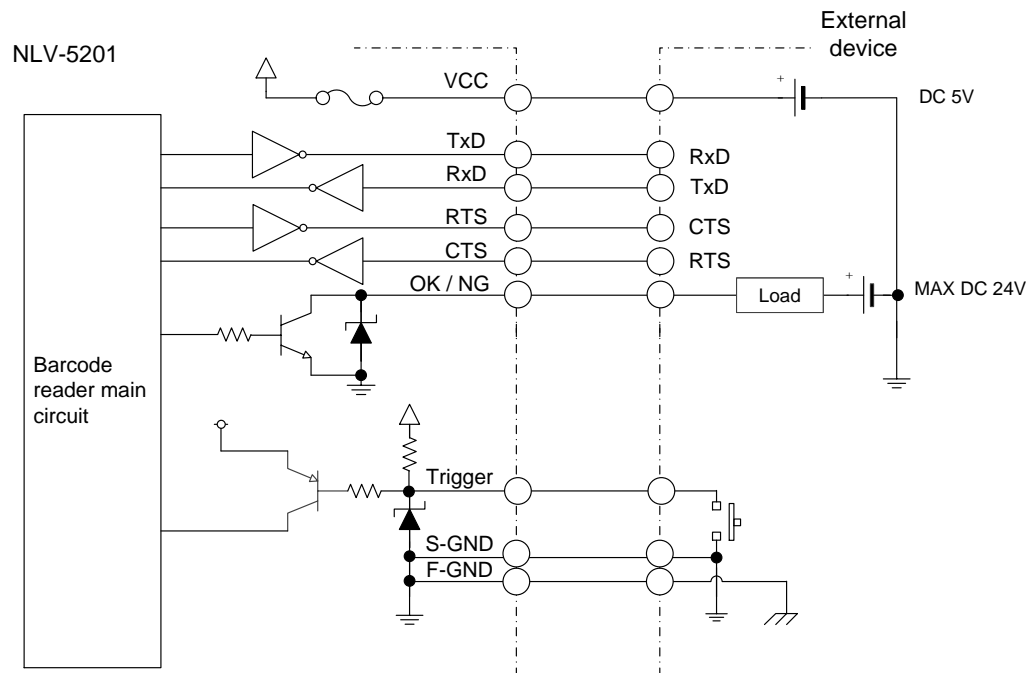
Figure 5: Interface Circuit (RS-232C)

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8.1.5   RS-232C Interface Cable
RS-232C Interface Cable Specifications

Parameter	Specification
Cable length	1500 mm
Exposed wire length	70 mm
Wire conductor diameter	AWG28
Insulator outer diameter	0.58 mm
Exposed conductor length	7 mm
Cable diameter	φ3.8 mm
Weight	Approx. 45 g
Cable material	PVC

[Unit: mm]
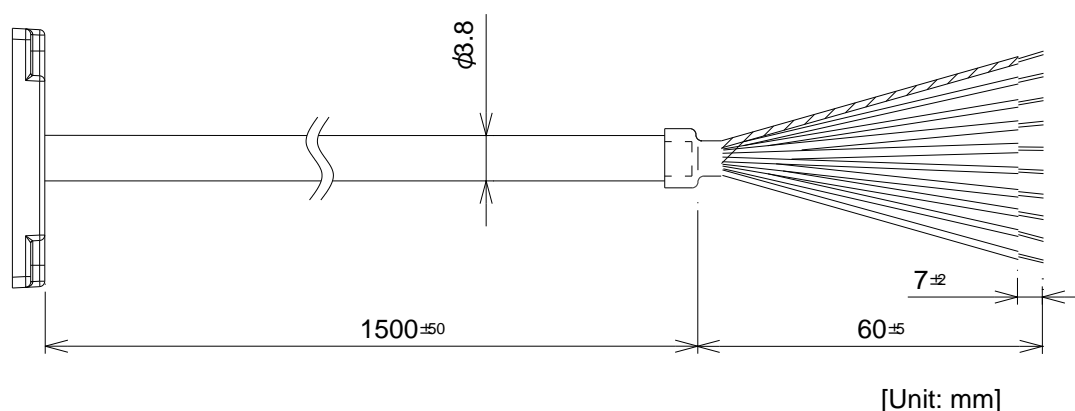
Figure 6: RS-232C Loose End Interface Cable

8.2   USB Interface
The NLV-5201 can use either USB interface:

- Human Interface Device Class (HID)
- Communication Device Class (COM)

The COM interface allows bidirectional serial communication, which supports transmitting commands from the host computer to the imager scanner, as well as receiving barcode data. To use USB-COM, you need to install the latest version of the Opticon USB-COM driver on your host device.

If the host COM post is not open, the imager scanner cannot send data and will emit an error sound.

Note: With the USB-COM interface, the imager scanner can transfer images.

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8.2.1   USB Interface Specifications

The USB interface model is bus powered. No external power supply is needed.

Caution: If you are using USB-HID to transmit barcode data, using the host keyboard may cause data to be lost.

USB-COM Interface Specifications

Setting	Description
Bus-power class	Use only a high-power (500 mA) USB port.
Speed	Full Speed (12 Mbps)
Interface	HID/COM (Virtual COM Port)
Transfer Speed	USB2.0 Full Speed
Vendor ID	065A
Product ID (HID)	A001
Product ID (COM)	A002

8.2.2   USB Connector

Pin No.	Name
1	VCC
2	-DATA
3	+DATA
4	GND
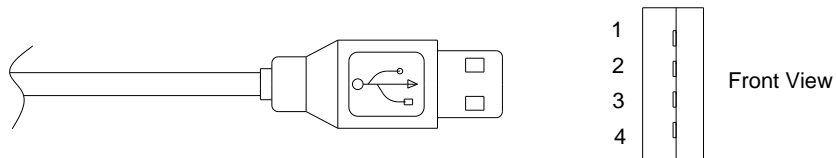
Figure 7: USB Plug (A) Pin Assignment

8.2.3   USB Interface Circuit
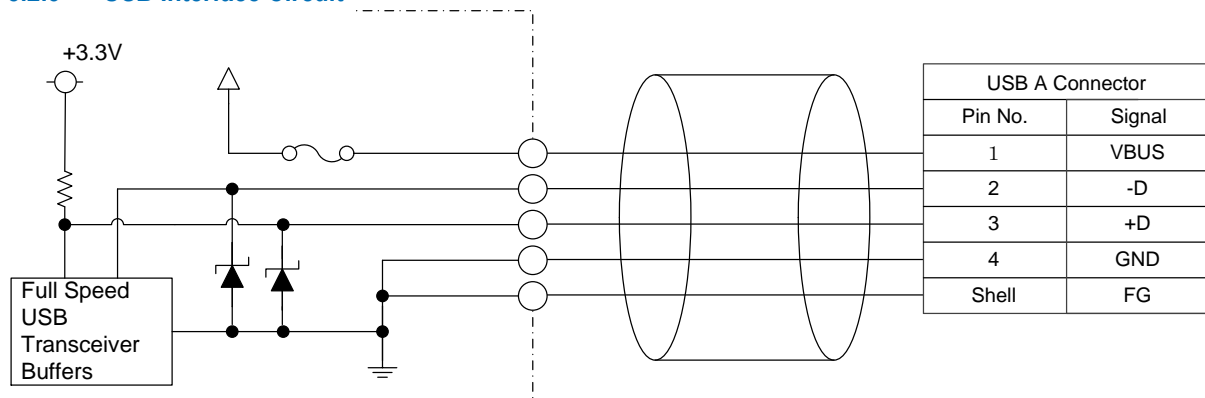
Figure 8: Interface Circuit (USB)

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8.2.4   USB Interface Cable
USB Interface Cable Specifications

Parameter	Specification
Cable length	1500 mm
Cable diameter	φ3.8 mm
Weight	Approx. 70 g
Cable material	PVC
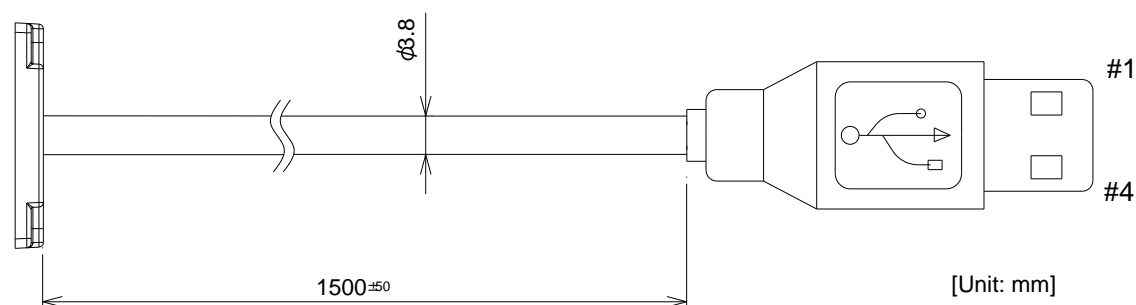
Figure 9: USB Interface Cable

9   Optical Specifications

9.1   Basic Optical Specifications

Parameter	Description	Specification
Scanning method	Monochrome CMOS area sensor	N/A
Number of effective pixels	(Column) × (Row)	640 × 480 dots (0.30 million pixels)
Image capture speed (fastest speed at which an image is captured)	Frame rate	100 fps
Sensor shutter speed	Minimum shutter speed	30µs
Focal distance	Distance from the front edge of the imager scanner	113 mm (SR models) 63 mm (HD models) 43 mm (UD models)
View angle	Horizontal	Approx. 38.0°
	Vertical	Approx. 28.9°
	Diagonal	Approx. 46.4°
Reading light source (LED × 1)	White LED	Warm white
	Color	2600 - 3700 K
Aiming light source (LED × 1)	Green LED	Single line
	Wavelength	525 nm
Scan window	Material	PMMA

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9.2   Aiming Pattern

Aiming indicates the appropriate reading distance by projecting a bar of green LED light:

- The optical axis of the imaging field of view and the center of the horizontal aiming bar coincide at a distance of L=148±20 mm from the front edge of the imager scanner.
- The width of the aiming bar at a distance of L=148 mm is 90%±10% of the width of the horizontal field of view.
- The sharpest aiming bar distance is 113 ± 10 mm (SR models), 63 ± 10 mm (HD models), or 43 ± 10 mm (UD models).
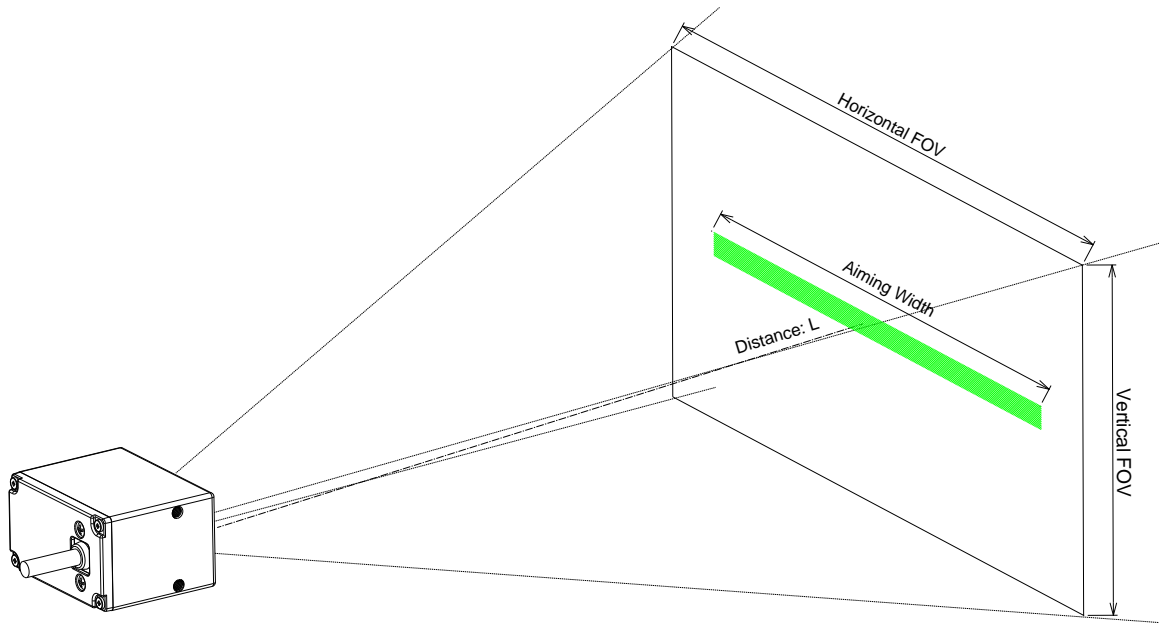
Figure 10: Aiming Pattern and Image Range

9.3   Image Range

The image range is the imaging field of view (not the scan area).

Image Range for SR Models

L: Distance from the Front Edge of the Imager Scanner (mm)	80	100	120	140	160	180
Horizontal Field of View (FOV)	57.1	70.9	98.5	98.5	112.3	126.0
Vertical Field of View (FOV)	42.7	53.0	63.3	73.6	83.9	94.2

Note: The range is ±5% from these values.

Image Range for HD Models

L: Distance from the Front Edge of the Imager Scanner (mm)	40	60	80	100	120	140
Horizontal Field of View (FOV)	29.6	43.4	57.1	70.9	98.5	98.5
Vertical Field of View (FOV)	22.1	32.4	42.7	53.0	63.3	73.6

Note: The range is ±5% from these values.

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Image Range for UD Models

L: Distance from the Front Edge of the Imager Scanner (mm)	30	40	50	60	80	100
Horizontal Field of View (FOV)	22.7	29.6	36.5	43.4	57.1	70.9
Vertical Field of View (FOV)	17.0	22.1	27.3	32.4	42.7	53.0

Note: The range is ±5% from these values.

10 Technical Specifications

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

Technical Specification Conditions

Specification	Condition
Ambient Temperature and Humidity	Room temperature and room humidity
Ambient Light	100 to 500 lux
Pitch Angle	α = 0°
Skew Angle	β = 15°
Tilt Angle	γ = 0°
Code Position	Near the center of the image
Curvature	R = ∞
Power Supply Voltage	5.0 V
PCS (1D and 2D)	0.9 or higher
Scanning Test	Accept the performance with 90% or more success rate for 10 scan attempts. One reading should be 2 seconds.
Barcode Test Sample (1D and 2D)	Specified in **"Barcode Test Labels" on page 17**.

Note: For 1D barcodes, use OPTOELECTRONICS test samples. For GS1 DataBar, stacked barcodes, and 2D barcodes, use barcodes from a dedicated barcode printer.
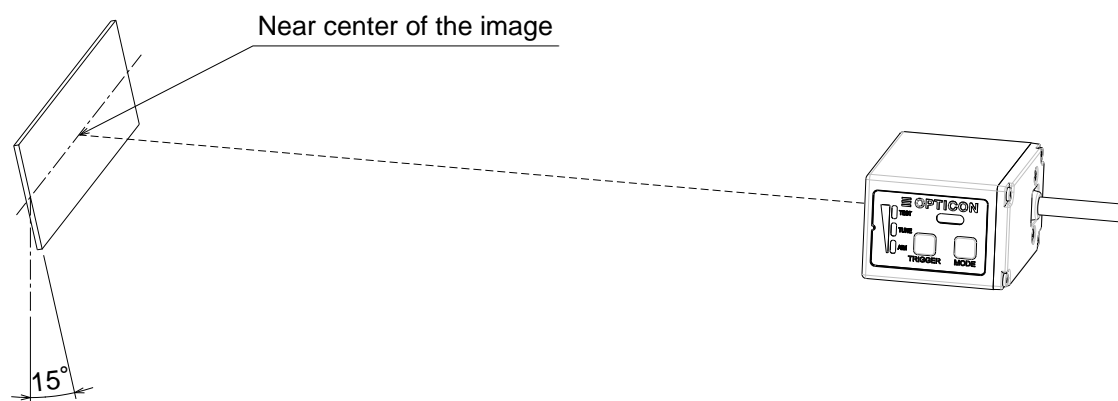
Figure 11: Test Condition for Depth of Field

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10.1   Barcode Test Labels
This section describes the barcode labels used when the depth of field was measured.

10.1.1   1D Barcode Test Labels
Code 39

Resolution	PCS (MRD)	Size (mm)	No. of Digits
0.10 mm (3.9 mil)	0.9 (80)	26 × 10	16
0.127 mm (5 mil)		11 × 10	4
0.20 mm (7.9 mil)		100 × 10	31
0.254 mm (10 mil)		32.5 × 12	7
0.508 mm (20 mil)		36 × 25	4

Code 128

Resolution	PCS (MRD)	Size (mm)	No. of Digits
0.20 mm (7.9 mil)	0.9 (80)	42 × 10	16

UPC/EAN

Resolution	PCS (MRD)	Size (mm)	No. of Digits
0.33 mm (13 mil)	0.9/0.3 (80/23)	31.5 × 25.0	12/13

10.1.2   GS1 DataBar/Composite
GS1-DataBar Limited

Resolution	Symbology	PCS (MRD)	Size (mm)	No. of Digits
0.169 mm (6.7 mil)	Limited	0.9 (80)	12 × 1.5	14
0.169 mm (6.7 mil)	Limited-Composite		12 × 3.0	26

10.1.3   2D Barcode Test Labels
PDF417

Resolution	Error Correction	PCS (MRD)	Size (mm)	No. of Characters
0.169 mm (6.7 mil)	Level-3	0.9 (80)	23 x 10	58
0.254 mm (10 mil)			35 x 15	

QR Code: Model-2

Resolution	Error Correction	PCS (MRD)	Size (mm)	No. of Characters
0.169 mm (6.7 mil)	M	0.9 (80)	5 x 5	44
0.381 mm (15 mil)			11 x 11	

Data Matrix

Resolution	Error Correction	PCS (MRD)	Size (mm)	No. of Characters
0.169 mm (6.7 mil)	ECC200	0.9 (80)	4 x 4	40
0.254 mm (10 mil)			6 x 6	

Note: Size is measured using the outline dimensions excluding the quiet zone.

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10.2   Scan Area and Depth of Field

The scan area is measured from the front edge of the imager scanner. The depth of field depends on the view angle and symbol length. Depth of field values provided are the typical values measured by tilting the test chart 15° from the optical axis.

The focal point of the camera, and therefore the depth of field, is different for the SR, HD, and UD models. This section describes the depths of field for all three models.

10.2.1   Scan Area and Depth of Field for SR Models
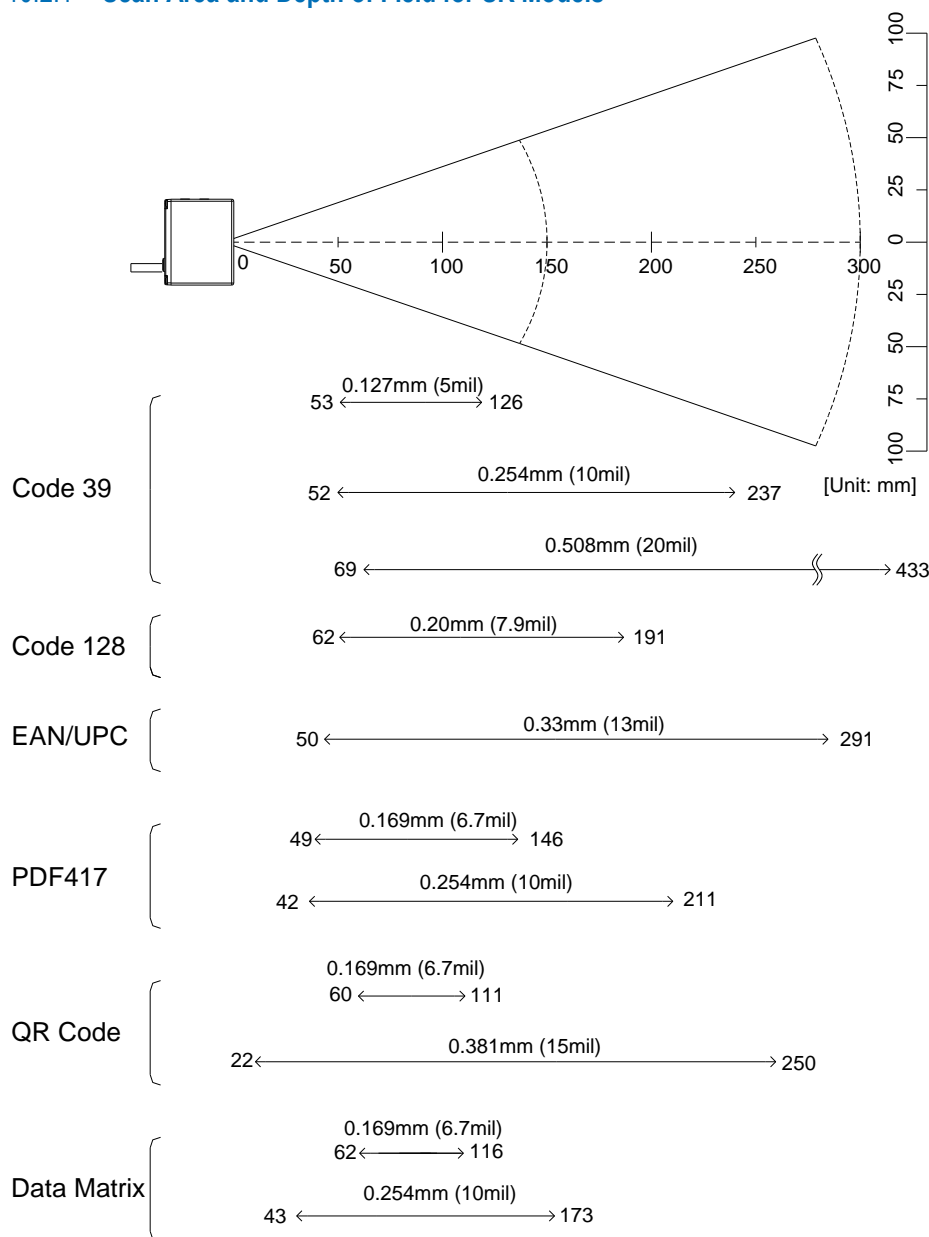
Figure 12: Scan Area and Depth of Field for SR Models

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Depth of Field for SR Models $T_A = 25°C$

Resolution	Symbology Type	PCS (MRD)	Guaranteed Value		Typical Value	
			Near	Far	Near	Far
0.127 mm (5 mil)	Code 39	0.9 (0.8)	64 mm (2.5″)	110 mm (4.3″)	53 mm (2.1″)	126 mm (5.0″)
0.254 mm (10 mil)	Code 39	0.9 (0.8)	62 mm (2.4″)	209 mm (8.2″)	52 mm (2.0″)	237 mm (9.3″)
0.508 mm (20 mil)	Code 39	0.9 (0.8)	84 mm (3.3″)	371 mm (14.6″)	69 mm (2.7″)	433 mm (17.0″)
0.20 mm (7.9 mil)	Code 128	0.9 (0.8)	77 mm (3.0″)	165 mm (6.5″)	62 mm (2.5″)	191 mm (7.5″)
0.33 mm (13 mil)	UPC/EAN	0.9 (0.8)	62 mm (2.4″)	248 mm (9.8″)	50 mm (2.0″)	291 mm (11.5″)
0.169 mm (6.7 mil)	QR Code	0.9 (0.8)	73 mm (2.9″)	97 mm (3.8″)	60 mm (2.4″)	111 mm (4.4″)
0.381 mm (15 mil)	QR Code	0.9 (0.8)	27 mm (1.1″)	214 mm (8.4″)	22 mm (0.9″)	250 mm (9.8″)
0.169 mm (6.7 mil)	Data Matrix	0.9 (0.8)	75 mm (3.0″)	101 mm (4.0″)	62 mm (2.4″)	116 mm (4.6″)
0.254 mm (10 mil)	Data Matrix	0.9 (0.8)	55 mm (2.2″)	149 mm (5.9″)	43 mm (1.7″)	173 mm (6.8″)

Note: The depth of field was determined using OPTOELECTRONICS test chart PCS 0.9, without specular reflection and at room temperature and room humidity.

10.2.2 Scan Area and Depth of Field for HD Models

		0	50	100	150	200

Code 39
- 0.076mm (3mil): 45 ↔ 72
- 0.127mm (5mil): 35 ↔ 119
- 0.254mm (10mil): 55 ↔ 179

Code 128
- 0.20mm (7.9mil): 68 ↔ 159

EAN/UPC
- 0.33mm (13mil): 48 ↔ 200

PDF417
- 0.127mm (5mil): 39 ↔ 109
- 0.254mm (10mil): 46 ↔ 154

QR Code
- 0.127mm (5mil): 43 ↔ 91
- 0.381mm (15mil): 24 ↔ 182

Data Matrix
- 0.127mm (5.0mil): 48 ↔ 78
- 0.254mm (10mil): 28 ↔ 139

[Unit: mm]
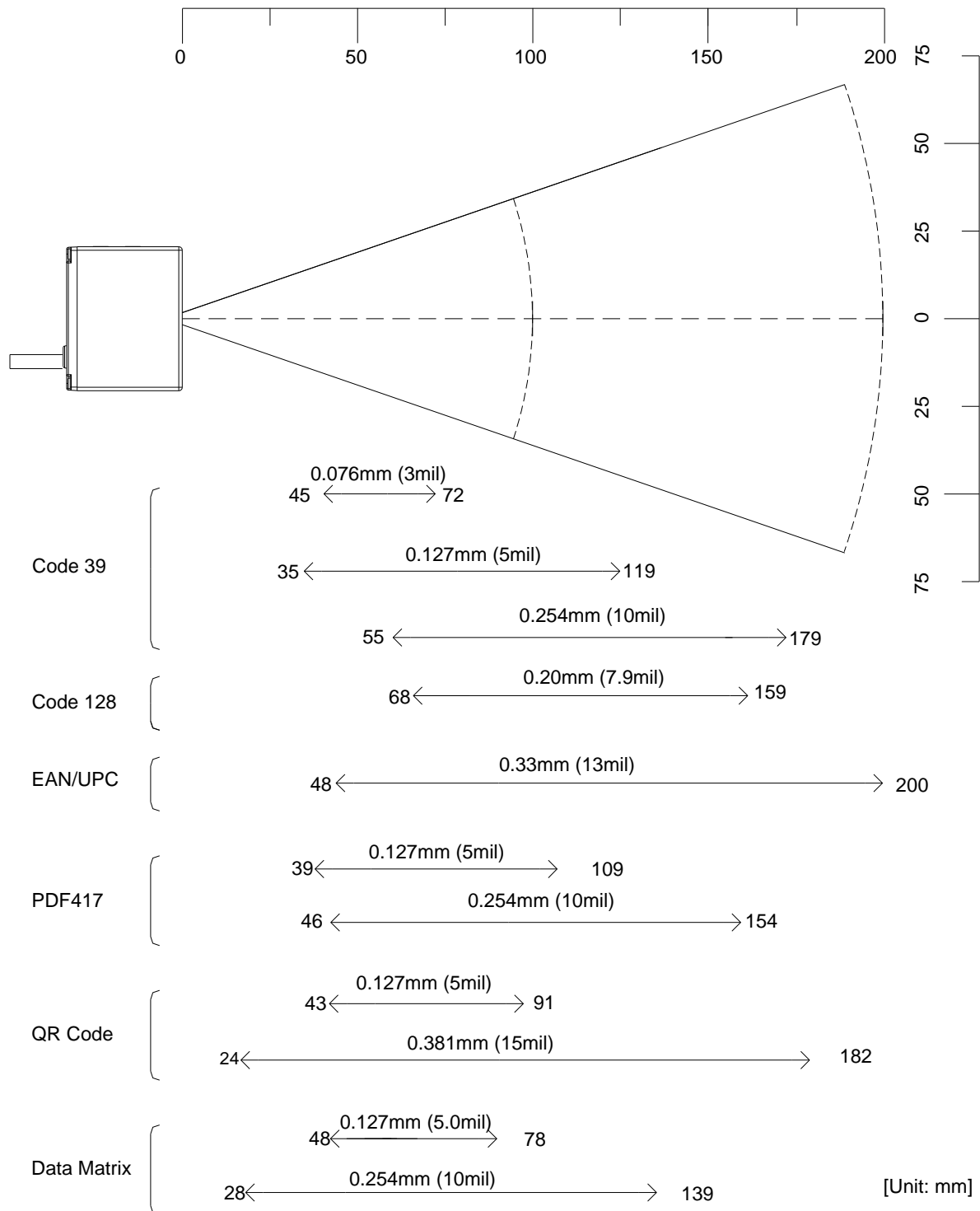
Figure **13***: Scan Area and Depth of Field for HD Models*

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Depth of Field for HD Models   T$_A$ = 25°C

Resolution	Symbology Type	PCS (MRD)	Guaranteed Value		Typical Value	
			Near	Far	Near	Far
0.127 mm (5 mil)	Code 39	0.9 (0.8)	53 mm (2.1″)	63 mm (2.5″)	45 mm (1.8″)	72 mm (2.8″)
0.254 mm (10 mil)	Code 39	0.9 (0.8)	43 mm (1.7″)	102 mm (4.0″)	35 mm (1.4″)	119 mm (4.7″)
.508 mm (20 mil)	Code 39	0.9 (0.8)	62 mm (2.4″)	155 mm (6.1″)	55 mm (2.2″)	179 mm (7.0″)
0.2 mm (7.9 mil)	Code 128	0.9 (0.8)	77 mm (3.0″)	138 mm (5.4″)	68 mm (2.7″)	159 mm (6.3″)
0.33 mm (13 mil)	UPC/EAN	0.9 (0.8)	62 mm (2.4″)	171 mm (6.7″)	48 mm (1.9″)	200 mm (7.9″)
0.169 mm (6.7 mil)	PDF417	0.9 (0.8)	46 mm (1.8″)	95 mm (3.7″)	39 mm (1.5″)	109 mm (4.3″)
0.254 mm (10 mil)	PDF417	0.9 (0.8)	51 mm (2.0″)	135 mm (5.3″)	46 mm (1.8″)	154 mm (6.1″)
0.169 mm (6.7 mil)	QR Code	0.9 (0.8)	49 mm (1.9″)	79 mm (3.1″)	43 mm (1.7″)	91 mm (3.6″)
0.381 mm (15 mil)	QR Code	0.9 (0.8)	31 mm (1.2″)	153 mm (6.0″)	24 mm (0.9″)	180 mm (7.1″)
0.169 mm (6.7 mil)	Data Matrix	0.9 (0.8)	55 mm (2.2″)	63 mm (2.5″)	48 mm (1.9″)	78 mm (3.1″)
0.254 mm (10 mil)	Data Matrix	0.9 (0.8)	35 mm (1.4″)	120 mm (4.7″)	28 mm (1.1″)	139 mm (5.5″)

Note: The depth of field was determined using OPTOELECTRONICS test chart PCS 0.9, without specular reflection and at room temperature and room humidity.

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10.2.3 Scan Area and Depth of Field for UD Models

0   25   50   75   100   125

50

25

0

25

50

[mm]

Code 39

28 ⟵ 0.076mm (3mil) ⟶ 65

23 ⟵ 0.127mm (5mil) ⟶ 82

53 ⟵ 0.254 (10mil) ⟶ 108

EAN/UPC

50 ⟵ 0.33mm (13mil) ⟶ 120

QR Code

33 ⟵ 0.084mm (3.3mil) ⟶ 55

22 ⟵ 0.381mm (15mil) ⟶ 109

Data Matrix

35 ⟵ 0.084mm (3.3mil) ⟶ 55

22 ⟵ 0.254mm (10mil) ⟶ 86   [Unit: mm]
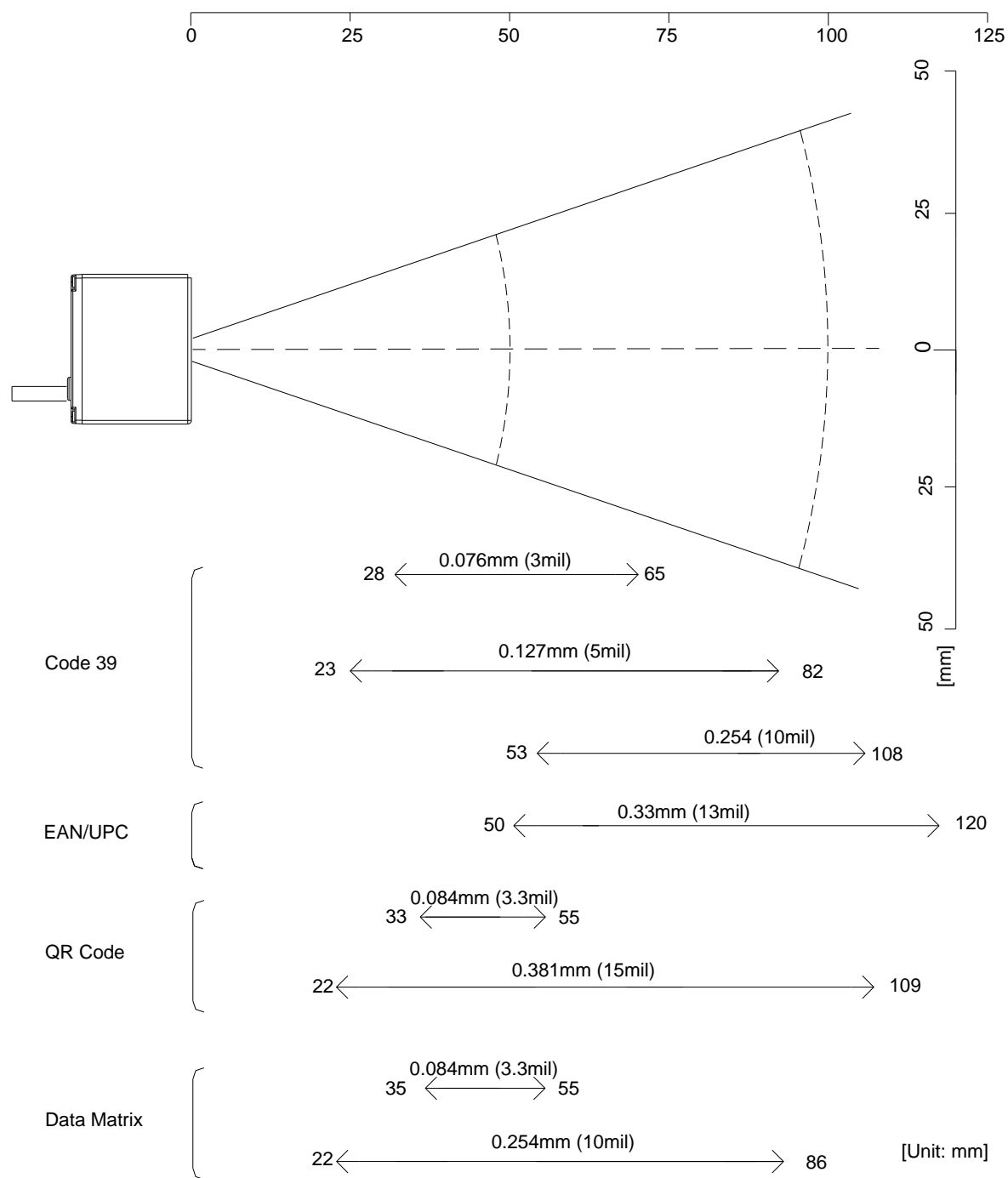
Figure **14**: *Scan Area and Depth of Field for UD Models*

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Depth of Field for UD Models   T$_A$ = 25°C

Resolution	Symbology Type	PCS (MRD)	Guaranteed Value		Typical Value	
			Near	Far	Near	Far
0.076 mm (3 mil)	Code 39	0.9 (0.8)	35 mm (1.4″)	56 mm (2.2″)	28 mm (1.1″)	65 mm (2.6″)
0.127 mm (5 mil)	Code 39	0.9 (0.8)	35 mm (1.4″)	68 mm (2.7″)	23 mm (0.9″)	82 mm (3.2″)
0.254 mm (10 mil)	Code 39	0.9 (0.8)	64 mm (2.5″)	93 mm (3.7″)	53 mm (2.1″)	108 mm (4.3″)
0.33 mm (13 mil)	UPC/EAN	0.9 (0.8)	66 mm (2.6″)	102 mm (4.0″)	50 mm (2.0″)	120 mm (4.7″)
0.084 mm (3.3 mil)	QR Code	0.9 (0.8)	42 mm (1.7″)	45 mm (1.8″)	33 mm (1.3″)	55 mm (2.2″)
0.381 mm (15 mil)	QR Code	0.9 (0.8)	29 mm (1.1″)	92 mm (3.6″)	22 mm (0.87″)	109 mm (4.3″)
0.084 mm (3.3 mil)	Data Matrix	0.9 (0.8)	43 mm (1.7″)	48 mm (1.9″)	35 mm (1.4″)	55 mm (2.2″)
0.254 mm (10 mil)	Data Matrix	0.9 (0.8)	33 mm (1.3″)	72 mm (2.8″)	22 mm (0.87″)	86 mm (3.4″)

Note: The depth of field was determined using OPTOELECTRONICS test chart PCS 0.9, without specular reflection and at room temperature and room humidity.

10.3   Printed Contrast Signal (PCS)

PCS: 0.3 or higher

PCS Conditions

Condition	Description
MRD	≥ 23% (≥ 80% reflectivity of space and quiet zone)
Barcode Sample	UPC specified in **"Barcode Test Labels" on page 17**. (Resolution: 0.33 mm, PCS: 0.3)

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

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

Note: Make sure that the optical window is clean and free from scratches. A dirty or damaged optical window may decrease reading performance.

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10.4   Minimum Resolution

10.4.1   Minimum Resolution for SR Models

For details, see **"Barcode Test Labels" on page 17**.

Minimum Resolution Barcodes

Barcode Type	Barcode Symbology	Minimum Resolution
1D Barcode	Code 39	0.1 mm
GS1 DataBar	GS1 DataBar Limited	0.169 mm
Stacked Barcode	PDF417, GS1 DataBar Limited Composite	0.169 mm
2D Barcode	QR Code, Data Matrix	0.169 mm

Minimum Resolution Conditions

Condition	Description
Distance	83 mm from the front edge of the imager scanner
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞

10.4.2   Minimum Resolution for HD Models

For details, see **"Barcode Test Labels" on page 17**.

Minimum Resolution Barcodes

Barcode Type	Barcode Symbology	Minimum Resolution
1D Barcode	Code 39	0.076 mm
GS1 DataBar	GS1 DataBar Limited	0.127 mm
Stacked Barcode	PDF417, GS1 DataBar Limited Composite	0.127 mm
2D Barcode	QR Code, Data Matrix	0.127 mm

Minimum Resolution Conditions

Condition	Description
Distance	58 mm from the front edge of the imager scanner
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞

10.4.3   Minimum Resolution for UD Models

For details, see **"Barcode Test Labels" on page 17**.

Minimum Resolution Barcodes

Barcode Type	Barcode Symbology	Minimum Resolution
1D Barcode	Code 39	0.051 mm
2D Barcode	QR Code, Data Matrix	0.084 mm

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Minimum Resolution Conditions

Condition	Description
Distance	43 mm from the front edge of the imager scanner
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞

10.5   Barcode Width

Barcode width: 100 mm

Barcode Width Conditions

Condition	Description
Barcode Sample	Code 39, 0.20 mm/PCS 0.9. For details, see **"Barcode Test Labels" on page 17**.
Distance	168 mm from the front edge of the imager scanner (SR models) 138 mm from the front edge of the imager scanner (HD models) 73 mm from the front edge of the imager scanner (UD models)
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞
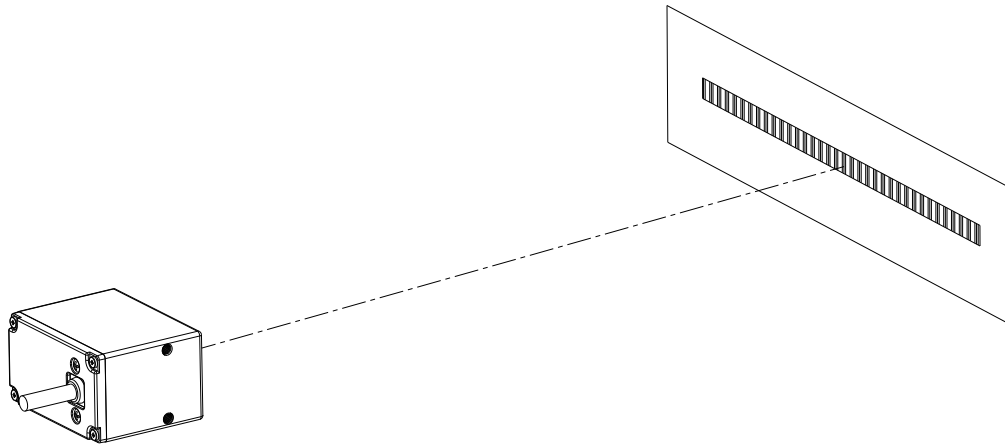
Figure 15: Barcode Width

10.6   Pitch, Skew, and Tilt

Pitch, Skew, and Tilt

Orientation	Description
Pitch	α = ±65° (SR models) α = ±60° (HD models) α = ±50° (UD models)
Skew	β = ±65° (SR and HD models) β = ±50° (UD models)
Tilt	γ = 360°

Pitch, Skew, and Tilt Conditions

Condition	Description	
Barcode Sample	Code 39, 0.508 mm. For details, see **"Barcode Test Labels" on page 17**.	
Distance	128 mm from the front edge of the imager scanner (SR models) 98 mm from the front edge of the imager scanner (HD models) 48 mm from the front edge of the imager scanner (UD models)	
Curvature	R = ∞	
Angle	Pitch:	β = +15°, γ = 0°
	Skew, Dead Zone:	α = 0°, γ = 0°
	Tilt:	α = 0°, β = +15°

Figure 16: Pitch, Skew, and Tilt

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10.7   Curvature

0.33 mm 12-digit UPC   R ≧ 20 mm (SR and HD models)
                           R ≧ 25 mm (UD models)

Note: Decoding may fail due to specular reflection.

Curvature Conditions

Condition	Description
Barcode Sample	UPC, 0.33 mm. For details, see **"Barcode Test Labels" on page 17**.
Distance	113 mm from the front edge of the imager scanner (SR models) 98 mm from the front edge of the imager scanner (HD models) 78 mm from the front edge of the imager scanner (UD models)
Angle	α = 0°, β =+15°, γ = 0°
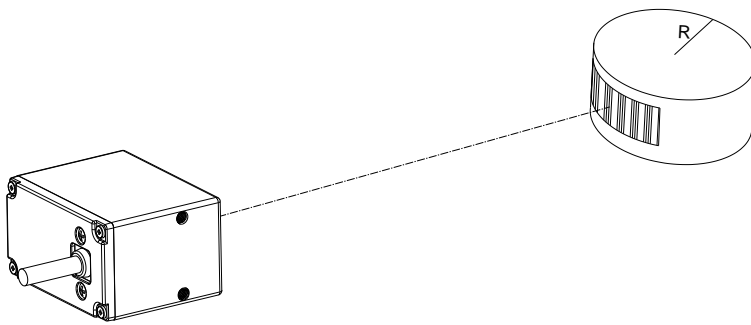
Figure 17: Curvature

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10.8   Motion Tolerance

2.54 m/s (UPC 100%) (SR models)
1.0 m/s (QR Code) (HD models)

Motion Tolerance Conditions

Condition	Description
Ambient Temperature and Humidity	Room temperature and room humidity
Ambient Light	500 lux to 1000 lux (on the surface of the barcode)
Distance	128 mm from the front edge of the imager scanner (SR models) 118 mm from the front edge of the imager scanner (HD models)
PCS (1D and 2D)	0.9 or higher
Barcode Sample	0.33 mm UPC (SR models) 0.381 mm QR Code (HD models) For details, see **"Barcode Test Labels" on page 17**.

Note: Successful reading at the indicated speed cannot be guaranteed. If the surface is highly reflective, the illumination LED may be reflected and cause scanning to fail.
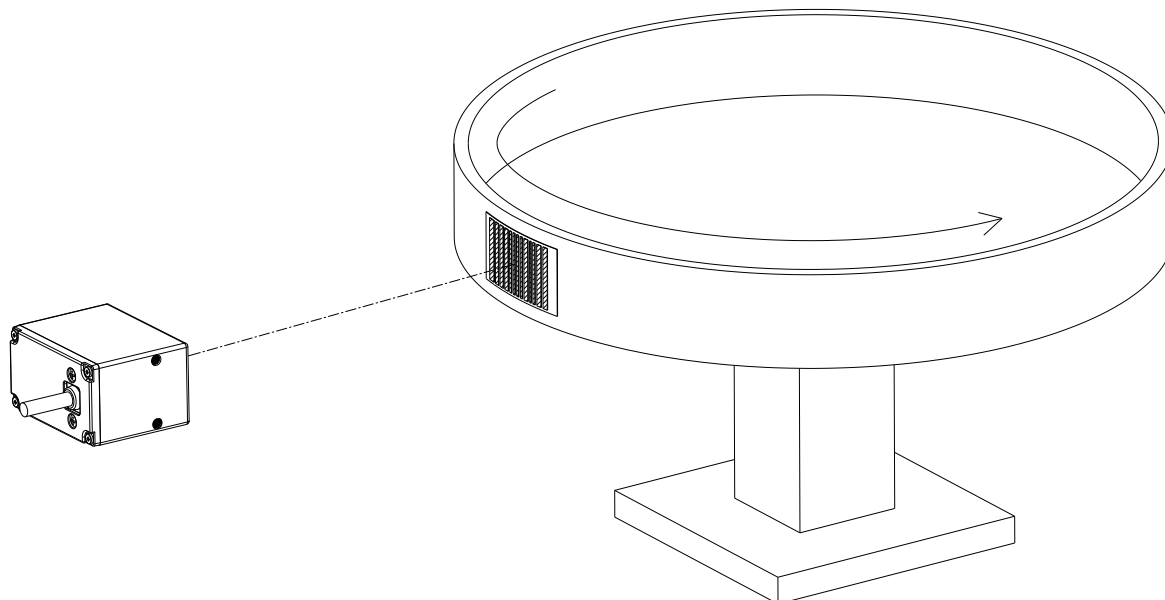
Figure 18: Motion Tolerance

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10.9   Scan Speed

Scan speed only applies to SR and HD models.

Number of scans per second:

- 1D Barcode: 40 scans/sec.
- 2D Barcode: 25 scans/sec.

Scan Speed Conditions

Condition	Description
Ambient Temperature and Humidity	Room temperature and Room humidity
Ambient Light	500 lux to 1000 lux (on the surface of a barcode)
Distance	113 mm from the front edge of the imager scanner engine (SR models) 98 mm from the front edge of the imager scanner engine (HD models)
Scan Mode	Continuous scan
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R =∞
Code Position	Center of the image
PCS (1D and 2D)	0.9 or higher
1D Barcode	0.33 mm UPC/EAN. For details, see **"Barcode Test Labels" on page 17**.
2D Barcode	0.254 mm Data Matrix. For details, see **"Barcode Test Labels" on page 17**.

Note: Performance is not guaranteed in other conditions.
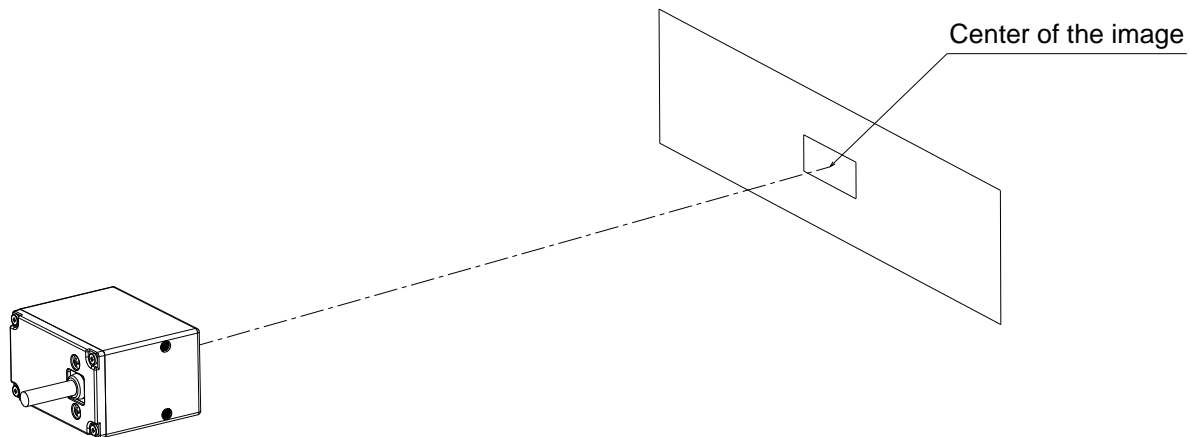
Figure 19: Scan Speed

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10.10 Auto Trigger

In auto trigger mode, the imager scanner detects an abrupt change in brightness in the scan area and automatically starts scanning. Auto trigger is activated when a black sheet of paper is placed in front of a gray sheet of paper. You can configure auto trigger.

Auto Trigger Conditions

Condition	Description
Paper	Black paper: Black 010010016, from Glory paper company Gray paper: Silver-gray 010010016, from Glory paper company
Ambient light	500 lux to 1000 lux (on the surface of a barcode)
Moving speed of detected paper	Less than 2 m/s
Ambient temperature and humidity	Room temperature and room humidity
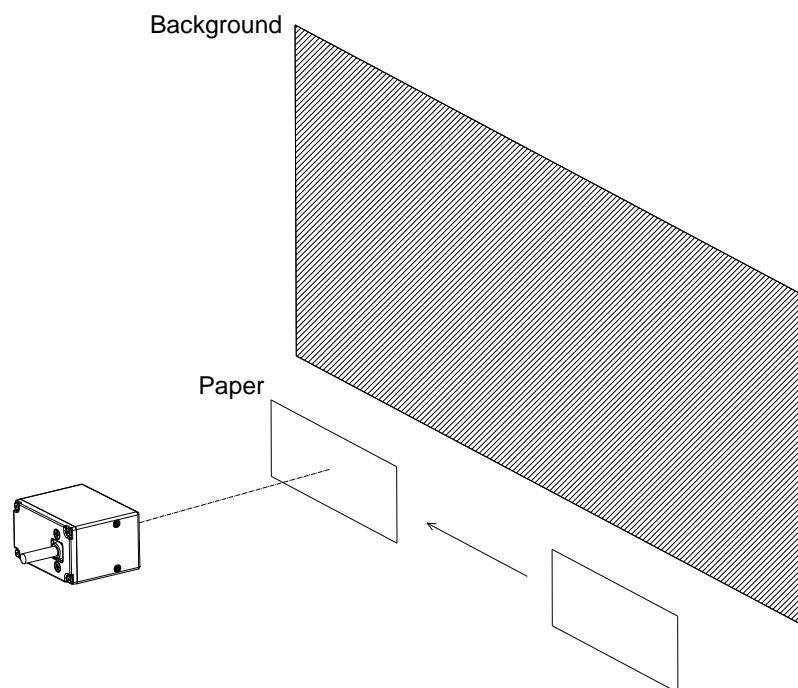
Figure 20: Auto Trigger

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10.11 Indicator Specifications

Indicator	Description
Status LED	Upper panel, 3 color LED: red, orange, and green
Buzzer	Adjustable volume and tone

10.12 Imager Specifications

Specification	Description
Image data format	Windows Bitmap, JPEG
Shades of gray	1024, 256, 16, 2
Range of output image	Select top/bottom (column) and left/right (row)
Resolution of output image	Full, 1/2, 1/4
Interface of output image	RS-232C, USB-COM
Baud rate (full resolution)	USB-COM, full speed (approx. 3 sec.)
	RS-232C, 115200 kbps (approx. 40 sec.)

11 Environmental Specifications

Unless otherwise noted, these conditions apply to all environmental specifications where applicable.

Environmental Specification Conditions

Condition	Description
Barcode Sample	0.33 mm UPC specified in **"Barcode Test Labels" on page 17.**
Distance	128 mm from the front edge of the imager scanner (SR models) 118 mm from the front edge of the imager scanner (HD models) 78 mm from the front edge of the imager scanner (UD models)
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞
Scanning Test	Read at intervals of 300 ms
Power Supply Voltage	5.0 V

11.1 Temperature

Operating Temperature: 0 to 50 °C
Storage Temperature: -20 to 60 °C

11.2 Humidity

Operating Humidity 20 to 85%RH (no condensation, no frost)
Storage Humidity 20 to 90%RH (no condensation, no frost)

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11.3   Ambient Light Immunity

Scanning performance is optimal when the illumination on the surface of a barcode is between zero and these values:

Incandescent Light: 10,000 lux
Fluorescent Light: 10,000 lux
Sunlight: 100,000 lux

Note: To achieve the best scanning performance, make sure that direct ambient light and specular reflection do not enter the light receiving section of the imager scanner.
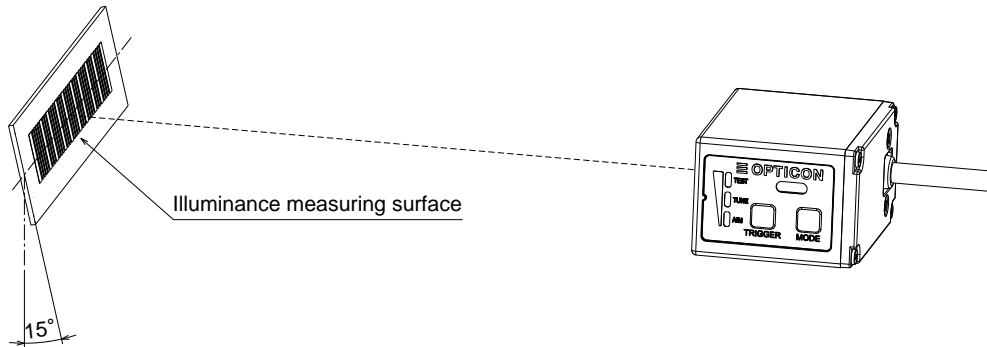
Figure 21: Ambient Light Immunity

11.4   Environmental Durability (IP)

IEC IP65 equivalent

11.5   Scanner Key Durability

The imager scanner key is designed to withstand the conditions of the following key durability test.

Key Durability Test: Position the imager scanner as shown in the next illustration. Use a push rod with a 10 mm diameter to press and release the key with a force of 9.8 N (1 kgf). Press and release the key 50,000 times.
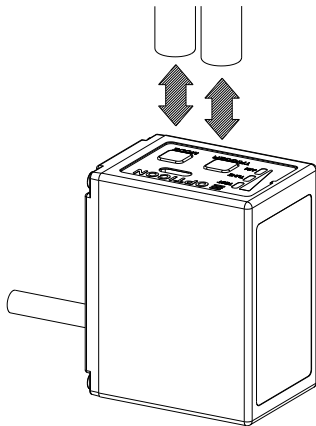
Figure 22: Scan Key Durability Test

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11.6   Cable Strength

The cable is designed to withstand the conditions of the following cable strength test.

Cable Strength Test: Attach the scanner to a stationary object. Pull the cable with a force of 25 N (2.5 kgf, static loading) for 60 seconds.

11.7   Cable Bending Strength

The cable is designed to withstand the conditions of the following cable bending strength test.

Cable Bending Strength Test: Add a load of 4.9 N (500 gf) to the cable. Flex the cable 60° in both directions 700 times.
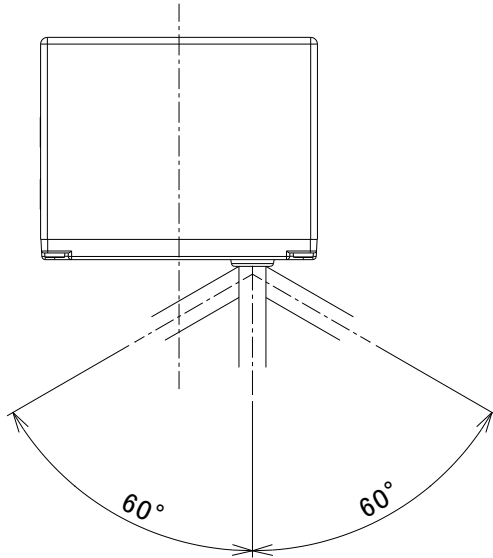
Figure 23: Cable Bending Strength

11.8   Vibration Tolerance

11.8.1   Vibration Tolerance of the Imager Scanner

The imager scanner is designed to withstand the conditions of the following vibration test.

Vibration Test: Turn off the imager scanner. Increase the frequency of the vibration from 10 Hz to 100 Hz at a maximum acceleration of 19.6 m/s^2 (2.0 g) for 30 minutes. Repeat the process 2 times in the X-direction, Y-direction, and Z-direction.

11.8.2   Vibration Tolerance of the Imager Scanner in Packaging

The individually packaged imager scanner is designed to withstand the conditions of the following vibration test.

Vibration Test: Make sure the imager scanner is individually packaged. Increase the frequency of the vibration from 10 Hz to 100 Hz at a maximum acceleration of 19.6 m/s^2 (2.0 g) for 30 minutes. Repeat the process 2 times in the X-direction, Y-direction, and Z-direction.

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11.9   Drop Impact Tolerance

11.9.1   Drop Impact Tolerance of the Imager Scanner
The imager scanner is designed to withstand the conditions of the following drop test.

Drop test: Drop the imager scanner a total of 15 times (3 times for each position shown in the next illustration) from a height of 75 cm onto a concrete floor.
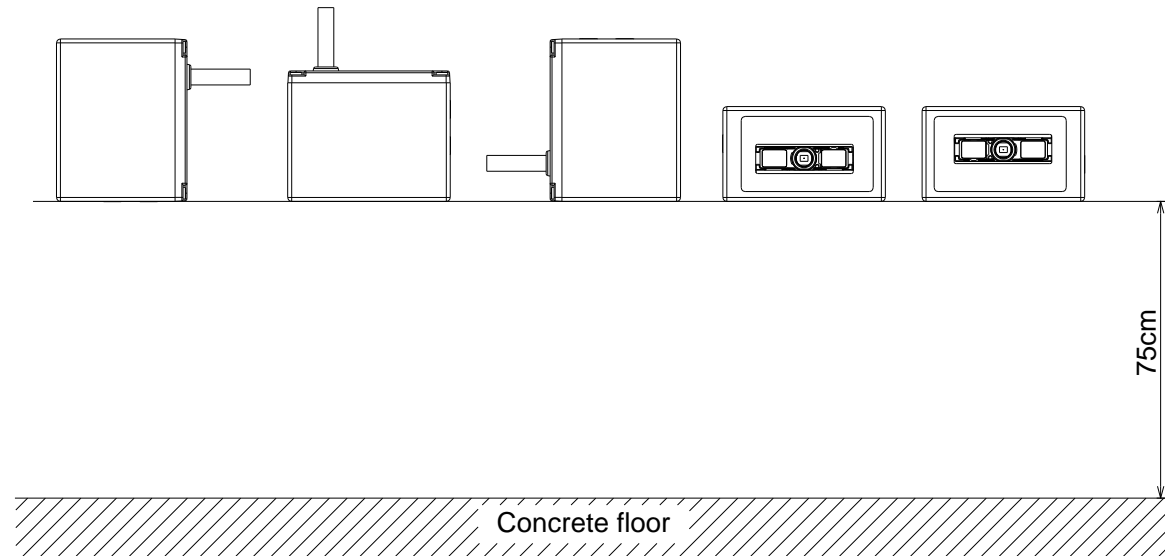
Figure 24: Drop Impact Resistance

11.9.2   Drop Impact Tolerance of the Imager Scanner in Packaging
The individually packaged imager scanner is designed to withstand the conditions of the following drop test.

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

11.10 Electrostatic Discharge Immunity
The Electrostatic Discharge Immunity Test method is compliant with IEC-61000-4-2. (150 pf, 330 ohm).

The imager scanner meets the electromagnetic immunity requirements for electronic equipment and can withstand these conditions:

No damage: ±15 kV (air discharge, direct)

No malfunction: ±8 kV (air discharge, direct)
                   ±6 kV (contact discharge, direct / indirect)

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11.11 Radio Frequency Electromagnetic Field Amplitude Modulation

The Radio Frequency Electromagnetic Field Amplitude Modulation Test is compliant with IEC-61000-4-3.

Radio Frequency Electromagnetic Field Amplitude Modulation

Condition	Description
Frequency	80 to 1000 MHz
Level	3 V/m
AM	80% (AM)

11.12 Power Frequency Magnetic Field

The Power Frequency Magnetic Field Test is compliant with IEC-61000-4-8.

Power Frequency Magnetic Field

Condition	Description
Frequency	50 and 60 Hz
Level	3 A/m

12 Regulatory Compliance

12.1 LED Safety

For warm white LED and green LED: IEC 62471:2006 Exempt Risk Group

12.2 EMC

EN55032 EN55024 Class B

FCC Part 15 Subpart B Class B

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

VCCI-CISPR 32:2016 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.

European Conformity: CE Marking

13 RoHS

The NLV-5201 is compliant with RoHS.

RoHS Directive

The restriction of the use of certain hazardous substances in electrical and electronic equipment, 2011/65/EU.

14 Reliability

The imager scanner will perform reliably if it is operated under normal operating conditions in the range of advised operating temperature and humidity without excessive electrical or mechanical shock.

MTBF (Mean Time Between Failures): 50,000 hours

15 Precautions

Caution: Make sure you understand these precautions before you install and use the imager scanner. Incorrect handling may cause the imager scanner to malfunction, overheat, create smoke, catch fire, create an electric shock, or cause injury.

General Cautions

- Do not disassemble this product.
- Do not stare into the LED light from the scan window. The LED may damage your eyes.
- Do not expose this product to edible or industrial fat and chemicals.
- Do not let children use this product.
- Be aware that this product may be affected by a momentary voltage fluctuation caused by lightning.

Electrical Handling

- If the product is faulty or stops working, unplug the cable and contact the dealer. Failure to unplug the cable may cause the product to malfunction, overheat, create smoke, or catch fire.
- Do not use this product at a voltage outside the specified range. The product may overheat, create smoke, or catch fire.
- For the RS-232C model, do not plug or unplug the connectors while power is supplied.
- Read the specification manual carefully and make sure you correctly connect the cable.

Excessive Shock or Stress

- Do not drop this product.
- Do not push or place this product under or between heavy items.
- Do not swing the product by the cable. This action may damage the product or cause injury.

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Cable Handling

- If the cable sheath breaks or becomes damaged, the core wire may be exposed or break. The wire may also become exposed if there is damage at the base of the cable. If any of these conditions occur, unplug the cable and contact the dealer. Using the product with exposed or broken wires may cause the product to malfunction, overheat, create smoke, or catch fire.
- Do not wrap the cable around a host device, such as a PC. This action may damage the cable sheath and the core wire which may cause the product to malfunction, overheat, create smoke, or catch fire.
- Do not place the cable under or between heavy items.
- Do not bend the cable at extremely low temperatures.

Operating Environment

- Do not use this product at temperatures outside the specified range.
- Do not use this product near combustible materials (such as gas or gunpowder).
- Do not immerse this product in water or any other liquid.
- If condensation forms on the product, do not use the product. The product may malfunction. Wait until the moisture has evaporated.
- Do not store this product in dusty environments or in extremely high humidity.
- Do not store this product in extremely cold or hot environments.
- Avoid exposing this product to direct sunlight for long periods of time.
- Avoid static electricity. Do not put this product close to a radio or a TV. Excessive static electricity may cause the product to malfunction.
- Do not place this product in an unstable location.
- Keep this product away from fire and flames.
- Do not touch the imager scanner housing in direct sunlight. The housing may be hot and cause burns.
- Do not touch the imager scanner housing if the imager scanner has been in use for an extended period of time.

16 Cleaning the NLV-5201

Dust and dirt on the scan window may affect reading performance. To maintain optimum performance, you should clean the scan window and housing on a regular basis.

To clean the scan window and housing, rub gently with either a soft dry cloth or a damp cloth with mild detergent.
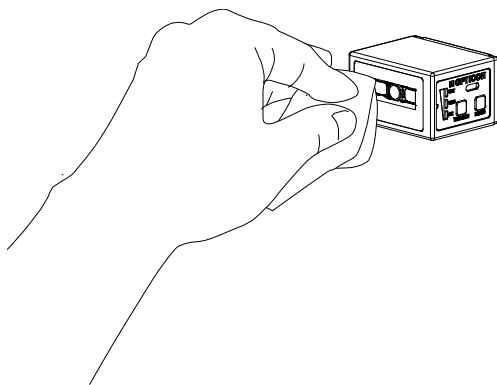
Figure 25: Cleaning the NLV-5201

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17 Product Labels

17.1 Serial Number Label

This serial number label is affixed to the NLV-5201. The serial number consists of 6 digits in the box labeled "SN".
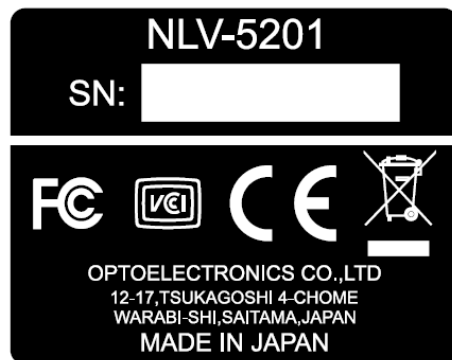
Figure 26: Serial Number Label
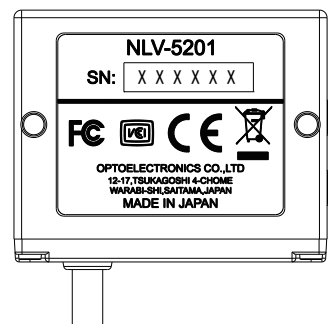
Figure 27: Serial Number Label Affixed to the NLV-5201

17.2 Address Label

Per European EMC directive 2014/30/EU, this address label is affixed to the NLV-5201.

Figure 28: Address Label
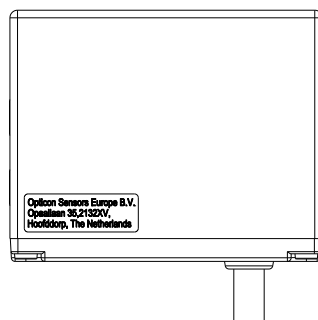
Figure 29: Address Label Affixed to the NLV-5201

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18 Packaging Specifications

Note: The "RO" mark labelled 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 mark does not have any legal weight in the European Union.

18.1   Individual Packaging Specification

These packaging specifications only apply to the USB model.

Outer dimensions are approximately W: 240 mm, D: 110 mm, H: 37 mm

Weight is approximately: 185 g
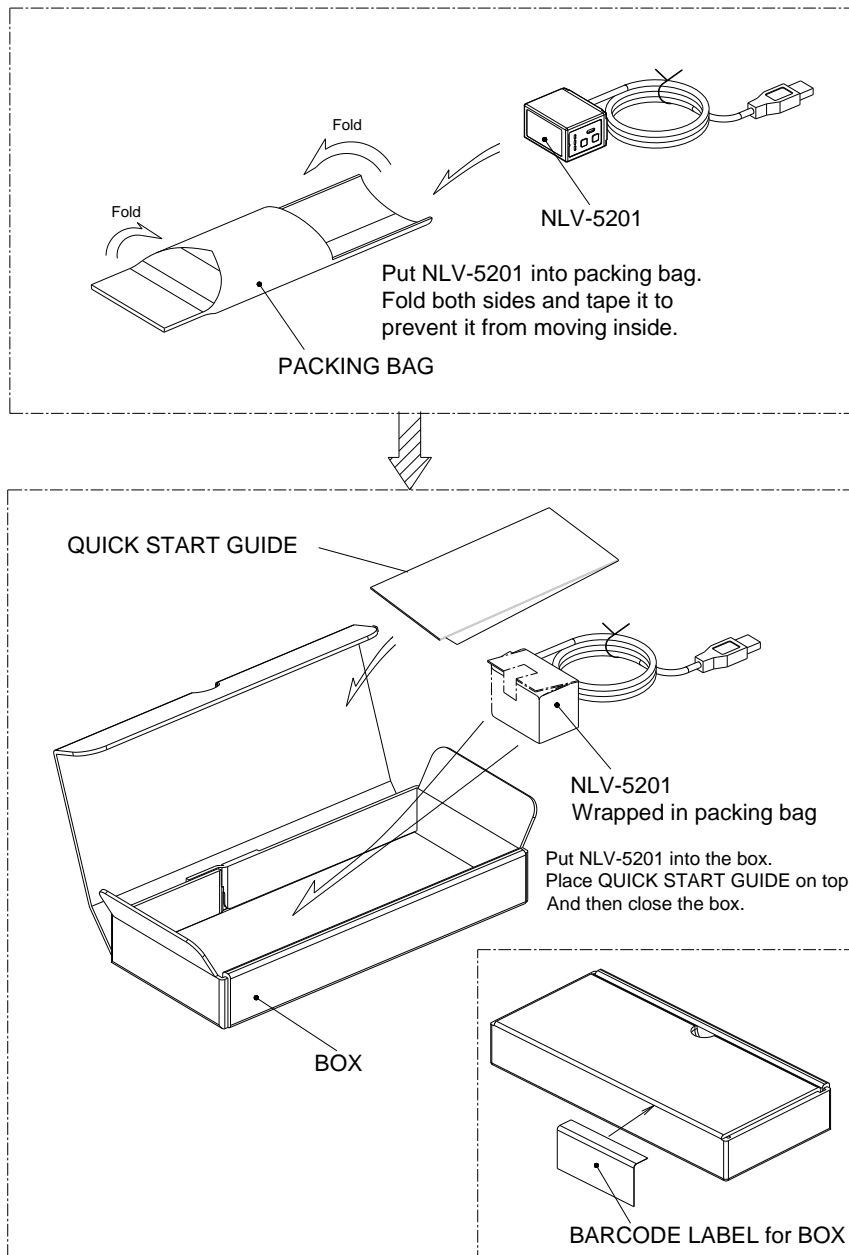
Figure 30: Individual Packaging (USB Model, Only)

18.2   Collective Packaging Specification

Carton box: 50 pieces, NLV-5201

Assembled package size is approximately W: 575 mm × D: 505 mm × H: 200 mm

Weight is approximately: 10 kg

Put the box to the carton box in this direction.
1 step 10 sets x 5 steps (50 sets)

CARTON BOX

Missing Serial Label x 2
Stick the labels on both front and back side of the carton box.

Barcode Serial Label x 2
Stick the labels on both front and back side of the carton box.

*Seal the bottom and top with "H" taping.
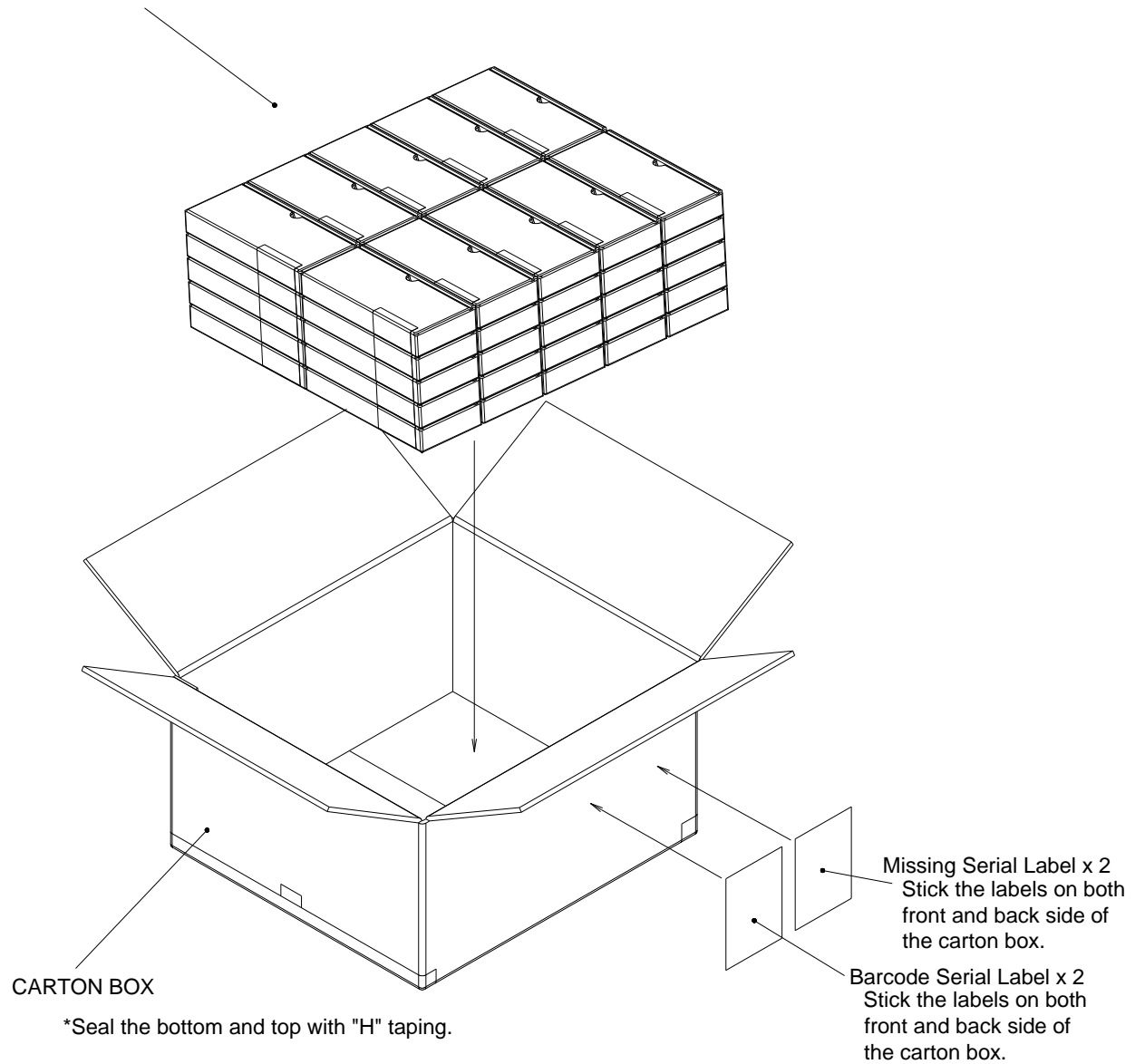
Figure 31: Collective Packaging

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19 Mechanical Drawing

Imaging Lens

Aiming Lens

13.11

Illumination LED Lens

Plastic Mask

Mounting Holes
M3 Depth 3.5

Status LED

41.1

18.8

2.6

35.9

11

33

15

NLV-5201

SN: X X X X X X

Trigger Key

Mode Key

Buzzer Holes

Mounting Holes
M3 Depth 3.5

8

24

12

10.9

[Unit: mm]
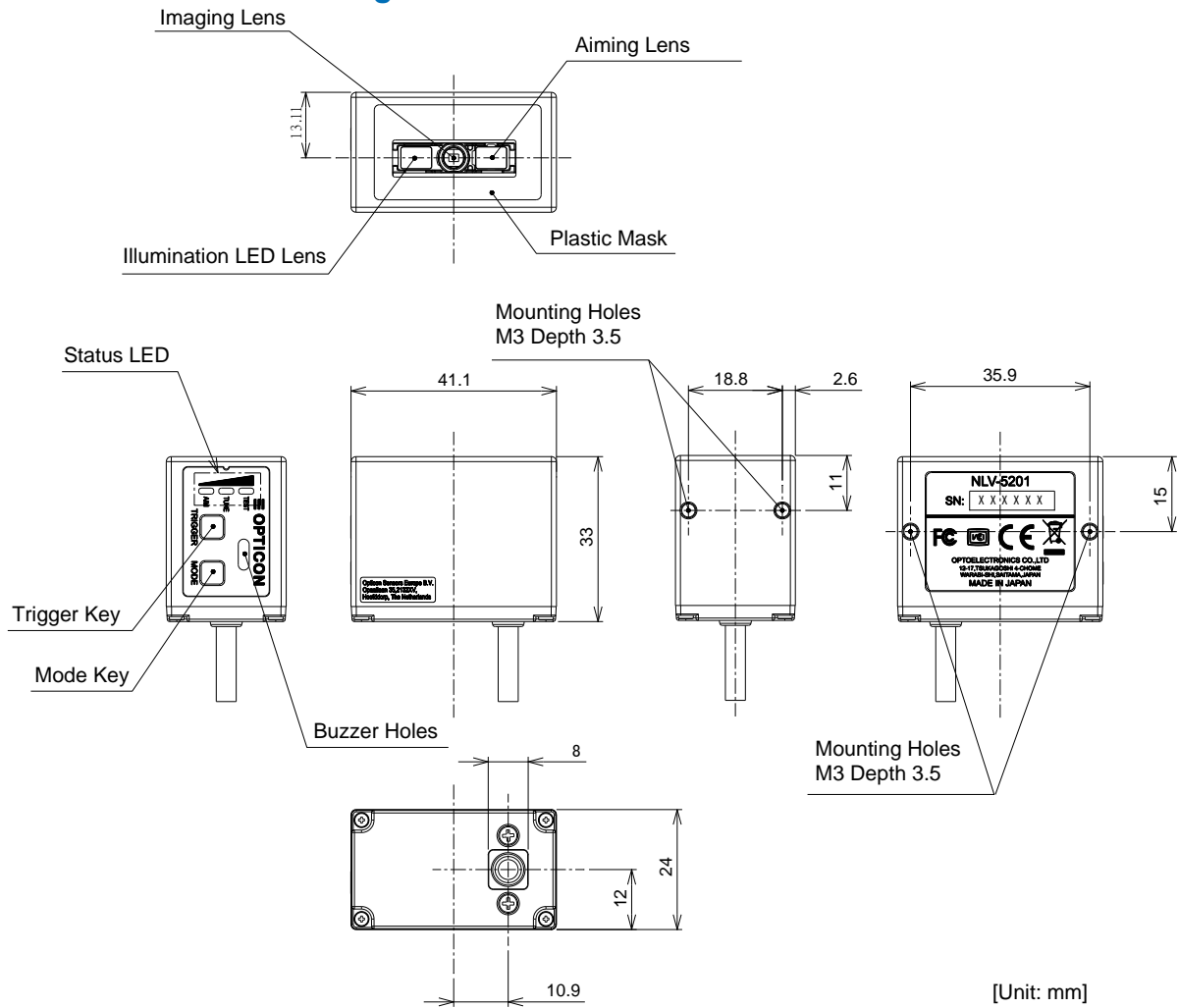
Figure 32: Mechanical Drawing

20 Default Factory Settings

20.1 Barcode Default Settings

20.1.1 1D Barcode Default Settings

Only positive image 1D barcodes can be decoded. These suffix values are supported:

- USB-HID: "ENTER"
- USB-COM/RS-232C: "CR"

1D Barcode Default Settings

Symbology	Enabled	Tuning	Minimum Digits	Start/Stop Transmission	Check Digit
UPC*	✓	✓	N/A	N/A	✓
UPC-A	✓	✓	N/A	N/A	✓
UPC-E	✓	✓	N/A	N/A	✓
EAN/JAN*	✓	✓	N/A	N/A	✓
EAN/JAN-13	✓	✓	N/A	N/A	✓
EAN/JAN-8	✓	✓	N/A	N/A	✓
Code 39	✓	✓	1	✘	✘
Codabar (NW-7)	✓	✓	2	✘	✘
Industrial 2 of 5	✓	✓	5	N/A	✘
Interleaved 2 of 5	✓	✓	6	N/A	✘
S-Code	✘	✓	5	N/A	N/A
Code 128	✓	✓	1	N/A	✓
Code 93	✓	✓	1	N/A	N/A
IATA	✘	✓	5	N/A	✘
MSI/Plessey	✘	✓	3	N/A	✓
UK/Plessey	✘	✓	2	N/A	✓
Telepen	✘	✓	1	N/A	✓
Code 11	✘	✓	1	N/A	✓
Matrix 2 of 5	✘	✓	5	N/A	✘

*   By default, the add-on setting is not supported.

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20.1.2 Postal Code Default Settings

These suffix values are supported:

- USB-HID: "ENTER"
- USB-COM/RS-232C: "CR"

Postal Code Default Settings

Symbology	Enabled	Minimum Digits
Chinese Post Matrix 2 of 5	✖	N/A
Korean Postal Authority	✖	N/A
Intelligent Mail Barcode	✖	N/A
POSTNET	✖	N/A
PLANET	✖	N/A
Japan Postal	✖	N/A
Netherland KIX Code	✖	N/A
UK Postal (Royal mail)	✖	N/A
Australian Postal Code	✖	N/A

20.1.3 GS1 DataBar Default Settings

These suffix values are supported:

- USB-HID: "ENTER"
- USB-COM/RS-232C: "CR"

GS1 DataBar Default Settings

Symbology	Enabled
[GS1 DataBar] 　　GS1 DataBar Omnidirectional 　　GS1 DataBar Truncated 　　GS1 DataBar Stacked 　　GS1 DataBar Stacked Omnidirectional	✓
[GS1 DataBar Limited] 　　GS1 DataBar Limited	✓
[GS1 DataBar Expanded] 　　GS1 DataBar Expanded 　　GS1 DataBar Expanded Stacked	✓

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20.1.4 Composite GS1 Default Settings
These suffix values are supported:

- USB-HID: "ENTER"
- USB-COM/RS-232C: "CR"

Composite GS1 Default Settings

Symbology	Enabled
[Composite GS1 DataBar] 　　CC-A 　　CC-B 　　Limited CC-A 　　Limited CC-B 　　Expanded CC-A 　　Expanded CC-B	✓
[Composite GS1-128] 　　CC-A 　　CC-B 　　CC-C	✓
[Composite EAN] 　　EAN-13 CC-A 　　EAN-13 CC-B 　　EAN-8 CC-A 　　EAN-8 CC-B	✖
[Composite UPC] 　　UPC-A CC-A 　　UPC-A CC-B 　　UPC-E CC-A 　　UPC-E CC-B	✖

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20.1.5   2D Barcode Default Settings

These suffix values are supported:

- USB-HID: "ENTER"
- USB-COM/RS-232C: "CR"

2D Barcode Default Settings

Symbology	Enabled	Tuning	Positive/Negative Image	Mirroring
PDF417	✓	✓	Positive	N/A
Micro PDF417	✗	✓	Positive	N/A
Codablock F*	✗	N/A	N/A	N/A
QR code	✓	✓	Positive and Negative	✓
Micro QR code	✓	✓	Positive and Negative	✓
Data Matrix (ECC 200)	✓	✓	Positive and Negative	✓
Aztec Code	✓	N/A	N/A	N/A
Aztec Runes	✗	N/A	N/A	N/A
Chinese-sensible code	✗	N/A	N/A	N/A
Maxi Code	✗	N/A	N/A	N/A

*   If you enable Codablock F, disable Code 128.

20.1.6   OCR Font Default Settings

Optical Character Recognition (OCR) fonts are used for International Civil Aviation Organization (ICAO) travel documents. Because the format is fixed, ICAO travel documents can be read regardless of the image direction.

These suffix values are supported:

- USB-HID: "ENTER"
- USB-COM/RS-232C: "CR"

OCR Font Document Default Settings

Document	Enabled
Machine readable Passports	✗
Machine readable Visa-A	✗
Machine readable Visa-B	✗
Official Travel Documents 1	✗
Official Travel Documents 2	✗

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20.2   Read, Trigger, and Buzzer Default Settings

Parameter	Default Setting
Read Mode	Single read
Read Effective Time	Trigger synchronized
Buzzer Duration	100 ms
Good Read Buzzer Tone	3000 Hz
Start-Up Buzzer	Enable
Buzzer Loudness	Maximum
Buzzer Timing	Before data transmission
Good Read Indicator Color	Green
Good Read LED Indicator Duration	200 ms
Data Buffering*	Buffered mode

*   Data buffering transfers the next piece of data that is read during the read data transfering process. Depending on the host system, output data may be lost.

20.3   Interface Communication Default Settings

20.3.1   RS-232C Default Settings

Parameter	Default Setting
Baud Rate	9600 bps
Parity Bits	No parity
Data Bits	8 bits
Stop Bits	1 bit
Handshaking	No handshake
ACK/NAK	Disabled
CTS Time Out	Indefinitely
ACK/NAK Time Out	1 second
Command Header	ESC or STX
Command Terminator	CR or ETX
Response to Commands	Disabled

20.3.2   USB Default Settings

Parameter	Default Setting
Keyboard Language	USA (USB-HID)
Send "new line key "after data	Enabled
Send "TAB key" after data	Disabled
Send "→ key" after data	Disabled
Other	CDC-ACM compliant (USB-COM)*

*   To use USB-COM, you need to install the latest version of the Opticon USB-COM driver on your host device.

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