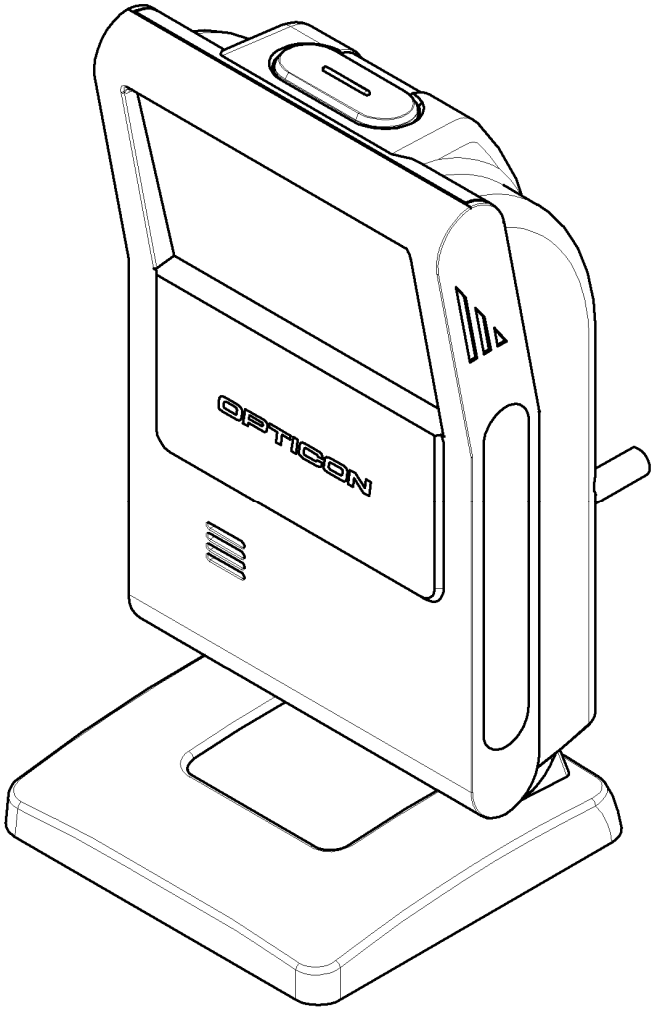
OPTICON

Hands-free presentation
Imager Scanner

M-10



This manual provides specifications for the M-10 hands-free presentation imager scanner.

Specifications Manual

All information subject to change without notice.

Document History

Model Number:	**M-10**	**Specification Number:**	**SS13063**
Edition:	**1st**	**Original Spec Number:**	**SS13062**
Date:	**2014-05-26**		

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Revision History

Specification No. : SS13063
Product name : M-10

Edition	Date	Page	Section	Description of Changes
1st	2014/05/26	-	-	Initial release

Contents

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1. Abstract

This manual provides specifications for the M-10 hands-free presentation imager scanner.

2. Overview

The M-10 is a hands-free imager scanner that enables high speed presentation scanning of standard linear (1D) and 2D symbologies. Main features of the M-10 are as follows:

- **Comfortable reading**
  The scanner ensures extremely high-speed and stress-free reading just by presenting a target code in front of it. It is also capable of fast response without being affected by hand movement and a light or dark environment.

- **Compact and stylish design**
  Stylish, ultra-compact and space-saving design that easily fits any desk, work space or retail counter. The scanner can be tilted forward up to 60 degrees that allows a user to scan a code in various ways.

- **Aiming**
  A single green LED aiming line that is emitted during code detection and scanning can help the uses find the position where a target code should be presented.

- **Handheld scanning**
  The scanner also can be used as a handheld scanner by using a trigger switch at the head of scanner. Its thin and lightweight body (approx. 250 g) makes it easy to hold and reduce the physical burden on the users.

- **Editing function**
  A new function “Data Editing Program” captures up to 16 codes on multiple images simultaneously in one go. Output editing process, such as GS1 format, also can be set easily.

- **Reading from LCD screen**
  The scanner can read 1D and 2D codes displayed on LCD screens.

- **Various interfaces**
  Three types of interfaces, USB-HID, USB-COM and RS-232C, are supported.

- **RoHS compliance**
  The M-10 is a RoHS compliant product.

Note: Refer to “M-10 User’s Manual” for supported codes and commands.

3. Basic Specifications

Item			Specification		Note
Control Section	CPU		32-bit RISC		
	SDRAM		256 M bits (2 M × 4 Banks × 32 Bits)		
	Flash ROM		16 M bits (1 M × 16 Bits) Flash Memory		
Interface	RS-232C		300 bps ~ 115200 bps		Default :9600bps
	USB		USB2.0 Full Speed 12 Mbps (HID/COM)		
Optical Section	Scanning method		WVGA CMOS Area sensor (Mono)		Frame rate: 60 fps
	Scanning light source		2 Red LEDs		LED Reflector
	Aiming and auto trigger activation light source		1 Green LED		
	Effective pixels		0.36 million pixels (H: 752 x V: 480)		
	Field of view (Vertical x Horizontal)		0 mm : 48 x 31 mm 50 mm : 85 x 54 mm 100 mm :122 x 78 mm 150 mm :165 x 105 mm		Typical Value
	View angle		Horizontal : about 40.6° Vertical : about 26.4°		
Supported 1D Symbologies	Symbologies	1D	UPC-A, UPC-E, UPC-E1, UPC-A Add-on , UPC-E Add-on, EAN-13, EAN-8, EAN-13 Add-on/EAN-8 Add-on, JAN-8, JAN-13, Code 39, Tri-Optic, NW-7, Industrial 2 of 5, Interleaved 2 of 5, Code 93, Code 128, GS1-128, S-Code, MSI/Plessey, UK/Plessey, TELEPEN, Matrix 2 of 5, IATA, Code 11,		
		Postal	Intelligent Mail Barcode, POSTNET, PLANET, Netherlands KIX Code, UK Postal (Royal mail), Australian Postal, Japanese Postal, Korean Postal Authority code, Chinese Post Matrix 2 of 5		
	Minimum resolution		Code 39 : 0.127 mm		PCS 0.9
	Curvature		Radius ≧ 20 mm (12-digit 13mil UPC/EAN)		
	Wide barcode		Possible to read: Code 39 with 100 mm width and resolution 0.2mm (DOF: 95 mm)		
	Motion tolerance		Possible to read: 13mil 100%UPC/EAN moving at 2 m/s (DOF: 65 mm)		
	Depth of field (mm)	Code 39	Resolution 0.127 (5mil)	35 ~ 60	
			Resolution 0.254 (10mil)	0 ~ 140	
		Code 128	Resolution 0.2 (7.9mil)	10 ~ 120	
		100%UPC/EAN	Resolution 0.33 (13mil)	0 ~ 170	
GS1 DataBar	Symbologies		GS1 DataBar, GS1 DataBar Limited, GS1 DataBar Expanded, GS1 DataBar Composite, GS1-128 Composite, EAN Composite , UPC Composite		
	Minimum resolution (mm)		GS1 DataBar : 0.169 (6.7mil) Composite Code : 0.169 (6.7mil)		PCS 0.9

Item			Specification		Note
Supported 2D Symbologies	Symbologies		PDF417, MicroPDF417, Codablock F, QR Code , Micro QR Code, DataMatrix (ECC 0 - 140 / ECC 200), MaxiCode, Aztec Code, Chinese Sensible Code		Disable Code 128 when Codablock F is enabled.
	Minimum resolution (mm)		PDF417 : 0.169 (6.7mil) QR Code : 0.169 (6.7mil) DataMatrix : 0.212 (8.4mil)		PCS 0.9
	Depth of field (mm)	PDF417	Resolution (0.169)	25 ~ 70	
			Resolution (0.254)	0 ~ 120	
		QR Code	Resolution (0.212)	35 ~ 55	
			Resolution (0.381)	0 ~ 120	
		DataMatrix	Resolution (0.254)	30 ~ 85	
Common	Scan angle		Pitch : ±50°		
			Skew : ±50°		
			Tilt : 360°		
	Minimum PCS		0.3 or more		MRD: 32% or more
Imager	Image data format		Windows Bitmap, JPEG		Black spot may appear on image, however, it does not affect the scanning performance.
	Shades of gray		1024, 256, 16, 2		
	Range of output image		Select top/bottom (row) and left/right (column)		
	Resolution of output image		Full,1/2, 1/4		
	Interface of output image		RS-232C, USB-COM		
	Baud rate		USB-COM (Full speed)	About 3 sec	Resolution: Full
			RS-232C (Baud rate: 115.2 kbps)	About 40 sec	
Power	Range of operating voltage		4.5 ~ 5.5 V: USB 5.4 ~ 6.6 V: RS-232C (D-Sub9pin) (external power supply)		RS-232C (D-Sub9pin) External power supply: Dedicated AC adapter 6.0 V ±5%
	Current consumption (USB)		Reading Peak	420 mA (Max)	USB 5.0V
			Reading Ave.	250 mA (Typ)	
			Standby	150 mA (Typ)	
			Auto trigger sleep	110 mA (Typ)	
			Non Operation	48 mA (Typ)	
Environmental Specifications	Temperature	Operating	0 ~ 40°C		AC adapter: 0 ~ 40°C
		Storage	-40 ~ 70°C		
	Humidity	Operating	5 ~ 90% (no condensing, no frost)		
		Storage	5 ~ 90% (no condensing, no frost)		
	Ambient light immunity	Fluorescent	10,000 lx or less		
		Sunlight	100,000 lx or less		
	Vibration		10 Hz ~ 100 Hz, acceleration of 19.6 m/s2, 60 minutes per cycle, repeat once in each X, Y and Z-direction		
	Drop		Drop 3 times, at each 5 faces (right, left, front, back and top), from a height of 1.5 m onto a concrete surface.		* Excluding the part where the interface cable is attached
	Dust & Water Proof Grade		IEC/EN 60529 protection level :IP 52		

Item			Specification	Note
Regulatory	LED safety		IEC 62471-1:2006 Exempt Risk Group	Peak Wavelength: 624 nm
	EMI/RFI		VCCI / EN55022 / FCC Class-B	For residential, commercial and light-industrial environments
	Product safety		CE Marking	
	Electromagnetic compatibility (EMC)		EN55024 (EN61000-6-1) Class-B	For residential, commercial and light-industrial environments
Immunity Test	ESD immunity	No destruction	15 kV (Apply static electricity 50 times to the surface of the scanner)	Condition: IEC:61000-4-2 compliant
		No malfunction	Contact discharge (direct / indirect): ±6 kV Air discharge (direct):±8 kV	
	Radio-frequency electromagnetic field. Amplitude modulation	Frequency	80 ~ 1000 MHz	Condition: IEC61000-4-3 compliant
		Level	3 V/m	
		AM	80% (AM)	
	Fast transient	Voltage	Alternating-current input cable: ±1 kV	Condition: IEC61000-4-4 compliant
		Pulse	5 / 50 ns (Tr / Tw)	
		Frequency	5 kHz	
	Surge	Pulse	1.2 / 50 ns (Tr / Th)	Condition: IEC61000-4-5 compliant
		Voltage	From L to P : ±2 kV (closed-loop voltage)	
			From L to L : ±1 kV (closed-loop voltage)	
	Radio-frequency common mode	Frequency	0.15 ~ 80 MHz	Condition: IEC61000-4-6 compliant
		Level	3 V	
		AM	80% (AM)	
	Power frequency magnetic field	Frequency	50 and 60 Hz	Condition: IEC61000-4-8 compliant
		Level	3 A/m	
	Voltage dip, momentary voltage drop, fluctuation	Dip 1	Drop 30%, 0.5 cycles	Condition: IEC61000-4-11 compliant
		Dip 2	Drop 60%, 5 cycles	
		Momentary drop	Drop > 95%, 250 cycles	
Physical Features	Dimensions		72 × 70 × 139 (WDH mm)	
	Weight		Approx. 250g	Excluding the interface cable
External Power Supply	Model name		SFP0602000P-PSE	Accessories: conversion plug
	Input	Voltage range	AC 90 ~ 265 V	
		Supply current	0.5 A (max)	
	Output	Voltage range	5.7 ~ 6.3 V	
		Maximum current	2.0 A (max)	

4. Detailed View

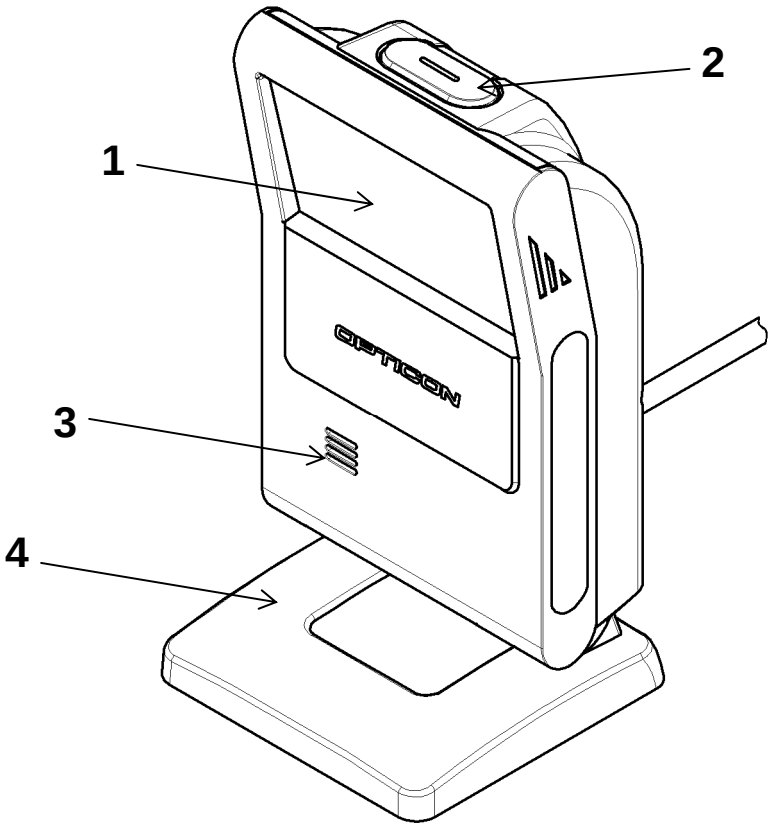


Figure 1: Detailed View of M-10

No	Name	Description
1	Scan Window	A window to which codes are presented.
2	Trigger Switch	A trigger switch to read codes for use as a handheld scanner 1. Press the trigger switch once, then a green single aiming line lights up. 2. Position the single aiming line over the code and press the trigger switch again to start reading.
	Status LED	The operating statuses are indicated by blue color different brightness. Light blue: Indicates the scanner being in standby state. Bright blue: indicates a successful read of codes
3	Buzzer Holes	Holes through where a sound comes out from a built-in buzzer.
4	Stand	Stands to adjust the angle of the scanner. Adjustable range: Forward:60°Backward: 15°

5. State Transition

5.1. State Transition

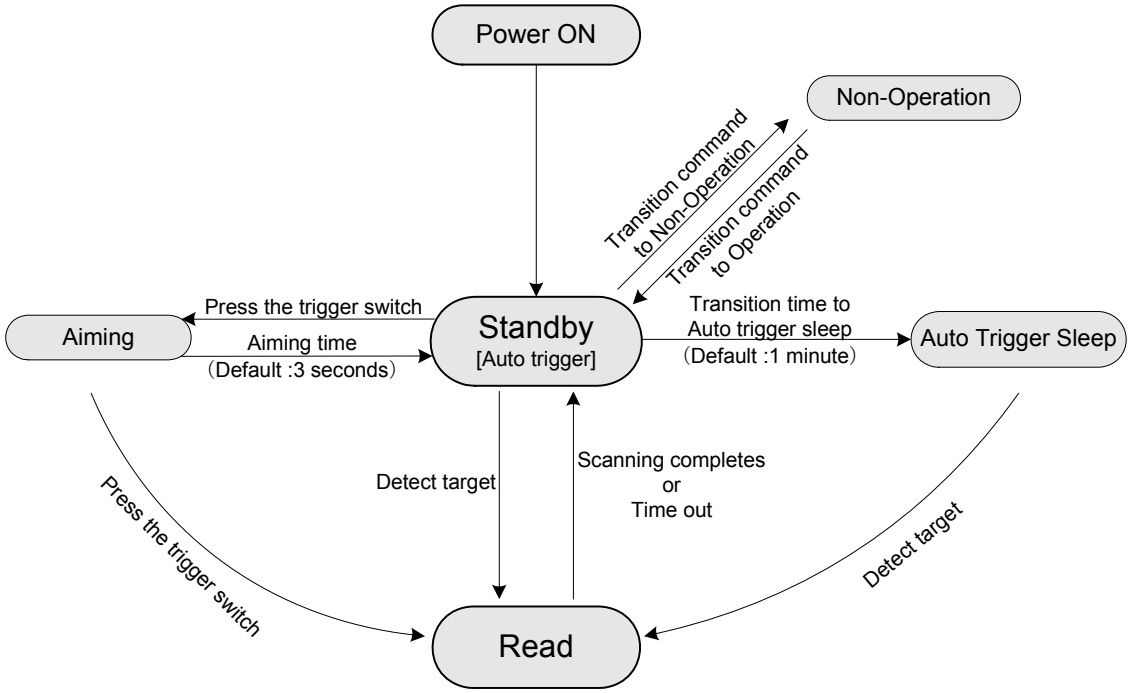


Figure 2: State Transition

- Read
  The scanner is reading a code with red illumination turned on.
- Standby
  The scanner is detecting a target code with green aiming light turned on. The scanner starts reading when the code is presented in front of it.
- Auto Trigger Sleep
  The scanner detects a target code with green aiming light turned off. The green aiming light may turn on temporarily when there is a change in the background. The green aiming light turns on in a dark place.
- Aiming
  A single line of bright green aiming light is turned on by pressing the trigger switch. When the aiming line is positioned over the target code and the trigger switch is pressed again, the scanner starts reading the code.
- Non-operation
  The scanner does not perform the reading operation. This mode is supported only when the command communications (USB-COM or RS-232C) are available.

5.2. Current Consumption

USB :5V, T=25°C

Item	Conditions	Min.	Typ.	Max.	Unit
Read current	-	-	250	420	mA
Standby current	-	-	150		mA
Auto trigger sleep current	Configured (default: 1 min)	-	110		mA
Non-Operation current	Configured	-	48		mA

Note: Refer to “M-10 User’s Manual” for supported operation and commands.

6. Electrical Specifications

6.1. USB Power Supply

Power supply	: 500 mA High-Power
Current consumption	: 420 mA (max) during reading operation
	: 150 mA (typ) in standby

* The current consumption was measured at 25°C.

6.2. AC Adapter Specifications

For RS-232C (D-Sub 9pin) model

6.2.1. Input Specifications

Power supply voltage	: AC 90 ~ 265 V
Power supply frequency	: 47 ~ 63 Hz
Maximum current	: 0.5 A (max)

6.2.2. Input Specifications

Output voltage	: 6.0 V ±5% / Output current: 0 ~ 2.0 A (max)
Power ripple	: 100 mV p-p (max, rated load)

7. Interface Specifications

The M-10 supports four types of interfaces; USB-HID, USB-COM and RS-232C.

7.1. USB

The USB interface models have two specifications: HID (Human Interface Device Class) and COM (Communication Device Class). With USB-COM model, VCP (Virtual Communication Port) allows virtual serial communication and the commands can be transmitted from the host computer.
* Multi byte character data or images can be transmitted via USB-COM interface.

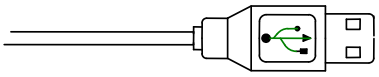
7.1.1. USB Interface Specifications

Power supply	: 500mA (High-Power).
Speed	: USB2.0 Full speed (12 Mbps)
Interface	: USB-HID / USB-COM (VCP)

* The USB model is bus powered and no AC adapter is required.
* Images cannot be transmitted via the USB-HID interface.
* Multi byte character data can be transmitted via USB-HID interface with settings.
* Make sure to connect to a High-power bus (500 mA max) USB terminal.

7.1.2. USB Connector

Pin No.	Signal name
1	V bus
2	Data (−)
3	Data (＋)
4	GND



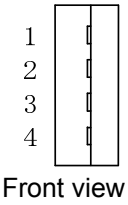


Figure 3: USB Plug (A)

7.1.3. USB Interface Circuit

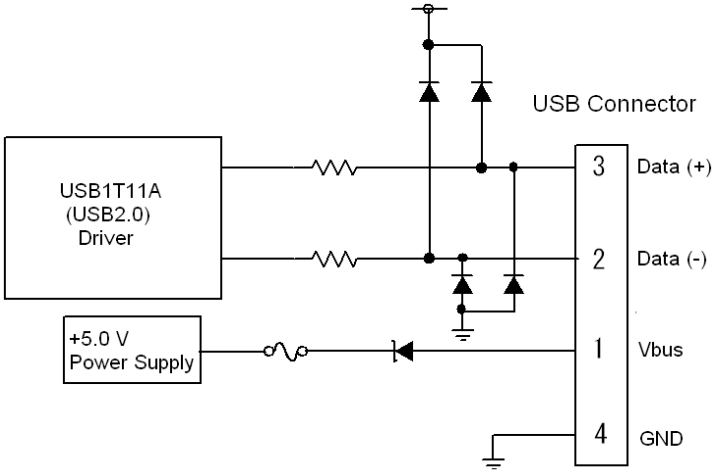


Figure 4: Interface Circuit (USB)

7.1.4. USB Interface Cable

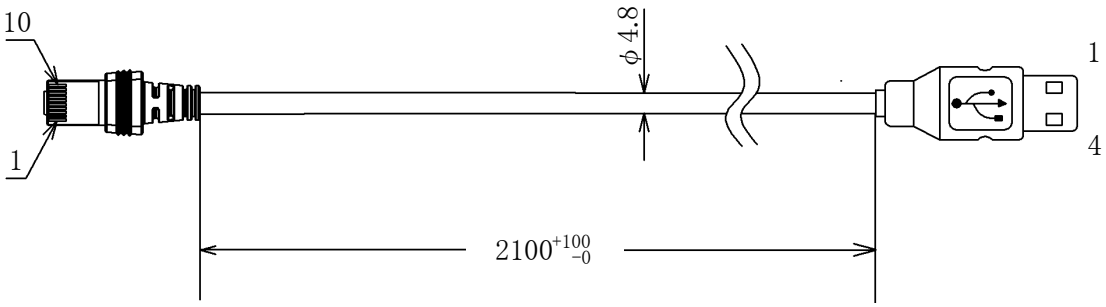


Figure 5: USB Interface Cable

7.2. RS-232C

The RS-232C interface has a specification for connecting to the host: D-Sub9pin.

7.2.1. Communication setting

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

* Multi byte character data or images can be transmitted via RS-232C interface.

7.2.2. Signal Level

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

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

7.2.3. D-Sub9pin Assignment

Pin No.	Signal Name	Note
1	(NC)	NC
2	TxD	
3	RxD	
4	-	Connect to pin 6
5	GND	
6	-	Connect to pin 4
7	CTS	
8	RTS	
9	(NC)	NC
Case	FG	Shield

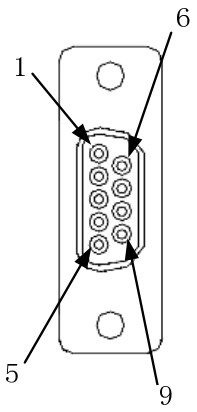


Figure 6: RS-232C D-Sub9pin Connector

7.2.4. D-Sub9pin Assignment

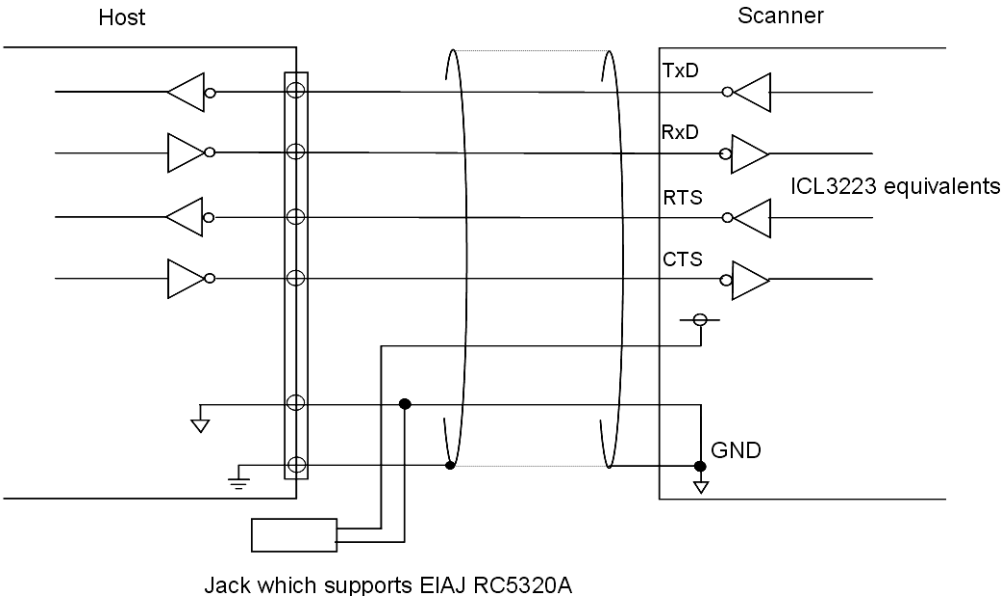


Figure 7: RS-232C D-Sub 9pin Circuit

Connector : D-Sub 9pin, female
Power supply : EIAJ RC5320A (voltage classification 2) jack

7.2.5. RS-232C Cable

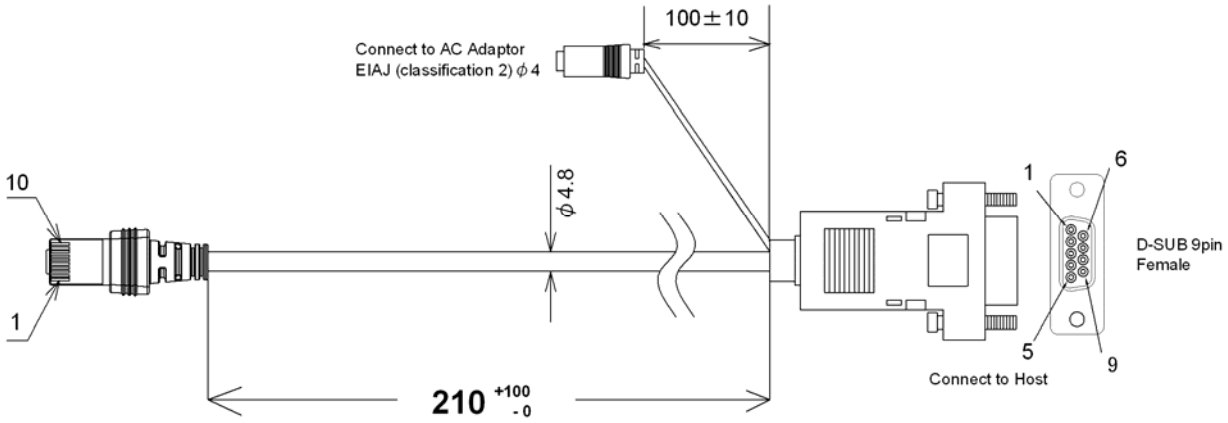


Figure 8: Cable (RS-232C D-Sub 9pin)

8. Optical Specifications

8.1. Basic Optical Specifications

Item		Characteristics
Scan method	CMOS area sensor	Monochrome
Effective pixels	(Column) × (Row)	752 × 480 (WVGA)
Image capture speed	Frame rate (*1)	60 fps
Focal distance	Distance from the front edge of scanner	65 mm
View angle	Horizontal	Approx. 40.6°
	Vertical	Approx. 26.4°
Light source for illumination (LED × 2 with reflector)	Red LED	-
	Peak wavelength	617 nm
	Maximum radiation output (*3)	15000 mcd
Light source for aiming and auto trigger activation (LED × 1)	Green LED	-
	Peak wavelength	528 nm
	Maximum radiation output (*4)	18700 mcd

*1 The fastest seed of image capture
*2, *3 Reference value based on the datasheet (25°C, IF = 50 mA).

8.2. Aiming Pattern

The aiming is used for the following purpose:
1. Light source to indicate the appropriate reading range
2. Light source for auto trigger operation

The aiming specifications are as follows:
- An optical axis of imaging field of view and the center of horizontal aiming width coincide at a distance of L=50±20 mm from the front edge of the scanner.
- The horizontal aiming width to the horizontal width of imaging filed of view at a distance of L=60 mm is 80%±10%.

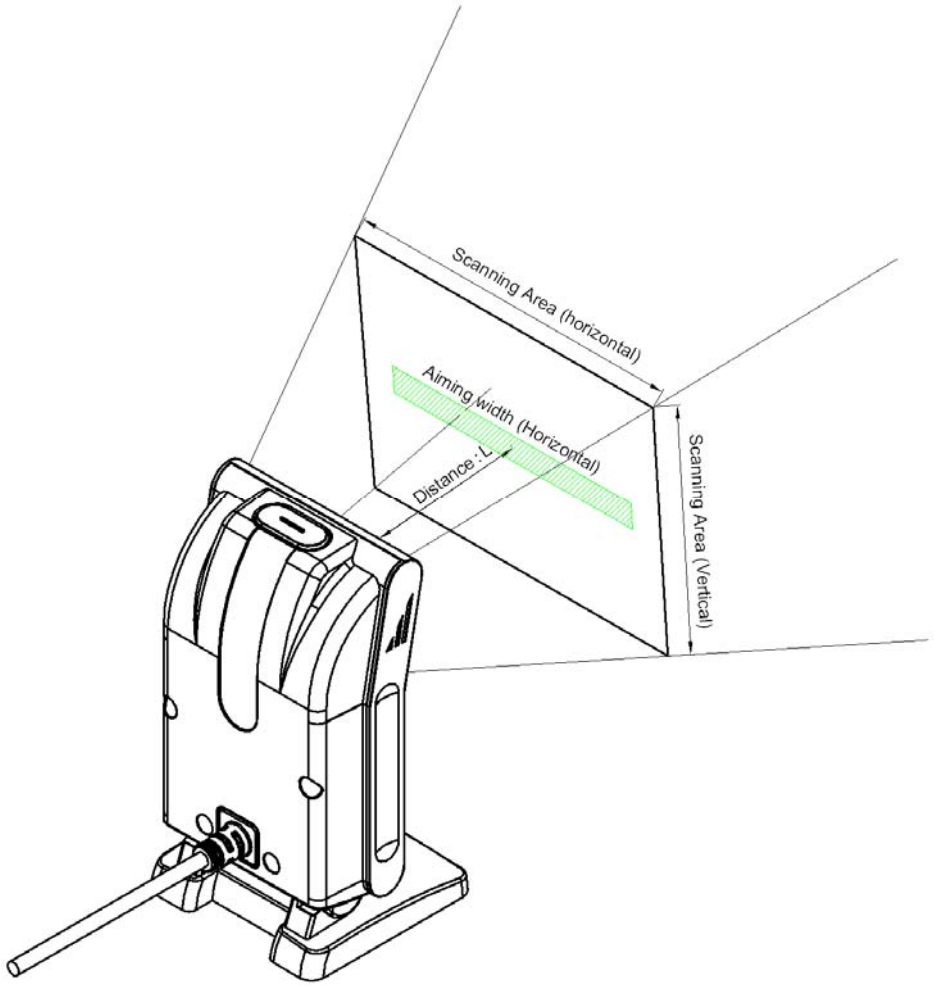


Figure 9: Aiming Pattern and Imaging Range

8.3. Scanning Area

The range is ±5% from the following values.

L: Distance from the front edge of scanner	[mm]	0	50	100	150
H: Horizontal reading area	[mm]	48	85	122	165
V: Vertical reading area	[mm]	31	54	78	105

9. Technical Specifications

Code reading is performed by positioning the aiming light over the center of a code. The conditions for technical specifications are as follows, unless otherwise specified in each section.

<Conditions>

Temperature and humidity	: Room temperature and room humidity
Ambient light	: 100 ~200 lx (on the surface of a barcode)
Pitch angle	: α= 0°
Skew angle	: β = 15°
Tilt angle	: γ = 0°
Curvature	: R = ∞
Power supply voltage	: 3.3 and 5.0 V
PCS (1D and 2D)	: 0.9 or higher
Reading test	: 1 read in 2 seconds or less. Accept the performance with 90% or more success rate for 10 readings.
Barcode test sample (1D and 2D)	: Specified below

<Barcode test sample>

1D codes	OPTOELECTRONICS test samples
GS1 Databar, stacked codes, 2D codes	Labels printed by a dedicated printer for barcode

9.1. Code Test Sample

1 D Barcodes

<Code 39>

Resolution	Symbology	PCS	Size (mm)	No. of Digits
0.127 mm (5mil)	Code 39	0.9	32 × 10	15
0.20 mm (7.9mil)			100 × 10	31
0.254 mm (10mil)			32.5 × 10	7

<Code 128>

Resolution	Symbology	PCS	Size (mm)	No. of Digits
0.20 mm (7.9mil)	Code 128	0.9	42 × 10	16

<UPC/EAN>

Resolution	Symbology	PCS	Size (mm)	No. of Digits
0.330 mm (13mil)	100% UPC/EAN	0.9/0.3	31.5 × 25.0	12/13

GS1 Databar / Composite

<GS1-limited>

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

2 D Codes

<PDF417>

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

<QR Code: Model-2>

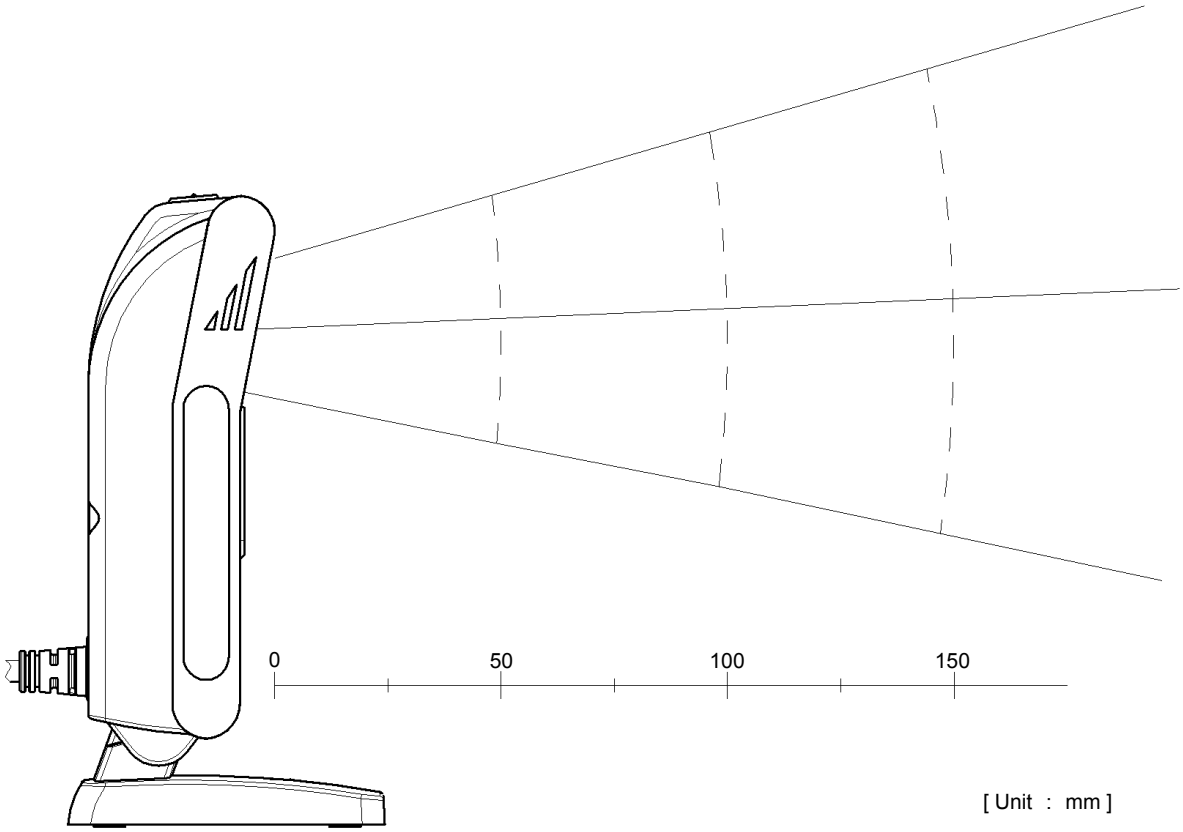
Resolution	Error Correction	PCS	Size (mm)	No. of Character
0.169 mm (6.7mil)	M	0.9	5 × 5	44
0.212 mm (8.4mil)			6 × 6	
0.381 mm (15mil)			11 × 11	

<Data Matrix>

Resolution	Model	PCS	Size (mm)	No. of Character
0.212 mm (8.4mil)	ECC200	0.9	5 × 5	40
0.254 mm (10mil)			6 × 6	

Note: The size is outline dimensions excluding quiet zone.

9.2. Scanning Area and Depth of Field



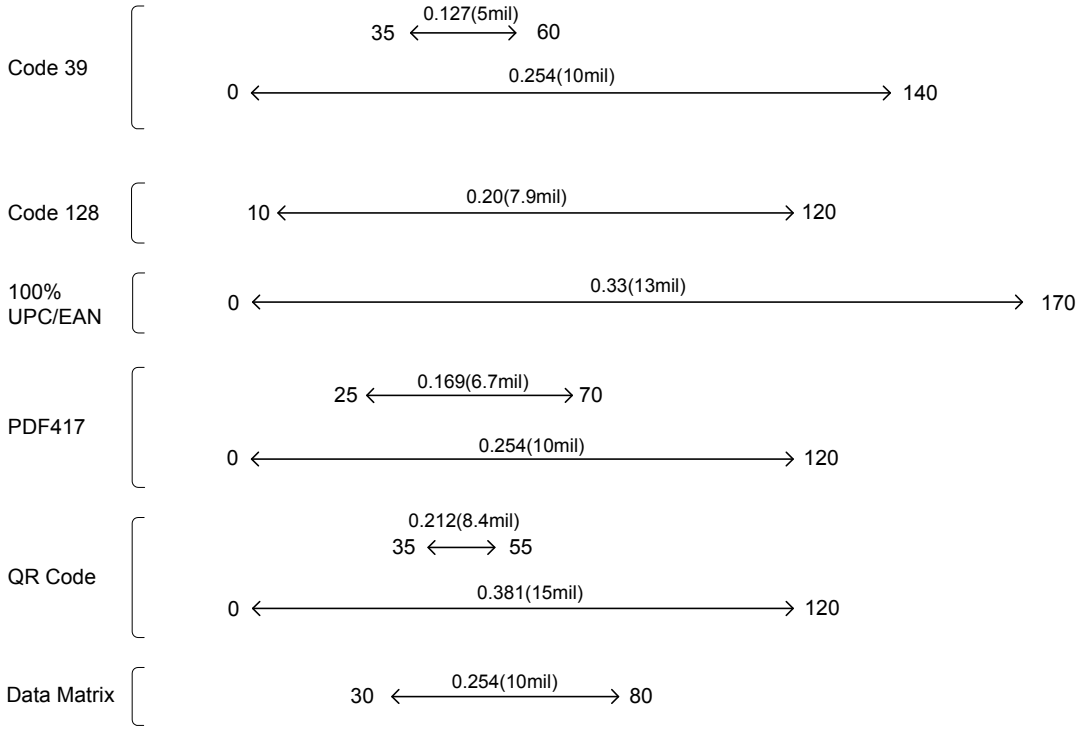


Figure 10: Scanning Area and Depth of Field

9.3. Print Contrast Signal (PCS)

PSC 0.3 or higher

<Conditions>
MRD : 32% and higher
(70% or higher reflectivity of white bar and quiet zone)
Distance : 60 mm from the front edge of the scanner
Barcode : 0.33mm PCS: 0.3 UPC/EAN specified in Section 9.1.

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

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

9.4. Minimum Resolution

1D Code : 0.127 mm (5 mil) Code 39 specified in Section 9.1
GS1-Databar : 0.169 mm (6.7 mil) GS1 Databar-Limited specified in Section 9.1
Stacked Code : 0.169 mm (6.7 mil) PDF417, GS1 Databar-Limited Composite specified in Section 9.1
2D QR Code : 0.169 mm (8.4 mil) OR Code specified in Section 9.1
2D DataMatrix : 0.212 mm (8.4 mil) Data Matrix specified in Section 9.1

<Conditions>
Barcode : The above codes specified in Section 9.1
Distance : 40 mm from the front edge of the scanner
Angle : α = 0°, β = +15°, γ = 0°
Curvature : R = ∞
For the pitch angle and tilt angle measurement, set the skew angle β = +15°

9.5. Wide Barcode

Code 39 with width of 100 mm and resolution of 0.2 mm can be read.

<Conditions>
Barcode : 0.20 mm Code 39 specified in Section 9.1
Distance : 95 mm from the front edge of the scanner
Angle : α = 0°, β = +15°, γ = 0°
Curvature : R = ∞

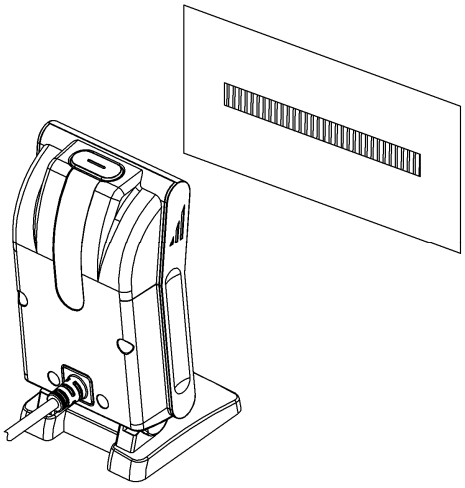


Figure 11: Wide Barcode

9.6. Pitch, Skew, and Tilt

Pitch : α = ± 50°
Skew : β = ± 50°
Tilt : γ = 360°

<Conditions>
Barcode : 0.33 mm UPC/EAN specified in Section 9.1
Distance : 65 mm from the front edge of the Scanner
Curvature : R = ∞
For the pitch angle and tilt angle measurement, set the skew angle β = +15°

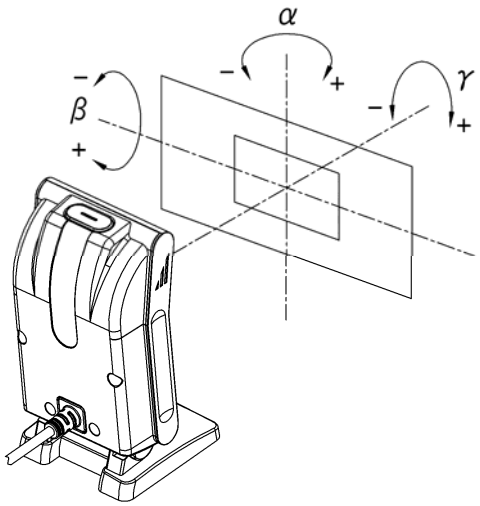


Figure 12: Pitch, Skew, and Tilt

9.7. Curvature

0.33 mm UPC/EAN : R ≧ 20 mm

<Conditions>
Barcode : 0.33 mm UPC /EAN specified in Section 9.1
Distance : 45 mm from the front edge of the scanner
Angle : α = 0°, β = ＋15°, γ = 0°

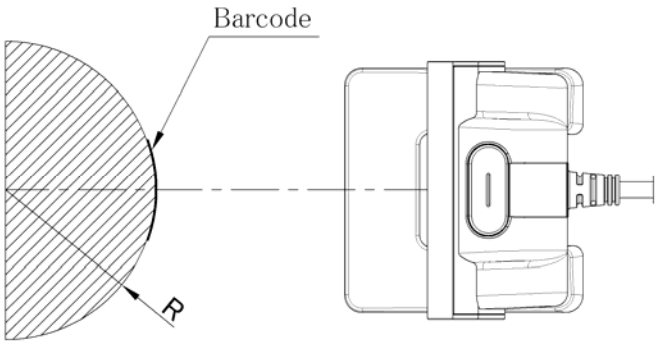


Figure 13: Curvature

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

9.8. Scanning from LCD Screen

Codes displayed on LCD screens (brightness of white part 30 cd/m2 or more, contrast ratio 100:1) can be read.

<Conditions>

Code	: Code for 0.381 mm QR Code specified in Section 9.1
Distance	: 65 mm from the front edge of the scanner
Ambient light	: 100 lx or less (on the surface of a barcode)
Angle	: α = 0°, β = ＋15°, γ = 0°
LCD screen type	: Transmissive (backlight) TFT

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

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

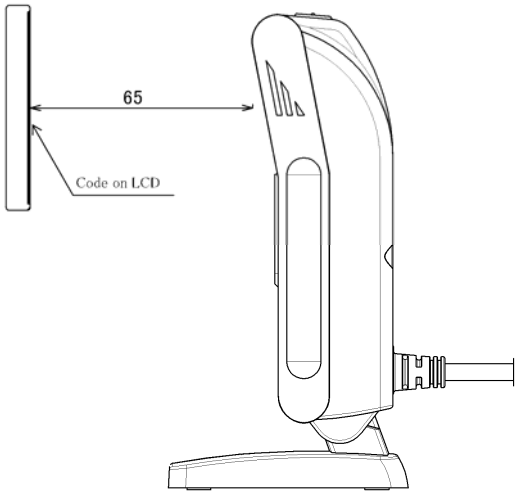


Figure 14: Reading from LCD screen

9.9. Auto Trigger

The scanner starts scanning automatically when it detects a change in brightness that occurs when a barcode label is presented in front of it.
The scanner should be triggered when a gray-colored paper is presented in front of a black-colored background paper.The scanner should also be triggered when a black-colored paper is presented in front of a gray-colored background paper.

<Conditions>
Ambient light : 500 ~ 1000 lx
Moving speed of detected paper : 2 m/s or slower

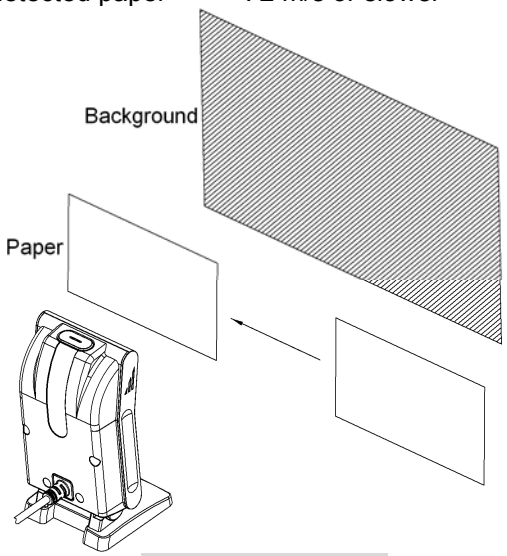


Figure 15: Auto Trigger

9.10. Motion Tolerance

0.33mm UPC/EAN can be read when it is moving at 2m/s.

<Conditions>
Ambient light : 500 ~ 1000 lx (on the surface of a barcode)
Distance : 65 mm from the front edge of the scanner
Barcode : 0.33mm UPC/EAN specified in Section 9.1

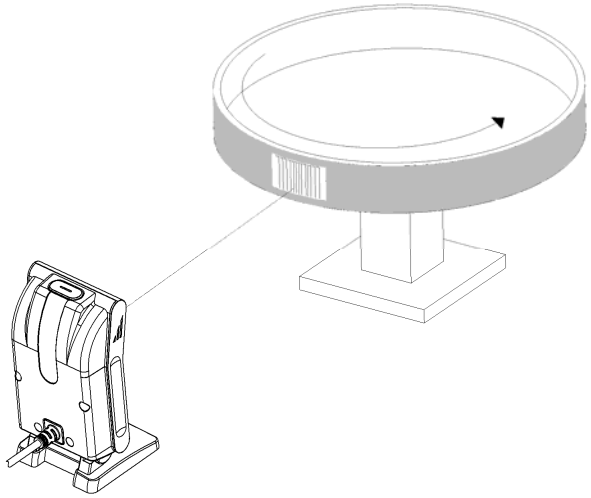


Figure 16: Motion Tolerance

* The above shows the capability of capturing/scanning a moving target and 100% scanning is not guaranteed.
* The reading characteristics may deteriorate due to the specular reflection of LED illumination when the reflectivity is high.

10. Environmental Specifications

10.1. Temperature

Operating Temperature : 0 ~ 40 °C
Storage Temperature : -40 ~ 70 °C

<Conditions>
Barcode : 0.33 mm UPC/EAN specified in Section 9.1
Distance : 65 mm from the front edge of the scanner
Angle : α = 0°, β = +15°, γ = 0°
Reading test : Read at intervals of 300 ms

10.2. Humidity

Operating Humidity : 5 ~ 90% RH (no condensation, no frost)
Storage Humidity : 5 ~ 90% RH (no condensation, no frost)

<Conditions>
Barcode : 0.33 mm UPC/EAN specified in Section 9.1
Distance : 65 mm from the front edge of the scanner
Angle : α = 0°, β = +15°, γ = 0°

10.3. Ambient Light Immunity

Scanning performance is guaranteed when the illuminance on a barcode surface is between zero and the following values:

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

<Conditions>
Barcode : 0.33 mm UPCEAN specified in Section 9.1
Distance : 130 mm from the front edge of the scanner
Angle : α = 0°, β = +15°, γ = 0°

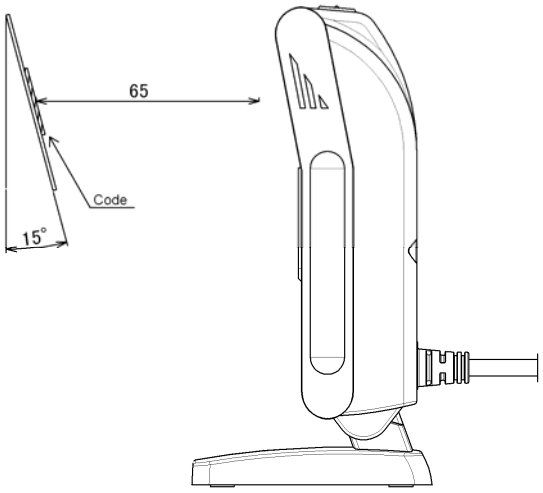


Figure 17: Ambient Light Immunity

Note: Scanning performance is guaranteed as far as the direct ambient light or specular reflection from the illumination LED does not enter the light receiving section of the M-10.

10.4. Dust & Water Proof Grade

IEC/EN 60529 Protection Level : IP52

10.5. Cable Strength

There shall be no sign of malfunction after the following cable strength test.
Cable Strength Test: Affix the scanner to an immovable object and pull it using a force of 24.5 N (2.5 kgf static loading) for 1 second. Repeat this 20 times continuously.

10.6. Cable Bending Strength

There shall be no sign of malfunction after the following cable bending test.
Cable Bending Test: Add a load of 4.9 N (500 gf) to a cable and bend it at an angle of 60° to both right and left. Repeat this 100000 times continuously.

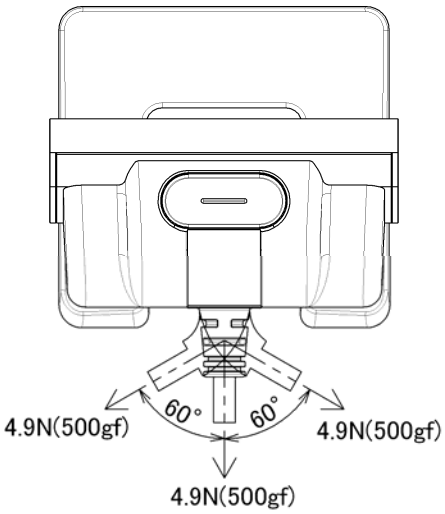


Figure 18: Cable Bending

10.7. Vibration Strength (without Packing)

There shall be no sign of malfunction after the following vibration test.
Vibration test: Increase the frequency of the vibration from 10 ~ 100 Hz at an accelerated velocity of 19.6 m/s^2 (2.0 G) for 30 minutes (60 minutes per cycle) in the non-operating state. Repeat this in each X, Y and Z direction.

10.8. Vibration Strength (in individual packing)

There shall be no sign of malfunction after the following vibration test.
Vibration test: Increase the frequency of the vibration from 10 ~ 100 Hz at an accelerated velocity of 19.6 m/s^2 (2.0 G) for 30 minutes (60 minutes per cycle) in individually packaged state. Repeat this in each X, Y and Z direction.

10.9. Drop Impact Strength (without packing)

Drop height : 1.5m
There shall be no sign of malfunction after the following drop test.
Drop test: Drop the scanner three times (15 times in total), at each 5 face, from a height of 1.5m onto a concrete floor as shown below.

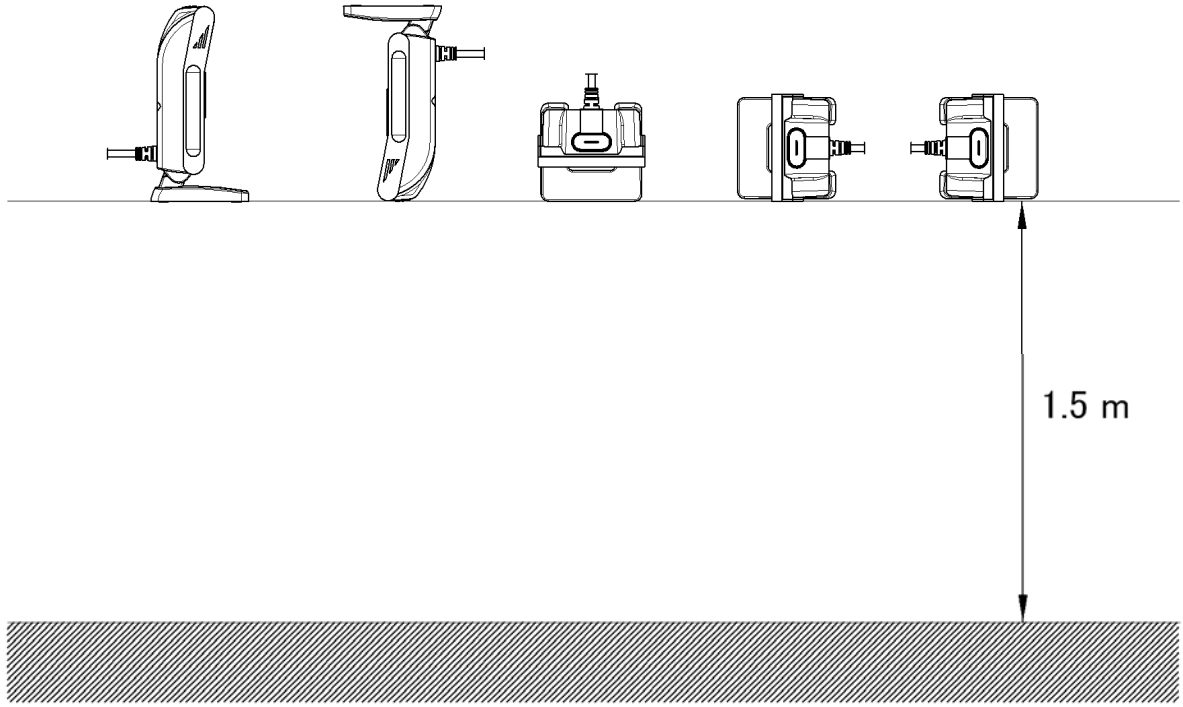


Figure 19: Drop Test

10.10. Drop Impact Strength (in individual packing)

There shall be no sign of malfunction after the following drop test.
Drop test: Drop an individually packaged scanner 10 times in total, at any of 1 corner, 3 edges, and 6 faces, from a height of 1m onto a concrete floor.

10.11. Electrical Specifications

Withstand Voltage	: AC 1500 V / 60 seconds, 10 mA or less
Insulation Resistance	: DC 500 V, 2 MΩ or higher
Current Leakage	: 250 µA or less / AC 250 V 60 Hz
Power Line Noise Immunity	: ±1 kV or lower
Electrostatic Discharge Immunity	: No destruction found (± 15 kV, air or direct discharge)
	: No malfunction found (± 10 kV, air or direct discharge)
	: ±6 kV (contact, direct or indirect discharge)

* Testing method is compliant with IEC-61000-4-2. (150 pF, 330 Ω)

11. Regulatory Compliance

11.1. LED Safety

IEC 62471-1:2006 Exempt Risk Group

11.2. EMC

EN55022
EN55024
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 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.

12. RoHS

The M-10 is compliant with RoHS.

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

13. Reliability

MTBF (Mean Time Between Failures) 50,000 hours

Note: The reliability of the M-10 is guaranteed as far as it is operated under normal operating conditions in the range of advised operating temperature and without excessive electrical or mechanical shock.

14. Precautions

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

14.1. Shock

- Do not throw or drop the scanner outside the specified height.
- Do not place heavy objects on the cables.

14.2. Temperature Conditions

- Do not use the scanner at temperatures outside the specified range.
- Do not pour boiling water on the scanner.
- Do not forcibly bend the cables at low temperatures.

14.3. Foreign Materials

- Do not subject the scanner to chemicals.

14.4. Other

- Do not disassemble this product.
- Do not place the product near a radio or a TV receiver, as the scanner may cause reception problems.
- The scanner may be damaged by voltage drops.

15. Product Label

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

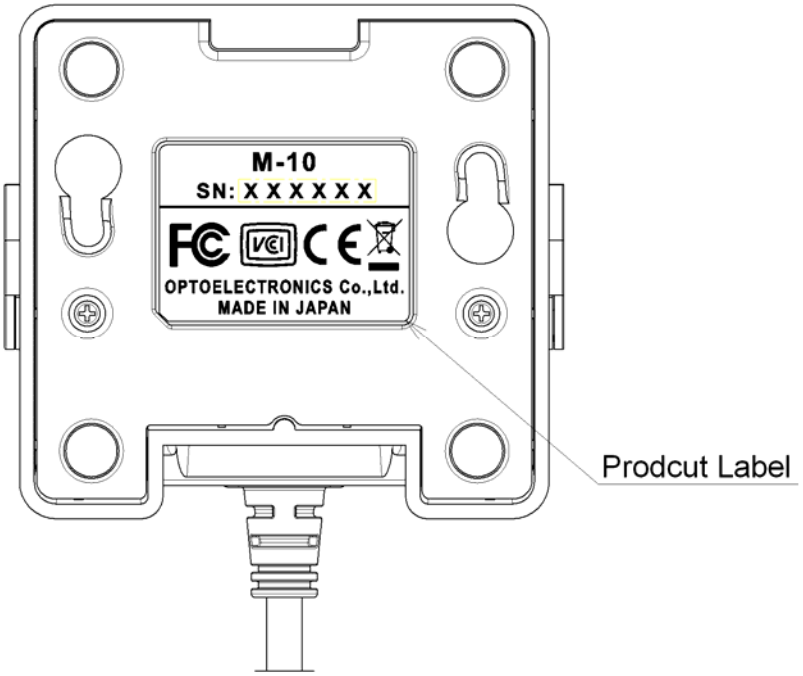


Figure 20: Product Label Position

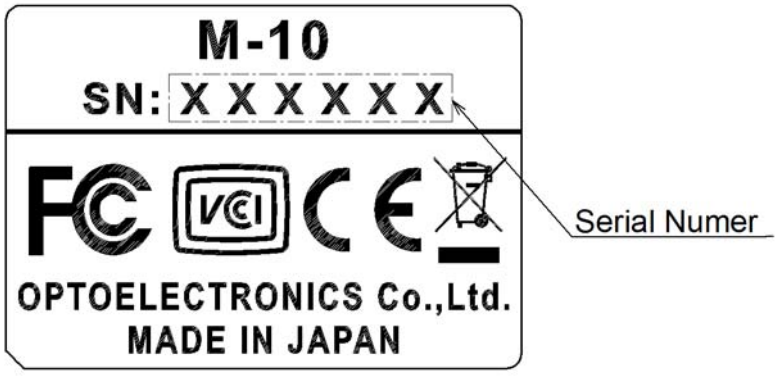


Figure 21: Enlarged View of Label

16. Packing Specifications

16.1. Individual Packaging

16.1.1. USB Type

Approx. 245 mm (W) × 110 mm (D) × 84 mm (H) (External dimensions)

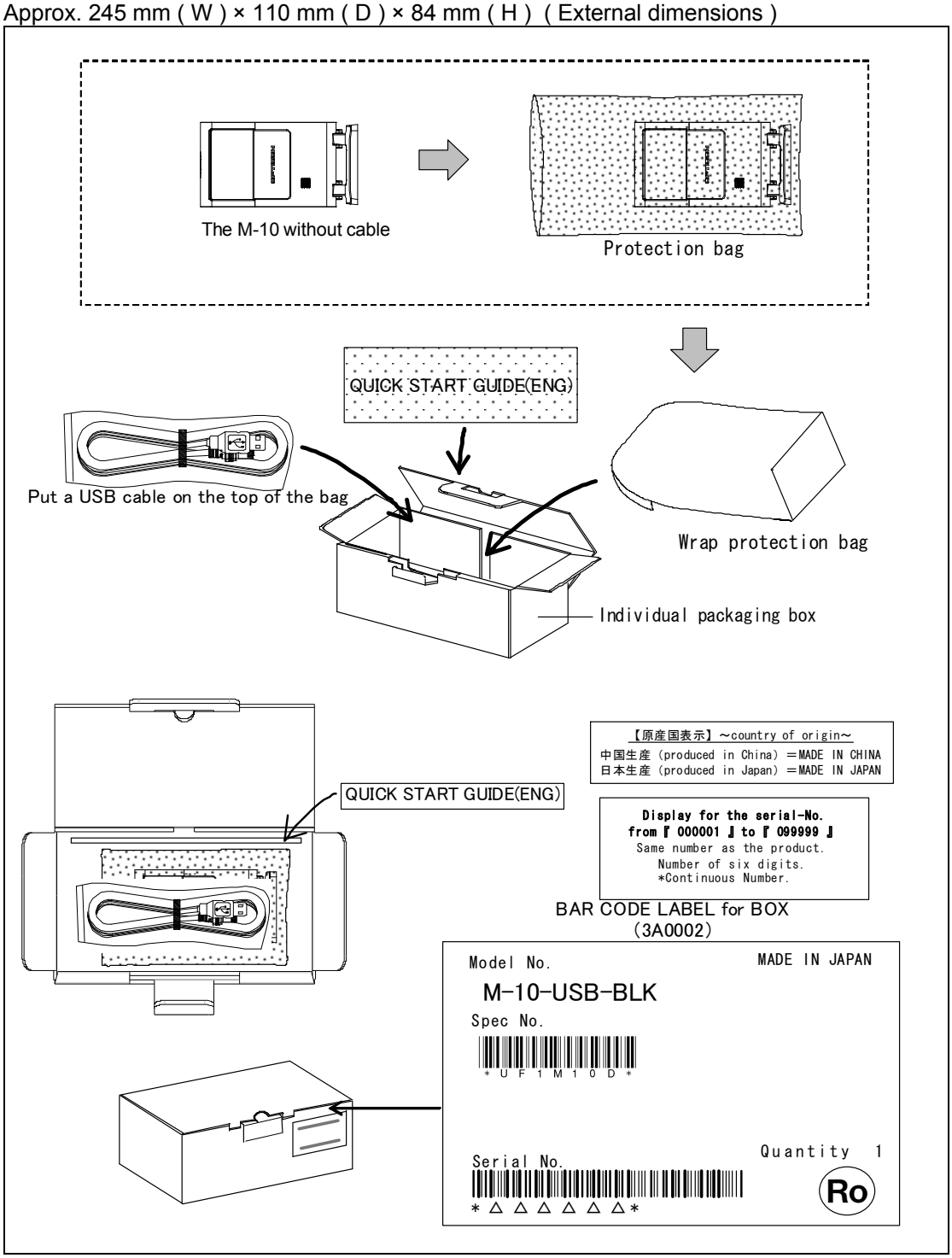


Figure 22: Individual Packaging USB Type

16.1.2. RS-232C Type

Approx. 245 mm (W) × 110 mm (D) × 84 mm (H) (External dimensions)

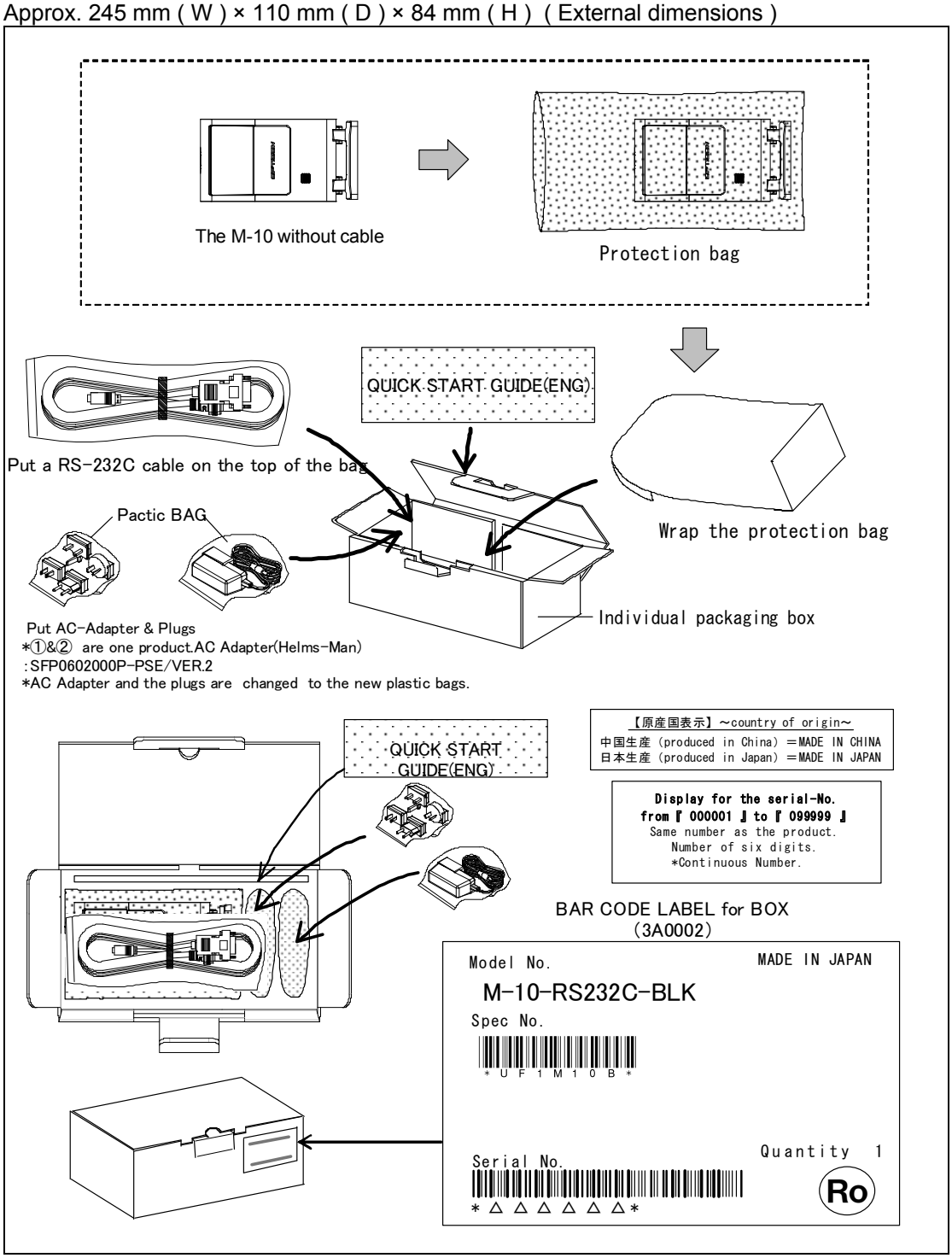


Figure 23: Individual Packaging RS-232C Type

16.2. Collective Packaging

Approx. 600 mm (W) × 525 mm (D) × 290 mm (H) (External dimensions) 30sets

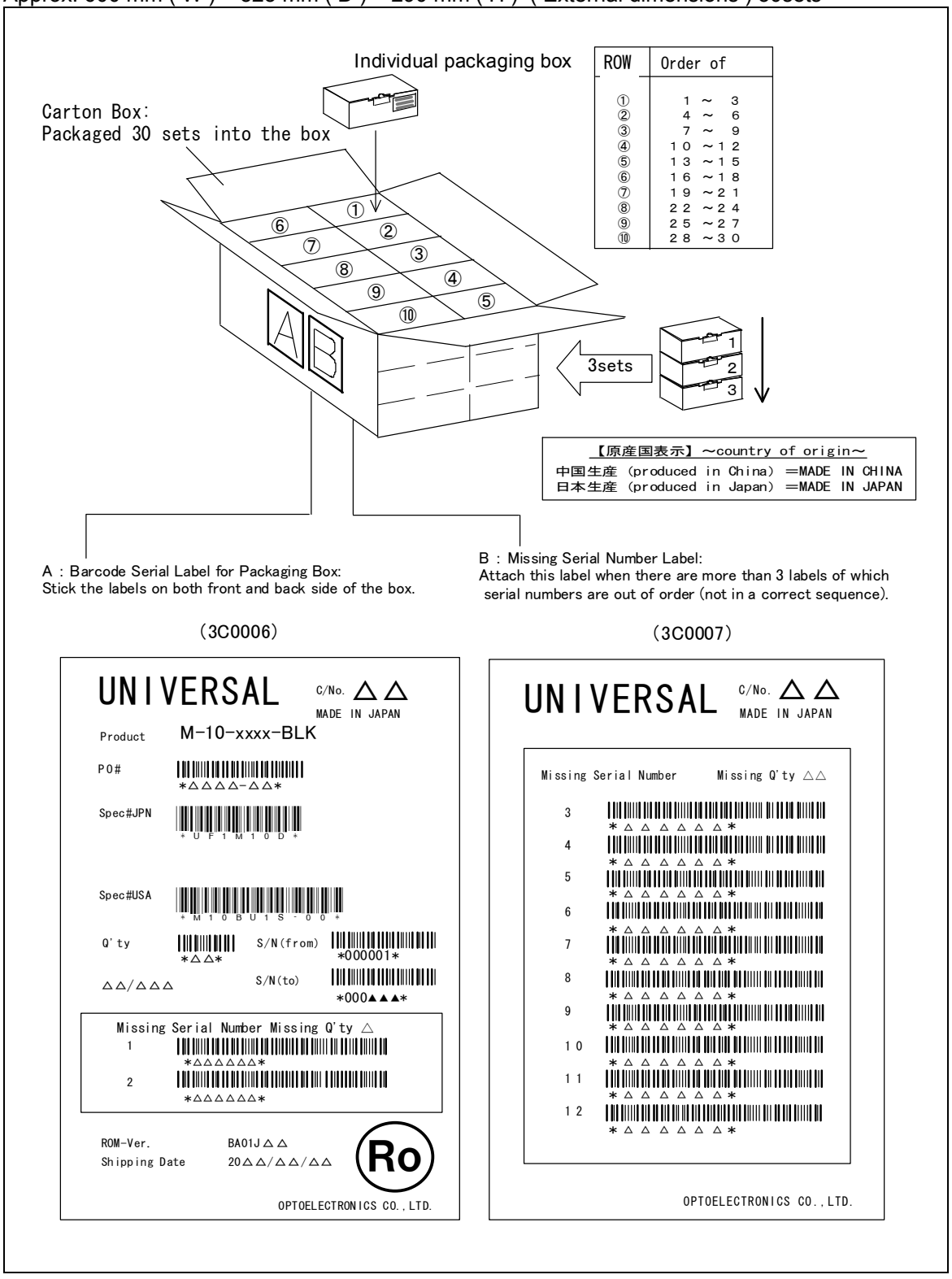


Figure 24: Collective Packaging

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

17. Physical Features

17.1. Dimensions

Approx. 76 mm (W) × 70 mm (D) × 139.5 mm (H)

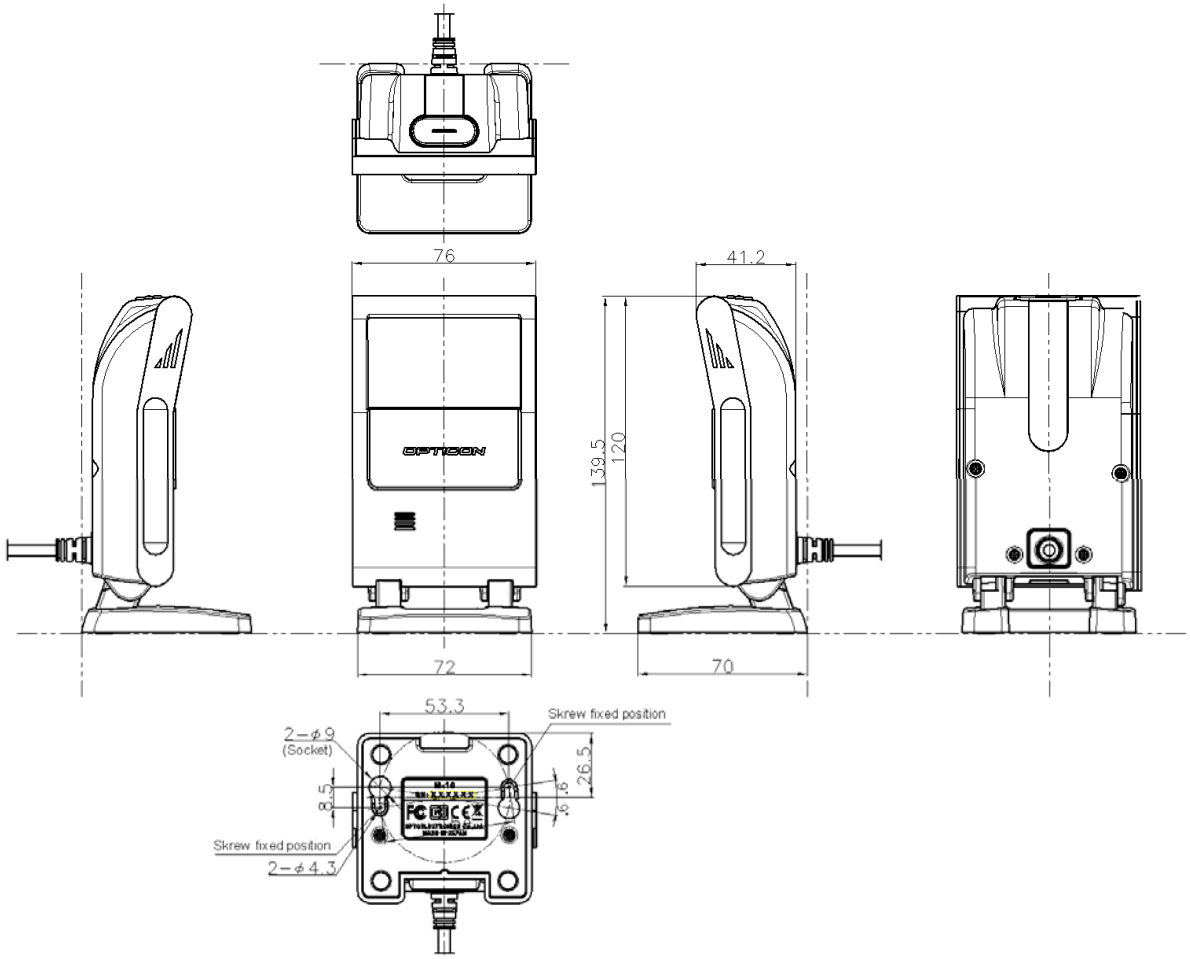


Figure 25: Mechanical Drawing

17.2. Weight

Approx. 250 g (excluding the cable)

17.3. Tilt Angle of Stand

Forward : 60° Backward :15°

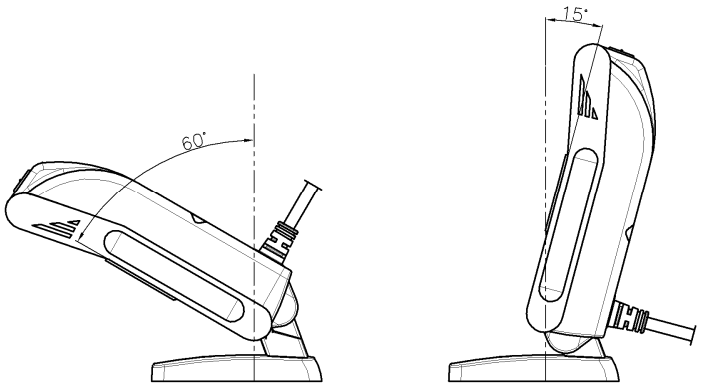


Figure 26: Tilt Angle of Stand

17.4. Mounting Method

1. Install the mounting screws.
Insert the specified size of screws into the screw holes in the bottom the scanner and tighten them to fix the scanner in your desired location.

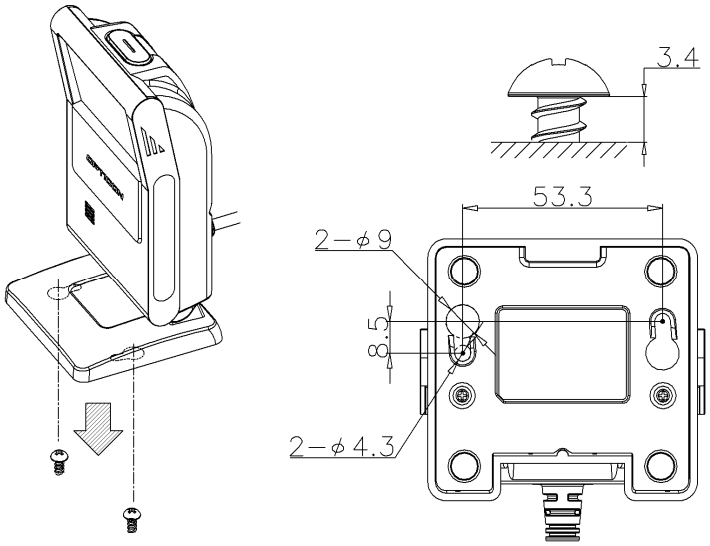


Figure 27: Screw Mounting Position

2. Mount the scanner.
Turn the scanner. (counterclockwise 18°)

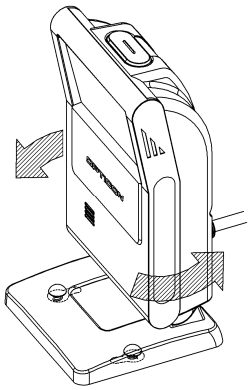


Figure 28: Scanner Rotation

3. Fix the scanner.
The scanner is fixed.

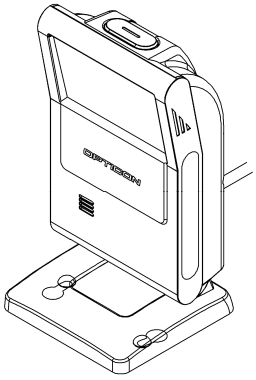


Figure 29: Scanner Fixed

18. Default Setting

18.1. Default Setting Menu Code

The M-10 is set to default settings by reading the following menu label regardless of the interface types.

Default

@MENU_OPTO@ZZ@BAP@ZZ@OTPO_UNEM@

18.2. Supported Symbologies

18.2.1. 1D Barcodes

Code type	Read Setting	Minimum length	Remarks
UPC	○	-	
UPC Add-on 2 UPC Add-on 5			
EAN(JAN)	○	-	
EAN Add-on 2 EAN Add-on 5			
EAN-13	○		
EAN-13 Add-on 2 EAN-13 Add-on 5			
EAN-8	○		
EAN-8 Add-on 2 EAN-8 Add-on 5			
Code 39	○	1	Not transmit ST/SP
Tri-Optic	○	-	Not transmit ST/SP
Codabar	○	2	Not transmit ST/SP
Industrial 2of 5	○	5	
Interleaved 2of 5	○	6	
S-Code		5	
Code 128	○	1	GS1 conversion (setting required)
Code 93	○	1	
IATA	○	5	
MSI/Plessey		3	
UK/Plessey		2	
Telepen		1	
Code 11		1	
Matrix 2 of 5		5	

18.2.2. Postal Codes

Code type	Read Setting	Minimum length	Remarks
Chinese Post Matrix 2 of 5		-	
Korean Postal Authority		-	
Intelligent Mail Barcode		-	
POSTNET		-	
PLANET		-	
Japan Postal		-	
Netherlands KIX Code		-	
UK Postal (Royal mail)		-	
Australian Postal Code		-	

18.2.3. GS1 Databar, Composite Code

Code type	Read setting	Remarks
GS1 DataBar ・GS1 DataBar Omnidirectional ・GS1 DataBar Truncated ・GS1 DataBar Stacked ・GS1 DataBar Stacked Omnidirectional	○	GS1 conversion (setting required)
GS1 DataBar Limited	○	
GS1 DataBar Expanded ・GS1 DataBar Expanded ・GS1 DataBar Expanded Stacked	○	
GS1-DataBar Composite ・CC-A ・CC-B ・Limited CC-A ・Limited CC-B ・Expanded CC-A ・Expanded CC-B	○	GS1 conversion (setting required)
GS1-128 Composite ・CC-A ・CC-B ・CC-C	○	GS1 conversion (setting required)
EAN Composite ・EAN-13 CC-A ・EAN-13 CC-B ・EAN-8 CC-A ・EAN-8 CC-B		GS1 conversion (setting required)
UPC Composite ・UPC-A CC-A ・UPC-A CC-B ・UPC-E CC-A ・UPC-E CC-B		GS1 conversion (setting required)

18.2.4. 2D Codes

Code type	Default	Remarks
PDF417	○	
Micro PDF417		
Codablock F		
QR Code	○	GS1 conversion (setting required)
Micro QR	○	
Data Matrix (ECC 200)	○	GS1 conversion (setting required)
Data Matrix (ECC 000-140)		
Aztec Code	○	
Aztec Runes		
Chinese-sensible code		
Maxi Code		

18.3. Other Default

Item	Default Setting
Read mode	Auto trigger
Extended read time	Disable (Auto)
Buzzer duration	50ms
Buzzer tone	2.65 kHz
Startup buzzer	Enable
Buzzer loudness	Max (100%)
Good read LED indicator duration	200 ms
Added suffix value	CR
Multiple read reset time	400ms
Auto trigger detection sensitivity	High
Transition time to auto trigger sleep	1 min
Data buffering	Buffered mode

18.4. USB-HID Default

Item	Default Setting
Keyboard language	USA
Inter-character delay	No delay

18.5. USB-USB Default

Item	Description
Baud rate	USB2.0 Full Speed
Power supply	500 mA
Vender ID	065A
Product ID	A002
Standards	CDC-ACM

* It is necessary to install Opticon USB Driver to a host.

18.6. RS-232C Default

Item	Default Setting
Baud rate	9600 bps
Parity bits	No parity
Data length	8 bits
Stop bits	1 bit
Handshaking	No handshake

19. Accessories

19.1. AC Adapter Specifications

The M-10 with RS-232C interfaces are shipped with a dedicated AC adapter “Universal AC Adapter Kit.” Plug connectors can be changed for each region. Refer to 19.2 for the detailed view.

Item		Specifications
Model Name		SFP0602000P-PSE
Dimensions		47.5 x 28.0 x 75.0 (WDH mm)
DC Output Cable Length		1.8 m
Input Spec	Voltage Range	AC 90 ~ 265 V
	Supply Current	0.5 A max
Output Spec	Voltage Range	5.7 ~ 6.3 V
	Maximum Current	2 A max
Operating Temperature		0 ~ 40°C

19.2. AC Adapter Mechanical Drawing

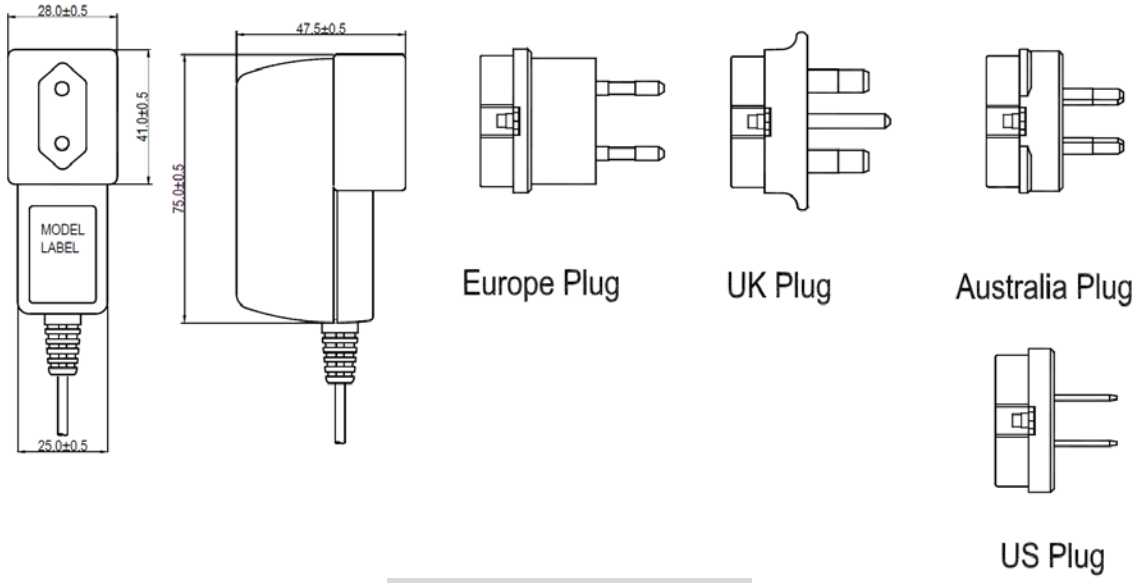


Figure 30: AC Adapter (input side)

The polarity of the center of DC jack is plus (+).

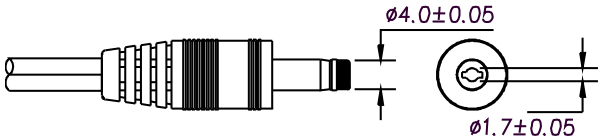


Figure 31: AC Adapter (output side: DC jack)