M-12M In-Counter 2D Imager Scanner

Specification Manual

The information in this document is subject to change without notice.

Document History

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Revision History

Product Name: M-12M

Edition	Date	Page	Section	Description of Changes
1st	2026/06/02	-	-	Initial release

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1. Overview

This manual provides specifications for the M-12M in-counter 2D imager scanner.

2. About the M-12M Imager Scanner

The M-12M is a low-profile, handheld, imager-based, in-counter 2D imager scanner that enables high-speed scanning of 1D (linear) and 2D barcodes, as well as OCR fonts.

The M-12M includes these features:

- New optical system
  The ultra wide-angle proximity readable optical system can read general QR codes at close proximity, as well as wide barcodes* and large QR codes* from a distance of about 40 - 45 mm.
  Note: *For a specified code.

- Low-profile imager scanner
  The space-saving size of the M-12M makes it ideal for kiosks and payment terminals.

- User-friendly illumination design
  Uniformly illuminating the reading area reduces brightness and minimizes glare, providing a comfortable illumination design.

- Ambient light immunity
  A special optical filter with sunlight resistance and industrial CMOS sensor control enables readings of up to 120,000 Lux.

- High-speed image sensor
  The high-speed global shutter CMOS image sensor in the MDI-12 captures images at a speed of up to 120 fps. This feature enables fast and accurate scanning.

- Full-color indicator and floodlight LED
  The M-12M has four full-color LEDs. The surface-emitting LED provides high visibility for the indicator display. You can also change the illumination color.

- Low power consumption
  The high-performance and customized low-power 800MHz CPU has drastically minimized power consumption in operating, standby, low-power states, and booting. This feature also makes it ideal for wireless devices.

- Data Edit Programming
  Data Edit Programming provides an almost unlimited flexibility to format scanned data before it is sent. Up to 16 barcodes can be partially combined and fixed parts can be added. The output editing process, such as GS1 format, can also be easily configured.

- RoHS compliance
  The M-12M is a RoHS compliant product, as declared by Optoelectronics Co., Ltd.

3. Model Details

The M-12M model name is constructed by a combination of these characteristics.

Model Name		Interface
M-12M		-USB-COM

3.1. Standard Product Description

These specifications describe the standard products.

Standard	Description
M-12M-USB-COM	USB-COM/Cable not included*

3.2. Model Description

Interface

Symbol	Description
-USB-COM	Interface default setting: USB-COM Supported interface: USB-HID/USB-COM/RS-232C Cable: Not included*

* You need to provide your own connection cable.

4. Basic Specifications

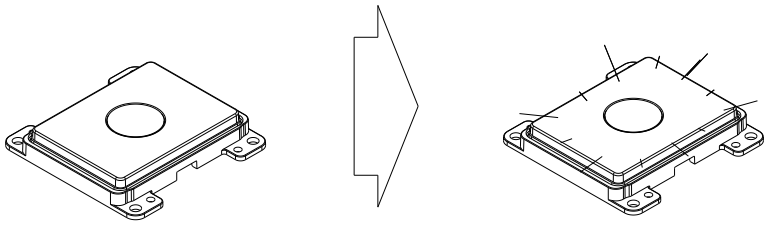
Specification			Description		Notes
Interface	RS-232C		300 bps to 115200 bps		Default: 9600 bps
	USB (HID/COM)		Full Speed 12Mbps		
Indicator	LED		Upper panel full color LED		
Optical Section	Scanning method		Monochrome CMOS area sensor		Frame rate: 120 fps
	Scanning light source		Full color LED × 4 pcs		
	Effective pixels		0.30 million pixels (H: 640 x V: 480)		
	View angle		Horizontal: about 120.0° Vertical: about 94.2° Diagonal: about 120.0°		
	Scan window		Material: Acrylic (PMMA) with hard coating Pencil hardness: 6H Mohs hardness: 4 equivalent		
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, NW-7(Codabar), Industrial 2 of 5, Interleaved 2 of 5, Code 93, Code 128, GS1-128, MSI/Plessey, Code 11, UK/Plessey, Telepen, Code 11, Matrix 2 of 5		
		Postal	Korean Postal Authority code, Chinese Post Matrix 2 of 5, Japanese Postal, Intelligent Mail Barcode, POSTNET, PLANET, Netherlands KIX Code, Australian Postal, UK Postal, 4-State Mailmark Barcode		
	Minimum resolution		Code 39: 0.076 mm		PCS 0.9
	Curvature		Radius ≧ 20 mm (12-digit UPC)		
	Barcode width		Possible to read: Code 39 with 100 mm width and resolution 0.2 mm (DOF: 127 mm)		
	Motion tolerance		Possible to read: UPC 100% moving at 3 m/s (DOF: 40 mm)		
	Depth of field	Code 39	Resolution (0.127 mm)	7 - 43 mm	
			Resolution (0.254 mm)	11 - 109 mm	
		Code 128	Resolution (0.20 mm)	17 - 88 mm	
		UPC	Resolution (0.33 mm)	12 -128 mm	
GS1/Composite	Symbologies		GS1 DataBar, GS1 DataBar Limited, GS1 DataBar Expanded Composite GS1 DataBar, Composite GS1-128, Composite EAN, Composite UPC		GS1 DataBar: formerly called “RSS”
	Minimum resolution		GS1 DataBar: 0.127 mm Composite Code: 0.127 mm		PCS 0.9

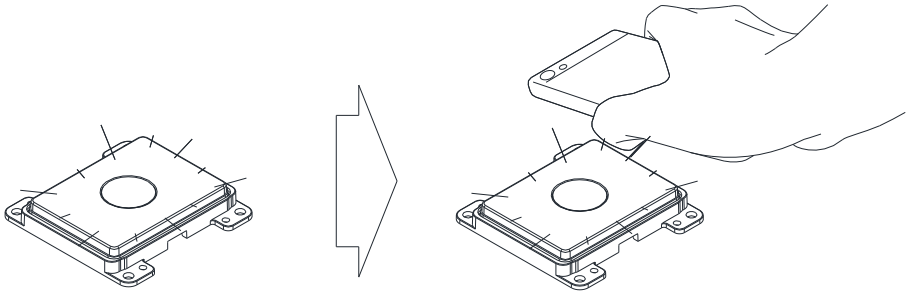
Specification			Description		Notes
Supported 2D Symbologies	Symbologies		PDF417, MicroPDF417, Codablock F, QR Code, Micro QR Code, rM QR Code, Data Matrix (ECC 200), MaxiCode, Aztec Code, Chinese Sensible (Han Xin) Code		Disable Code 128 when Codablock F is enabled.
	Minimum resolution		PDF417: QR 0.127 mm Code: 0.127 mm Data Matrix: 0.127 mm		PCS 0.9
	Depth of field	PDF417	Resolution (0.254 mm)	13 - 53 mm	
		QR Code	Resolution (0.127 mm)	7 - 18 mm	
			Resolution (0.381 mm)	7 - 69 mm	
		Data Matrix	Resolution (0.254 mm)	6 - 39 mm	
Common	Scan angle		Pitch: ±55°		
			Skew: ±65°		
			Tilt: 360°		
	Minimum PCS		0.2 or more		MRD: 13% or more
OCR	OCR font		Machine Readable Travel Documents, ISBN(OCR-B)		
Imager	Image data format		Windows Bitmap, JPEG		
	Shades of gray		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		
	Image Transfer Time		USB-COM (full speed)	About 3 sec	Resolution: Full
			RS-232C (baud rate: 115.2 kbps)	About 40 sec	
Power	Range of operating voltage		5V ± 10%		Both RS-232 and USB
	Current consumption	Reading	RS-232C: 115 mA/USB: 140 mA (typ.)		Ambient temperature: 25°C Power supply voltage: 5.0 V
		Standby	RS-232C: 22 mA/USB: 48 mA (typ.)		
Environmental Specifications	Temperature	Operating	-20 to 60 °C		
		Storage	-30 to 65 °C		
	Humidity	Operating	5 to 90% (no condensation, no frost)		
		Storage	5 to 90% (no condensation, no frost)		
	Ambient light immunity	Fluorescent	10,000 lx or less		UPC 100% Optical axis angle: 75° Distance: 90 mm
		Sunlight	120,000 lx or less		
	Vibration		10 Hz to 100 Hz, acceleration of 19.6 m/s^2, 60 minutes per cycle, repeat once in each X, Y and Z-direction		
	Drop		Drop 3 times, at each 6 faces from a height of 150 cm onto a concrete surface.		Condition: Secured to a dummy case
Regulatory	This scanner is an Exempt Risk Group LED product.				
	LED safety		IEC 62471:2006 Exempt Group		3 color LED
Physical Features	Dimensions		Approx. 53.6 × 53.6 × 11.5 (WDH mm)		
	Weight		Approx. 20 g		

5. Basic Operation Mode

The M-12M has three trigger modes and three specific reading modes.

5.1. Trigger Modes

Operation Mode Name	Manual Trigger Mode (Default)		
Mode description	The mode to start reading when the read operation start signal is received.		
Menu label		Menu command	S8+F
Operation diagram	Read operation signal input  *Figure 1: Manual Trigger Operation*		

Operation Mode Name	Always Reading Mode		
Mode description	The mode to read instantly by holding a code on a screen or on paper.		
Menu label		Menu command	S7
Operation diagram	 *Figure 2: Always Reading Operation*		

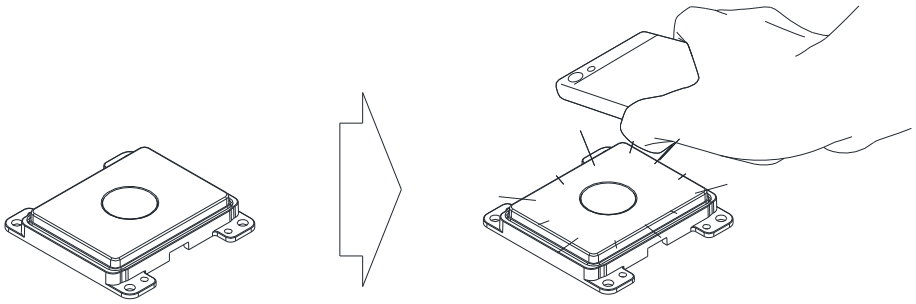
Operation Mode Name	Auto Trigger Mode		
Mode description	Starts reading when holding the reading target and turns on the illumination. *1 *1 When Screen Only Mode is selected as the Specific Reading Mode, the illumination is OFF.		
Menu label		Menu command	S8+I
Operation diagram			

Figure 3: Auto Trigger Mode Operation

5.2. Specific Reading Modes

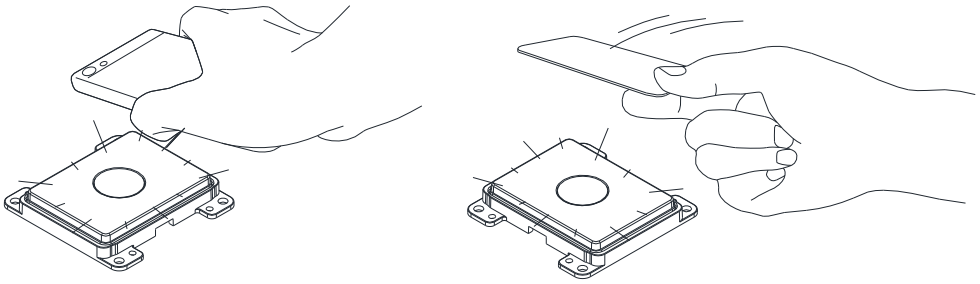
Operation Mode Name	Balance Mode (Default)		
Mode description	The mode to read both on-screen codes and printed codes.		
Menu label		Menu command	[D3B
Operation diagram			

Figure 4: Balance Mode Operation

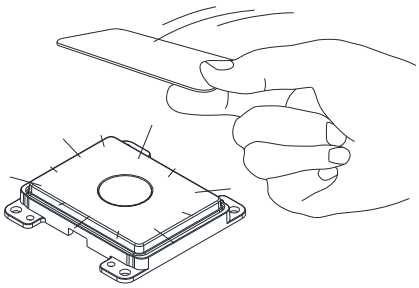
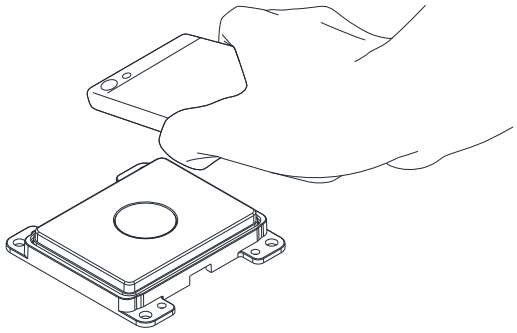
Operation Mode Name	Paper Only Mode		
Mode description	Suitable for reading codes on paper, only. Illumination is ON.		
Menu label		Menu command	[D39
Operation diagram			

Figure 5: Paper Only Mode Operation

Operation Mode Name	Screen Only Mode		
Mode description	Suitable for reading codes on screen, only. Illumination is OFF.		
Menu label		Menu command	[D3A
Operation diagram	 *Figure 6: Screen Only Mode Operation*		

6. Detailed View

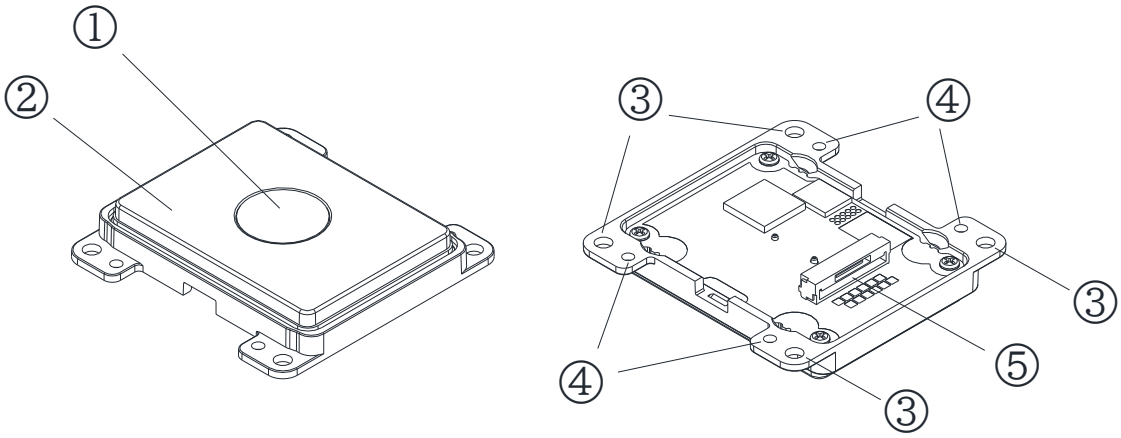


Figure 7: Detailed View of M-12M

No.	Name	Description
1	Scan Window	Light path of the imager, LED illumination, and LED aiming. Make sure that the lens is not exposed to dust or dirt before scanning.
2	LED Panel	Shows the operating status of the scanner. Blue LED light indicates a good read. You can also set the lighting color.
3	Screw Holes (for M3, 4 places)	The M3 screw holes are used to mount the scanner.
4	Screw Holes (for M2, 4 places)	The M2 screw holes are used to mount the scanner.
5	Connector for Interface Cable	The connector for interface cable. JST SM12B-GHS-TB (Cable side connector: JST GHR-12V-S)

7. Electrical Specifications

The M-12M comprises of these sections:

- Image Section: Contains the CMOS sensor, wide-angle lens, and LED for illumination and indicator.
- Decoder Section: For image processing and decoding 1D/2D codes captured in the acquired image.
- Communication Control Section: To communicate with a host.
- Power Supply Section: For the main power supply conversion.

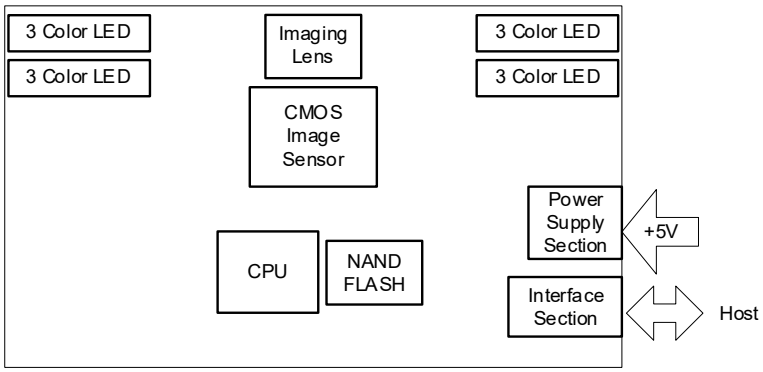


Figure 8: Configuration Diagram

7.1. USB Specifications

Input voltage:	5.0 V ±10%
Current consumption:*	48 mA (typ.) in standby mode
	140 mA (typ.) during reading operation

* The current consumption was measured at 25°C and may vary depending on the host.

7.2. RS-232C Specifications

Input voltage:	5.0 V ±10%
Current consumption:*	22 mA (typical) in standby mode
	115 mA (typical) during reading operation

* The current consumption was measured at 25°C and may vary depending on the host.

8. Optical Specifications

8.1. Basic Optical Specifications

Specification		Characteristics
Scan method	CMOS area sensor (white/black)	-
Number of effective pixels	(Column) × (Row)	640 × 480 pixels
Image capture speed*1	Frame rate	120 fps
Image capture direction*2		See Figure 9 below
Focal distance	Distance from the front edge of scanner	Approx. 23 mm
View angle*3	Horizontal	about 120.0°
	Vertical	about 94.2°
	Diagonal	about 120.0°
Reading light source (3 colors LED × 4)	3 colors LED	White sorted product
	Maximum luminous intensity*4	2.0cd
Scan window	Material	Acrylic (PMMA) with hard coating
	Pencil hardness	6H
	Mohs hardness	4 equivalent

*1 The fastest speed of image capture.
*2 The image direction during image capture can be changed by the setting.
*3 Imaging range. The readable area may vary depending on the code type and reading conditions.
*4 Reference value based on the Nichia Corporation (NESM238AT-PW white sorted product) data sheet.

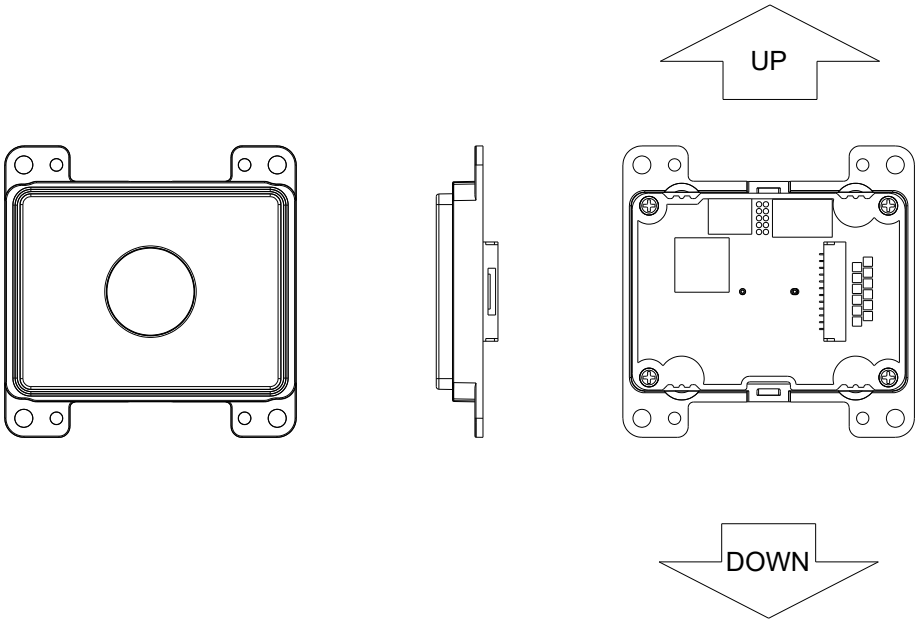


Figure 9: Image Capture Direction

9. Technical Specifications

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

Conditions

Ambient Temperature and Humidity	Room temperature, room humidity
Ambient Light	100 to 500 lux
Angles	Pitch: α = 0°, Skew: β = 0°
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 tries of scan.
Barcode Test Sample (1D and 2D)	Specified in section 9.1.

Test Chart

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

9.1. Barcode Test Sample

1D Barcodes

Code 39

Resolution	Symbology	PCS	Size (mm)	No. of Digits
0.076 mm (3 mil)	Code 39	0.9	13 × 10	10
0.127 mm (5 mil)			11 × 10	4
0.20 mm (7.9 mil)			60 × 10	17
0.254 mm (10 mil)			32.5 × 10	7
0.508 mm (20 mil)			43 × 25	4

Code 128

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

UPC/EAN

Resolution	Symbology	PCS	Size (mm)	No. of Digits
0.330 mm (13 mil)	UPC/EAN	0.9/0.2	31.5 × 24.5	12/13

Codabar (NW-7)

Resolution	Symbology	PCS	Size (mm)	No. of Digits
0.254 mm (10 mil)	Codabar	0.9	40 × 13	12

GS1 Databar/Composite

GS1 DataBar Limited

Resolution	Symbology	PCS	Size (mm)	No. of Digits
0.127 mm (5.0 mil)	Limited	0.9	9 × 1.3	14
0.127 mm (5.0 mil)	Limited-Composite	0.9	9 × 2.5	26

2D Codes

PDF417

Resolution	Error Correction	PCS	Size (mm)	No. of Characters
0.127 mm (5.0 mil)	Level-3	0.9	17.3 × 7.5	58
0.254 mm (10 mil)			35 × 15	

QR Code: Model-2

Resolution	Error Correction	PCS	Size (mm)	No. of Characters
0.127 mm (5.0 mil)	M	0.9	4 × 4	44
0.381 mm (15 mil)			11 × 11	
1.650 mm (54 mil)			48 × 48	

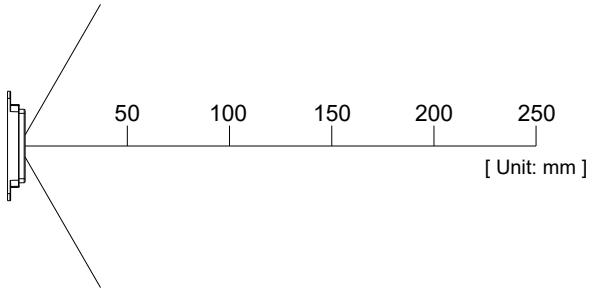
Data Matrix

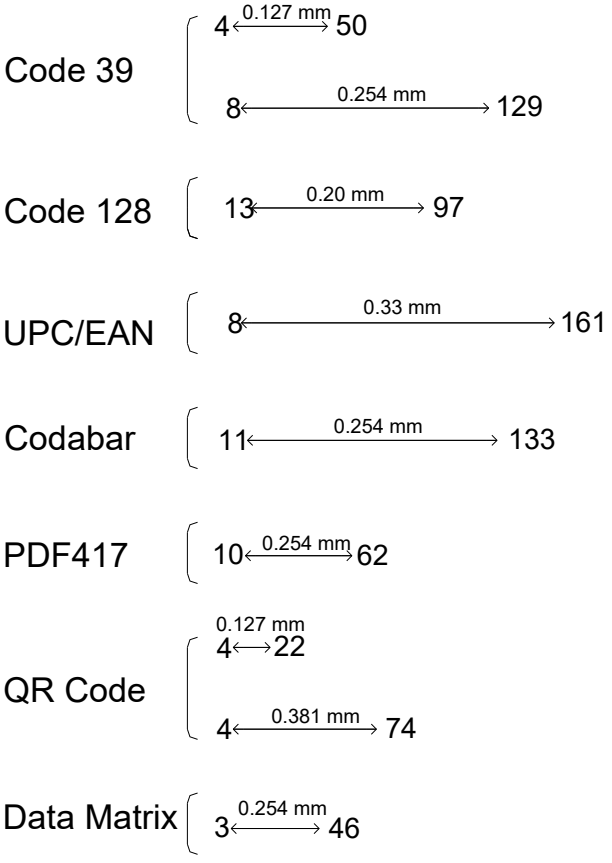
Resolution	Model	PCS	Size (mm)	No. of Characters
0.127 mm (5.0 mil)	ECC200	0.9	3 × 3	40
0.254 mm (10 mil)			6 × 6	

* Size is measured using the outline dimensions, excluding the quiet zone.

9.2. Scan Area and Depth of Field

The scan area is measured from the front edge of the scanner.





Note: The depth of field depends on the view angle and symbol length. The depth of field values mentioned are the typical values measured at an ambient temperature of 25°C without strong reflection.

Figure 10: Scan Area and Depth of Field

9.3. Depth of Field

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

Resolution	Code	PCS (MRD)	Guaranteed Value (mm)		Typical Value (mm)	
			Near	Far	Near	Far
0.127 mm	Code 39	0.9 (0.8)	7 mm	43 mm	4 mm	50 mm
0.254 mm	Code 39	0.9 (0.8)	11 mm	109 mm	8 mm	129 mm
0.2 mm	Code 128	0.9 (0.8)	17 mm	88 mm	13 mm	97 mm
0.33 mm	UPC/EAN	0.9 (0.8)	12 mm	128 mm	8 mm	161 mm
0.254 mm	Codabar	0.9 (0.8)	15 mm	108 mm	11 mm	133 mm
0.254 mm	PDF417	0.9 (0.8)	13 mm	53 mm	10 mm	62 mm
0.127 mm	QR Code	0.9 (0.8)	7 mm	18 mm	4 mm	22 mm
0.381 mm	QR Code	0.9 (0.8)	7 mm	69 mm	4 mm	74 mm
0.127 mm	Data Matrix	0.9 (0.8)	6 mm	39 mm	3 mm	46 mm

Note: The depth of field depends on the reading angle and barcode width.

9.4. Printed Contrast Signal (PCS)

PCS: 0.2 or higher

Conditions

MRD	13% and higher (80% or higher reflectivity of space and quiet zone)
Barcode Sample	UPC specified in section 9.1. (Resolution: 0.33 mm, PCS: 0.2)
Code paper surface brightness	100 lx and more

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

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

Note: Make sure to keep the optical window clean. Dirt or scratches on the optical window may negatively affect reading.

9.5. Minimum Resolution

1D Code:	0.076 mm (3 mil) Code 39 specified in section 9.1
GS1-Databar:	0.127 mm (5 mil) GS1 Databar Limited specified in section 9.1
Stacked Code:	0.127 mm (5 mil) PDF417, GS1 Databar Limited Composite specified in section 9.1
2D Code:	0.127 mm (5 mil) QR Code and Data Matrix specified in section 9.1

Conditions

Barcode Sample	The above codes specified in section 9.1
Angle	α = 0°, β =0°
Curvature	R = ∞

9.6. Barcode Width

1D Code:	60 mm width Code 39
2D Code:	Size 48 × 48 mm QR Code

Conditions

1D Code Sample	Resolution 0.20 mm Code 39/PCS 0.9 specified in section 9.1
Distance	40 mm from the front edge of the scanner
2D Code Sample	Resolution 1.65 mm QR Code/PCS 0.9 specified in section 9.1
Distance	45 mm from the front edge of the scanner
Angle	α = 0°, β =0°
Curvature	R = ∞

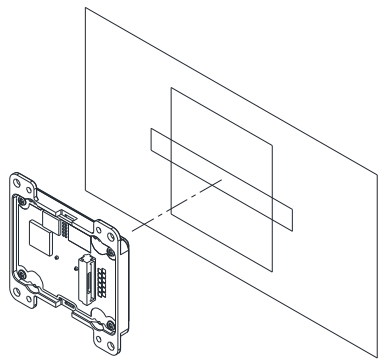


Figure 11: Wide Barcode

9.7. Pitch, Skew and Tilt

Pitch: α = ±55°, β = 0°, γ = 0°
Skew: β = ±65°, Dead zone α = 0°, γ = 0°
Tilt: γ = 360°, α = 0°, β = 0°

Conditions

Barcode Sample	0.5 mm Code 39, specified in section 9.1
Distance	50 mm from the front edge of the scanner
Curvature	R = ∞

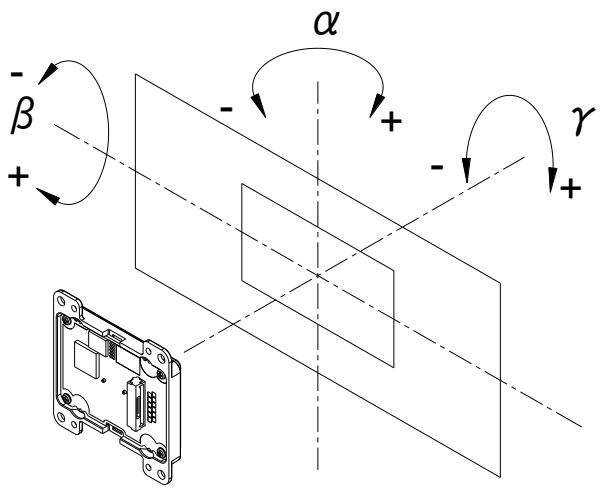


Figure 12: Pitch, Skew, and Tilt

9.8. Curvature

0.33 mm 12-digit UPC: R ≥ 20 mm

Conditions

Barcode Sample	0.33 mm UPC specified in section 9.1
Distance	50 mm from the front edge of the scanner
Angle	α = 0°, β =0°

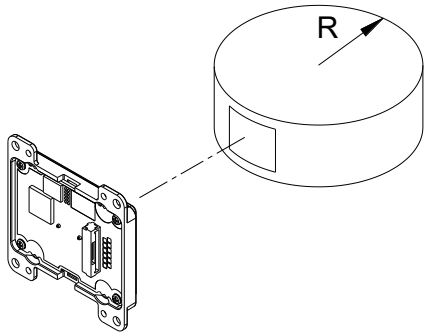


Figure 13: Curvature

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

9.9. Motion Tolerance

UPC can be read when it is moving at 3m/s

Conditions

Ambient Temperature and Humidity	Room temperature, room humidity
Ambient Light	500 to 1000 lux
Distance	40 mm from the front edge of the scanner
PCS (1D and 2D)	0.9 or higher
Barcode Sample	UPC 0.33 mm, specified in section 9.1.

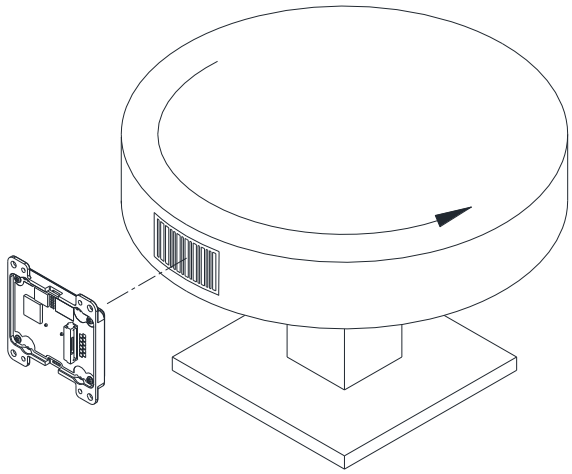


Figure 14: Motion Tolerance

Note: This is only the possible reading speed, which does not guarantee 100% reading.

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

9.10. Auto Trigger

In Auto Trigger mode, the scanner automatically detects a barcode and starts scanning. Auto Trigger is a configurable option. The scanner starts scanning automatically when it detects an abrupt change in brightness within the scan area.

For example:

- Auto Trigger is activated when a gray-colored paper is inserted in front of a black paper.
- Auto Trigger is activated when a black-colored paper is inserted in front of a gray paper.

Conditions

Paper used	Black paper from Glory called as Black 010010016 Gray paper from Glory called as Silver-gray 010010016
Ambient Light	500 to 1000 lux
Moving speed of paper	less than 2m/second
Ambient Temperature and Humidity	Room temperature, room humidity

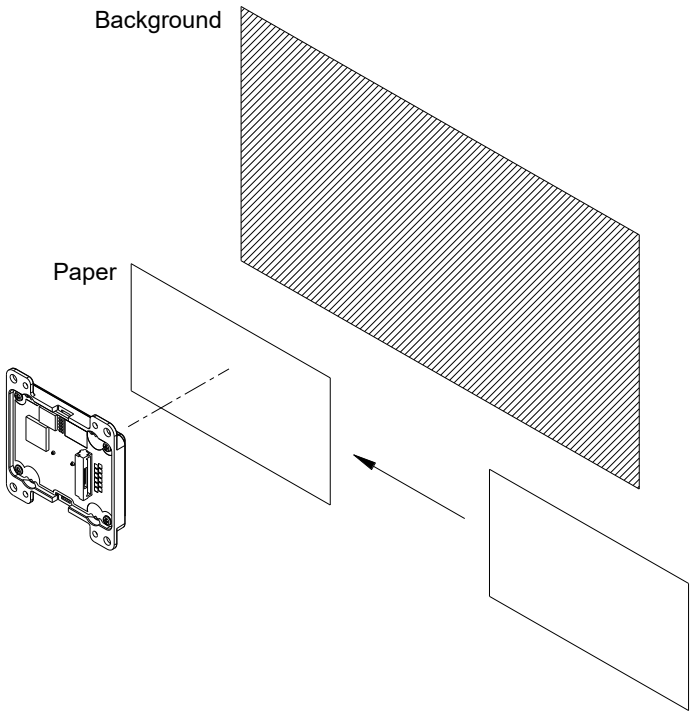


Figure 15: Auto Trigger Specification

9.11. Reading On-Screen Codes

You can read codes displayed on a screen (brightness of white part 30 cd/m2 or more, contrast ratio 100:1).

Reading Conditions

Code	QR Code 0.381 mm equivalent, specified in Section 9.1
Ambient light	100 lx or less
Distance	40 mm from the front edge of the scanner
Read mode	Screen only mode
Angle	α = 0°, β = 0°
LCD screen type	Transmissive (backlight) TFT and Organic EL

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

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

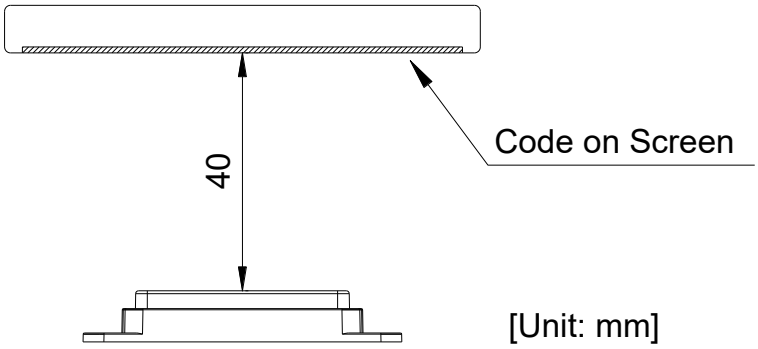


Figure 16: Reading On-Screen Codes

10. Interface Specification

The M-12M supports three interfaces: RS-232C, USB-HID, and USB-COM.
You can change the interface by changing the settings.

10.1. Interface Signal

A J.S.T.MFG.CO.,LTD. SM12B-GHS-TB (12PIN) connector is used.

No.	Name	Function	I/O	Conditions	State	Notes
1	GND	System ground				
2	BUZZERn	Buzzer	Out			Tone/sound pressure is adjustable by PWM signal
3	GR_LEDn	Good read LED	Out		L: LED on H: LED off	
4	RTS	Communication control signal to host system	Out	When RS-232C is set		
5	CTS	Communication control signal from host system	In			
6	TxD	Transmitted data signal to host system	Out			
7	RxD	Received data signal from host system	In			
8	V_{CC}	Power input	In			
9	TRIGn	Trigger	In		L: Start operation H: No action	
10	USB-	USB D- signal	In/Out	When USB is set		
11	USB+	USB D+ signal	In/Out			
12	GND	Frame ground				

10.2. USB Interface

The USB interface has two specifications: HID (Human Interface Device Class) and COM (Communication Device Class). COM allows for bidirectional serial communication and is used for command transmission from the host device to the scanner, in addition to receiving barcode data.

Notes:

- With USB-COM, the scanner can transfer images.
- For the USB-COM interface model, you need to install the Opticon USB-COM driver on your host device. Make sure to use the latest version of the USB-COM driver.
- While using USB-COM, if the host COM port is not actively open, scanned data cannot be sent.

10.2.1. USB Interface Specifications

Bus-power class: 500 mA (high-power)
Speed: Full speed (12 Mbps)
Interface: HID/COM (Virtual COM Port)

Notes:

- When using USB, the USB interface models are bus powered, so no AC adapter is needed.
- HID interface cannot transfer images.
- Use only a high-power bus (500 mA) USB port.
- Do not use the host keyboard when using USB-HID to transmit barcode data. Data may be lost.

Parameter	Description
Transfer Speed	USB2.0 Full Speed/High Speed
Vendor ID	065A
Product ID	A001 (HID)
Product ID	A002 (COM)

10.3. RS-232C Interface

This section describes RS-232C serial communication with a host computer.

Notes:

- When the COM port on the host side is closed, scanned data cannot be sent.

10.3.1. Initial Communication Settings

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

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

10.3.2. Signal Level

Signal 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

11. Environmental Specifications

11.1. Temperature

Scanning performance is guaranteed when the ambient temperature around the scanner is within the following ranges:

Operating Temperature	-20 to 60 °C
Storage Temperature	-30 to 65 °C

Conditions

Barcode	0.33 mm UPC, specified in section 9.1.
Distance	40 mm from the front edge of the scanner
Angle	α = 0°, β =0°
Curvature	R = ∞
Scanning Test	Read at intervals of 300 ms

11.2. Humidity

Scanning performance is guaranteed when the ambient humidity around the scanner is within the following ranges:

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

Conditions

Barcode	0.33 mm UPC, specified in section 9.1.
Distance	40 mm from the front edge of the scanner
Angle	α = 0°, β =0°
Curvature	R = ∞

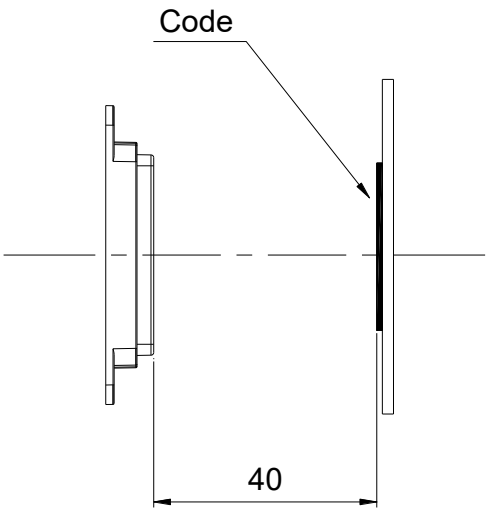
11.3. Ambient Light Immunity

Scanning performance is guaranteed when the illumination on a barcode surface is between 100 lx and the following values:

Incandescent light	10,000 lx
Fluorescent light	10,000 lx
Sunlight	120,000 lx

Conditions

Barcode	0.33 mm UPC, specified in section 9.1.
Distance	40 mm from the front edge of the scanner
Angle	α = 0°, β =0°
Curvature	R = ∞



[Unit: mm]

Figure 17: Ambient Light Immunity

Note: Avoid direct or specular reflection from the light source to get the best scanning performance.

11.4. Electrical Noise

Reading Codes

Sine wave component 50 Hz – 100 kHz, even 0.1 V_{P-P} or less noise on the power line. There should be no abnormalities in the output signal during the reading operation.

Conditions

Barcode	0.33 mm UPC, specified in section 9.1.
Distance	40 mm from the front edge of the scanner
Angle	α = 0°, β =0°
Curvature	R = ∞
Power Supply Voltage	5.0 V
Scanning Test	Read at intervals of 300 ms

Acquiring Image Data

Sine wave component 50 Hz – 100 kHz, even 20 mV_{P-P} or less noise on the power line. There should be no significant noise or inconsistencies in the acquired image, and it should be sufficient to discriminate.

* Power supply noise may affect image quality. However, the M-12M is not intended for capturing image data; its signal processing is specialized to achieve optimal characteristics for use as a barcode reader. The images obtained may have striking noise or unevenness compared to general digital cameras.

11.5. Vibration Strength (Without Packaging)

The M-12M is designed to withstand the conditions of the following vibration test.

Vibration Test Without Packaging

Increase the frequency of the vibration from 10Hz to 100Hz at an acceleration velocity of 19.6m/s2 (2.0 G) for 30 minutes in the non-operating state. Repeat twice for each X, Y, and Z direction.

11.6. Vibration Strength (in Individual Packaging)

The M-12M is designed to withstand the conditions of the following vibration test.

Vibration Test in Individual Packaging

Increase the frequency of the vibration from 10Hz to 100Hz at an acceleration velocity of 19.6 m/s2 (2.0 G) for 30 minutes in an individually packaged state. Repeat twice for each X, Y, and Z direction.

11.7. Drop Impact Strength (Without Packaging)

The M-12M is designed to withstand the conditions of the following drop test.

Drop Test Without Packaging

Secure the scanner to a dummy case and drop 16 times (3 times at each of 6 orientations), from a height of 150 cm onto a concrete floor.

11.8. Drop Impact Strength (in Individual Packaging)

The M-12M is designed to withstand the conditions of the following drop test.

Drop Test in Individual Packaging

Drop an individually packaged scanner 10 times in total, at any of 1 corner, 3 edges, and 6 faces, from a height of 150 cm onto a concrete floor.

12. Regulatory Compliance

12.1. LED Safety

IEC 62471:2006 Exempt Group

13. RoHS

RoHS compliance.

RoHS: The restriction of the use of certain hazardous substances in electrical and electronic equipment, Directive 2011/65/EU
Commission Delegated Directive (EU) 2015/863

14. Reliability

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

Note: Reliability is calculated based on standard operation of the product within the operating environment parameters and without extreme electronic or mechanical shock.

15. Precautions

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

Shock

- Do not drop from the non-standard height.
- Do not place any heavy items on the scanner.
- Do not squeeze the scanner between heavy items.

Temperature Conditions

- Do not use the scanner at temperatures outside the specified range.
- Do not pour boiling water on the scanner.
- Do not throw the scanner into fire.
- Do not leave the scanner in direct sunlight or in high or low temperatures for a long time.

Foreign Materials

- Do not put the scanner in water.
- Do not put the scanner in chemicals.

Other Precautions

- Do not plug/unplug the connectors while power is supplied.
- Do not disassemble this product.
- The scanner may be damaged by voltage drops caused by lightning.

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

16. Product Display

16.1. Product Label

The next image shows the label attached to the scanner.

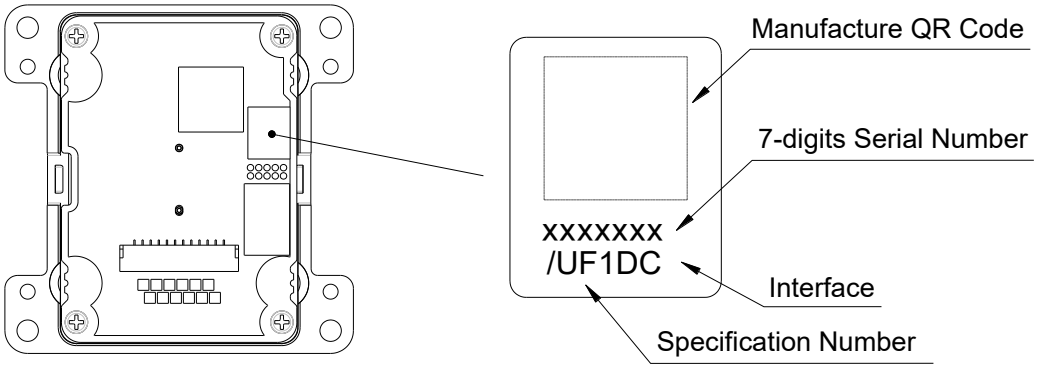


Figure 18: Product Label

* The serial number (seven-digits) starts from 1000001 or J000001 and is sequentially numbered.
* DC stands for USB-COM interface in default.

17. Packaging Specifications

17.1. Individual Packaging Specification

Package size: Approximately 71 x 71 x 21 (WDH mm)
Weight: Approximately 29 g

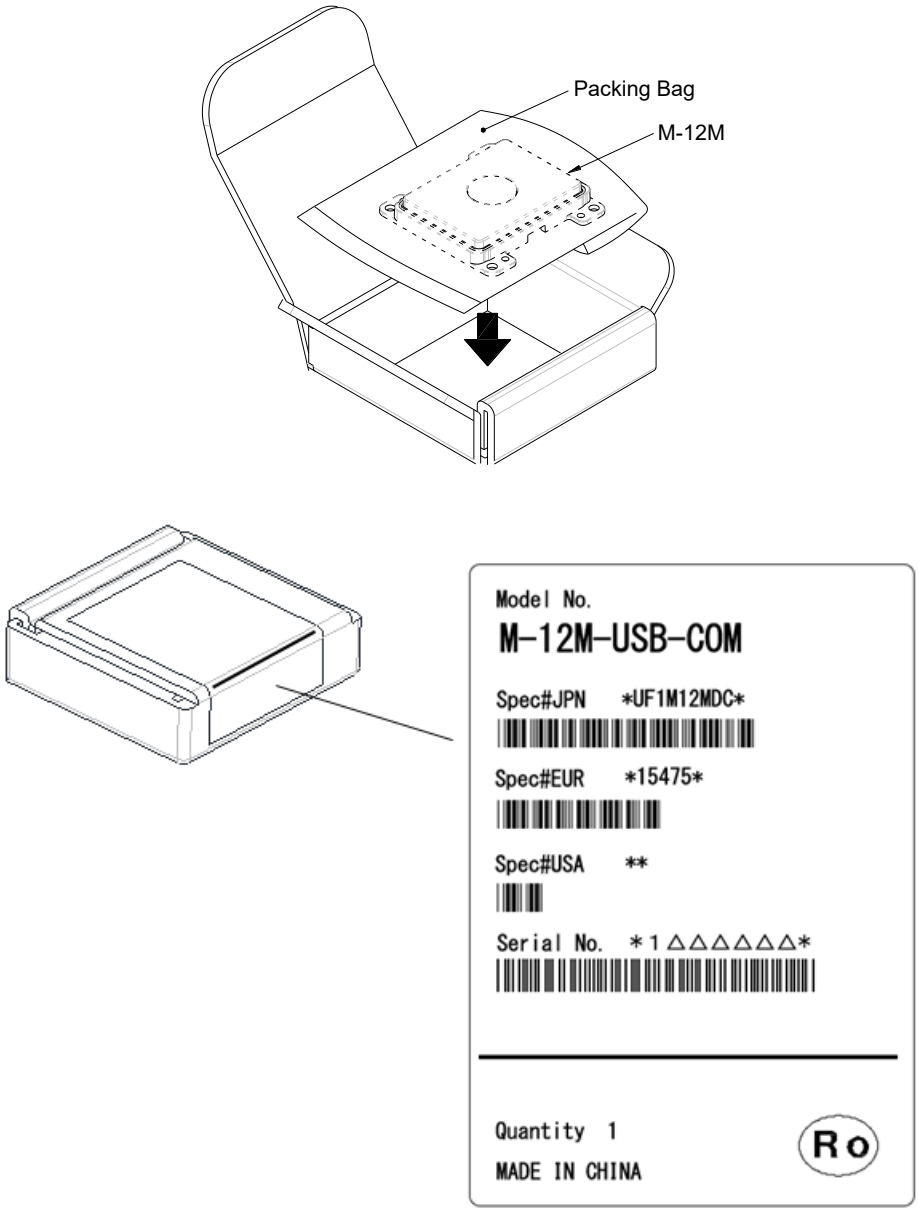
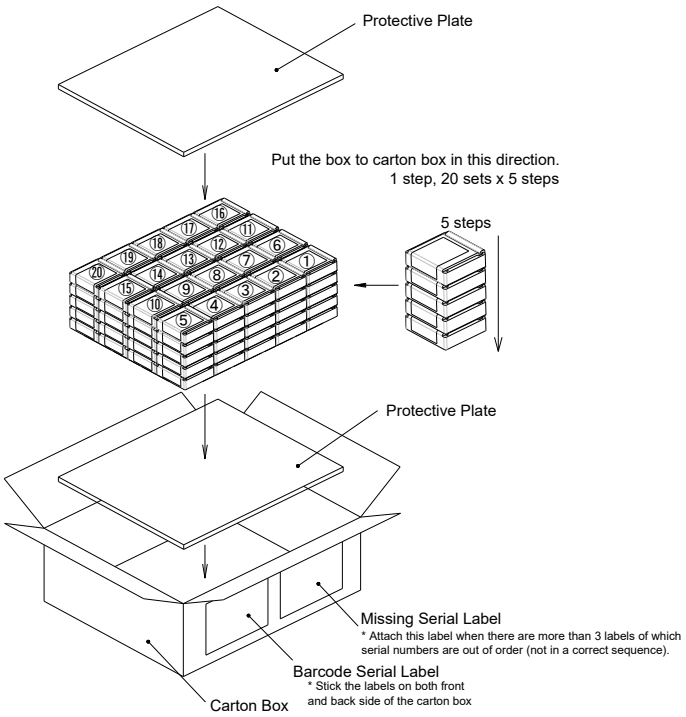


Figure 19: Individual Packaging

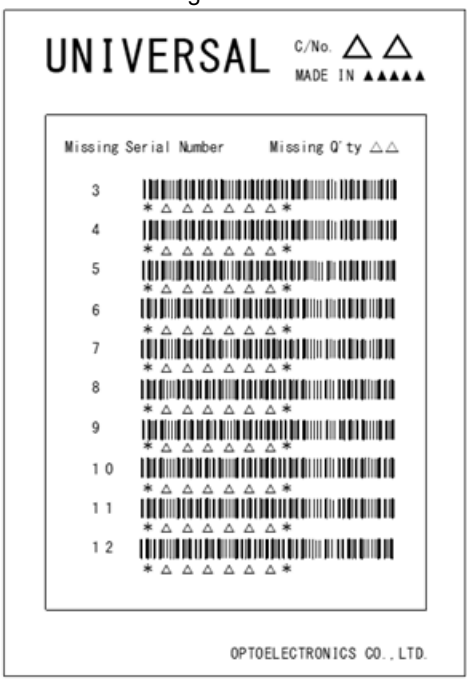
17.2. Collective Packaging Specification

Assembled package size: Approximately 370 × 300 × 150 (WDH mm)
Weight: Approximately 3.4 kg (USB interface model)



Barcode Serial Label

Missing Serial Label



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

Figure 20: Collective Packaging

18. Physical Features

18.1. Dimensions

Approximately 53.6 mm × 53.6 mm x 11.5 mm (WDH, except protruding portion)

18.2. Weight

Approximately 20 g

18.3. Mechanical Drawing

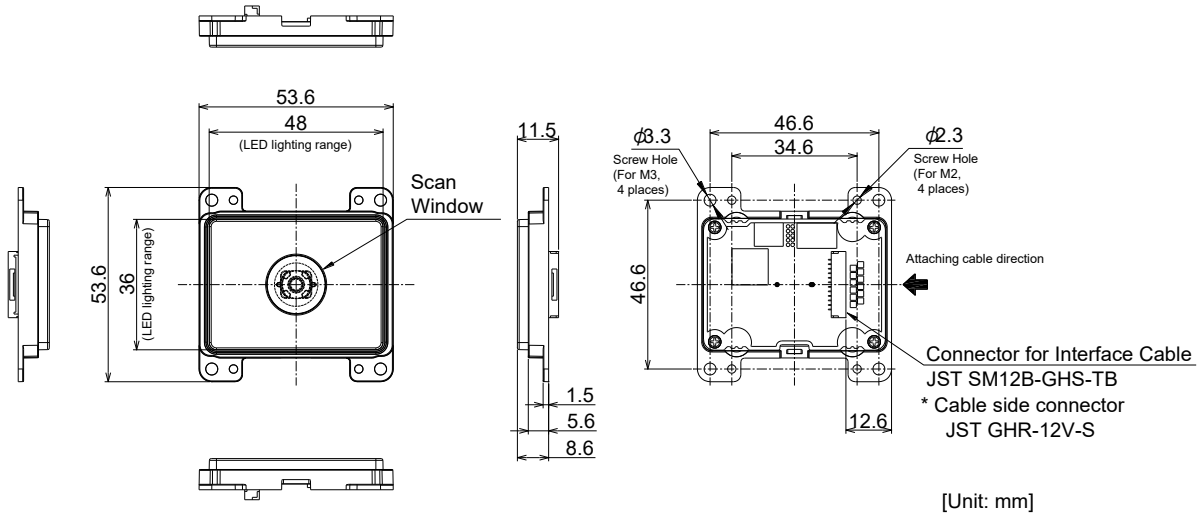


Figure 21: Mechanical Drawing

19. Default Settings

19.1. Default Menu Barcodes (Part 1: Supported Symbologies)

19.1.1. 1D Barcodes

The scanner is reset to each interface's factory default by reading the following menu barcodes.

Code Type	Default	Minimum Length	Notes
UPC	✓	-	
UPC Add-on 2, UPC Add-on 5		-	
EAN(JAN)	✓	-	
EAN Add-on 2, EAN Add-on 5		-	
Code 39	✓	3	Do not transmit ST/SP
Tri-Optic	✓	-	
Codabar	✓	3	Do not transmit ST/SP
Industrial 2 of 5	✓	5	
Interleaved 2 of 5	✓	6	
S-Code		-	
Code 128	✓	3	GS1 conversion (setting required in USB-HID)
Code 93	✓	3	
IATA	✓	5	
MSI/Plessey		3	
UK/Plessey		2	
MSI/Plessey		3	
Telepen		3	
Matrix 2 of 5		5	

19.1.2. Postal Codes

Code Type	Default	Minimum Length	Notes
Chinese Post Matrix 2 of 5		-	
Korean Postal Authority		-	
Intelligent Mail Barcode		-	
POSTNET		-	
PLANET		-	
Japan Postal		-	
Netherland KIX Code		-	
Australian Postal Code		-	
UK Postal (Royal mail)		-	
4-State Mailmark Barcode		-	

19.1.3. GS1 Databar, Composite Codes

Code Type	Default	Notes
GS1 DataBar ・GS1 DataBar Omnidirectional ・GS1 DataBar Truncated ・GS1 DataBar Stacked ・GS1 DataBar Stacked Omnidirectional	✓	GS1 conversion (setting required in USB-HID)
GS1 DataBar Limited	✓	
GS1 DataBar Expanded ・GS1 DataBar Expanded ・GS1 DataBar Expanded Stacked	✓	
Composite GS1 DataBar ・CC-A ・CC-B ・Limited CC-A ・Limited CC-B ・Expanded CC-A ・Expanded CC-B	✓	GS1 conversion (setting required in USB-HID)
Composite GS1-128 ・CC-A ・CC-B ・CC-C	✓	GS1 conversion (setting required in USB-HID)
Composite EAN ・EAN-13 CC-A ・EAN-13 CC-B ・EAN-8 CC-A ・EAN-8 CC-B		GS1 conversion (setting required in USB-HID)
Composite UPC ・UPC-A CC-A ・UPC-A CC-B ・UPC-E CC-A ・UPC-E CC-B		GS1 conversion (setting required in USB-HID)

19.1.4. 2D Codes

Code Type	Default	Notes
PDF417	✓	
Micro PDF417		
Codablock F		
QR Code	✓	GS1 conversion (setting required in USB-HID)
Micro QR	✓	
rM QR Code		
Data Matrix	✓	GS1 conversion (setting required in USB-HID)
Aztec Code	✓	
Aztec Runes		
Chinese-sensible (Han Xin) code		
Maxi Code		

19.1.5. OCR Font

Code Type	Default	Notes
[ICAO Machine Readable Travel Document]		
Machine readable Passports		
Machine readable Visa-A		
Machine readable Visa-B		
Official Travel Documents 1		
Official Travel Documents 2		
ISBN (OCR font-B)		

19.2. Default Setting (Part 2: Read Setting, Trigger, Buzzer)

Command	Default Setting
Read mode	Single read
Reading effective time	Trigger synchronize
Extended read time	Disable
Buzzer duration	50 ms
Buzzer tone	3000Hz
Start-up buzzer	Enable
Buzzer loudness	Maximum
Buzzer timing	Before data transmission
Good read LED indicator duration	200 ms
Indicator LED color	Light blue
Start-up LED Indicator	Disable
Data buffering	Buffered mode

[Data Buffering]
Not all output data can be received depending on the host system. So, you should use buffered mode for USB-HID and unbuffered mode for RS-232C and USB-COM interfaces.

Unbuffered Mode	Buffered Mode (default)

19.3. Default Setting (Part 3: Interface Communication Settings)

19.3.1. USB

Command	Default Setting
Keyboard language	USA (USB-HID)
Send “new line key “after data	Enable
Send “TAB key “after data	Disable
Send “→ key “after data	Disable
Other	CDC-ACM compliant (USB-COM)*

* When using USB-COM, OPTOELECTRONICS USB-COM driver must be downloaded.

19.3.2. RS-232C

Command	Default Setting
Baud rate	9600 bps
Parity	No parity
Data length	8 bits
Stop bits	1 bit
Handshaking	No handshake
ACK/NAK	ACK/NAK no response
CTS time out	Indefinitely
ACK/NAK time out	1 second
Command header	ESC or STX
Command terminator	CR or ETX
Response to the commands	Disable

20. Interface Setting

You can configure the M-12M with these interface settings. The M-12M does not come with a cable. You must provide your own cable.

Switchable Interface
USB-COM (Default)/USB-HID/RS-232C

* Customer specific settings need to be configured after switching the interface.

20.1. Switching to USB-COM

Operation	Command	Menu Code	Notes
Change interface to USB-COM and initialize	[X.Z[C01[X.ZZ2	@MENU_OPTO@ZZ@X.Z@C01@X.Z@ZZ@OTPO_UNEM@	*

*** Notes for USB-COM:**

- When the COM port on the host side is closed, scanned data cannot be sent.
- The OPTOELECTRONICS USB-COM driver needs to be installed on the host device.
- Make sure you are using the latest version of the USB Driver.
- After changing from HID to COM, depending on the compatibility of the host device, you may need to disconnect and reconnect the M-12M before the interface change is recognized by the host.
- If the interface switch is performed with the RS-232C cable connected, communication to the host fails. The M-12M will not be able to read.

20.2. Switching to USB-HID

Operation	Command	Menu Code	Notes
Change interface to USB-HID and initialize	[X.ZSU[X.ZZ2	@MENU_OPTO@ZZ@X.Z@SU@X.Z@ZZ@OTPO_UNEM@	*

* If the interface switch is performed with the RS-232C cable connected, communication to the host fails. The M-12M will not be able to read.

20.3. Switching to RS-232C

Operation	Command	Menu Code	Notes
Change interface to RS-232C and initialize	[X.ZU2[X.ZZ2	@MENU_OPTO@ZZ@X.Z@U2@X.Z@ZZ@OTPO_UNEM@	*

20.4. Forced Initialization

Forced initialization lets you read the initialization menu code regardless of the interface settings after turning on the M-12M. This function makes it possible to forcibly initialize and recover, even if the M-12M is unable to read due to incorrect settings.

Note: When an interface setting menu code that differs from the interface cable is read, communication to the host fails and the status LED remains flashing. The M-12M is not able to read. Attempting to read the original interface menu code fails.

To Forcibly Initialize and Recover the M-12M

1. Power off the M-12M.
2. Within 3 seconds of turning on the M-12M, read the interface setting and initialization menu code for the interface being used.
3. The resetting completion indicator illuminates yellow, and after 3 seconds, the initialization is complete. The M-12M automatically changes to normal reading operation.

Please be careful when switching between interfaces.