



This manual provides the specifications for the M-6 fixed position 2D scanner.

Specifications Manual

All information subject to change without notice.

Document History

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1. Abstract

This manual provides the specifications for the M-6 fixed position 2D scanner.

2. Overview

The M-6 is a fixed position 2D scanner adopting the latest technology to enable smooth scanning of linear (1D) and 2D symbologies. Main features of this scanner are as follows:

- **Smooth scanning**
New imaging technology enables smoother and more comfortable scanning than ever before. Both 1D and 2D codes can be read just by holding a label in front of the scanner.
- **Auto trigger**
The M-6 offers comfort in use by supporting auto detection. The LEDs will only be fully on when necessary to read a bar code.
- **Code scanning on mobile devices**
The M-6 has a high ability to read codes displayed on mobile devices such as mobile phones.
- **Single line scanning**
The M-6 is able to read a specific target code from an object containing multiple printed codes. When the trigger switch is pressed, the scanner emits a single aiming line helping to select a target code from multiple codes.
- **Various Interfaces**
The M-6 supports RS-232C, USB (HID), and USB (VCP) interfaces. USB (VCP) can be used to send command communications from the host.
- **Rugged design**
The M-6 can withstand a drop from a height of 1.5 meters.
- **Wide range of supported symbologies**
The M-6 supports symbologies such as GS1 DataBar (formerly called RSS), Aztec Code, EAN, UCC Composite bar code and so on. Please refer to "12. Default Settings" for details of supported symbologies.
- **RoHS compliance**
The M-6 is a RoHS compliant product, which is declared by Optoelectronics Co., Ltd.

3. Physical Features

Item		Specifications	Notes	
Control	ASIC	OEY-0603	CPU: ARM-1026EJ-S Core: 160 MHz	
	SDRAM	128MB (1M × 4 Banks × 32 Bits)	SDCLK: 80 MHz	
	Flash ROM	16 MB (1M × 16 Bits) flash memory		
Interface	RS-232C	9,600 ~ 115,200 bps		
	USB	Full-Speed 12Mbps (HID/VCP) Hi bus-powered		
Optical Section	Scan Method	CMOS area sensor	MCLK: 24 MHz	
	Scanning Light Source	8-AllnGaP Red LEDs (normal scanning mode)	625nm	
		4-AllnGaP Red LEDs (mobile phone scanning mode)	633nm	
	Aiming Light Source	2-InGaN Green LEDs	525nm	
	Status Light Source	Green LED : good red	570nm	
		Blue LED : standby (normal scanning mode)	470nm	
		Orange LED : standby (mobile phone scanning mode)	606nm	
	Effective Pixels	WVGA (H:752 x V:480)		
	View Angle	Horizontal : 46.0° Vertical : 30.0°	Typical value	
	Field Of View	0mm : 50 X 32mm	No guaranty is given as to the read performance, depending on the conditions of code types and/or resolution.	
50mm : 94 X 59mm				
100mm :137 X87mm				
150mm :180 X 115mm				
IR Detection Area	155mm			
Supported 1D Symbology	Supported 1D Symbologies	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, Chinese Post Matrix 2 of 5, IATA, Code11, Korean Postal Authority code, GS1 DataBar, Postal Code	GS1DataBar: formerly RSS GS1-128: formerly UCC/EAN128	
	Min. Resolution	0.127mm	Code 39 (PCS: 0.9)	
	Curvature	r ≥ 15 mm (with 8-digit JAN) r ≥ 20 mm (with 13-digit JAN)	PCS: 0.9	
	Depth of Field (mm)	Resolution: 0.127	18 ~ 38	PCS: 0.9
		Resolution: 0.260	0 ~ 130	
Resolution: 0.330		0 ~ 155		

Item		Specifications		Notes		
Supported 2D Symbology	Supported 2D Symbologies		PDF417, MicroPDF417, QR Code, MicroQR Code, Data Matrix (ECC 000-140/ECC 200), MaxiCode (Modes 2 to 5), Aztec Code, EAN.UCC Composite bar code, Codablock F			
	Min. Resolution (mm)		PDF417	: 0.127	PCS 0.9	
			Data Matrix & QR Code			: 0.212
	Depth of Field (mm)	PDF417	Resolution: 0.127	18 ~ 45mm		PCS 0.9
			Resolution: 0.254	0 ~ 130mm		
Data Matrix			Resolution: 0.381	0 ~ 110mm		
QR Code	Resolution: 0.381	0 ~ 110mm				
1D/2D Common	Scan Angle		Tilt	: 360°	JAN-13, PDF417	
			Pitch	: ± 55°	Resolution: 0.254mm	
			Skew	: ± 50°	Distance: 80mm from the edge of the scanner	
			* Scanning may fail due to specular reflection at some angles.		Curvature: r = ∞	
	Min. PCS		0.45 or higher		MRD: 32% or higher	
Supported Symbology for Mobile Devices	Supported 1D symbologies for mobile devices		UPC-A, UPC-A Add-on, UPC-E, UPC-E Add-on, EAN-13, EAN-13 Add-on, EAN-8, 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, Chinese Post Matrix 2 of 5, IATA, Code 11, Korean Postal Authority code, GS1 DataBar, Postal Code			
	Supported 2D symbologies for mobile devices		QR Code, MicroQR Code, Data Matrix (ECC 000-140/ECC 200), PDF417, MicroPDF417, Aztec Code, MaxiCode(Modes 2 to 5), EAN.UCC Composite bar code, Codablock F			
	Min. Resolution (mm)		2D code	: 0.330	*It may be unable to read depending on the condition of LCD.	
			1D code	: 0.254		
	Scanning reference position		10mm			
	Field of view		55mm x 34mm			
Depth of field (mm)		0 ~ 40 mm				
Power Supply	Range of Operating Vol.		4.5 ~ 6.6 V		Dedicated AC adapter: 6.0V ± 5%	
	Current Consumption (USB)	Inrush	2.3 A		5μs or less	
		Peak	420 mA		When scanning / decoding	
		Average	280 mA (typ)		When scanning / decoding	
		Standby	140 mA (typ)			
	Sleep mode	85 mA (typ)		Average value		
Environmental Specifications	Temperature	Operating	0 to 40 degrees C			
		Storage	-40 to 70 degrees C			
	Humidity	Operating	5 to 95 % (no condensing)			
		Storage	5 to 95 % (no condensing)			
	Ambient Light Immunity	Fluorescent	10,000 lx or less		Except for mobile phone scanning mode	
		Incandescent	10,000 lx or less			
		Sunlight	50,000 lx or less			
Vibration		Increased the frequency of vibration from 10Hz to 100Hz at an accelerated velocity of 19.6m/s ² (2G) for 60 minutes (6 minutes x 10 cycles) each in X-direction, Y-direction and Z-direction.				
Shock		Drop test: Drop the scanner facing 5 sides from a height of 150cm onto concrete floor per cycle.				
Protective Structure		IP67				

item		Specifications	Notes	
Regulatory	LED Safety Standard	IEC 62471:2006 Exempt Risk Group		
	EMI/RFI	VCCI, EN55022, FCC Class-B	For residential, commercial and light-industry environments	
	European Conformity	CE Marking		
	Immunity Standard	EN55024 (EN61000-6-1) Class-B	For residential, commercial and light-industry environments	
Immunity Test	Residence to Static Electricity	No destruction	Impressed static electricity of 15kV for 50 times on the surface of the scanner.) Contact Discharge (direct / indirect): ± 6 kV Air Discharge (direct):± 8 kV	IEC:61000-4-2 compliant test
		No malfunction		
	Amplitude Modulation (AM) caused by Radio Signal	Frequency	80 to 1000 MHz	IEC:61000-4-3 compliant test
		Level	3 V/m	
		AM	80 % (AM)	
	Fast Transient	Voltage	Alternating-current Input Cable: ± 1 kV	IEC:61000-4-4 compliant test
		Pulse	5 / 50 ns (Tr/Tw)	
		Frequency	5 kHz	
	Surge Voltage	Pulse	1.2 / 50 ns (Tr/Th)	IEC:61000-4-5 compliant test
		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 to 80 MHz	IEC:61000-4-6 compliant test
		Level	3 V	
		AM	80 % (AM)	
	Power Frequency Magnetic Field	Frequency	50 and 60 Hz	IEC:61000-4-8 compliant test
Level		3 A/m		
Voltage Dip, short interruptions and voltage variations	Dip 1	Drop 30 %, 0.5 Cycles	IEC:61000-4-11 compliant test	
	Dip 2	Drop 60 %, 5 Cycles		
	Momentary Drop	Drop 95 %, 250 Cycle		
Physical spec	Dimensions (mm)	85.0 (W) × 55.5 (D) × 99.5 (H)		
	Weight	Approx. 290g	Excluding cable	

4. Detailed View

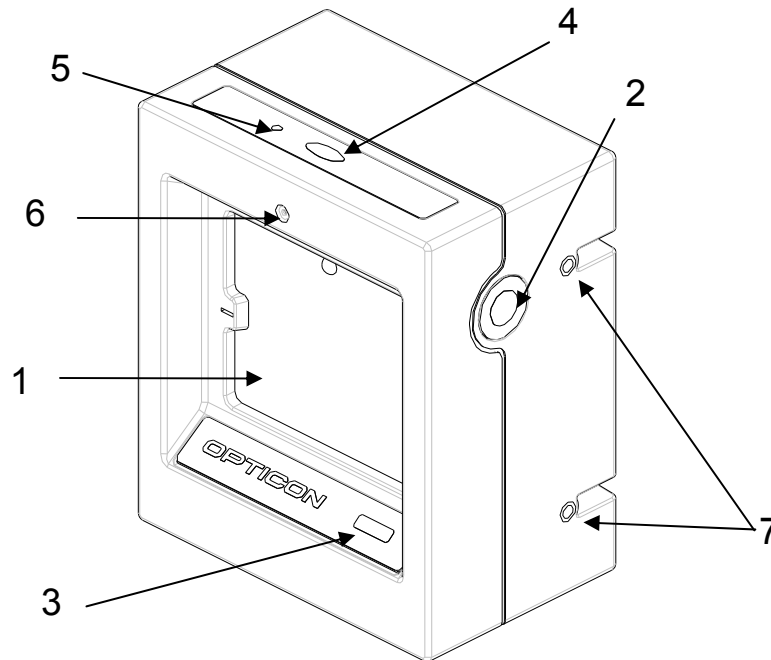


Figure 1: Detailed View of M-6

No.	Name	Description
1	Optical Window	A window to read 1D / 2D codes
2	Trigger Switch	A switch to move to Single Line Scanning mode
3	Mode Switch	A switch to change modes between Normal and Mobile Phone Scanning modes.
4	Indicator LED	Green LED lights to indicated a successful read. Blue LED lights when the scanner is ready for scanning in Normal Scanning mode.
5	Indicator LED (Mobile Phone Scanning mode)	Orange LED lights when the scanner is ready for scanning codes on mobile devices.
6	Buzzer Hole	A hole through where a sound comes out from a built-in buzzer. Buzzer sounds according to the buzzer settings configured. When this hole is covered, you may not be able to hear the buzzer sound.
7	Screw Holes	Holes to use for installing the scanner in other devices. M3 screws (valid depth 5mm) can be used.

5. Scanning Mode

Normal scanning mode

It automatically starts scanning just by holding a bar code label over the scan window.

Mobile phone scanning mode

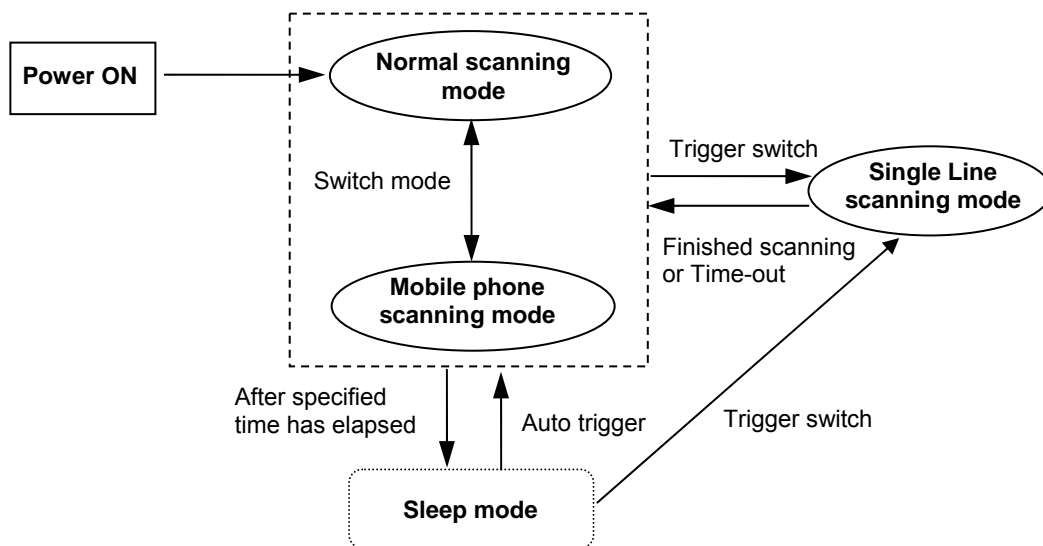
It is possible to read codes displayed on mobile devices such as phones.

Single line scanning mode

It is possible to read a specific target code from an object containing multiple printed codes. The scanner emits a single aiming line helping to select a target code from multiple codes.

Sleep mode

When auto trigger is not activated within a specified period of time, the scanner is able to enter Sleep mode. The scanner can go back to the scanning mode by activating the auto trigger.



Note:

- (1) Sleep mode is disabled by default.
- (2) Sleep mode is not available with USB/VCP.
- (3) The following menus or commands also can be used to switch modes:

Mode conversion		Menus / Commands
Normal scanning mode	-> Mobile phone scanning mode	E8Z
Mobile phone scanning mode	-> Normal scanning mode	E8Y

6. Electrical Specifications

6.1. Configuration

The M-6 consists of

- a Camera section of CMOS sensor and lens
- a Decode and communication control section, where 1D / 2D code data from a scanned image is decoded
- an Interface and power supply section, where the main power supply (3.3V) is converted and the decoded results are output

The USB model is bus powered and no adapter is needed. The RS-232C model needs a dedicated adapter for DC 6.0V power. Do not abruptly turn off the power adapter right after the settings are changed. It may cause malfunctions of the M-6.

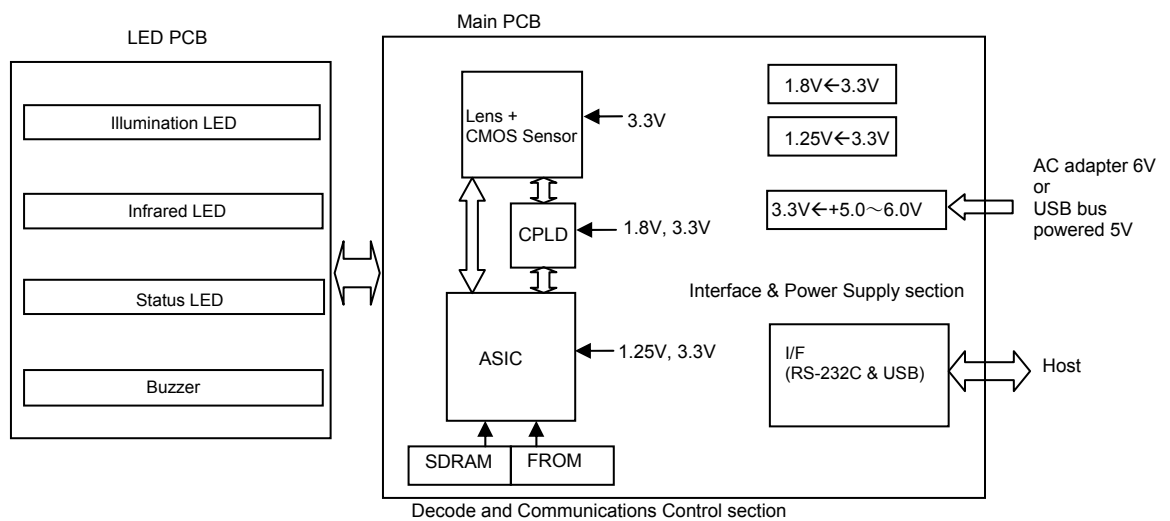


Figure 2: Configuration

6.2. AC Adapter (RS-232C model)

6.2.1. Input

Voltage	: AC 90V ~ 265V
Frequency	: 47Hz ~ 63Hz
Maximum current	: 0.5A

6.2.2. Output

Voltage	: 6.0V ±5% / Output current: 0 ~ 2.0A
Ripple	: 120m Vp-p max (rated load)

6.3. USB Power Supply

Bus-Power (class)	: Hi-Power (500mA max)
Nominal current	: 500mA

7. Optical Specifications

Item	Characteristics	Unit
Scan method	CMOS area sensor (black / white)	-
Number of effective pixel	752 (H) × 480 (V)	pixel
Frame rate	50	fps
View angle	Horizontal	46.0
	Vertical	30.0
Scanning light source (Normal scanning mode)	Wavelength	633
	Maximum radiation output (instantaneous value)	505.7
Scanning light source (Mobile phone scanning mode)	Wavelength	625
	Maximum radiation output (instantaneous value)	1.2
Aiming light source	Wavelength	525
	Maximum radiation output (instantaneous value)	7.1
Auto trigger light source	Wavelength	850
	Maximum radiation output (instantaneous value)	52.0

* The Maximum radiation outputs for the each light source is the reference values extracted from the LED datasheet.

8. 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	: 500 ~ 1500 lx
Angles	: $\alpha = 0^\circ$
Skew	: $\beta = 0 \sim 10^\circ$
Tilt	: $\gamma = 0^\circ$
Curvature	: $R = \infty$
Power Supply Voltage	: 6.0V
PCS (1D and 2D)	: 0.9 or higher
Scanning Test	: Carry out 10 scanning tests. The scanner is approved when scanning is successful in 70% or higher in the testing.
Bar code Test Sample (1D and 2D)	: Specified below

Code 39 (resolution 0.127 mm) and JAN codes used for the testing are listed on the OPTOELECTRONICS test chart. Other codes listed on a chart are printed by a normal printer (NW ratio = 1 : 1.25).

Supported 1 D symbology

<Code 39>

Resolution	Symbology	PCS	Size (mm)	No. of Digits
0.127mm	Code 39	0.9	11 x 10	4

<JAN>

Resolution	Symbology	PCS	Size (mm)	No. of Digits
0.260mm	13-digit JAN	0.9	25 x 19	13
0.330mm	13-digit JAN	0.9	31 x 24.5	13

Supported 2 D symbology

<PDF417>

Resolution	Error Correction	PCS	Size (mm)	No. of Characters
0.127mm	Level-4	0.9	13 x 8	17
0.254mm	Level-4	0.9	26 x 16.5	17

<Data Matrix>

Resolution	Model	PCS	Size (mm)	No. of Characters
0.381mm	ECC200	0.9	9 x 9	40

<QR Code>

Resolution	Error Correction	PCS	Size (mm)	No. of Characters
0.381mm	M	0.9	11 x 11	44

8.1. Field of View

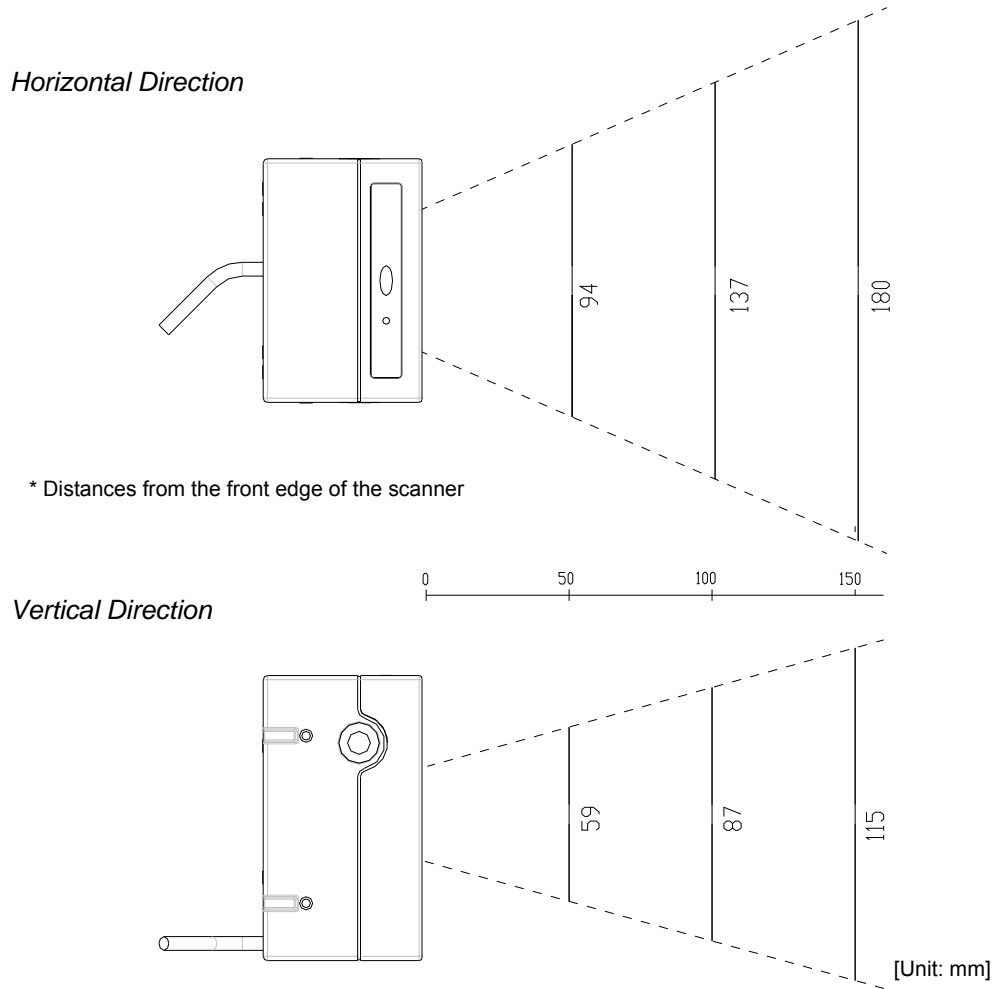


Figure 3: Field of View

*Those are the typical values of the filed range calculated from the specifications of view angle and the distance from the edge of the scanner, which does not guarantee the readable range.

8.2. Depth of Field

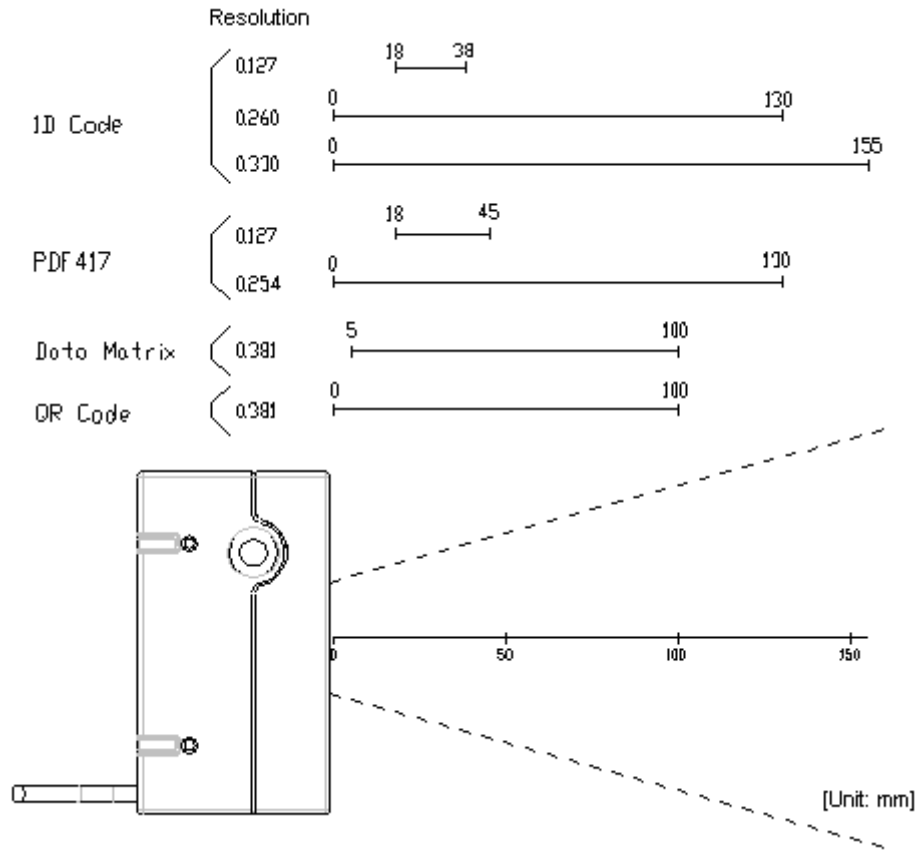


Figure 4: Depth of Field

8.3. Print Contrast Signal

PSC 0.45 or higher

<Conditions>

- MRD : 32% and higher (70% or higher reflectivity of space and quiet zone.)
- Distance : 40 mm from the front edge of the scanner
- Bar code Sample : PDF417 specified in Chapter 8
- (1D and 2D) (Resolution: 0.254 mm, PCS: 0.45)

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

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

8.4. Resolution

0.0762mm : Code 39 (specified in Chapter 8)

0.127mm : PDF417 (specified in Chapter 8)

0.127mm : Data Matrix, QR Code

8.5. Pitch, Skew, and Tilt

Pitch : $\alpha = \pm 55^\circ$

Skew : $\beta = \pm 50^\circ$

Tilt : $\gamma = 360^\circ$

Note: In case the reflectivity is high, there are some angles at which scanning fails due to the specular reflection.

<Conditions>

Bar Code Sample : JAN-13 and PDF417 specified in Chapter 8
(Resolution: 0.245mm, PCS: 0.9)

Distance : 80 mm from the front edge of the scanner

Angle : Pitch angle measurement: set the skew angle $\beta = 10^\circ$ fixed.

Tilt angle measurement: set the skew angle $\beta = 10^\circ$ when the pitch angle is 0° and rotate 1D/2D codes.

Curvature : $R = \infty$

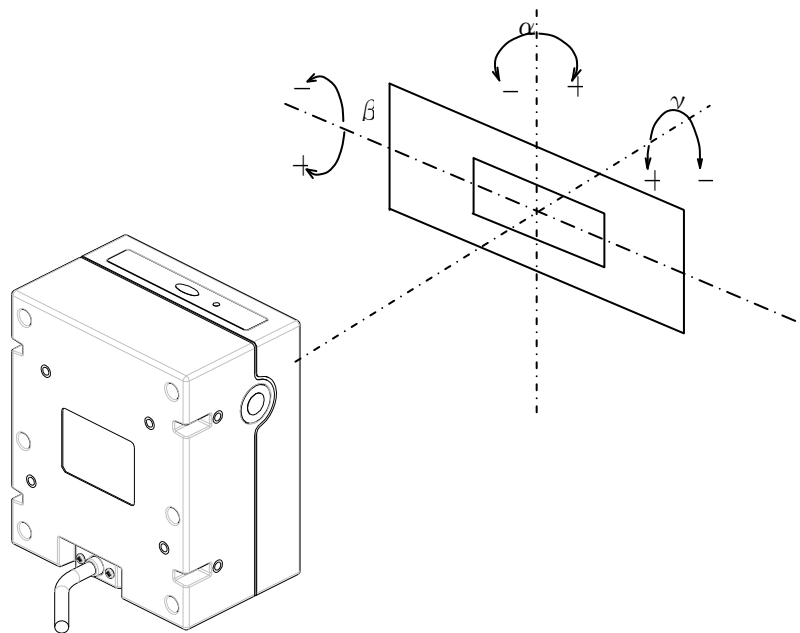


Figure 5: Pitch, Skew and Tilt

8.6. Curvature

8-digit JAN : $r \geq 15\text{mm}$

13-digit JAN : $r \geq 20\text{mm}$

<Conditions>

Bar Code Sample : PCS = 0.9, Resolution = 0.26 mm, Quiet Zone = 10 mm
as specified in Chapter 8

Distance : 80 mm from the front edge of the scanner

Angle : Skew $\beta = 10^\circ$

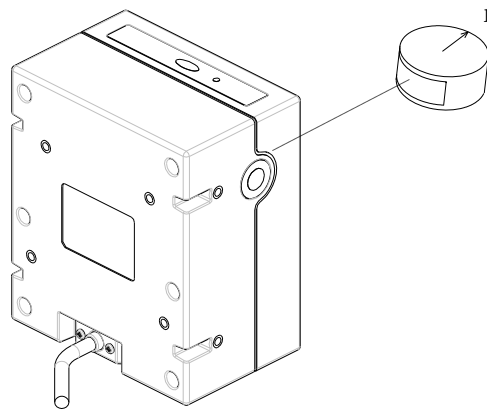


Figure 6: Curvature

Note: Scanning may fail due to the specular reflection of illumination LEDs when the reflectivity is high. In that case, scan the code tilting the scanner in the skew direction so that the performance can improve. The ambient lights also may cause the reflection and the degraded scanning performance.

8.7. Sybologies for Mobile Devices

Field of view 50mm x 30mm
 Depth of field 0 ~ 40mm

<Conditions>

Bar code Sample QR code (specified in Section 8) displayed on 2.4-inch LCD,
 (1D and 2D) 320x240 pixels

Angles Pitch: $\alpha = 0^\circ$, Skew: $\beta = 0$, Tilt: $\gamma = 0^\circ$
 Curvature $r = \infty$

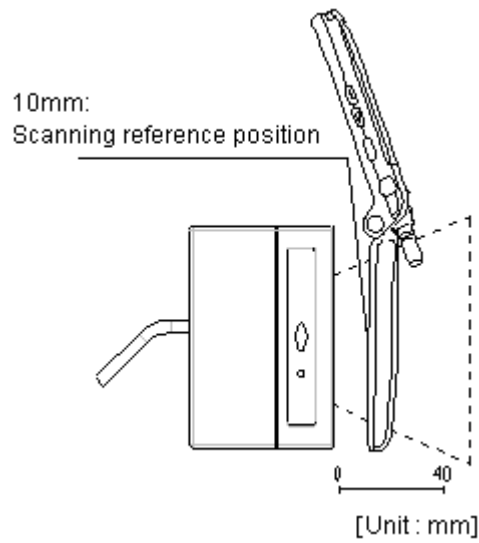


Figure 7: Depth of field (codes for mobile devices)

9. Auto Trigger

9.1. Operating Principle

When illuminating a part of the scan area with infrared LEDs and detecting the reflected light by the CMOS area sensor, the scanner starts scanning.

9.2. Specifications

Trigger gets enabled when an object/paper passes through the detection area.

<Conditions>

Size of Detected Paper

Bigger than the detection area

Size of Background

Bigger than the scanning area

Ambient Temperature and Humidity

Room temperature and room humidity

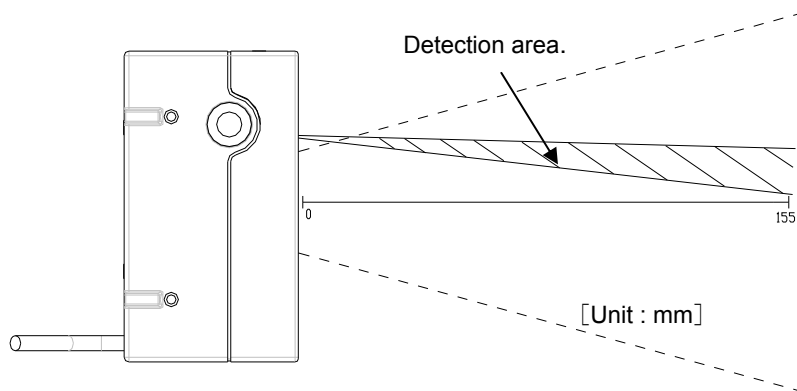


Figure 8: Detection Area

Note: When the colors of an object to be detected (label) and its background are similar and those positions are adjacent, the auto trigger may not be activated.

10. Interface Specifications

The M-6 supports either RS-232C or USB interface.

10.1. RS-232C Interface

10.1.1. Setting

Reading menu bar codes [ZZ] + [U2] + [ZZ] can set RS-232C interface default. Kanji codes and image data can be transmitted via RS-232C interface.

10.1.2. Signal Level and Pin Assignment

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

Signal name	Pin No.	Notes
Shield	1	
TxD	2	
RxD	3	
(NC)	4	Open (not connected)
GND	5	
(NC)	6	Open (not connected)
CTS	7	
RTS	8	
(NC)	9	Open (not connected)

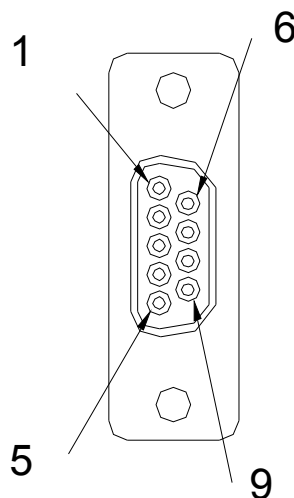


Figure 9: RS-232C Connector

10.1.3. RS-232C Interface Circuit

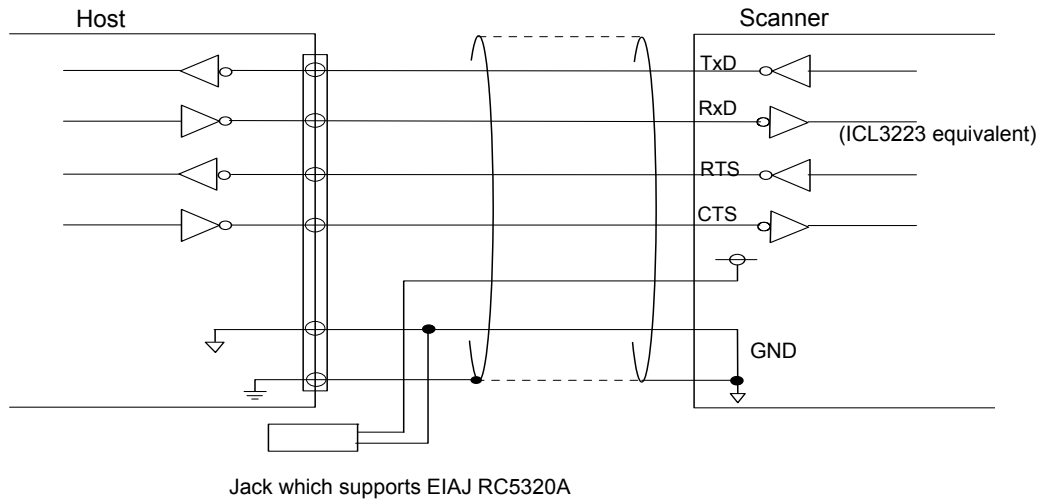


Figure 10: Interface Circuit

Connector : D-Sub9pin, female
Power supply : EIAJ RC5320A (voltage class2) jack

10.1.4. Character Format (for transmitting / receiving data)

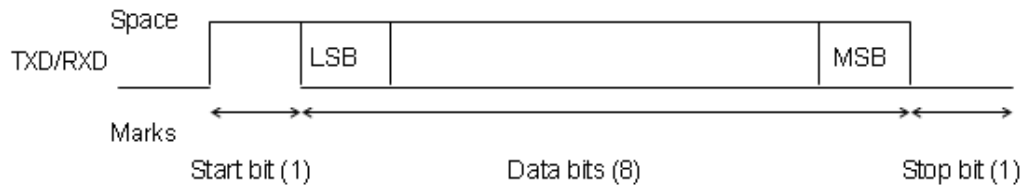


Figure 11: Character Format

10.1.5. Communication Format

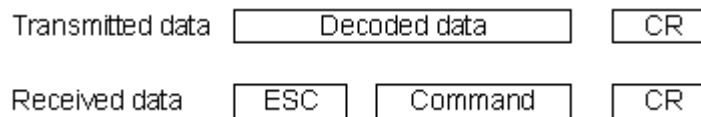


Figure 12: Communication Format

10.1.6. Handshaking

Select handshaking options using the menu or command listed below.

Handshaking	Menu / Command
No handshaking	P0
BUSY/READY	P1
MODEM	P2
ACK/NAK	P3
ACK/NAK NO RESPONSE	P4

a) No handshaking

The scanner makes communication regardless of the state of the host system.

* In this setting, the commands from the host system may not be received correctly..

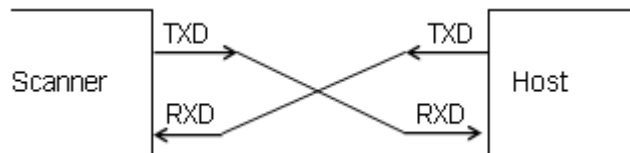


Figure 13: No Handshaking

b) Busy/Ready

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

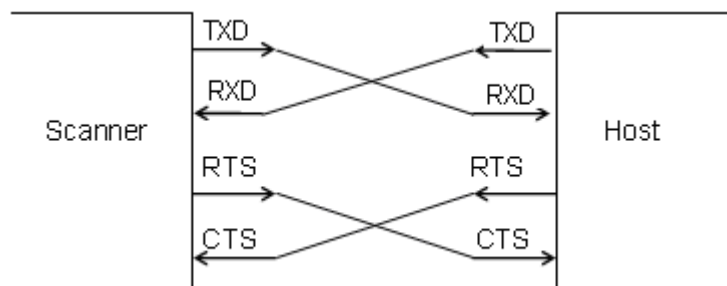


Figure 14: BUSY / READY

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

The following options are provided for the CTS line timeout setting. The default is "indefinitely" (I0).

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

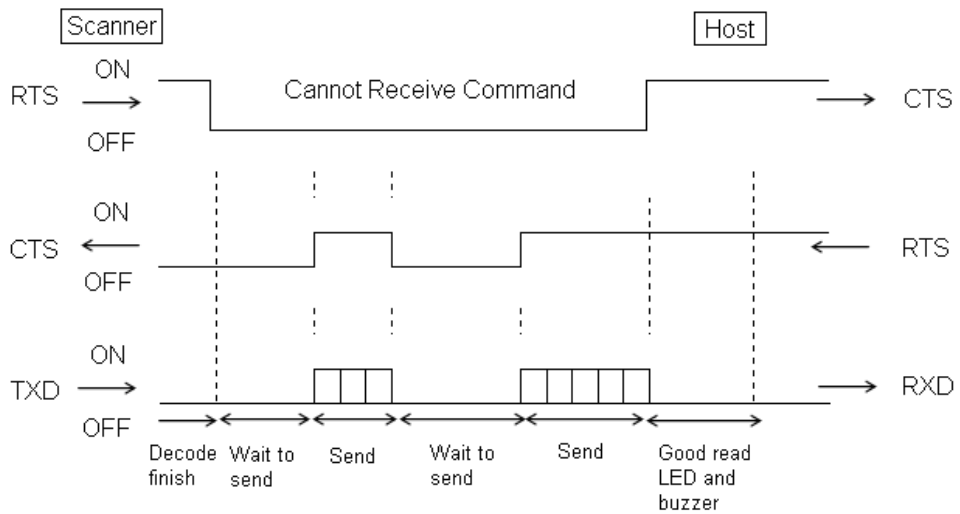


Figure 15: Cannot Receive Command

<CTS, TXD signals timing >

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



Figure 16: Signals Timing

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

e) ACK/NAK No Response

When no response from the host is received within 100ms, the scanner assumes that the host properly received the data. The other actions are the same as ACK/NAK.

*ACK/NAK timeout period is 100ms.

10.2. USB Interface

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.

10.2.1. Setting

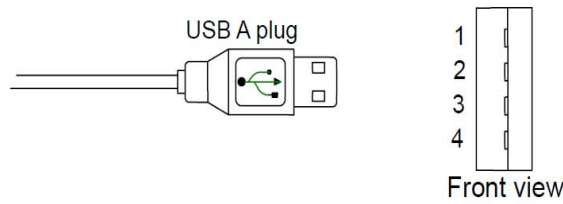
Reading menu bar codes [ZZ] + [SU] + [ZZ] can set USB-HID interface default.
Reading menu bar codes [ZZ] + [C01] + [ZZ] can set USB-COM interface default.

10.2.2. USB Interface Specifications

- Device Class : High-power bus-powered function. This interface does not require AC adapter.
- Speed : Full-speed (12 Mbps)
- Interface : USB-HID (Human Interface Device) or USB-COM (VCP - Virtual Communication Port)

*1: Japanese kanji data or images cannot be transmitted via this USB-HID interface.
*2: Make sure to connect to a Hi-power bus (500 mA max.) USB terminal.

10.2.3. Connector



Pin No.	Signal name
1	Vbus
2	Data (-)
3	Data (+)
4	GND

Figure 19: USB Pin Assignment

10.2.4. USB Interface Circuit

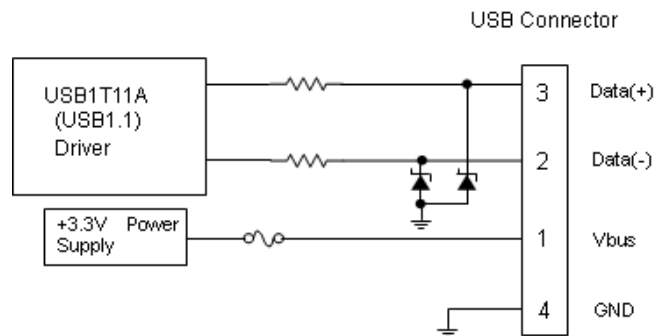


Figure20: USB Interface Circuit

11. Cable and Connector Specifications

11.1. RS-232C Interface

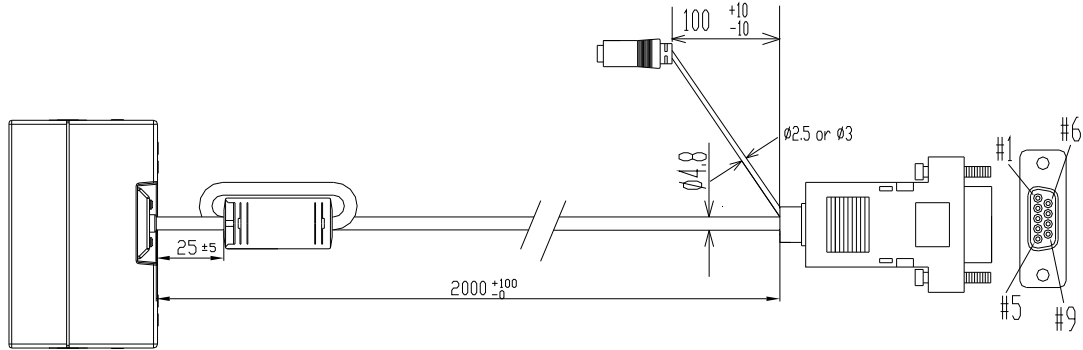


Figure 21: Cable for RS-232C

11.2. USB Interface

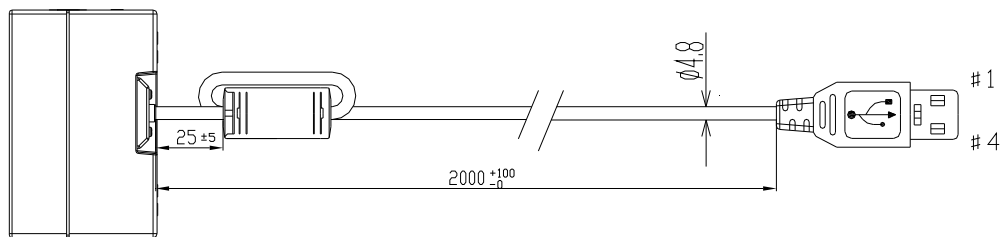


Figure 22: Cable for USB

12. Default Settings

The M-6 is configured for default settings at factory for each interface.

12.1. Default Settings

12.1.1. Readable Codes

Code type	Read	Transmit code length	Transmit CD	Calculate CD	Set prefix	Set suffix	Transmit other
UPC-A	○	×	○	○	—	CR	
UPC-A Add-on	×	×	○	○	—	CR	
UPC-E	○	×	○	○	—	CR	
UPC-E1	×	×	○	○	—	CR	
UPC-E Add-on	×	×	○	○	—	CR	
EAN13	○	×	○	○	—	CR	
EAN13 Add-on	×	×	○	○	—	CR	
EAN8	○	×	○	○	—	CR	
EAN8 Add-on	×	×	○	○	—	CR	
Code 39	○	×	○	×	—	CR	Not transmit ST/SP
Tri-Optic	○	×	—	—	—	CR	Not transmit ST/SP
NW-7	○	×	○	×	—	CR	Not transmit ST/SP
Industrial 2of5	○	×	○	×	—	CR	
Interleaved 2of5	○	×	○	×	—	CR	
Code 93	×	×	—	○	—	CR	
Code 128	○	×	—	○	—	CR	
GS1-128	×	×	×	○	—	CR	
S-Code	○	×	○	×	—	CR	
MSI/Plessey	○	×	○	○	—	CR	Not transmit CD2
UK/Plessey	○	×	○	○	—	CR	
TELEPEN	○	×	—	○	—	CR	
Matrix 2of5	×	×	○	×	—	CR	
Chinese Post	×	×	○	×	—	CR	
IATA	○	×	×	×	—	CR	
Code 11	×	×	×	○	—	CR	
Postal Code (JPN)	×	×	—	○	—	CR	
Postal Code (USPS)	×	×	—	○	—	CR	
Postal Code (POSTNET)	×	×	—	○	—	CR	
Korean Postal Authority code	×	×	×	○	—	CR	
PDF417	○	×	—	○	—	CR	
MicroPDF417	×	×	—	○	—	CR	
QR Code	○	×	—	○	—	CR	
MicroQR Code	×	×	—	○	—	CR	
Data Matrix (ECC200)	○	×	—	○	—	CR	
Data Matrix (ECC000-140)	×	×	—	○	—	CR	
MaxiCode	×	×	—	○	—	CR	
Aztec Code	×	×	—	○	—	CR	
Aztec Runes	×	×	—	○	—	CR	
Codablock F	×	×	—	○	—	CR	

*In case of enabling Codablock F, be sure to disable Code128. Codablock F may accidentally be recognized as Code 128.

Code type	Read	Transmit code length	Transmit CD	Calculate CD	Transmit other	Set prefix	Set suffix
GS1 DataBar Omnidirectional	○	x	○	○		—	CR
GS1 DataBar Truncated							
GS1 DataBar Stacked							
GS1 DataBar Stacked Omnidirectional							
GS1 DataBar Limited	○	x	○	○		—	CR
GS1 DataBar Expanded	○	x	—	○		—	CR
GS1 DataBar Expanded Stacked	○	x	—	○		—	CR
Composite EAN	x	x	○ (1D part)	○		—	CR
EAN13 CCA							
EAN13 CCB							
EAN8 CCA							
EAN8 CCB							
Composite UPC	x	x	○ (1D part)	○		—	CR
UPC-A CCA							
UPC-A CCB							
UPC-E CCA							
UPC-E CCB							
Composite GS1 DataBar	x	x	○ (1D part)	○		—	CR
CCA							
CCB							
Limited CCA							
Limited CCB							
Expanded CCA							
Expanded CCB							
Composite GS1-128	x	x	—	○		—	CR
CCA							
CCB							
CCC							

GS1 DataBar: Former “RSS”, GS1-128: Former “UCC/EAN128”

Notes:

- In the “Reading” column, “○” means “Enable reading” and “x” means “Disable reading”.
- In the “Transmit code length” column, “○” means “Transmit code length” and “x” means “Not transmit code length”.
- In the “Transmit CD” column, “○” means “Transmit check digit” and “x” means “Not transmit check digit”. Also, “-” means “not supported”.
- In the “Calculate CD” column, “○” means “Calculate check digit” and “x” means “Not calculate check digit”.
- In the “Prefix”, “-” means “there is no prefix setting”.
- For Wedge/USB, enter [0x84] to set suffix. (Direct control character input menu is “71”.)

12.1.2. Read Options, Trigger, Buzzer

Item	Default setting
Read time (normal scanning mode)	1sec
Read time (mobile phone scanning mode)	3sec
Multiple read reset time	0.2sec
Power saving	Disabled
Number of digit of scanning	None
Read mode	Single read
NW-7 inter-character gap check	Same as a character
Multiple read (bar code only)	Disabled
Trigger switch	Enable
Single line scanning time out	3sec
Buzzer duration	100ms
Buzzer tone	3kHz
Buzzer loudness	Volume 1 (max.)
Indicator (green LED) duration	200ms

12.1.3. Communication Settings (RS-232C)

Item	"U2" Default Setting
Baud rate	9600 bps
Parity bits	None
Data length	8 bits
Stop bits	1 bit
Handshaking	No handshaking
ACK/NAK	ACK/NAK NO RESPONSE
CS time out	Indefinitely
ACK/NAK time out	1sec
Command header	ESC or STX
Command terminator	CR or ETX
Response to commands	Disable

12.1.4. Communication Settings (USB-HID, USB-VCP)

Item	"SU"/"C01" Default Setting
Scanner power: Max Power Descriptor	500mA
Keyboard (*)	US keyboard
Vender ID	0x65a (OPTOELECTRONICS)
Transmit 'Enter key' after data (*)	Enable
Transmit 'Tab key' after data (*)	Disable
Transmit 'Arrow right key' after data (*)	Disable

(*): These settings are enabled for USB-HID interface only.

12.1.5. Reading Options

(1) Read time

This option can be used to configure the read time, counting from the moment the reading has started by auto trigger. The following menus/commands are provided for the configuration.

Normal scanning mode		Normal scanning mode	
Read time	Menu/Command	Read time	Menu/Command
0.5 sec	Y0	1 sec	E91
1 second (default)	Y1	2 sec	E92
2 sec	Y3	3 sec (default)	E93
3 sec	Y4	4 sec	E94

(2) Multiple Read Reset Time

This option can be used to prevent 1D / 2D codes from being read twice. The following menus/commands are provided for the configuration.

Multiple Read Reset Time	Menu/Command
0.22 sec (default)	AH
0.35 sec	AI
0.48 sec	AJ
0.61 sec	AK
0.74 sec	AL
0.87 sec	AM
1 sec	AN
No double-reading	AG

(3) Power Saving

When auto trigger is not activated within a specified period of time, the scanner is able to enter Sleep mode. The scanner can go back to the scanning mode by activating the auto trigger. Note that the sleep mode cannot be used with USB-VCP. The following menus/commands are provided for the configuration.

Time for switching to Sleep mode	Menu/Command
Indefinitely (default)	XSC
1 sec	XSH
15 sec	E9E
30 sec	XSD
10 min	XSE
30 min	XSF
60 min	XSG

(4) Single Line Scanning Time Out

This option can be used to configure the effective duration of single line scanning. The following menus/commands are provided for the configuration.

Single Line Mode duration	Menu/Command
1 sec	E8V
3 sec (default)	E8W
5 sec	E8X

13. Serial Number

The serial number is written on the following labels which are to be attached to the scanner.

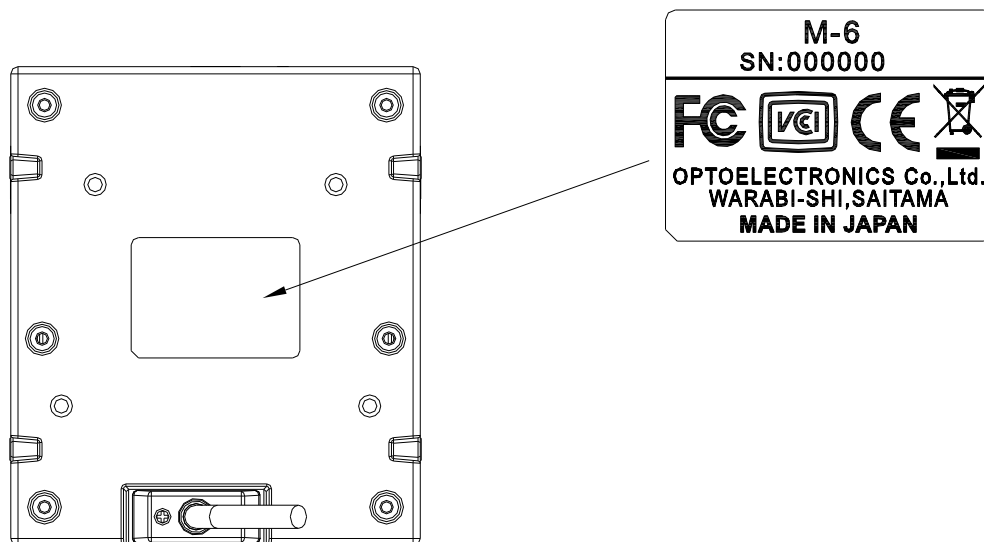


Figure 23: Serial label

14. Packaging Specifications

14.1. Individual Packaging Specifications

Assembled package size: (W)186 x (D)164 x (H)164 mm

14.1.1. RS-232C

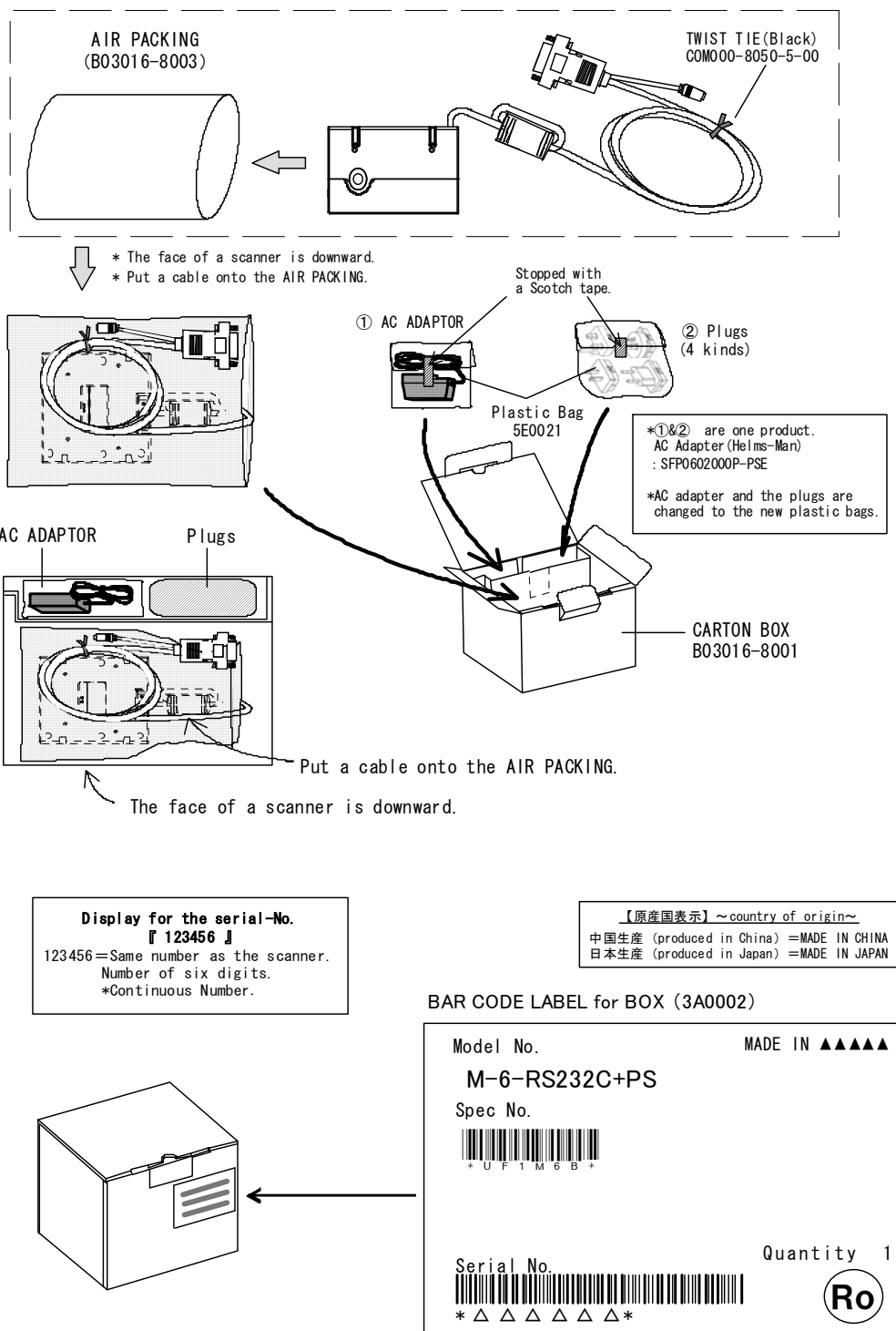


Figure 24: Individual Packaging for RS-232C

14.1.2. USB

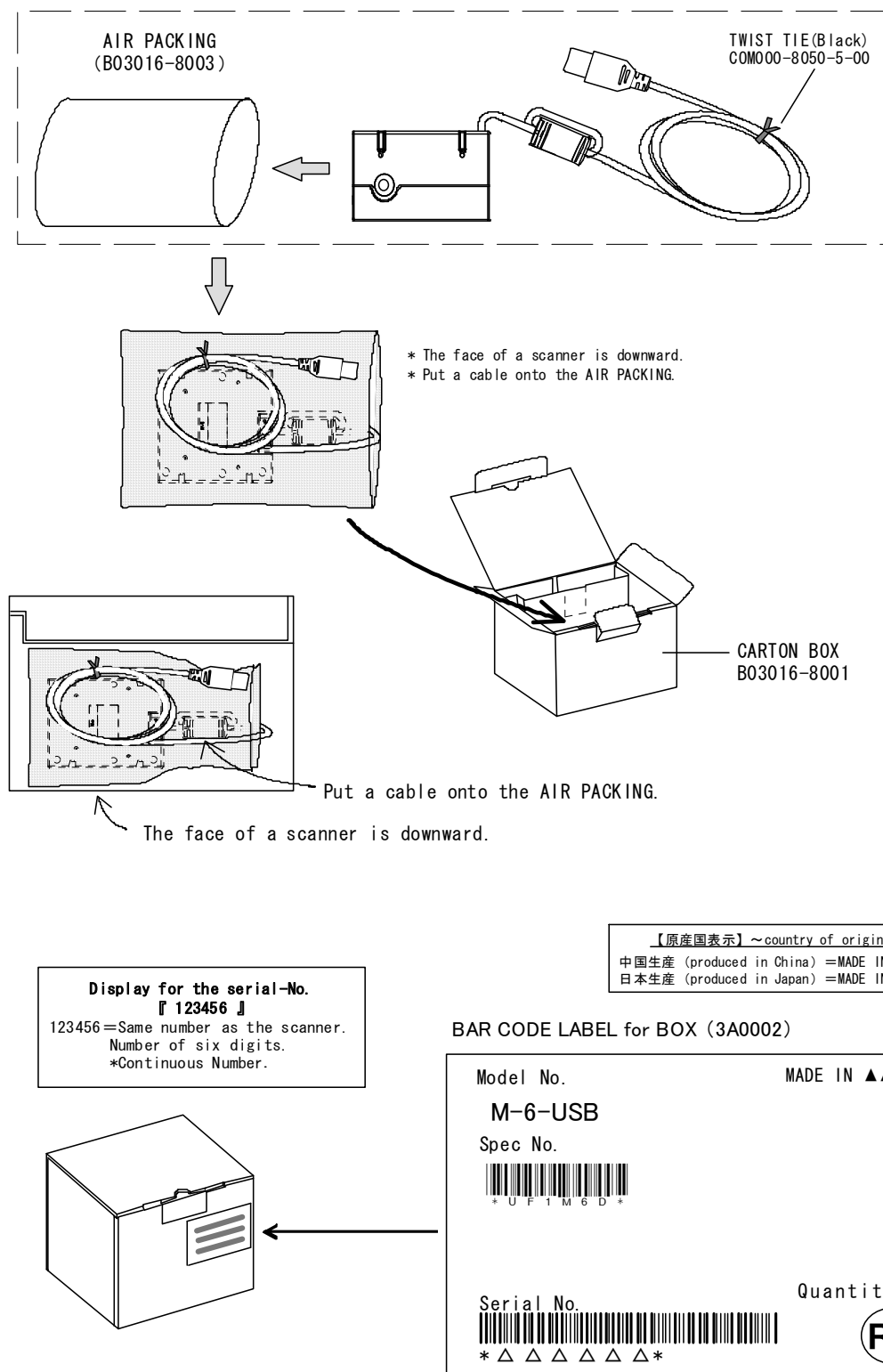
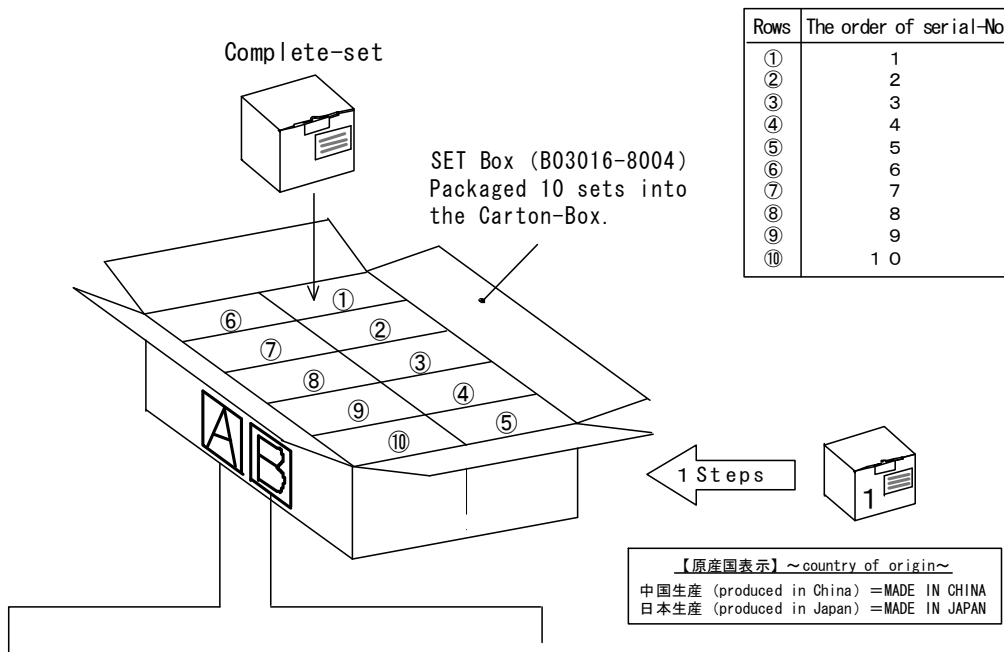


Figure 25: Individual Packaging for USB

14.2. Collective Packaging Specifications

Quantity per package: 10 boxes

Assembled package size: (W)840 x (D)395 x (H)185 mm



A : Barcode Serial Label for Packaging Box:
Stick the labels on both front and back side of the box.

B : Missing Serial Number Label:
Attach this label when there are more than 3 labels of which serial numbers are out of order (not in a correct sequence).

(3C0006)

(3C0007)

UNIVERSAL C/No. $\triangle\triangle$
MADE IN $\blacktriangle\blacktriangle\blacktriangle\blacktriangle$

Product M-6-USB

P0# $*\triangle\triangle\triangle\triangle-\triangle\triangle*$

Spec#JPN $*U F 1 M 6 D *$

Q'ty S/N(from) $*000001*$
 $\triangle\triangle/\triangle\triangle\triangle$ S/N(to) $*000\blacktriangle\blacktriangle*$

Missing Serial Number	Missing Q'ty \triangle
1 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	
2 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	

ROM-Ver. FL44J $\triangle\triangle$
Shipping Date 20 $\triangle\triangle$ / $\triangle\triangle$ / $\triangle\triangle$

OPTOELECTRONICS CO., LTD.

UNIVERSAL C/No. $\triangle\triangle$
MADE IN $\blacktriangle\blacktriangle\blacktriangle\blacktriangle$

Missing Serial Number	Missing Q'ty $\triangle\triangle$
3 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	
4 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	
5 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	
6 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	
7 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	
8 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	
9 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	
10 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	
11 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	
12 $*\triangle\triangle\triangle\triangle\triangle\triangle*$	

OPTOELECTRONICS CO., LTD.

Figure 26: Collective Packaging

15. Environmental Specifications

15.1. Operating Temperature and Humidity

Temperature : 0 ~ 40°C (excluding AC adapter)
Humidity : 0 ~ 95% (non-condensing)

15.2. Storage Temperature and Humidity

Temperature : -40 ~ 70°C
Humidity : 0 ~ 95% (non-condensing)

15.3. Ambient Light Immunity

Fluorescent light : 0 ~ 10,000lx
Incandescent light : 0 ~ 10,000 lx
Sunlight : 0 ~ 50,000 lx
* except for mobile phone scanning mode

<Conditions>

- Use Code-39 and PDF417 samples (resolution = 0.254 mm) specified in Section 8 under the condition as shown in the figure below.
- Leave the specular reflection area out of testing.
- Keep LEDs ON during testing

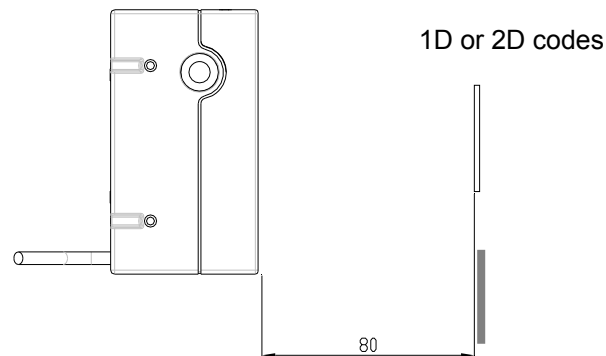


Figure 27: Ambient Light Immunity

15.4. Dust and Drip Proof

IEC IP67 equivalent

15.5. Electrical Specifications

- Withstand Voltage : AC 1500 V per 60 seconds, 10mA 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 : ± 1kV and higher
- Static Electricity Noise Immunity : No destruction found:
± 15kV (air or direct discharge)
No malfunction found:
± 8kV (air or direct discharge),
± 6kV (contact, direct or indirect discharge)

* Testing method complies with IEC-61000-4-2. (150pf, 330ohm)

15.6. Shock (without packaging)

There shall be no sign of malfunction of the M-6 after the following drop test.

Drop Test: Drop the scanner facing its left, right, front, back and top from the height of 1.5 m onto a concrete floor. Repeat this procedure 5 times.

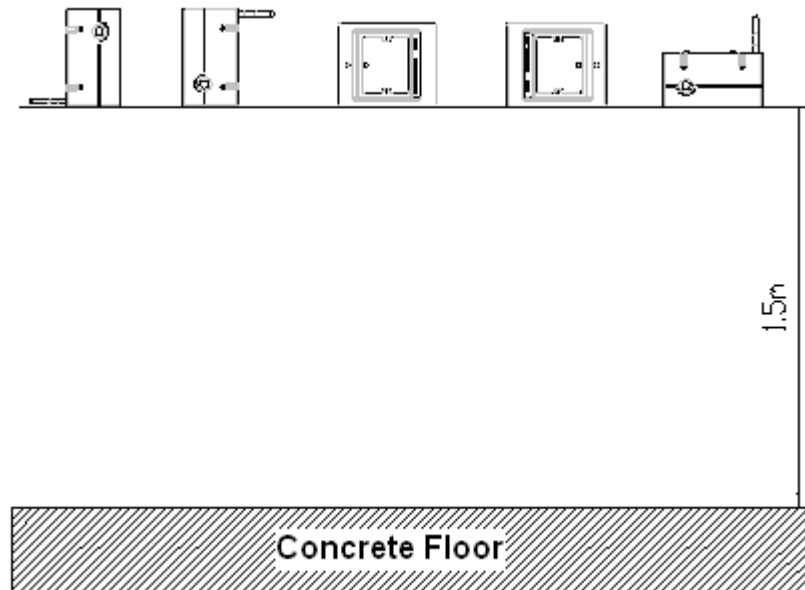


Figure 28: Drop Test

15.7. Shock (with individual packaging)

There shall be no sign of malfunction of the M-6 after the following drop test.

Drop Test: Drop an individually packaged scanner facing its 1 corner, 3 edges and 6 sides from a height of 1.5m onto a concrete floor. Repeat this procedure 10 times.

15.8. Vibration

There shall be no sign of malfunction of the M-6 after the following vibration test.

Vibration Test: Increase the frequency of the vibration from 10Hz to 100Hz at accelerated velocity 19.6m/S^2 (2G) for 6 minutes. Repeat this routine 10 times in each X, Y, Z direction for a total of 180 minutes.

15.9. Cable Strength

There shall be no sign of malfunction of the M-6 after the following cable strength test.

Cable strength test: Affix the scanner to an immovable object and pull it with a force of 2.5kg (static loading) for 1 second. Repeat this procedure 20 times.

15.10. Cable Bending

There shall be no sign of malfunction of the M-6 after the following cable bending test.

Cable bending test: Add a load of 4.9 N (500gf) to a cable and bend it at an angle of 90 degrees to both right and left. Repeat this procedure 1 million times.

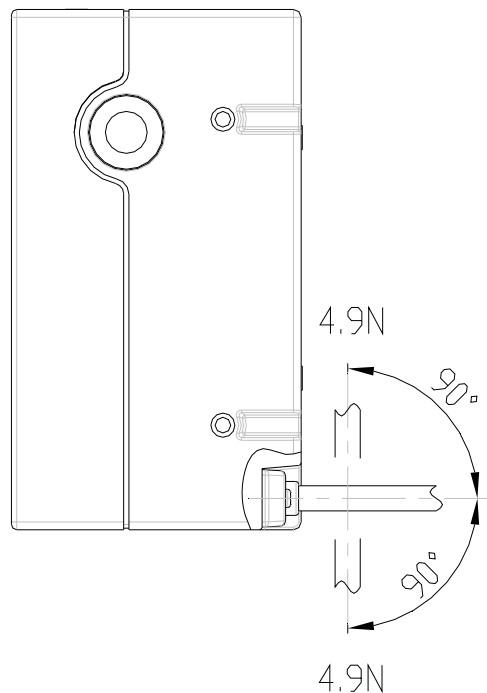


Figure 29: Cable strength

15.11. MTBF

50,000 hours

* This value is calculated under normal operation conditions; without giving electric / mechanical shocks within the operating temperature range.

16. Regulatory Compliance

16.1. LED Safety

IEC 62471:2006 Exempt Risk Group

16.2. 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.

17. RoHS

RoHS: The restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95/EC

18. Precautions

18.1. Precaution against LED light

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

Caution - Do not stare into the LED light from a scan window. It may harm your eyes.

18.2. Handling

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

(1) Shock:

- Do not drop this device from a height greater than specified in this manual.
- Do not place any heavy items on this device.
- Do not squeeze this device between any heavy items.
- Do not bend the cable in extremely low temperature.

(2) Temperature Conditions:

- Do not use this device at temperatures outside the specified range.
- Do not pour boiling water on this device.
- Do not expose the device to open flame

(3) Foreign Materials:

- Do not put the device in water.
- Do not expose the device to chemicals.

(4) Others

- Do not plug/unplug the connectors before disconnecting the power.
- Do not disassemble this product.
- Do not use the device near a radio or a TV receiver. It may cause reception problems.
- The device may be damaged by voltage drops.
- The device may not perform properly in environments when it is used near a flickering light, such as computer monitor, television, etc.

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

Appendix 1: Mechanical Drawings

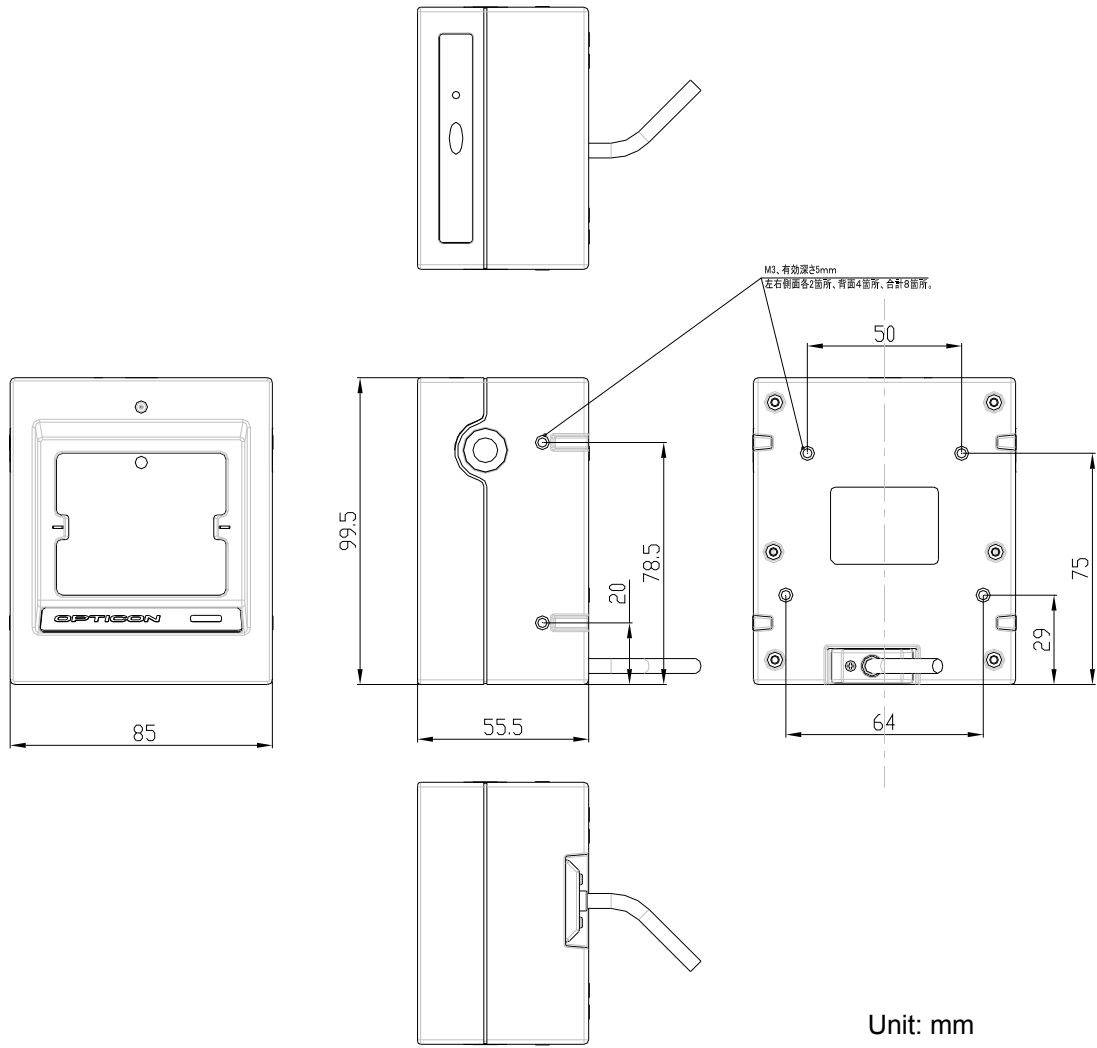


Figure 30: Mechanical Drawing

Appendix 2: Outline View of AC Adapter

SFP0602000P-PSE

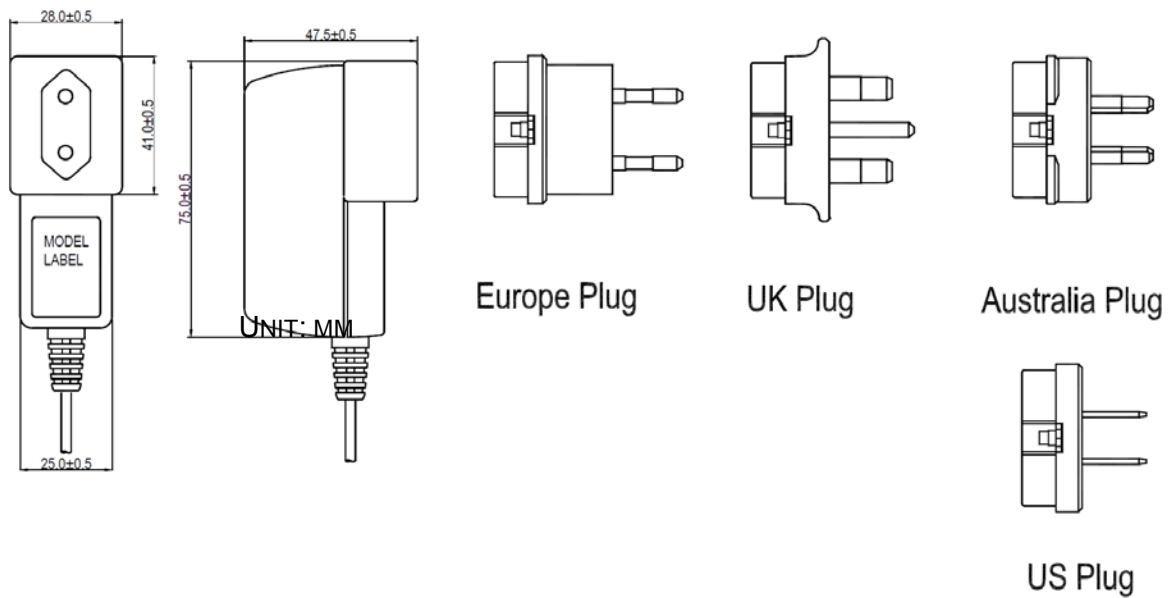


Figure 31:AC adapter 1, AC input

Note: The polarity of the center of DC jack is positive (+).

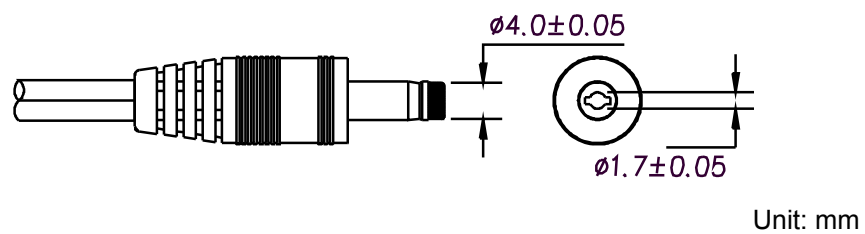


Figure 32:AC adapter 2, DC output