OPTICON MDC-200A Linear CCD Scan Engine Instruction Manual

Contents

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OPTICON MDC-200A Linear CCD Scan Engine

Product Information

The MDC-200A is a Linear CCD Scan Engine manufactured by Opticon. It is designed for high-performance scanning operations.

Physical Features

- **Dimensions:** Compact size for easy integration
- **Weight:** Lightweight for convenient use

Technical Specifications

- **Depth of Field:** 12 units
- **Pitch, Skew and Tilt:** 13 units
- **Curvature:** 13 units

Product Usage Instructions

1. Unpack the MDC-200A carefully and keep all packaging materials for future transportation or servicing needs.
2. Do not remove the serial number from the device to maintain warranty validity.
3. For technical support, contact Opticon through the provided phone numbers or email addresses.

All information subject to change without notice.

Document History

Model Number:	**MDC200A**	**Specification Number:**	**SS15050**
Edition:	**3**	**Original Spec Number:**	**SS15049**
Date:	**2024-7-16**		

Limited Warranty and Disclaimers
PLEASE READ this manual CAREFULLY before installing or using
the product.

Serial Number
A serial number appears on all Opticon products. This official registration number is directly related to the device purchased. Do not remove the serial number from your Opticon device. Removing the serial number voids the warranty.

Warranty
Unless otherwise agreed in a written contract, all Opticon products are warranted against defects in materials and workmanship for two years after purchase. Opticon will repair or, at its option, replace products that are defective in materials or workmanship with proper use during the warranty period. Opticon is not liable for damages caused by modifications made by a customer. In such cases, standard repair charges will apply. If a product is returned under warranty and no defect is found, standard repair charges will apply. Opticon assumes no liability for any direct, indirect, consequential or incidental damages arising out of use or inability to use both the hardware and

software, even if Opticon has been informed about the possibility of such damages.

Packaging
The packing materials are recyclable. We recommend that you save all packing material to use should you need to transport your scanner or send it for service. Damage caused by improper packaging during shipment is not covered by the warranty.

Trademarks

- Trademarks used are the property of their respective owners.
- Opticon Inc. and Opticon Sensors Europe B.V. are wholly owned subsidiaries of OPTOELECTRONICS Co., Ltd., 12-17, Tsukagoshi 4-chome, Warabi-shi, Saitama, Japan 335-0002.
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- **Email:** support@opticon.com
- **Web:** www.opticon.com

Revision History

- **Specification No.** : SS15050
- **Product name :** MDC200A

Edition	Date	Page	Section	Description of Changes
1st	2015/09/02	–	–	Initial release
2nd	2017/10/31	2	4	Added timing specification
3rd	2024/07/16	–	–	Updated manual to new layout

Abstract
This manual provides specifications for the MDC200A linear CCD scan engine with built-in decoder.

Overview

- The MDC200A is a compact barcode scan engine that can be installed in various handheld products such as a portable device. The use of short wavelength red LED illumination enhances the visibility when aiming at a barcode. The
- MDC200A has a built-in decoder that enables this scan engine to decode the bar codes after scanning and output the information via its serial communication interface. The MDC200A is RoHS compliant.

Features

- MDC200A is only 7.5 mm in height, allowing low profile installation in, for example smart-phones and data collectors.
- MDC200A's high definition glass lens ensures reliable performance in various conditions.
- Its strong glass-fiber reinforced polycarbonate body is resistant to mechanical shocks, enabling use from general home environment to hard field applications.
- Its 50 degree scan angle is larger than that of any laser scan engine in equivalent class, enabling it to read high capacity barcode in space-limited applications.
- MDC200A's patented adaptive illumination technology allows it to automatically read barcodes either on paper or on LCD screens such as mobile phone / tablet / and PC monitor, while keeping the power consumption very low.
- MDC200A features both RS-232C and USB interfaces.

Physical Features

- **Dimensions** 22.8 × 15.0 × 7.5 (WDH mm)
- **Weight** 2.4 g

Electrical Specifications

Absolute Maximum Ratings

Item	Symbol	Rated Value	Unit
Power Supply Voltage(Vcc to GND)	Vcc	3.9	V
Input Voltage	V1	-0.3 Vcc +0.3	V

Electrical Characteristics VCC = 3.3 V Ta = 25 °C

Item		Symbol	Conditions	Min	Typ	Max	Unit
Operating Voltage		Vcc		3.0		3.6	V
Operating Current		IOP	READ State		110	120	mA
Idle Current		IIDL	IDLE State		18	25	mA
Sleep Current		ISLP	SLEEP State	–	100	–	uA
Peak Inrush Current		IPEEK			150	200	mA
Input Voltage	High	VIH		VCC×0.8			V
	Low	VIL				VCC×0.2	V
Output Voltage	High	VOH	IOH =-1mA	VCC 0.5			V
	Low	VOL	IOL =1.0mA			0.5	V
Input Current		IIN	VIN=Vcc VIN=0V			1.0	uA

Timing Specification

Item	Symbol	Conditions	Min	Typ	Max	Unit
Start-up Time	STT		80			ms
Trigger ON Time	TOT		20			ms

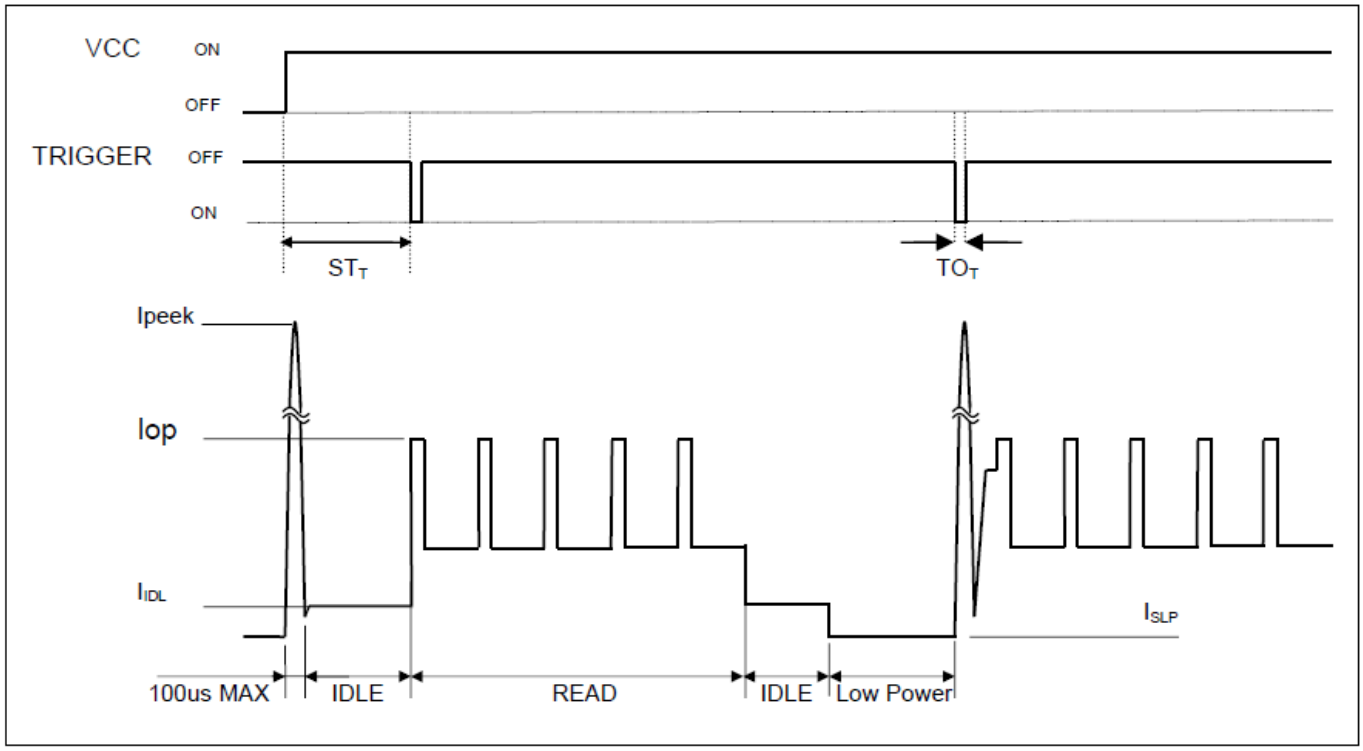


Figure 1: Current Waveform

Power Mode Transition

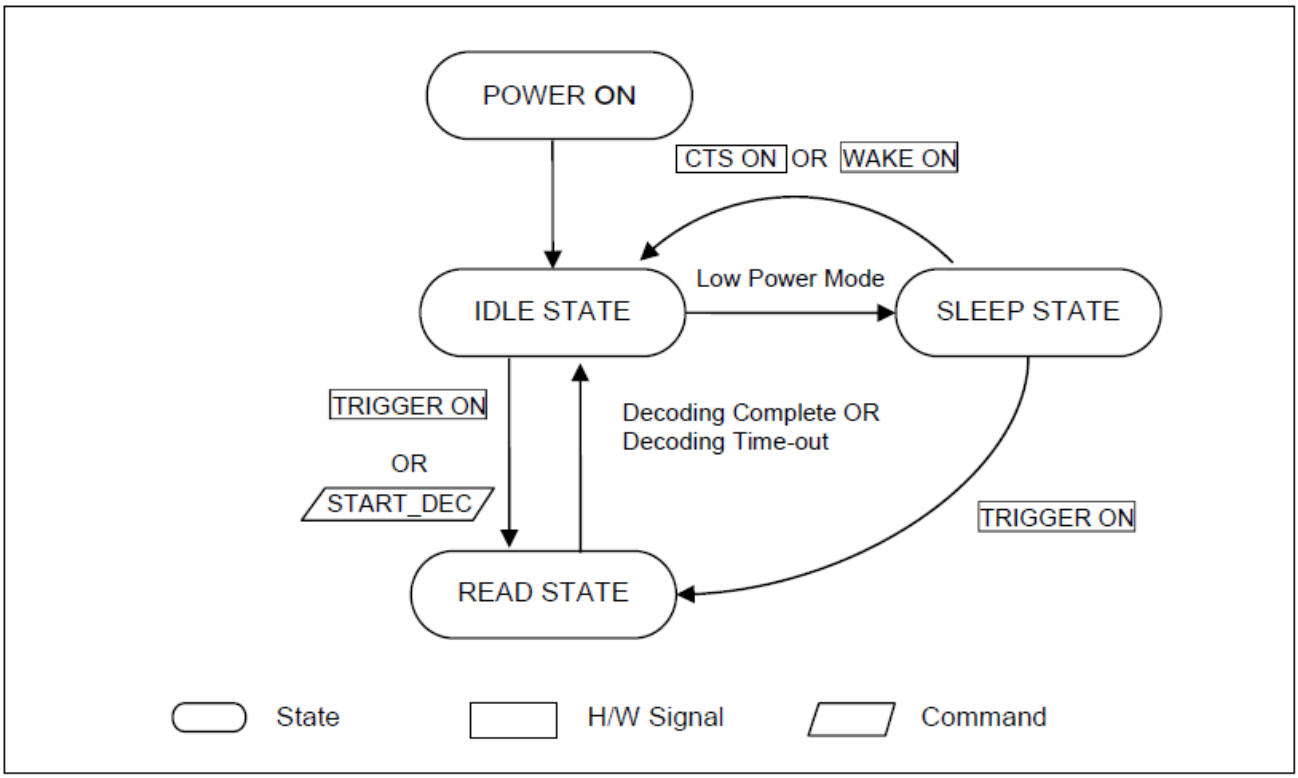


Figure 2: Power Mode Transition

Low Power mode is ONLY available when using RS-232C interface.

- When “Low Power” mode is enabled, the MDC200A automatically enters “SLEEP” state from “Power-ON”.
- When moving to “IDLE” state by “CTS ON” or “WAKE ON” from “SLEEP” state, MDC200A goes back to “SLEEP” state in two seconds if no event occurs to move to other states.

Universal ID	Description	Default
Z5	Disable Low Power mode	Y
Z6	Enable Low Power mode	

Interface Specifications

- Connector used: IRISO Electoronics Co.,LTD.”IMSA-9681S-12″,
- 12-pin, 0.5 mm pitch, FFC connector, bottom contact type (gold-plated)

Signal	Pin No.	I/O	Functions
Trigger	1	I	Trigger input, CMOS logic level: Low = Trigger
Wake	2	I	Wakeup input, CMOS logic level: Low = Wake
Decode LED	3	O	LED output, CMOS logic level: Low = LED On
Buzzer	4	O	Buzzer control pulse output, CMOS logic level: Low = Buzzer On
Power Down	5	O	Power down output, CMOS logic level: High = Low Power state
RTS	6	O	Request to send, CMOS logic level
CTS/USB+	7	I/O	Clear to send, CMOS logic level / USB + data signal
Txd	8	O	Serial data output, CMOS logic level
Rxd/USB-	9	I/O	Serial data input, CMOS logic level / USB- data signal
GND	10		Ground
VDD	11	I	Power supply: DC 3.0V ~ 3.6V
Boot	12	I	Start signal input, CMOS logic level : High = normal operation

Optical Specifications

General Factors

Item		Characteristics		Unit
Illumination		Amber LED		
Peak wavelength		624		nm
Scan rate		300 Maximum		scans
FOV	Horizontal	50		deg
	Vertical	±0.25	TYP	deg
		±(1.3 ~ 1.8)	MAX	

Optical Clear Zone for Decoding

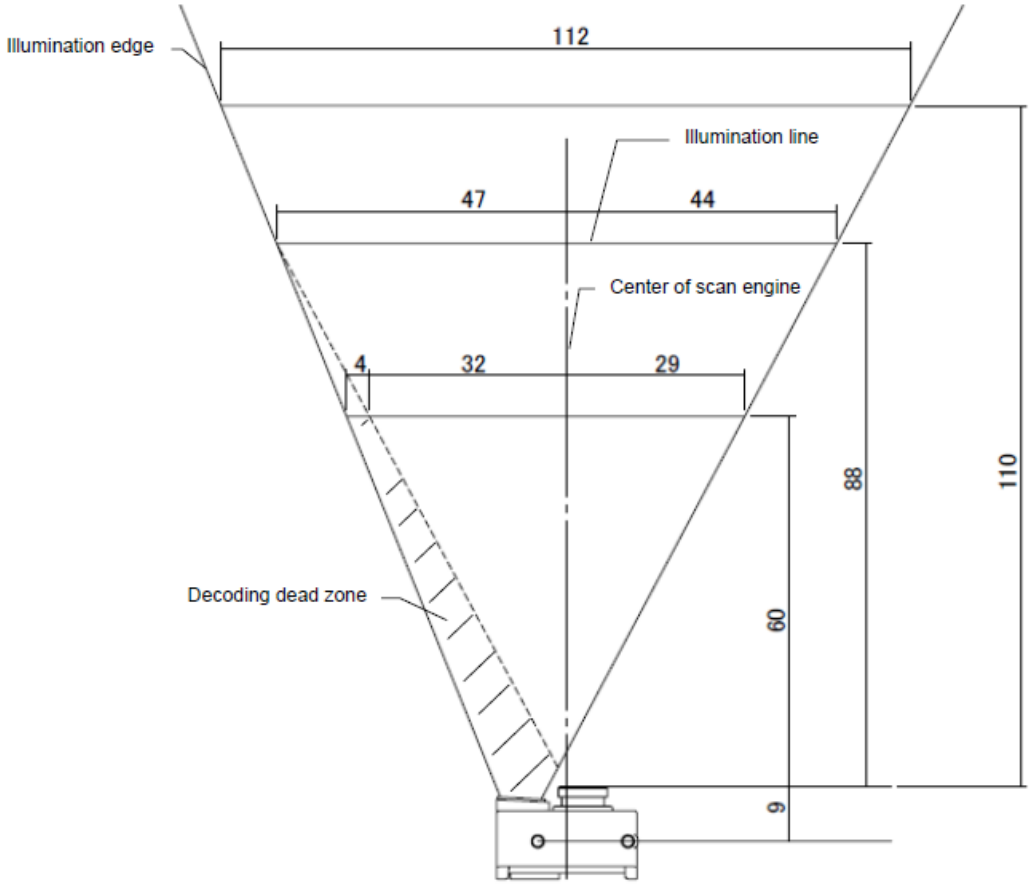
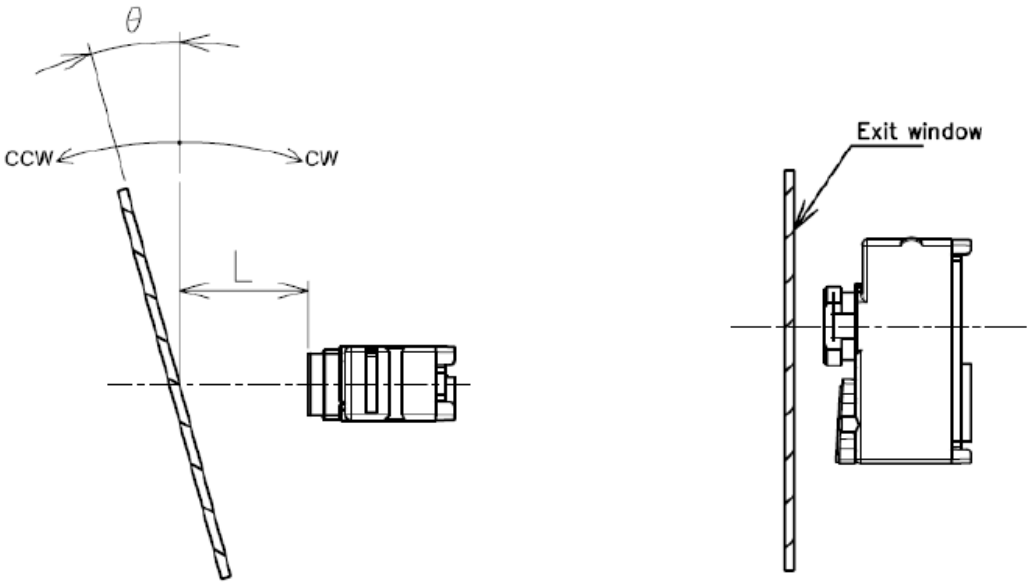


Figure 3: Optical Clear Zone for Decoding

1. Illumination line except the dead zone (out of the FOV of imaging lens) is defined as optical clear path, where the MDC200A is able to decode.
2. Illumination edge is defined by 90% peak luminance of illumination line.

Recommended Installation Condition of Exit Window

The material of exit window is recommended to be transparent colorless PMMA plate with its thickness is less than 1.0mm. The plate is recommended with optical flatness and with optical anti-reflective coating on both surfaces. To remove the reflected LED illumination rays from the exit window, the following condition should be satisfied.



L(mm)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	≥10
θ cw (deg)	0.0	0.0	0.0	≥15 ≤25	≥15 ≤30	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35
θ ccw (deg)	0.0	0.0	0.0	≥15 ≤25	≥15 ≤30	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35	≥15 ≤35

Figure 4: Recommended Installation Condition

<Test condition>

- **Exit window :** 1.0mm thickness PMMA plate without anti-reflect coat
- **Ambient light :** 300lux, neutral white fluorescent lamp, no other light source and no other reflective object in the test environment
- **Recommending conditions:** L < 1.0 mm, θ = 0.0 deg.

Optical Clear Area of Exit Window

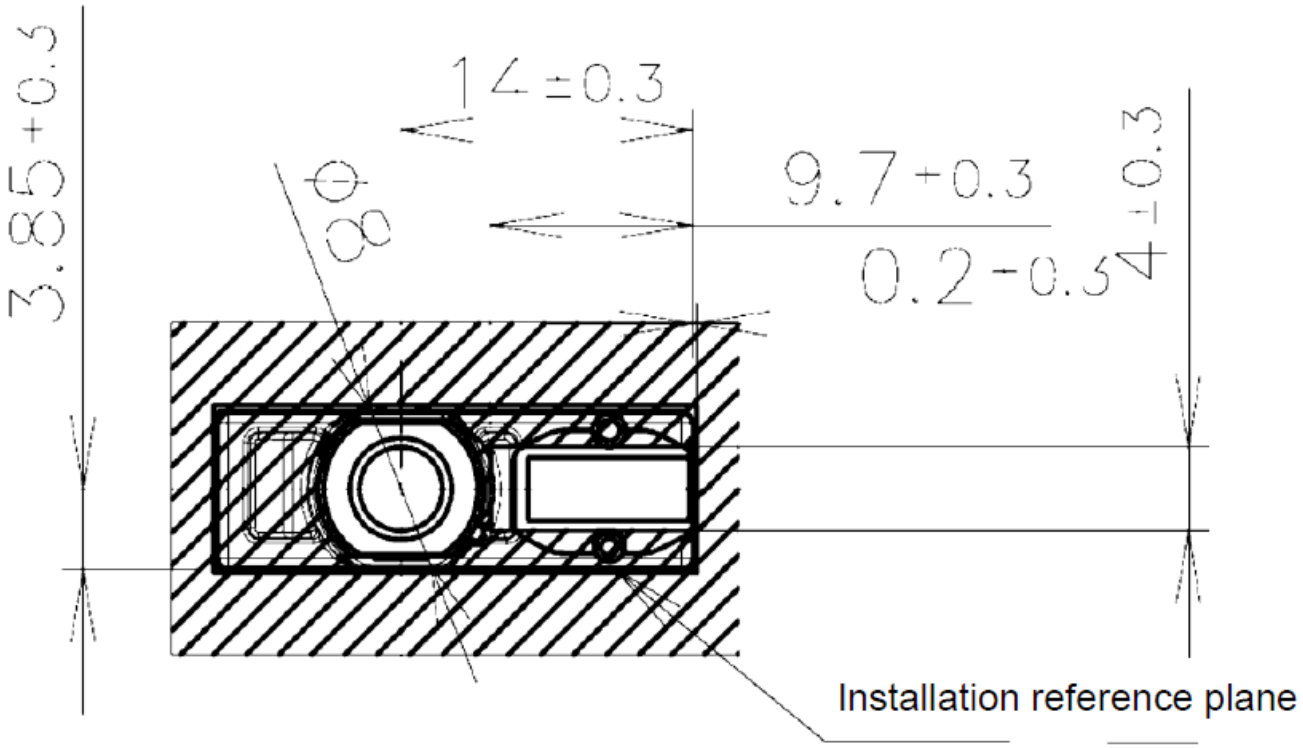


Figure 5: Optical Clear Area of Exit Window

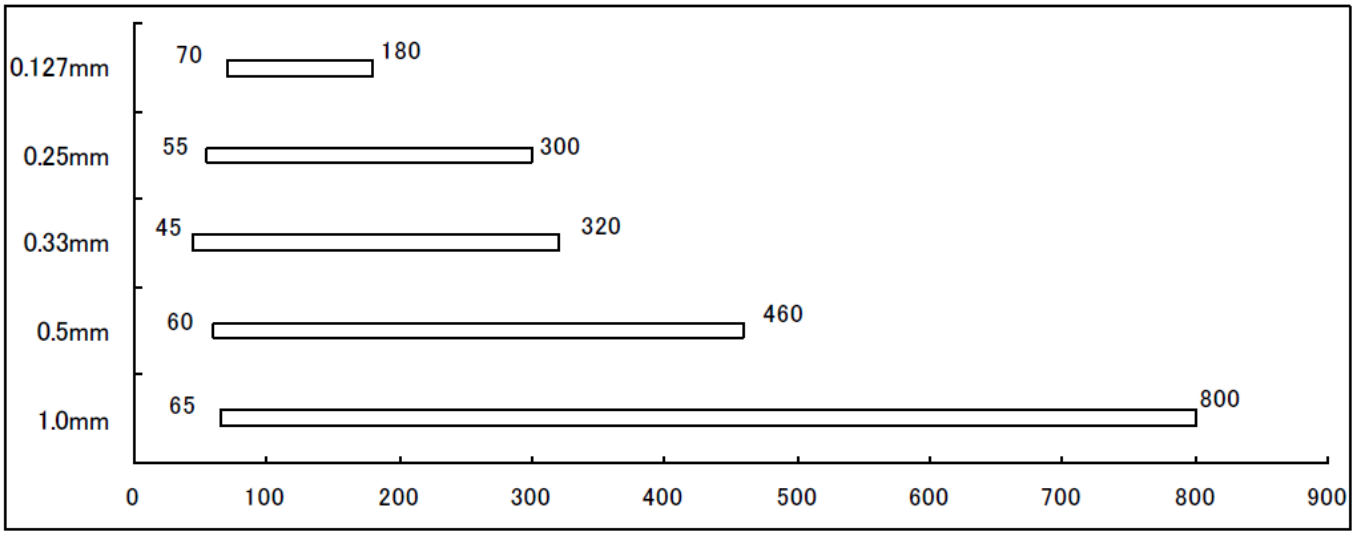
- From front view of the scan engine, the non-shaded area indicates the optical clear area. It is recommended to coat the shaded area matt-black. The dimension of the shaded area is based on the condition where the exit window is parallel located at 1 mm distance to the tip surface of the imaging lens and that there is a reasonable installation precision.

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

<Conditions>

- **Temperature and humidity** : Room temperature, room humidity
- **Ambient light** : 500 lx
- **Background** : White
- **Power supply voltage** : 3.3 V
- **Test PCS**: PCS 0.9
  - PCS = (Reflectance of white bar-Reflectance of black bar) / Reflectance of white bar
- **Reading test**
  - : Accept 4 successful reading within 5 consecutive attempts.
  - Each successful reading is in 0.25 seconds or less.

Depth of Field



***The decoding range is from the edge of the imaging lens.**

<Conditions>

Resolution	Symbology	PCS	Quiet Zone	No. of Digits
1.0 mm	Code 39	0.9	20 mm	1
0.5 mm	Code 39	0.9	10 mm	4
0.33 mm	EAN-13	0.9	10 mm	13
0.25 mm	Code 39	0.9	5 mm	9
0.127 mm	Code 39	0.9	7 mm	4

- **Bar Code Sample :** Optoelectronics Test Chart, N/W ratio = 1 : 2.5
- **Angle :** α = 0° β = 15° γ = 0°
- **Curvature :** R = ∞

Pitch, Skew and Tilt

- **Pitch :** α ≦ ±50°
- **Skew :** β ≦ ±65°
- **Tilt :** γ ≦ ±25°

<Conditions>

- **Bar code :** Optoelectronics Test Sample
- **Distance :** 110 mm from the edge of the scan engine
    - PCS 0.9, Resolution 0.33 mm, EAN-13, Quiet Zone 15 mm
- **Angle :** Pitch and Tilt angles calculated with Skew angle β = +15 degree
- **Curvature :** R = ∞

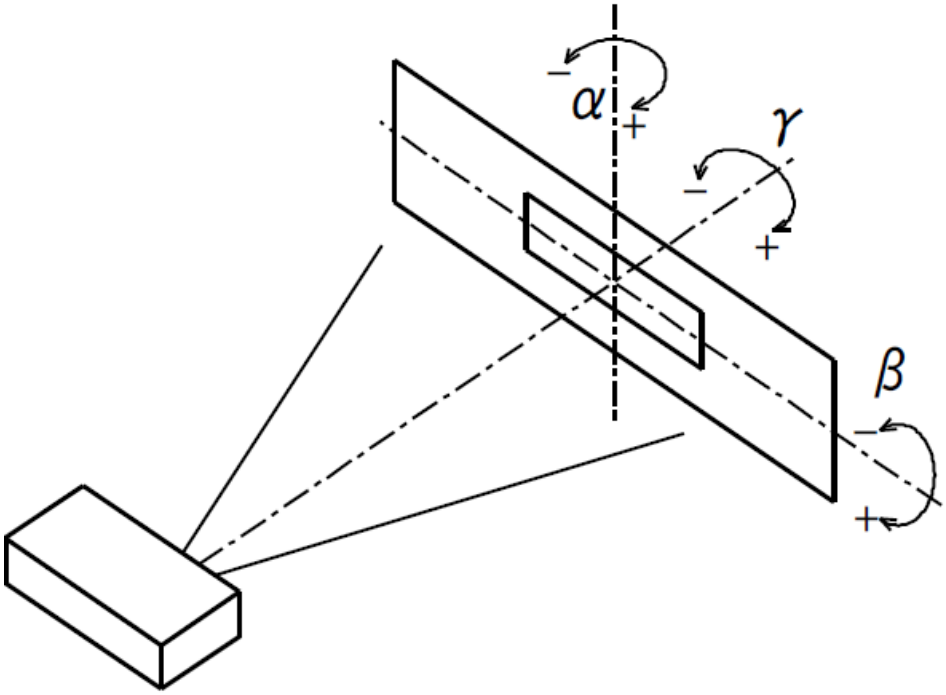


Figure 6: Pitch, Skew and Tilt

Cur ature

- **JAN-8 :** R ≥ 15 mm

<Conditions>

- **Bar code :** Optoelectronics Test Sample
  - PCS 0.9, Resolution 0.26 mm, EAN-8, Quiet Zone 10 mm
- **Distance :** 110 mm from the edge of the scan engine
- **Angle :** Skew angle β = +15°

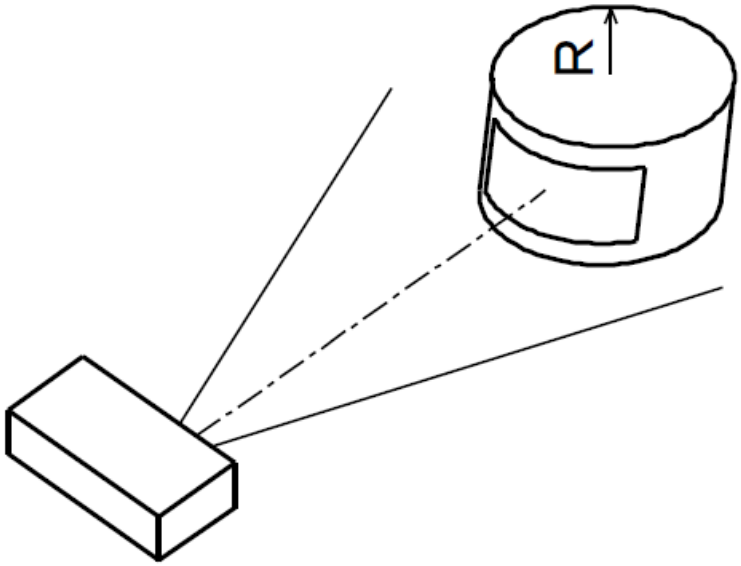


Figure 7: Curvature

Environmental Specifications

Temperature

- **Operating temperature :** -20 ~ 60 °C
- **Storage temperature :** -40 ~ 70 °C

Humidity

- **Operating humidity :** 5 ~ 90% RH (no condensation, no frost)
- **Storage humidity :** 5 ~ 90% RH (no condensation, no frost)

Ambient Light Immunity

Decoding performance is guaranteed when the range of illumination on a bar code surface is between zero and the following values:

- **Incandescent light :** 4,000 lx
- **Fluorescent light :** 4,000 lx
- **Sunlight :** 100,000 lx

Be sure that direct light or specular reflection from the light source does not enter the light receiving area of the scan engine.

Electrostatic Noise

There shall be no abnormalities in the output signals when sinusoidal electrical noise (50 Hz to 100 kHz, smaller than 0.1 Vpp) is added to the power supply line.

Vibration Strength

- There shall be no sign of malfunction after the following vibration test.
- **Vibration test:** Increase the frequency of the vibration from 12 Hz to 200 Hz at an accelerated velocity of 32.3 m/s2 (3.3 G) for 10 minutes per cycle. Repeat this for 2 hours in X-direction, 2 hours in Y-direction and 4 hours in Z-direction.

Drop Impact Strength

- There shall be no sign of malfunction after the following drop test.
- **Drop test:** Fix the scan engine in a specific dummy case and drop it 10 times in total, at top, bottom, front, back, left, right, top-left, top-right, bottom-left and bottom-right faces, from a height of 180 cm onto a concrete floor.

Regulatory Compliance

- **LED Safety:** IEC 62471-1:2006 Exempt_Group

RoHS
The MDC200A is compliant with RoHS.

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

Reliability
MTBF (Mean Time Between Failures) 100,000 hours

- It is calculated based on standard operation of the product within the recommended temperature range and without extreme electronic or mechanical shock.

Precautions

- All work-benches, tools, measuring instruments and any part of human body which have come into contact with MDC200A must undergo preliminary antistatic treatments.
- Do not touch the optical and electrical components. If the MDC200A needs to be picked up, hold it on the camera body.
- Avoid handling MDC200A in a dusty area. In case dust gets on MDC200A, gently blow it off with dry air. Direct contact of swabs and such on its optical part may cause deterioration of its performance.

Packaging Specifications

Packaging

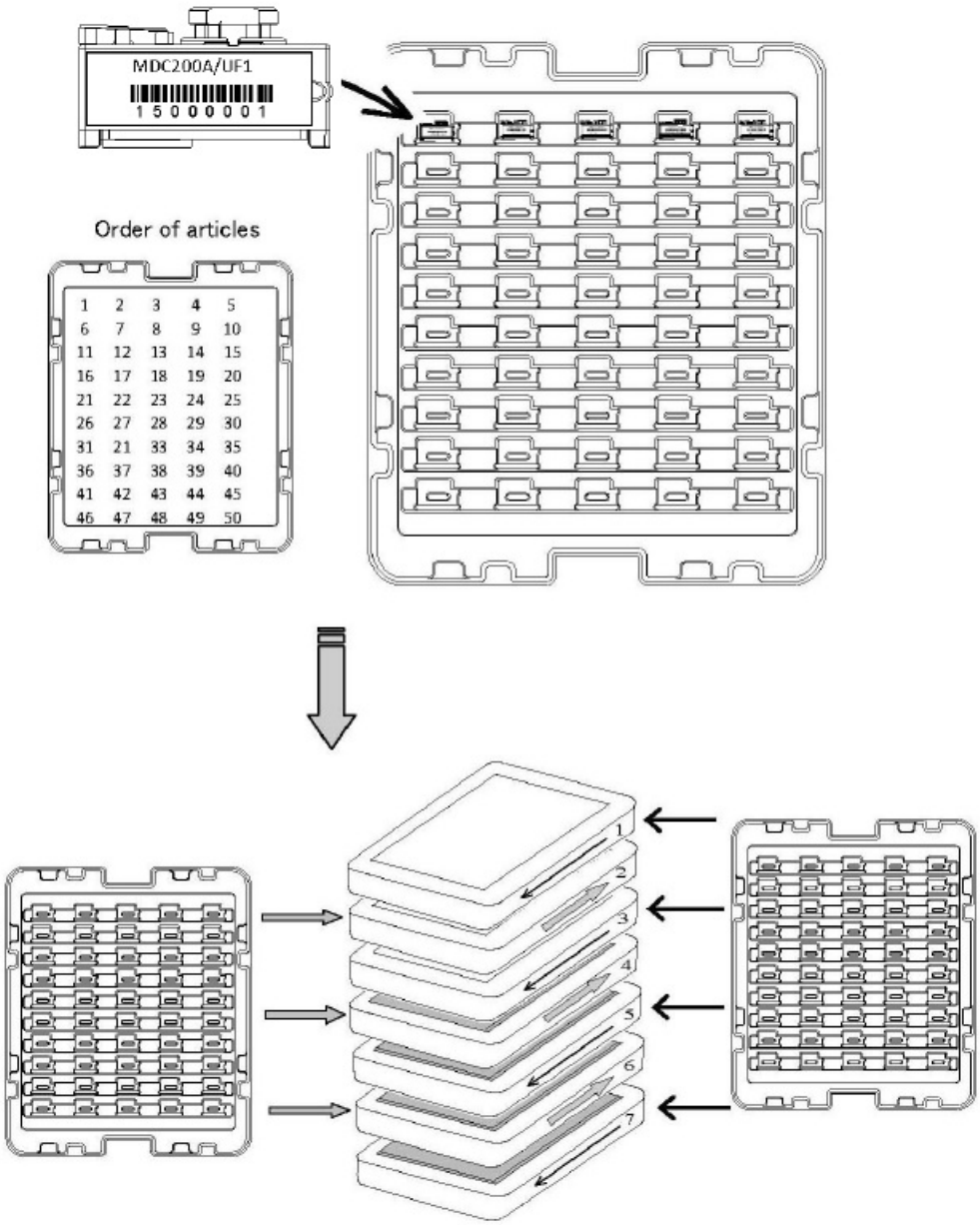
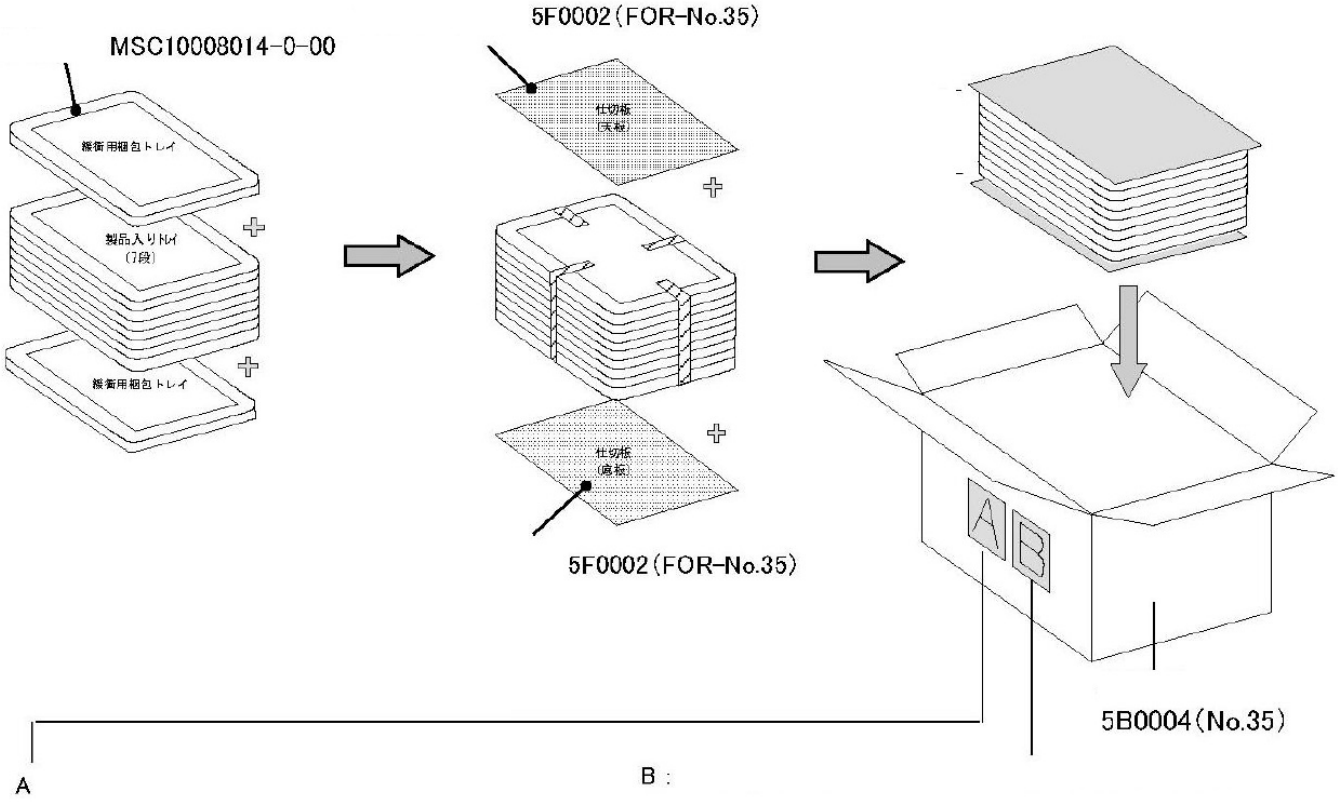
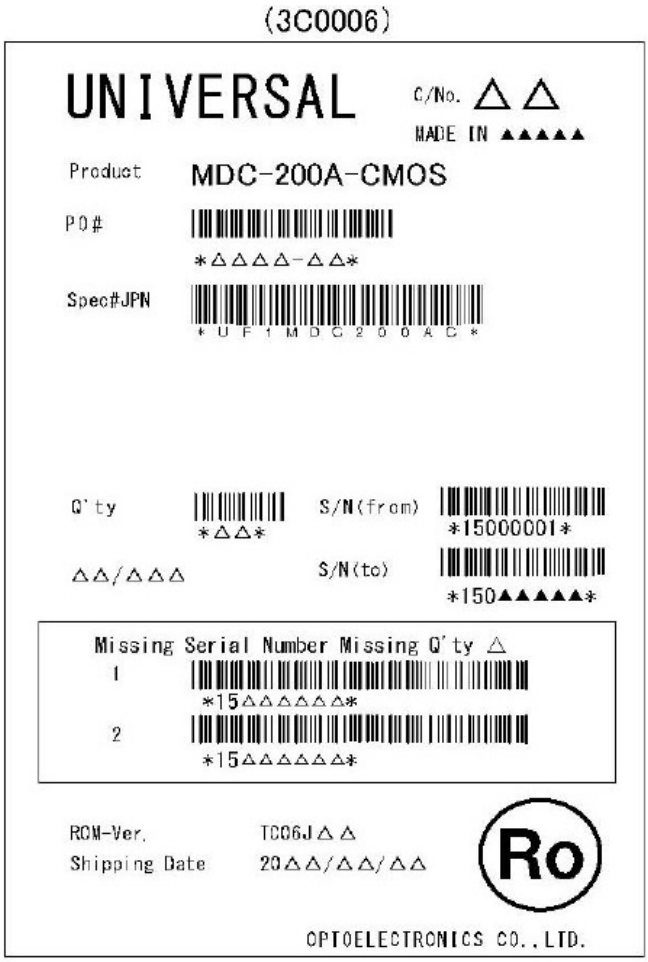


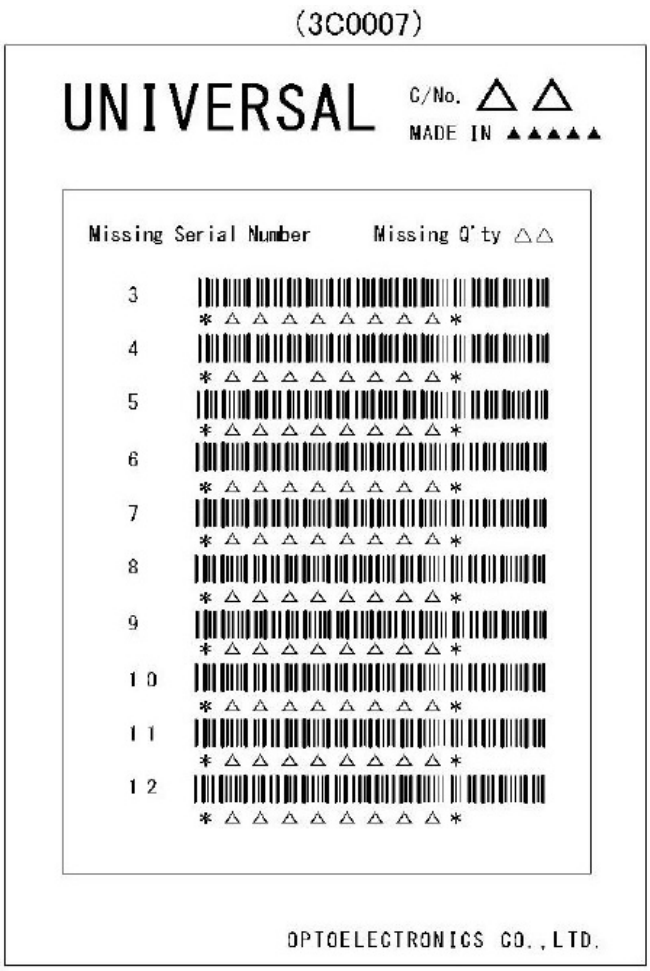
Figure 8: Packaging 1

- 50 pieces in one tray
- 7 trays in one package (total 350 pieces for one package)



- 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).





•country of origin

- (produced in China) MADE IN CHINA
- (produced in Japan) MADE IN JAPAN

Figure 9: Packaging 2

Package Size

- 355 × 290 × 185 (WDH mm)
- ‘Ro mark’ on the trays or boxes for the product indicates that the product is RoHS compliant.

Serial Label

The following label with serial number is attached to the product.

- **Top** : Product name
- **Middle** : Bar code (Code 128, Resolution 0.2, N/W 2.5)
- **Bottom** : Serial number

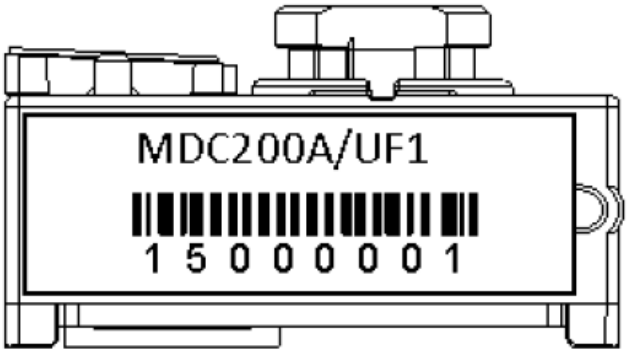


Figure 10: Serial Label

Mechanical Drawing

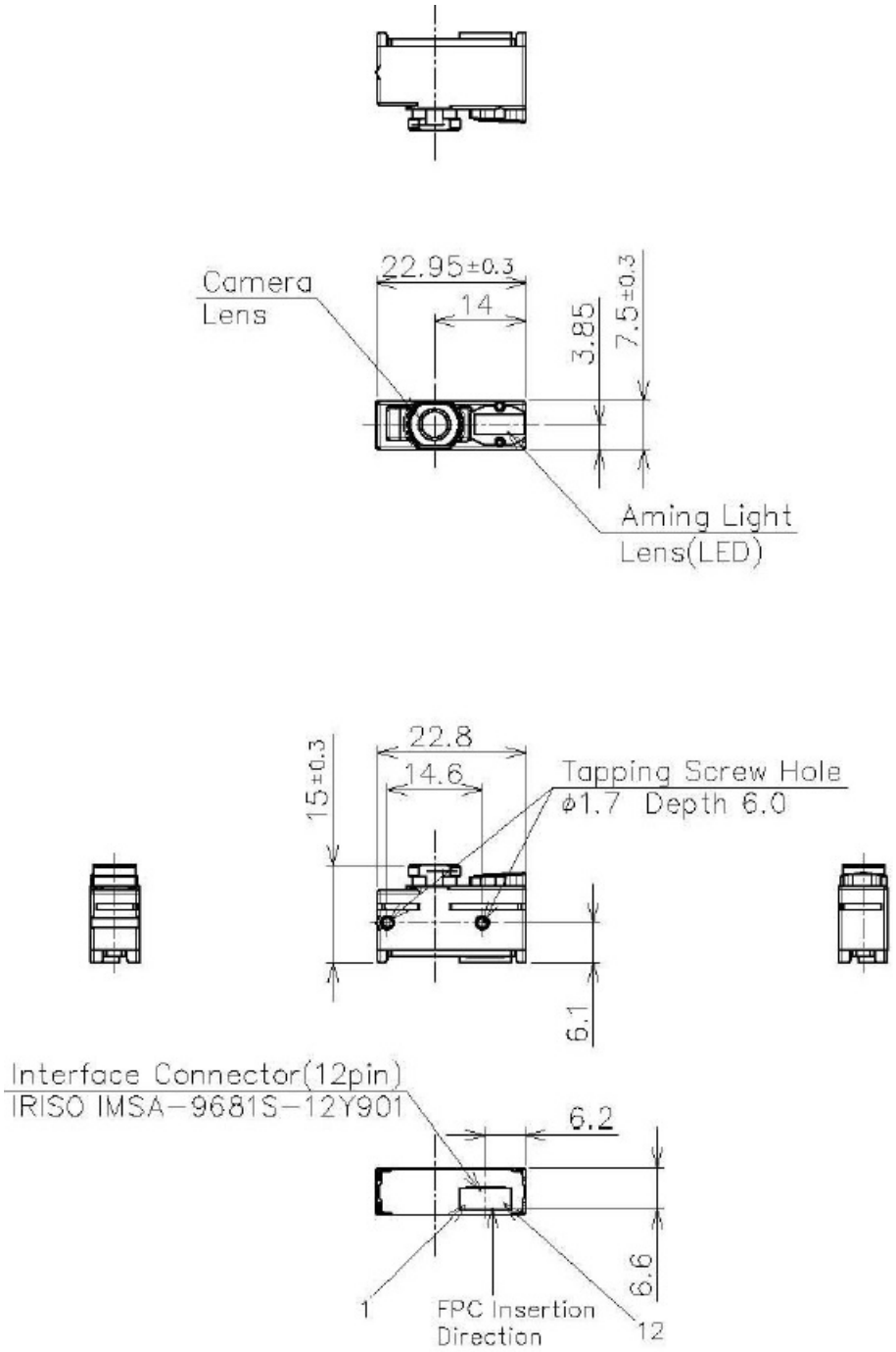


Figure 11: Mechanical Drawing

FAQs

Q: What should I do if my MDC-200A is damaged during shipment?
A: If your device is damaged due to improper packaging during shipment, it may not be covered by the warranty. Contact Opticon for assistance.

Documents / Resources

	**OPTICON MDC-200A Linear CCD Scan Engine** [pdf] Instruction Manual MDC200A, MDC-200A Linear CCD Scan Engine, MDC-200A, Linear CCD Scan Engine, CCD Scan Engine, Scan Engine, Engine

References

- **Opticon USA | Home | Opticon Barcode Scanners 1D Lasers and 2D Imagers**
- **User Manual**