SPECIFICATIONS MANUAL

MDI-5010 MR

2D Imager Engine

LED Aiming 2D Imager Engine

2nd

OPTICON

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Document History

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Date:	25-March-2021		

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OPTOELECTRONICS Co., Ltd., 12-17, Tsukagoshi 4-chome, Warabi-shi, Saitama, Japan 335-0002.
TEL +81-(0) 48-446-1183; FAX +81-(0) 48-446-1184

Support

USA

Phone: 800-636-0090
Email: support@opticonusa.com
Web: www.opticonusa.com

Rest of World

Phone: +31235692728
Email: support@opticon.com
Web: www.opticon.com

Revision History

Product Name : MDI-5010 MR

Edition	Date	Page	Section	Description of Changes
1st	2019/02/19	-	-	1st release
2nd	2021/03/25	25, 26	17.1, 17.3	Added interface connector :Molex 503566-1902
		-	-	Correct errors, adjust format.

Contents

Table of Figures

1 Abstract

This manual provides specifications for the MDI-5010 MR imager scan engine.

2 Overview

The MDI-5010 is a laser aiming, imager based, barcode scan engine with a separated camera and decoder board that enables high speed scanning of 1D (linear) and 2D barcodes, as well as OCR fonts.

The main features of the MDI-5010 are as follows:

- Wide range reading
  The MDI-5010 with its 1 mega pixel wide lens (horizontal 48°) enables wide range reading and high resolution image acquisition.

- High-speed reading
  The extremely high performance decoder and 120fps CMOS sensor used in the MDI-5010 ensures stress-free scanning and fast response regardless of reading angle, even with poor quality barcodes (damaged, low contrast etcetera), movement and vibration, and poor lighting conditions.

- Green LED aiming and Warm-White LED Illumination
  A well-defined single line of green LED light and efficient warm-white LED illumination makes it easy to aim the scan engine while providing safety and long life.

- Low power consumption
  The power consumption in operating, standby, and low power states has been drastically reduced. Various power saving settings can be configured to optimize the power consumption for your particular application.

- Auto trigger / Motion tolerance
  Automatically detects the moving target with the auto trigger function and then scans instantaneously.

- Editing function
  A new function, “Data Editing Program,” captures up to 16 barcodes on multiple images at once. The output editing process, such as GS1 format, can also be configured easily.

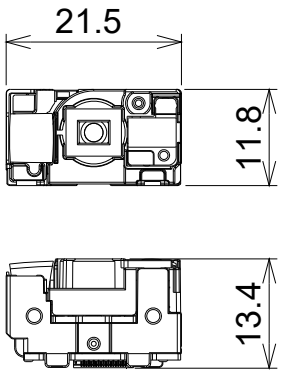
- Various interfaces
  The MDI-5010 supports the UART interface and USB interface. You can also easily switch between the interfaces.

- RoHS compliance
  The MDI-5010 is a RoHS compliant product, as declared by Optoelectronics Co., Ltd.

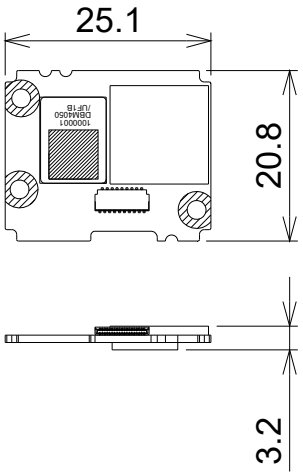
3 Physical Features

3.1 Dimensions

Camera Engine (MSI-5010): D: 13.4 × W: 21.5 × H: 11.8 (mm)



Decoder Board (DBM-4050): D: 20.8 × W: 25.1 × H: 3.2 (mm)



FPC: D: 24.0 × W: 6.0 × H: 0.3 (mm)

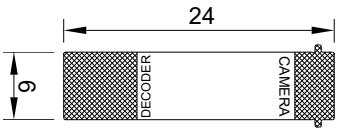


Figure **1***: Dimensions of the MDI-5010*

3.2 Weight

Camera Engine (MSI-5010): 3.5 grams (max)
Decoder Board (DBM-4050): 2.5 grams (max)

4 Electrical Specifications

4.1 Absolute Maximum Ratings*

Item	Symbol	Rated Value	Unit
Power Supply Voltage (V_{CC} to GND)	V_{CC}	-0.3 to 7.0	V
Input Voltage	V_I	-0.3 to V_{CC} +0.3	V

* Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions is not implied. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.

4.2 Recommended Operating Conditions

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage		V_{CC}		3.0	3.3/5.0	5.5	V
Input Voltage	Low	V_{IL}		0	-	0.15	V
	High	V_{IH}		V_{CC} -0.4	-	V_{CC}	V
Output Voltage	Low	V_{OL}	I_{OL} = 600µA		-	0.55	V
	High	V_{OH}	I_{OH} = -20µA	0.67*V_{CC}	-	V_{CC}	V
Output current	Low	I_{OL}	V_{cc} = 3.0V			-4	mA
	High	I_{OH}	V_{cc} = 3.0V			4	mA

* Measured at the MDI-5010 connector

4.3 Current Consumption

(IF:UART/USB, V_{CC} = 3.3V/5.0V T_A = 25°C)

Item	State	Symbol	Conditions	Min.	Typ.	Max.	Unit
Peak Rush Current *	Boot	I_{PK}	-	-	800	1000	mA

* Measured at the MDI-5010 connector

UART

[V_{CC} = 3.3V] (IF:UART, T_A = 25°C)

Item	State	Recovery time *1	Symbol	Conditions	Min.	Typ.	Max.	Unit
Operating Current	Read	-	I_{OP}	-	-	390	520	mA
Standby Current	Standby	0 ms	I_{STB}	-	-	24		mA
Low Power Current	Low Power	41 ms	I_{LOW}	Configured	-	1.7		mA

[V_{CC} = 5.0V] (IF:UART, T_A = 25 °C)

Item	State	Recovery time *1	Symbol	Conditions	Min.	Typ.	Max.	Unit
Operating Current	Read	-	I_{OP}	-	-	270	390	mA
Standby Current	Standby	0 ms	I_{STB}	-	-	22		mA
Low Power Current	Low Power	41 ms	I_{LOW}	Configured	-	1.3		mA

*1 Recovery time is time until ready to scan.
* Refer to “Serial Interface Specifications” for details.

USB

[V_{CC} = 3.3V] (IF:USB, T_A = 25°C)

Item	State	Recovery time *1	Symbol	Conditions	Min.	Typ.	Max.	Unit
Operating Current	Read	-	I_{OP}	-	-	390	520	mA
Standby Current*2	Standby	0 ms	I_{STB}	-	-	28		mA
Low Power Current*2	Low Power	43 ms	I_{LOW}	Configured*2	-	2.1		mA

[V_{CC} = 5.0V] (IF:USB, T_A = 25°C)

Item	State	Recovery time *1	Symbol	Conditions	Min.	Typ.	Max.	Unit
Operating Current	Read	-	I_{OP}	-	-	270	390	mA
Standby Current*2	Standby	0 ms	I_{STB}	-	-	21		mA
Low Power Current*2	Low Power	43 ms	I_{LOW}	Configured*2	-	1.6		mA

*1 Recovery time is time until ready to scan.
*2 Current value when USB is “Selective Suspend” mode. When using as USB-COM (USB as virtual COM), use USB driver “Opticon USB Code Reader driver” version 3.x.x.x.
* Refer to “Serial Interface Specifications” for details.

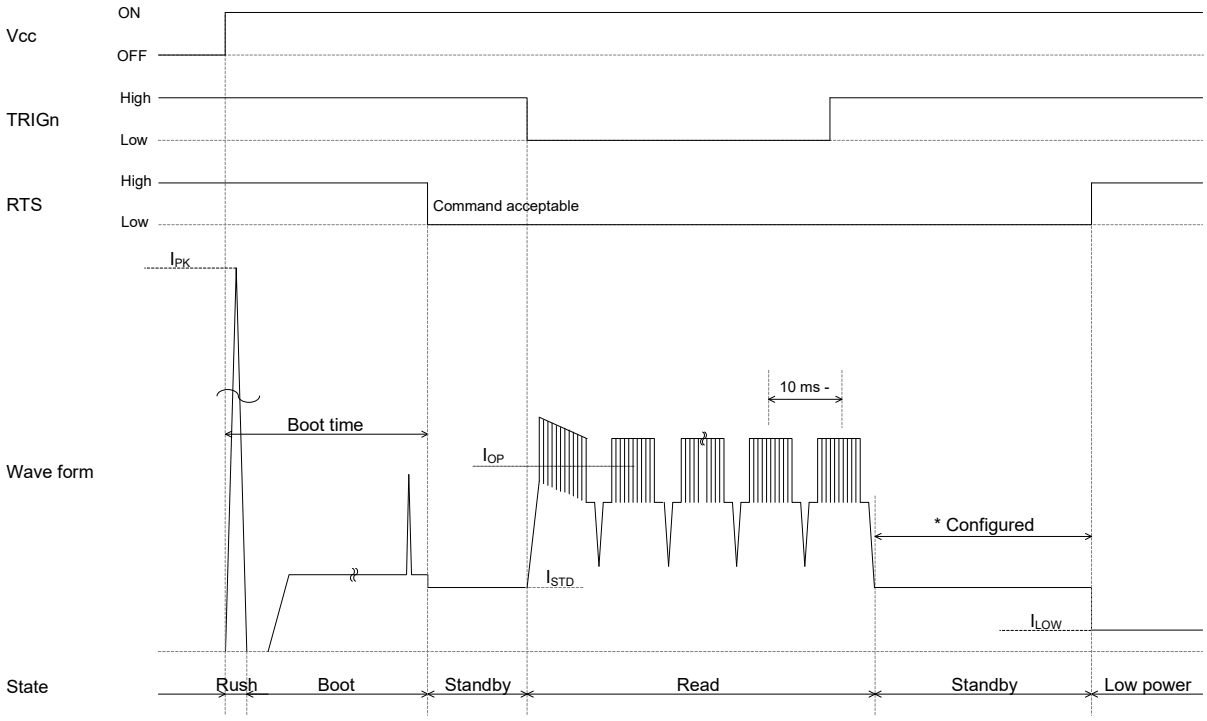
4.4 Recovery Time from Power Down State

(IF=UART/USB, V_{CC} = 3.3V, 5.0V T_A = 25°C)

Item	Mode	Conditions	Min	Typ.	Max	Unit
Boot time	Normal boot		-	610		ms
	Fast Boot Mode	Configured*	-	525		ms

* Refer to “Serial Interface Specifications” for details.

4.5 Current Waveform



* When Low Power Mode is enabled, the MDI-5010 automatically enters Low Power state after Power On.

*Figure **2**: Current Waveform*

5 Power Mode Transition

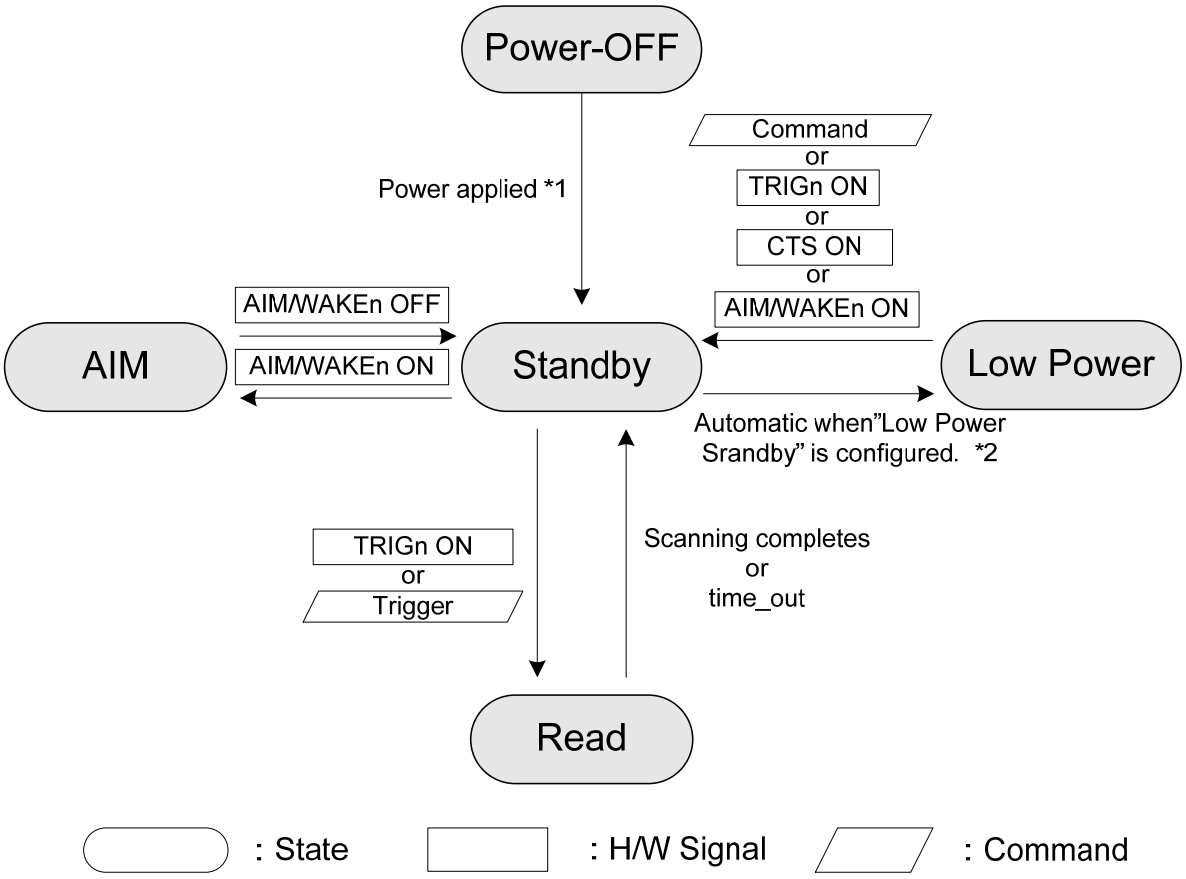


Figure **3***: Power Mode Transition*

*1 Options are available to adjust the start-up time: Fast Boot and Normal Boot.
*2 When Low Power is enabled, the MDI-5010 automatically enters Low Power mode after the specified Standby time.

Status	Description
Read	White LED illumination, green aiming light, and process reading.
Standby	Ready to read. The scan engine can immediately read barcodes.
Low Power	Low current consumption status. The specified time to change from Standby is configurable.
AIM	The green aiming lights when the AIM signal is on.

6 Interface Specifications

6.1 Interface Signals

The connector used is equivalent to the one produced by IRISO Electronics Co., Ltd.
Product No.: 9681-12 (12-pin, 0.5 mm pitch bottom contact, 0.3 mm thick FPC/FFC connector)

No.	Name	Function	I/O	Conditions	State	Note
1	TRIGn	Trigger	In		L: Start operation H: No action	100kΩ pull up on scan engine
2	AIM/WAKEn	Recovery signal from Low Power state	In		L: Recover from low power state H: No action	100kΩ pull up on scan engine
		Aiming control signal in other states than Low Power	In		L: Aiming LED on H: Aiming LED off	
3	GR_LEDn	Good read LED	Out		L: LED on H: LED off	4.7kΩ pull up on scan engine
	EX_ILLUM	Control of an external light source.	Out	Configured	L: External Illumination On H: External Illumination Off	
4	BUZZERn	Buzzer	Out		ACTIVE: PWM signal (frequency and duration configurable) IDLE: Steady high or low (configurable idle state)	A transistor or FET should be used to drive a buzzer. 100kΩ pull up on scan engine
5	POWERDWN	Indicates Low Power state	Out		L: Normal state H: Low Power state	100kΩ pull up on scan engine
6	RTS	Communication control signal to host system	Out			10kΩ pull up on scan engine
7	CTS	Communication control signal from host system	In	Interface configured as UART		100kΩ pull up on scan engine
	USB+	D+ signal for USB	In/ Out	Interface configured as USB		
8	TxD	Transmitted data signal	Out			10kΩ pull up on scan engine
9	RxD	Received data signal	In	Interface configured as UART		100kΩ pull up on scan engine
	USB-	D- signal for USB	In/ Out	Interface configured as USB		
10	GND	System ground				
11	V_{CC}	Power input	In		3.3V / 5.0V	
12	Reserve		In			N.C

* Refer to “Serial Interface Specifications” for details.

6.2 Interface Circuit

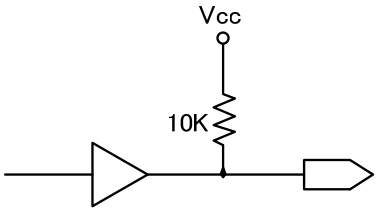
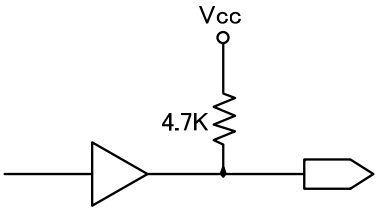
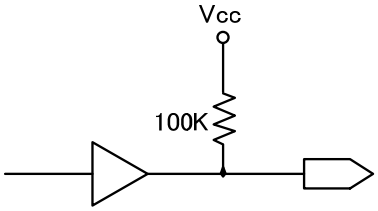
Signal Name	Circuit
AIM/WAKEn RxD CTS	
TRIGn	
RTS TxD	
GR_LEDn	
BUZZERn POWERDWN	
USB+ USB-	

*Figure **4**: Interface Circuit*

7 Optical Specifications

7.1 Basic Optical Specifications

Item		Characteristics
Scan method	CMOS area sensor (black and white)	-
Number of effective pixels	(H) × (V)	1280 × 800
Image capture speed	Frame rate*1	120 fps
Sensor shutter speed	Minimum shutter speed	30 µs
Focal distance	From the front edge of scan engine	Approx. 165 mm
View angle	Horizontal	Approx. 48.0°
	Vertical	Approx. 30.8°
	Diagonal	Approx. 55.8°
Auxiliary light source (LED × 1)	Warm white LED	-
	Color temperature	2600 to 3700K
	Maximum Optical Efficiency *2	173 lm/W
Light source for aiming (LED x 1)	Single Line Green LED	-
	Peak Wave Length	525 to 535 nm
	Maximum Optical Efficiency *2	87.4 lm/W

*1 The fastest speed of image capture
*2 The reference value extracted from the LED datasheet

7.2 Aiming Specifications

Aiming is used to indicate the appropriate reading distance by projecting a bar of green light.

The aiming specifications are as follows:

- The optical axis of the imaging field of view and the center of the horizontal aiming bar coincide at a distance of L=120±20 optical axis of the imaging fiscan engine.
- The width of the aiming bar at a distance of L=120 mm is 70%dth of the aiming bar at a distance of

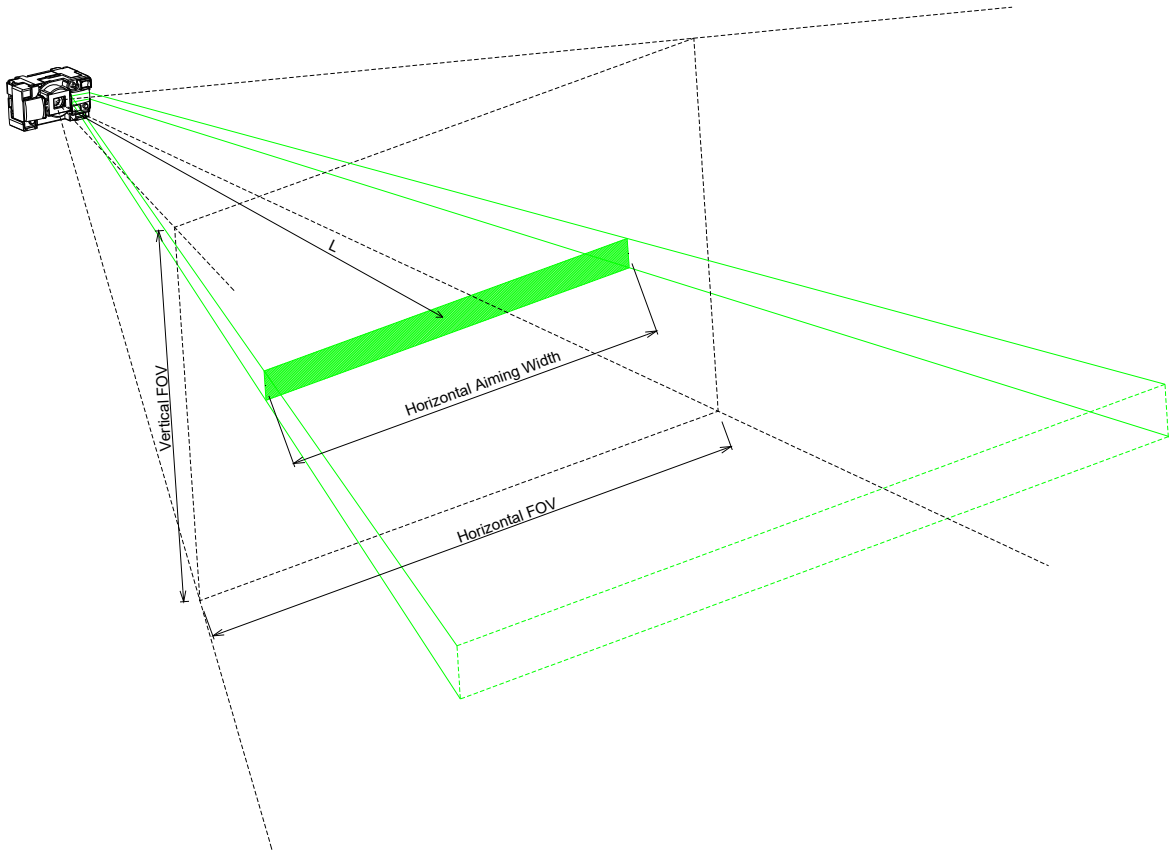


Figure ***5****: Aiming Pattern*

8 Technical Specifications

Unless otherwise specified, the conditions for technical specifications are as follows.

Conditions	
Ambient Temperature and Humidity	Room temperature and room humidity
Ambient Light	100 to 200 lux (on the surface of a barcode)
Pitch Angle	α = 0°
Skew Angle	β = 15°
Tilt Angle	γ = 0°
Code Position	Center of the image
Curvature	R = ∞
Power Supply Voltage	3.3 and 5.0 V
PCS (1D and 2D)	0.9 or higher
Scanning Test	Accept the performance with 90% or more success rate for 10 scan attempts.
Barcode Test Sample (1D and 2D)	Specified in Chapter 8.1

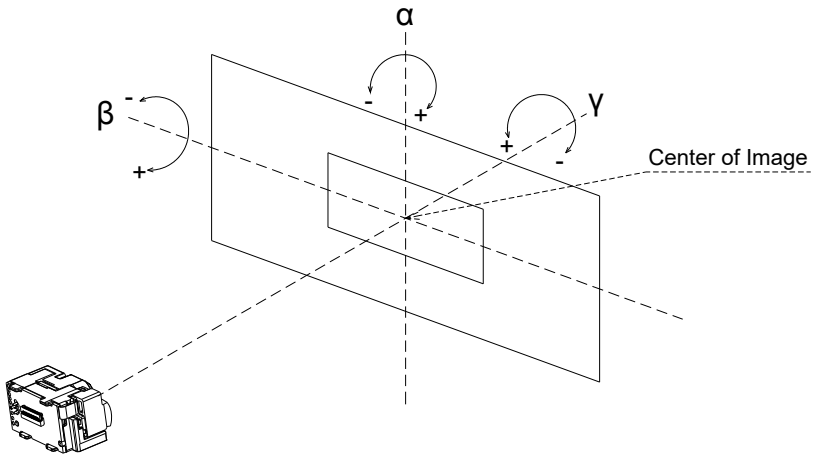


Figure ***6****: Test Condition of Depth of Field*

8.1 Barcode Test Sample

1D Barcode test labels

Code 39

Resolution	Symbology	PCS (MRD)	Size (mm)	No. of Digits
0.1 mm (4 mil)	Code 39	0.9 (80)	26 × 10	16
0.127 mm (5 mil)			32 × 10	15
0.20 mm (7.9 mil)			110 × 10	34
0.508 mm (20 mil)			43 × 25	4

Code 128

Resolution	Symbology	PCS (MRD)	Size (mm)	No. of Digits
0.20 mm (7.9 mil)	Code 128	0.9 (80)	42 × 10	16

UPC/EAN

Resolution	Symbology	PCS(MRD)	Size (mm)	No. of Digits
0.260 mm (10 mil)	UPC/EAN	0.9/0.3 (80/23)	25 × 20	12/13
0.330 mm (13 mil)	UPC/EAN	0.9/0.3 (80/23)	31.5 × 24.5	12/13

GS1 DataBar / Composite test labels

GS1 DataBar Limited

Resolution	Symbology	PCS(MRD)	Size (mm)	No. of Digits
0.169 mm (6.7 mil)	Limited	0.9 (80)	12 × 1.8	14
0.169 mm (6.7 mil)	Limited-Composite		12 × 3.0	26

2 D test labels

PDF417

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

QR Code: Model-2

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

Data Matrix

Resolution	Model	PCS(MRD)	Size (mm)	No. of Character
0.169 mm (6.7mil)	ECC200	0.9 (80)	4 × 4	40
0.254 mm (10mil)			6 × 6	

Note: The size is the outline dimension excluding the quiet zone.

8.2 Scan Area and Depths of Field

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

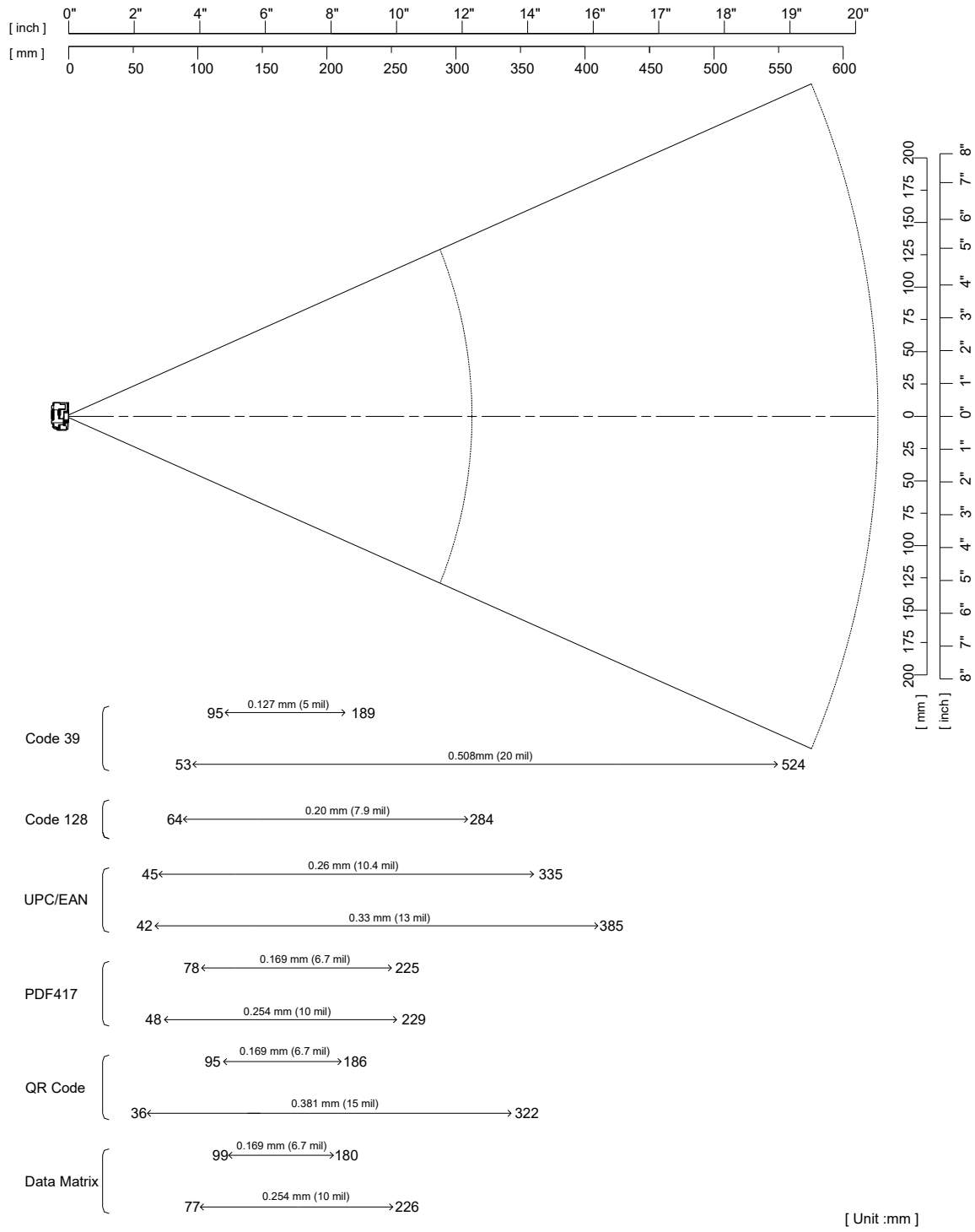


*Figure **7**: Scan Area and Depth of Fields*

Note: The depth of field depends on the view angle and symbol length.
The depth of field values are the typical values measured at an ambient temperature of 25°C.

8.3 Depths of Field

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

(T_A = 25°C)

Resolution mm (mil)	Symbology type	PCS (MRD)	Guaranteed Value		Typical Value	
			Near	Far	Near	Far
0.127 mm (5 mil)	Code 39	0.9 (80)	121 mm (4.8″)	167 mm (6.6″)	95 mm (3.7″)	189 mm (7.4″)
0.508 mm (20 mil)	Code 39	0.9 (80)	65 mm (2.6″)	400 mm (15.7″)	53 mm (2.1″)	524 mm (20.6″)
0.2 mm (7.9 mil)	Code 128	0.9 (80)	79 mm (3.1″)	221 mm (8.3″)	64 mm (2.5″)	284 mm (11.2″)
0.26 mm (10.4 mil)	UPC/EAN	0.9 (80)	54 mm (2.1″)	277 mm (10.9″)	45 mm (1.8″)	335 mm (13.2″)
0.33 mm (13 mil)	UPC/EAN	0.9 (80)	52 mm (2.1″)	313 mm (12.3″)	42 mm (1.7″)	385 mm (15.2″)
0.169 mm (6.7 mil)	PDF417	0.9 (80)	98 mm (3.9″)	193 mm (7.6″)	78 mm (3.1″)	225 mm (8.9″)
0.254 mm (10 mil)	PDF417	0.9 (80)	64 mm (2.5″)	241 mm (9.5″)	48 mm (1.9″)	299 mm (11.8″)
0.169 mm (6.7 mil)	QR Code	0.9 (80)	128 mm (5.0″)	149 mm (5.9″)	95 mm (3.7″)	186 mm (7.3″)
0.381 mm (15 mil)	QR Code	0.9 (80)	46 mm (1.8″)	221 mm (8.7″)	36 mm (1.4″)	322 mm (12.7″)
0.169 mm (6.7 mil)	Data Matrix	0.9 (80)	136 mm (5.4″)	142 mm (5.6″)	99 mm (3.9″)	180 mm (7.1″)
0.254 mm (10 mil)	Data Matrix	0.9 (80)	107 mm (4.2″)	178 mm (7.0″)	77 mm (3.0″)	226 mm (8.9″)

8.4 Print Contrast Signal

PCS 0.3 or higher

Conditions

MRD	23% and higher (70% or higher reflectivity of space and quiet zone)
Distance	130 mm from the front edge of the scan engine
Barcode Sample	UPC specified in Chapter 8.1 (Resolution: 0.33 mm, PCS: 0.3)

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

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

8.5 Minimum Resolution

1D Code: 0.1 mm (4 mil) Code 39 specified in Chapter 8.1
GS1-DataBar: 0.169 mm (6.7 mil) GS1 DataBar Limited specified in Chapter 8.1
Stacked Code: 0.169 mm (6.7 mil) PDF417, GS1 DataBar Limited Composite specified in Chapter 8.1
2D Code: 0.169 mm (6.7 mil) QR Code and Data Matrix specified in Chapter 8.1

Conditions

Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞

8.6 Barcode Width

110 mm

Conditions

Barcode Sample	0.20 mm Code 39 specified in Chapter 8.1
Distance	160 mm from the front edge of the scan engine
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞

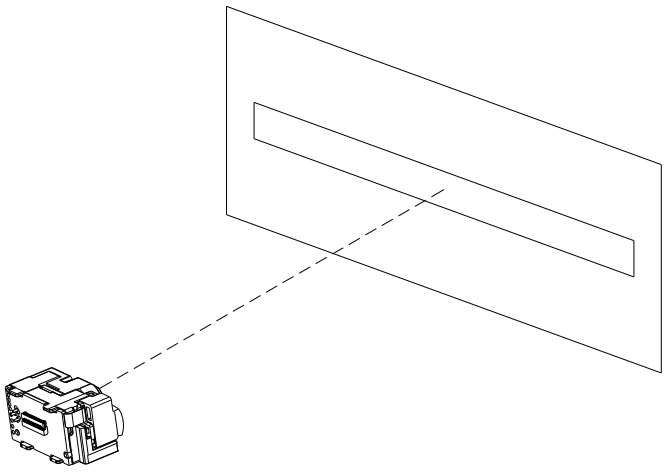


Figure **8***: Wide Bar Code*

8.7 Pitch, Skew, and Tilt

Pitch: α = ±65°
Skew: β = ±65°
Tilt: γ = 360°

Conditions

Barcode Sample	0.508 mm Code 39 specified in Chapter 8.1
Distance	180 mm from the front edge of the scan engine
Curvature	R = ∞

For pitch angle and tilt angle measurements, set the skew angle β to +15°

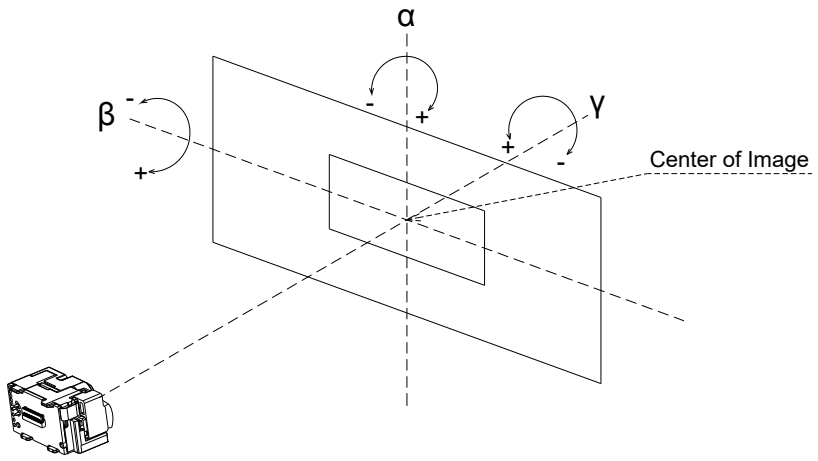


Figure ***9****: Pitch, Skew, and Tilt*

8.8 Curvature

0.33 mm 12-digit UPC R ≧ 20 mm

Conditions

Barcode Sample	0.33 mm UPC specified in Chapter 8.1
Distance	130 mm from the front edge of the scan engine
Angle	α = 0°, β = +15°, γ = 0°

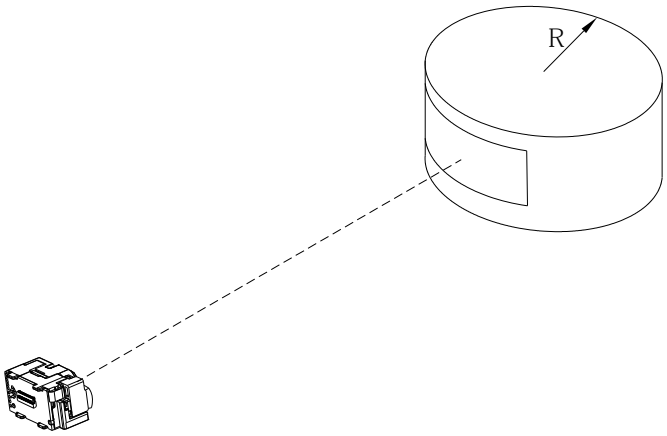


Figure ***10****: Curvature*

Note: Scanning may fail due to specular reflection of the illumination LED when reflectivity is high.

8.9 Motion Tolerance

2.54 m/s

Conditions	
Ambient Temperature and Humidity	Room temperature and Room humidity
Ambient Light	500 lux to 1000 lux (on the surface of the barcode)
Distance	180 mm from the front edge of the scan engine
Skew	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞
PCS	0.9 or higher
Barcode Sample	UPC with 0.33 mm resolution specified in Chapter 8.1

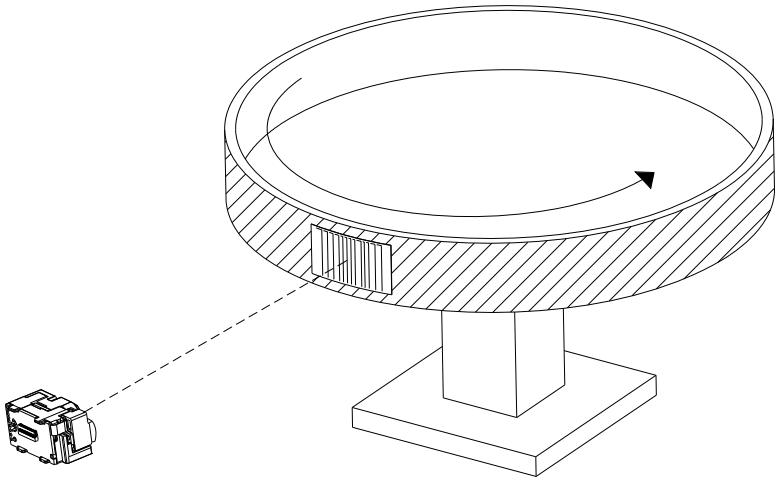


Figure **11***: Motion Tolerance*

Note: Successful reading at the indicated speed cannot be guaranteed. Reading may fail due to specular reflection of the illumination LED when the reflectivity is high.

8.10 Scan Speed

The number of scans per second
1D code: 30 Scans/Second
2D code: 20 Scans/Second

Conditions	
Ambient Temperature and Humidity	Room temperature and Room humidity
Ambient Light	500 lux to 1000 lux (on the surface of a barcode)
Distance	180 mm from the front edge of the scan engine
Scan Mode	Continuous scan
Angle	α = 0°, β =+15°, γ = 0°
Code position	Center of the image
PCS (1D and 2D)	0.9 or higher
1D Code	UPC/EAN with 0.33 mm specified in Chapter 8.1
2D Code	Data Matrix with 0.254 mm specified in Chapter 8.1

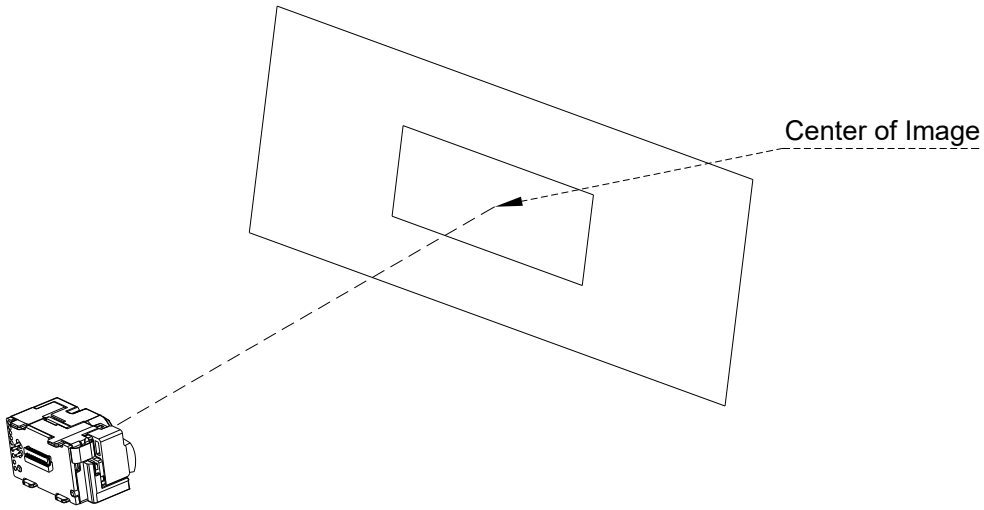


Figure ***12****: Scan Speed*

Note: The performance is not guaranteed in other conditions.

9 Environmental Specifications

9.1 Temperature

Operating Temperature: -20 to 60 °C
Storage Temperature: -40 to 70 °C

Conditions	
Barcode Sample	0.33 mm UPC specified in Chapter 8.1
Distance	130 mm from the front edge of the scan engine
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞
Scanning Test	Read at intervals of 300 ms
Power Supply Voltage	3.3 and 5.0 V

9.2 Humidity

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

Conditions	
Barcode Sample	0.33 mm UPC specified in Chapter 8.1
Distance	130 mm from the front edge of the scan engine
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞
Power Supply Voltage	3.3 and 5.0 V

9.3 Ambient Light Immunity

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

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

Conditions	
Barcode Sample	0.33 mm UPC specified in Chapter 8.1
Distance	180 mm from the front edge of the scan engine
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞
Power Supply Voltage	3.3 and 5.0 V

Note: Scanning performance is guaranteed as long as direct ambient light and specular reflection from the illumination LED does not enter the light receiving section of the MDI-5010.

9.4 Electrical Noise

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

Conditions	
Scan Method	Continuous scanning
Barcode Sample	0.33 mm UPC specified in Chapter 8.1
Distance	130 mm from the front edge of the scan engine
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞
Scanning Test	Read at intervals of 300 ms
Power Supply Voltage	3.3 and 5.0V

b) Image Data Acquisition
There shall be no excessive noise or misalignments in acquired images when sinusoidal electrical noise (50 Hz to 100 kHz, smaller than 20 mVp-p) is added to the power supply line.

Note: Electrical noise may affect the quality of captured images. The signal processing system of the MDI-5010 is specifically designed to scan symbologies, not acquiring image data. Therefore, the quality of images captured by the MDI-5010 may be lower than that of general purpose digital cameras.

9.5 Vibration Strength

There shall be no sign of malfunction of the MDI-5010 after the following test.
Vibration Test: Increase the frequency of the vibration from 12Hz to 200Hz at accelerated velocity 32.3m/s^2(3.3G) for ten minutes. Continue this routine for 2 hours in the X-direction, 2 hours in the Y-direction, and 4 hours in the Z-direction.

Conditions	
Barcode Sample	0.33 mm UPC specified in Chapter 8.1
Distance	130 mm from the front edge of the scan engine
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞
Power Supply Voltage	3.3 and 5.0 V

9.6 Drop Impact Strength

There shall be no sign of malfunction of the MDI-5010 after the following test.
Drop test: Fix the MDI-5010 in a specific aluminium made dummy case 100x70x50 (WDH mm) and drop it a total of 10 times at top, bottom, front, back, left, right, top-left, top-right, bottom-left and bottom-right faces, from a height of 1.8 meters onto a concrete floor.

Conditions	
Barcode Sample	0.33 mm UPC specified in Chapter 8.1
Distance	130 mm from the front edge of the scan engine
Angle	α = 0°, β =+15°, γ = 0°
Curvature	R = ∞
Power Supply Voltage	3.3 and 5.0 V

10 Integration Specifications

Connection between the MDI-5010 and a host system:
Use an FFC or FPC cable developed in accordance with specifications provided by the connector manufacturer to connect the MDI-5010 with the host system.

The connector used is produced by IRISO Electronics Co., Ltd.
Product No.: 9681-12 (12-pin, 0.5 mm pitch, 0.3 mm thick)
Recommended Cable Length: 50 mm (max)

11 Regulatory Specifications

11.1 LED Safety

IEC62471:2006 Exempt Group

12 RoHS

The MDI-5010 is compliant with RoHS.

Note: 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

13 Reliabilities

MTBF: 364154 hours

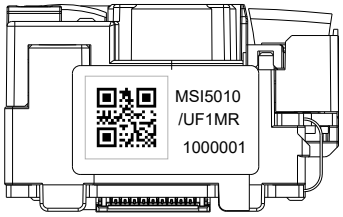
Note: The reliability of the MDI-5010 is guaranteed if it is operated under normal operating conditions within the range of advised operating temperature and without excessive electrical or mechanical shock.

14 Precautions

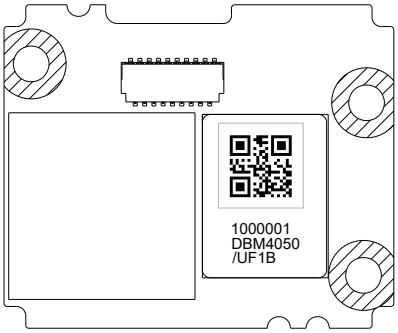
- All work-benches, tools, measuring instruments and any part of the human body which may come into contact with the MDI-5010 must undergo antistatic treatments.
- Do not touch the optical and electrical components. When handling the MDI-5010, hold it by the camera body.
- Avoid handling the MDI-5010 in a dusty area. If dust gets on the MDI-5010, gently blow it off with dry air. Direct contact of swabs on optical parts may reduce performance.
- Do not drop the MDI-5010.

15 Product Label

The product labels are affixed to the MDI-5010 as shown below.



MSI-5010 Camera Engine



DBM-4050 Decoder Board

The details of the label are as follows.

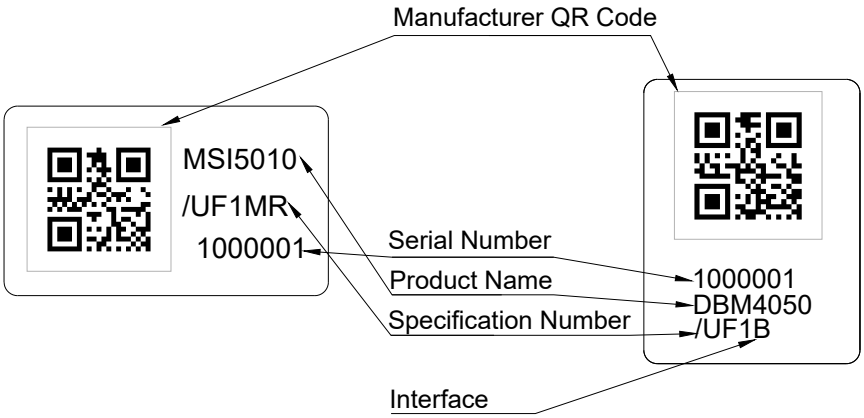


Figure **13***: Serial Label*

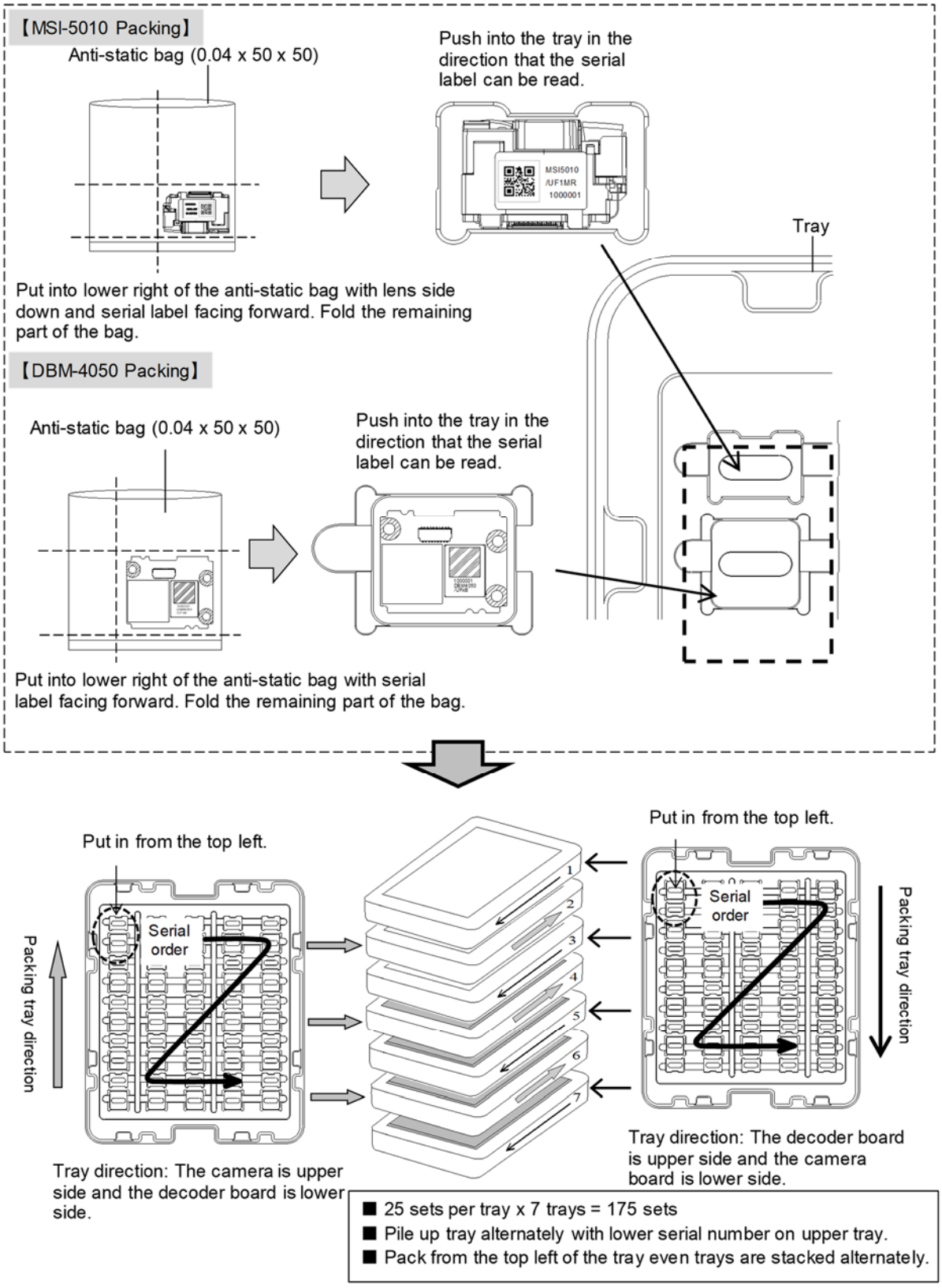
The serial number (seven-digit) starts from 1000001 and is sequentially numbered, regardless of lot number.

Note: B stands for UART interface in default.
DC stands for USB-COM interface in default.
D stands for USB-HID interface in default.

16 Packaging Specifications

16.1 Packaging

A carton box: 175 pieces MDI-5010 (MAX)



- 25 sets per tray x 7 trays = 175 sets
- Pile up tray alternately with lower serial number on upper tray.
- Pack from the top left of the tray even trays are stacked alternately.

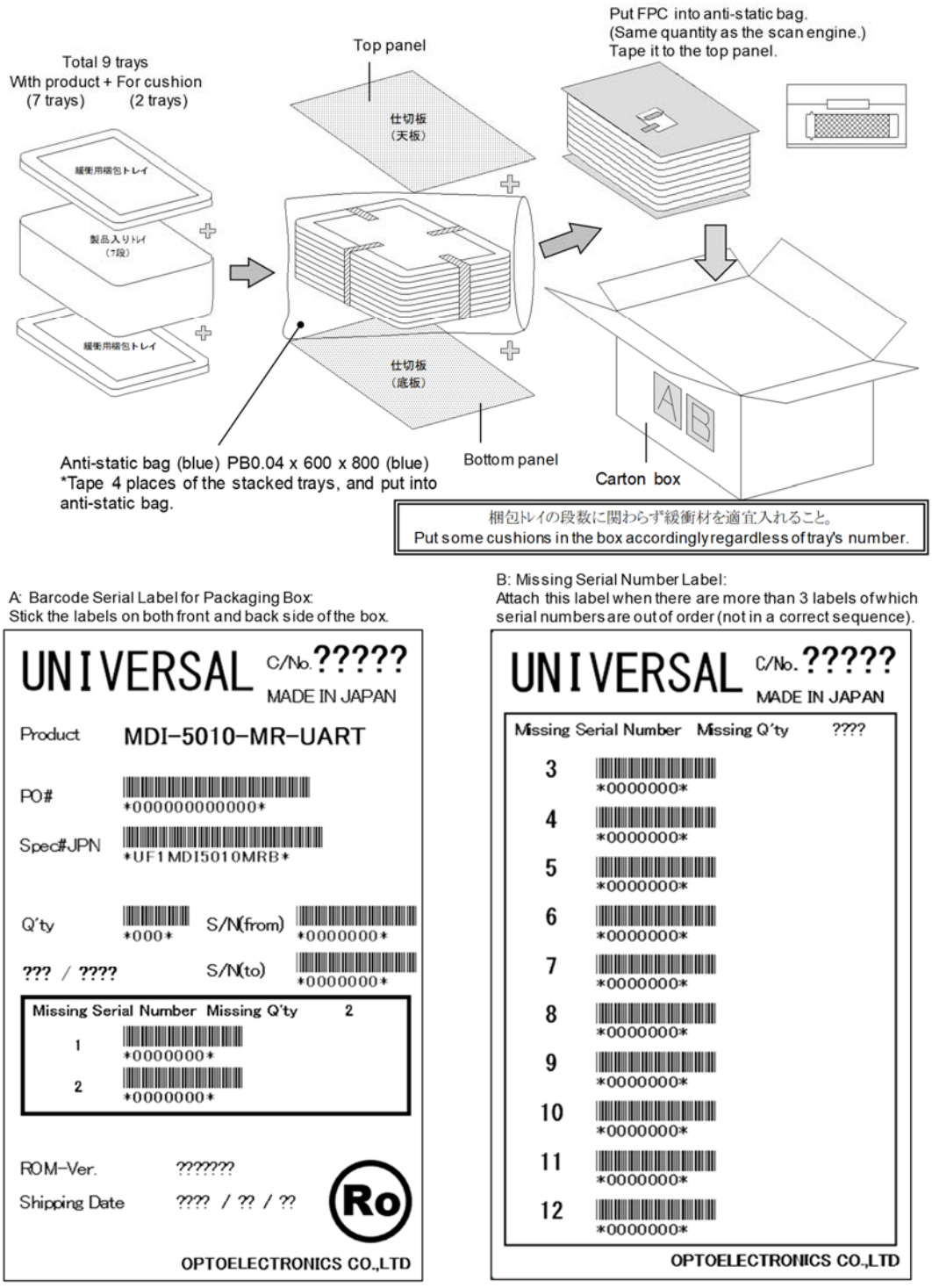


Figure **14***: Packaging*

Product name, number of products contained within and the name of the manufacturer are displayed on the packing box.

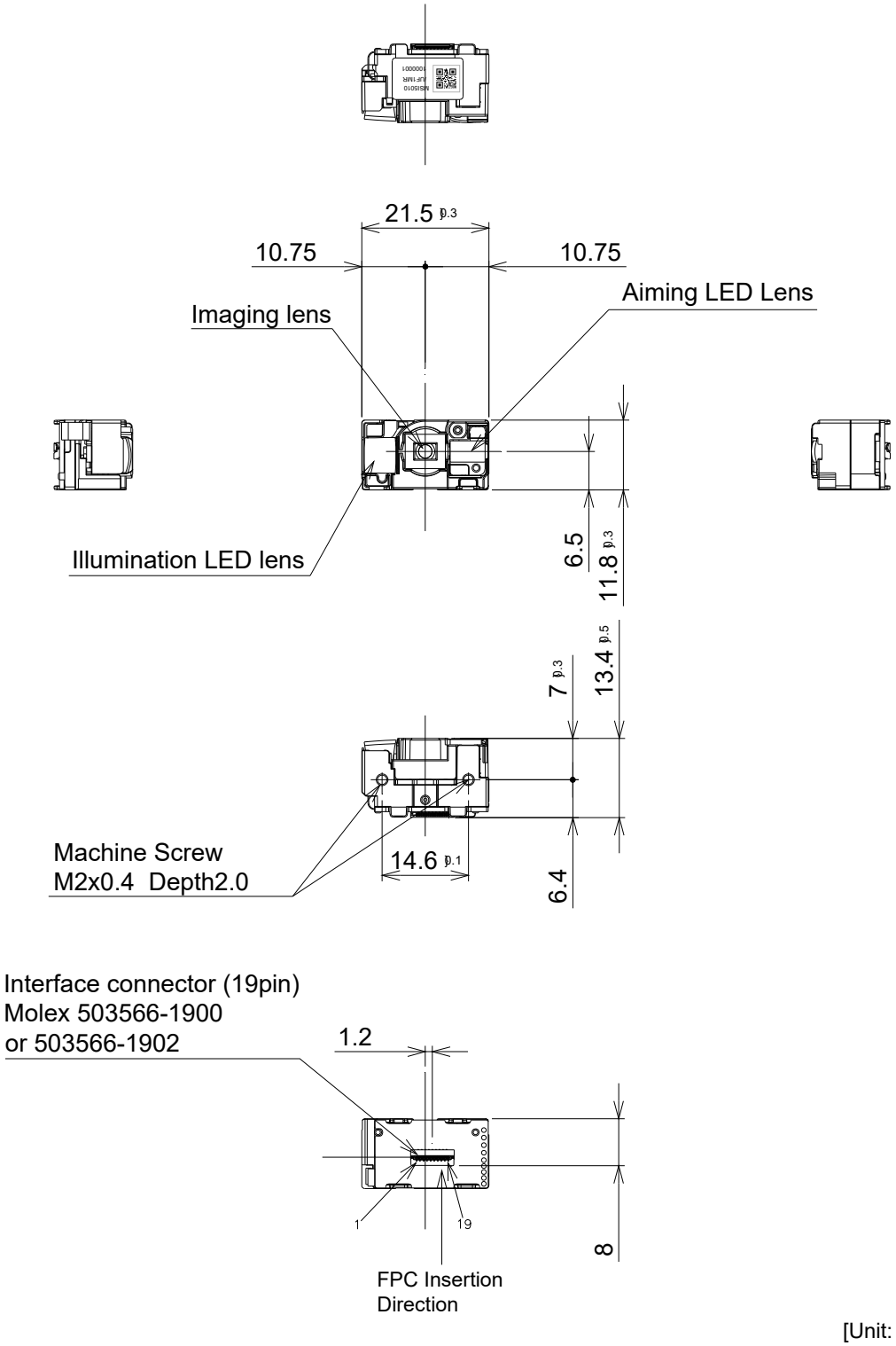
16.2 Package Size

295 × 365 × 225 (DWH mm) (Outside dimensions)

Note: The “RO” mark labelled on the package tray or package box guarantees that the applicable product has passed our test of RoHS restrictions compliance (The restriction of the use of certain hazardous substances in electrical and electronic equipment, Directive 2011/65/EU, Commission Delegated Directive (EU) 2015/863.). However, this mark does not have any legal weight in the European Union.

17 Mechanical Drawing

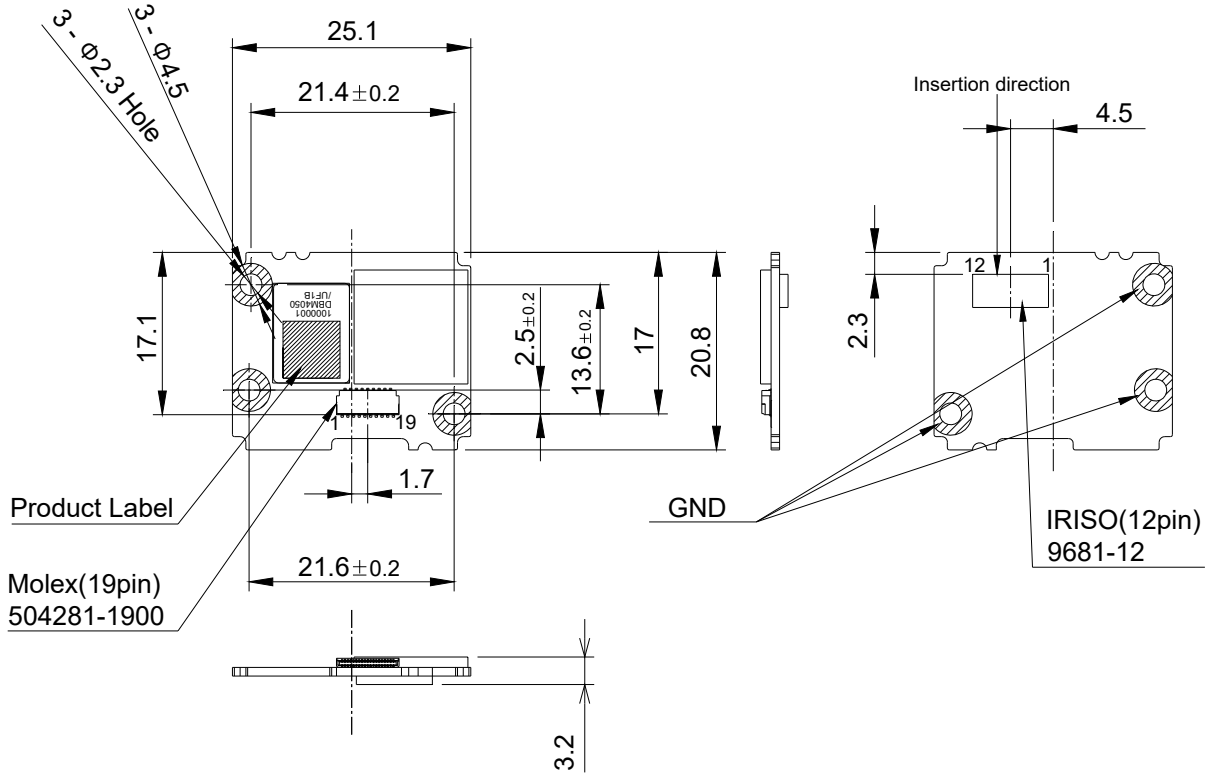
17.1 Camera (MSI-5010)



[Unit: mm]

Figure **15***: Camera (MSI-5010)*

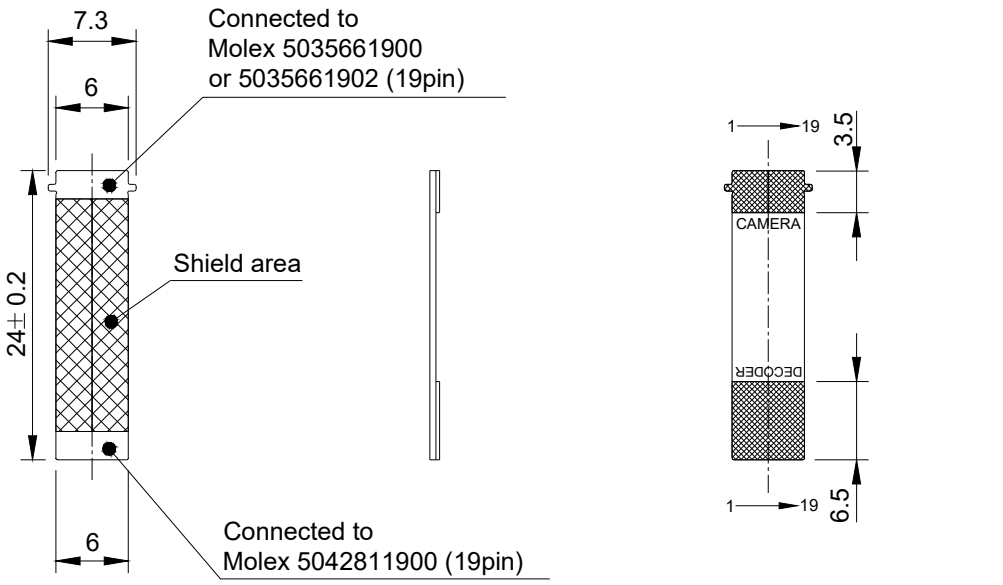
17.2 Decoder Board (DBM-4050)



[Unit: mm]

Figure **16***: Decoder Board (DBM-4050)*

17.3 FPC



[Unit: mm]

Figure **17***: FPC*