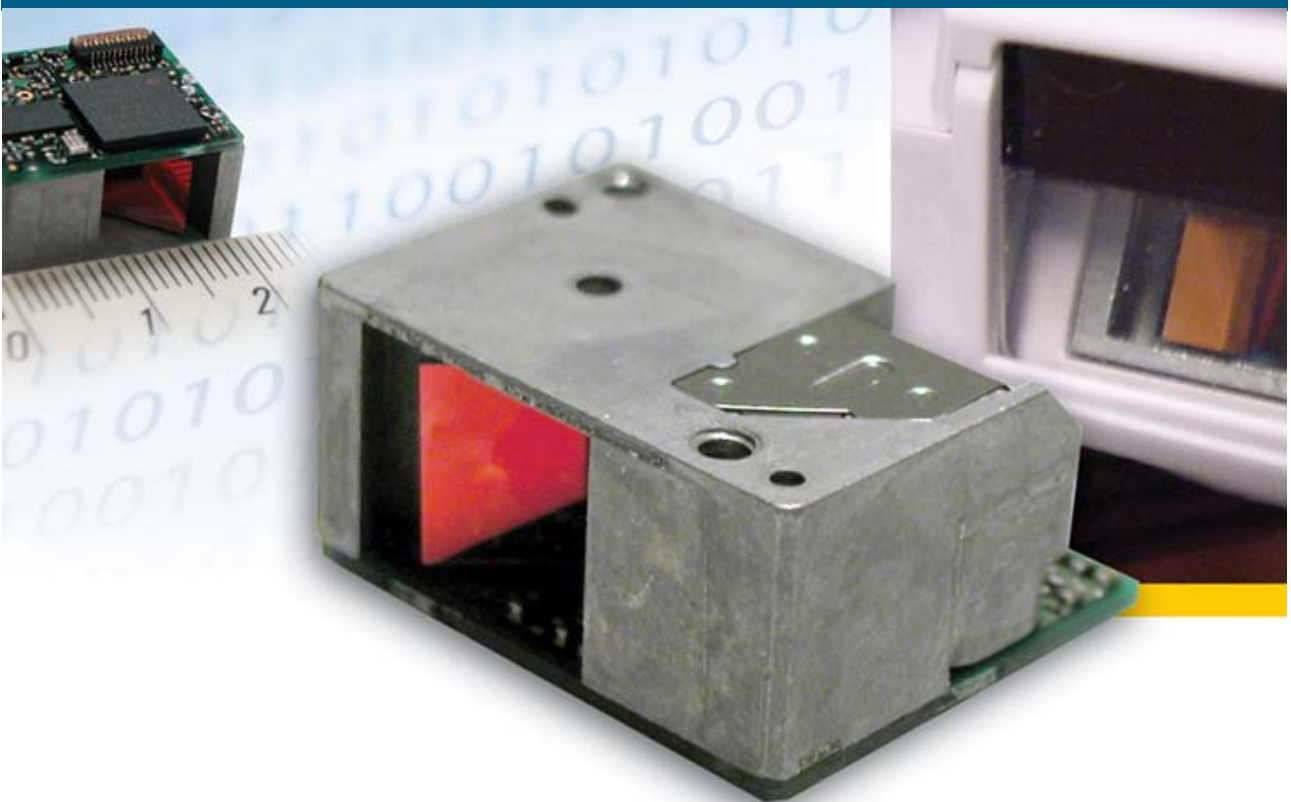


# Specification manual

## MDL - 2000

### **OPTICON**



**Decoded Laser module**

Document : MDL-2000 Standard Specification
Admin No. : SS05046 (MDL-2000)E1
Collected: OPTOELECTRONICS CO.,LTD, Kawaguchi, Saitama Pref.
Distributed: Opticon Sensors Europe B.V., Hoofddorp

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Opticon Sensors Europe B.V.  
email support department: support@opticon.com

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## **1 Physical specification**

### **1.1 Dimensions**

20.4(W) x 18(D) x 11.2(H) mm

### **1.2 Weight**

4.7g

## 2 Electric specification

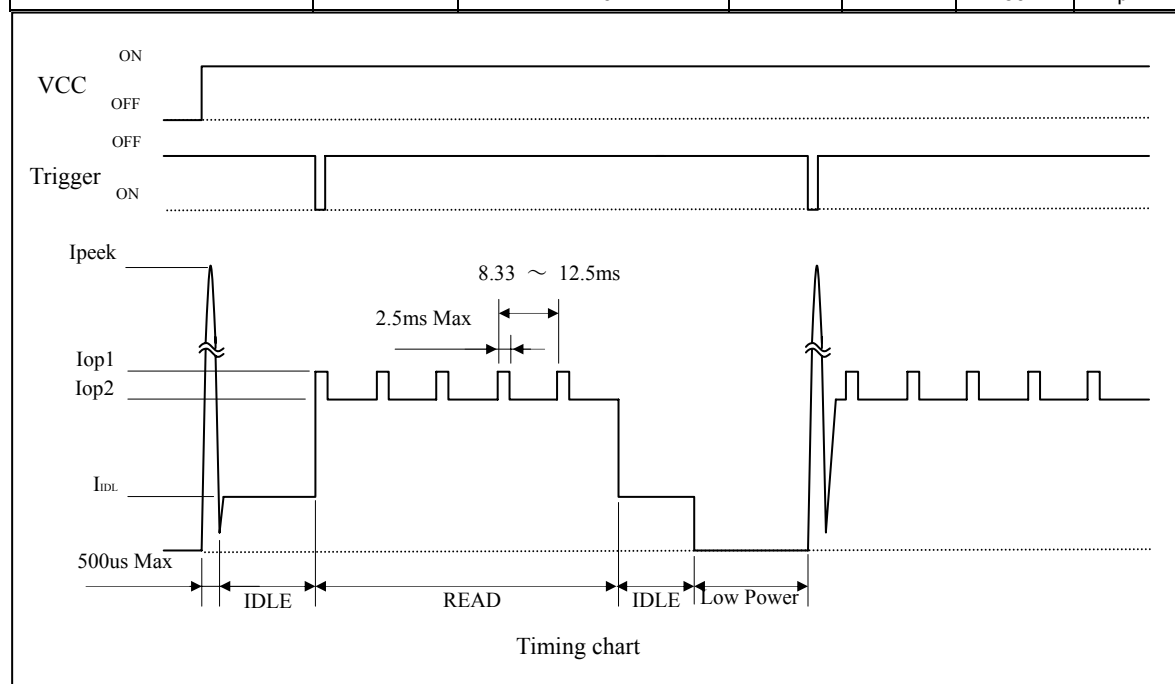
### 2.1 Absolute maximum rating

Item	Symbol	Rating	Unit
Power voltage	$V_{CC}$	3.9	V
Input voltage	$V_i$	-0.3 to $V_{CC}+0.3$	V
Output current	$I_{Co}$	$\pm 4$	mA

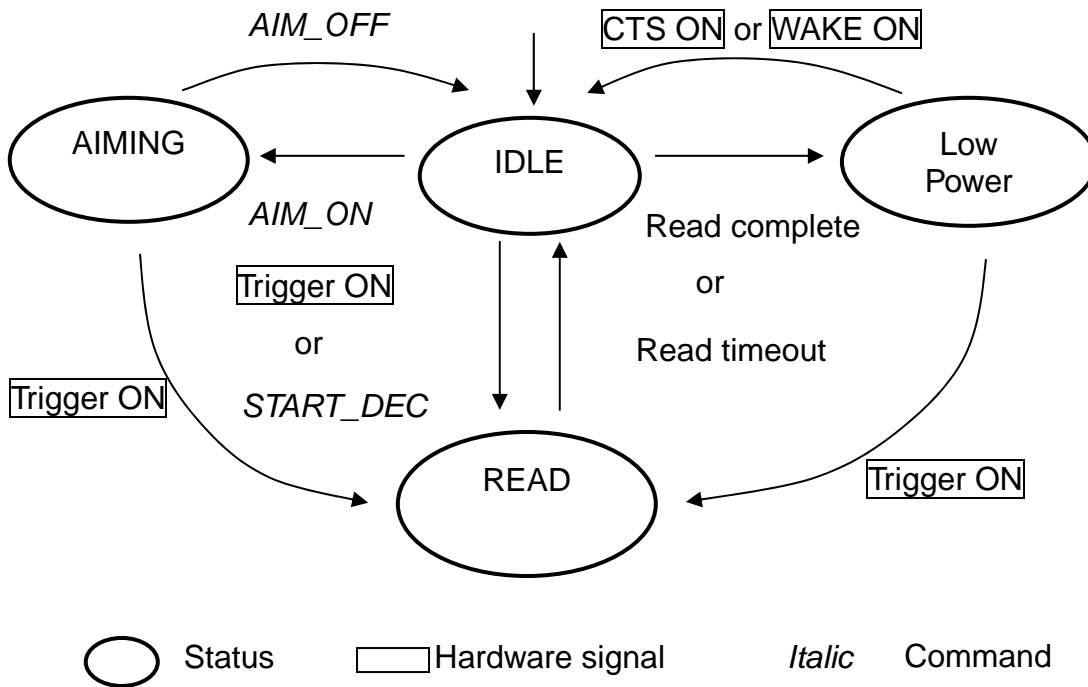
### 2.2 Electric specification

$V_{CC}=3.3V$ ,  $T_a=25^\circ C$

Item	Symbol	Conditions	Min	Typ	Max	Unit
Power voltage	$V_{CC}$		3.0	-	3.6	V
Operating current_1	$I_{OP1}$	READ State	-	110	125	mA
Operating current_2	$I_{OP2}$	READ State	-	95	110	
Idle current	$I_{IDL}$	IDLE State	-	30	40	mA
Aiming current	$I_{AIM}$	AIMING State	-	50	65	mA
Low power current	$I_{LOW}$	Low Power State	-	-	1400	$\mu A$
Rush current	$I_{PEEK}$		-	500	1000	mA
Input voltage	H	$V_{IH}$	$V_{CC} \times 0.8$	-	-	V
	L	$V_{IL}$	-	-	$V_{CC} \times 0.2$	V
Output voltage (Decode LED)	H	$V_{OH}$	$I_{OH} < 8mA$	$V_{CC}-0.6$	-	V
	H (Low Power State)	$V_{OH}$	$I_{OH} < 5\mu A$	$V_{CC}-0.6$	-	V
	L	$V_{OL}$	$I_{OL} < 8mA$	-	0.4	V
Output voltage (Txd, RTS)	H	$V_{OH}$	$I_{OH} < 4mA$	$V_{CC}-0.6$	-	V
	H (Low Power State)	$V_{OH}$	$I_{OH} < 5\mu A$	$V_{CC}-0.6$	-	V
	L	$V_{OL}$	$I_{OL} < 4mA$	-	0.4	V
Output voltage (Power Down)	H (Low Power State)	$V_{OH}$	$I_{OH} < 5\mu A$	$V_{CC}-0.6$	-	V
	L	$V_{OL}$	$I_{OL} < 4mA$	-	0.4	V
Input current	$I_{IN}$	$V_{IN}=3.3V$	-	-	-10	$\mu A$
		$V_{IN}=0V$	-	-	50	$\mu A$



### 3 Power mode status chart



In the Low Power mode, Power ON enters into Low Power status.  
 In the Low Power mode, CTS ON or WAKE ON enters into IDLE and moves on to Low Power status after one second if no events occur.

## 4 Interface specification

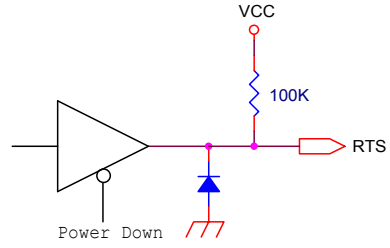
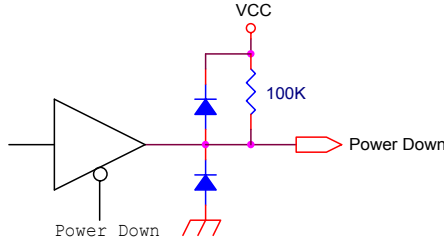
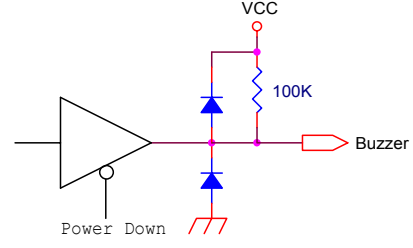
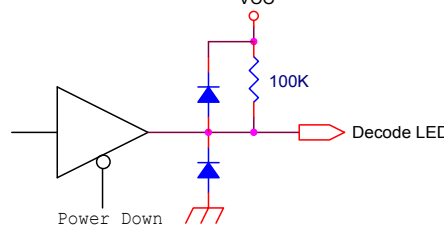
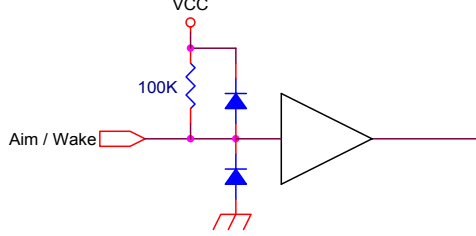
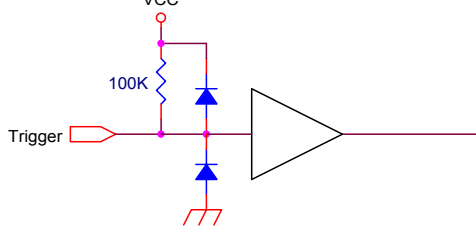
### 4.1 Connector

Signal	Pin	I/O	Function
TEST	1	I	High or open.
VCC	2	-	DC 3.0 ~ 3.6V
GND	3	-	Ground
Rxd	4	I	Serial data input, CMOS logic
Txd	5	O	Serial data output, CMOS logic
CTS	6	I	Clear to send, CMOS logic
RTS	7	O	Request to send, CMOS logic
Power Down	8	O	Power down output, CMOS logic, High = Low Power status
Buzzer	9	O	Buzzer control, CMOS logic, Low = Buzzer enabled.
Decode LED	10	O	LED output, CMOS logic, Low = LED ON
Aim/Wake	11	I	Aiming/Wakeup input, CMOS logic, Low = Aim/Wake
Trigger	12	I	Trigger input, CMOS logic, Low = Trigger

Connector type: Kyocera: 04 6238 012 010 883+, 12 PIN 0.5mm Pitch FCC contacts under

### 4.2 Interface circuit

Pin	Signal	Circuit
1	Test (Open or Vcc)	-
2	VCC	-
3	GND	-
4	Rxd input	
5	Txd output	
6	CTS input	

7	RTS output	
8	Power Down output High = Low Power Status	
9	Buzzer output High = OFF Low = ON	
10	Decode LED output High = OFF Low = ON	
11	Aim/Wakeinput Low = Aim / Wake	
12	Trigger input Low = Trigger	



## 5 Optical specification

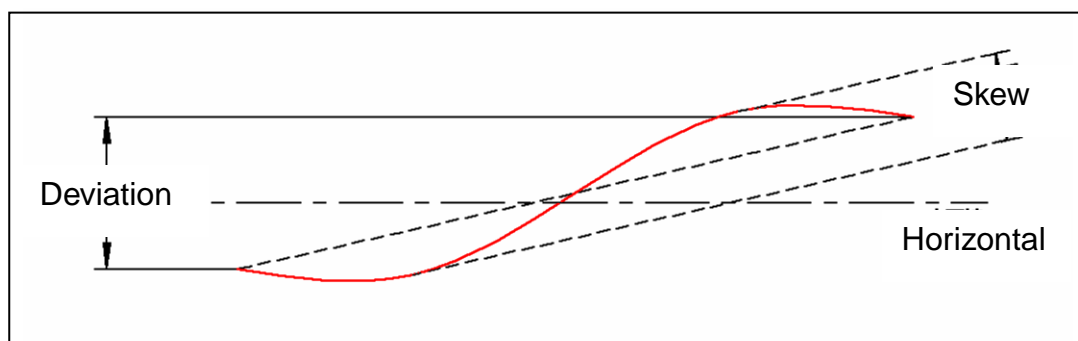
### 5.1 Laser scanning

Item		Description	Unit
Light source		Diode laser	-
Wave length		650±10 (25°C)	nm
Optical power		< 1.0	mW
Scan method		Vibration mirror	-
Scan speed		100±20	scan/sec
Scan angle	Scan angle	54±5	deg
	Read angle	44 (Min)	deg

### 5.2 Deviation of scan line

(1) Vertical deviation of scan line  
 Vertical angle of <math><1.2^\circ</math> at the scan mirror.  
 At 150mm, the deviation is <math><3.1\text{mm}</math>.

(2) Skewed deviation of scan line  
 The line between two extremes of scan line makes <math><1.27^\circ</math> with horizontal line.  
 At 150mm, it deviates <math><3.3\text{mm}</math>.



## 6 Reading specification

Conditions:

Environment: Room temperature  
 Ambient light: 500 to 900 lx  
 Barcode: Black  
 Power voltage: 3.3V  
 Read rate: > 95%

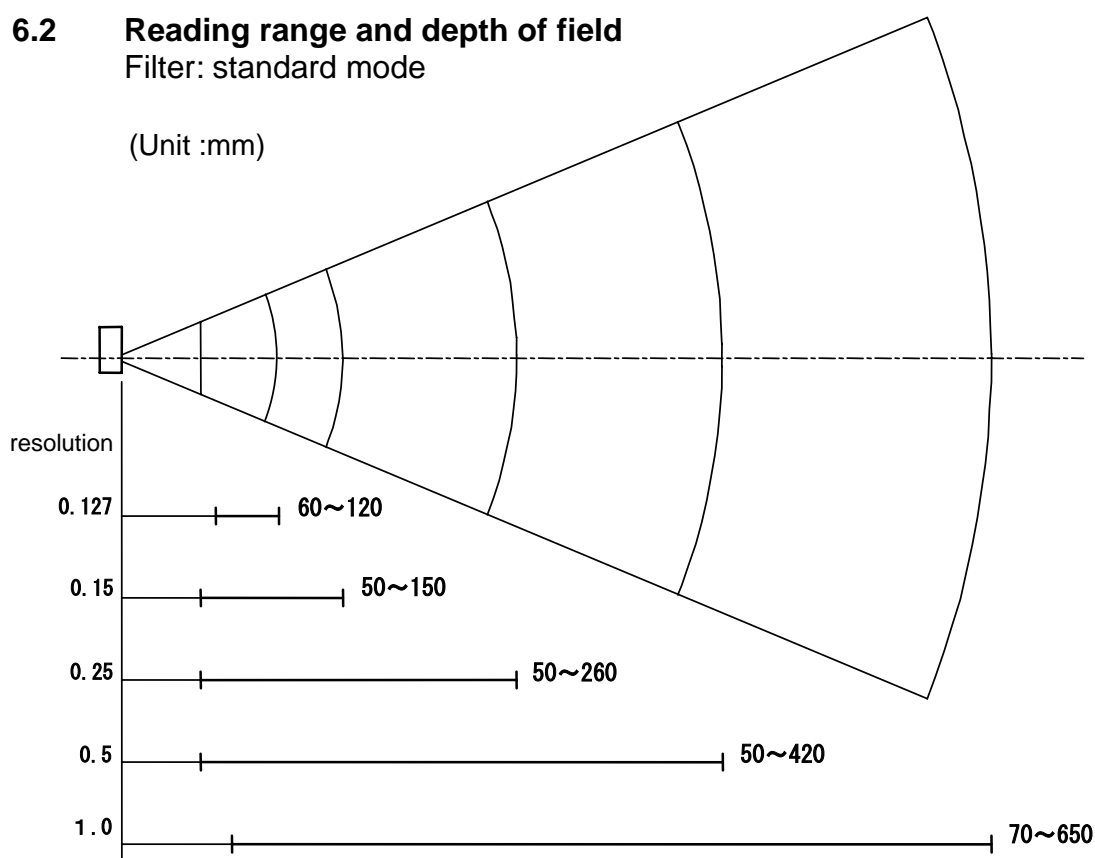
### 6.1 PCS

>0.45 at the reflection rate of >70%.

### 6.2 Reading range and depth of field

Filter: standard mode

(Unit :mm)



Note: The distance is measured from the tip of the module.

Conditions:

Resolution	Code	PCS	Margin	Digits
1.0 mm	CODE-39	0.9	25 mm	1
0.5 mm	CODE-39	0.9	18 mm	3
0.25 mm	CODE-39	0.9	10 mm	8
0.15 mm	CODE-39	0.9	7 mm	10
0.127 mm	CODE-39	0.9	5 mm	4

Opticon test chart

Angle:  $\alpha=0^\circ, \beta=15^\circ, \gamma=0^\circ$

Curvature:  $R=\infty$

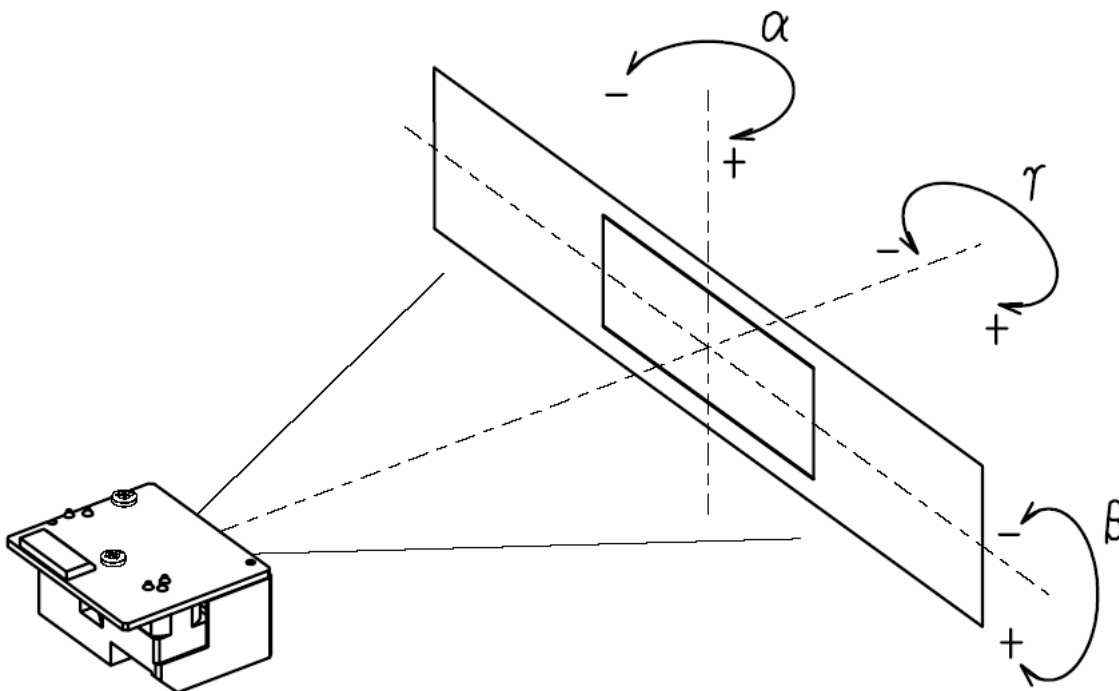
### 6.3 Reading specification

Filter: standard mode

Pitch:  $\alpha = \pm 35^\circ$   
 Skew:  $\beta = \pm 50^\circ$  except dead zone  
 Dead zone:  $\beta = \pm 8^\circ$ , area of specular reflection  
 Tilt:  $\gamma = \pm 20^\circ$

Conditions:

Test label: Opticon test label  
 Distance: 110mm from the tip  
 Parameters: (1) for testing pitch, skew, dead zone  
 PCS=0.9, Resolution=0.25mm, Code39, 9 digits, Margin=10mm,  
 NW: 1:2.5,  $R = \infty$ ,  $\beta = +15^\circ$   
 (2) for testing tilt,  
 PCS=0.9, Resolution=0.26mm, EAN, 13 digits, Margin=10mm,  
 $R = \infty$ ,  $\alpha = \pm 0^\circ$ ,  $\gamma = \pm 0$



## 6.4 Curvature

Filter: standard mode

EAN 8:  $R \geq 15\text{mm}$

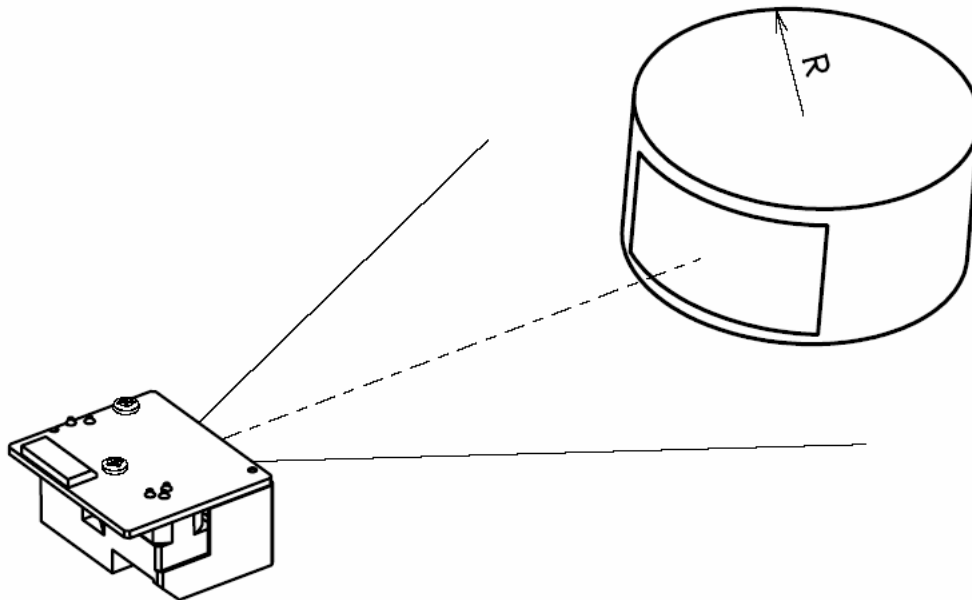
EAN 13:  $R \geq 20\text{mm}$

Conditions:

Test label: Opticon test label  
PCS=0.9, Resolution=0.26mm, Margin=10mm

Distance: 110mm from the tip

Angle:  $\beta = +15^\circ$



## 7 Environmental specification

### 7.1 Temperature

Operating temperature: -20 to 65°C

Storage temperature: -30 to 70°C

### 7.2 Humidity

Operating humidity: 5 to 90%RH

Storage humidity: 5 to 90%RH

### 7.3 Ambient light

White light: 4000lx

Fluorescent light: 4000lx

Sun light: 80000lx

#### Conditions:

Test label: Opticon test label  
PCS=0.9, Resolution=0.25mm, Code39, 9 digits,  
Margin=10mm, NW: 1:2.5

Distance: 150mm from the tip

Angle:  $\alpha=0^\circ$ ,  $\beta=15^\circ$ ,  $\gamma=0^\circ$

Curvature:  $R=\infty$

Power voltage: 3.3V

Note: The direct or specular-reflected light should not come into the sensor.

#### 7.4 Power noise

Sinusoidal 50Hz to 100kHz, 0.1Vp-p elements are accepted.

Conditions:

Test label: Opticon test label  
PCS=0.9, Resolution=0.25mm, Code39, 9 digits  
Margin=10mm, NW: 1:2.5  
Distance: 150mm from the tip  
Angle:  $\alpha=0^\circ$ ,  $\beta=15^\circ$ ,  $\gamma=0^\circ$   
Curvature:  $R=\infty$   
Power voltage: 3.3V

#### 7.5 Vibration test

12Hz to 200Hz, 3.3G 10 minutes session is applied to Z direction for four hours, to X direction for 2 hours, and to Y direction for 2 hours.

#### 7.6 Drop test

1.8 m drop onto the concrete surface with the dummy case on six surfaces and four ridges.

Conditions:

Test label: Opticon test label  
PCS=0.9, Resolution=0.25mm, Code39, 9 digits,  
Margin=10mm, NW: 1:2.5  
Distance: 50mm to 150mm  
Pitch:  $\alpha=0^\circ$   
Skew:  $\beta=15^\circ$   
Tilt:  $\gamma=0^\circ$   
Curvature:  $R=\infty$   
Power voltage: 3.3V

## **8 Regulatory approvals**

EMI: CE FCC needs to be applied.  
Laser class: IEC-825, CDRH class 2 to be applied.

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

## **9 Reliability**

MTBF: 30,000 except laser diode and scanning mirror unit.

Expected life of laser diode is 10,000 hours.  
Expected life of scanning mirror unit is 10,000 hours.

## **10 Caution**

### **10.1 Label**

Attach proper label of the laser class on the product incorporating the laser module.

### **10.2 Handling**

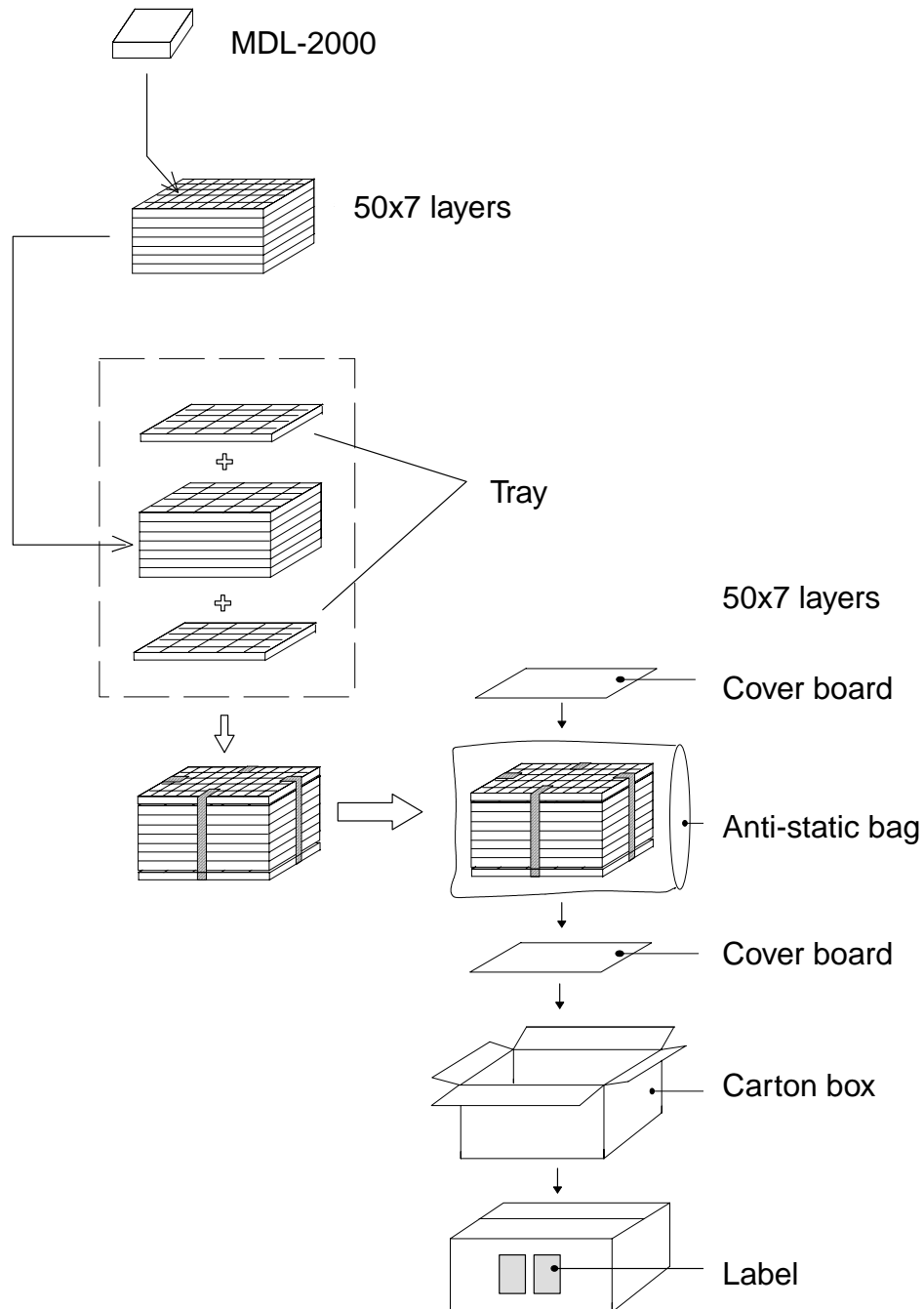
Take anti-static measure before handling the laser module.

### **10.3 Dust**

Blow away the dust if necessary. Do not wipe with cloth.

## 11 Packaging

### 11.1 Packing specification



### 11.2 Dimensions

355(W) × 290(D) × 185(H) mm



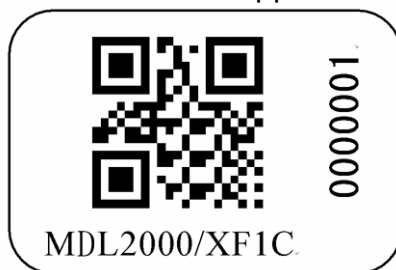
## 12 Warranty

2 years from shipping date.

The warranty does not apply for mishandling or unit without label.

## 13 Serial number

Serial number is applied in barcode.



## 14 Measurement

