

Introduction sheet			
CCD linear scan engine			
Product name	MDC-100		
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Preliminary

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1. Abstract

This manual provides specifications for the MDC-100 linear scan engine.

2. Overview

MDC-100 linear scan engine is a compact barcode scan engine which is possible to be installed in various handheld products such as a handy terminal. The use of short wave-length red LED illumination enhances the visibility when aiming a barcode. A decoder is built in MDC-100 and that enables this scan engine to decode the bar codes after scanning and output the information in serial communication. MDC-100 is compliant to Restriction of Hazardous Substances.

Features

- MDC-100's high definition glass imaging system ensures steady performance in various conditions.
- Glass-fiber reinforced polycarbonate body is very strong to mechanical shocks which extend the applications from general in-house environment to hard field applications.
- 50 degree scan angle is larger than any laser scan engines in equivalent class, best to read high capacity barcode in space-limited applications.
- MDC-100's patented adaptive illumination technology not only permits to automatically read barcodes either on papers or on LCD, but allows low power consumption.
- MDC-100 permits both RS232 and USB communication modes.

3. Physical features

3-1. Dimensions: W22.8xD15.0xH11.5

3-2. Weight: 3.5grams

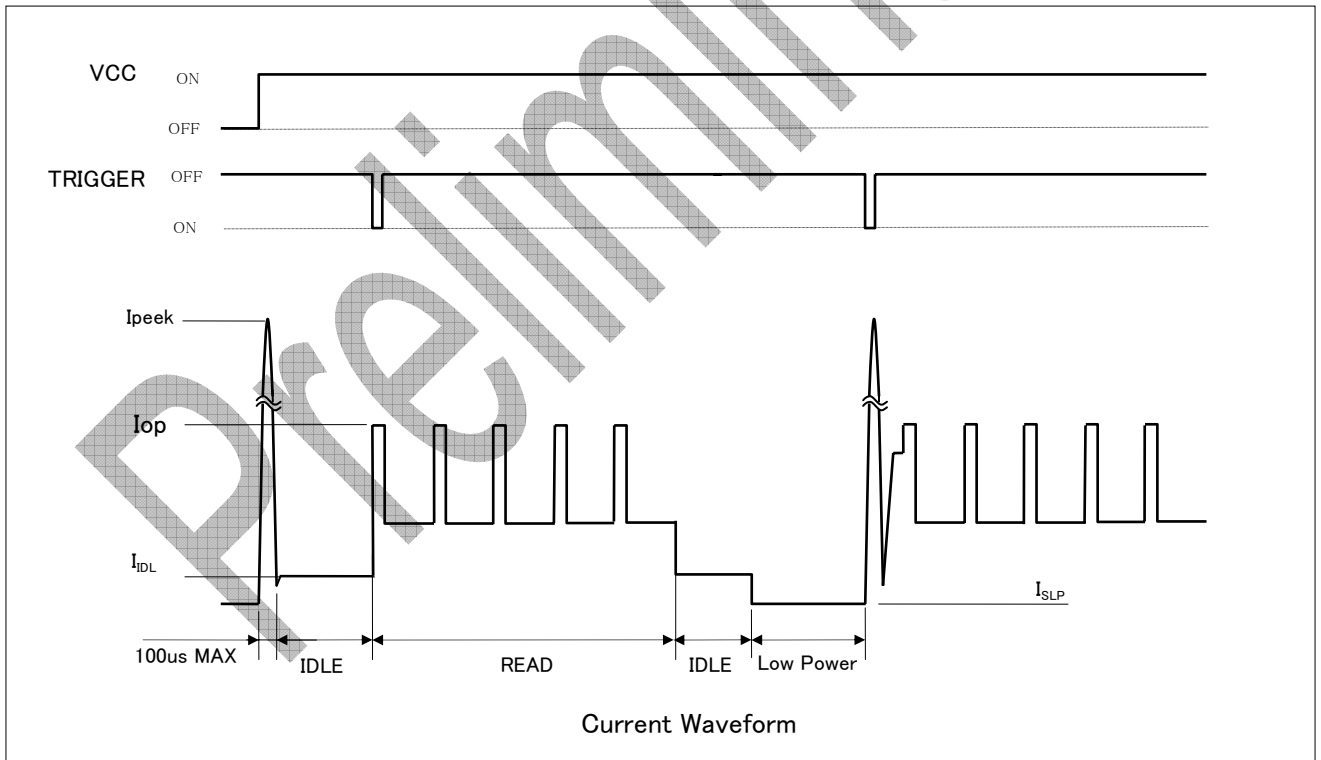
4. Electrical specifications

Absolute maximum Ratings

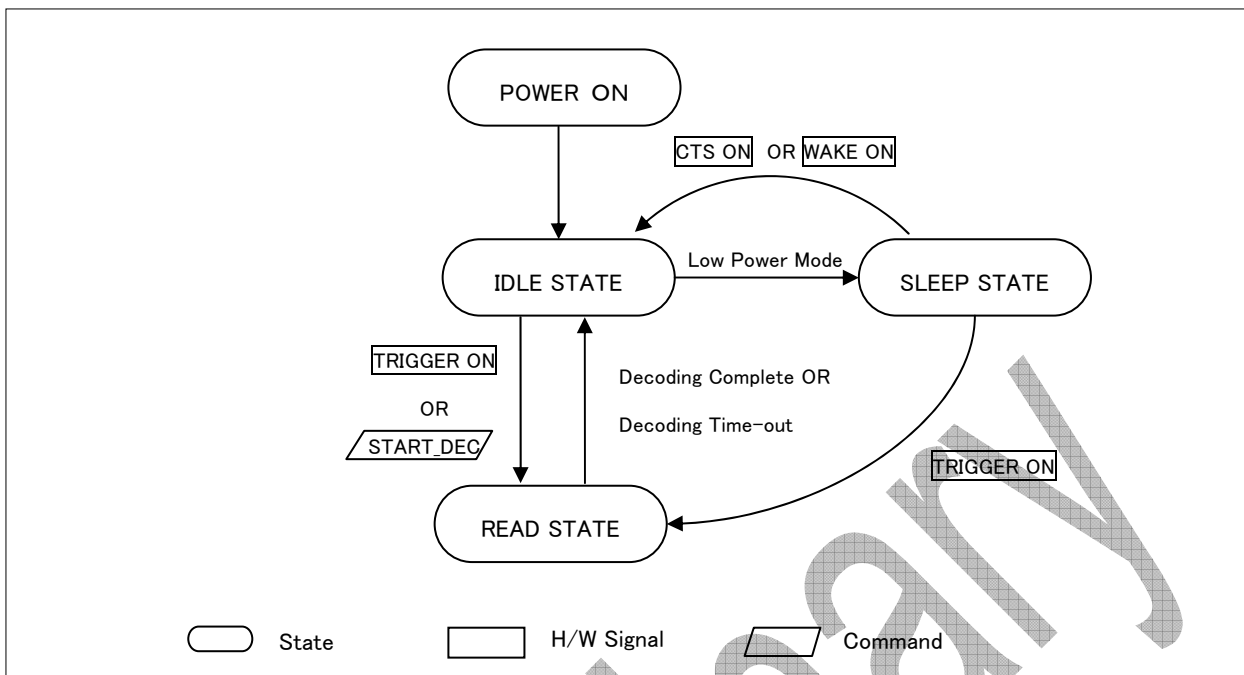
Items	Symbol	Rated Value	Unit
Power Supply Voltage(V_{CC} to GND)	V_{CC}	3.9	V
Input Voltage	V_1	-0.3 ~ $V_{CC}+0.3$	V

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

Item	Symbol	Conditions	Min	Typ	Max	Unit
Operating Voltage	V_{CC}		3.0	—	3.6	V
Operating Current	I_{OP}	READ State	—	110	120	mA
Idle Current	I_{IDL}	IDLE State	—	18	25	mA
Sleep Current	I_{SLP}	SLEEP State	-	100	-	mA
Peak Inrush Current	I_{PEEK}		—	150	200	mA
Input Voltage	High	V_{IH}	$V_{CC}\times 0.8$	—	—	V
	Low	V_{IL}	—	—	$V_{CC}\times 0.2$	V
Output Voltage	High	V_{OH}	$I_{OH}=-1mA$	$V_{CC}-0.5$	—	V
	Low	V_{OL}	$I_{OL}=1.0mA$	—	—	0.5
Input Current	I_{IN}	$V_{IN}=V_{CC}$ $V_{IN}=0V$	—	—	1.0	μA



5. Power Mode Transition



- When “Low Power” mode is enabled, MDC-100 automatically enters “Low Power” state from “Power-ON”.
- When moving to “IDLE” state by “CTS ON” or “WAKE ON” in Low Power mode, MDC-100 goes back to “Low Power” state in a second if no event occurs to move to other states.

6. Interface Specifications

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

Interface Pin definition

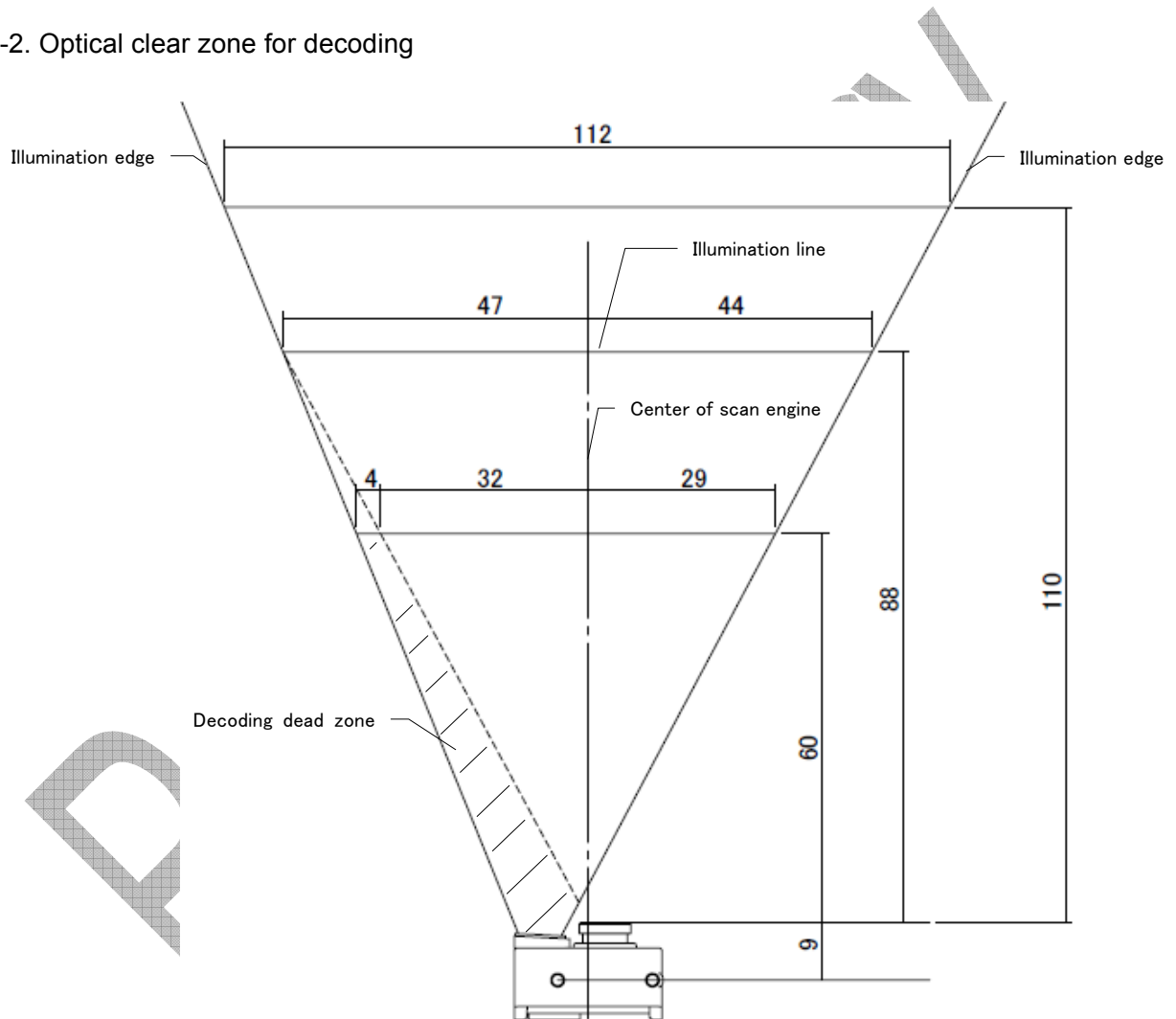
Signal	Pin No.	I/O	Functions
Trigger	1	I	Trigger input, CMOS logic level: Low = Trigger
Wake	2	I	Wakeup input, CMOS logic level: Low = Wake
Decode LED	3	O	LED output, CMOS logic level: Low = LED On
Buzzer	4	O	Buzzer control pulse output, CMOS logic level: Low = Buzzer On
Power Down	5	O	Power down output, 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

7. Optical Specifications

7-1. General Factors

Item	Characteristics	Unit
Illumination	Amber LED	—
Peak wavelength	624	nm
Scan rate	300 adaptive	scans
FOV	Horizontal	50
	Vertical	0.5

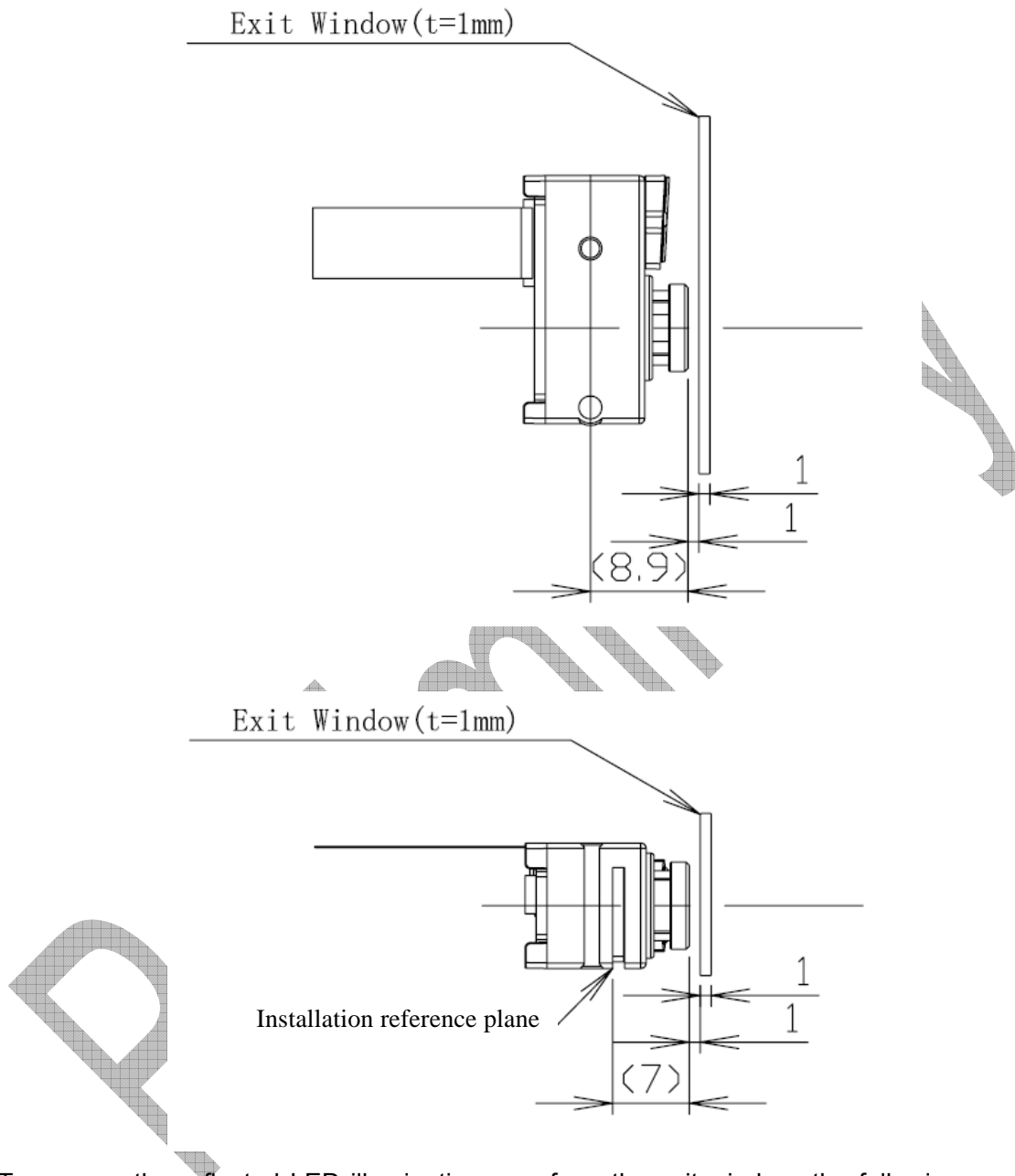
7-2. Optical clear zone for decoding



1: Illumination line except the dead zone (out of the FOV of imaging lens) is defined as decoding clear path. MDC-100 is possible to decode a barcode located along everywhere along the illumination line except the dead zone.

2: Illumination edge is defined by 90% peak luminance of illumination line.

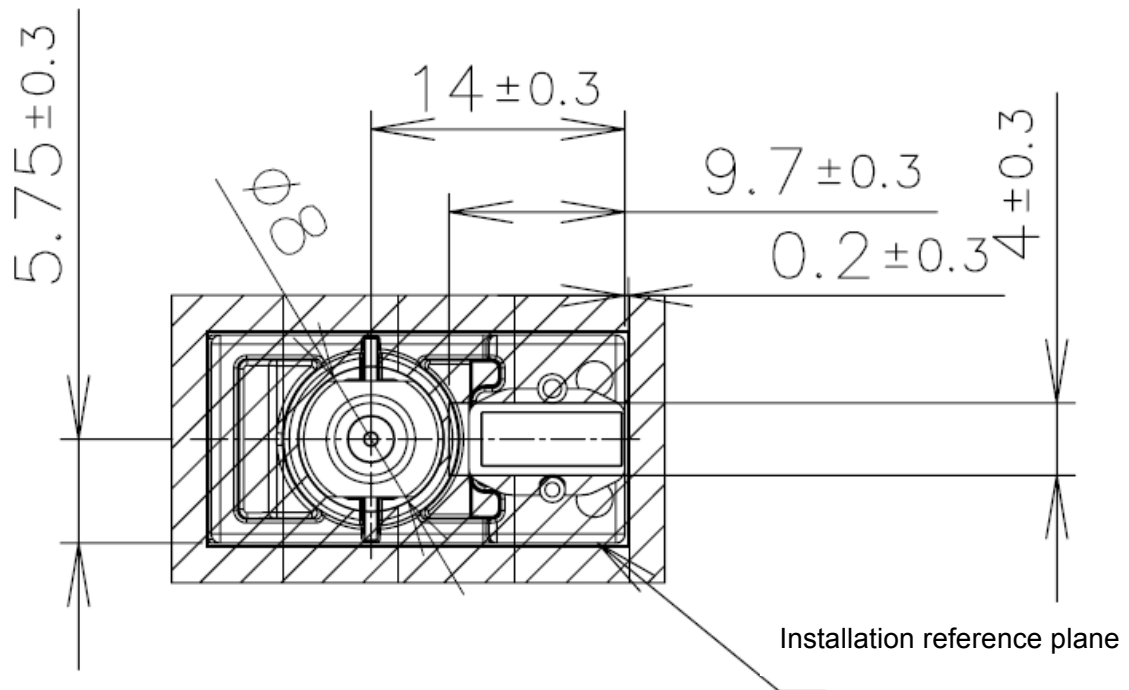
7-3. Recommended installation condition of exit window



To remove the reflected LED illumination rays from the exit window, the following condition is recommended:

1. The exit window is parallel to the tip surface of the imaging lens within 1mm distance.
2. The thickness of the exit window is less than 1mm.
3. The material of exit window is recommended to be transparent colorless PMMA plate. The plate is recommended with optical flatness and with optical anti-reflective coating on both surfaces.

7-4.Optical clear area of the exit window



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

Premium

8. Decoding specification

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

<Conditions>

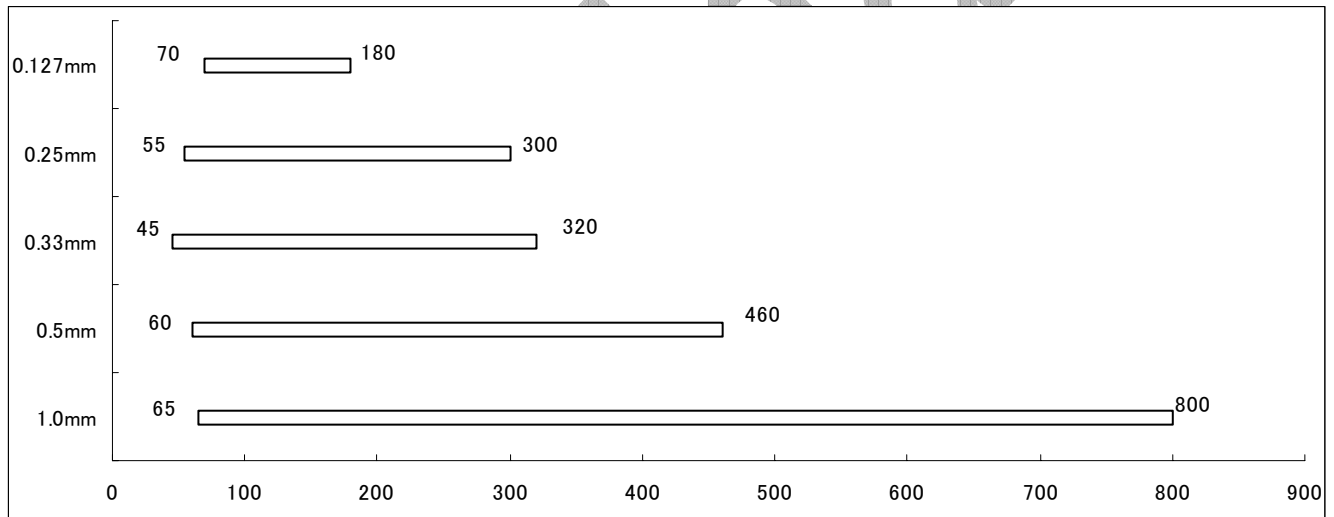
Ambient Temperature and Humidity Room temperature, room humidity
 Ambient Light 500lux
 Background White
 Power Supply Voltage 3.3 V

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.

8-1. Depth of field



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

Conditions

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

Bar Code Sample : Optoelectronics Test Chart, N/W ratio = 1 : 2.5

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

Curvature : $R = \infty$

8-2. Pitch, Skew and Tilt

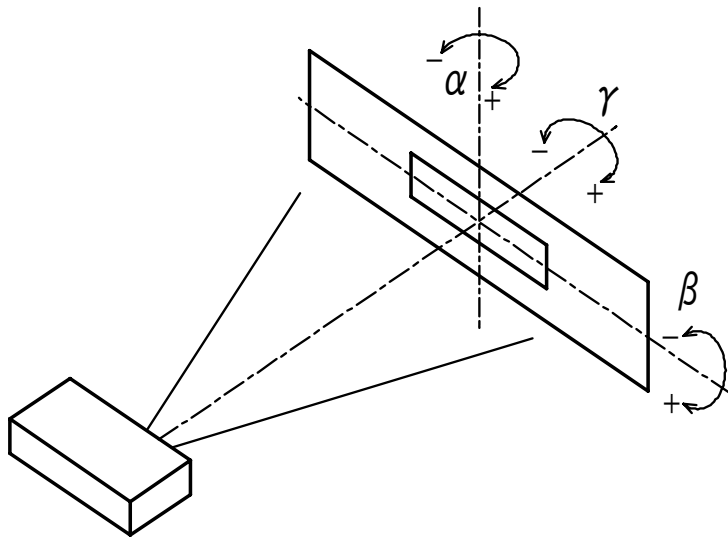
Pitch : $\alpha \leq \pm 50$ degrees

Skew : $\beta \leq \pm 65$ degrees

Tilt : $\gamma \leq \pm 25$ degrees

<Conditions>

Bar Code Sample Distance	Optoelectronics Test Sample 110 mm from the tip of the scan engine PCS 0.9, Resolution 0.33 mm, EAN13, Quiet Zone 15 mm
Angle	Pitch and Tilt angles calculated with Skew angle $\beta = +15$ degree
Curvature	$R = \infty$



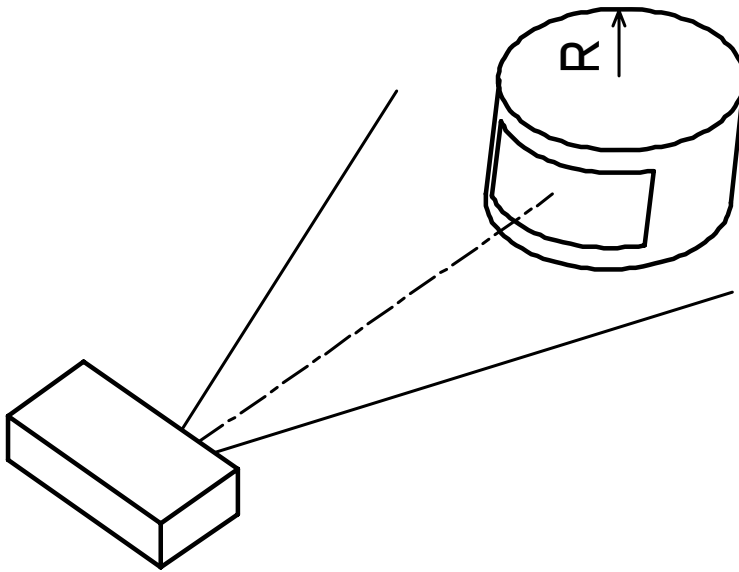
8-3. Curvature

JAN-8

$R \geq 15\text{mm}$

<Conditions>

Bar Code Sample Optoelectronics Test Sample
 PCS 0.9, Resolution 0.26 mm, EAN8, Quiet Zone 10 mm
Distance 110 mm from the edge of the scan engine
Angle Skew angle $\beta = +15^\circ$



9. Environmental specifications

9-1. Temperature

Operating Temperature: -20 ~ 60 °C

Storage Temperature : -40 ~ 70 °C

9-2. Humidity

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

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

9-3. Ambient Light Immunity

Decoding performance is guaranteed when the luminance on the bar code surface is between zero and the following values:

Incandescent light: 4,000 lux

Fluorescent light: 4,000 lux

Sunlight: 100,000 lux

<Conditions>

Bar Code Sample: Optoelectronics Test Sample

PCS 0.9, Resolution 0.25 mm, 9-digit Code 39, Quiet Zone 10 mm, N/W

Ratio = 1 : 2.5

Distance : 150 mm from the edge of the scan engine

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

Curvature : $R = \infty$

Voltage : 3.3 V

* Be sure that the direct light or specular reflection from the light source does not enter the light receiving area of MDC-100.

9-4. Electrical 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.

<Conditions>

Bar Code Sample: Optoelectronics Test Sample

PCS 0.9, Resolution 0.25 mm, 9-digit Code 39, Quiet Zone 10 mm, N/W

Ratio = 1 : 2.5

Distance : 150 mm from the edge of the scan engine

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

Curvature : $R = \infty$

Voltage : 3.3 V

9-5. 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 100 Hz at an accelerated velocity of 32.3 m/S² (3.3G) for 10 minutes per cycle. Repeat this for 2 hours in X-direction, 2 hours in Y-direction and for 4 hours in Z direction.

9-6. 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.

<Conditions>

Bar Code Sample: Optoelectronics Test Sample

PCS 0.9, Resolution 0.25 mm, 9-digit Code 39, Quiet Zone 10 mm, N/W
Ratio = 1 : 2.5

Distance : Between 50 ~ 150 mm from the edge of the scan engine

Pitch : $\alpha = 0^\circ$

Skew : $\beta = 15^\circ$

Tilt : $\gamma = 0^\circ$

Curvature : $R = \infty$

Voltage : 3.3 V

10. Regulatory Compliance

LED Safety: IEC 62471-1:2006 Exempt Group

11. RoHS

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

12. Precautions

- All work-benches, tools, measuring instruments and any part of human body which have come into contact with MDC-100 must undergo preliminary antistatic treatments.
- Do not touch the optical and electrical components. Hold it on the camera body when carrying MDC-100.
- Avoid handling MDC-100 in a dusty area. In case dust gets on MDC-100, gently blow it off with dry air. Direct contact of swabs and such on its optical part may cause deterioration of its performance.
- Do not intentionally drop MDC-100.

13. Packing Specifications

13-1. Packing

T.B.D

13-2. Packing Size

355 (W)×290 (D)×185 (H)mm

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

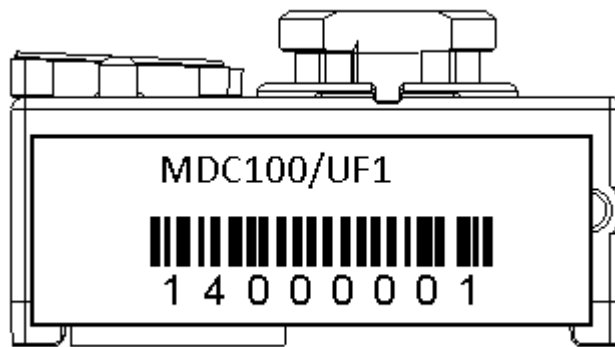
14. Serial Label

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

Top : Product name

Middle : Barcode (Code128, Resolution 0.2, N/W 2.5)

Bottom : Series number



15. Warranty

12 months

Mechanical Installation guidance

