

**OPTICON**

Auto Focus 2D Scan Engine

# MDI-2300



This document provides instructions for installing the MSI-2300 camera module and the MDI-2300 decoder board.

## Integration Guide

All information subject to change without notice.

## Document History

<b>Model Number:</b>	<b>MDI-2300</b>	<b>Specification Number:</b>	<b>TS10033</b>
<b>Edition:</b>	<b>3<sup>rd</sup></b>	<b>Original Spec Number:</b>	<b>TS10032</b>
<b>Date:</b>	<b>2011-12-15</b>		

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## Revision History

Specification No. : SS10031  
Product name : MDI-2300

Edition	Date	Page	Section	Description of Changes
1st	2010/08/10	-	-	Initial release
2nd	2010/11/01	13	7.3. FPC	Added the description 'Do not bend here' to the drawing.
3rd	2011/12/15	8	4. EMC measures	Section added

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## 1. Introduction

The MDI-2300 CMOS two-dimensional scan engine consists of MSI-2300 camera module (hereafter called “camera module”) and a decoder board developed specifically for the MDI-2300 (hereafter called “decoder board”). This guide provides instructions for installing the camera module and the decoder board.

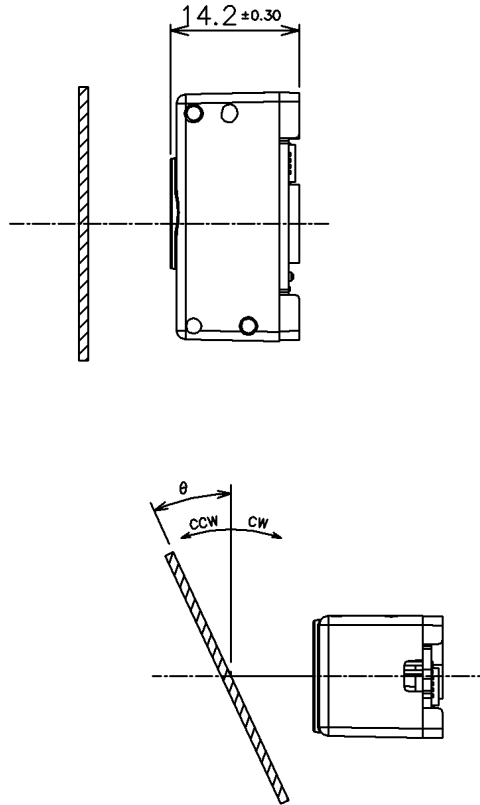
## 2. Exit Window Material and Placement

- For the best optical quality, use an acrylic material (cast or extruded) for the exit window.
- Select a high-quality achromatic acrylic material with a smooth, flat surface and no scratches or dents.
- The acrylic material should be 1 mm thick and have an anti-reflective (AR) coating applied to both sides of the exit window.
- It is recommended to apply an anti-scratch coating to the surface of the exit window to protect it from scratches during operation.
- Hard coated acrylic plates are readily available. Such a coating greatly enhances anti-scratch properties without degrading the optical characteristics of the acrylic material.
- To protect the exit window from dust, stains, and scratches during assembly, a protective sheet was attached. This should be removed before operation.
- After removing the protective sheet, use an ion-blower or other method to remove any dust that may have been attracted by static electricity.

Recommended acrylic material:

Nitto Jushi Kogyo Co., Ltd. “Clarex Precision Thin Sheet”  
MITSUBISHI RAYON CO., LTD. “Acrylite”

- The exit window must be positioned to accommodate limitations of distance and inclination. Design the layout within the range specified in the following diagram and associated table.



L	[mm]	1.6	2	3	4	5	6	7	9	12
$\theta_{cw}$	[deg]	>6°	>9.5°	>20°	>25°	>25°	>30°	>30°	>25°	>25°
$\theta_{ccw}$	[deg]	>6°	>9.5°	>20°	>25°	>25°	>30°	>30°	>25°	>25°

\* When installing the exit window most closely to the scan engine, take the following range including the tolerance.

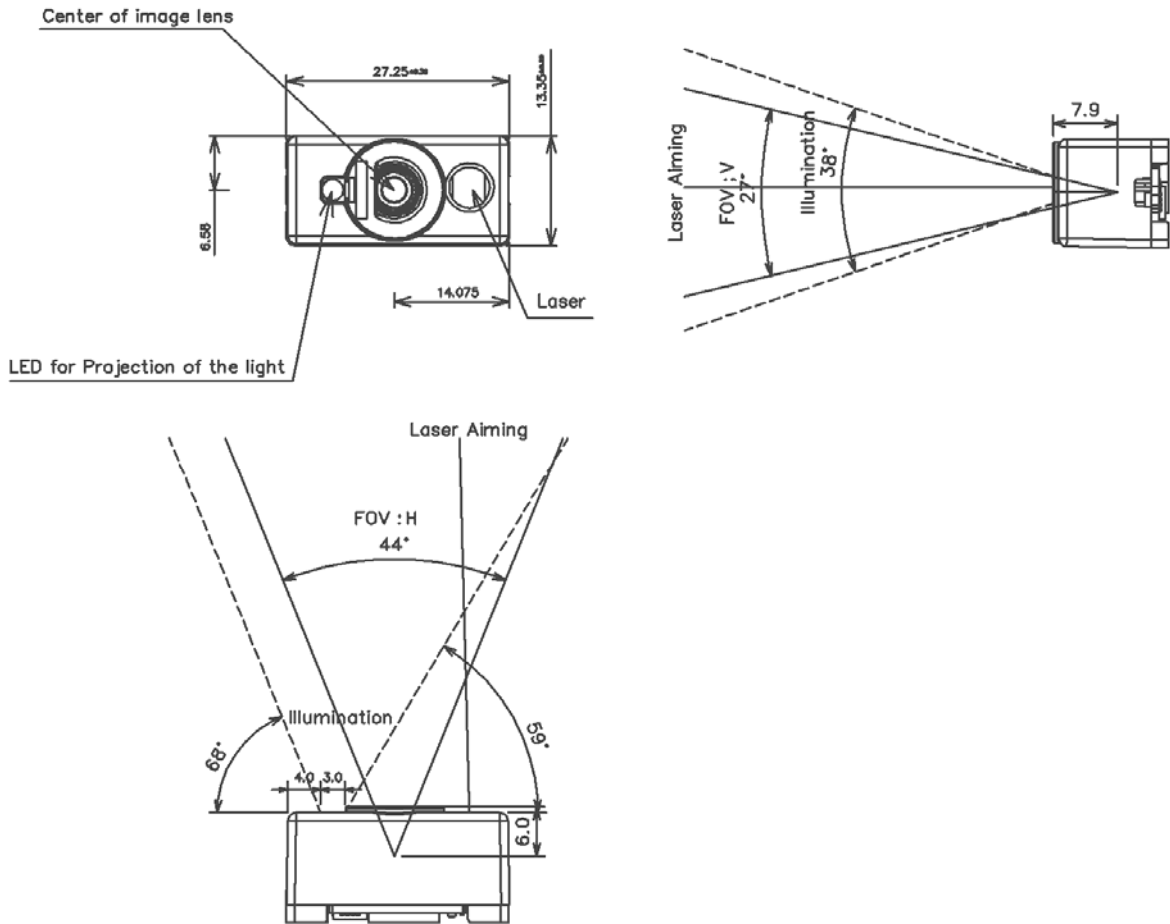
L=1.6,  $\theta_{cw}$  and  $\theta_{ccw} < 6^\circ$ (deg)

\* The Maximum exit window inclination is up to 40 degrees in both directions,  $\theta_{cw}$  and  $\theta_{ccw}$ .

Image eclipse caused by insufficient exit window size, and LED illumination entering the central part due to improper angle-settings should be checked in the design phase. The check can be done by acquiring images from the camera module.

- Window size and optical path clearance:

With respect to the optical path depicted below, provide an exit window with sufficient clearance.



Install the window with sufficient clearance for FOV, Illumination, Laser Aiming.

### 3. Installation

- When installing a camera module, use the crew holes on the bottom surface.
- Do not screw down further than the specified depth.
- When installing a camera module, only the bottom surface of the camera module should be attached to a chassis for installation.
- Keep enough clearance to avoid damage to the camera module in case the host device is dropped and damaged.
- Shock / impact resistance of the camera module to the acceleration applied via the bottom surface is guaranteed. In case of direct shock, the camera module will almost certainly be damaged since it consists of precise optical elements.
- Use the mounting hole with screw clamp to install the decoder board.
- The size of the screw head must not exceed the diameter of the mounting land ( $\phi 3.8$ ).

Installation conditions - camera module side:

Recommended screw : M2x0.4 (depth max 2.7)

Tightening torque : 12N<sub>cm</sub> or less

Do not screw down further than 3.3mm from the mounting surface of the camera module.

Installation conditions - decoder board side:

Recommended screw : M2 (Do not use a countersunk screw)

Tightening torque : 12N<sub>cm</sub> or less

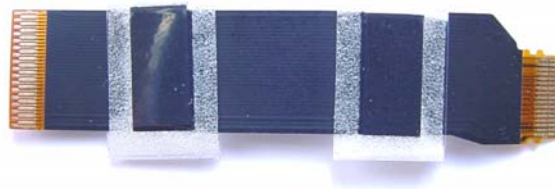
### 4. EMC measures

From a regulatory point of view this device is considered to be a component. Therefore requirements of EMC directive 89/336/EEC do not apply. To the end product in which this module will be incorporated this directive is however applicable.

In order to achieve compliance to EN 55022 (class B ITE equipment) following measures are recommended for integration:

- Apply a metal chassis as ground plane to mount-on both the camera module and the decoder board.
- Apply two ferrite cores on the flat-cable between camera module and decoder board (see picture below).

Recommended type ferrite cores: Murata FSSA101005RNN00S





## 5. Cable Specifications

### 5.1. Connection between Camera Module and Decoder Board

Recommended Connector

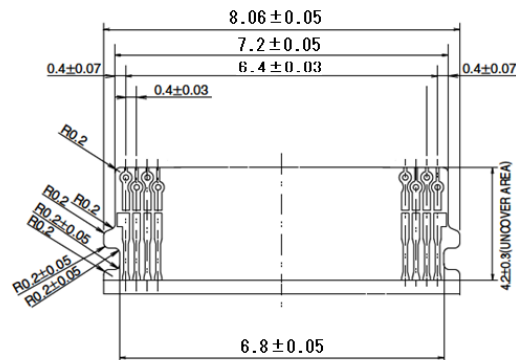
Camera module side : HIROSE FH29B-34S-0.2SHW(05)

Decoder board side : HIROSE FH35-33S-0.3SH

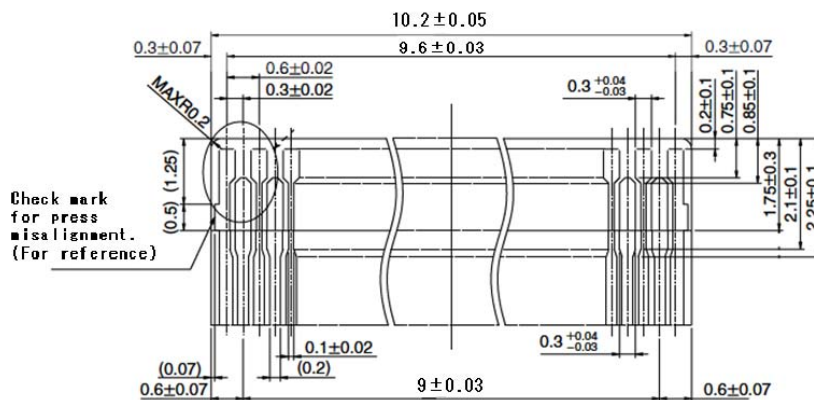
Note: These drawings are subject to change. For details, please obtain the most recent drawings from the connector manufacturer (Hirose).



Terminal Thickness  $0.2 \pm 0.03$



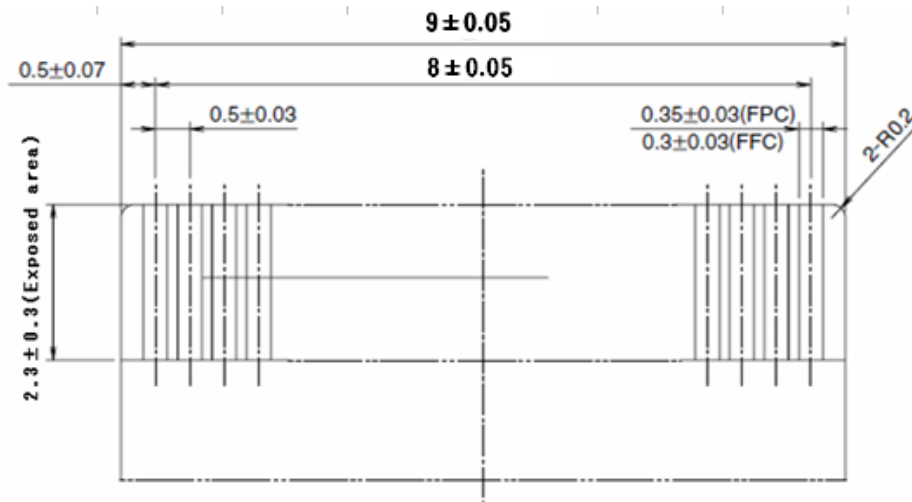
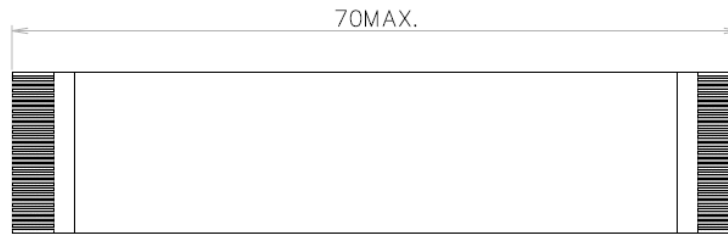
Camera module side



Decoder board side

**5.2. Connection between Decoder Board and Host System**

Recommended connector : HIROSE FH19SC-17S-0.5SH (17-pin)  
Recommended cable length : 70mm (max)



**Note 1:** Polyimide and a thermally hardened adhesive is recommended as the materials for the stiffener.  
**Note 2:** When using FFC, confirm the tolerance of the FFC thickness coupled to the connector.

Recommended FPC dimensions

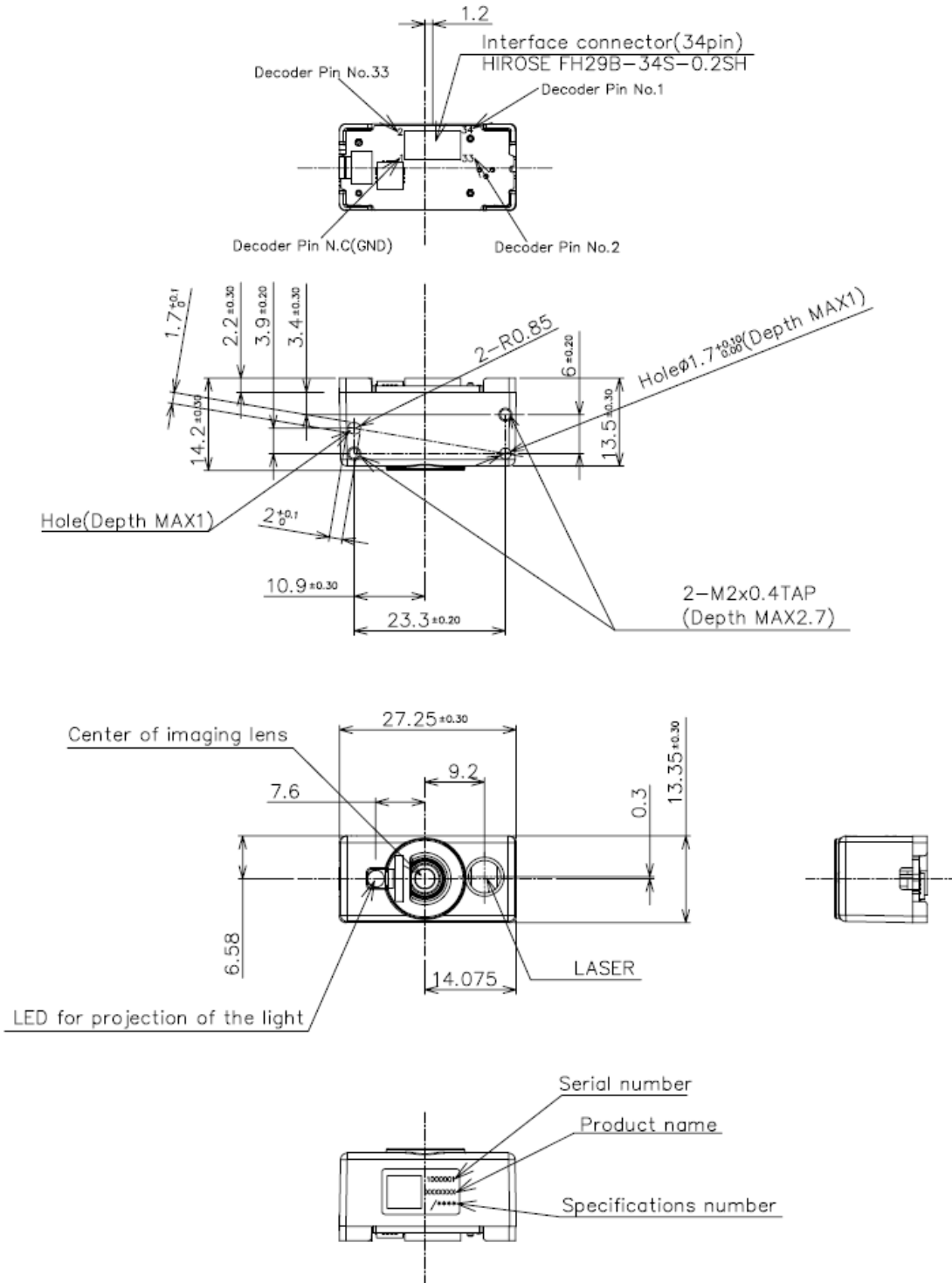
Thickness: 0.3 ± 0.05

## 6. Handling Requirements

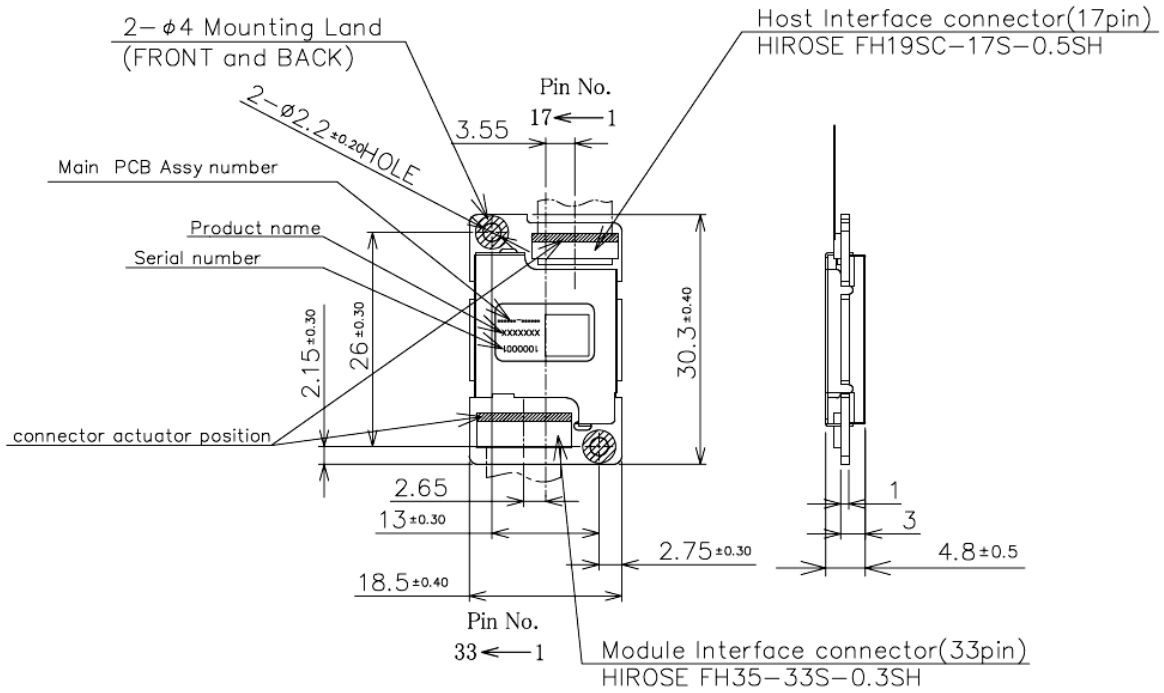
- Use anti-static measures such as a grounding strap before handling the scan engine in order to avoid damage to the electronic components from electrostatic discharge.
- Hold the scan engine only by the metal case. Do not touch the circuit board or the front side of the scan engine when handling it.
- Do not touch the electronic components or the terminals on the circuit board.
- Installation in a clean environment is recommended in order to protect the imaging lens from dust.
- Operators should wear gloves to avoid contaminating the optical elements.
- Do not drop the MDI-2300.

## 7. Mechanical Drawings

### 7.1. Camera Module



**7.2. Decoder Board**



**7.3. FPC**

