

NFA Co., Ltd.



Vision Inspection for Tablet & Capsule



NFA Co., Ltd.(F.A. Electronics) is specialized in developing automatic machines with 26 years of accumulated Machine Vision technology and rich experience in the relative field.

We had successfully developed various vision machines applied self-developed high technical skills such as DSP board, embedded system, and image processing technology and have been expanding our business area with automated equipment in the pharmaceutical sector.

Our constant efforts for research & development and close cooperation with our customers will always enable us to be in the center of vision industry.

NFA Co., Ltd. & F.A. Electronics

was founded in 1989 as a solution developer of Vision Inspection Equipments for automated production plant of electronic products.

Year 2000, We was requested to develop a capsule inspection machine for a hard-gelatin capsule manufacturer. This was the starting point to make pharmaceutical equipment.

Today, NFA & F.A. Electronics have a proven track record of supplying high-end vision inspection platforms to the most demanding clients and markets, World Wide.

CE & Patents



NFA & F.A. Electronics Step Forward...



Year 1989, founded as a specialist for vision inspection system for electric product plant, FPCB Final Inspector, BLU Screen Inspector, etc.



Year 2000, developed Capsule vision inspection machine and sold 25 machines. It was the first step in Pharma-ceutical solid production equipment, 1st generation.



Year 2007, developed Tablet inspection machine based on the technology of hard capsule vision inspection machine, 2nd generation. Year 2011, tablet and capsule inspection technology on a single unit, 3rd generation. Year 2014, complete capsule and tablet inspection technology on a single unit, 4th generation.

ELMA 100 series



ELMA 100 **T** Vision inspection machine for Tablet



ELMA 100 **C** Vision inspection machine for Capsule



ELMA 100 **H** Vision inspection machine for Tablet & Capsule

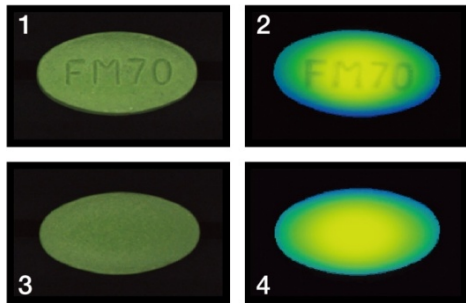
A highly sophisticated 4th generation inspection unit, built in the foundation of two decades of accumulated experience of vision inspection systems.

Research and development are the inspiring factors in NFA & F.A. Electronics's continuous strive for perfection.

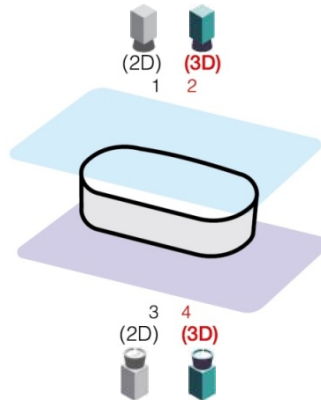
Camera System

Tablet

Inspect tablet with **10 cameras**

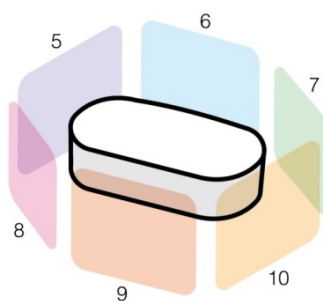


Capture Image.

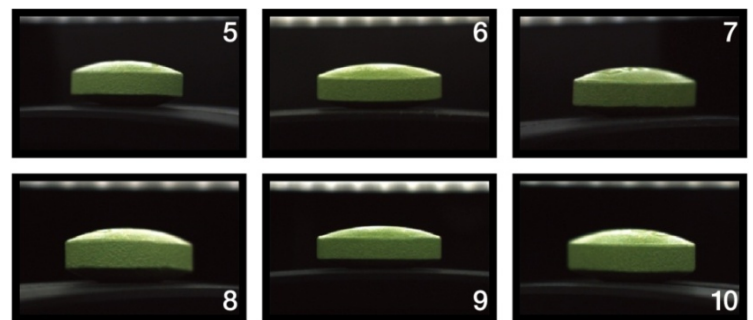


- Inspects the top and bottom of a tablet with 2 sets of color camera and 2 sets of 3D Camera.

- Inspects sides of tablet with 6 sets color camera without blind spot.



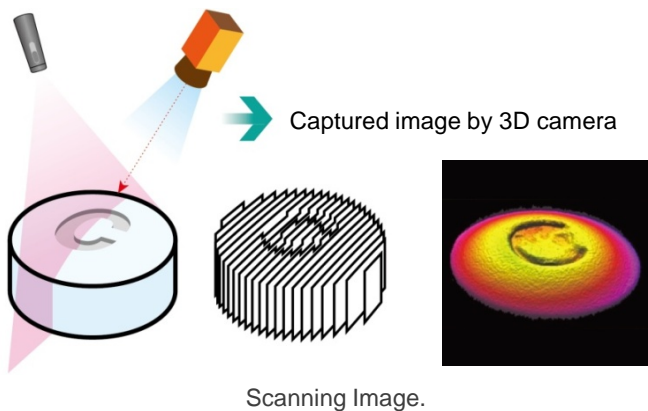
6 sets color camera position.



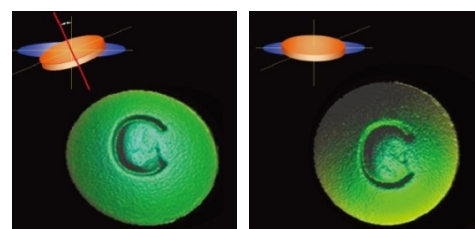
Capture Image.

3D Camera

2 additional sets of 3D high resolution cameras are used for precise detection of tablet surface defects. Line scanning ensures exact and detailed imagery of the tablet surface and enables accurate inspection of tablet surface defects. A normal camera cannot easily accomplish that.

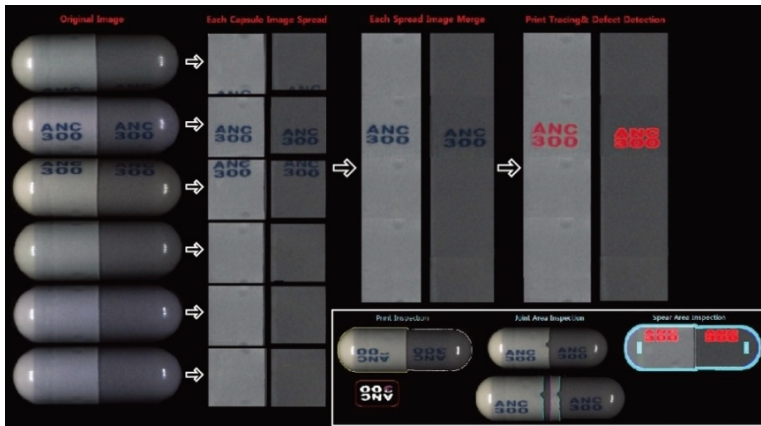


Posture correction of tilted object in 3 dimensional space for accurate inspection

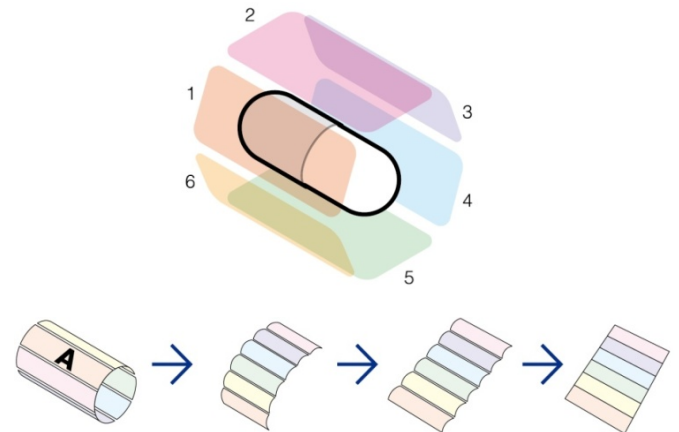


Capsule Capsule inspection with 11 color cameras

The Cylindrical Part

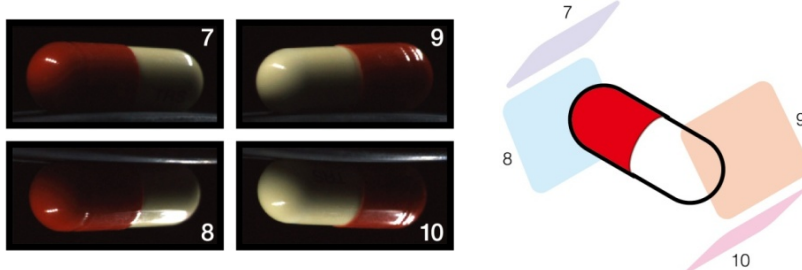


■ Inspects the cylindrical part of capsule with 6 color cameras.



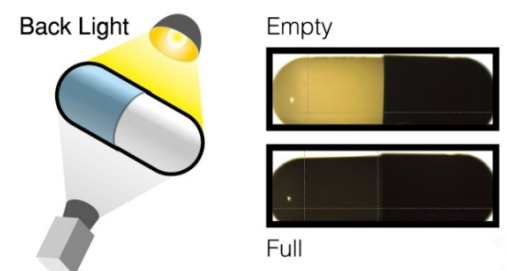
6 images captured from each camera are combined into a banded image through image complanation.

The Two Rounded Capsule Ends



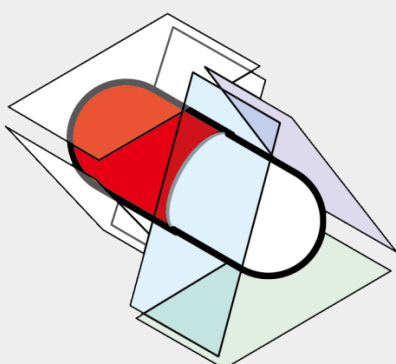
■ Inspects each cupola of cap & body by 4 sets of color cameras.

The Empty Capsule



■ Inspects the empty capsule by 1 color camera.

Special Algorithm



For different color of cap & body

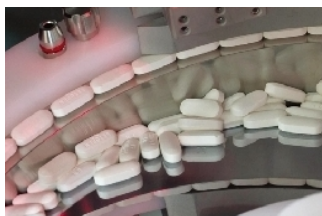
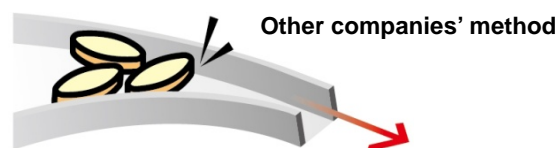
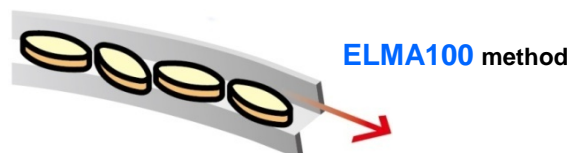
The different color of cap & body capsules are inspected separately with 3 sets of camera each, which is divided from 6 cameras for the cylindrical parts inspection.

This special algorithm allows getting optimized images as per the specific colors of each part.

Hardware System

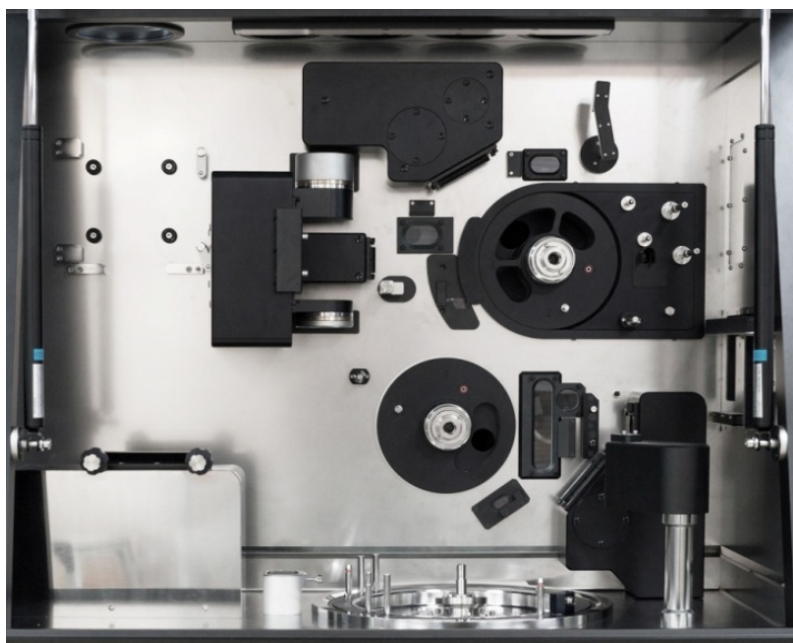
No Jam Jam free sorting

Open structured sorting track with upward product flow path ensures the steady sorting and flow of tablets without jam.



Easy Cleaning Cleaning Optimizing System

Simple cleaning part structural enable to quick disassembly in 5 min. and don't need tools for disassembly. Radius corners enhance easy cleaning and real-time dust extraction system maximize the dust protection.



Auto Air Cleaning

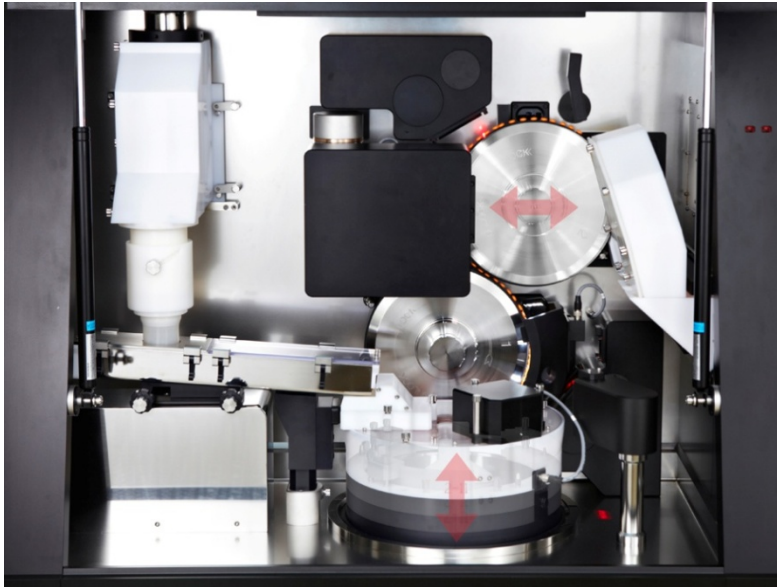


Round Type Corner

Easy Setting

10 minutes Cleaning Parts Changeover

Automatic adjustment of place and distance by tablet size enable to prompt & precise inspection and don't need a professional operator.



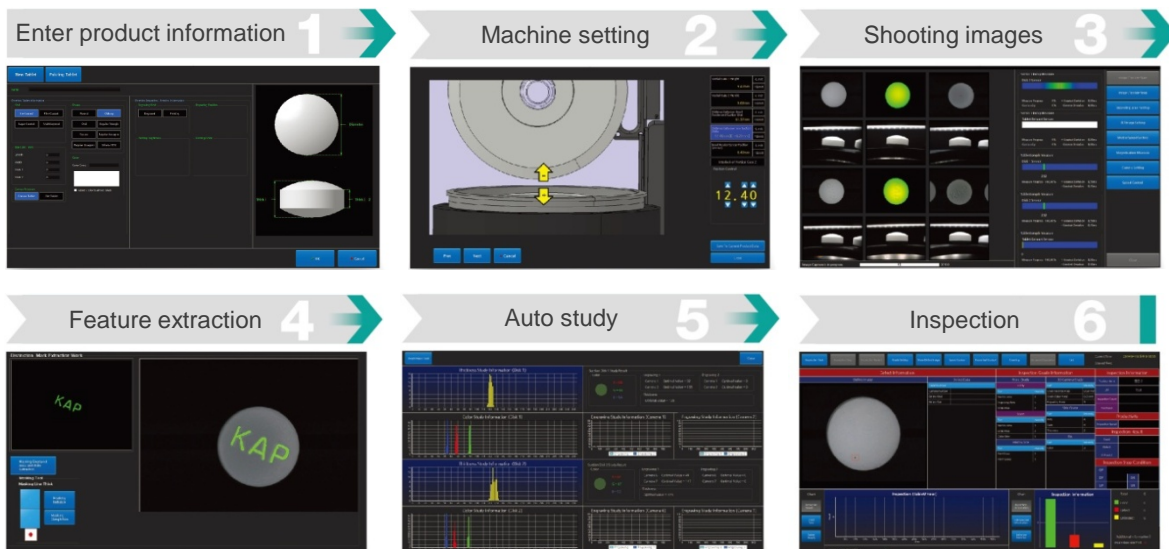
Fully Automatic Setting.



- Only 3 Pieces(Change Part) to change by Tablet's diameter and Capsule's width.
- Every type of tablet & capsule could be inspected regardless of size and shape with same Change Part.
- Do not need to replace Change Part for other type of pill. (Tablet ↔ Capsule)

30minutes New Product Setting by Self Study

Allow to operate to set all 6 steps for new tablet in 30 min.



5minutes Stored tablet setting time

The stored tablet can be set within 5 minutes by automatically imported the relative information from the storage.

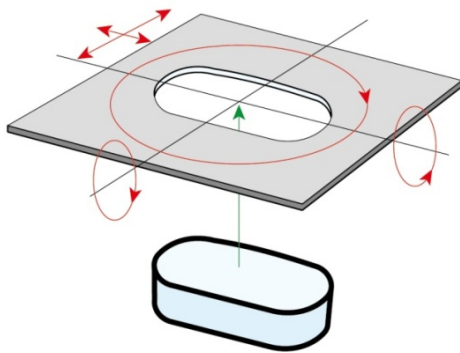


Software System

Sectionization

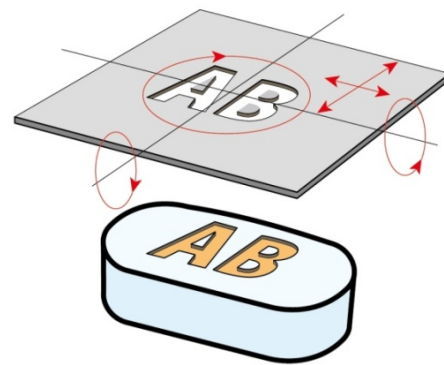
Only ELMA100 Provides special technique of Analyzing Algorithm for precise inspection.

Shape tracing
by sectionization



Recognizes an exact product shape to match with an inspection target.

Recognition engraving
and printing



Recognize the shape of engraving & printing to match with an inspection target.

■ Shape Tracing by sectionization



1) Area restriction by sectionization



Technology gives many benefits. High convex tablets are easily tilted so front images can include a part of the side surface and a reject can result. But ELMA100 images are taken using a precise restricted area.

2) Using this technique, dark colored tablets



On the dark or black colored transfer track are restricted to an accurate object area by sectionization algorithm.

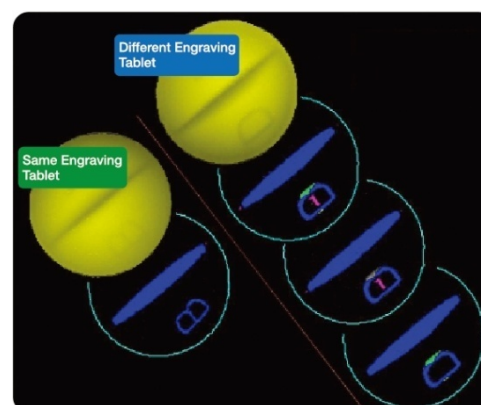
■ A Single Tablet by sectionization



After recognize the shape of engraving, sectionize a sing tablets using shape tracing technology to be able to accurate inspection.



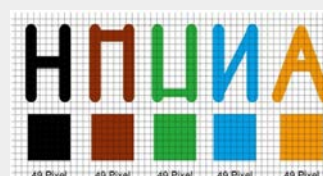
■ Engraved / Printed Tablet



No engraving where should be

Engraving where should not be

■ Comparison



Traditional analyzing method of engraved/printed object before ELMA100 that the system acknowledge left characters as same image by comparison of pixel quantity.

Tablet

Item	Contents
Surface	Spot, Stain, Broken, Chipped, Discolor, Float coating etc.
Printing	Missing letters, Blurred letters, Scratches, Non printing.
Engraving	Sticking, Different kinds of engraving, Double engraving etc.
2D camera	Over 40 μ m spot and stain.
3D camera	Over 40 μ m depth difference, Over 60 μ m surface defects.

Capsule

Item	Contents
Inspection item	Surface stain, Defective color, Discolor, Color difference, Spot, A small piece spot, Printing stain, Printing spread, Printing letter error, Dent, Tear, Empty capsule etc.
2D camera	Over 50 μ m spot & stain.



OUTPUT

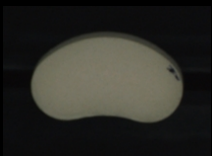
Tablet

Max. 350,000 tablets/hour for the round tablet, 5mm diameter.
Max. 160,000 tablets/hour for the oblong, oval tablet, 14mm length.

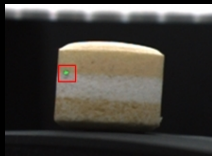
Capsule

Up to 150,000 capsules/hour for capsule #4
Up to 140,000 capsules/hour for capsule #3
Up to 130,000 capsules/hour for capsule #2
Up to 120,000 capsules/hour for capsule #1
Up to 110,000 capsules/hour for capsule #0

Tablet defects



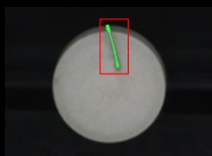
Corner spot



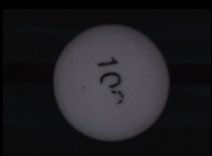
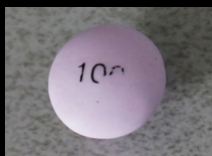
Spot 3 layer tablet



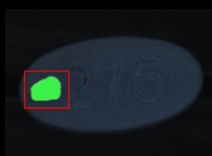
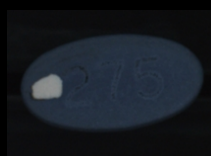
Chipped edge coating



Hair



Missing letter



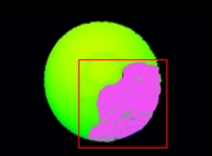
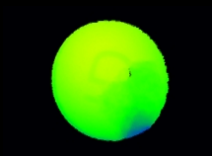
Chipped top coating



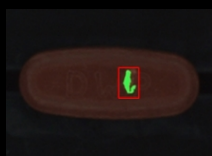
Spot in engraving



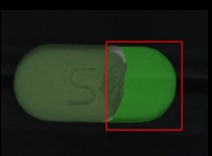
Chipped edge



Broken top surface



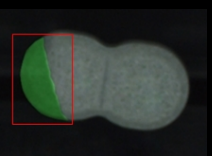
Chipped engraving



Broken



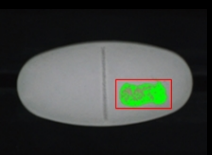
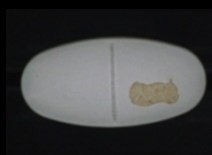
Broken edge



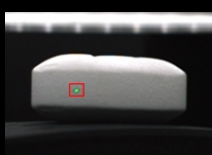
Broken



Stained in engraving



Chipped top coating



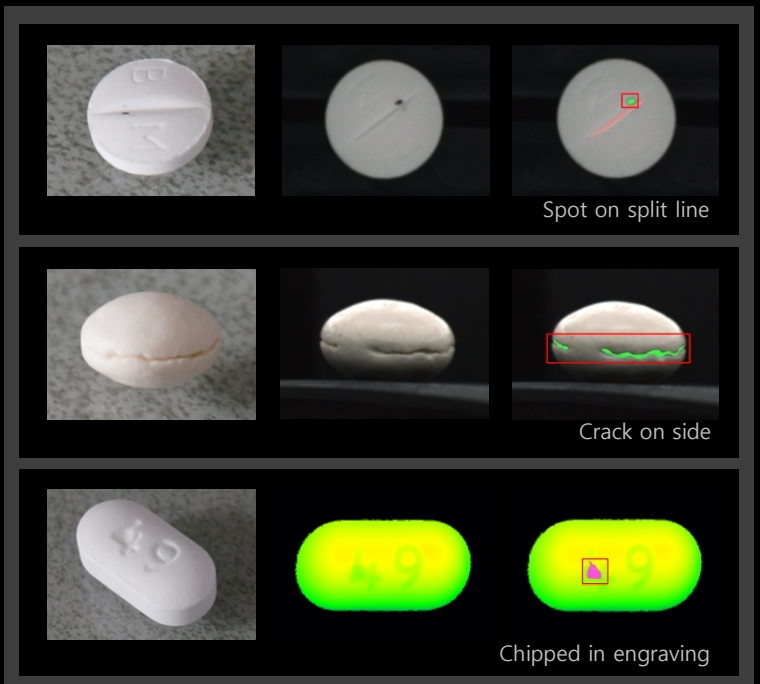
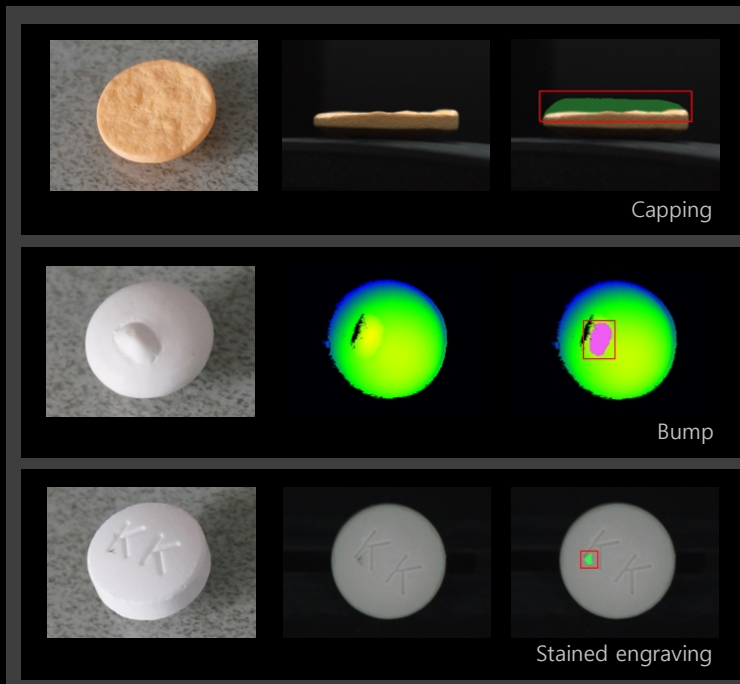
Spot on side



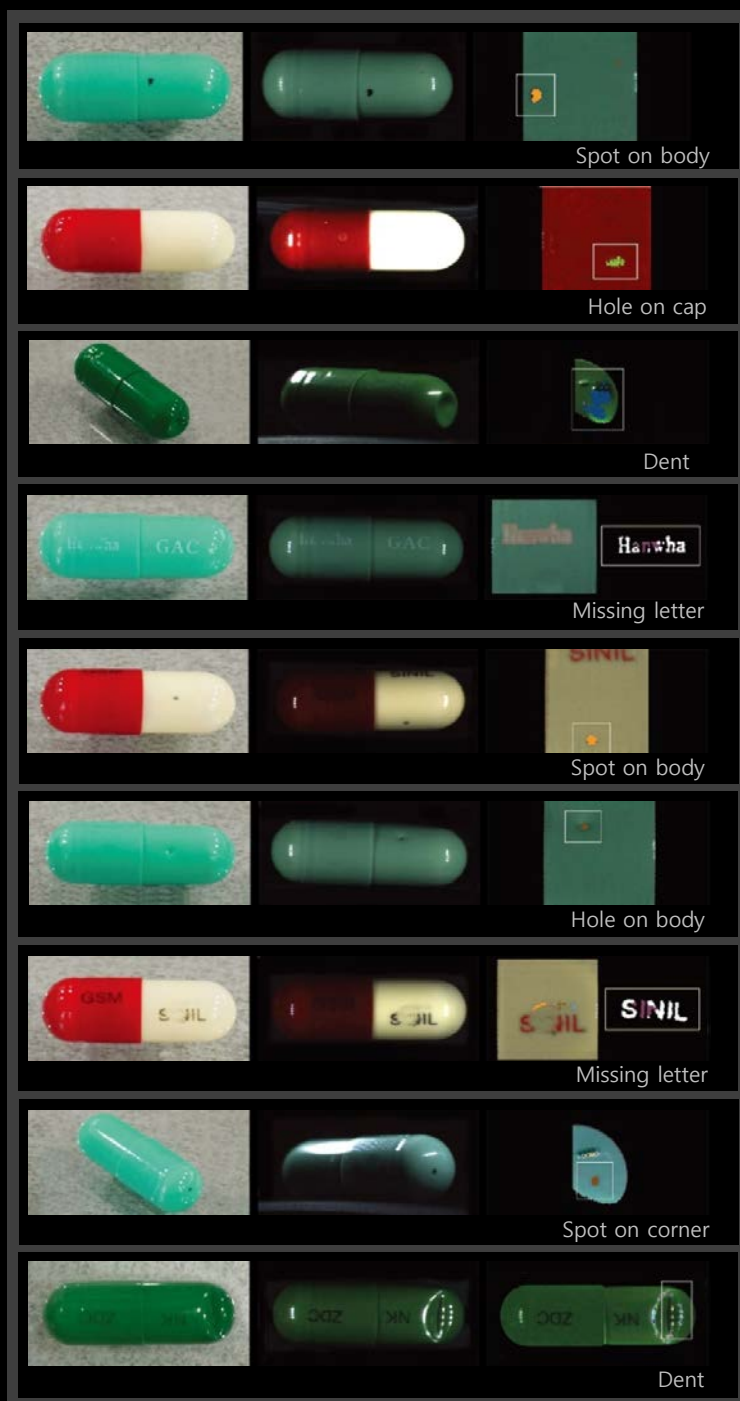
Stained



Abnormal shape



Capsule defects



V i s i o n I n s p e c t i o n f o r T a b l e t & C a p s u l e

Vision Inspection Tablet & Capsule

ELMA200 series is Tablet & Capsule inspection machine which was developed on the basis of vision technology and innovative development experience of more than 25 years. ELMA200-JH are designed as unity but they also have special features of each.

NFA Co., Ltd.

Marketing and Sales : NFA Co., Ltd.

#402, Ace Techno Tower 5cha, 20, Digital-ro 31-gil, Guro-gu,
Seoul, Korea

T. +82-2-854-9500 F. +82-2-854-9506 www.nfa.kr

Distridutor / Agency

Manufacture : F.A. Electronics Co., Ltd.

#401, Ace Techno Tower 5cha, 20, Digital-ro 31-gil, Guro-gu,
Seoul, Korea

T. +82-2-868-1177 F. +82-2-863-1173 www.fae.co.kr