



Vision Inspection for Tablet & Capsule

Next Generation
PLANET 6G series

PLANET 6G

Tablet and Capsule Vision Inspection

Tablet and Capsule Capability
Free Shape Tablet Application
Time Saving New Product Setup
Rapid Changeover
cGMP Design



Enclony Produces

Tablet and capsule inspection machines,
Empty hard capsule inspection machines and
Tablet UV Laser printing with inspection machines.

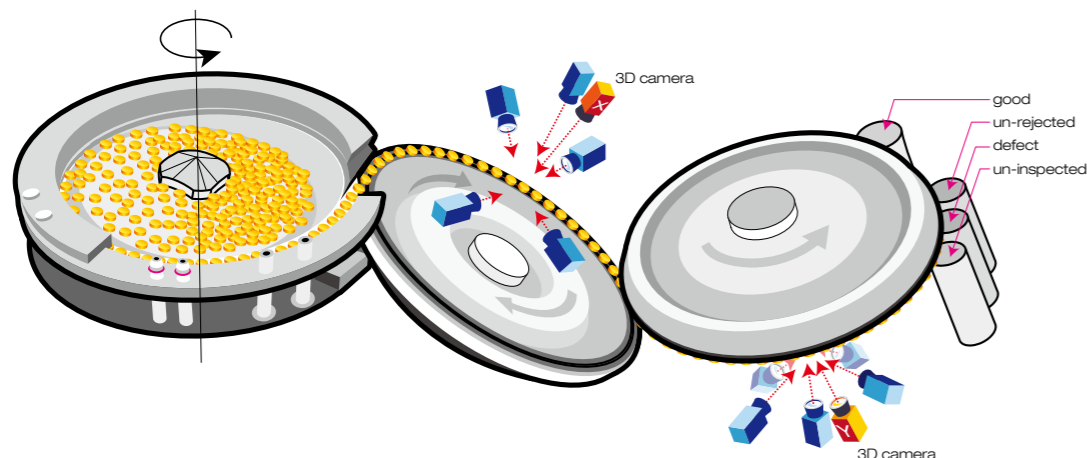
Enclony is committed to continuous research and development
of equipment that contributes to world-class product at
pharmaceutical manufacturing facilities.

PLANET 6G series

-  **PLANET 6G/T** for **T**ablet
-  **PLANET 6G/C** for **C**apsule
-  **PLANET 6G/TC** for **T**ablet and **C**apsule

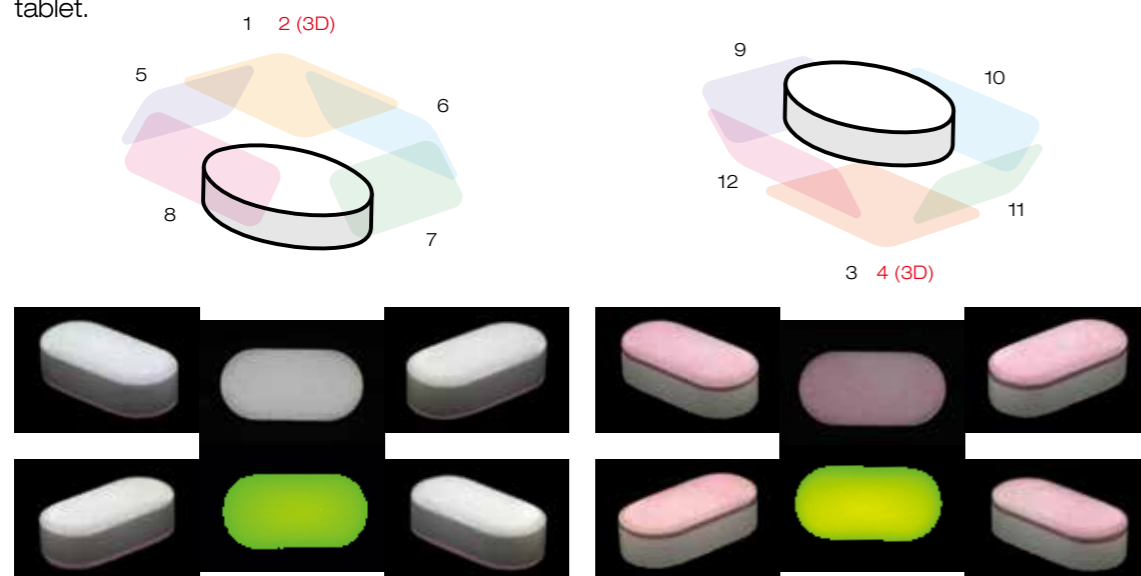


A clean cGMP design is the key concept for PLANET 6G



Tablet Inspection

Each tablet is inspected by ten interdependent 2D cameras capturing the complete surface area. Two additional 3D cameras capture the surface image of both the top and bottom of each tablet.

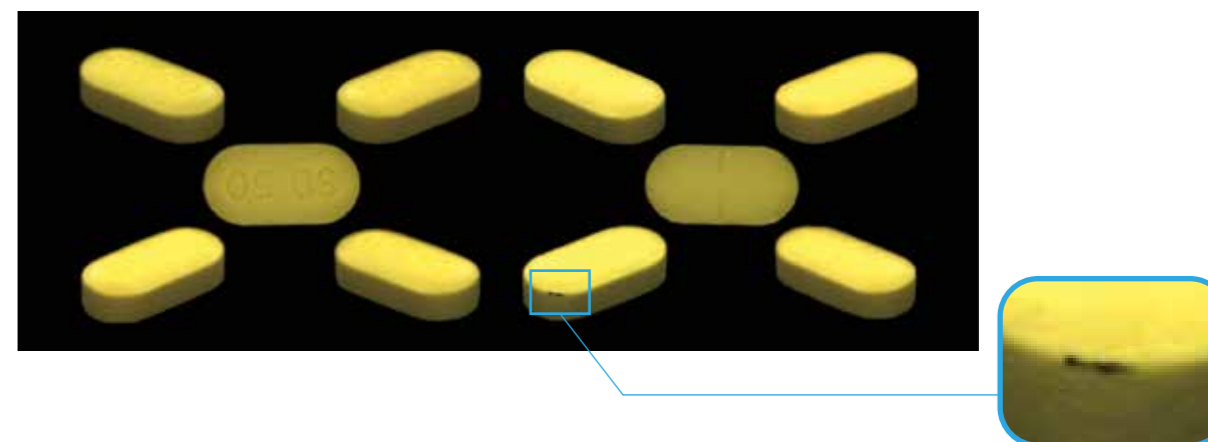


PLANET 6G has no Blind Spot

Blind spots have been eliminated by capturing each tablet from eight different angles including top and bottom.



(case of hair on the edge)



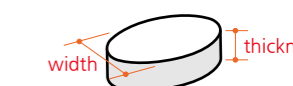
Applicable Tablet Flexibility

Round Tablet : diameter allowance **min. 3.5mm - max. 13mm**

Oblong/Oval Tablet : width allowance **min. 3.5mm - max. 13mm**,
length allowance **min. 10mm - max. 22mm**

Polygon Shaped Tablets : triangle, square, diamond, pentagon, hexagon, octagon shapes and so on

Free Shapes : heart shape, kidney shape, bean shape, water drop shape, half round shape, almond shape and so on



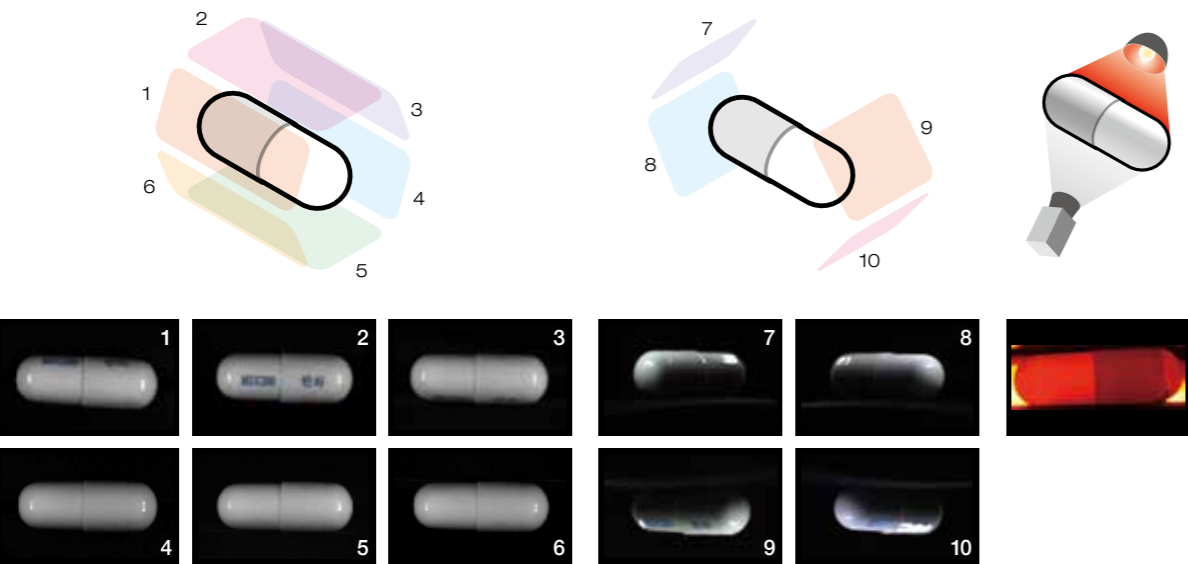
Allowance of Tablet Difference Dimension (TDD = diameter/width - thickness) $\geq 0.7\text{mm}$



Inspection applicability of respective products is subject to actual product testing and confirmation by manufacturer.

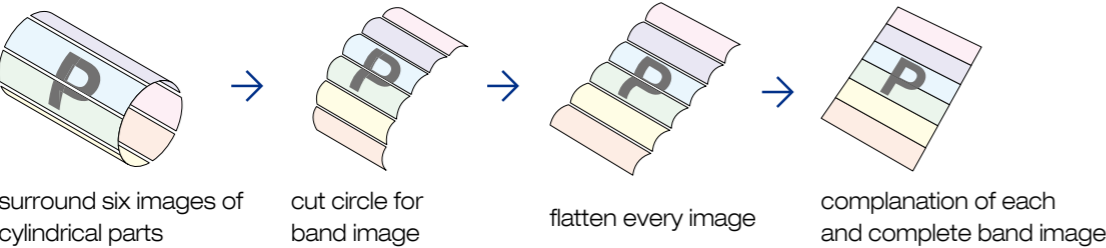
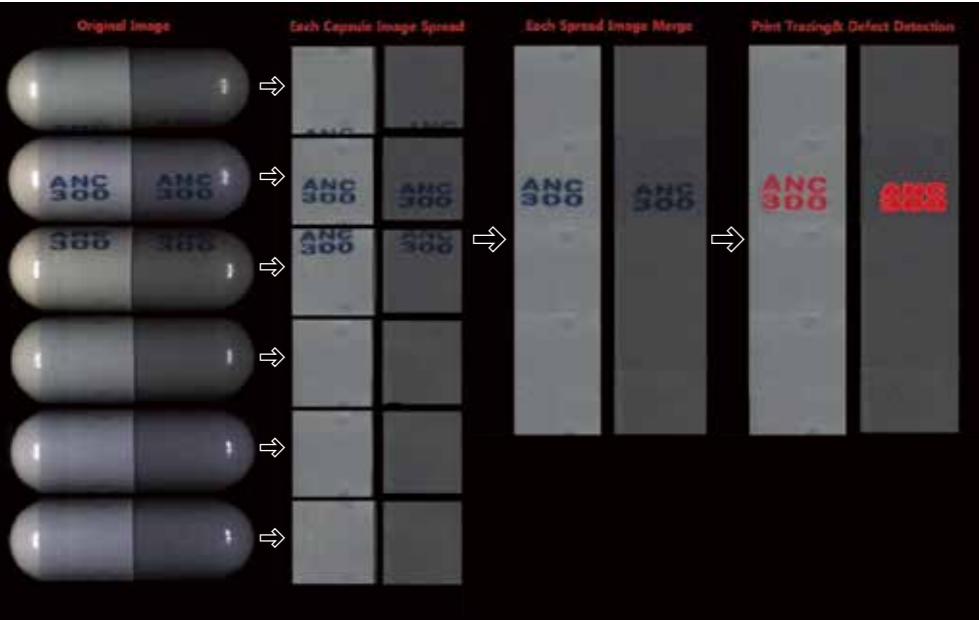
Capsule Inspection

Each capsule is inspected by ten interdependent 2D cameras capturing the complete surface area. An additional infrared camera identifies empty capsules and checks for filled volume.



Cylindrical Part

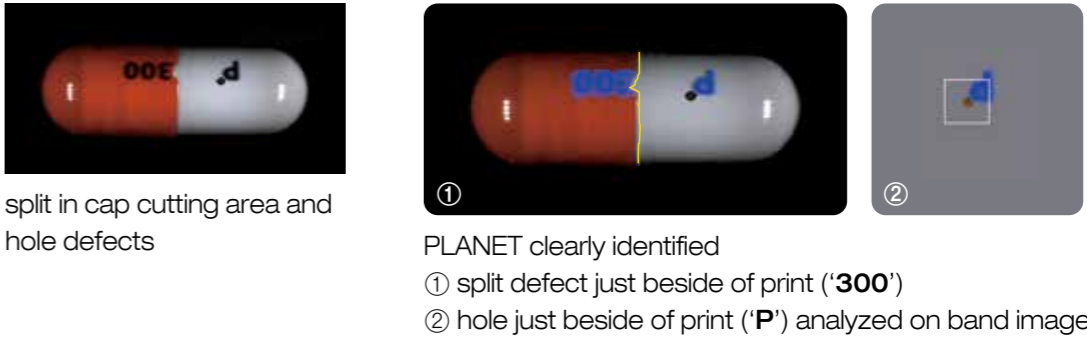
6 images of cylindrical parts are combined and made as a banded image through several steps of image reformation algorithm which is essentially required for detail image analyzation.



Powerful Capsule Inspection by PLANET

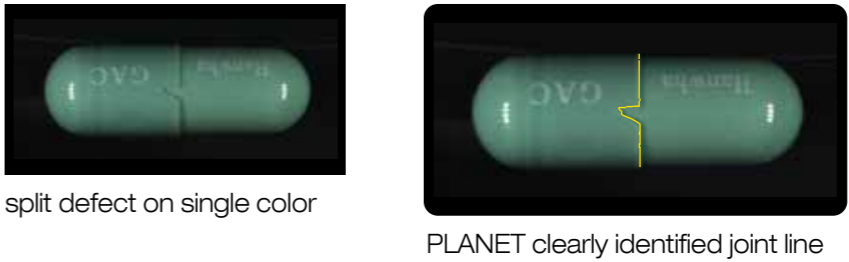
Example 1, Letter Tracing

Print image does not effect to identify defects on capsule.



Example 2, Joint Line Tracing

PLANET traces joint line on single color of capsule.



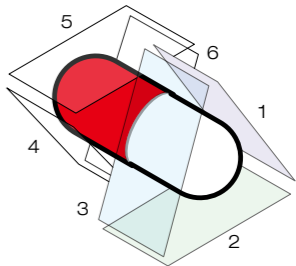
Example 3, Widely Different Brightness of Cap and Body

PLANET has a special algorithm to divide cap and body to get an optimized image as per specific color on each part. It works well in identifying capsules with widely differing brightness of cap and body.

image for body, lighting sets for bright color (white)

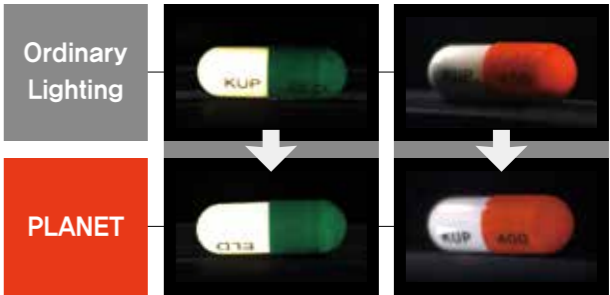


image for cap, lighting sets for dark color (dark red)



New Lighting System

New lighting system makes almost equal brightness to everywhere of capsule which minimizing of shadow.



4 Sides Wing Door Open

Allows full access to the inspection process path.

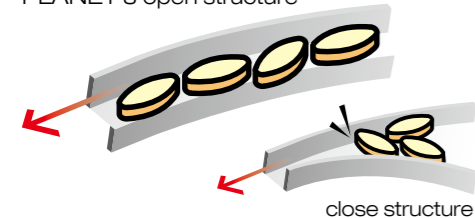
Smart HMI

Controlled through a very intuitive Smart HMI. This interface controls mechanical setting, inspection fine tuning, and all compliance reports.

Jam Free Sorting

PLANET uses an open feed structure to prevent jamming of tablets.

PLANET's open structure



Dust Protected Enclosed Cameras

All cameras and sensors are placed behind glass windows. A protective air curtain reduces dust accumulation.



Humidity and Temperature sensor

Continuous monitoring of the inspection environment allows the Planet to notify the operator of any conditions that are outside the set range.

Discharge

Each tablet is classified as
1) un-inspected 2) defect
3) un-rejected and 4) good.



Threshold free edge

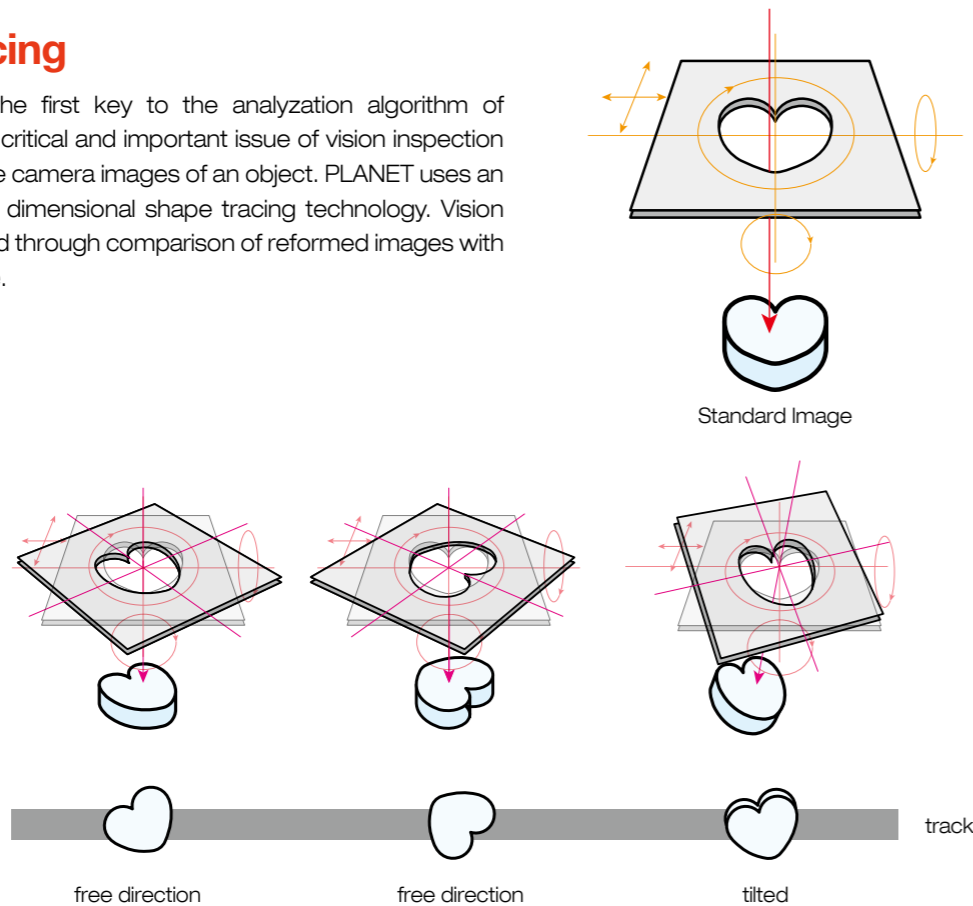
Neat outline design for easy cleaning



Analyzing Algorithm

Shape Tracing

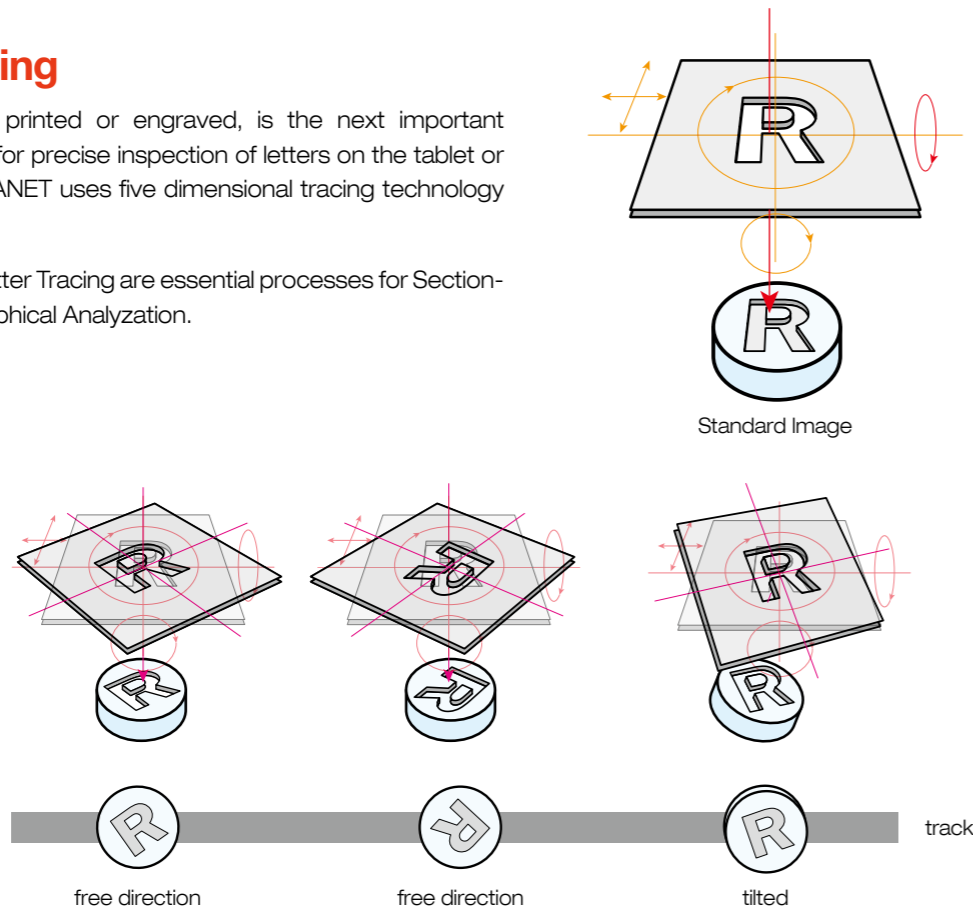
Shape tracing is the first key to the analyzation algorithm of PLANET. The most critical and important issue of vision inspection is how to reform the camera images of an object. PLANET uses an algorithm, with five dimensional shape tracing technology. Vision analyzation is fulfilled through comparison of reformed images with the standard image.



Letter Tracing

Tracing of letters, printed or engraved, is the next important technological step for precise inspection of letters on the tablet or capsule. Again, PLANET uses five dimensional tracing technology for letter tracing.

Both Shape and Letter Tracing are essential processes for Sectionization and Geographical Analyzation.



Sectionization

One single image is sectionized as shown below.

		letter area	edge of letters	general area	outline area
Round					
Oblong					
Free Shape					

Geographical Analyzation

Every reformed object image by shape and letter tracing is compared with a standard one, pixel by pixel. This algorithm distinguishes the areas where the letter should be and should not be.

foreign tablet

production batch tablet

case reference

no letter image where should be

letter image where should not be

HNUNA

All above are 49 pixels.

Traditional analyzation

Pixel counting technology gets inspection result as same letters for left images because all of them have same quantities of colored pixel.

Job Change-Over

PLANET is designed for compact Job change-over in less than one hour. Dismantling (5 min.), cleaning and reassembly (5min.) are done without tools



New Product Setting in 30 Minutes

No factory support is required. The intuitive Smart HMI guides the operator through the process of programming a new product. These 6 steps can be completed within 30-35 minutes.



Setup Product



Once a product recipe has been created, it's a short 3 step process to start an inspection.

128 Multi-Core DSP Board

PLANET's Image Processing Board that is integrated in high density with DSP (Digital Signal Processor) can calculate complex image processing algorithm in real time. With specialized OS developed by Enclony, it makes maximum inspection capability without error or time delay. Image Processing composed of total 128-Core is, in effect, equivalent to the capability of 30 sets of PCs loaded with latest CPU (on Intel i5 basis).

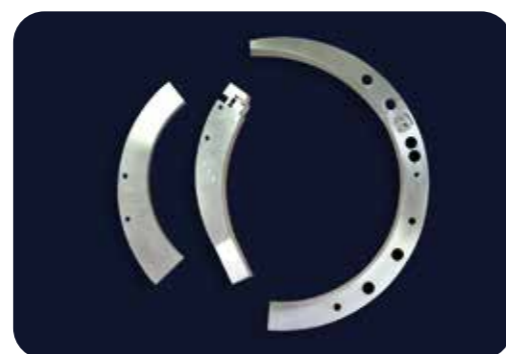


Compliance with regulations

FDA 21 CFR Part 11, CE, EU GMP, GAMP, UL and so on as option

Change Parts

The Planet is only mechanically dependent on the width/diameter of the product. With each set of tools covering 1mm of width/diameter, most products can be inspected with 4 to 8 sets of change parts.



one set of size parts

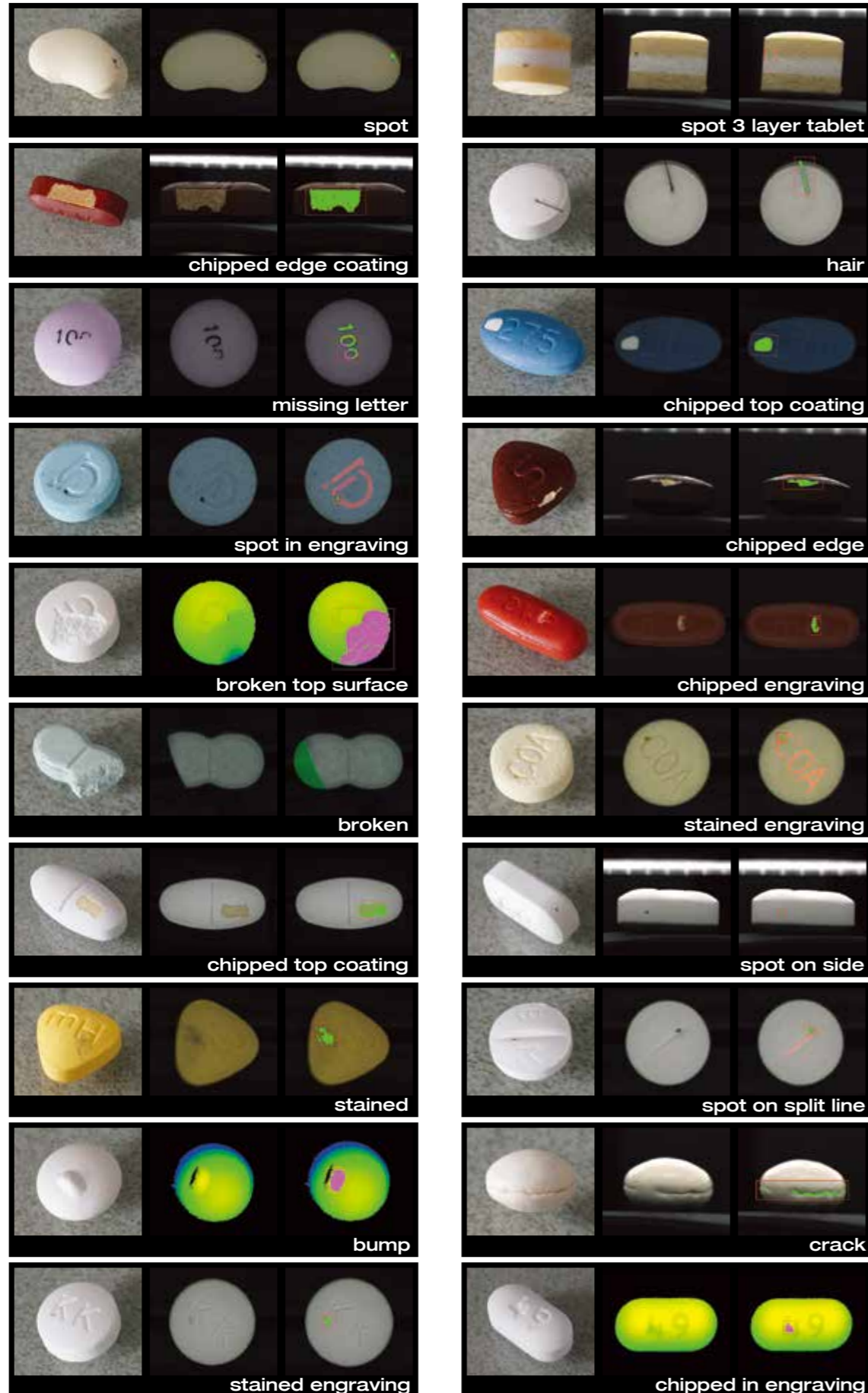
Auto-Setting of Mechanical Gaps

Product dimensions are programmed through the Smart HMI. All these parameters are saved in each product recipe for easy recall later.



Tablet

human eye camera image analyzed



Capsule



Ergonomic Layout

Effective Output

Round tablet

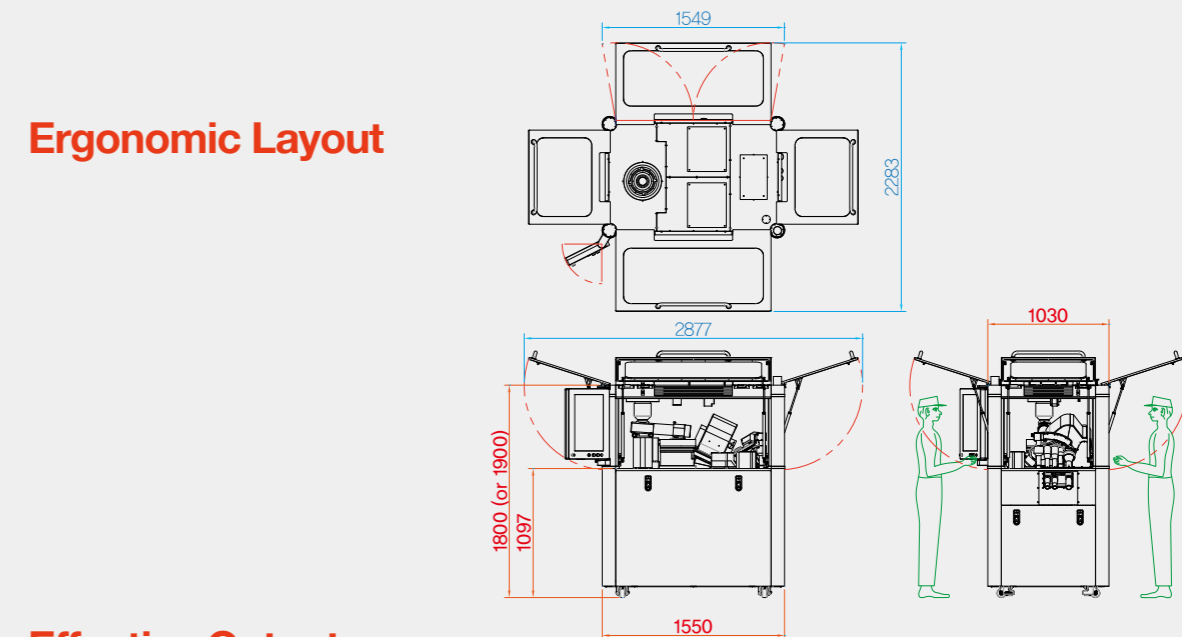
dia. 5mm : up to 350,000 tab./hr
dia. 7mm : up to 240,000 tab./hr
dia. 9mm : up to 200,000 tab./hr
dia. 10mm : up to 180,000 tab./hr
dia. 12mm : up to 150,000 tab./hr

Oblong and Oval tablet

length 10mm : up to 200,000 tab./hr
length 14mm : up to 160,000 tab./hr
length 17mm : up to 130,000 tab./hr
length 21mm : up to 100,000 tab./hr

Capsule

no. 4 : up to 150,000 cap./hr
no. 3 : up to 140,000 cap./hr
no. 2 : up to 130,000 cap./hr
no. 1 : up to 110,000 cap./hr
no. 0 : up to 100,000 cap./hr
no. 00 : up to 90,000 cap./hr



PLANET 6G *series*



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