



# MatliX

AUTOMATIC VISUAL INSPECTION MACHINE  
WITH SINGLE TABLE FOR SMALL O-RING  
AND GENERIC PIECES

**UTP** VISION  
VISUAL INSPECTION



LOADING SYSTEM

①



DIMENSIONAL CAMERA

②



SURFACE CAMERAS

③



UNLOADING

④



CONTROL DEVICE  
OF EXTERNAL AND  
INTERNAL SURFACES

OPTIONAL

**MatliX** is a simple visual inspection machine with single rotary table for the dimensional and surface control of o-rings and generic pieces made of rubber, plastic, PTFE, etc. MatliX is able to identify critical surface defects such as cuts, flashes, voids, marks, stains, double-mouldings, out-of-roundness, out-of-concentricity, etc.

MatliX is available in four versions optimized for different part sizes. The MatliX OS model is equipped with a camera for top surface inspection, whereas the MatliX DS model integrates two cameras, one directly above the object for top surface inspection and one underneath the rotary glass table for bottom surface inspection.

In each version, the feed system loads the parts onto a conveyor belt, then a motorized diverter transfers them onto a rotary glass table. From this point on, every single part is inspected for defects and dimensional accuracy by a series of dedicated vision inspection stations.

The acquired images are transferred without any data loss to a PC managed by a **Real Time OS**, which handles both image processing and the interaction with the operator through a user-friendly interface. The system's stability is guaranteed even at extremely high inspection speeds.

After the images have been processed, pieces are sorted into three different collection areas depending on whether they are compliant, non-compliant or reworkable. Part changeover is quick thanks to the possibility of saving inspection parameters in each recipe.



LINUX



DATABASE  
INTEGRATION



STATISTICS  
REPORTS



COLOR VISION  
PATENTED



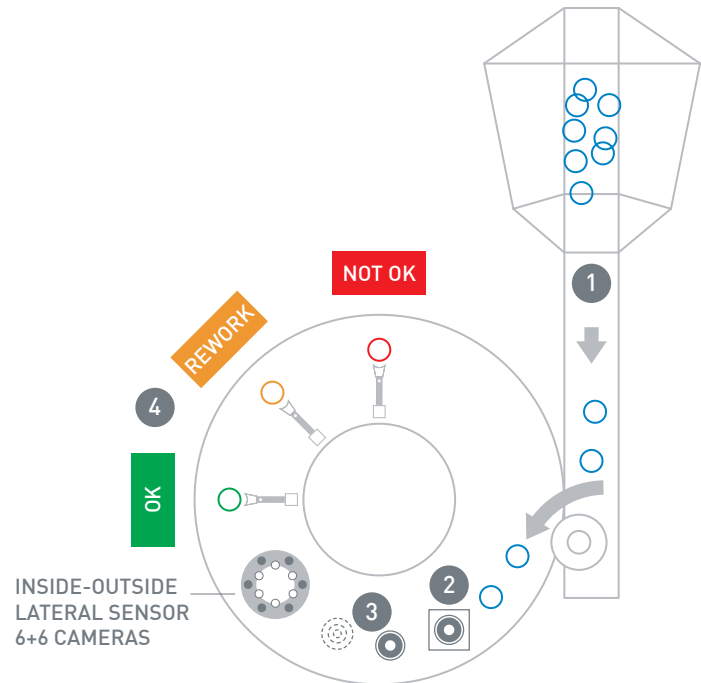
ARTIFICIAL  
INTELLIGENCE

## ILLUMINATION

- Digital regulation of bright intensity for inside and outside surfaces
- Possibility to control piece with reflecting surface
- Good precision of dimensional and surface controls
- No decadence of bright intensity

## LASER THRUBEAM SENSOR

Laser thrubeam sensor is able to measure with extreme accuracy the planarity of the piece scanning its profile. It's possible to measure the height of pieces only if they are perfectly planar. The elevated precision of measuring is achieved using algorithms of elaboration of the signal that allow to eliminate any imperfection of the rotating table during its oscillation.





## DIMENSIONAL STATION

Independent measurement sensor for dimensional control of circular pieces, with the following characteristics:

- Progressive scan high resolution B/W camera
- Nearly zero distortion bi-telecentric lenses
- Dedicated lighting system

### Related control program features

- Measurement of the inner/outer diameter
- Measurement of the radial cross section
- Measurements of general lengths, angles, radii
- Flash defects inspection
- Nicks defects inspection
- Roundness inspection
- Center distance

## CONTROL SOFTWARE

The software for analysis and control of components with complex shape allows the recognition of planar rotation of piece. It also recognizes the top and bottom sides and independently processes the image of the piece regardless of load position.

### Control program

- Irregular profiles identification and related control with reference to the sample profile
- Control of the maximum and minimum height of holes and flash on linear and curvilinear profiles
- Definition of multiple calipers and control of their dimensions
- Control of the median and punctual variation of cord sections
- Simultaneous analysis of surface defectiveness in many inspection areas



## OPTIONAL CONTROL DEVICE OF EXTERNAL AND INTERNAL SURFACES

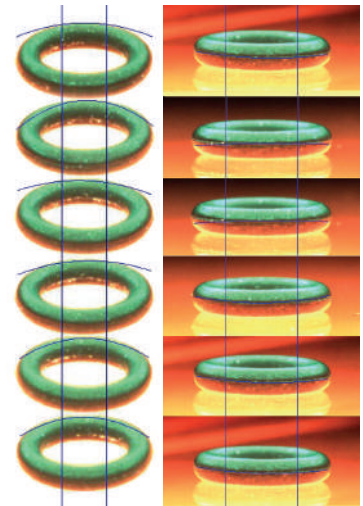
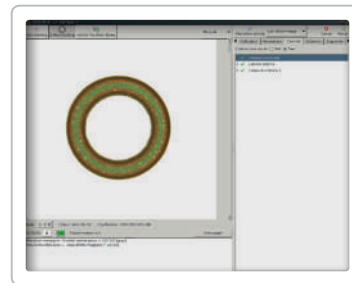
This system consists of two stations (internal side and external side) with each 6 progressive 2 Mpixel color scan cameras, with framing of the outside and inside of the piece every 60 °. Each camera has a very low distortion lens. In addition, the system is characterized by 2 levels of colored LED lighting arranged above and below the piece.

The system allows to optimize the illumination of the piece thanks to the independent regulation of the illuminators with pulsed light.

The control program allows you to detect defects on the external and internal edge of a piece and anomalies related to the mold closure and production defects that frequently occur in that area.

### Two stations: internal and external lateral surface

- 6+6 color camera
- Framing every 60°



## SPECIFICATIONS

TECHNICAL SPECIFICATIONS	OS 35	OS 70	DS 35	DS 50
Material	rubber, plastic, PTFE, metal			
Color	any color			
Min. external diameter (mm)	3	3	3	3
Max. external diameter (mm)	35	70	35	50
Min. thickness (mm)	0.9	0.9	0.9	0.9
Max. thickness (mm)	9 / 25	9 / 25	9 / 25	9 / 25
Productivity	up to 10 pcs/s (36,000 pcs/h) depending on the typology and material of article			
Loading system	bulk feeder 130 L			

PLANARITY STATION	OS 35	OS 70	DS 35	DS 50
Height measurement range (mm)	9	9	9	9
Dimensional resolution (mm)	0.001	0.001	0.001	0.001
Accuracy of measurement (mm)	±0.015	±0.015	±0.015	±0.015
Repeatability of measurement (±2σ) (mm)	±0.025	±0.025	±0.025	±0.025

VERTICAL DIMENSIONAL STATION	OS 35	OS 70	DS 35	DS 50
Camera	B/W	B/W	B/W	B/W
Field of view (mm)	Ø39	Ø71	Ø39	Ø54
Generic pieces maximum height (mm)	1	5	1	5
Oring maximum height (mm)	2	10	2	10
Dimensional resolution (mm)	0.001	0.001	0.001	0.001
Optical resolution (mm/px)	0.025	0.046	0.025	0.035
MPE Inside Diameter (mm)	8 µm	10 µm + 0.5 x 10 <sup>-4</sup> x IntDia µm	8 µm	9 µm
MPE Outside Diameter (mm)	7 µm	10 µm + 1.5 x 10 <sup>-4</sup> x ExtDia µm	7 µm	9 µm

UPPER SURFACE STATION	OS 35	OS 70	DS 35	DS 50
Camera	full color	full color	full color	full color
Number of lenses	3	4	3	4
Focus adjustment	motorized	motorized	motorized	motorized

LOWER SURFACE STATION	OS 35	OS 70	DS 35	DS 50
Camera	-	-	full color	full color
Number of lenses	-	-	3	4
Focus adjustment	-	-	motorized	motorized

The technical data and images contained herein are indicative only. UTPVision reserves the right to modify its products at any time without prior notice.

## OPTIONALS

DIFFERENTIAL THICKNESS LASER STATION	OS 35	OS 70	DS 35	DS 50
Measuring range (mm)	25	25	25	25
Resolution (mm)	0.001	0.001	0.001	0.001
Accuracy of measurement (mm)	±0.003	±0.003	±0.003	±0.003
Repeatability of measurement [±2σ] (mm)	±0.005	±0.005	±0.005	±0.005
Minimum internal diameter (mm)	10	10	10	10

INTERNAL LATERAL STATION	OS 35	OS 70	DS 35	DS 50
Camera	full color	-	full color	-
Width of field of view for each camera (mm)	33	-	33	-
Optical resolution (mm/px)	0.21	-	0.21	-
Minimum detectable defect size (mm)	0.065 x 0.065	-	0.065 x 0.065	-

EXTERNAL LATERAL STATION	OS 35	OS 70	DS 35	DS 50
Camera	full color	-	full color	-
Width of the field of view for each camera (mm)	25	-	25	-
Optical resolution (mm/px)	0.016	-	0.016	-
Minimum detectable defect size (mm)	0.050x 0.050	-	0.050x 0.050	-

PLANARITY STATION 25 MM	OS 35	OS 70	DS 35	DS 50
Height measurement range (mm)	25	25	25	25
Dimensional resolution (mm)	0.001	0.001	0.001	0.001
Accuracy of measurement (mm)	±0.018	±0.018	±0.018	±0.018
Repeatability of measurement [±2σ] (mm)	±0.030	±0.030	±0.030	±0.030

UPPER SURFACE STATION	OS 35	OS 70	DS 35	DS 50
Camera	full color	full color	full color	full color
Field of view (mm)	48x40	88x74	48x40	66x55
Dimensional resolution (mm)	0.001	0.001	0.001	0.001
Optical resolution (mm/px)	0.019	0.036	0.019	0.027
Minimum detectable defect size (mm)	0.058x 0.058	0.108x 0.108	0.058x 0.058	0.081x 0.081
Focus adjustment	fixed	fixed	fixed	fixed

LOWER SURFACE STATION	OS 35	OS 70	DS 35	DS 50
Camera	-	-	full color	full color
Field of view (mm)	-	-	48x40	66x55
Dimensional resolution (mm)	-	-	0.001	0.001
Optical resolution (mm/px)	-	-	0.019	0.027
Minimum detectable defect size (mm)	-	-	0.058x 0.058	0.081x 0.081
Focus adjustment	-	-	fixed	fixed

## DEVICES

Bulk feeder 300 L
Heater on bulk feeder
Antistatic bars
ABC Station (Automatic Blowing Checker)
DTC (Dirty Table Checker)
Laminar flow cabinet
Manual cleaning machine control
Rotating warehouse
Packaging machine
Z conveyor belt



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