

CONDOR



DeCoSystem

JAR & COSMETICS INSPECTION

DECOSYSTEM has long experience in this sector and some Deco engineers have already been in this field for many years.

- **Condor**, 100% real-time control system, is dedicated to the inspection of the glass bottles for the cosmetic industry. In any case it can be used for the inspection of any object that is transported on a conveyor belt with the same angular and transversal position.
- **Condor** works either with cylindrical or with different shapes elements. A single unit performs the inspection on one face of the bottles. The full configuration, two parallel systems, are able to cover 360° of control.
- **Condor** is a stand-alone station that is installed at the end of the printing process. To achieve the 100% control it is necessary to align each printed element on a conveyor belt.

CONDOR TEAM

PRODUCT MANAGER

Ing. Roberto Cecchi

Roberto is our Production Director, he grew his experience across the years developing the software of different inspection systems.

SERVICE AND INSTALLATION ENGINEER

Dipl. Ing. Andrea Guidieri

Andrea is our expert on the field with more than 40 installations of different systems.

SOFTWARE DEVELOPMENT

Ing. Gianluca Pioggia

Gianluca has a 8 years experience in the image analysis and database management

MECHANICAL ENGINEER

Ing. Paolo Landi

Paolo has 10 years experience in mechanical design and personalization of camera unit for video inspection system.

TECHNICAL DESCRIPTION

SYSTEM COMPOSITION

HARDWARE

The system is based on one or two parallel modules. Each one is equipped with a dedicated computer, illuminations and cameras.

TOUCH SCREEN INTERFACE

High resolution touch screen monitor.

ILLUMINATION

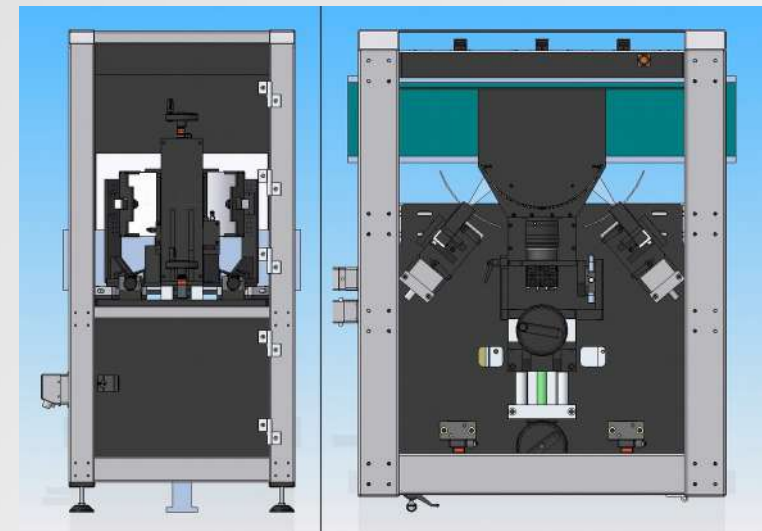
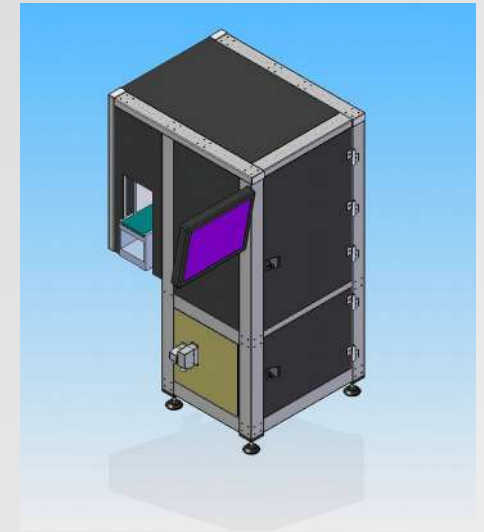
The system is equipped with three different illumination sources:

- LED Back light
- LED Dark field light
- LED Diffuse light

CAMERAS

The system is equipped with one line-scan camera and two matrix cameras technologies:

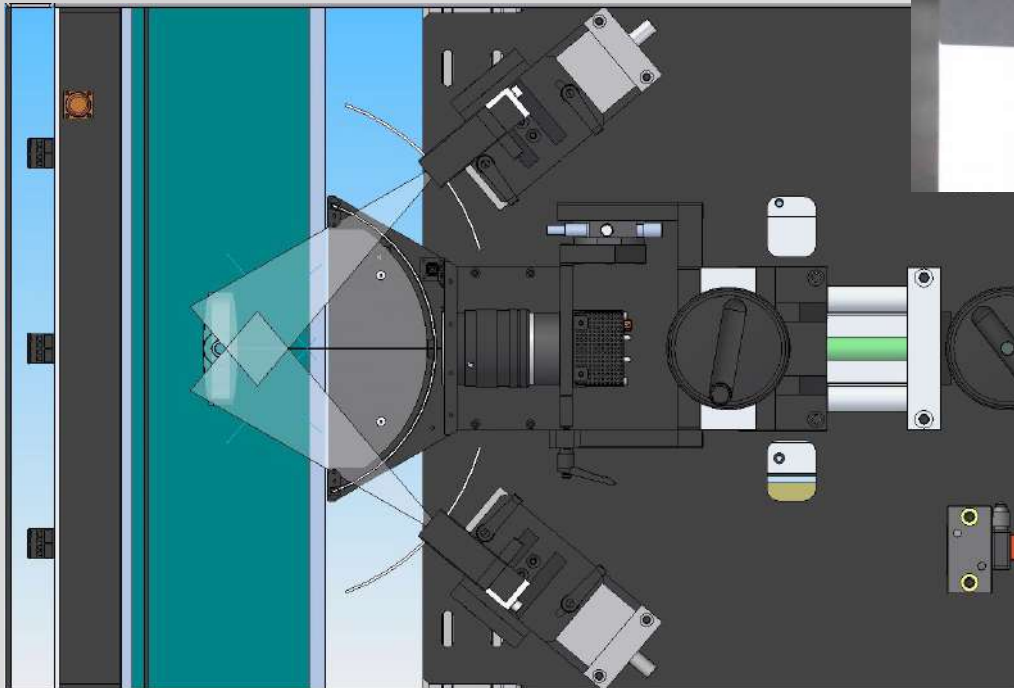
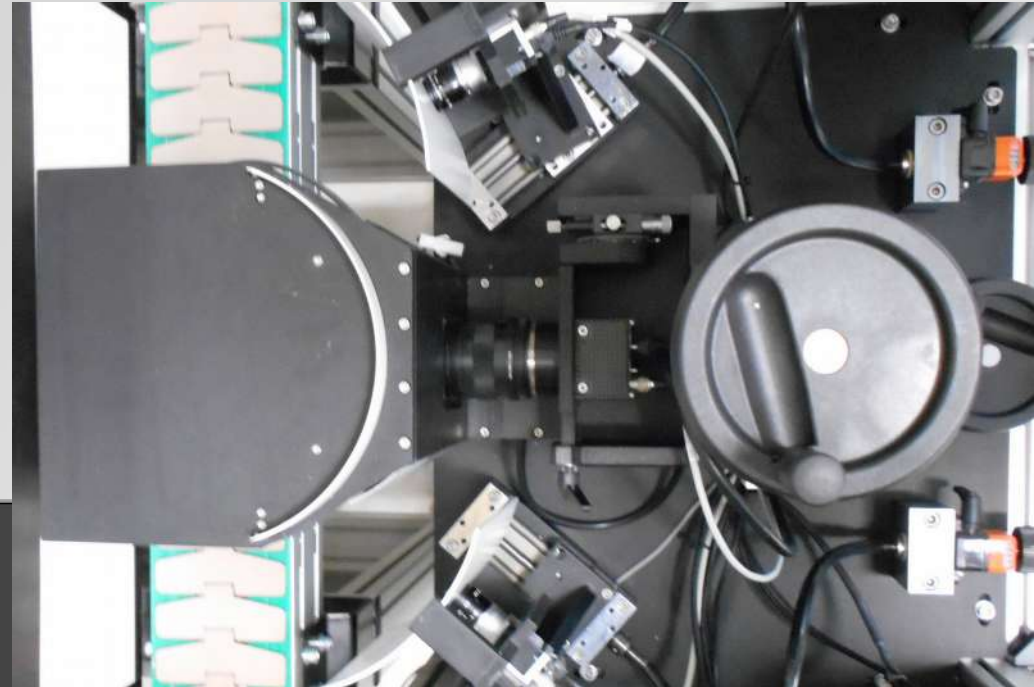
- LINESCAN camera
- 2 x MATRIX cameras



FIELD OF VIEW

The three cameras cover the whole side of the inspected element.

- The two matrix cameras are synchronized to acquire an image when the incoming bottle is in the correct position.



- The line camera performs the acquisition while the bottle is moving in front of the camera.

REJECTION STATION



Rejection Turning Table (Optional)

- For the rejection is possible to collect the defective bottles into a turning table of 600mm diameter.
- The turning table is equipped with a mechanical speed changer to adapt the rotation speed to the conveyer belt speed.

INPUT/OUTPUT AND PLC MODULE

- **Encoder:** device for the synchronization of the conveyer belt speed. The encoder must be installed on the motor that runs the conveyer belt.
- **Input trigger:** the system is equipped with an electric eye for the synchronization of the start the image acquisition.
- **Rejection device:** signal for the activation of the rejection device that is a FESTO pneumatic cylinder.
- **System On:** this signal is enabled when the CONDOR is in control.
- **Alarm:** this signal is enabled in case of consecutive defects or in case of many rejections. The signal can be used to stop the machine in order to avoid the production of too many bad bottles.
- Other outputs are available on requests.

INSPECTED ELEMENT



CYLINDRICAL BOTTLES: Min. diameter 35mm
Max. diameter 80mm
Max. printing height 120mm

OVAL BOTTLES: Min. length 40mm
Max. length 120mm
Max. printing height 150mm

RECT. BOTTLES: Min. length 40mm
Max. length 120mm
Max. printing height 150mm



INSPECTED ELEMENT – LIMITATIONS

The inspection of the glass bottles can have some limitation in the following cases:

Print close to the bottle edges

The position of the print inside the bottle is very important to carry out a good inspection. If the print is on the border of the bottles the glass edges (internal and external) could affect the visibility of the print.

Hot stamping

In some cases hot stamping is not visible. In particular the screen-printed prima must have a good contrast compared to the hot stamping material.

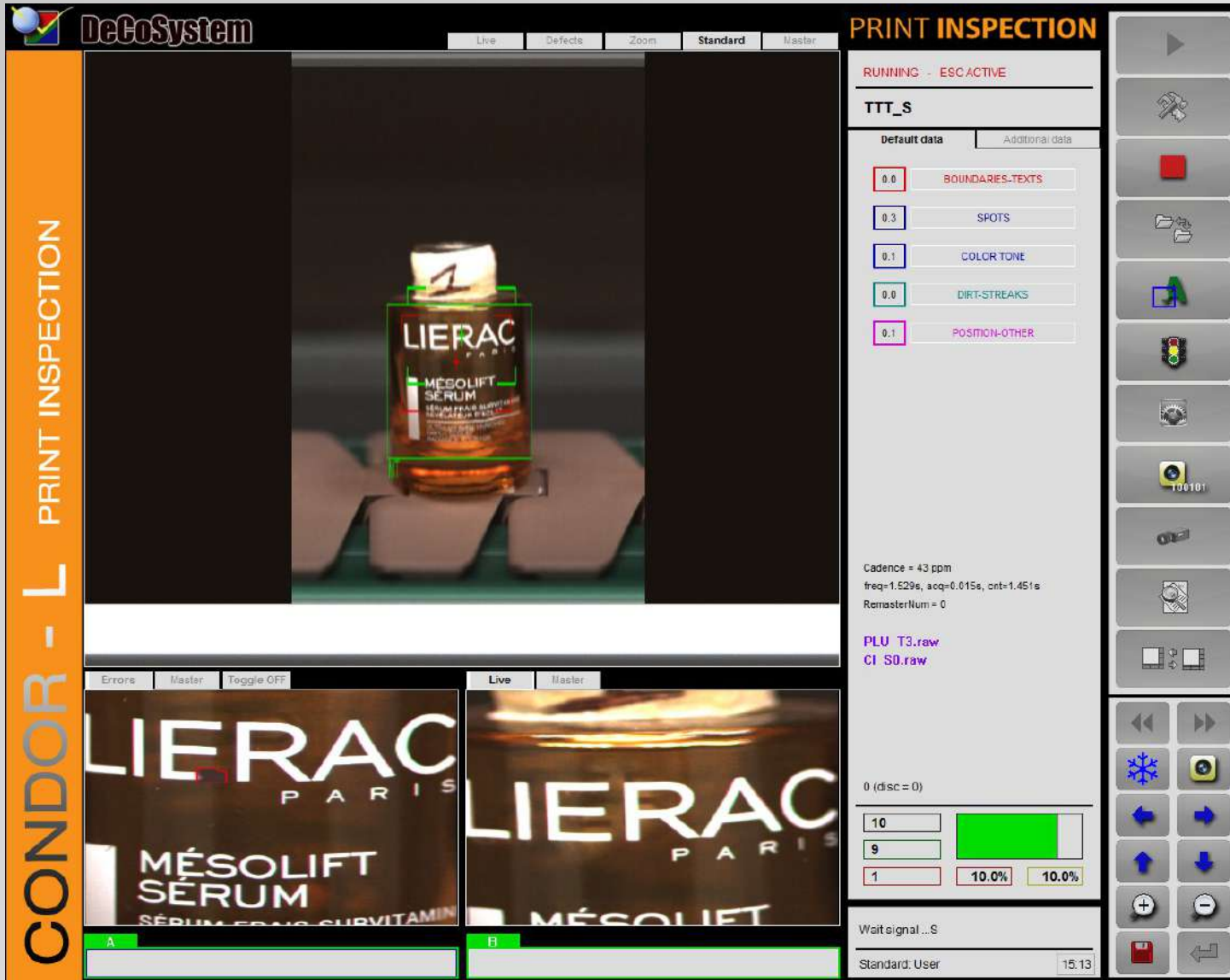
Transparent bottles

In case of transparent bottle the print on the back side can influence the print in the front side.

Cylindrical bottle

In case of cylindrical bottle Condor is able to inspect the print on the front for a development of 120° and the print on the back for a development of 120°.

GRAPHICAL USER INTERFACE – GUI



Screenshot of the GUI that shows the control mode and the acquired image from the line camera.

GRAPHICAL USER INTERFACE – GUI

The screenshot displays the DeCoSystem PRINT INSPECTION GUI. The main window is titled "CONDOR - M PRINT INSPECTION" and shows two bottles of LIERAC serum on a conveyor belt. The left bottle is labeled "ERAC PARIS" and "RESOLIFT SERUM". The right bottle is labeled "LIERAC PARIS" and "RESOLIFT SERUM". The GUI includes a top menu bar with "Live", "Defects", "Zoom", "Standard", and "Master" options. A vertical sidebar on the left contains the text "CONDOR - M PRINT INSPECTION". The right side of the GUI features a "PRINT INSPECTION" panel with the following data:

RUNNING - ESCACTIVE
TTT_T

Default data | Additional data

- 0.0 BOUNDARIES-TEXTS
- 0.5 SPOTS
- 0.2 COLOR TONE
- 0.0 DIRT-STREAKS
- 0.0 POSITION-OTHER

Err. density Red = 0.0 (0.0-0.0)
Err. density Blue = 0.5 (11.0-1.0)
Low variation of unit = 0.2 (0.4-10.0, 0.4)
High variation of unit = 0.0 (0-10, 60)
Position Err. X = 0.0 (0.00mm)
Position Err. Y = 0.0 (0.00mm)

Selez (8/16,0,nont 3)
CompR = -1 CompG = -1 CompB = -1

Ind. Reg=0, Area=0, Su=2160, OrAgg=0
Cadence = 41 ppm
freq=1.732a, acq=0.015a, cnt=1.436a
RemoaterNum = 0

PLU T0.raw
CI S1.raw

0 (disc = 0)

37 37 0 0.0% 0.0%

Wait signal...T
Supervisor: ADMIN 16.42

The bottom of the GUI shows a "Errors" panel with "Master" and "Toggle OFF" buttons, and a "Live" panel with "Master" buttons. The bottom right corner contains a control panel with various icons for navigation and inspection.

Screenshot of the GUI that shows the control mode and the acquired image from the matrix cameras.

TECHNICAL DESCRIPTION

The configuration we are proposing have the following technical characteristics:

Camera:	Linear – colour – 2048 pixel Matrix – colour – 2048x1024 pixel
Field of view:	220 mm
Max printing length:	150 mm
Object range:	Diameter 35mm – 60mm Length 40mm-120mm High 40mm-150mm
Cadence (max):	50 pieces/Min
Resolution:	0,07mm x 0,07
Control:	100% defect detection
Detectable defects:	dirt, splotches, scratches, colour, lacks, wipes, colour variations, material defects, mis-registration
Rejection:	One the belt
Synchronization:	With encoder
Minimum detectable defect⁽¹⁾ in uniform area:	0,15 mm ² (dot of 0,45mm)
Minimum detectable defect⁽²⁾ in structured area:	0,25 mm ² (dot of 0,6mm)
Safety:	UPS
Operating:	With touch screen interface

(1) we consider a defect of 30 pixel

(2) we consider a defect of 50 pixel

CONDOR CONFIGURATIONS

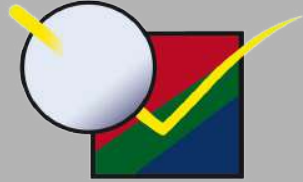
CONDOR L, composed by a single acquisition unit, a line camera.

CONDOR L+2M, a full set of cameras composed by a line one and two matrix elements.

CONDOR L MASTER+SLAVE, a twin set of condor each one equipped with a line camera.

CONDOR L+2M MASTER+SLAVE, a twin set of condor each one equipped with a full set of cameras, 2 matrix ones and a line camera.

CONDOR L+2M MASTER+SLAVE and rejection table, a twin set of condor each one equipped with a full set of cameras, 2 matrix ones and a line camera, plus a rejection table after the systems.



DeCoSystem

**THANK YOU FOR
YOUR ATTENTION**