

SYMPLEX MULTIKON-NCI

Inspection Technology for the
Container Glass Industry



- Detects cosmetic defects (stones, blisters and others) in side wall and base
- Stress detection in side wall and base
- Finish control including line over finish (LOF)
- Mould number reading (alphanumeric and dot code)
- Dimension inspection
- Modern LED lighting concepts
- High line speeds (up to 600 containers per minute), upon request even more
- Can be delivered in any configuration
- Long-term product data collection plus statistical evaluation
- Minimum space requirement
- Software-guided change over procedure
- Operation via touch screen
- Remote control and maintenance
- Networking options available



BBULL
INFORMATIK & INDUSTRIE
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CENTRO
KONTROLLSYSTEME

STRATEC
CONTROL-SYSTEMS

SYMPLEX
VISION SYSTEMS

FULL SURROUND CONTROL 360°

Maximum reliability regarding the product quality is every producer's main concern. Using the new camera inspection system MULTIKON-NCI (new container inspector) this reliability will finally materialise. This multistation assembly is a combination of all our high-level inspection solutions.

MULTIKON-NCI comes packed with state of the art camera technology, a custom-tailored high-performance controller, variable image processing units and an easy user interface. Furthermore, the machine applies a unique lighting concept allowing picture acquisition of unsurpassed quality. Special transport components make an all-round inspection of the specimen possible. Therefore, **MULTIKON-NCI** even inspects the base of the containers from below. Despite all these features, **MULTIKON-NCI** is still one of the most compact systems on the market. It can be placed at spots where similar machines do not fit in.



FUNCTIONALITY

The inspection of the containers is carried out in various steps. The specimens run through a number of inspection stations that serve a particular inspection purpose. Combining separate inspection options, you can establish any kind of inspection profile, from stand-alone

solutions for the base inspection only up to all-round inspections covering every detail of the container.

The stations mainly use optical inspection methods - a combination of lighting technology, optics, cam-

era technology and computer software - to detect defects and deformations.

A master controller and tracking system makes sure that all incoming data are reliably attributed to the corresponding container and allows rejecting the defective samples, once they have passed the machine. Sorting the containers according to predefined criteria with a variety of pusher units is also part of the machine options.

To allow an unimpaired view on all parts of the container, the machine features two lateral transport belts that carry the containers through the centre of the machine over a gap between two conveyors. In this manner, the container base can be shown from below, which is not possible while the specimen is transported in the usual fashion - standing on the conveyor belt.

INSPECTION TASKS

To guarantee best possible inspection results we apply the latest technological advances in hard- and software. Depending on the configuration, the machine detects defects in every area of the specimen, be it dimensional deviations, stress problems or enclosures. Combining all inspection features, you can make sure that the produced containers leave your line with optimum quality.

MODULAR SOLUTIONS

MULTIKON-NCI operates asynchronously and can thus be incorporated into any possible production line system at any given spot along the production line. A modular machine sign not only makes it possible to customise the system to the customer's precise specifications, but also allows incorporating extensions and improvements later on. For those reasons, we can offer the system at an unrivalled price. Furthermore, we offer the system in fully customised configurations.

INSPECTIONS-MODULES

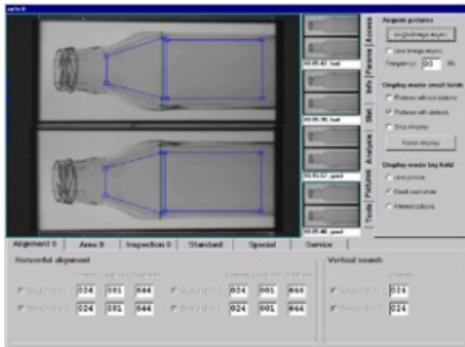
The available inspection modules comprise a constantly widening range of inspection functions. If you can not find your required function in the list below, please feel free to contact us directly. We might already be working on exactly the feature you need.

For the new container inspection we offer the following features:

- Side wall control finding stones, blisters, enclosures and cosmetic defects
- Base inspection finding stones, blisters, enclosures and cosmetic defects
- Side wall stress control finding tensions
- Base stress control finding tensions
- Finish control to detect surface defects, overpress finishes and others
- Mould number reading function: dot-code and alphanumeric
- Dimension control finding deviations from the usual contour

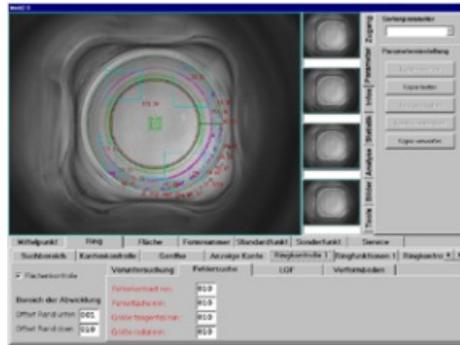
The following features are described in detail:

SIDE WALL INSPECTION



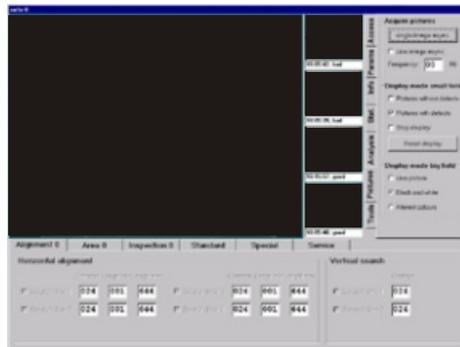
Using a special optical system MULTIKON-NCI can show the specimen from up to four different perspectives in on station. Applying two stations you get a seamless 360° view. Illuminating the specimen with a light source that sends its rays through the specimen, all the defects become visible as dark contrasts.

BASE CONTROL



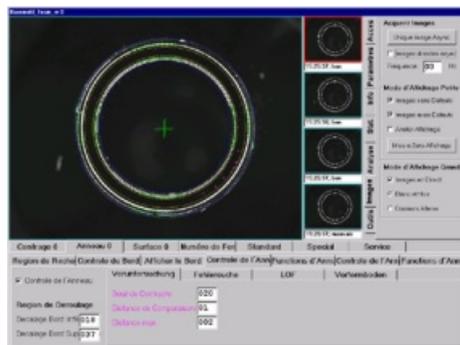
A camera mounted over the specimens captures ist image through the opening of the container. With the light source located under container base, all defects and deposits appear as contrast areas. Software algorithms that were designed for the use in the bulk glass industry (such as the swung baffle detection) guarantee best inspection results.

Stress BASE, SIDE WALL



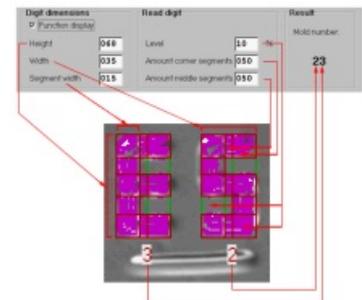
A special dark field illumination concept makes tensions in the base and wall areas visible as bright spots. The corresponding containers are then removed from the production line. The defects are not visible in normal lighting conditions and, therefore, require a separate inspection.

FINISH CONTROL



At this station, the container finish is inspected from above. Using a dark field lighting the system detects all relevant defects such as chips. With a broad variety of tuning options, this function can be adapted to any kind of inspection requirement. Special algorithms, such as the LFO detection (line over finish), make this station the ideal tool for the quality assurance in the container glass industry.

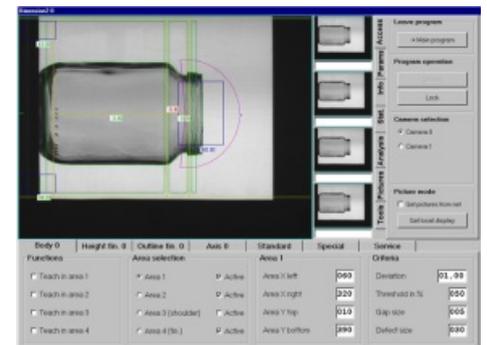
MOULD NUMBER READING



Only with the correct setting can the system detect the digits. The filled segments with a red margin, the empty segments are filled with a green margin. Now the system can interpret the mould number.

The mould number reader can detect alphanumeric marks as well as dot codes. The function uses an image that is taken through the opening of the container. The orientation of the container is of no importance here. This means that a prior turning of the containers is not necessary.

DIMENSION CONTROL



The dimensional control examines the containers from various perspectives. Comparing the contour to a reference the system can detect all kinds of dimensional flaws such as sunken sides, leaners and bent necks.

LED LIGHTING

All the camera stations use light-emitting diodes (LEDs) to provide optimum illumination conditions. This state-of-the-art lighting concept features advantages such as an even light distribution, minimum space requirements, long service life, and a reduced power consumption compared to other illumination methods. Moreover, they produce only little heat. This means that cooling devices are not needed in the stations.



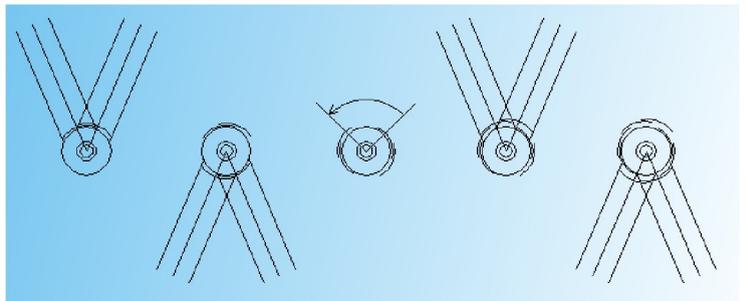
The side wall inspection stations include two identical opposite mounting positions, on either side of the conveyor. The light source sits on one side of the conveyor, the optical unit is mounted on the opposite. In some special cases, the use of four adjacent mounting positions might be obligatory in order to create a large sized lighting fixture in conjunction with multiple optical paths. The side wall, side wall stress and dimensional inspection are typical examples for this set-up.

The stations inside the machine are designed for modular equipment. Station five is mounted immediately above a suction nozzle. This means that you can only mount stations here that feature a top light source. The finish control, the thread control and the lateral finish control are typical applications that are placed in this position.

Stations six and seven are reserved for inspection stations with a bottom light source, such as the base inspection, base stress inspection, base dark field inspection and mould number reading. Using suitable optical components, you can combine various functions in one station.

Station eight offers the option of a top plus bottom lighting, which means that all standard inspection functions (base / finish) and any combination of them can be applied here.

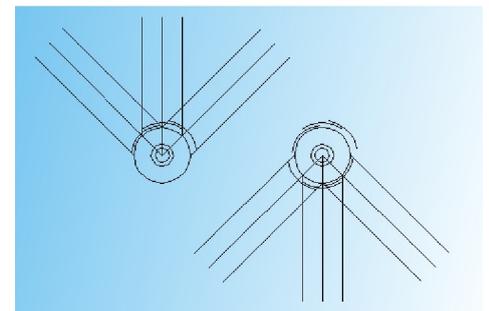
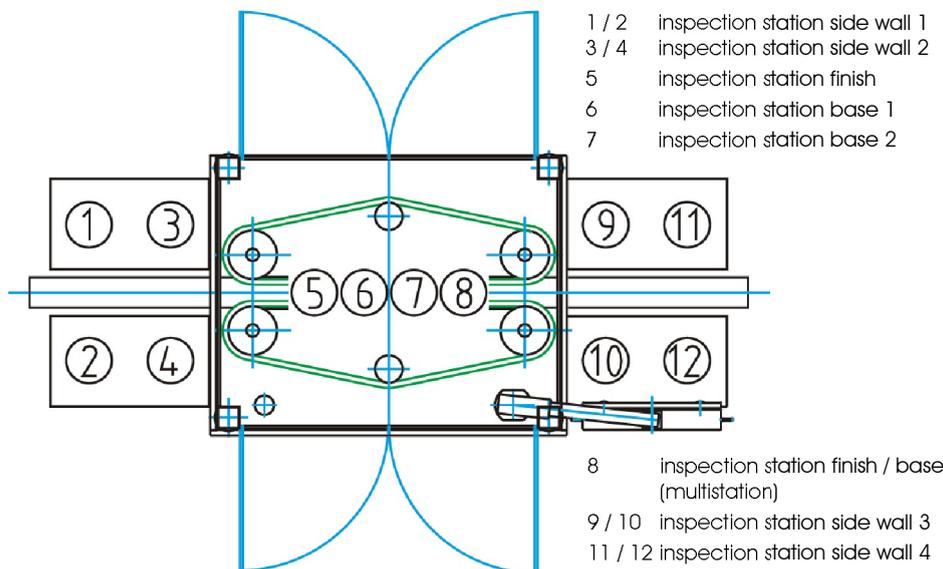
Production lines that run axially symmetric containers are best equipped with four side wall inspection stations. Each camera delivers two views of a container, the second with a 45° offset to the first. Two of these units are mounted in front and behind the lateral belts. Using different belt speeds, the containers are turned by 90° while being transported through the machine. In this manner, the system creates eight different views of the specimen, which results in an all round direct view (360°). The following illustration displays this set-up. Using Fresnel optics in each of the optical paths, even the marginal areas immediately above the base and under the finish become visible.



CONFIGURATION

Due to the basic modular machine design concept, **MULTIKON-NCI** offers a variety of configurations. The combination of lateral transport belts in conjunction with the asynchronous machine drive make it possible to open the finish and base areas for a precise inspection at full line speed.

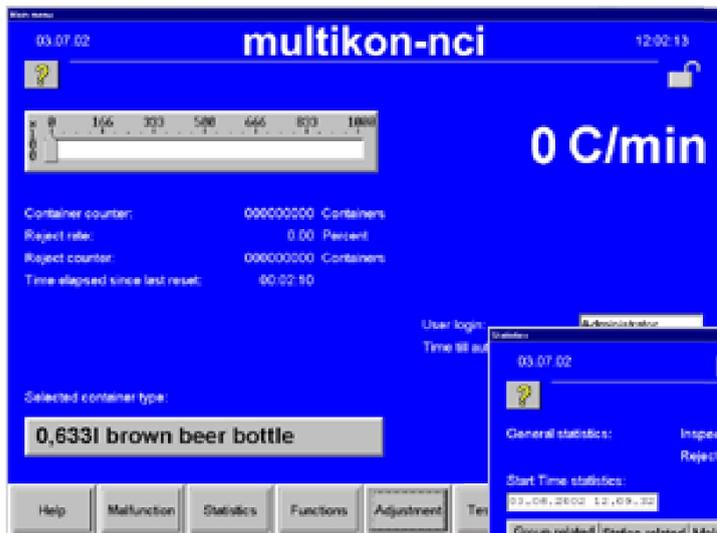
Production lines that do not run axially-symmetric containers can, in general, not use the lateral belts to turn the containers. If that is the case, the use of two side wall stations is feasible. These specially designed units show three views of the container, each. The following illustration explains the concept. There is a weakness here, regarding the minimum overlap between the images taken from either side of the belt. It is understood that, unlike the images of a rotated container, the margin areas of the container are roughly the same in the images taken from either side of the conveyor and can, therefore, not be inspected with the same scrutiny as the remaining container parts. As a compromise solution, however, this set-up produces more than satisfactory results.



MONITOR

The machine is operated via a high-resolution colour touch screen. During operation, the screen displays current production data in the selected language. If necessary, the operator can switch the program language on-line. For monitoring and adjusting purposes, the display provides large-sized images, either of the actual specimens on the production line or loaded from a pre-stored sequence of pictures. A context sensitive help function covers all the adjustment procedures. A variety of access levels protected by individual passwords makes sure that only authorised personnel carry out their designated tasks. All production data and parameter changes can be attributed to the person in charge over a period of one year. Furthermore, you can feed the production data into a data base. If a PC network is available, you can apply a separate software tool that turns any connected PC into a supervising workstation.

MONITOR



DATA STORAGE

The machine stores all its production data, such as reject rates, access status, parameter changes, results of the test container programs as well as malfunctions that might occur during production. All information is time-stamped and coded to render alterations of legally significant information impossible.

REMOTE MAINTENANCE

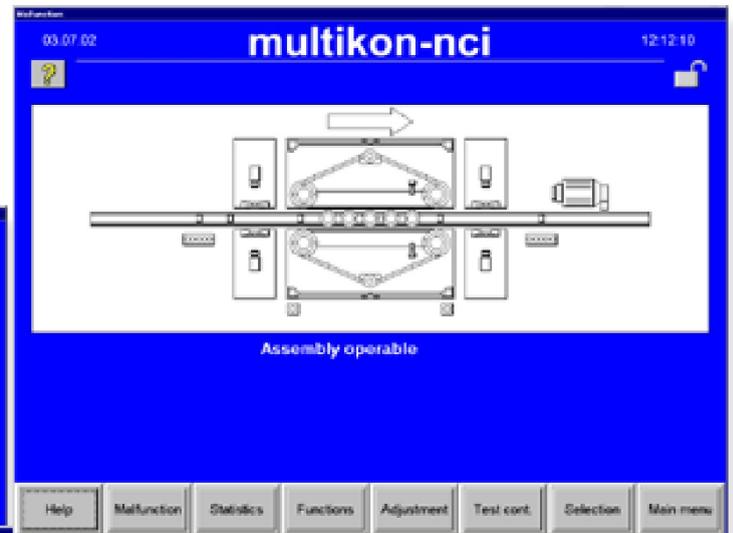
Saving your time and money, Symplex service specialists can log in on your machine to help your staff to find the correct parameter settings. The machine control status is transferred to one of our workstations and we carry out the necessary adjustments via a standard ISDN or analogue connection. In the event of a malfunction, we provide a fast and qualified diagnostic assessment and transfer necessary program updates.

DATA STORAGE

ONLINE HELP AND SOFTWARE GUIDED CHANGE-OVER

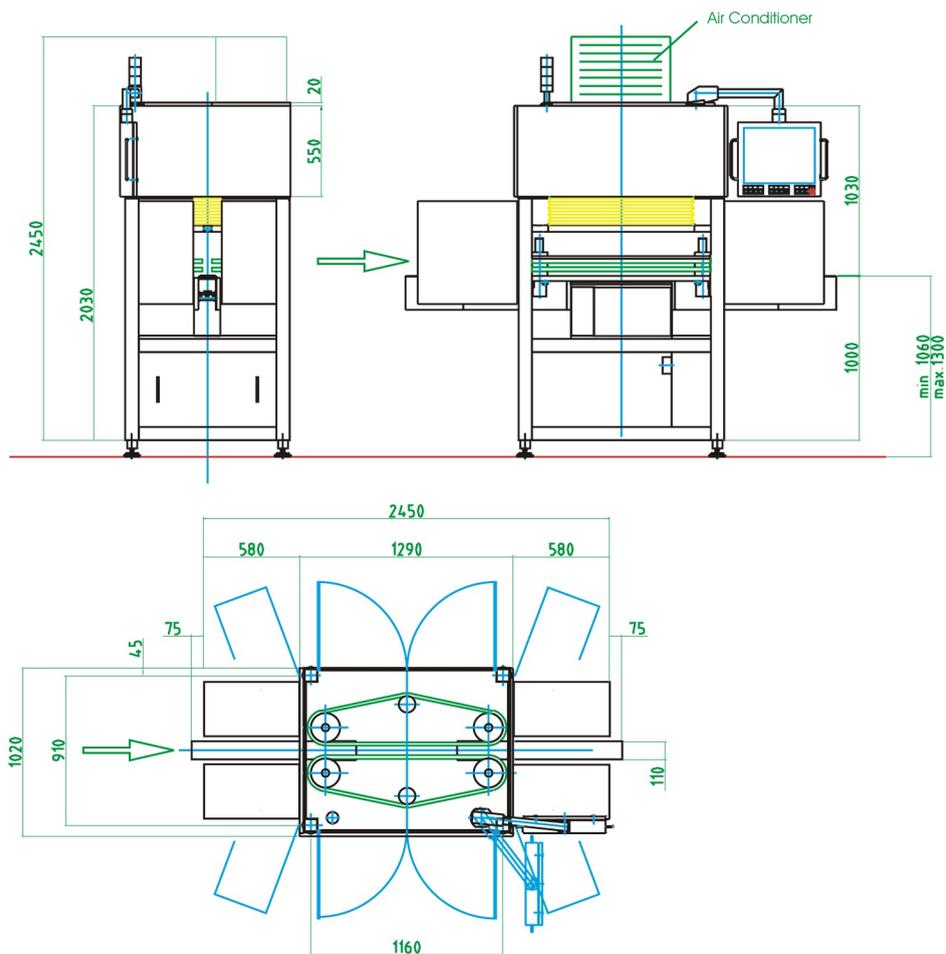
A state-of-the-art context sensitive help system explains the machine's dos and don'ts from the big picture down to the most specific details of the operation in your operator's language. In order to facilitate service tasks and to cope with multilingual circumstances, a language-switching function allows changing the program language while the software is running. The software assisted change-over and adjustment procedure, organises the parameter set-up in a sequence of simple steps that lead the user through the adjustment and fine-tuning of the machine.

ONLINE HELP AND SOFTWARE GUIDED CHANGE-OVER

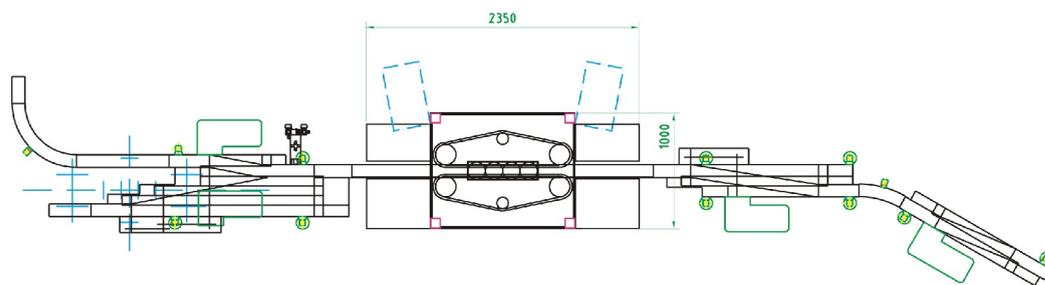


ONLINE HELP AND SOFTWARE GUIDED CHANGE-OVER

DRAWINGS



LINE ADAPTATION



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