

Empty Bottle Inspector

miho David 2



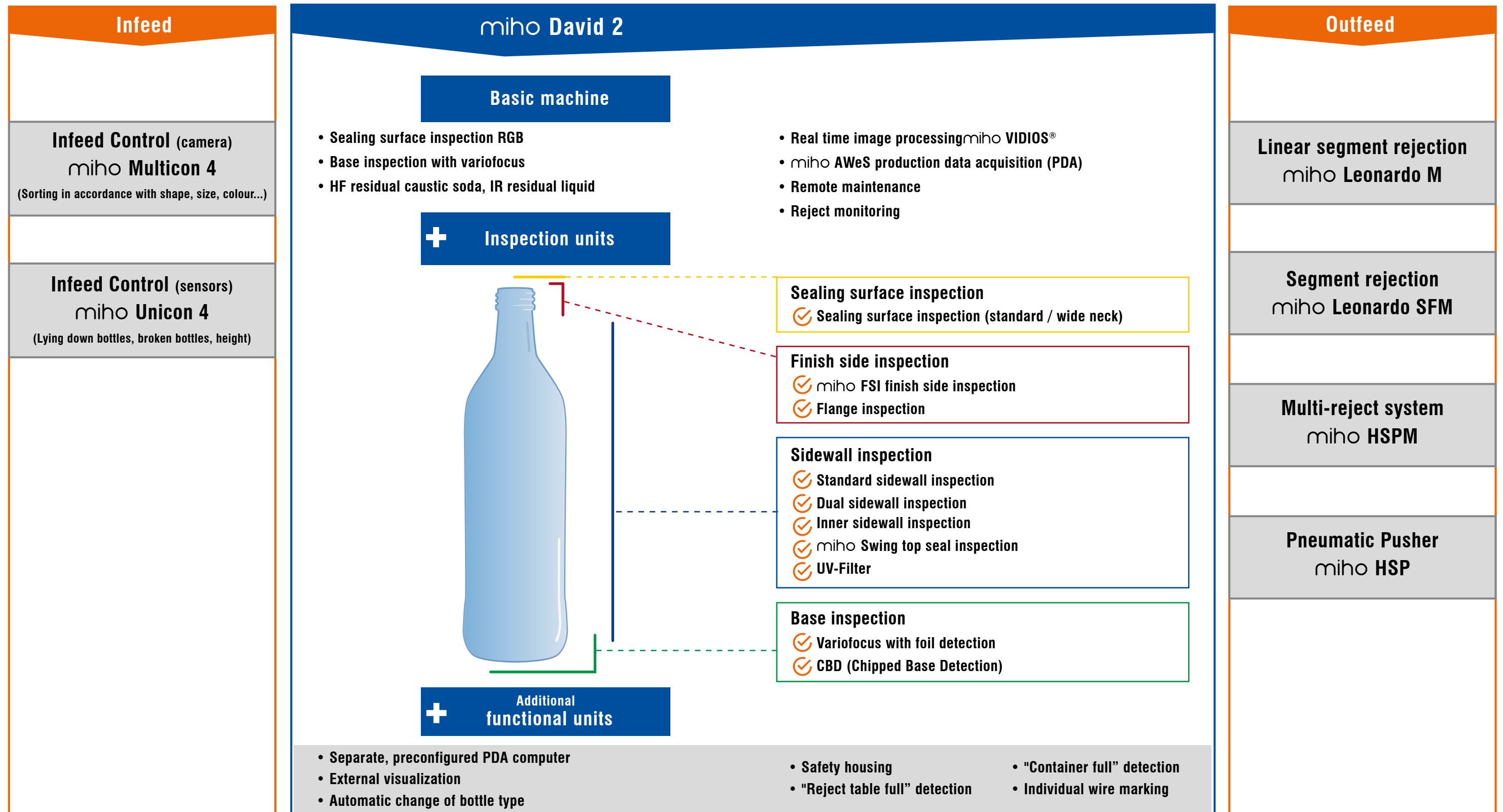
Empty Bottle Inspector miho David 2

Full inspection of the empty and cleaned bottles / containers
(returnable / one-way) between washing machine and filler:

- ✓ Individually configurable
- ✓ State-of-the-art real-time image processing on the miho VIDIOS® platform
- ✓ Up to 72 000 bottles per hour
- ✓ Installed more than 500 times worldwide
- ✓ Hygienic design
- ✓ Innovation: miho FSI, miho OpAL, miho Clapper inspection, miho CBD
- ✓ Optimized energy efficiency
- ✓ 24/7 hotline, remote maintenance, Spare parts supply for at least 15 years



1	Product overview	4
2	Empty Bottle Inspector miho David 2 Basic machine	6
2.1	Basic machine	6
2.2	Sealing surface inspection RGB	6
2.3	Base inspection	8
2.4	miho VIDIOS®	10
2.5	Service counter	10
3	miho David 2 Upgrade modules / Options	12
3.1	CBD (Chipped Base Detection)	12
3.2	Inner sidewall inspection	12
3.3	Standard thread inspection	12
3.4	Extension of visual angle for the base inspection	13
3.5	UV Filter detection of bottles	13
3.6	Automatic adjustment when changing bottle type	13
3.7	Drip trays	13
3.8	Undervoltage supply	13
3.9	Additional "Reject table full" detection	13
3.10	Separate computer for production data acquisition miho AWeS	14
3.11	Safety cabinet	14
3.12	Separate AWeS viewer	14
3.13	Additional safety mechanism	15
3.14	Individual wire marking	15
4	Sidewall inspection	16
4.1	Dual sidewall inspection with miho OpAL	18
4.2	Standard sidewall inspection	19
4.3	Extension module dual sidewall inspection 45°	20
4.4	Extension module with additional vertical viewing angle	21
4.5	miho Finish Side Inspection (FSI)	22
4.6	FSI upgrade flange inspection	23
4.7	Blowing device for the finish area (glass bottles)	23
4.8	miho Finish Side Inspection (FSI)	24
5	Configuration miho David 2	25
6	Integrated inspection of swing top bottles	26
7	Integrated inspection of returnable PET-Bottles	28
8	Network integration & production data acquisition	30
9	Infeed control systems	32
10	Bottle sorting system	34
11	Reject systems	35
12	Conveyor control Conveyor construction Container transport	38
13	Recommended installation Technical data	44
14	Overview product range	46



2.1 Basic machine

Function

- **Base inspection** with foil detection and variofocus: automatic adjustment of the focus for bottles with different heights
- **Sealing surface inspection (RGB)** with colour camera: detection of damage to the sealing surface
- **HF residual caustic soda**: to detect liquid residues in the bottle, with continuous self-control
- **IR residual liquid**: to detect organic liquid residues, with continuous self-control
- **Test bottle management**: automatic request of specially prepared test bottles to check that the machine is running smoothly. Allocation via transponder ring
- **User administration**: via transponder or password entry
- **Production data acquisition** miho AWeS with intermediate storing of production data if there is a network failure

Technology

- Real time image analysis software miho VIDIOS®
- Remote maintenance functionality with all the necessary software licences
- Software package miho AWeS for production data acquisition: Logging of all production data, counter readings, intermediate storing of the operating data, test bottle protocols and user access; Weihenstephan standard
- Mechanical construction: stainless steel, hygienic design
- TFT colour display with touch screen
- Pipelinecooling, closed system: no contamination through outside air or moisture, compressor based air conditioner
- Servo drive: automatic adjustment of the rotation angle (90°) for different bottle diameters
- Simple infeed protection system with line shutdown (too high, too low, lying bottles)
- Reject monitoring: line shutdown if a bottle is not rejected



Touch operation through swivel arm



Test bottle with transponder ring attached

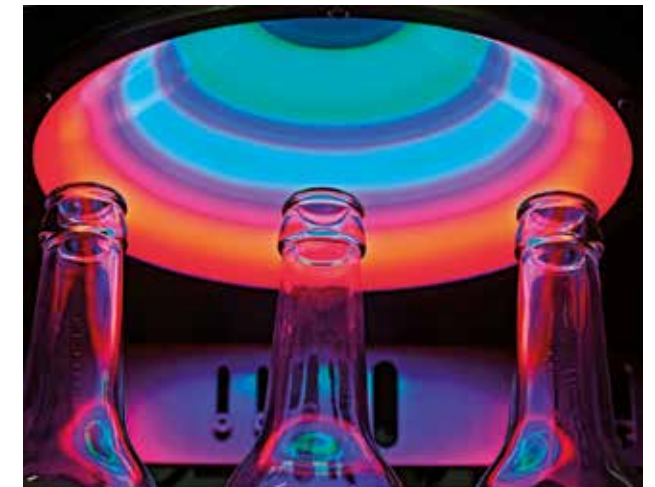
2.2 Sealing surface inspection RGB

Function

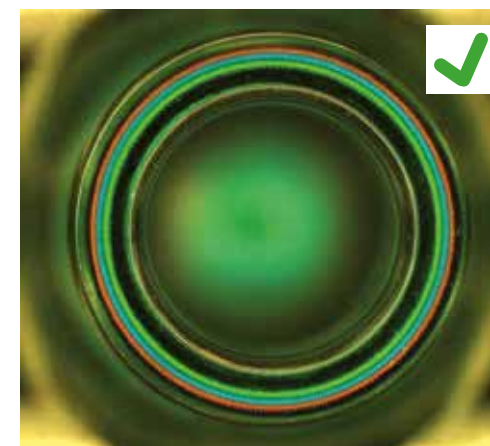
- For the improved detection of damage, especially at the outer edges of the sealing surface
- Detects, for example, bursts and dirt on the sealing surface / thread
- For glass and PET

Technology

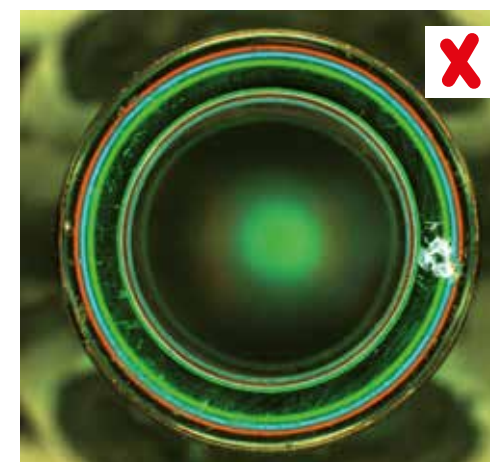
- Three lighting zones with three LED colour lighting rings RED / GREEN / BLUE at different illumination angles
- Colour camera with spectral filter



The LED colour lighting ring in operation



Bottle finish recorded from above with ring-shaped RGB lighting for the improved detection of chips



Chip on the sealing surface



Glass: chip on the sealing surface



Glass: chip on the sealing surface

2 miho David 2 | Basic machine

2.3 Base inspection

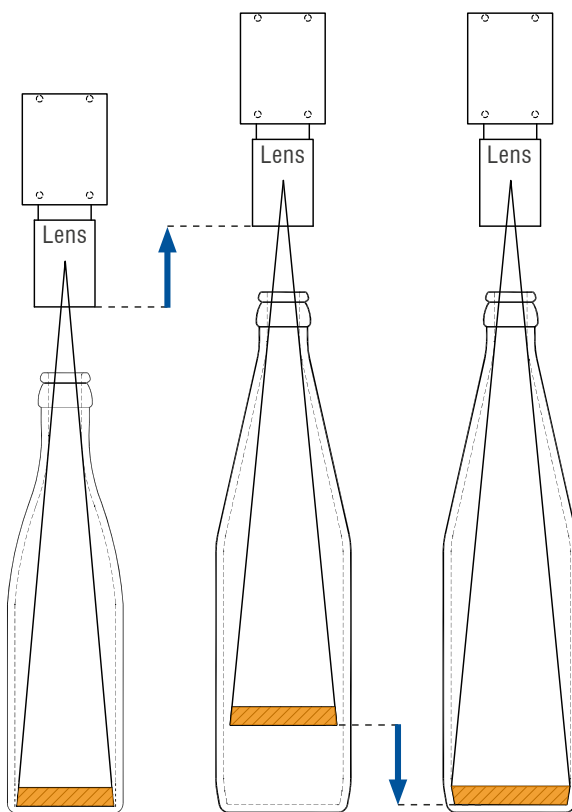
Function

- Detection of:
- Chipping, contamination, inclusions, damage
 - Foreign objects
 - Foil remains

Technology

- LED lighting unit below, circular pole filter, camera above
- Variofocus: automatic focal tracking for change of bottle type

Variofocus principle:



Left: small bottle with correct adjustment of the focus at the bottle base (orange) → sharp image

Centre: after changing to the big bottle, the focal point is above the bottle base, without having made any readjustment → blurred image

Right: miho Variofocus adjusts the focal point for the big bottle → sharp image



Glass Fragment



Medicine Blister



Mould

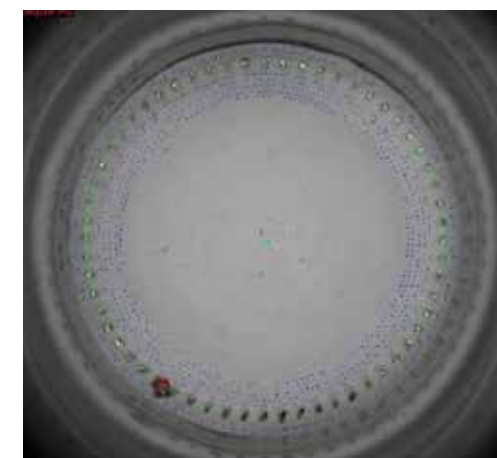
Base inspection also for non-circular bottles

- Configure different base shapes and set up evaluation zones flexibly
- The analysis software miho VIDIOS® now allows for a base inspection even for non-circular bottles without hidden zones
- Particularly interesting for foreign body detection in individual disposable containers



Base inspection also for base embossing

The embossing form is not recognized as an error but any contamination itself in the embossing area will be detected.



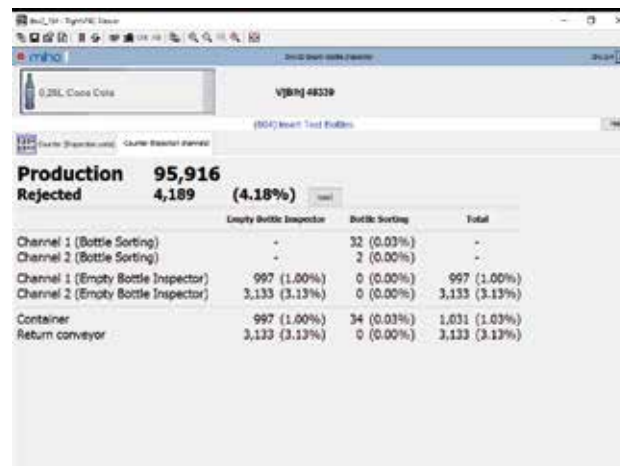
Base inspection of a glass fragment on the knurling marks



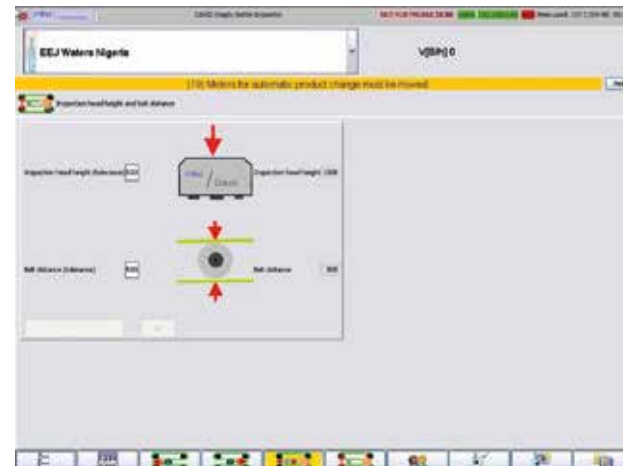
Examples of different bottles with base embossing

2.4 miho VIDIOS®

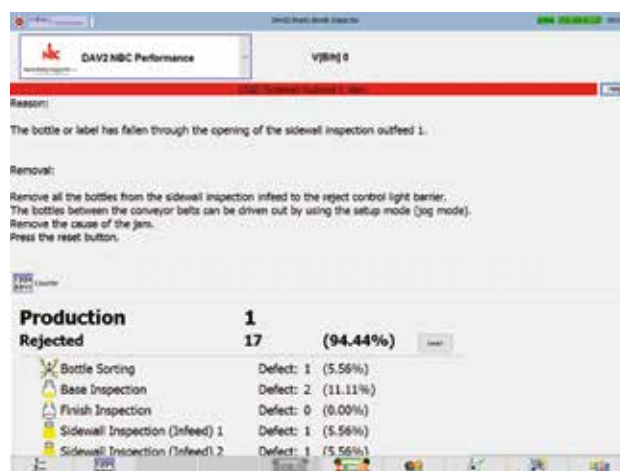
- ✓ Licence-free, because the proprietary software comes directly from miho
- ✓ Intuitive graphic user interface (GUI) in the local language
- ✓ Interactive help
- ✓ Machine diagnosis with clear display of machine status
- ✓ Operating system: Microsoft Windows IoT Enterprise LTSC



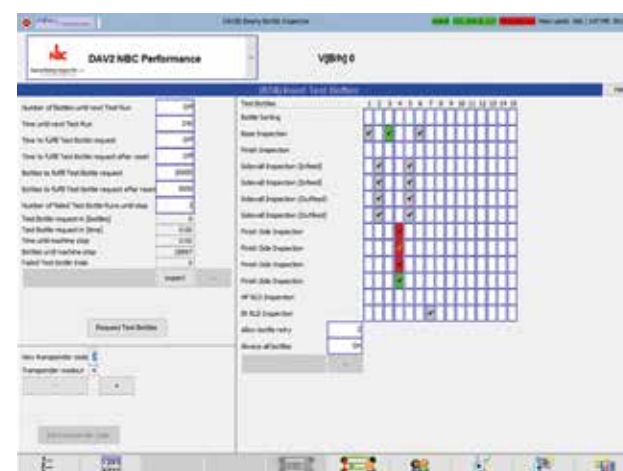
Clear list of reasons for rejection



Icon-based user guide when changing types



Help function in case of malfunction



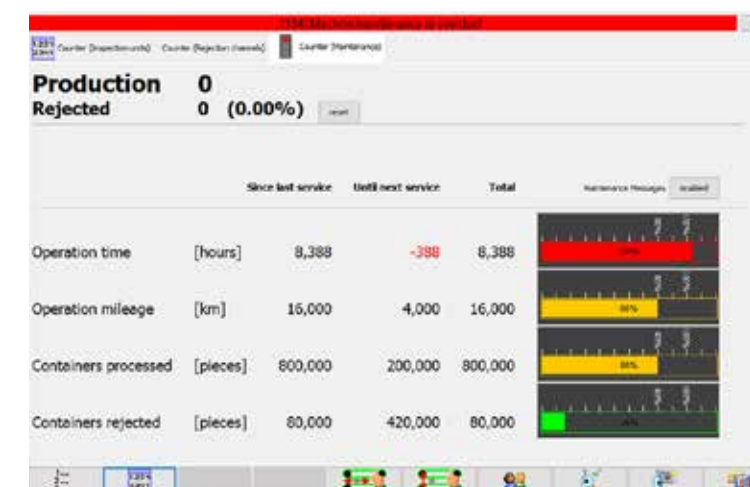
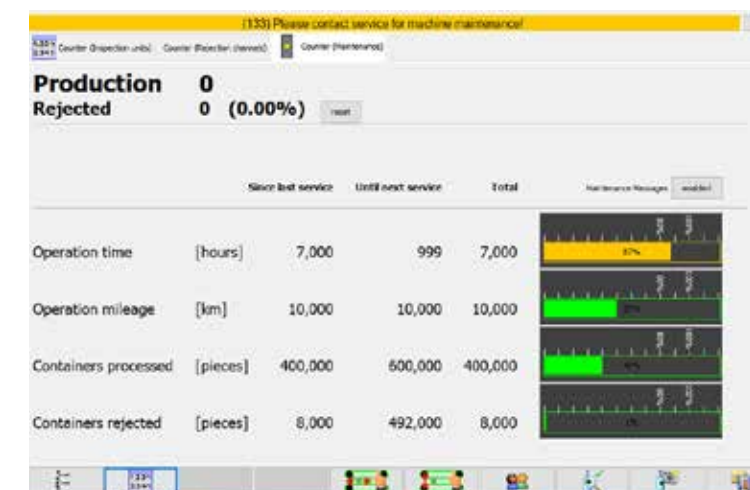
Clear presentation of the test bottle run result

2.5 Service counter

- ✓ Runtime and performance-dependent maintenance request
- ✓ Flexible system-specific execution of the required maintenance work
- ✓ Planning based on real-time interval display with warning messages

Real-time display of the current operating status for planning upcoming maintenance or service work. The display shows, customised to suit your system performance:

- Operating hours
- Distance travelled by the conveyors through the inspection machine
- Number of containers run in and inspected
- Number of containers rejected as faulty



The status displays are optional in miho VIDIOS® Vers. 1.7.61 or higher (from serial number 193).

3 miho David 2 | Additional modules / options

3.1 Chipped Base Detection (CBD)

Function

For an improved detection of chips at the outer rim of the bottle base, as an extension of the base inspection in the basic machine. Base chips at the outer rim of the bottle base affect

- The pressure resistance
- The stability, especially in slim and tall bottles

Technology

- High resolution camera technology
- Energy-saving, variable and maintenance free
- high power LED lighting
- Automatic centering of the container base image
- Freely adjustable monitoring of consecutive rejects

3.2 Inner sidewall inspection

Function

To detect three-dimensional dirt on the inner side wall, which is, for example, obscured by ACL labels or glass embossing. Restriction of the viewing angle is dependent on the bottle shape.

Technology

Lighting by a maintenance-free LED lighting unit from below, camera-based detection above the bottle.

3.3 Standard thread inspection

Function

To detect damaged thread dials in screw cap bottles (MCA), with camera technology and maintenance-free LED lighting unit.

Technology

Lighting unit and camera above the bottle finish, special mirror arrangement for inspecting from the side (incident light or reflection method).



CBD: Examples for chipped outer base

3.4 Extension of visual angle of inspection

Function

Extension of visual angle of the base inspection for improved inspection of longneck and / or swing top bottles.

3.5 Additional UV filter detection

Function

For the detection of clear glass bottles with or without UV coating and following rejection as a part of the Empty Bottle Inspection Machine miho David 2.

Technology

- Fluorescence method with camera based inspection
- Additional module, as extension of a sidewall inspection module

3.6 Automatic adjustment when changing the bottle type

Function

Automatic adjustment of inspection head height and the belt width when the operator changes the bottle type on the touch screen of the inspector.

Technology

Adjustment via servomotors, all parameters of that setting are stored under miho VIDIOS® according to type.

3.7 Drip trays

Function

Drip trays for the empty bottle inspector miho David 2 for systems with particularly high consumption of belt lubricant. Drip trays in the infeed and outfeed area of the empty bottle inspector.

Technology

- Drip trays made out of stainless steel
- Easy to disassemble and clean
- Central drain in the infeed and outfeed areas
- Easy to upgrade

3.8 Low voltage protection

Function

Equipment of the empty bottle inspector with integrated uninterruptible power supply (UPS) for controlled shutdown in case of mains interruption or a power failure.

Technology

- The fuse is integrated in the electronic housing of the basic machine
- Uninterruptible power supply with IQ Technology 1AC / 1AC / 500 VA

3.9 Additional "Reject table full" detection

Function

For monitoring the filling level of a reject table. The signal is transmitted to the assigned miho control unit in the form of a digital signal.

Technology

- Sensor with holder and mounting material (ultrasonic, light barrier or jam switch)
- Cable and installation material

3 miho David 2 | Additional modules / options

3.10 Separate PC for PDAS miho AWeS

Function

- Separate PC system incl. monitor for operation with the production data acquisition software miho AWeS
- Also enables the integration of additional miho machines
- Also available as an option to set up the remote maintenance connection.

Technology

- Min. Intel Core i5, Min. 8 GB RAM, Min. 250GB SSD, Min. 2x PCIe Steckplatz, Min. 2x Ethernet (RJ45), Min. DP/HDMI
- screen resolution min. 1400x1050 pixels
- operating system Microsoft Windows 11 Pro, german or english

3.12 Separate AWeS viewer

Function

Remote visualization of the operating status of the empty bottle inspector on a separate computer, for example, in the foreman's office

Technology

Installation of a separate viewer, for example, on a separate miho AWeS computer from miho; network connection is necessary. Requirements in accordance with miho IT-regulations

3.13 Additional safety mechanism

Function

- Checking whether the operator is carrying out work instructions
- If the work instruction has not been carried out or not enough bottles have been removed from the conveyor, the machine automatically initiates a machine and conveyor stop
- The machine stop can no longer be cancelled by the operator by pressing the acknowledge button
- To cancel the error message, the production manager with the appropriate user level is required, for example

3.14 Individual wire marking

Function

- Individual wire marking in accordance with section 13.2.1 of DIN EN 60204-1 for the empty bottle inspection machine miho David 2 including documentation in the E-plan
- Identification is ensured by applying the connection designation of the relevant equipment

3.11 Safety cabinet

Function

- Improved interference protection for the belt system
- Operator protection from glass splinters and chemical exposure
- Extended protection of bottles inside the inspection machine from contamination by surrounding machines or conveyors (lubrication, aerosol, splinters coming from machines like mixer, filler, buffer conveyors)
- Improved protection of inspected bottles from manipulation by operators
- Improved protection from light disturbances through optional use of tinted polycarbonate panels
- Improved sound protection

Technology

- 2 large safety doors at the front side
- Monitoring by contact-free and safe from manipulation safety switches, integrated in the ASI-bus safety system of the machine
- Fixed side and rear panels
- Material: Stainless steel / Polycarbonate



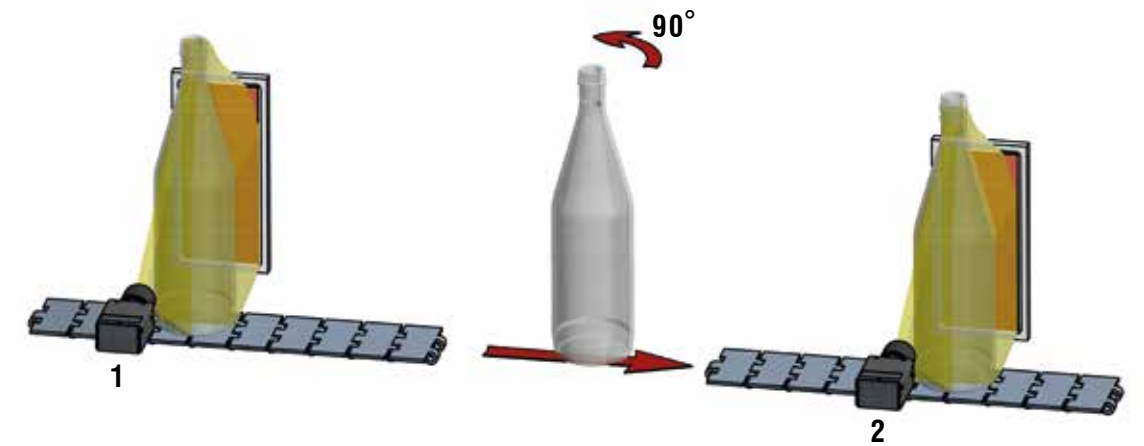
miho David 2 with safety cover



Circuit board test by a miho technician

Standard sidewall inspection

- 2 high-resolution cameras
- 360° Inspection
- Foil detection
- Meets the basic requirement of a modern full inspection

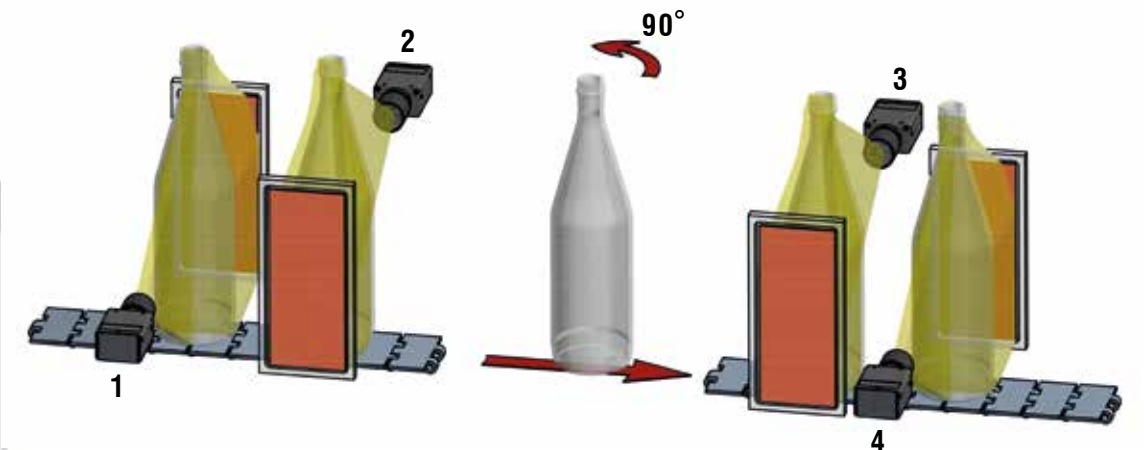


Dual sidewall inspection with miho OpAL

- 4 high-resolution cameras
- 360° inspection: fault at least once on the side facing the camera
- miho OpAL-Technology
- Foil detection

Consider for:

- Semi-transparent contaminants
- Bottles with ACL labels
- Bottles with relief or embossing
- Bügelflaschen

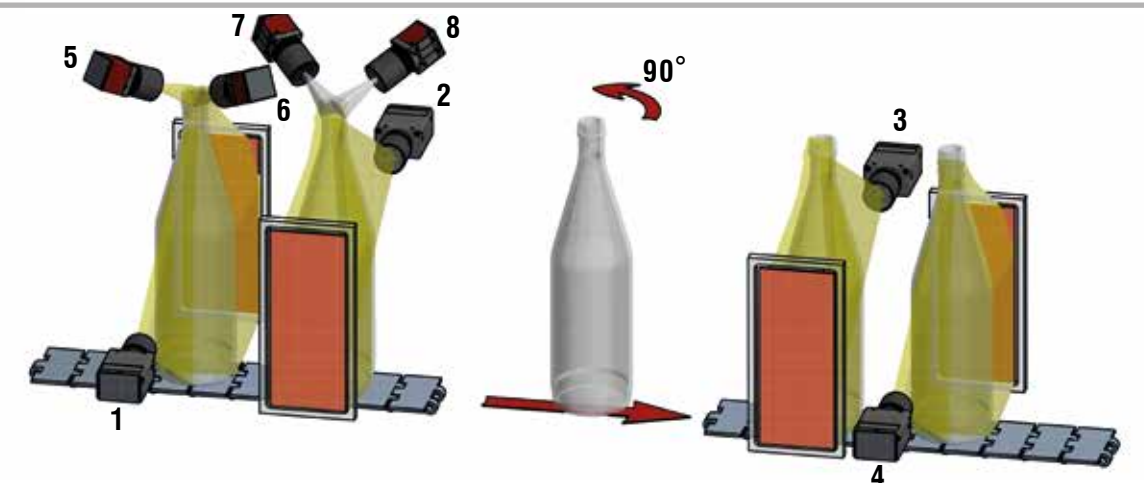


Dual sidewall inspection with finish side inspection miho FSI

- 4 additional high-resolution cameras
- 360° inspection: fault at least once on the side facing the camera
- Unique transmitted light method

Consider for

- Threaded bottles: MCA, Twist-Off, Twist-Crown, etc.
- Bottles with finish side damage and contamination
- Bottles with finish cracks without sealing surface damage
- Screw top bottles: inspection from beginning to end, from below and from above
- Damaged or dirty flanged edges
- Wide-neck container, such as jam jars, fruit juice bottles, etc.



4 miho David 2 | Dual sidewall inspection

Why dual sidewall inspection with miho-OpAL-Technologie

Improved sidewall inspection: glass

- contamination and damage of the sidewall, inclusions, ...
- bottles with embossing and ACL labels, no masking out of the permanent areas anymore
- swing top bottle inspection: no masking out of bracket area

Improved sidewall inspection: PET

- labelling with permanent markers
- misted-up bottles / droplet formation
- semi-transparent contamination

4.1 Dual sidewall inspection with miho OpAL

Function

- Two modules (infeed and outfeed of the empty bottle inspector) for significantly improved detection of contamination, foil residues and damage to the outer and inner sidewall of the bottle, using a total of four cameras. This ensures that all areas of the bottle are recorded at least once directly from the front by one of the cameras
- Two images per camera through mirror cabinet. Includes circular polarising filter for detecting film adhering to the inside of glass bottles
- Especially suitable for bottles with relief structures, embossing, swing top bottles or permanent ACL labels
- Defects that are difficult to detect, such as semi-transparent dirt, conchoidal fractures, or inclusions can be inspected
- **OpAL**- algorithm: no concealed areas that are completely masked out by ACL or embossing anymore



Shell chipping in decorative area

Contamination in the bracket

Chipping

miho OpAL

(Optimized Area Localisation) is an innovative development of the image analysis software miho VIDIOS®, used in the dual sidewall inspection. From now on, objects such as ACLs, embossing, shadows of bottle reliefs or parts of a swing top closure are recognized as such and no longer lead to false rejects. The **entire** sidewall of the bottle is inspected from now on!

Advanced inspection by miho OpAL:

Without miho OpAL

Bracket area:
masked out

Embossing:
limited inspection

ACL:
masked out

Semi-transparent fault:
limited inspection

With miho OpAL

Bracket area:
inspection ✓

Embossing:
inspection ✓

ACL Labels:
inspection ✓

Semi-transparent fault:
inspection ✓

4.2 Standard sidewall inspection

Function

Two modules (infeed and outfeed of the empty bottle inspector) for the detection of contamination, foil residues and damage to the outer and inner sidewall of the bottle, using a total of **two** cameras.

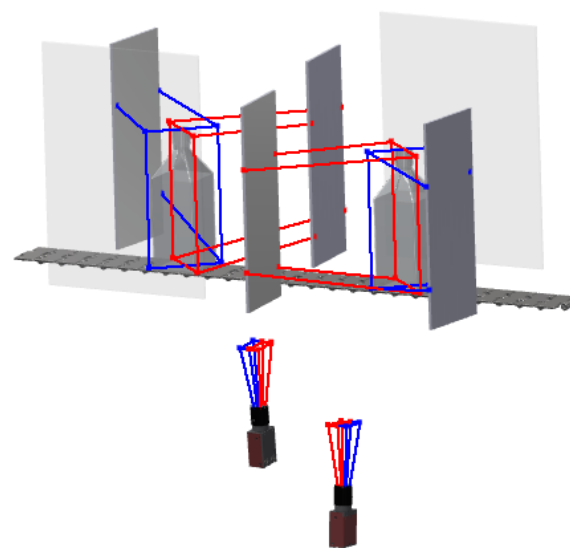
4 miho David 2 | Dual sidewall inspection

- ✓ 45° viewing angle for dual sidewall inspection
- ✓ For very oval or angular containers
- ✓ No rotation of the container necessary

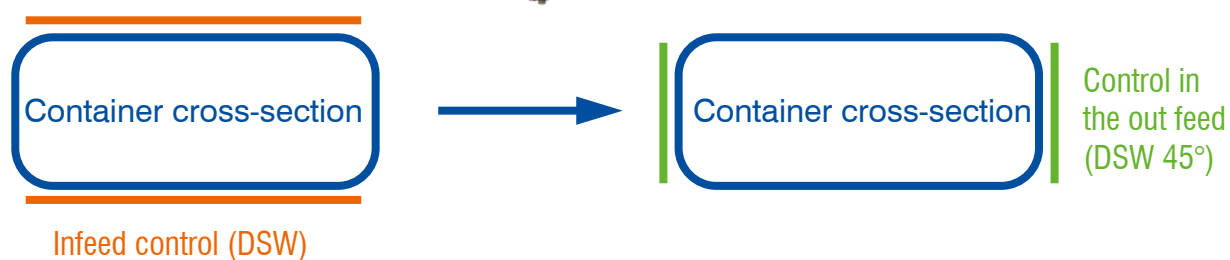
4.3 Extension module dual sidewall inspection 45°

Funktion

- Two 45° side wall inspections at the out feed with which the remaining side walls of the containers are inspected
- The 45° side wall module, specially developed for the inspection of angular containers, enables an unrestricted 360° inspection even with very oval and angular containers
- The 45° viewing angle of the side wall module at the out feed enables the inspection of side wall areas that could not be inspected in the previous side wall module without turning the bottle



Schematic diagram of DSW 45°

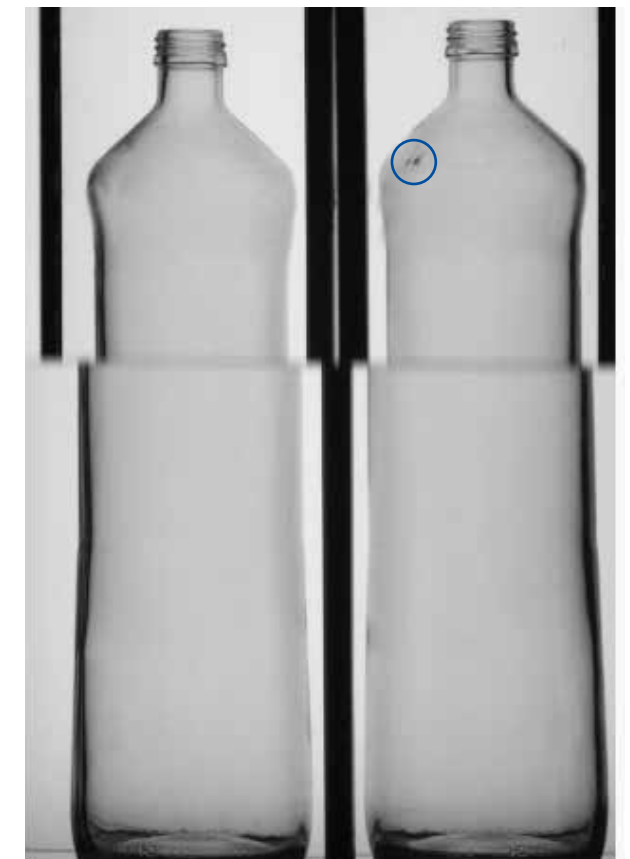


- ✓ Additional vertical viewing angle for side wall inspection
- ✓ For containers with a particularly flat shoulder shape
- ✓ Four additional images are generated and analysed using a mirror system

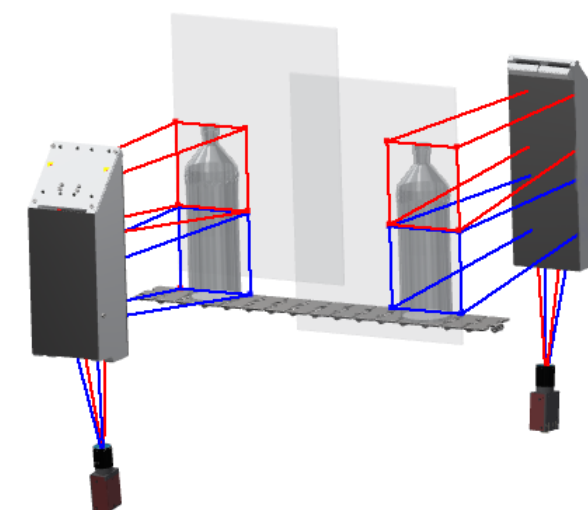
4.4 Extension module with additional vertical viewing angle

Funktion

- An additional vertical viewing angle reduces optical effects that lead to shadows forming on the container shoulder
- Improved inspection performance with reduced false rejection in the area of particularly flat container shoulders
- A total of four additional images of each container are evaluated via a mirror system
- Includes circular polarising filter for detecting film adhering to the inside of glass containers
- Especially suitable for containers with flat shoulder shapes
- Defects that are difficult to detect, such as semi-transparent defects, shell break-outs or inclusions, can be reliably inspected even with flat shoulder shapes



Optimised beam path: minimal shadowing in the shoulder area. This means that even the smallest defects are recognised in flat areas



Schematic illustration of one of the side panel modules with the additional vertical image division

miho **Finish Side Inspection (FSI)**, an upgrade of the dual sidewall inspection, allows for the complete inspection of the side finish and thread:

- ✓ Dirt and damage
- ✓ Rust ring detection
- ✓ Cracks
- ✓ Inspection regardless of the thread form
- ✓ No false rejection of refunded new bottles

4.5 miho Finish Side Inspection (FSI)

Function

- Detection and visual display (360°) of damaged and incorrectly manufactured threads for screw cap bottles
- Detection of contamination and damage in the area of the side finish (for example, glass defects, glass cracks, rust rings, underchip damage, chipping)
- Inspection regardless of the thread design:
 - segmented thread: twist off, vent slot
 - fault at the thread start / end
 - roughness of the thread is examined
 - contamination of the thread dial
 - no false rejection of refunded new bottles anymore
 - **full inspection of the thread dial: from beginning to end, from below and from above**

Technology

- As with the dual sidewall inspection
- An additional four cameras in the infeed module to ensure a full 360° view (transmitted light process)
- Automatic adjustment of camera positions when changing bottle type



Twist-Off: Thread defect

MCA: Damaged thread



MCA: Dirt in the threaded area

MCA: Rough thread

Twist-Crown:
Chipping at the flanged edge



Twist-Crown:
Thread defect

Twist-Crown:
Vertical Split



miho FSI schematic view:
the cameras look down at an angle from above into the finish

4.6 FSI-Upgrade flanged edge inspection

Funktion

As 3.3, additional detection of chipping at the flanged edge, for example with MCA threaded screw-top bottles. The following is detected:

- Chipping/bursts in the area of the flanged edge
- Friction rings below the flanged edge

MCA:
Chipping at the
flanged edge



4.7 Blowing device (glass bottles)

Function

For the removal of adherent water or foam residues in the area of the thread dial, in order to ensure a proper inspection

Technology

Blowing device before the empty bottle inspector, compressed air supply, optionally with sterile air filter, including control system and solenoid valve



Crown corks: Underchip defect

Crown corks: Vertical Split

4 miho David 2 | Sidewall inspection

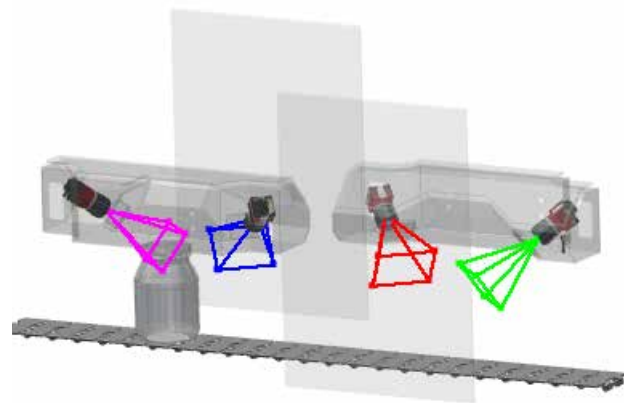
miho **Finish Side Inspection 2 (FSI 2)**, especially for the inspection of large **finish diameters up to 75 mm**:

- ✓ Contamination and damage
- ✓ Cracks
- ✓ Inspection independent of the thread form
- ✓ Both for disposable and reusable

4.8 miho Finish Side Inspection 2 (FSI 2)

Function

- Detection and visualisation (360°) of damaged and faulty threads on screw-cap bottles
- Up to 75 mm finish diameter thanks to innovative optics



FSI 2 Finish side inspection of a wide-mouth jar



5 Configuration miho David 2



Basic machine with dual side wall

Basic machine with standard side wall



Basic machine



The three modules for the comprehensive swing top bottle inspection in front of the filler in **one** machine.

- ✓ Dual sidewall inspection (DSW)
- ✓ Finish side inspection (FSI)
- ✓ Clapper inspection

6.1 Dual sidewall inspection with miho FSI for swing top bottles

Function

Detects amongst other things:

- Contamination
- Adhesive labels
- Missing bracket parts
- Missing clapper
- Vertical Splits
- Bracket assembly faulty

6.2 Additional residual liquid detection

Function

Detection above the bottle base. To detect residual liquid in transparent bottles in front of the Empty Bottle Inspection Machine.

6.1 Adptation Basic machine for swing top bottles

Function

Modification to the design of the centre section of the empty bottle inspection machine for improved handling of bottles with swing tops:

- More precise triggering of the bottle
- Avoidance of collision with protruding swing-top closures
- Enlarged adjustment range in relation to bottle height

Examples for use:



Bracket is missing



Bracket mounted the wrong way round

Bracket mounted the wrong way round



Vertical Split in the finish area

6.4 Additional modul miho clapper inspection

Function

The following is inspected:

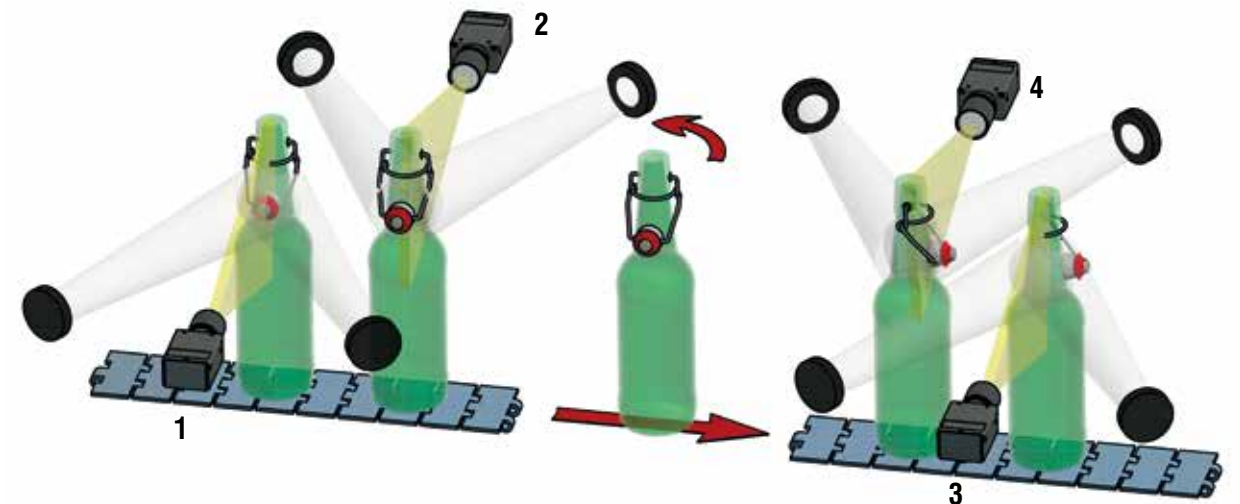
- Presence of the sealing rubber
- Colour of the rubber seal (colour and fading)
- Presence of the clapper
- Clapper: colour

Depending on the orientation of the clapper (the rubber seal must point to the camera):

- Dirt of the rubber seal, for example, mould
- Damage to the rubber seal, for example, missing material
- Damage to the pin, for example, bursts

The presence and colour of the rubber seal will be detected from every position of the clapper.

Additional module for the dual sidewall inspection with one module each in the infeed and outfeed of the empty bottle inspector. 2 colour cameras both in the infeed and outfeed module:



Clapper colour



Mould on the rubber seal



Rubber seal presence



Pins damaged



Curved rubber seal



Rubber seal: colour and fading



Incorrectly mounted

Detection of typical faults in PET-returnable bottles:

- ✓ Scuffing
- ✓ Stress cracks
- ✓ Damaged or dirty vent slots and segment threads
- ✓ Faulty support rings
- ✓ Deformed bottle bases
- ✓ Correlation of the stress crack pattern and the likely later leakage of the bottle



Abrasion through faulty neck ring guide



Stress cracks



Burst at the support ring



Scuffing



Damage in the threaded area



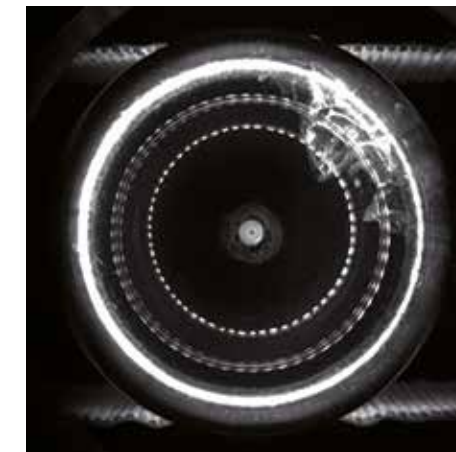
Damage to the thread



Cracks in the finish area



PET bottle: stress cracks, resulting in leakage



PET bottle: cigarette foil

For blowing off PET bottles:
miho Bottle Dryer



7.1 miho Bottle Dryer

Function

Fast and thorough drying of the throat or neck ring especially for PET bottles to guarantee a flawless inspection of these areas. The containers will be guided with two driven special belts, running synchronized with the conveyor speed. Adjustable nozzles and controlled airflow achieve an optimized drying result.

The belt system can be easily adjusted for different bottle diameters by using a handwheel. The regulated 4kW high performance ventilator with HEPA filter system generates the needed airflow.

Technology

- Stainless steel housing
- Drive control unit
- Robust, long life time and easy cleaning substructure
- Guide belts with reduced abrasion and quick fastening
- High performance blower and HEPA-filter (class 7)

8.1 Production data acquisition system miho AWeS

Function

- Visualization and logging of:
 - Counters
 - Operating status
 - Warning and error messages
 - Test bottle runs
- Measures to correct faults after an unsuccessful test bottle run
- User registrations
- To monitor single or multiple miho machines, such as the empty bottle inspector miho David 2, the inspection of a fully equipped bottle by the miho Allround, the fill level inspection miho Newton Optics 2, ...
- Export of data in pdf or xls format for further processing
- Backing up data in case of network failure - no data is lost.

Technology

- Polling the production data in accordance with the Weihenstephan standard, allowing easy integration into a PDAS
- Either installation into the network on a virtual machine or on a separate PDAS computer from miho

Production Data	Rejection causes	Sorting (1)	Sorting (2)	Machine Data	Logging
By inspection unit					
Base (1)	336	(0.19 %)	*	Base	
Base (2)				Finish	
Finish (1)	1032	(0.57 %)	*	Side wall	
Finish (2)				Thread	
Finish (3)				Finish side wall	
Side wall in (1)	154	(0.09 %)	*		
Side wall in (2)	168	(0.09 %)	*		
Side wall out (1)	212	(0.12 %)	*		
Side wall out (2)	249	(0.14 %)	*		
Thread (1)					
Thread (2)					
PET-Scuffing					
Sorting	39	(0.02 %)	*		
High Frequency (HF)	6	(0.00 %)	*		
Infrared (IR)	8	(0.00 %)	*		
Chipped base					
Inner side wall					
Finish side wall (1)	285	(0.16 %)	*		
Finish side wall (2)	414	(0.23 %)	*		
Finish side wall (3)	311	(0.17 %)	*		
Finish side wall (4)	306	(0.17 %)	*		
Sorting (HF)					
Sorting (IR)					
By fault					
				Wrong bottle type	37 (0.02 %)
				Bottle too high	
				Bottle too low	
				Wrong coloured bottle	
				Defective opening	2236 (1.24 %)
				Defective bottom	336 (0.19 %)
				Scuffing	
				Closed bottle	
				Foreign object	
				Side wall fault	485 (0.27 %)
				Residual liquid in the bottle	10 (0.01 %)
				Underchip fault	0 (0.00 %)
				Other faults	75 (0.04 %)
				Broken bottle	2 (0.00 %)
				Lying bottle	0 (0.00 %)

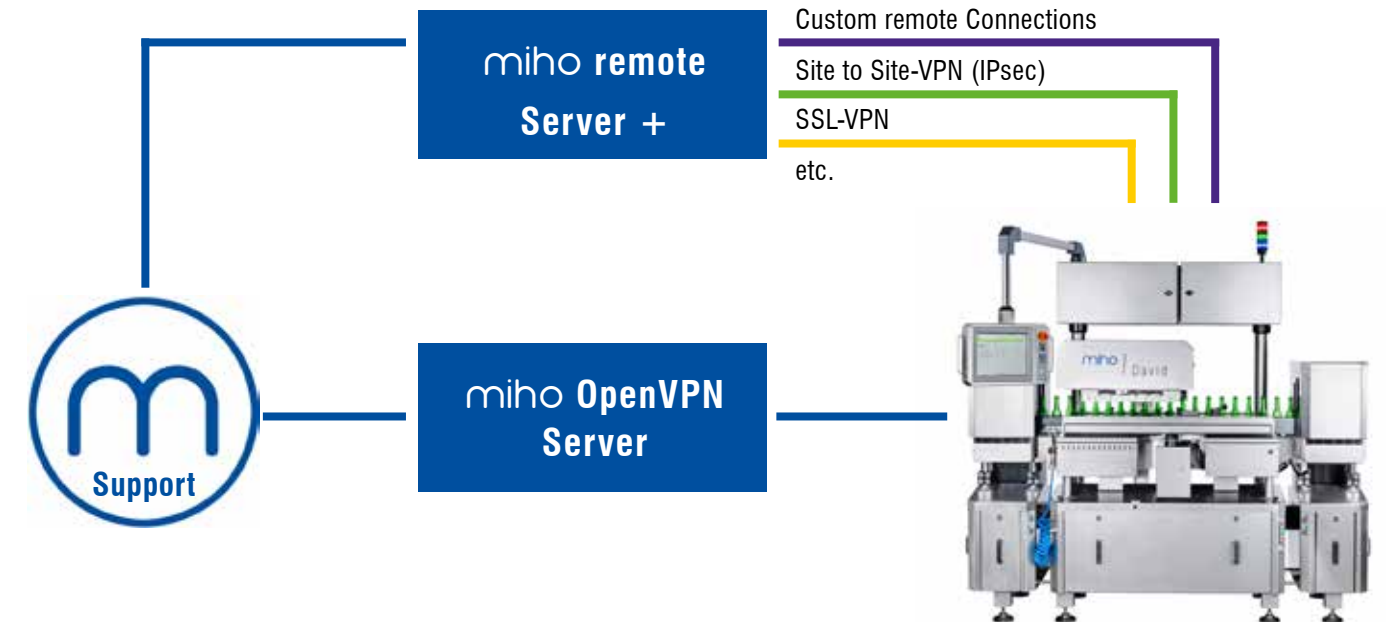
Screenshot miho AWeS user interface:

Statistical analysis of the inspection modules and causes of rejection

Date	Time	Message	Value
2017-01-12	02:06	Successful testbottle run (at count reading ...)	28831
2017-01-12	04:19	Request for testbottles activated. (at count reading ...)	58161
2017-01-12	04:22	Successful testbottle run (at count reading ...)	62091
2017-01-12	06:06	Request for testbottles activated. (at count reading ...)	14253
2017-01-12	06:10	Successful testbottle run (at count reading ...)	16077
2017-01-12	09:01	Request for testbottles activated. (at count reading ...)	49536
2017-01-12	09:15	Successful testbottle run (at count reading ...)	48057
2017-01-12	10:59	Request for testbottles activated. (at count reading ...)	77162
2017-01-12	11:04	Successful testbottle run (at count reading ...)	78537
2017-01-12	12:23	Request for testbottles activated. (at count reading ...)	107822
2017-01-12	12:29	Successful testbottle run (at count reading ...)	110367
2017-01-12	14:36	Request for testbottles activated. (at count reading ...)	14214
2017-01-12	14:38	Successful testbottle run (at count reading ...)	15533
2017-01-12	16:00	Request for testbottles activated. (at count reading ...)	44856
2017-01-12	16:01	Successful testbottle run (at count reading ...)	45295
2017-01-12	17:52	Request for testbottles activated. (at count reading ...)	74537
2017-01-12	17:53	Successful testbottle run (at count reading ...)	75030
2017-01-12	19:52	Request for testbottles activated. (at count reading ...)	104000
2017-01-12	20:06	Not successful testbottle run (at count reading ...)	108871
2017-01-12	20:06	Request for testbottles activated (repeated trial). (at count reading ...)	108899
2017-01-12	20:07	Successful testbottle run (at count reading ...)	109197
2017-01-12	21:40	Request for testbottles activated. (at count reading ...)	9639
2017-01-12	21:41	Successful testbottle run (at count reading ...)	10293
2017-01-12	23:12	Request for testbottles activated. (at count reading ...)	39497
2017-01-12	23:13	Successful testbottle run (at count reading ...)	40136

Screenshot miho AWeS user interface:

Example of a successful test bottle run



8.2 miho OpenVPN Server

Function

Software package for remote visualization of the operating status, the parameters and images on an authorized computer of a miho service engineer: monitoring of counters and disruptions, checking and operating the inspection systems, new input and optimization of inspection parameters, accurate and quick analysis of faults.

Technology

- Internet access with data transfer of at least DSL standard
- **OpenVPN**, a globally recognized tool for establishing a virtual private network via an encrypted TLS connection, or alternatively with TeamViewer (licence supplied by the customer)

8.3 miho Remote Server +

Function

If the customer requires a remote maintenance solution other than 'miho OpenVPN', this can be realised individually.

The advantages of this solution

„miho Remote Server+“ are:

- The remote maintenance solution is customised and adapted to your company and your IT requirements
- Your individual security requirements for remote maintenance are met
- Up-to-date and secure
- Installation included

Technology

- Site to Site VPN (IPsec)
- SSL-VPN
- The specific solution must be individually agreed between the customer's IT department and miho Inspektionssysteme before the order is placed

General features of the infeed control:

Machine protection for

- too high, too low or lying bottles
- broken shards of glass

Bottle sorting

- shape, colour, height
- secondary characteristics such as embossing, ACL labels

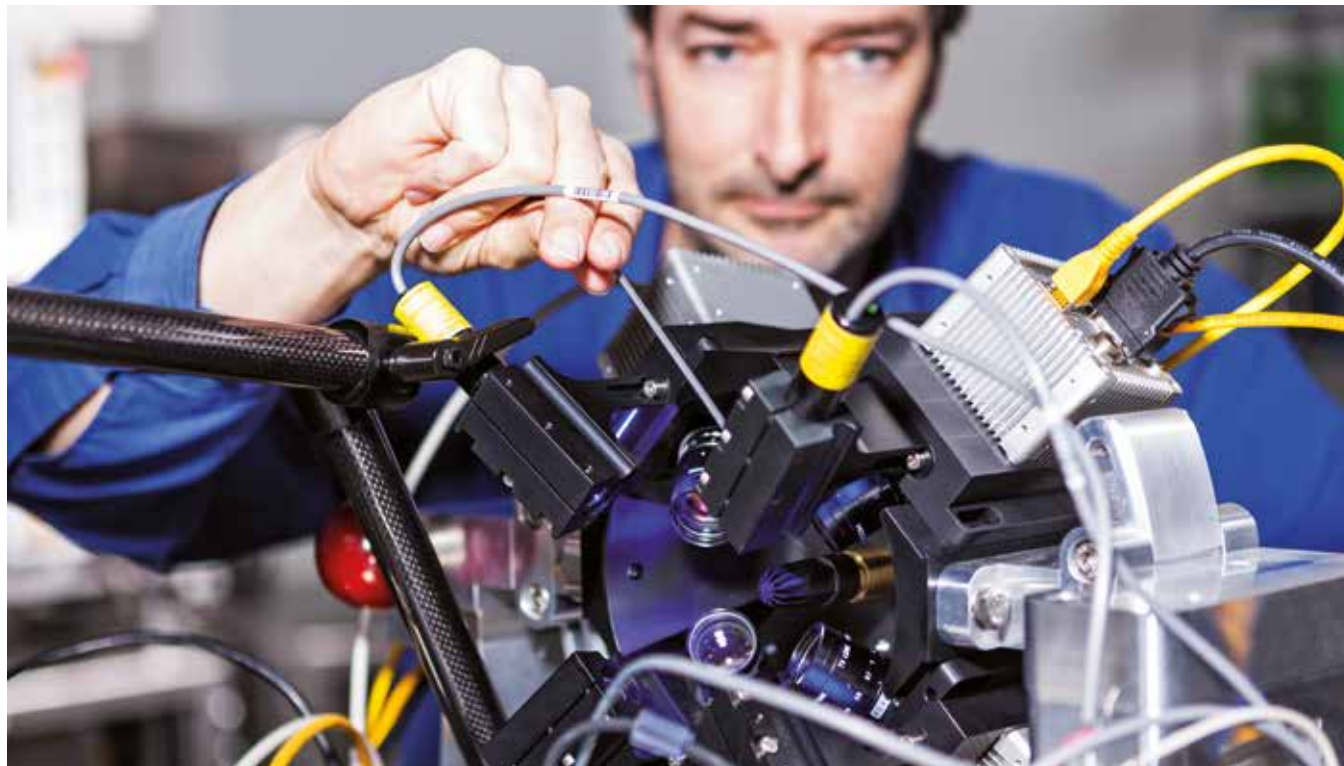
9.1 Infeed control miho Unicon 4

Function

- Infeed control before the empty bottle inspector for broken bottles, lying bottles and bottle height

Technology

- Light barrier technology
- Control and reject monitoring by the empty bottle inspector



A miho development engineer at the evaluation of a prototype board test by a miho technician

9.2 Infeed control miho Multicon 4

Function

- Camera-based system for detecting and sorting bottles made of glass or PET or other containers according to differences in shape, colour and size
- In addition, lying bottles or broken bottles can be recognised and rejected
- Bottles can also be recognised and evaluated using secondary features such as embossing, ACL or the degree of scuffing of the bottle. Testing of sample bottles is required

Technology

- miho VIDIOS® image processing system and the latest colour camera system, innovative lighting concept
- Rejection according to different sorting criteria into different rejection channels possible
- Glass-PET differentiation optionally possible
- Control and rejection monitoring via the empty bottle inspection machine



10 Bottle sorting system

miho Multicon 4 – Sorting of glass or PET bottles or other containers

- ✓ Shape and Size differences
- ✓ Colour
- ✓ Embossing, ACL
- ✓ Scuffing (-grad)
- ✓ Glass or PET
- ✓ Sorting in up to 8 channels



11 Reject systems

miho Reject systems – four systems for different requirements:

- ✓ The appropriate reject system, depending on the function and requirement
- ✓ All reject systems including reject monitoring
- ✓ Central control system through the empty bottle inspector

11.1 Reject system miho HSP

Function

- To reject the faulty bottle via a pneumatic pusher
- Including reject monitoring in the empty bottle inspector

11.2 Multi-reject system miho HSPM

Function

- Universal use in glass and plastic bottles, as well as in cans or carton packaging, empty or filled
- up to 60,000 containers per hour
- different container shapes and weights are compensated thanks to the servo-control of the linear drive and have no influence on the motion sequence of the reject block
- the reject process is individually configured for different container types and optimized for the respective container type

Technology

- The reject block of the miho HSPM is driven by an optimized high speed linear servomotor
- Parameterization and operation integrated in upstream inspection unit
- Low maintenance and durable
- No compressed air supply necessary
- Including reject monitoring in the empty bottle inspector



miho HSPM:
multiple rejection (red arrows),
depending on the type of bottle defect

11 Reject systems

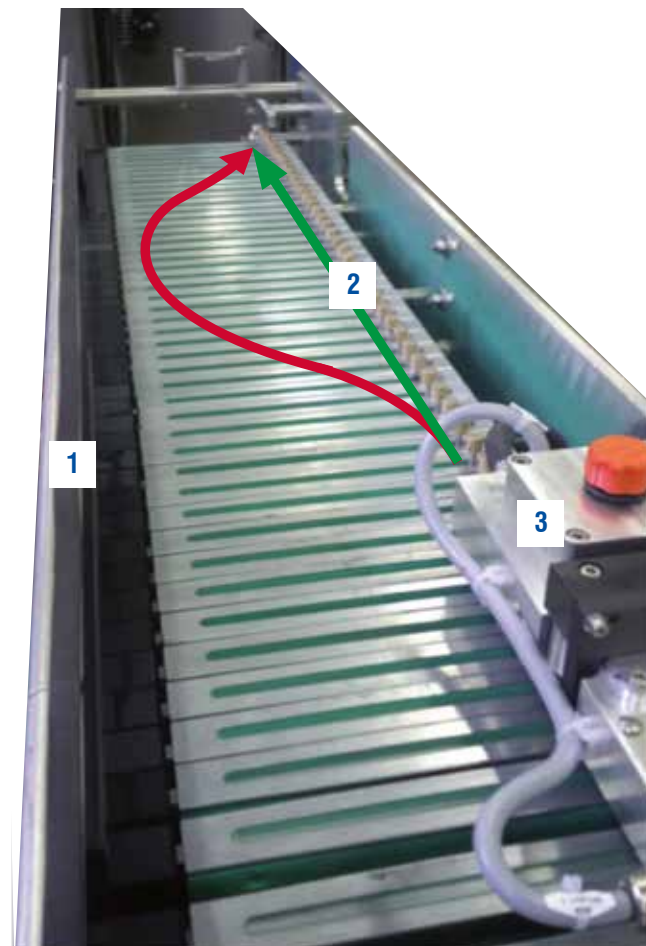
11.3 Segment reject system miho Leonardo M

Function

- Secure standing rejection of bottles, cans and carton packaging, even of difficult bottles in terms of shape and centre of gravity
- Suitable for sorting tasks

Technology

- magneto-mechanical reject system: containers to be rejected are transferred to a parallel conveyor by slide segments which run synchronously and parallel to the conveyor
- gearless drive via toothed belt, thus less mass movement and low-wear
- torque monitoring of the servomotor through slip clutch
- including reject monitoring in the empty bottle inspector



Reject principle:

The mechanical core piece of the **Leonardo M** is the approximately **100 reject slides (1)**, each one being connected to its own private **guide element (2)**. They are all permanently driven parallel to the reject conveyor (**green line**) by a rotating **chain** and synchronously with the belt speed. If a bottle is to be rejected, the **central switching unit (3)** electromagnetically moves two or three of the guide elements in a mathematically calculated **curve (red line)** vertically to the running direction of the conveyor. Thus, by activating the reject slides in this way, the bottle to be rejected is pushed **gently and securely standing** onto the parallel reject conveyor (left reject conveyor, not pictured).

11.4 Segment reject system miho Leonardo SFM

- ✓ Upright rejection on parallel track
- ✓ Elektro-magnetic actuator, no compressed air
- ✓ Compact design

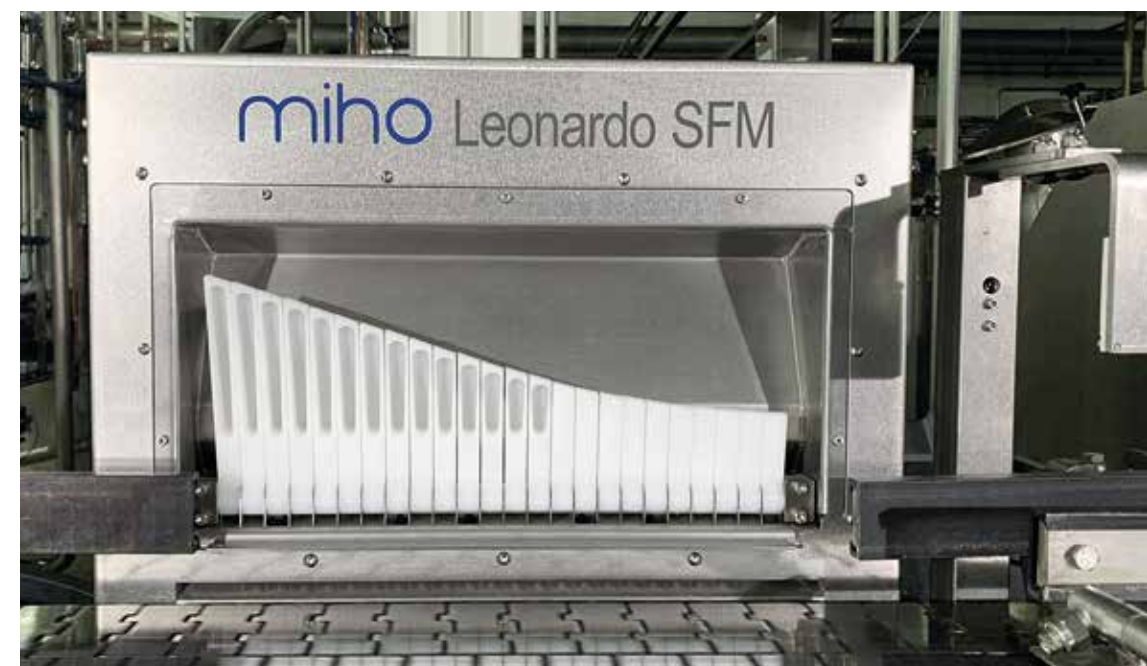
The Multi-Segment Rejector is an ideal system for upright rejection or sorting of empty containers. Thanks to its 24 rejection segments, which fold in and out quickly, faulty and unsuitable containers can be rejected easily without touching the preceding or following containers.

Likewise, distribution of empty and filled containers is possible with this system. Suitable for serial installations, i.e. several rejection systems are arranged one after the other in order to be able to guide containers into several channels.



Function

- For the upright rejection or sorting of cylindrical empty containers, whether bottle or can
- Up to 24 quickly in and outfolding rejection segments, reject faulty and unsuitable containers without touching the containers in front or behind
- Suitable for serial installations, i.e. several reject systems are arranged one behind the other, to be able to divert containers into several channels
- Including reject verification in the empty bottle inspector



12 Conveyor control | Conveyor construction | Container

From a single source:

Empty bottle inspector
miho David 2



Conveyor control
miho Pascal 2



Container transport
miho Conveyance

12.1 Intelligent conveyor control system miho Pascal 2

- ✓ Smoother conveyance, less noise emission
- ✓ Bottle preserving conveyance, less scuffing
- ✓ Multiple monitoring of the conveyor's fill gade
- ✓ Early gap detection in the bottle flow and restoration of throughput without touching the bottles
- ✓ FPGA technology ensures gap detection accurate to the millimetre in real time
- ✓ No locked system: standalone device, not buried in the EBI, makes change of inspection device more convenient and easy
- ✓ Easy and fast Ether-Cat signal wiring
- ✓ No external programming unit or software necessary
- ✓ Up to 128 bottle types with individual parameters
- ✓ Teach-In mode for easier setup of a new bottle type
- ✓ Help and parameter guide on screen
- ✓ Not bound to expensive and custom PLC solutions
- ✓ Up to 16 fully controllable conveyor belt sections are possible
- ✓ Remote visualization

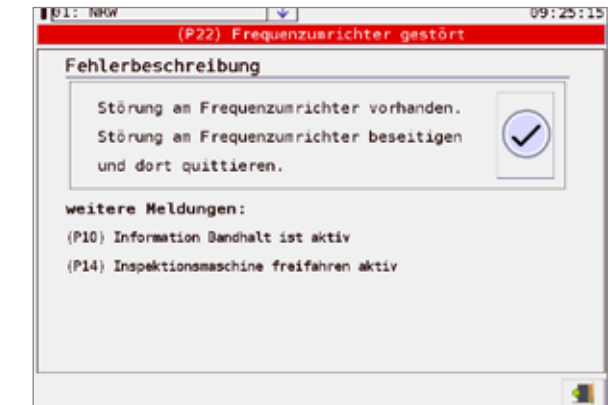


Function

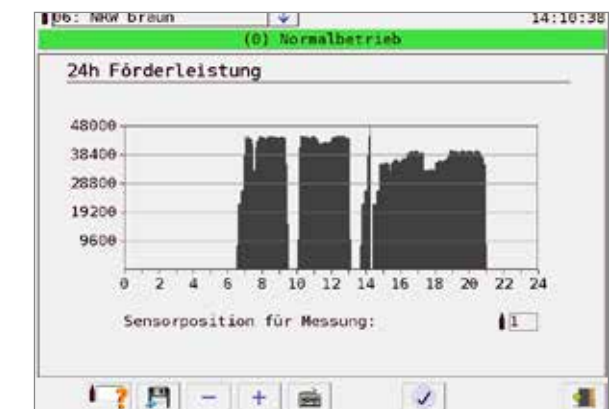
- A solution tailored to the specific requirements of the system
- Electronic processor for controlling the following areas: Single line blocking, Inliner and buffering
- Reducing disruptions by detecting bottle shortages at multiple locations
- Possibility to control a return conveyor after the Empty bottle inspection machine, for example back to the washing machine
- Diagnostic functions like oscilloscope screen and extensive diagnostic of the input and output signals
- External error message with editable text, a separate alarm indicator and individual stop signals for conveyor sections
- Statistical function for visualizing the progress of production output over the course of a day
- Energy-efficient standby function: During the set-up phase and during longer stops, all conveyors are automatically stopped
- Special functions: bypass, infeed worm, conveyor lubrication control, buffer table control, filling-up function and much more

Technology

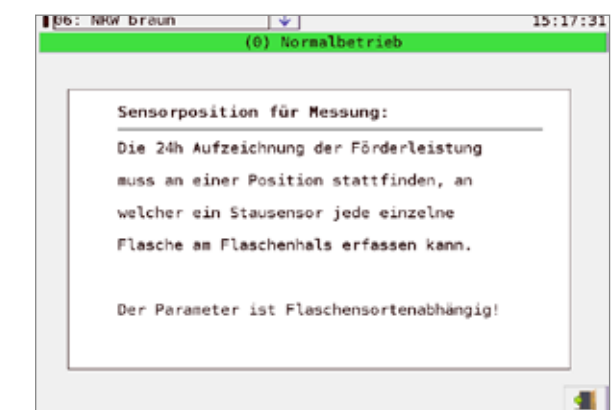
- Standardized FPGA control module in stainless steel case with 10,4" colour display and touch function
- Improved visualization via parameter guides
- Remote-controlled bottle type changeover, requiring no staff intervention
- Multilingual user interface (language selection), role-based password protection
- A three-colour indicator light on the remote control unit to indicate operational status and malfunctions, as well as up to four additional alarm indicators in the system area
- 10 sensor inputs available for detecting any deviating bottle gaps and 8 sensor inputs for the control of buffer conveyors



Error messages on the display with instructions on how to rectify the error



Display of statistics on the conveying capacity of the daily production



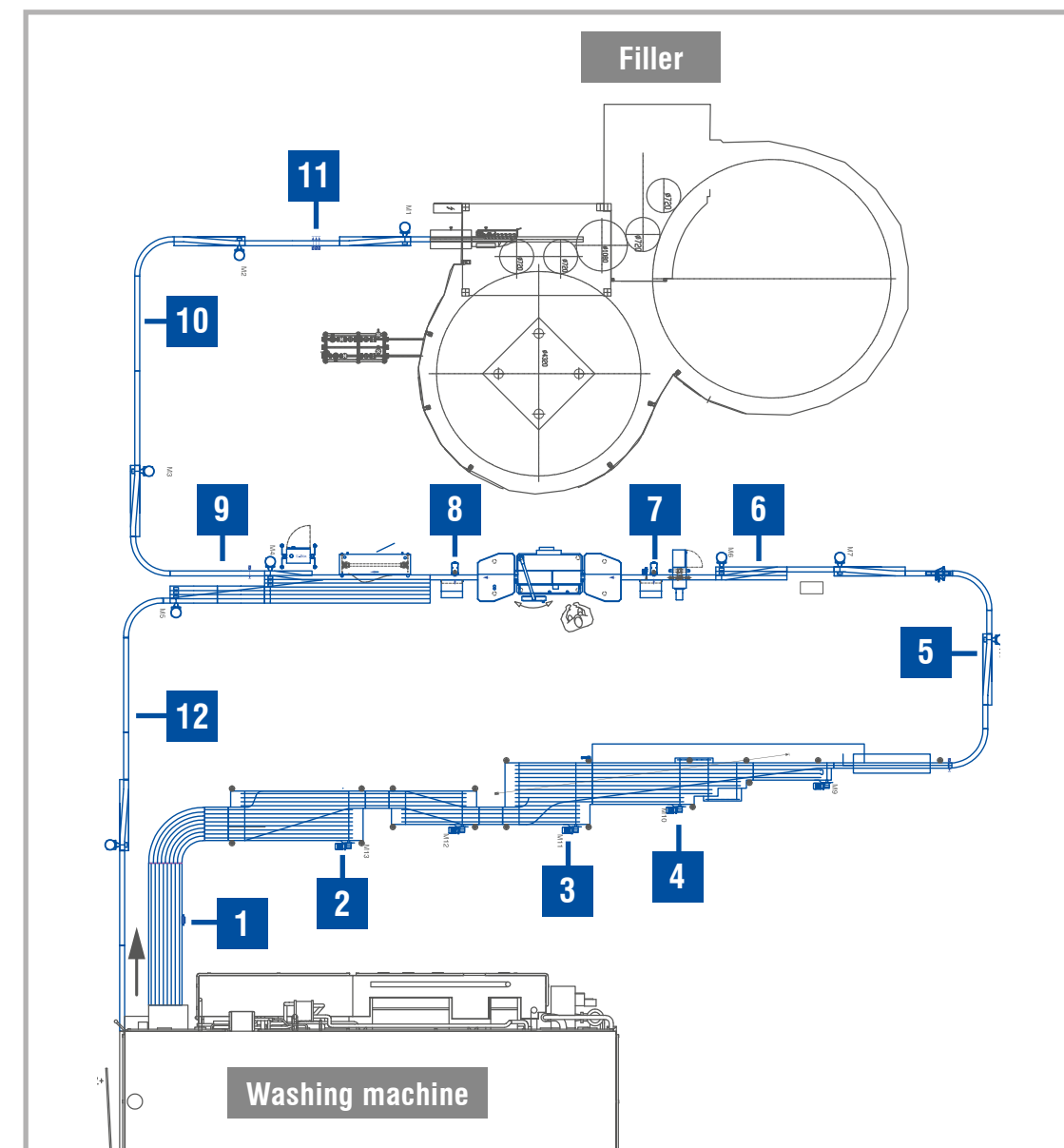
Improved visualisation using parameter guides

12 Conveyor control | Conveyor construction | Container

12.2 Additional module conveyor control through the empty bottle inspector

Adjustment of the conveyor control system

miho Pascal 2 and the selection of suitable sensors is carried out automatically when changing the bottle type on the empty bottle inspector miho David 2.



Concept for conveyor control miho Pascal, from the washing machine to the filler

- | | |
|---|---|
| 1 Buffer control | 7 Rejection of lying down bottles |
| 2 Reduce output of main machine, detect lack of bottles | 8 Compensate gaps from the rejector |
| 3 Control of the pressureless combiner | 9 Early gap detection and adjusting the point of collision |
| 4 Create gaps for the inliner to allow bottle to get in line | 10 Smooth collision control and jam detection |
| 5 Close gaps, detect lack of bottle and bottle jams | 11 Lack of bottle detection |
| 6 Create gaps between bottles | 12 Control the bottle return conveyor |

12 miho Conveyance container transport

From a single source:

Empty bottle inspector
miho David 2

+

Conveyor control
miho Pascal 2

+

Container transport
miho Conveyance

Bandbau

- ✓ Conveyor construction made out of stainless steel
- ✓ Depending on the project conveyor chains made out of stainless steel or plastic are possible (Rexnord)
- ✓ Curved conveyors with magnetic chain guides
- ✓ Railing structure: Solid material and plastic railing profile according to the requirements
- ✓ Railing bracket in stainless steel
- ✓ Stainless steel conveyor lubrication pipework for connection to existing belt lubrication system
- ✓ Open or closed wire basket cable trays
- ✓ Optionally with internal conveyor cleaning
- ✓ Optionally with high efficiency motors

12.3 Container transport system miho Conveyance

- modern filling and sorting systems
- single and multi-lane conveyors, pressureless combiners, buffer systems and reject tables
- high quality reject tables from miho are a requirement for secure standing rejection
- hygiene-friendly design details
- pre-assembled in the factory, thus short installation and commissioning times
- miho Conveyance und miho Pascal 2 form a combined basis for smooth production and high plant efficiency



Mechanical pre-assembly in the factory at miho



Reject table, with belt lubrication, height-adjustable foot receptacle and optional drip tray



Curve with optional drip tray and height-adjustable foot



Two-sided rail adjustment



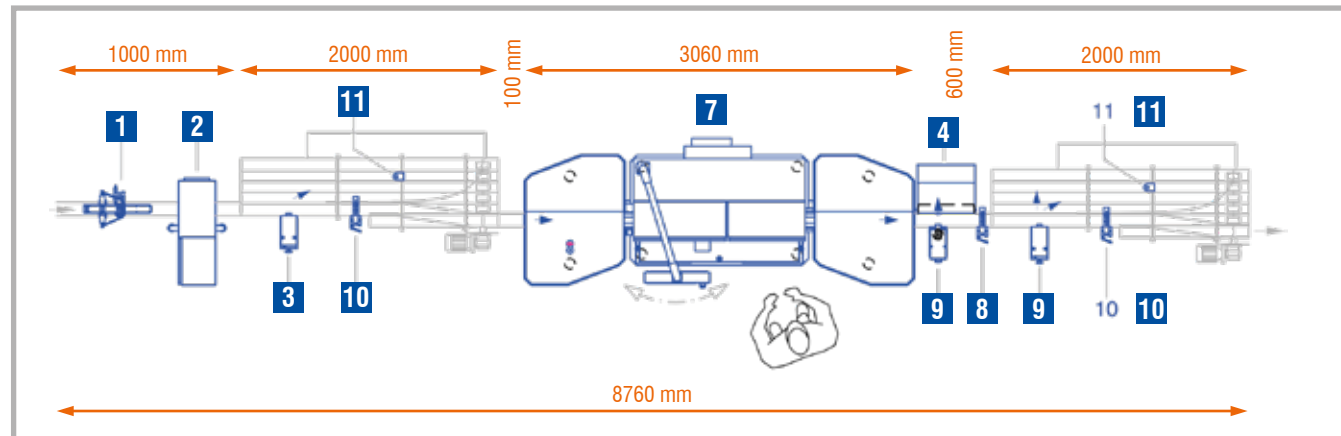
Optional conveyor belt cover



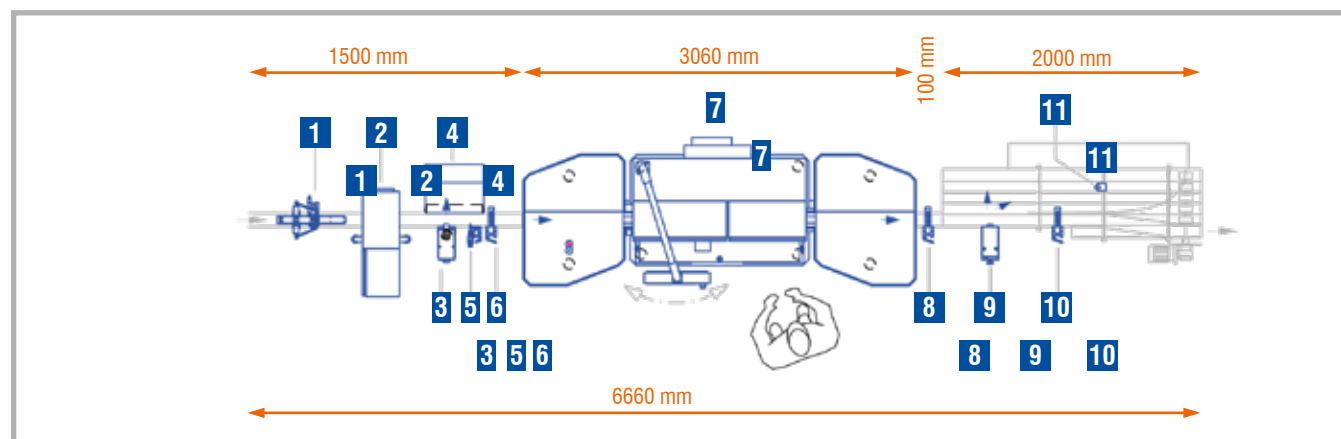
miho Conveyance, individual special solution for collecting lying bottles in hard to reach places

13 Recommended installation | Technical Data

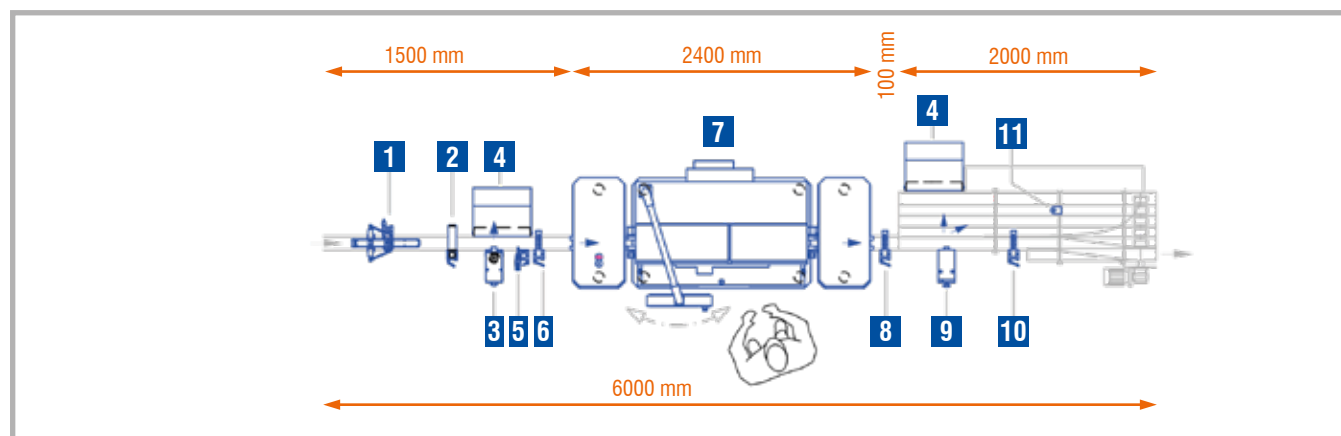
13.1 miho David 2 with dual sidewall inspection and miho FSI as well as an additional reject table for the infeed control



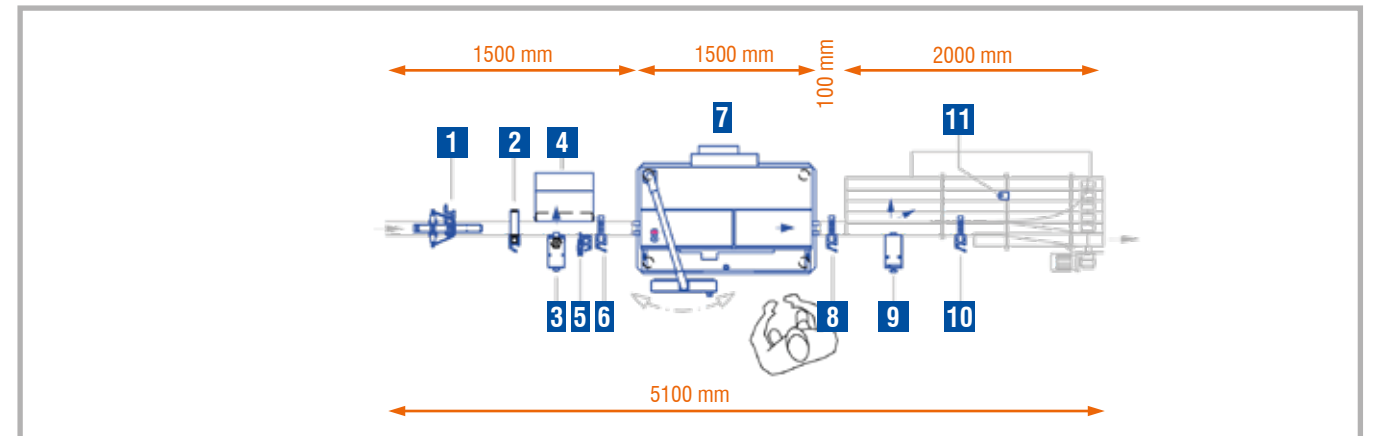
13.2 miho David 2 with dual sidewall inspection and miho FSI



13.3 miho David 2 with standard sidewall inspection



13.4 miho David 2 with basic functions, for example base and finish inspection



- 1 Optional finish blow-off system
- 2 Infeed control (e.g. Unicon 4 or Multicon 4)
- 3 Reject system after infeed control (HSP)
- 4 Glass shards cover
- 5 Reject system for laid down and broken bottles (blow-out)
- 6 Reject monitoring
- 7 Empty bottle inspector miho David 2
- 8 Trigger-Light barrier
- 9 Reject system after empty bottle inspector (HSP, HSPM, ESF 2, Leonardo M)
- 10 Reject control
- 11 Optional table monitoring

Operation

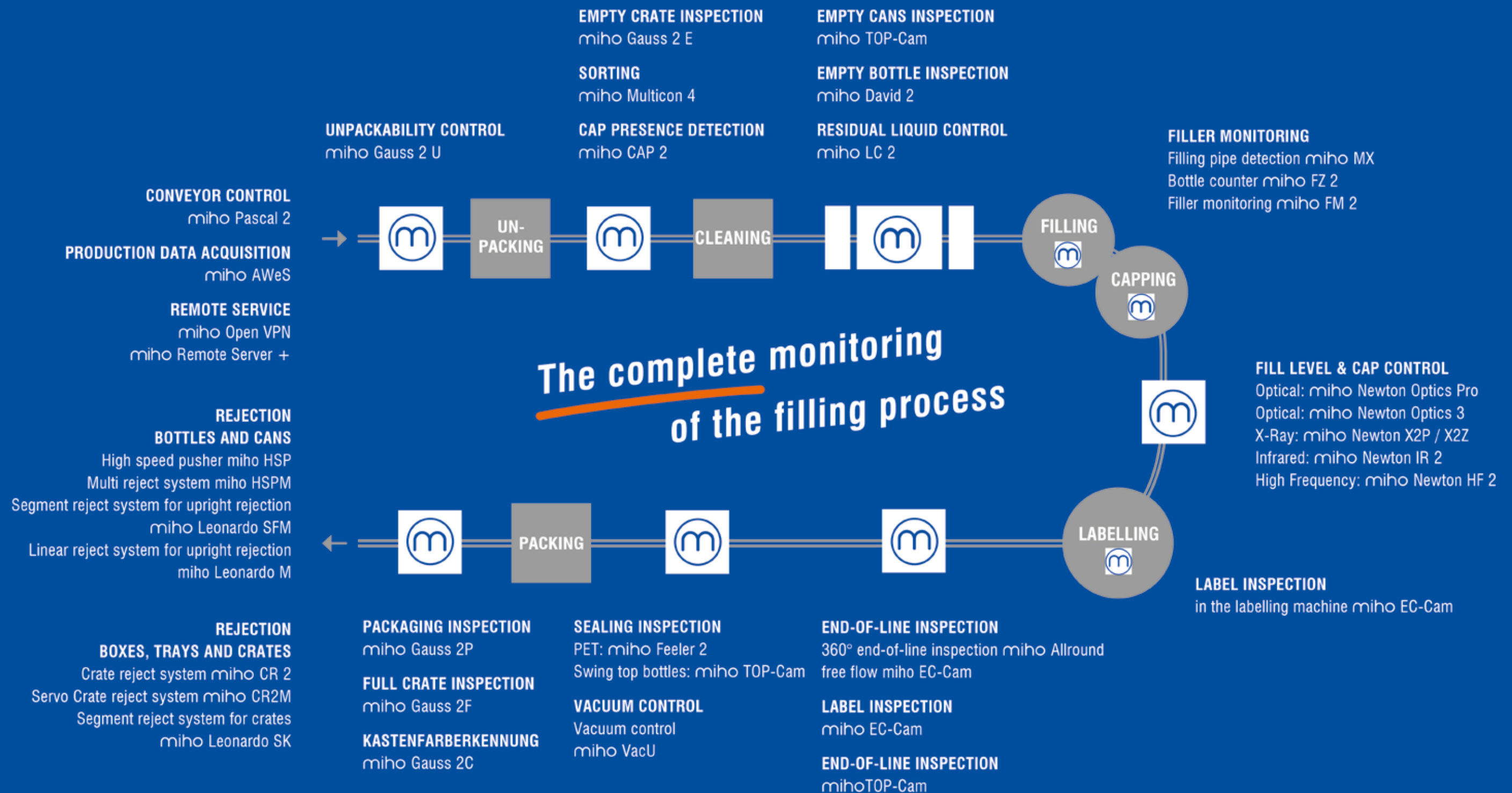
- Temperature +10°C to +40°C
- Relative humidity: 30% bis 90%

Cleaning

- cleaning plans in accordance with the instruction manual
- with standard industry cleaning agents

Supply

- Operating voltage 230 V +/- 10%, 1-phase AC
- Frequency: 50 Hz bis 60 Hz
- Power < 1.5 kW
- Pneumatic, operating pressure: 5 bar - 10 bar
- Average consumption: 10 Nm³/h



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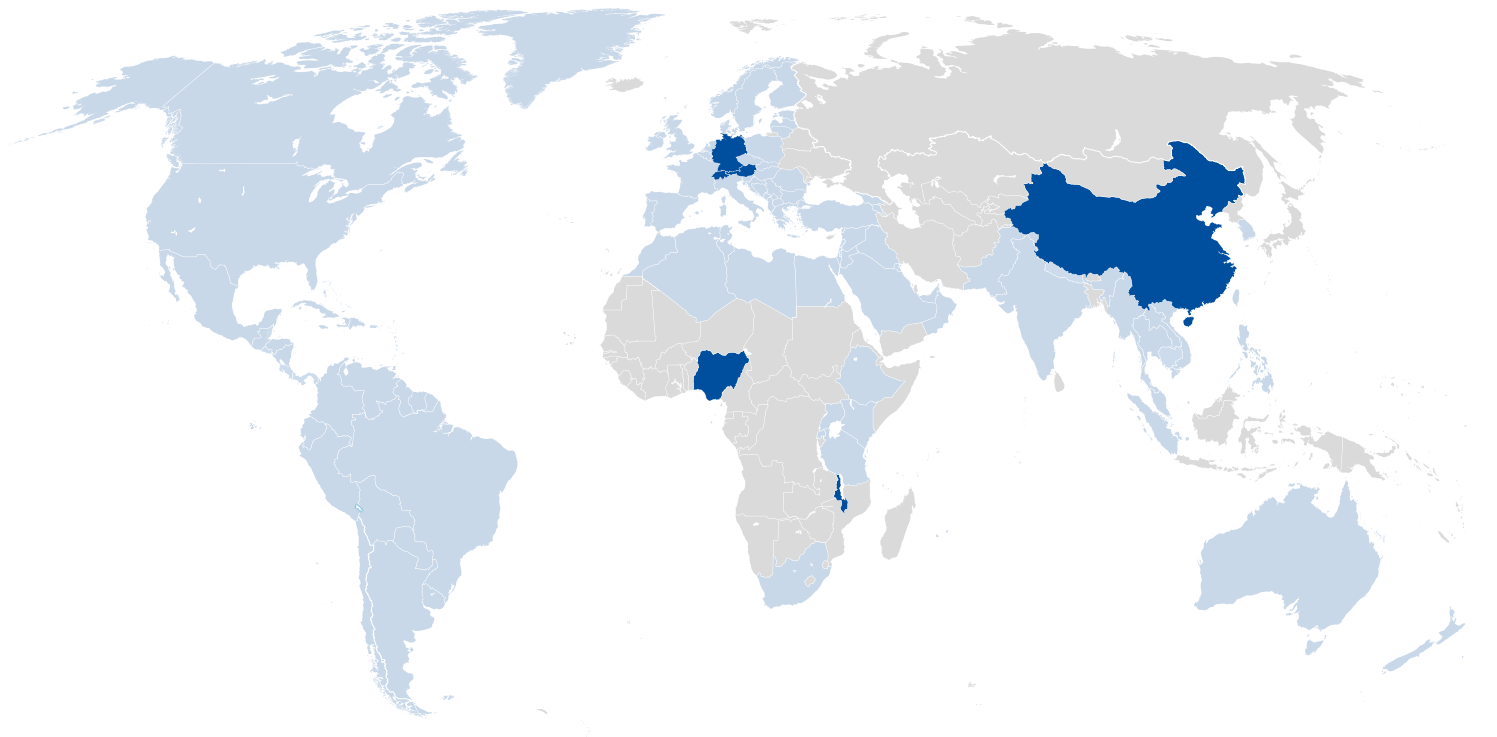
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