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 Swing top seal inspection, miho CBD**
- **Optimized energy efficiency**
- **24/7 hotline, remote maintenance, Spare parts supply for at least 15 years**

Current innovations in this brochure are marked orange!

made
in
Germany

Table of contents

The miho David 2 and the machines at the infeed and outfeed

Infeed

Infeed Control (camera)
miho **Multicon 4**
(Sorting in accordance with shape, size, colour...)

Infeed Control (sensors)
miho **Unicon 4**
(Lying down bottles, broken bottles, height)

miho David 2

Basic machine

- Sealing surface inspection RGB
- Base inspection with variofocus
- HF residual caustic soda, IR residual liquid
- Real time image processing miho **VIDIOS®**
- miho **AWeS production data acquisition (PDA)**
- Remote maintenance
- Reject monitoring

+ Inspection units

Sealing surface inspection
- Sealing surface inspection (standard / wide neck)

Finish side inspection
- miho **FSI finish side inspection**
- Flange inspection

Sidewall inspection
- Standard sidewall inspection
- Dual sidewall inspection with miho **OpAL: Embossing and ACL**
- Inner sidewall inspection
- miho **Swing top seal inspection**
- Additional UV-filter recognitiom

Base inspection
- Variofocus with foil detection
- CBD (Chipped Base Detection)

+ Additional functional units

- Separate, preconfigured PDA computer
- External visualization
- Automatic change of bottle type
- Remote visualization with Separate Viewer
- Automatic adjustment of the inspection head height and belt width

Outfeed

Linear segment rejection
miho **Leonardo M**

Multi-reject system
miho **HSPM**

Pneumatic Pusher
miho **HSP**

2.1 Basic machine

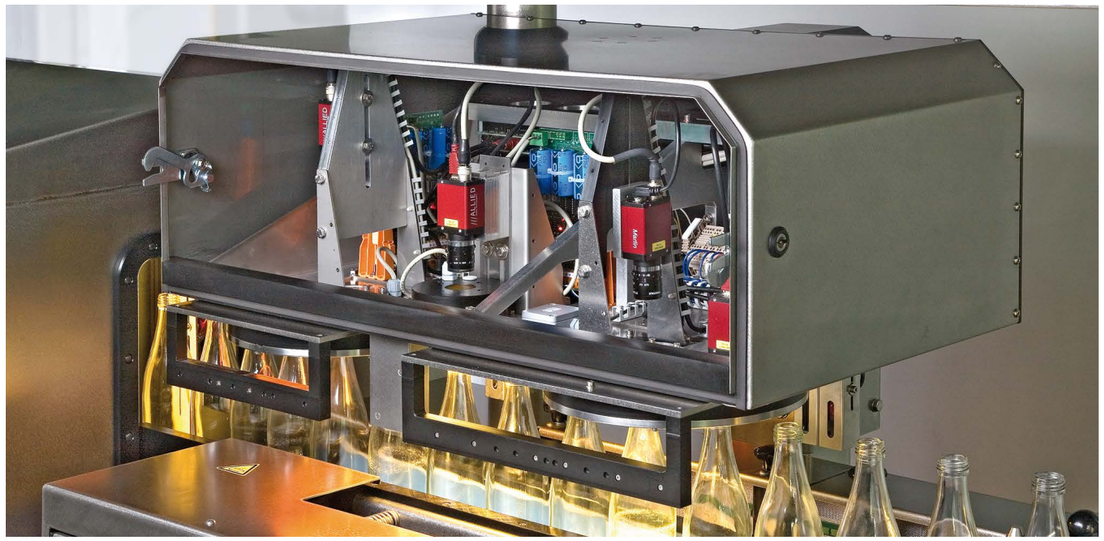
Function

- **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
- Pipeline cooling, closed system: no contamination through outside air or moisture, air conditioner based on Peltier
- 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

Sealing surface inspection with RGB lighting



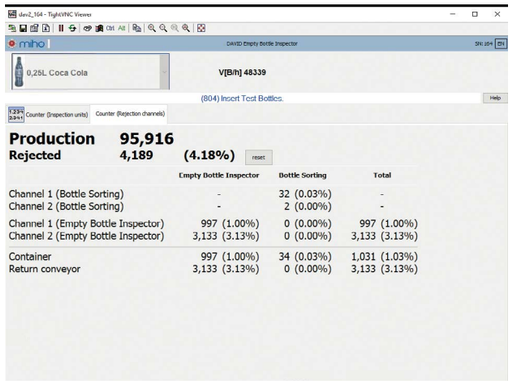
Inspection head of the basic machine, opened

Touch operation through swivel arm

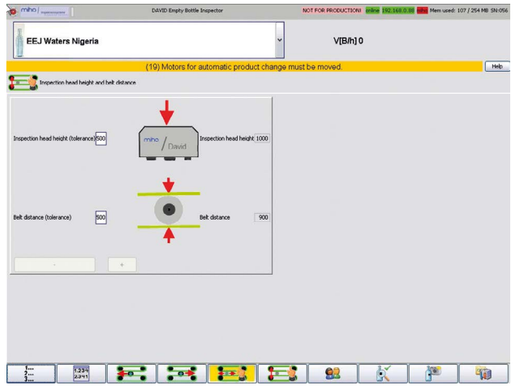
Test bottle with transponder ring attached

2.2 miho VIDIOS®

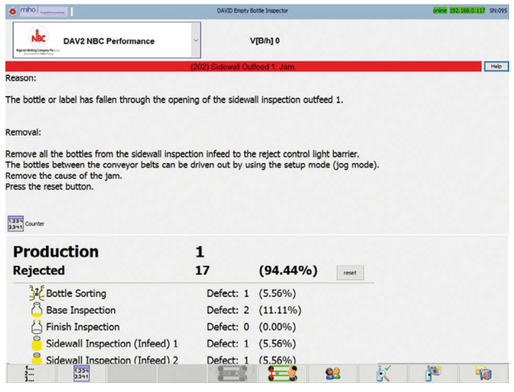
- **Licence-free, because the proprietary software comes directly from miho**
- **Intuitive graphic user interface (GUI) in the local language**
- **Interactive help**
- **Machine diagnosis with clear display of machine status**
- **Operating system: Microsoft Windows 10**



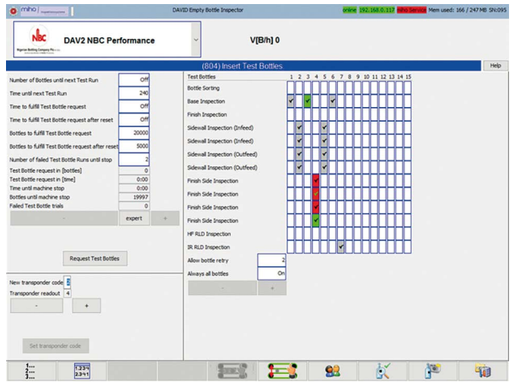
Clear list of reasons for rejection



Icon-based user guide when changing types



Help function in case of malfunction



Clear presentation of the test bottle run result

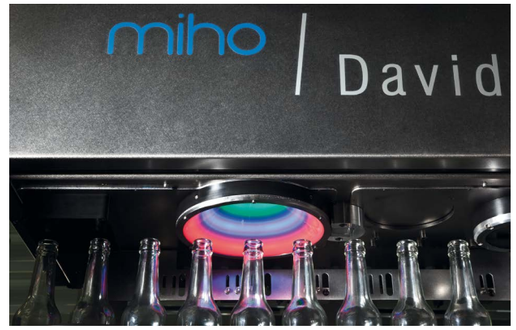
2.3 Sealing surface inspection RGB

Function

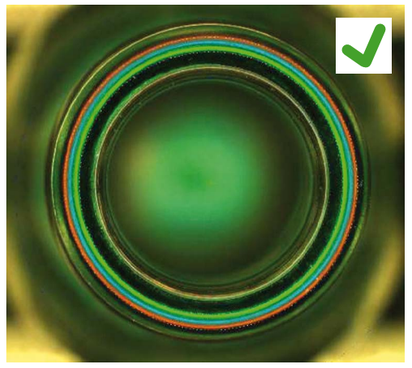
- For the improved detection of damage, especially at the outer edges of the sealing surface
- Detects, for example, bursts and dirt on the sealing surface / thread
- For glass and PET

Technology

- Three lighting zones with three LED colour lighting rings **R**ED / **G**REEN / **B**LUE at different illumination angles
- Colour camera with spectral filter

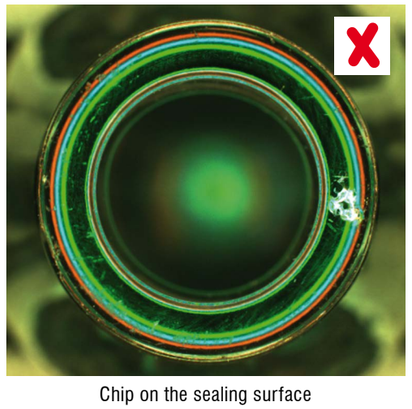


The LED colour lighting ring in operation



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

Glass: chip on the sealing surface



Chip on the sealing surface

Glass: chip on the sealing surface

2.4 Base inspection

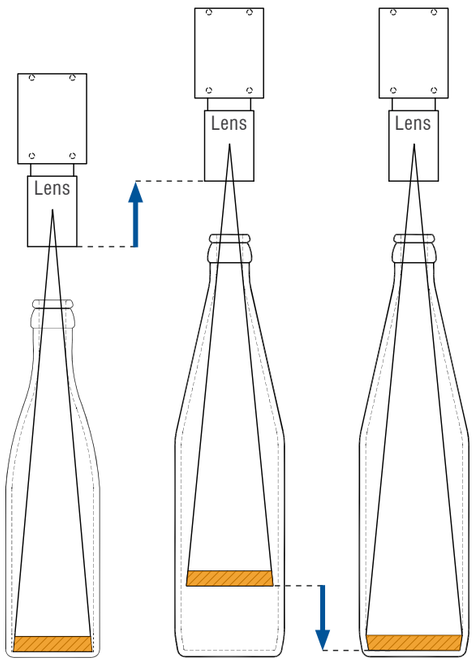
Function

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

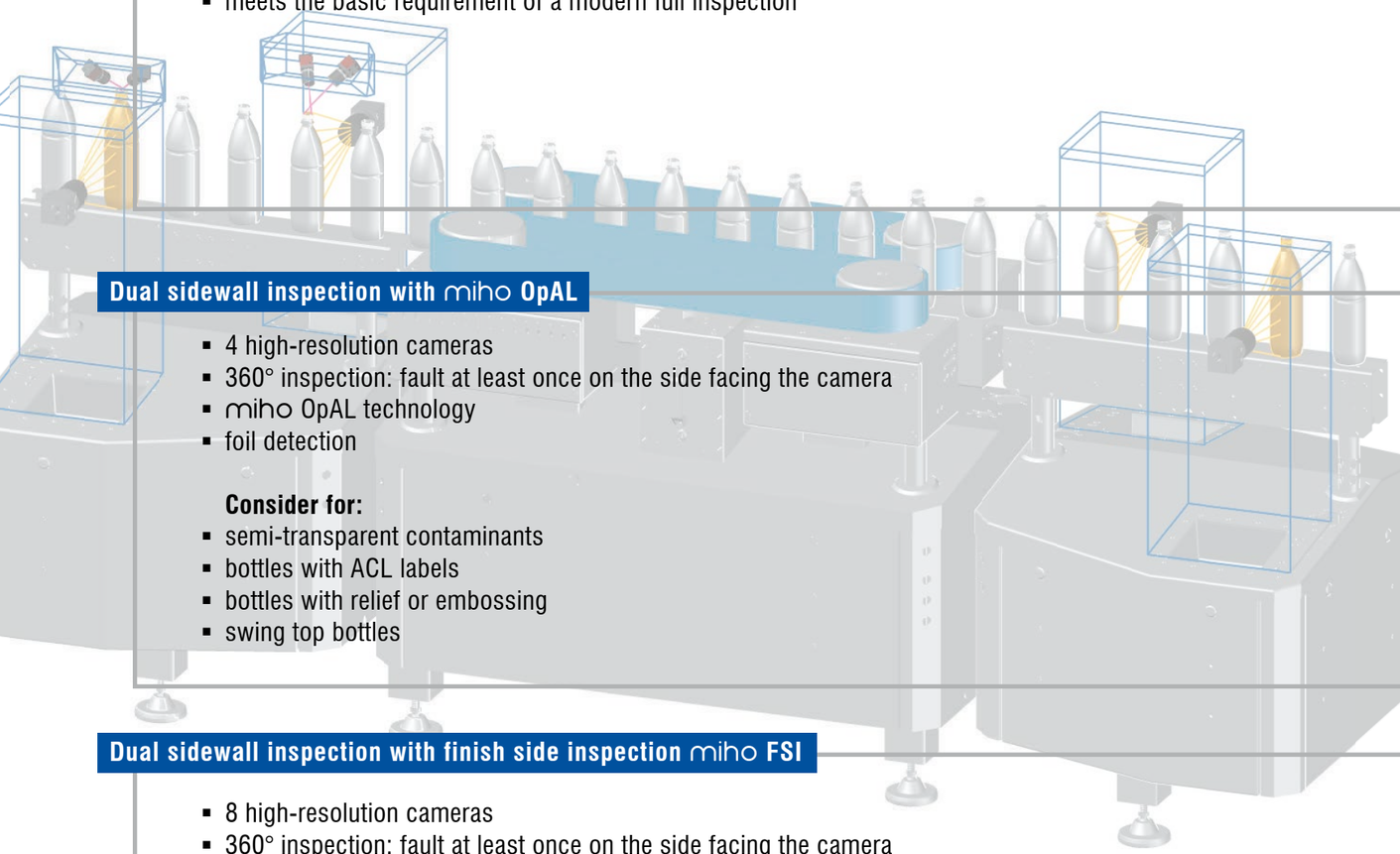
The embossing form is not recognized as an error but any contamination itself in the embossing area will be detected.

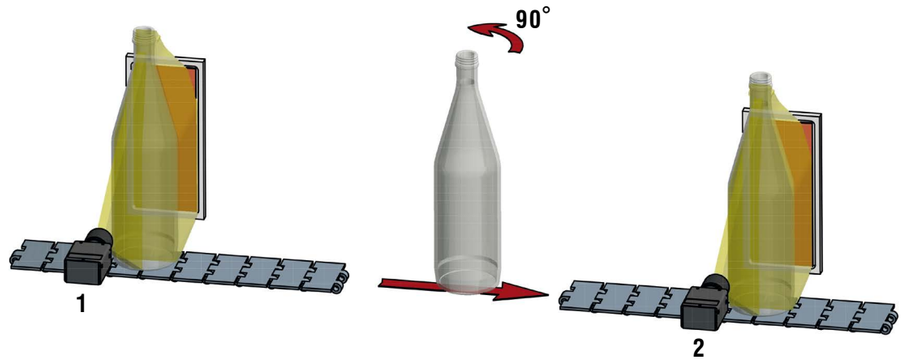
Examples of different bottles with base embossing

3 miho David 2 | Sidewall inspection in three versions

Standard sidewall inspection

- 2 high-resolution cameras
- 360° inspection
- foil detection
- meets the basic requirement of a modern full inspection



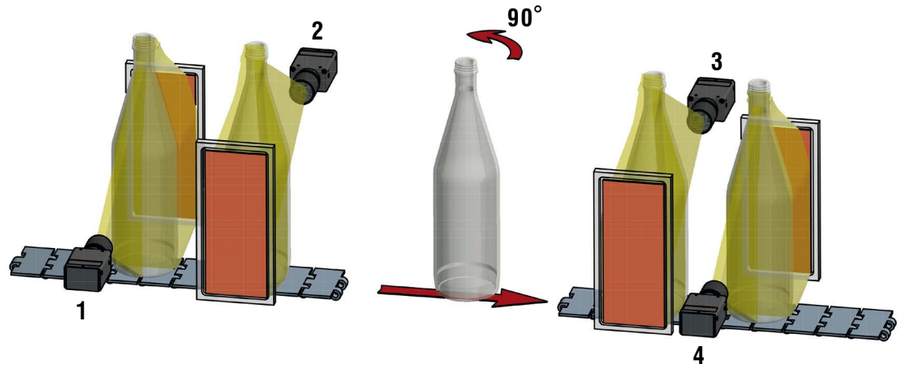


Dual sidewall inspection with miho OpAL

- 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
- swing top bottles

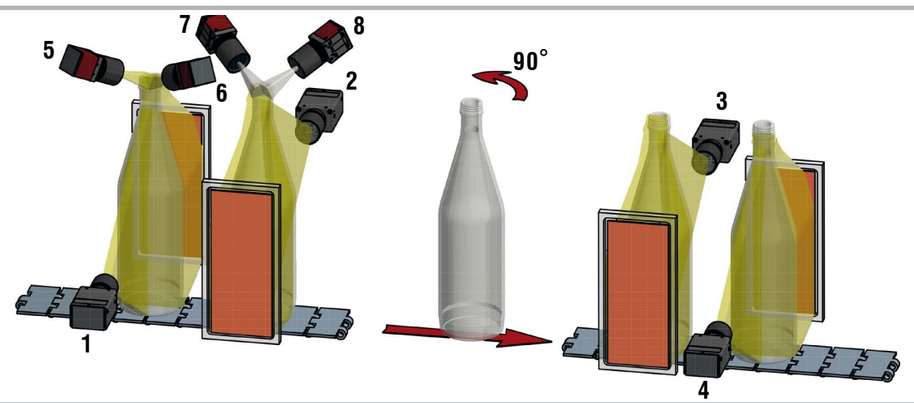


Dual sidewall inspection with finish side inspection miho FSI

- 8 high-resolution cameras
- 360° inspection: fault at least once on the side facing the camera
- miho OpAL technology
- foil detection
- Additional miho FSI: unique transmitted light method

Consider for:

- bottles with finish side damage and contamination
- bottles with finish cracks without sealing sur face damage
- screw top bottles: inspection from beginning to end, from below and from above
- Damaged or dirty flanged edges



Why dual sidewall inspection with miho-OpAL technology

- **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

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	With miho OpAL
Bracket area: masked out	Bracket area: inspection ✓
Embossing: limited inspection	Embossing: inspection ✓
ACL: masked out	ACL Labels: inspection ✓
Semi-transparent fault: limited inspection	Semi-transparent fault: inspection ✓

3.1 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
- 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

Technology

- dual sidewall inspection with one module at the infeed and at the outfeed of the empty bottle inspector respectively
- **two** cameras in the infeed module and **two** cameras in the outfeed module
- two images per camera through mirror cabinet
- including circular pole filter to detect adherent foils on the inside of glass bottles

3.2 Standard sidewall inspection

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.

Dual sidewall inspection with miho FSI-technology

miho FSI (Finish Side Inspection), 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

3.3 Dual sidewall inspection with miho FSI

Function

Functions identical to the dual sidewall inspection, and in addition:

- 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: Vertical Split

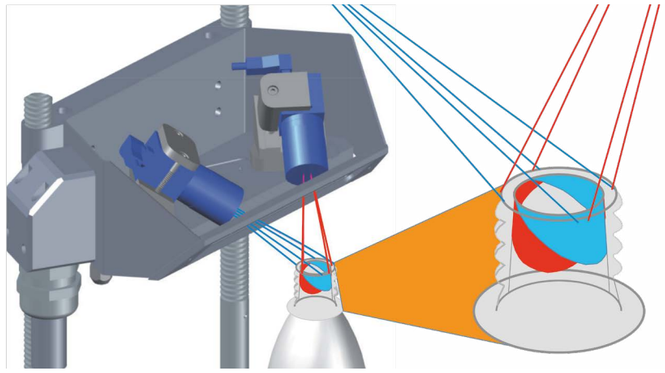
MCA: Dirt in the threaded area

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

3.4 FSI-Upgrade flanged edge inspection

Function

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

Crown corks: Underchip defect

Crown corks: Vertical Split

3.5 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

4 miho David 2 | Integrated inspection of bracket area and clapper

The three modules for the comprehensive swing top bottle inspection in front of the filler in <u>one</u> machine.

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

4.1 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

Swing top bottle with vertical split in the finish area

4.2 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.

4.3 Additional module clapper inspection

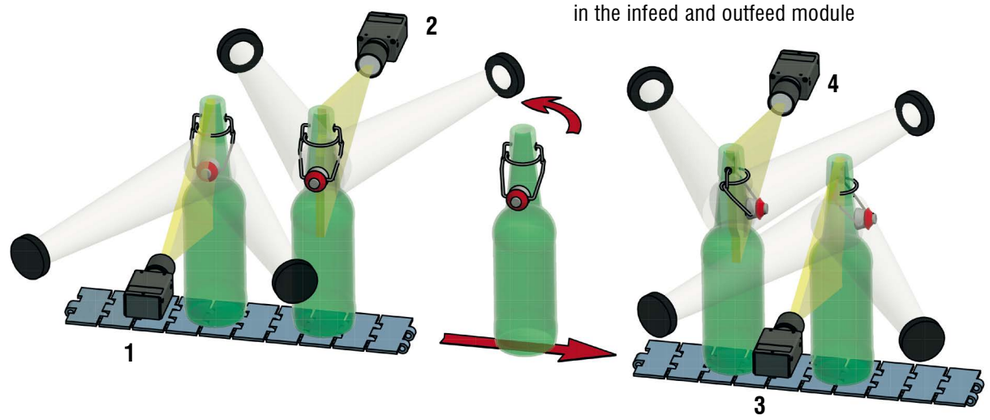
Function

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

Curved rubber seal

Pins damaged

Rubber seal: colour and fading

Examples of use for the inspection of swing top bottles:

4 miho David 2 | Integrated inspection of the bracket area

4.4 Bottling plant swing top bottles

Installed by miho:

- Complete bottle transportation
- Intelligent conveyor control
- All control and inspection systems:

After the washing machine:

1. Infeed control miho **Unicon 4** with rejection and additional residual liquid detector
2. Empty bottle inspector miho **David 2**

After the filler:

3. Fill Level inspection miho **Newton HF**
4. Ultrasonic bar for detecting leakage miho **UIP**

After the labeller:

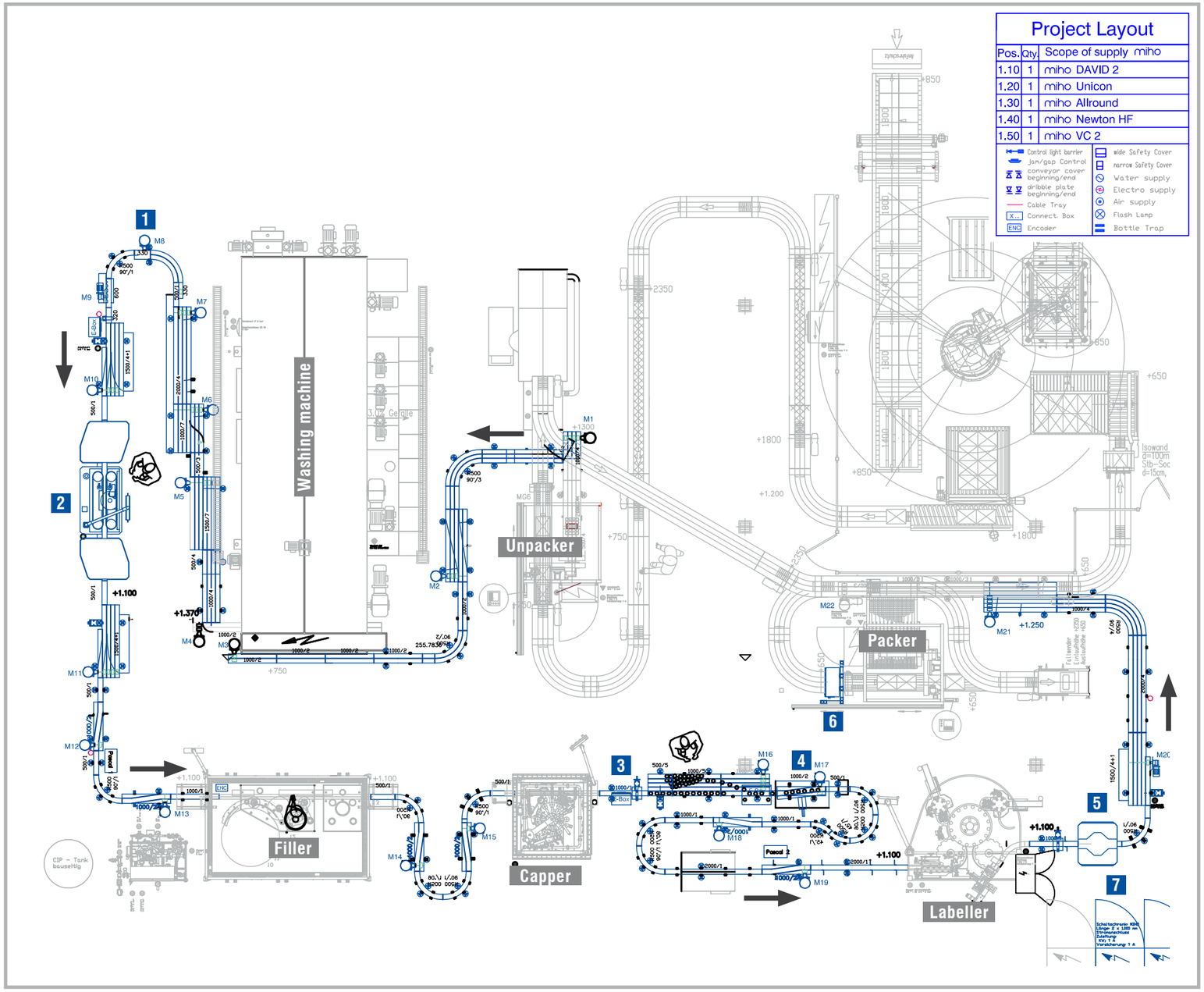
5. 360° inspection of a fully equipped bottle miho **Allround** with rejection

After the packer:

6. Full crate inspection miho **Gauss F**

Conveyor control:

7. Intelligent conveyor control system miho **Pascal 2** / central control cabinets



Incorrectly mounted

Distorted rubber seal

Bottle leaking (sweating)

Examples of use for the inspection of swing top bottles:

Detection of typical faults in PET returnable bottles:

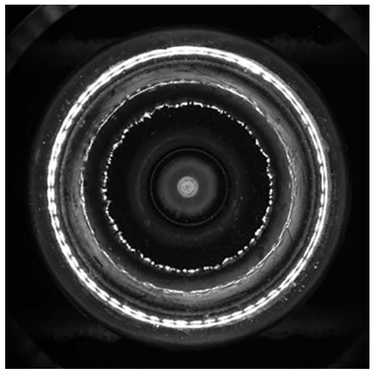
- Scuffing
- Stress cracks
- Damaged or dirty vent slots and segment threads
- Faulty support rings
- Deformed bottle bases
- Correlation of the stress crack pattern and the likely later leakage of the bottle

Scuffing

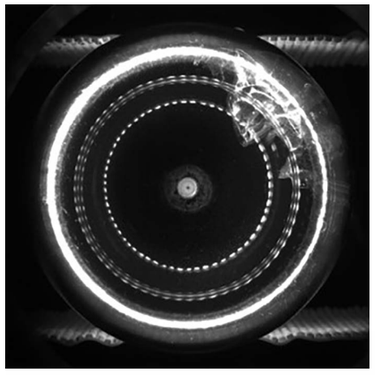
Abrasion through faulty neck ring guide

Stress cracks

Burst at the support ring



PET bottle: stress cracks, resulting in leakage



PET bottle: cigarette foil

Damage in the threaded area

Damage to the thread

Cracks in the finish area

Burst at the sealing surface / thread

5.1 miho Bottle Dryer

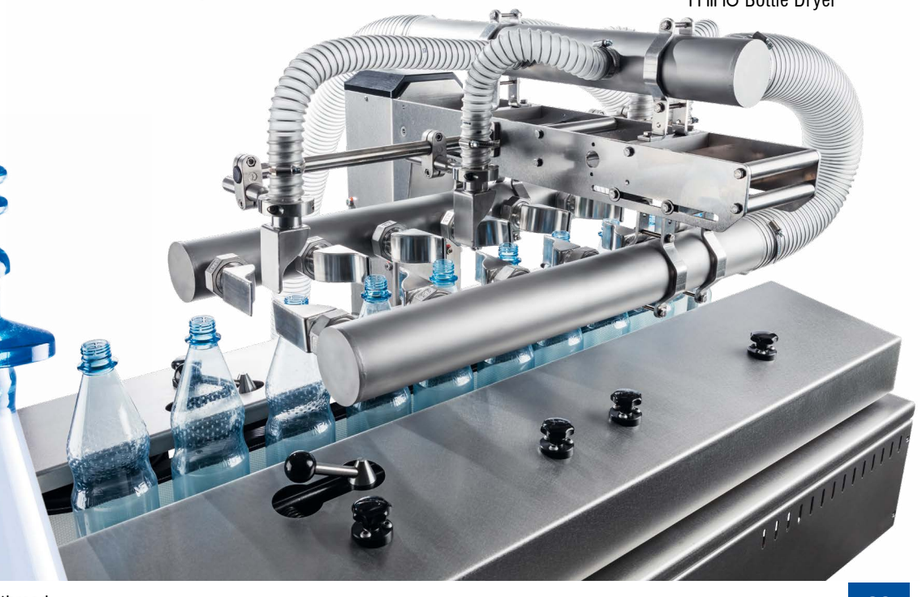
Function

Fast and thorough drying of the threat 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)

For blowing off PET bottles:
miho Bottle Dryer



5.2 Bottling plant returnable PET bottles

Installed by miho:

- **Extremely accurate finish and thread inspection miho FSI,** for example, to detect stress cracks
- **Extremely effective thread blowing to avoid false rejects**
- **Secure standing rejection at 40,000 bottles / hour**

1 **High-performance thread blowing miho Bottle Dryer**

2 **Infeed protection** with foreign bottle inspection and sorting of scuffed bottles **miho Multicon 4**

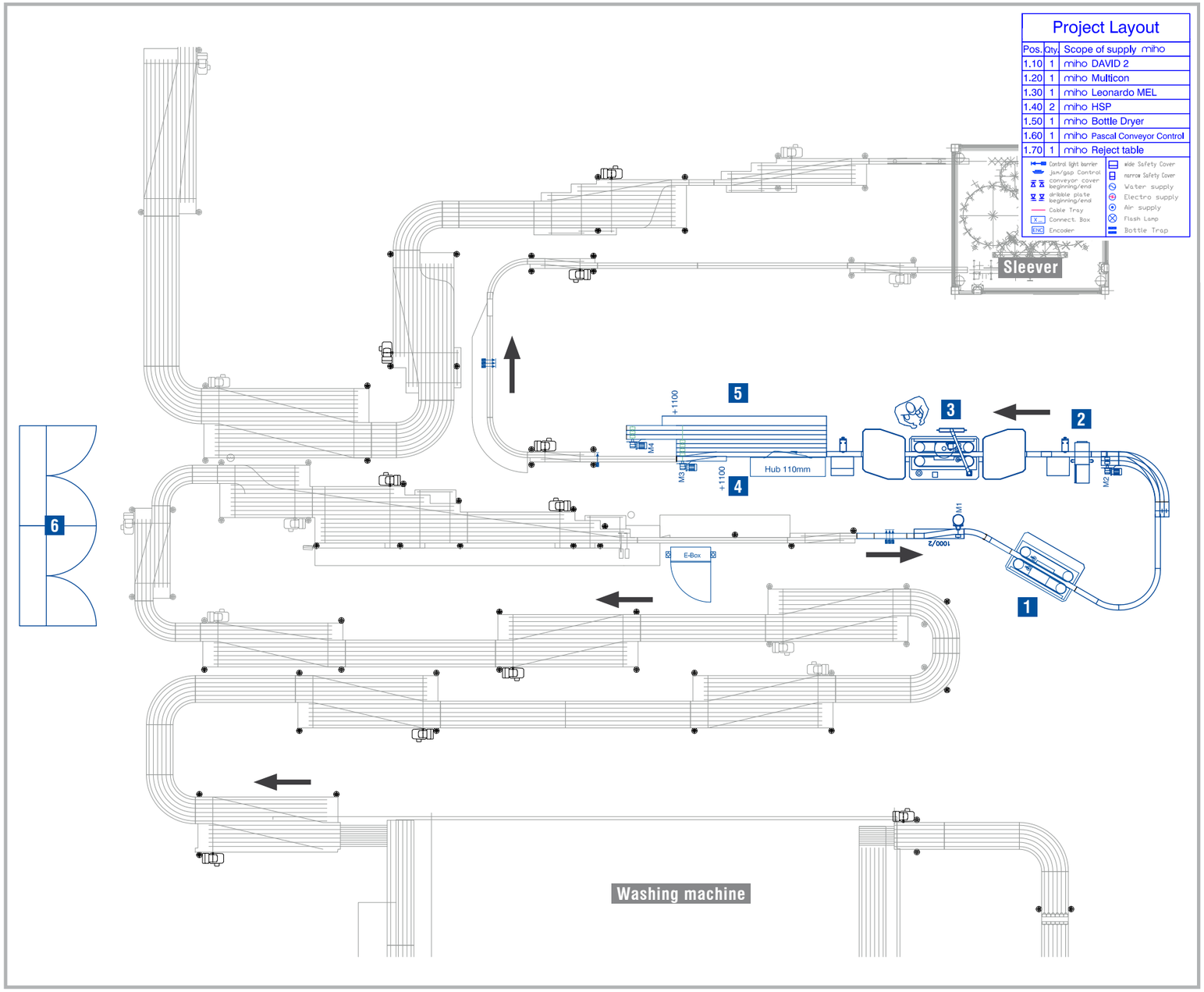
3 **Empty bottle inspector miho David 2 with:**

- dual sidewall inspection
- finish side inspection miho FSI
- sealing surface inspection with RGB-Lighting
- base inspection with stress crack detection

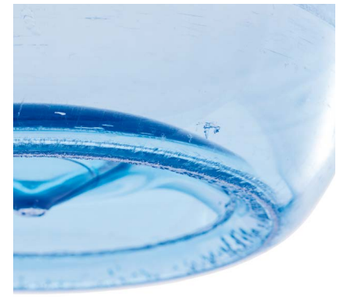
4 **Linear segment rejector miho Leonardo M** for standing rejection of empty and (partially) filled PET bottles

5 **Reject table,** optimized for PET bottles

6 **Intelligent conveyor control system miho Pascal 2 / central control cabinets**



Dirty vent slot



Stress cracks

Permanent marker

6 Examples of bottling plants

6.1 High-speed bottling line 72 000 bottles / hour

Installed by miho:

- Up to 72,000 bottles / hour; 5 different bottle types
- Integration into the existing conveyor control
- Connection to the existing PDAS of the customer

1 Infeed protection with foreign bottle inspection miho **Multicon 4**

2 Empty bottle inspector miho **David 2** with:

- dual sidewall inspection
- finish side inspection miho **FSI**
- sealing surface inspection with RGB-Lighting
- base inspection with Variofocus

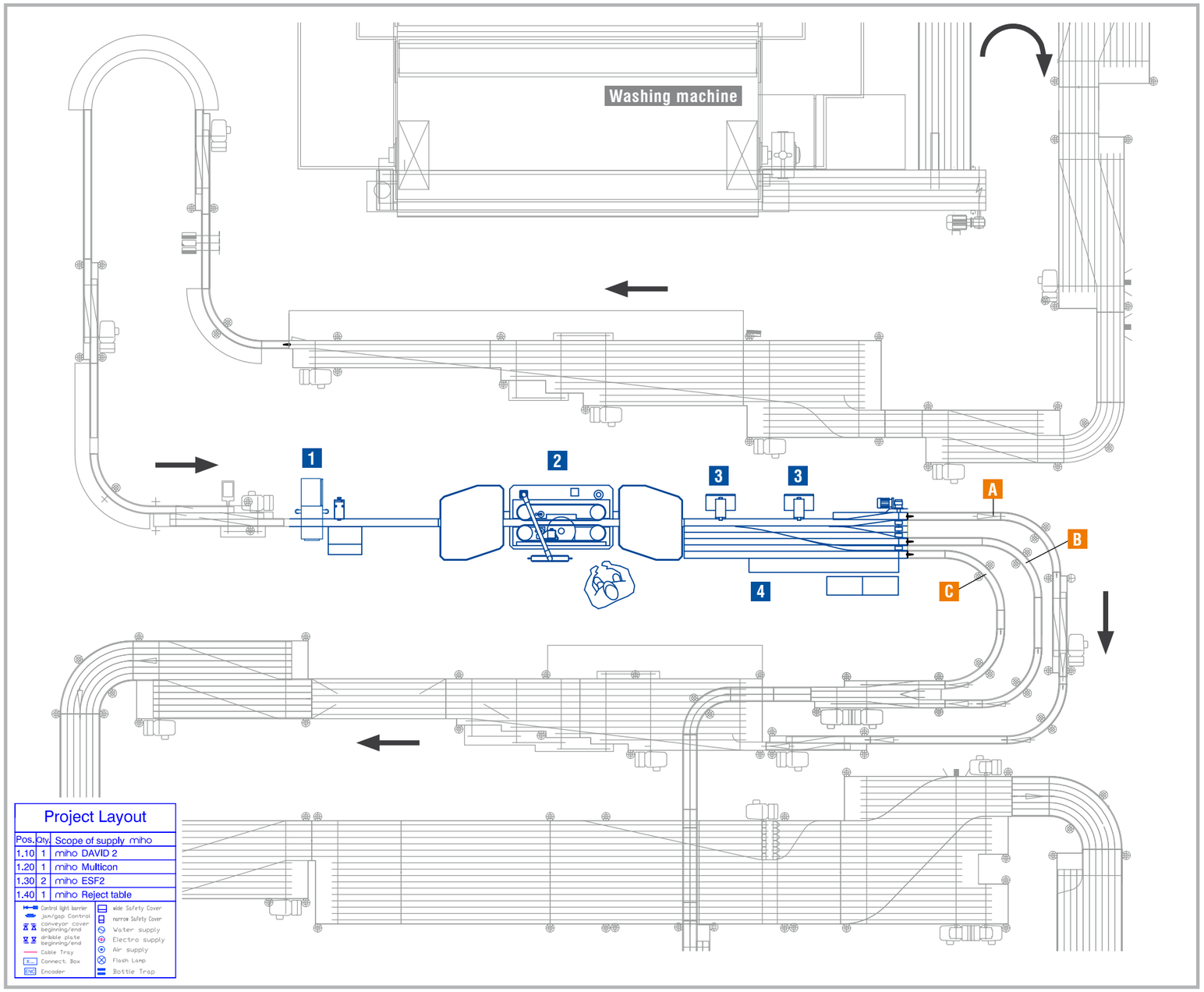
3 Multi reject system miho **HSPM**

4 Reject table, optimized for high speeds

A Good bottle, continues to the filler

B Dirty bottle, goes back to the washing machine

C Damaged bottle, goes to the container for broken glass



Project Layout

Pos.	Qty.	Scope of supply miho
1.10	1	miho DAVID 2
1.20	1	miho Multicon
1.30	2	miho ESF2
1.40	1	miho Reject table

Control light barrier, Jam/gap Control, conveyor cover beginning/end, dribble plate beginning/end, Cable Tray, Connect. Box, Encoder, wide Safety Cover, narrow Safety Cover, Water supply, Electro supply, Air supply, Flash Lamp, Bottle Trap

Damage in thread

Vertical split

Crown cork rust ring

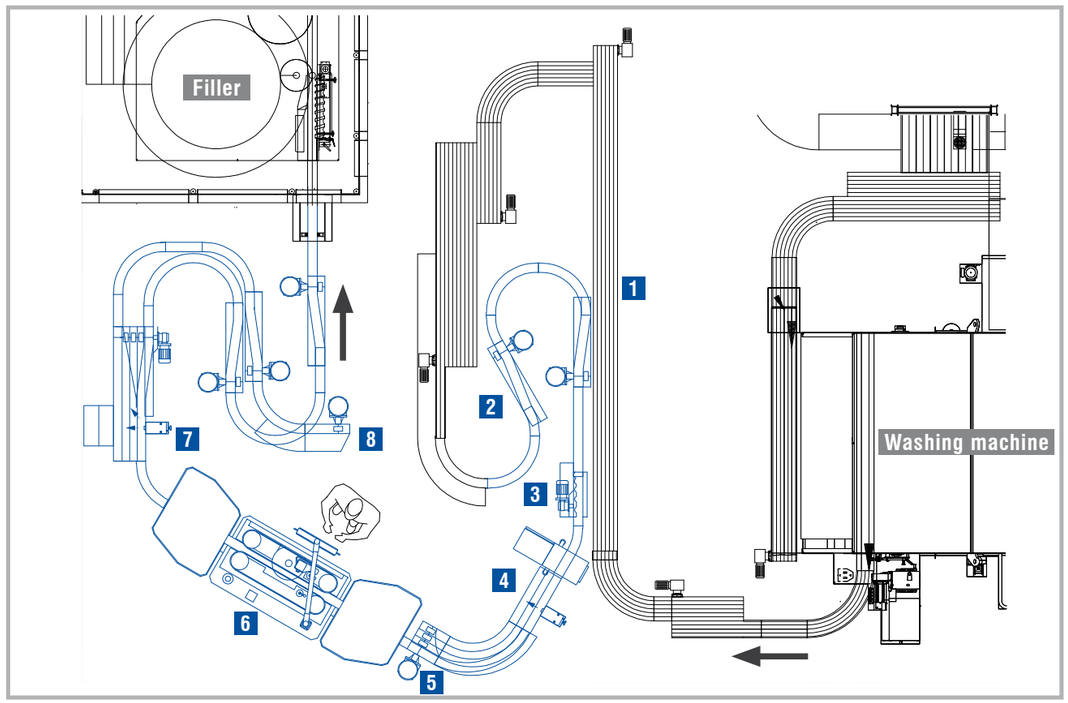
Examples of use for the inspection of glass bottles:

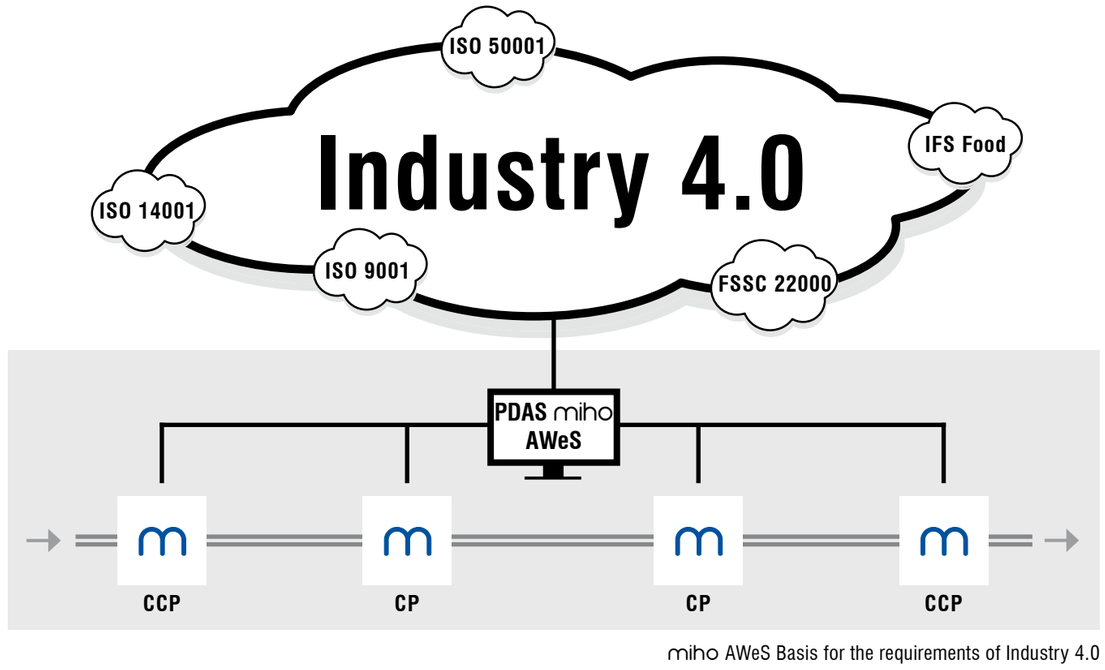
6.2 Modernization of a bottling plant in confined spaces

Installed by miho:

- Cost-effective modernization: replacement of conveyor belts only where absolutely necessary
- Approximately 10,000 bottles/hour filling capacity in this example

1. Intelligent conveyor control miho **Pascal 2**, incl. buffer control
2. Conveyor construction miho **Conveyance**: The optimal solution of functional requirements in a given space
3. Infeed worm for creating a defined bottle division, ideal for swing top bottles
4. Camera based infeed control miho **Multicon 4**
5. Reject table for infeed control set at 90°
6. Empty bottle inspector miho **David 2** with:
   - dual sidewall inspection
   - finish side inspection miho **FSI**
   - sealing surface inspection with RGB-Lighting
   - base inspection with Variofocus
7. miho **HSPM** two-way rejection
8. Removal of the bottles rejected at the optimum location for the operator





miho AWeS Basis for the requirements of Industry 4.0

Why network integration?

- **The empty bottle inspector is a prerequisite to**
  - monitor critical control points (CCP) in the filling process
  - initiate quality assurance countermeasures, if necessary
  - verifiably log all production conditions
  - comply with the duty of care of producers in accordance with HACCP, IFS or other country-specific requirements for risk management
- **Monitoring the filling process to control and improve efficiency,** for example, in the control room, integration of the empty bottle inspector in a company-wide production data acquisition system (PDAS)
- **Statistical evidence of minimum rejection,** in accordance with the specifications of the operator of the bottle pool
- **Remote diagnostics by miho** for carrying out maintenance and optimization measures - quickly and inexpensively
- **Basis for the requirements of Industry 4.0** and for modern certification standards: IFS Food, ISO 50001, FSSC 22000, ISO 9001, ISO 14001

7.1 Production data acquisition system miho AWeS

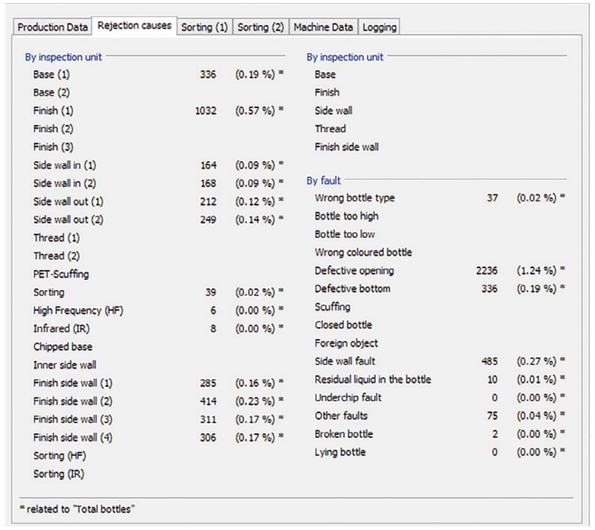
Part of the scope of delivery for the basic machine Advanced

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

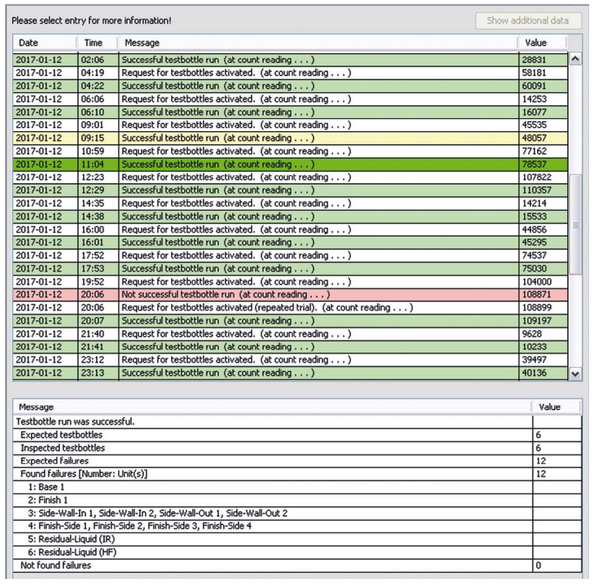


Production Data | Rejection causes | Sorting (1) | Sorting (2) | Machine Data | Logging

By inspection unit			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)	164	(0.09 %) *			
Side wall in (2)	168	(0.09 %) *	By fault		
Side wall out (1)	212	(0.12 %) *	Wrong bottle type	37	(0.02 %) *
Side wall out (2)	249	(0.14 %) *	Bottle too high		
Thread (1)			Bottle too low		
Thread (2)			Wrong coloured bottle		
PET-Scuffing			Defective opening	2236	(1.24 %) *
Sorting	39	(0.02 %) *	Defective bottom	336	(0.19 %) *
High Frequency (HF)	6	(0.00 %) *	Scuffing		
Infrared (IR)	8	(0.00 %) *	Closed bottle		
Chipped base			Foreign object		
Inner side wall			Side wall fault	485	(0.27 %) *
Finish side wall (1)	285	(0.16 %) *	Residual liquid in the bottle	10	(0.01 %) *
Finish side wall (2)	414	(0.23 %) *	Underchip fault	0	(0.00 %) *
Finish side wall (3)	311	(0.17 %) *	Other faults	75	(0.04 %) *
Finish side wall (4)	306	(0.17 %) *	Broken bottle	2	(0.00 %) *
Sorting (HF)			Lying bottle	0	(0.00 %) *
Sorting (IR)					

* related to "Total bottles"

Screenshot miho AWeS user interface:
Statistical analysis of the inspection modules and causes of rejection



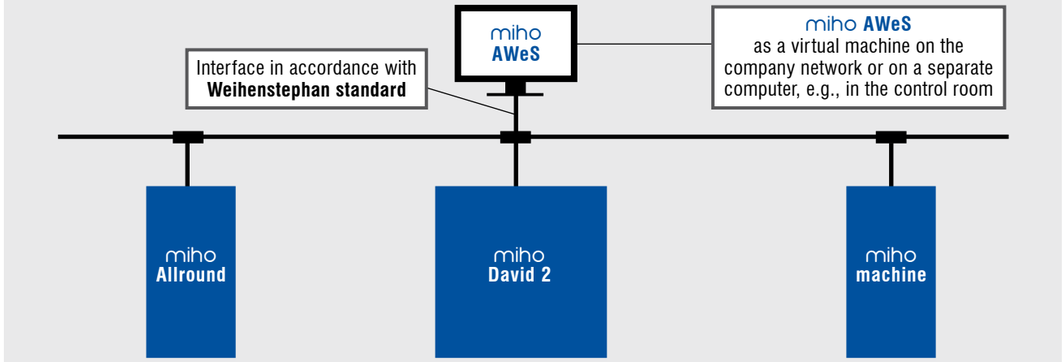
Please select entry for more information! — Show additional data

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 . . .)	58181
2017-01-12	04:22	Successful testbottle run (at count reading . . .)	60091
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 . . .)	45535
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 . . .)	110357
2017-01-12	14:35	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 . . .)	9628
2017-01-12	21:41	Successful testbottle run (at count reading . . .)	10233
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

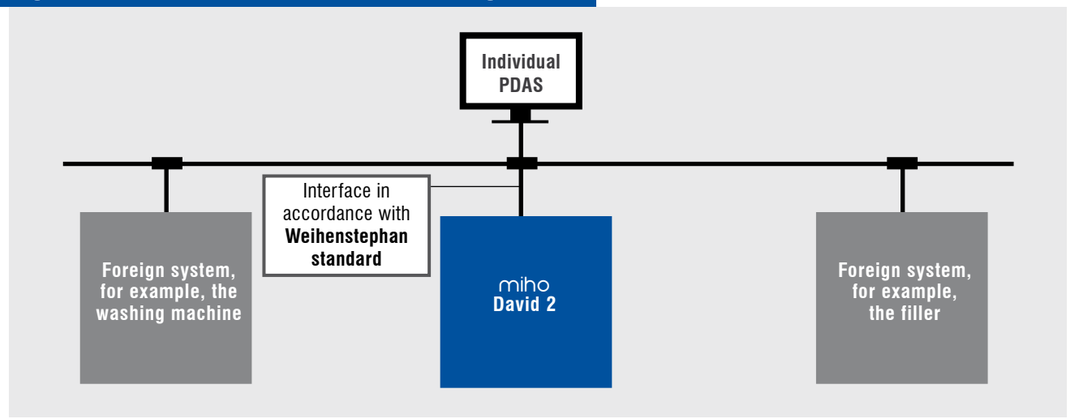
Message	Value
Testbottle run was successful.	
Expected testbottles	6
Inspected testbottles	6
Expected failures	12
Found failures [Number: Unit(s)]	12
1: Base 1	
2: Finish 1	
3: Side-Wall-In 1, Side-Wall-In 2, Side-Wall-Out 1, Side-Wall-Out 2	
4: Finish-Side 1, Finish-Side 2, Finish-Side 3, Finish-Side 4	
5: Residual-Liquid (IR)	
6: Residual-Liquid (HF)	
Not found failures	0

Screenshot miho AWeS user interface:
Example of a successful test bottle run

miho AWeS as the central PDAS



Integration of miho machines into an existing PDAS



7.2 miho remote maintenance

Part of the scope of delivery for the basic machine Advanced / basic machine Eco

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 **v**irtual **p**rivat **n**etwork via an encrypted TLS connection, or alternatively with TeamViewer (licence supplied by the customer)

8.1 CBD (Chipped Base Detection)

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

8.2 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.

8.3 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

8.4 Extension of visual angle of the base inspection

Function

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

8.5 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

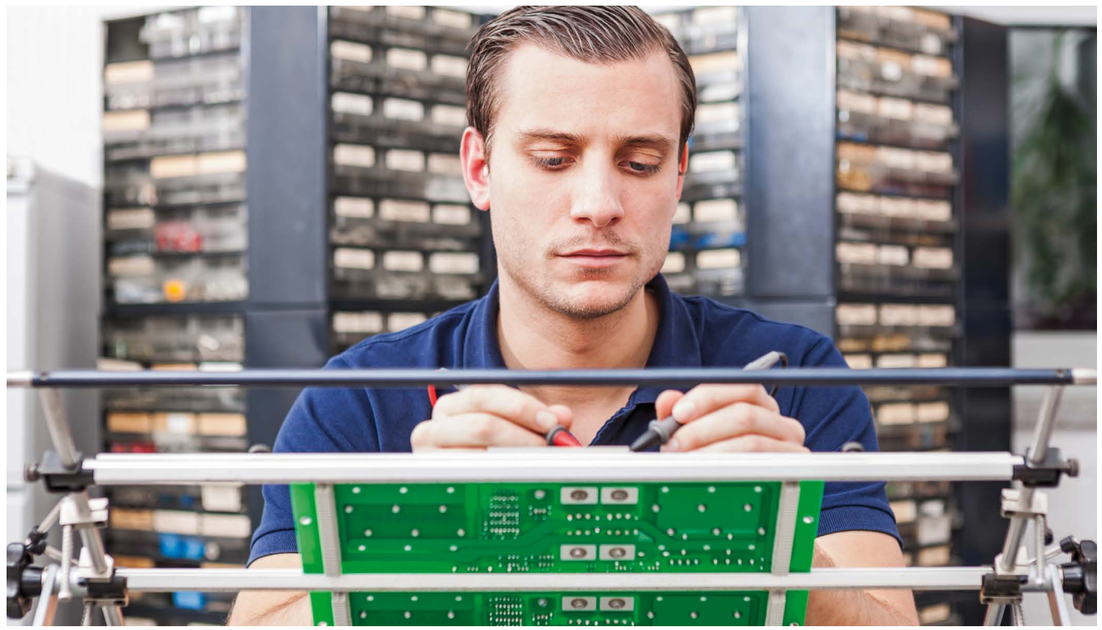
8.6 Automatic adjustment when changing the bottle type

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.



Circuit board test by a miho technician

8.7 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 steell
- Easy to disassemble and clean
- Central drain in the infeed and outfeed areas
- Easy to upgrade

8.8 Undervoltage supply

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

8.9 Separate computer 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. 4 GB RAM, min. 250GB SSD, min. 2x PCIe slot, min. 2x Ethernet (RJ45), min. 1x VGA or DVI / HDMI, screen resolution min. 1400x1050 pixels, operating system Microsoft Windows 10 Professional (min. Version 1803, 64bit), German or English.

8.10 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

8.11 Air condition unit (compressor cooling unit):

Function

Air condition unit (compressor cooling unit):

The basic machine remains a closed over-pressure chamber, no contamination through outside air, no condensation inside.

Technology

- Cooling power (L35/L35): 400 W
- Dimensions: 340 x 520 x 110 mm
- Compressor type: Rotary compressor
- Cooling liquid / GWP R134a / 1430

8.12 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

Empty bottle inspector miho David 2 with safety cover

9 Infeed controls

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

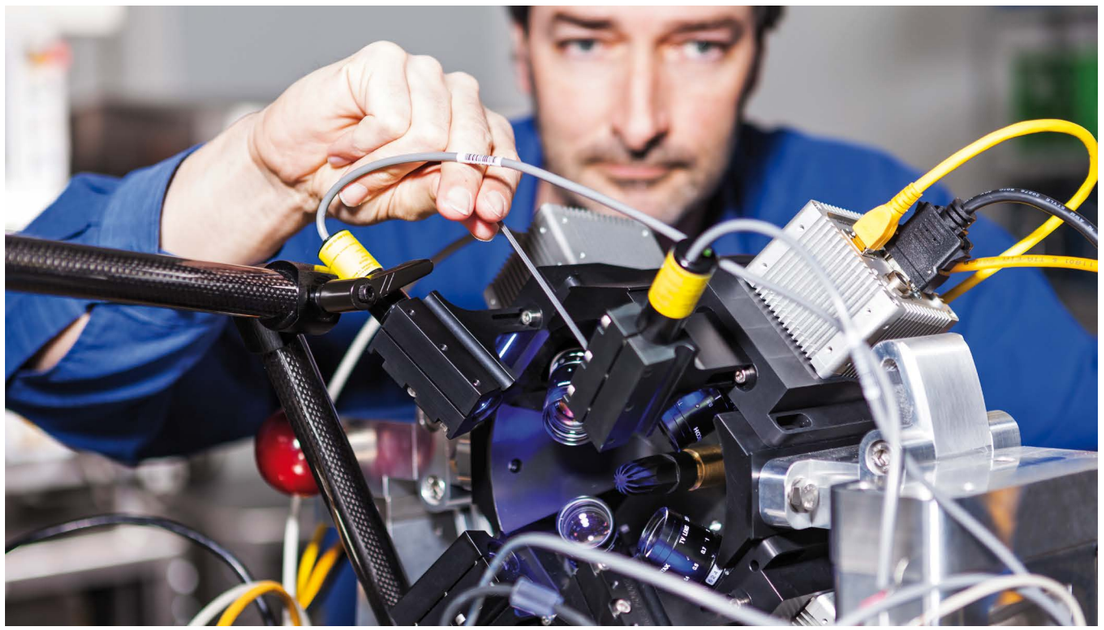
9.1 Infeed control miho Unicon 4

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 infeed control (lying bottles, broken bottles) before the empty bottle inspector
- sorting in accordance with shape, colour and differences in size
- compensation of disruptive factors such as labels sticking out, drinking straws etc...
- independent of the container material, even PET
- sorting of bottles based on secondary features such as embossing, permanent labels or degree of scuffing

Technology

- image processing system miho VIDIOS® and modern colour camera system, innovative lighting concept
- rejection in accordance with different sorting criteria to different reject channels is possible
- glass-PET distinction is a possible option
- control and reject monitoring by the empty bottle inspector

Infeed control miho Multicon 4

David 2 | 2021.07

10 Reject systems

miho rejection - three 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**

10.1 Reject system miho HSP

Function

- to reject the faulty bottle via a pneumatic pusher
- including reject monitoring in the empty bottle inspector

10.2 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

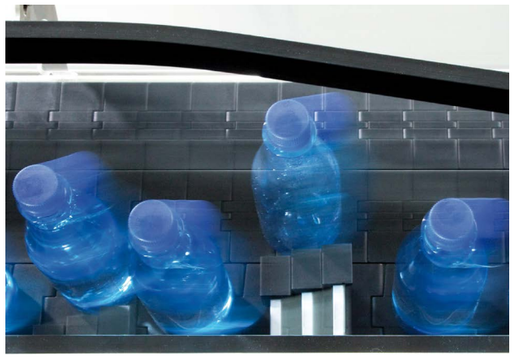
10.3 Segment reject system miho Leonardo M

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

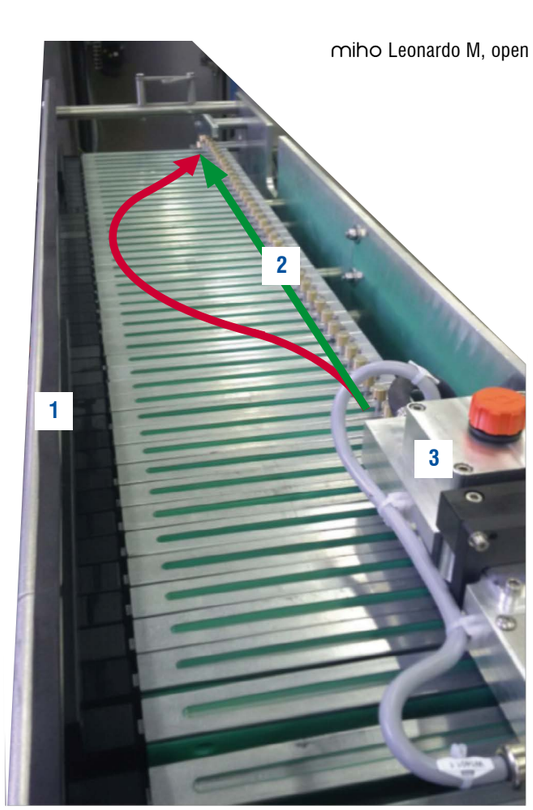
- magneto-mechanical reject system: containers to be rejected are transferred to a parallel conveyor by slide segments which run synchronously and parallel to the conveyor
- gearless drive via toothed belt, thus less mass movement and low-wear
- torque monitoring of the servomotor through slip clutch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



miho Leonardo M, slide segments in action

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).



miho Leonardo M, open

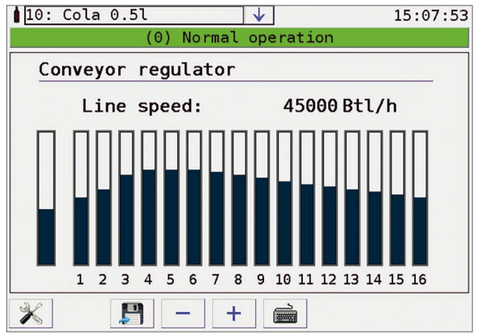
David 2 | 2021.07

From a single source:

Empty bottle inspector miho **David 2** + **Conveyor control** miho **Pascal 2** + **Container transport** miho **Conveyance**

▪ Conveyor control

- contactless compensation of bottle gaps: reducing the noise and bottle abrasion
- **one** single control unit from the washing machine to the filler
- a modern conveyor control system brings efficiency, less disruption, less idle running at the filler



Display of different motor group speeds

11.1 Intelligent conveyor control system miho Pascal 2

Function

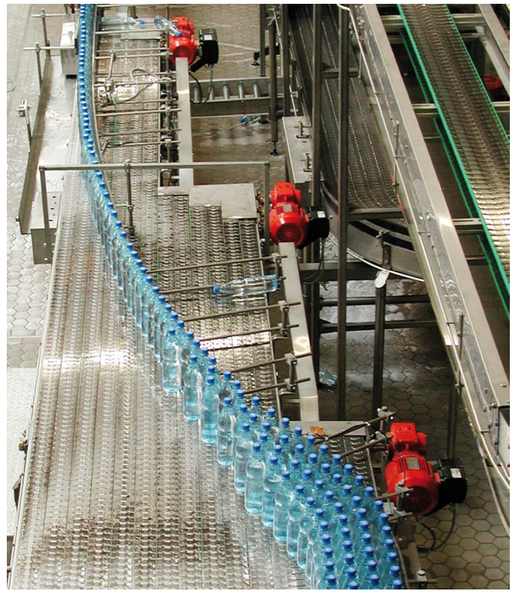
- early detection of one of the nominal output deviating transportation capacities of the bottle line
- gaps created by rejected containers are compensated for without any container contact
- smooth and low noise gap closure for smooth bottle transport
- buffer control, isolation and single-lane blocking between two aggregates with only one control module miho Pascal 2
- reduction of aggregate interference from a lack of bottles at the infeed
- remote-controllable change of bottle type, no user intervention is necessary
- the operator is informed of the status of the system with messages in the local language
- alarm detectors can also inform on plant status on the spot
- user administration with individual access authorization of the operators

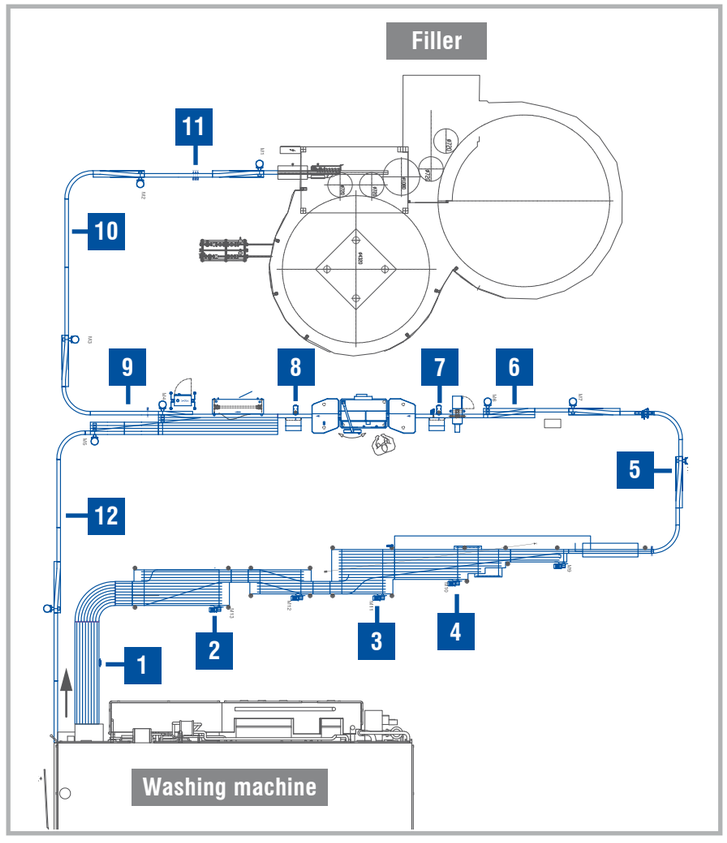
Technology

- microcontroller technology for quick responsive conveyor control in real time
- millimetre-precise detection of gap size
- no counting method: removing or adding bottles has no influence
- Allocation of the system section into up to **16 motor groups** with different speed adjustments
- production data acquisition in accordance with Weihenstephan standard and remote visualization for example, in the foreman's office
- a **graphical user interface** with touchscreen makes operating for the user even easier
- Data backup of user-specific parameters on SD card
- no additional software necessary
- easy integration of the miho Pascal 2 into existing bottling plants.
- up to 18 gap sensors and up to 8 buffer sensors

11.2 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.





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

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

11 miho Conveyance container transport

From a single source:

Empty bottle inspector miho **David 2** + **Conveyor control** miho **Pascal 2** + **Container transport** miho **Conveyance**

▪ Conveyance

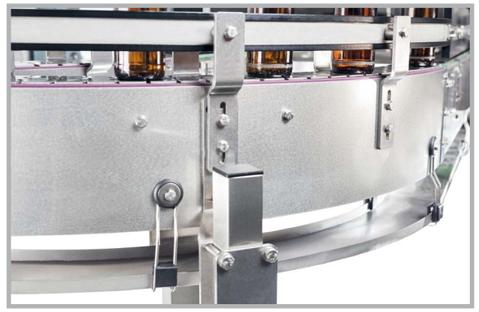
- Conveyor construction made out of stainless steel
- Depending on the project conveyor chains made out of stainless steel or plastic are possible (Rexnord)
- Curved conveyors with magnetic chain guides
- Chain sprockets are dividable
- Bottle railings are made out full profile stainless steel, with plastic bottle guides depending on the requirements of the project
- Railing holders made of stainless steel, adjustable where necessary
- Piping for conveyor lubrication made of stainless steel pipes, for the connection to the existing lubrication system
- Stainless steel wire-basket cable trays, open. Other variations upon request

11.3 Container transport system miho Conveyance

- modular container transport system for 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

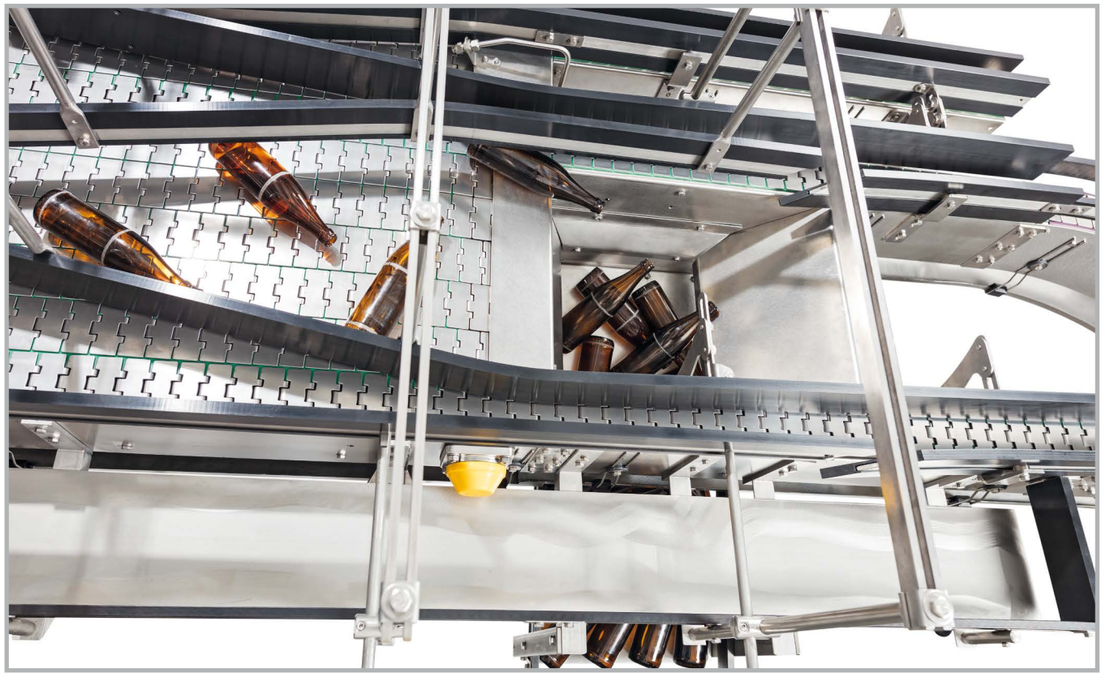
Reject table, with belt lubrication, height-adjustable foot receptacle and optional drip tray



Curve with optional drip tray and height-adjustable foot

Two-sided rail adjustment

Optional conveyor belt cover

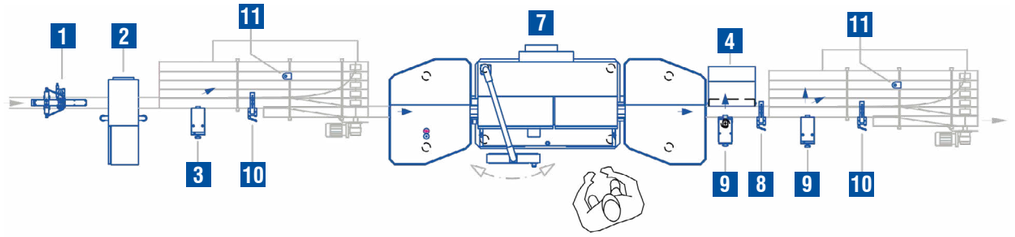


miho Conveyance, individual special solution for collecting lying bottles in hard to reach places

12 Recommended installation | Technical Data

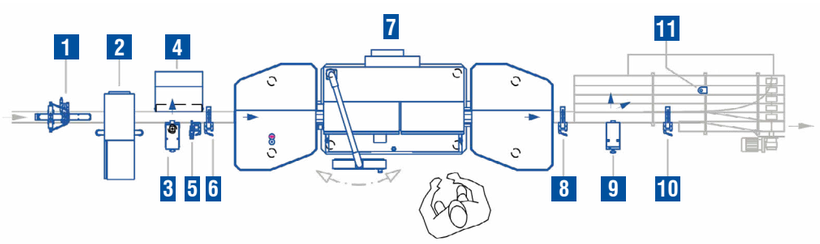
12.1 miho David 2 with dual sidewall inspection and miho FSI as well as an additional reject table for the infeed control

Recommended installation



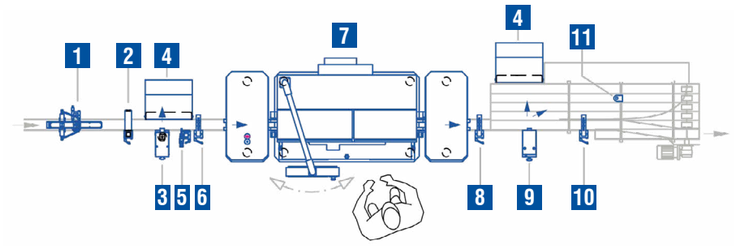
12.2 miho David 2 with dual sidewall inspection and miho FSI

Recommended installation



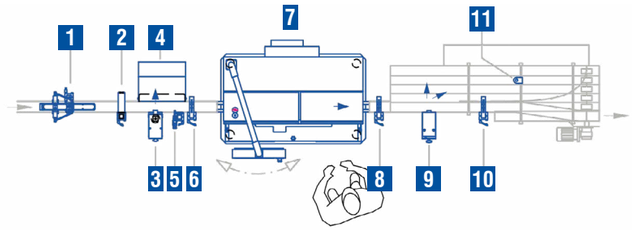
12.3 miho David 2 with standard sidewall inspection

Recommended installation



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

Recommended installation



Legend

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

CONVEYOR CONTROL
miho Pascal 2

PRODUCTION DATA ACQUISITION
miho AWeS

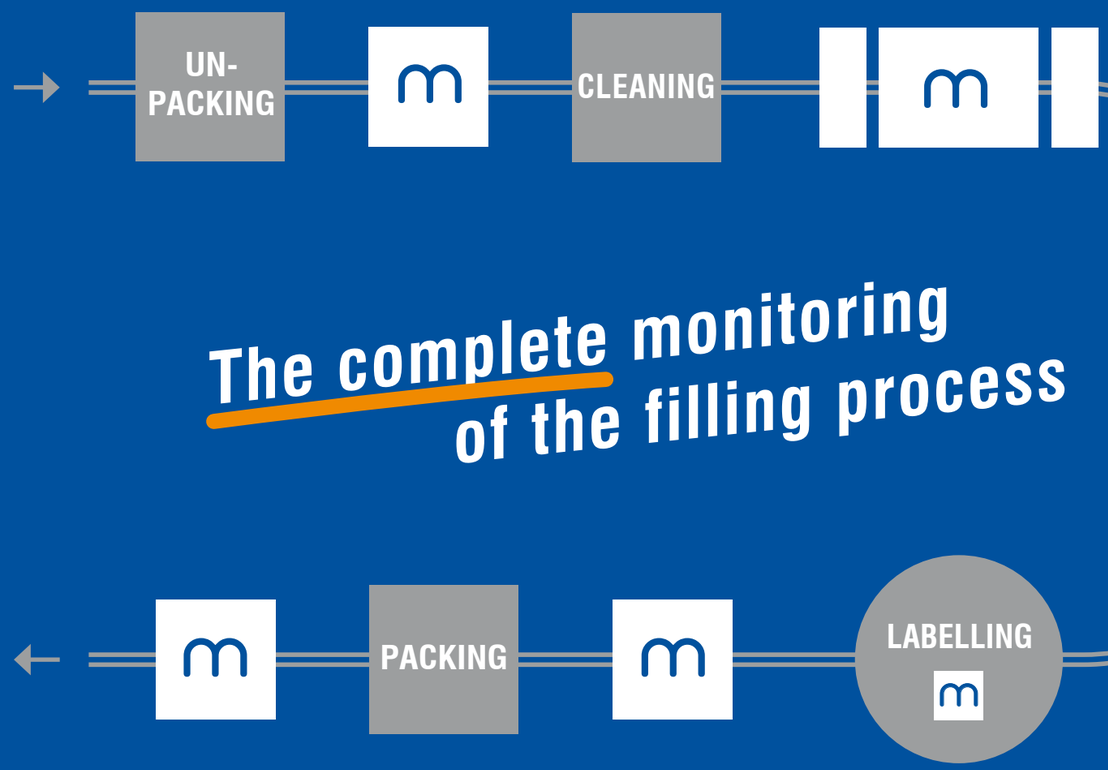
EMPTY CRATE INSPECTION
miho Gauss E

SORTING
miho Multicon 4

CLOSURE CONTROL
miho CAP 2

EMPTY BOTTLE INSPECTION
miho David 2

RESIDUAL LIQUID DETECTOR
miho LC 2



FILLER MONITORING
Filler Monitor miho FM 2
Filling Pipe Detection miho MX 2
Bottle Counter miho FZ 2

FILL LEVEL & CAP CONTROL
Optical: miho Newton Optics 2
X-Ray: miho Newton X 2
Infrared: miho Newton IR 2
High Frequency: miho Newton HF 2

REJECTION
High Speed Pusher miho HSP
Multi-reject System miho HSPM
Linear Reject System for bottles
miho Leonardo M

SHRINK PACK CONTROL BEVERAGE CARTON TRAY CONTROL
miho Gauss P

FULL CRATE INSPECTION
miho Gauss F

SEALING INSPECTION- & VACUUM CONTROL
PET-Sealing Inspection miho Feeler 2
Vacuum Control miho VacU

END-OF-LINE INSPECTION
360° end-of-line inspection miho Allround 2

LABEL INSPECTION
Reflected light sensor: miho EC 2
Camera: miho EC-Cam

The complete monitoring of the filling process

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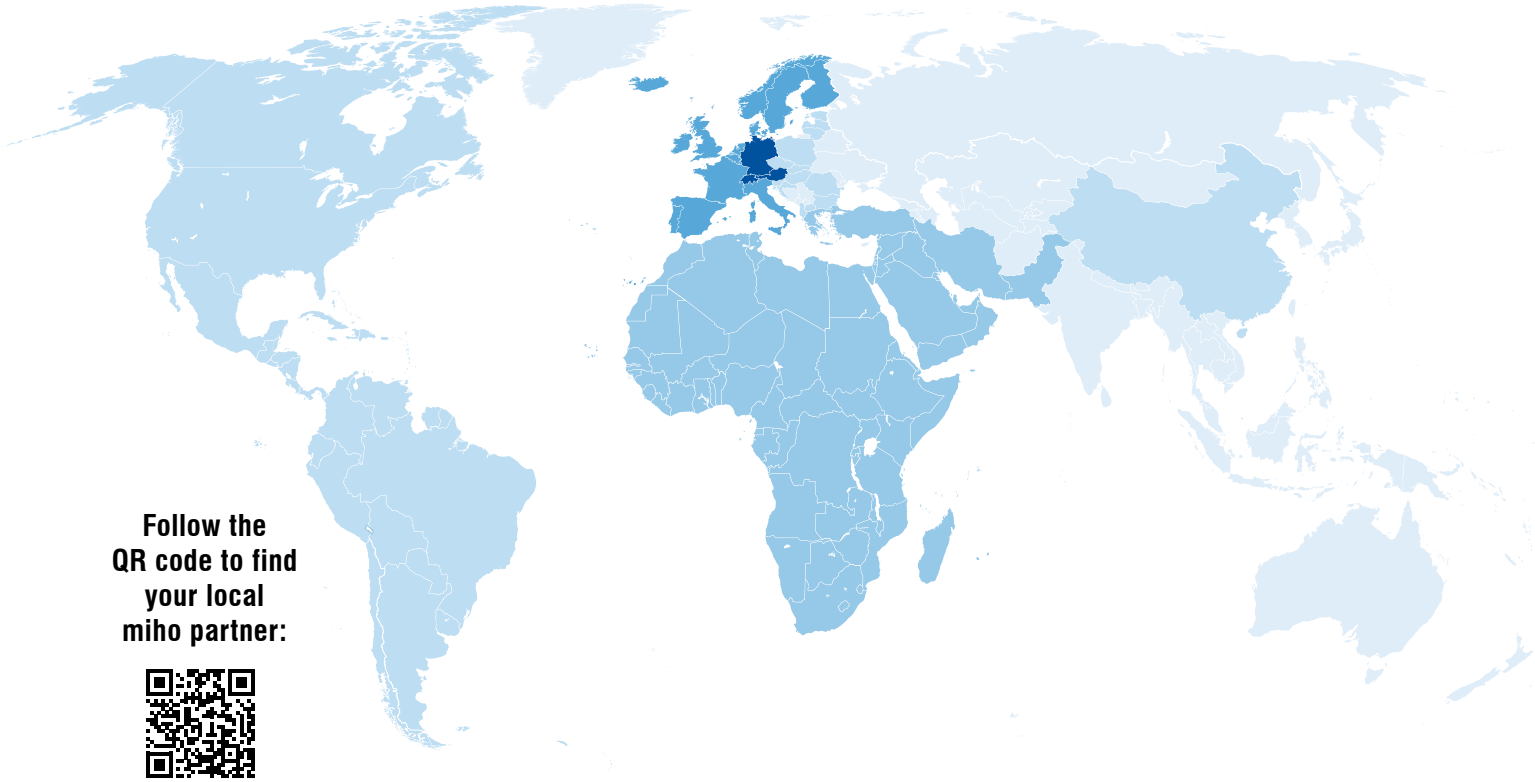

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