

Empty pallet inspection

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Basic Data

The basic configuration of the empty pallet inspection is configured for the inspection of Euro pallets. Depending on the task, other pallet formats can also be checked.

The regulation and control of the system is implemented with the EtherCAT field bus system. A remote maintenance connection is planned.

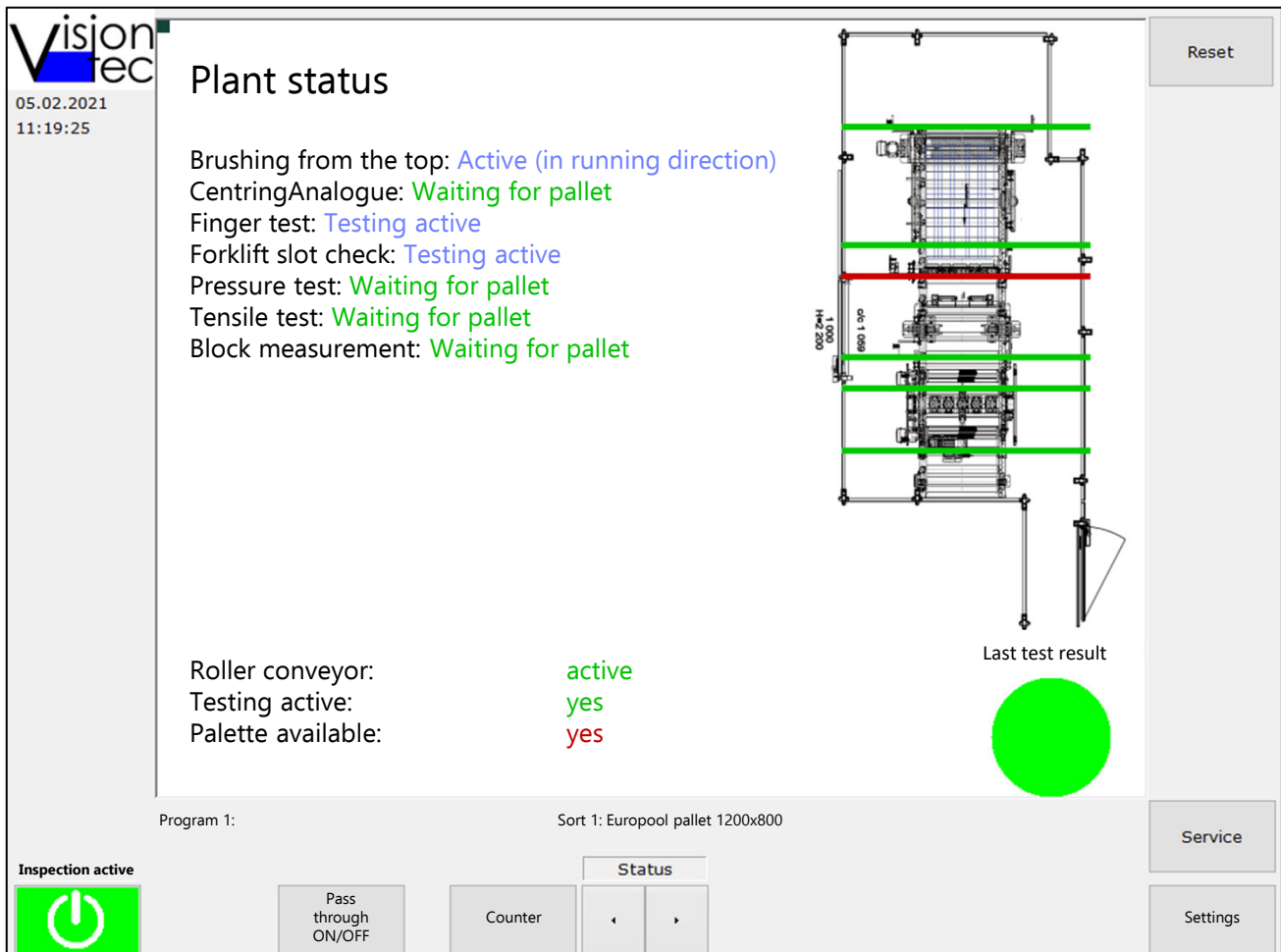
The pallet inspection is equipped with an industrial PC. All inspection functions and possible malfunctions are visualized on the graphic interface.

For rejection or for a conveyor stop a potential-free signal is transferred.

All inspection results are counted, stored as a CSV file and can thus be processed with Excel.

Technical Specifications:

- Power supply: 3L/N/PE 400 V
- Power consumption: approx. 2 kW/h
- Compressed air supply: 6 bar applied
- Supply line: ½"
- Air consumption: approx. 0,02 m³ per Pallet



The screenshot shows the 'Plant status' interface. In the top left corner, the Visiontec logo is displayed along with the date '05.02.2021' and time '11:19:25'. The main area lists various inspection functions and their current states: 'Brushing from the top: Active (in running direction)', 'CentringAnalogue: Waiting for pallet', 'Finger test: Testing active', 'Forklift slot check: Testing active', 'Pressure test: Waiting for pallet', 'Tensile test: Waiting for pallet', and 'Block measurement: Waiting for pallet'. Below this list, three specific status indicators are shown: 'Roller conveyor: active', 'Testing active: yes', and 'Palette available: yes'. To the right, a technical diagram of the inspection station is shown with horizontal lines indicating sensor positions. A 'Last test result' is displayed as a large green circle. On the far right, there are 'Reset', 'Service', and 'Settings' buttons. At the bottom, the interface includes 'Program 1:', 'Sort 1: Europool pallet 1200x800', an 'Inspection active' indicator with a power button icon, a 'Pass through ON/OFF' button, a 'Counter' button, and a 'Status' button with left and right arrow icons.

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Inspection criteria

Pallet dimensions

The width, the length and the height of the pallet are checked with sensors.

Inspection accuracy:

- pallet width > 30 mm above nominal width: 99%
- pallet length > 30 mm above nominal length: 99%
- pallet height > 15 mm above nominal height: 99%

The inspection is possible with an accuracy of 5 mm; in practice the above mentioned inspection values are used.

Pressure test with analogue displacement measuring system

Checking the stability of the top and bottom boards as well as the presence of the blocks is done with pneumatically operated pressure rollers. The transport rollers simultaneously press in protruding nails. The transport of the pallet is ensured by the knurled transport rollers.

The inspection is mounted between the two driven transport rollers so that a safe transport of the pallet is possible during the continuously pressure test.

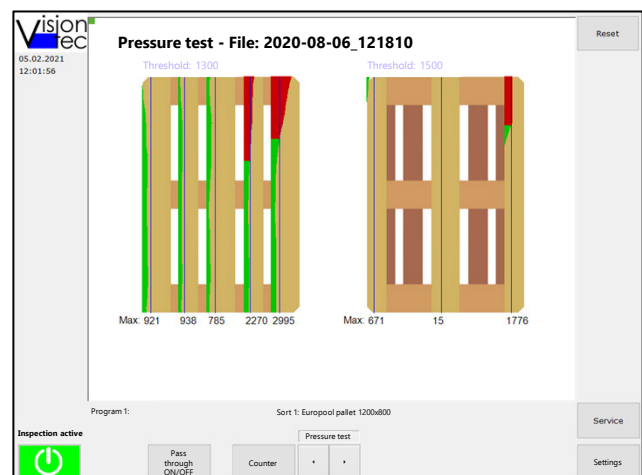
For the pressure test, a cylinder and a pressure roller are provided for each board. An analog distance measuring system is installed at the cylinder.

By evaluating analog data, the height tolerances of the pallets can be compensated without changing the measuring accuracy. Furthermore, bendings can be distinguished from breaks.

For pallets that have already been detected as defective in the previous stations, the pressure test is omitted in order to prevent malfunctions due to possible breakage of single boards.

Test pressure:

- Pressure test of 700 N per cover board
- Pressure test of 700 N per bottom board



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Cover boards

The longitudinal cover boards are checked for presence and breakouts with rockers and mechanical probes.

Inspection accuracy:

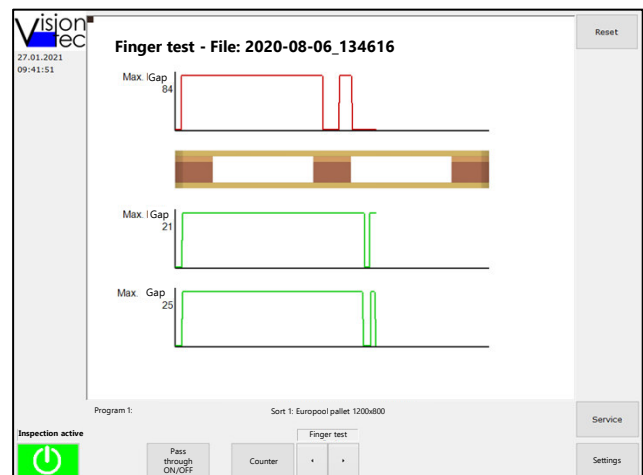
- Minimum breakout from 25 x 30 mm (WxL): 99 %

Bottom boards

The longitudinal bottom boards are checked for presence and breakouts with rockers and mechanical probes.

Inspection accuracy:

- Minimum breakout from 25 x 30 mm (WxL): 99 %

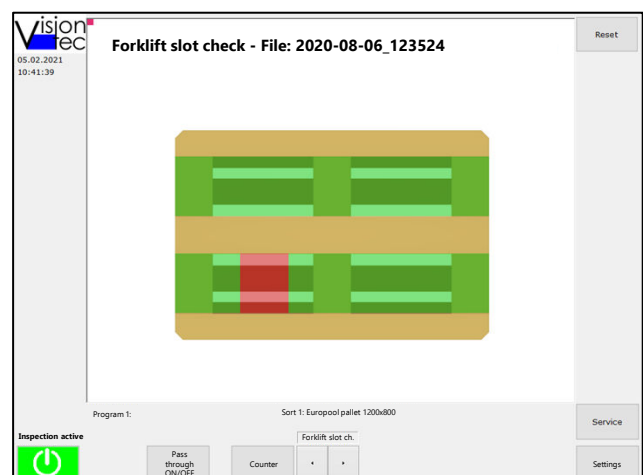


Forklift slot check

The free space between the blocks is ensured by checking with rockers and mechanical probes.

Inspection accuracy:

- Minimum clearance of 200 x 80 mm (adjustable): 99 %



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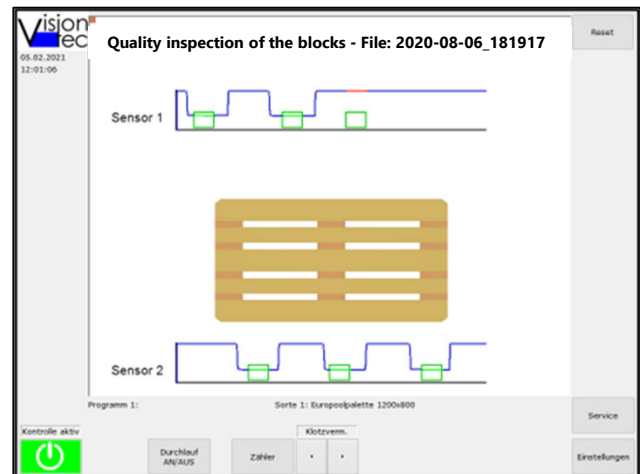
Options

Quality inspection of the blocks

To measure the block width and length, a differential ultrasonic system is used for each row of blocks (2 outside, 1 inside), which inspect the blocks while the pallet passes the inspection unit.

Inspection accuracy:

- Presence (without quality check): 99 %
- outwardly twisted blocks protruding > 15 mm: 99 %



Block Printing inspection

To check print images on the pallet blocks (e.g. "EUR" marking) from both sides, two laterally arranged camera systems are used.

These camera systems can also check the colour of the pallet (in case of significant differences).

Moisture measurement

Moisture measurement for measuring pallets to detect damp pallets. Moisture measurement involves measuring the conductivity of the pallets via metal contacts. Detection is made possible by the improved conductivity of damp pallets.

Camera inspection from above

Using a camera from above, several images are taken of the passing pallet, which can be used to evaluate the following inspection criteria:

- Presence of cover boards
- Presence of space between the cover boards
- breakouts on the outer board edges and pallet corners
- Detection of coarse dirt
- Detection of loose cardboard layers
- Pallet colour (in case of significant differences)
- Dirt stains/discolorations (in case of significant differences)

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Options

Brushing from the top

Rotating brushes located above the pallet are used to remove coarse dirt from the pallet.

Lateral brushing

Rotating brushes arranged next to the pallet remove coarse dirt from the pallet. The lateral brushing is automatically adjusted to the pallet width.

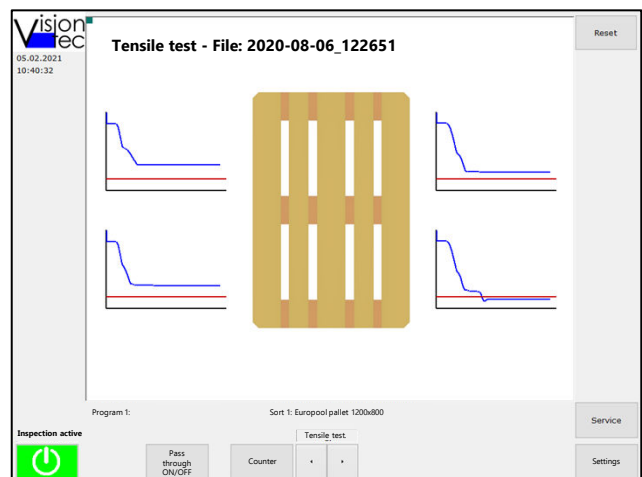
Suction system

The connection for a suction system is prepared. Suction systems can be supplied in different sizes (depending on requirements).

The dust and dirt whirled up by the rotating brushes is thus completely sucked up; additional dust contamination in the hall is avoided.

Tensile test

In Start/Stop operation, the connection of the outer bottom and cover boards is checked.



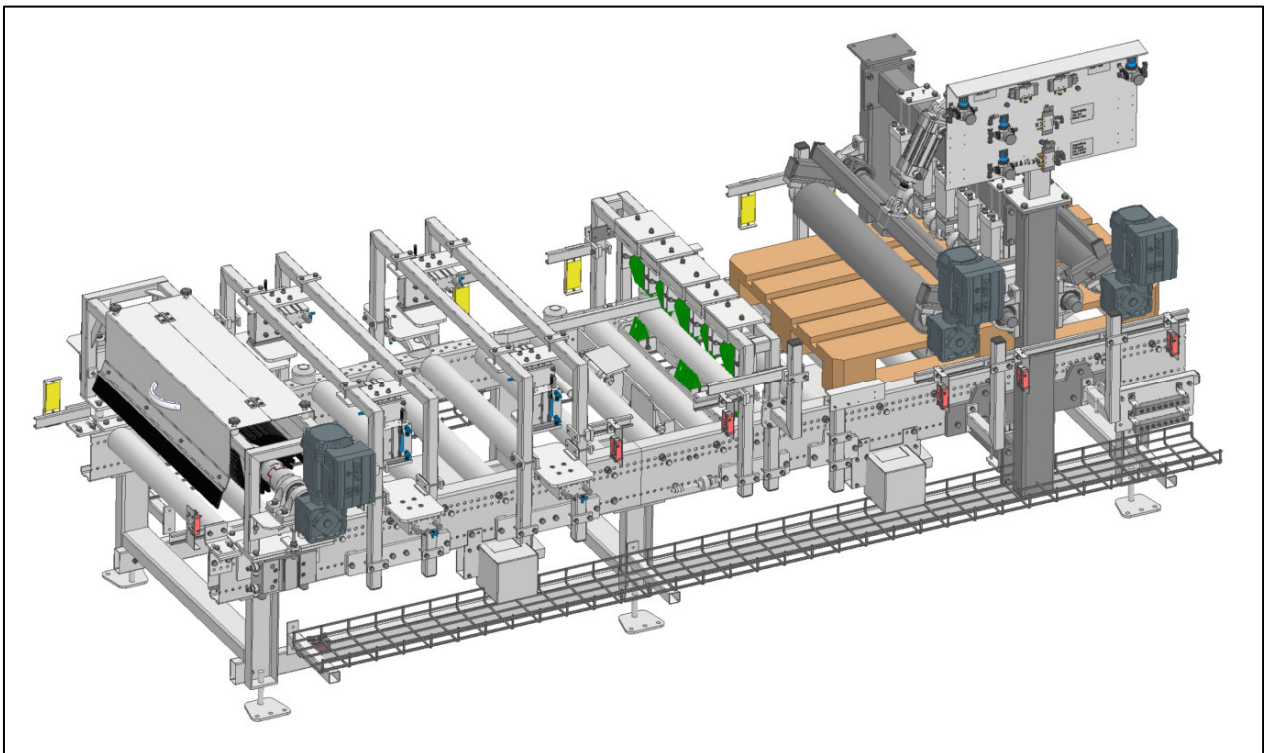
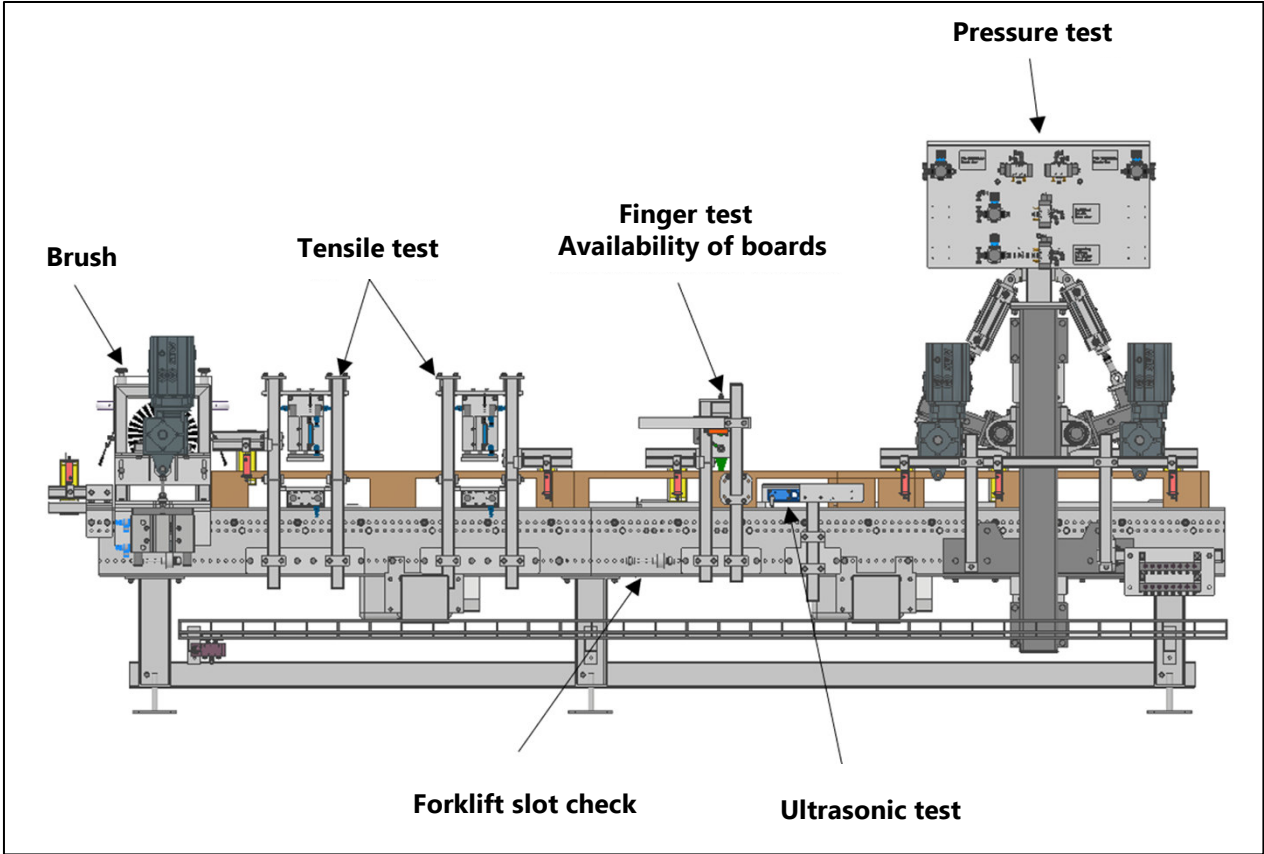
Weighing device

Weighing device for weighing pallets to detect fully soaked pallets.

One pallet segment is mounted on pressure cells so that the weight is determined on the pallet segment. The data from the pressure cells is evaluated in the electronic unit of the pallet inspection. Weight differences from 5 kg are reliably detected.

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Side view of empty pallet inspection unit (depending on equipment)





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