

Cyclops

Automatic on-loom inspection



The Cyclops automatic on-loom fabric inspection system detects warp, filling and point defects by means of a moving camera system installed on the off-loom take up.

In case of a warp defect or a concentration of filling or point defects, the system stops the loom, lights a warning lamp in the loom's light tree and informs the defect nature and location on the loom's microprocessor display. The system holds the loom in the stopped position till the weaver has made the "defect corrected" declaration.

Connected to the BMSvision **QUALIMASTER** system, all defect information, pick and time stamped, is sent to a fabric quality database. This allows producing defect maps and various types of quality reports.

Interaction with the weaving machine

The on-loom fabric inspection system communicates with the microprocessor of the weaving machine. In case a running defect is detected, the on-loom fabric inspection system stops and holds the loom, preventing to continue the production of defective fabric. Before the loom can be put back in production, the weaver has to make a declaration, confirming that the defect cause has been eliminated.

The weaver's declaration also allows further specification of the nature of the defect for which the loom has been stopped by the **CycLOPS** on-loom fabric inspection system.

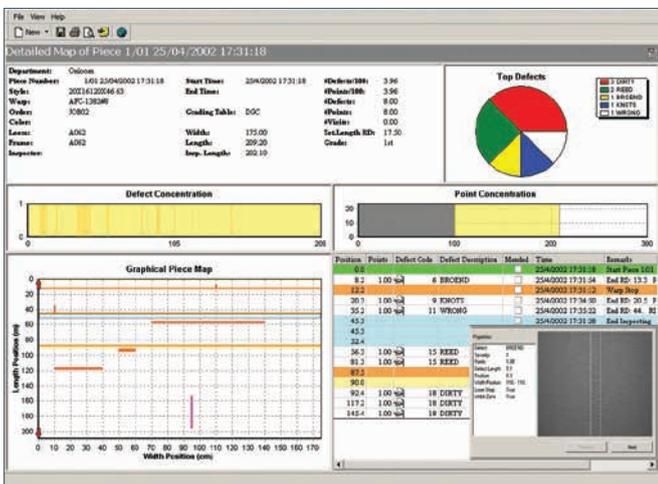
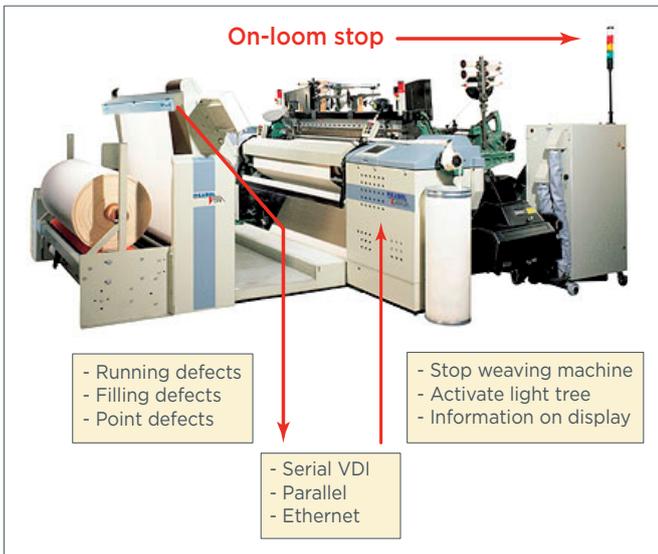
In order to help the weaver, a lamp in the loom's light tree is activated indicating the stop and a message on the loom's display informs the weaver about the nature and location of the fabric defect.

The loom will be stopped for any detected running warp defect as well as for a too high concentration of weft or filling defects in a set length of fabric.

Connection to QualiMaster

All detected defects are transmitted to the **QUALIMASTER** system. In order to complete the information, each defect is marked with time, date and pick stamp. This allows locating the defect in the cloth roll, to generate quality reports by weaver, per shift, per style and many more.

A typical application of **QUALIMASTER** is the "by-pass" software. At cloth roll doffing, the system formulates a fabric quality advice. In case, based on the number and concentration of the detected defects, the fabric is judged to be first grade, the system will indicate on the loom's display that the cloth roll can pass the greige cloth inspection and can be sent on directly for further processing.



On-loom inspection "by pass" at doffing

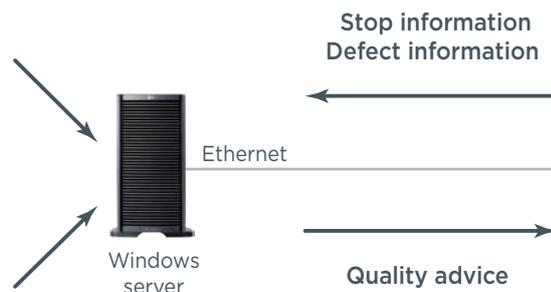
Quality risk

Calculation based on:

- Number of defects
- Number of warp and filling stops
- Number of technician interventions
- Concentration of above events

Quality advice

- By-pass greige inspection if no quality risk
- If a quality risk present, proceed to greige inspection

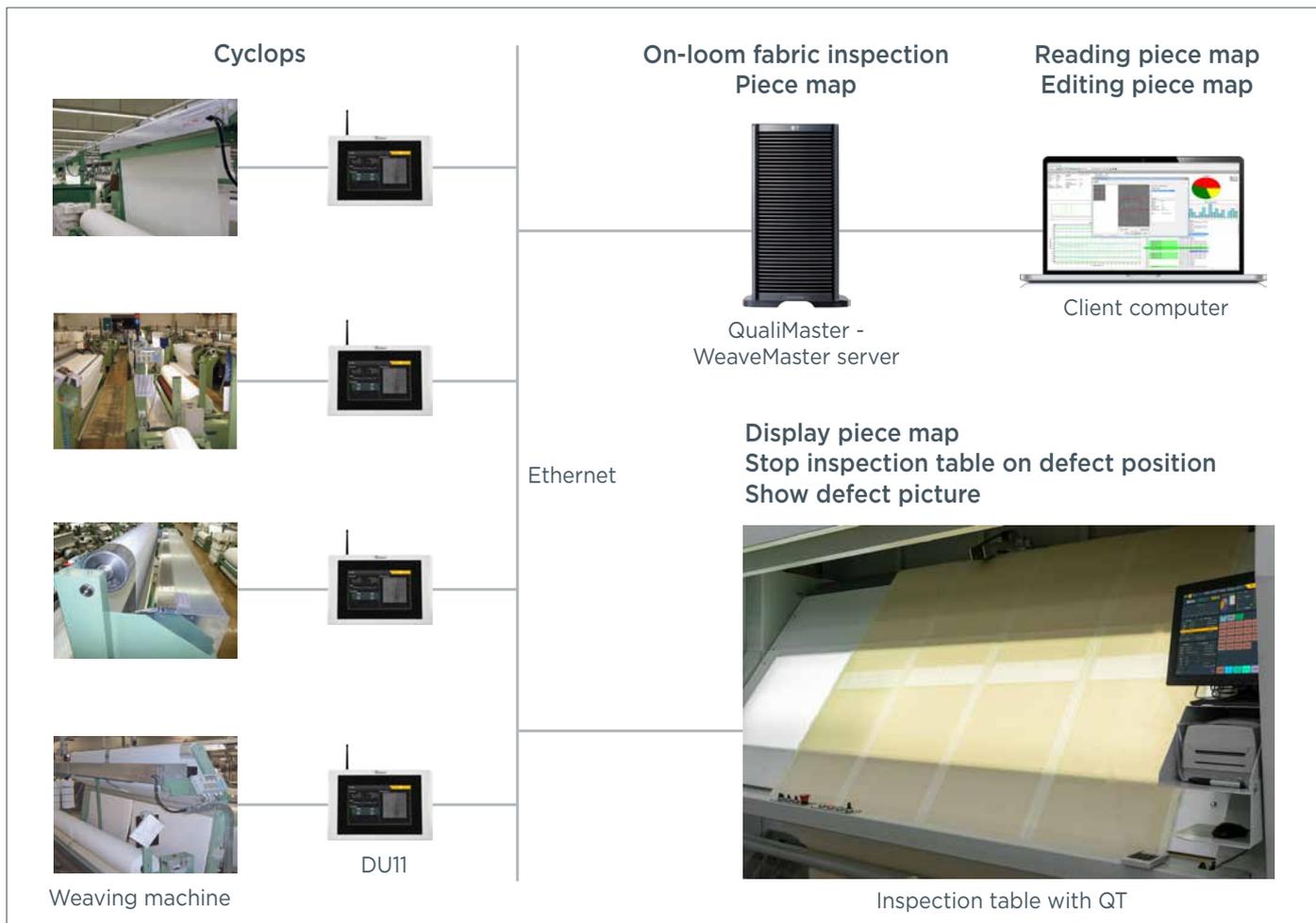


Machines

Feedback to grey inspection

The pieces which have been marked “quality risk” by the by-pass software, are re-inspected and possibly mended on a grey inspection table. Upon identifying the piece at the inspection table, **QUALIMASTER** sends the piece map in reversed order to the **QT** fabric inspection terminal mounted on the table. The

QT I/O-unit can interface with the speed control of the inspection table, allowing high speed forwarding in defect free zones and slowing down the speed of the table when approaching a mendable defect. This feature significantly increases the efficiency in the mending department.



Benefits and advantages

- Real time defect detection allowing to stop the loom and prevent the production of defective fabric.
- Independent of human perception.
- Higher fabric quality, less second choice.
- Automatic fabric grading based on customer defined rules.
- Lower work load in greige inspection department.
- No investment needed in automatic inspection of loom state fabric.
- Integration with **QUALIMASTER** and **WEAVEMASTER** loom monitoring system.
- Easy to install.
- No maintenance required.
- Support for back and front inspection.

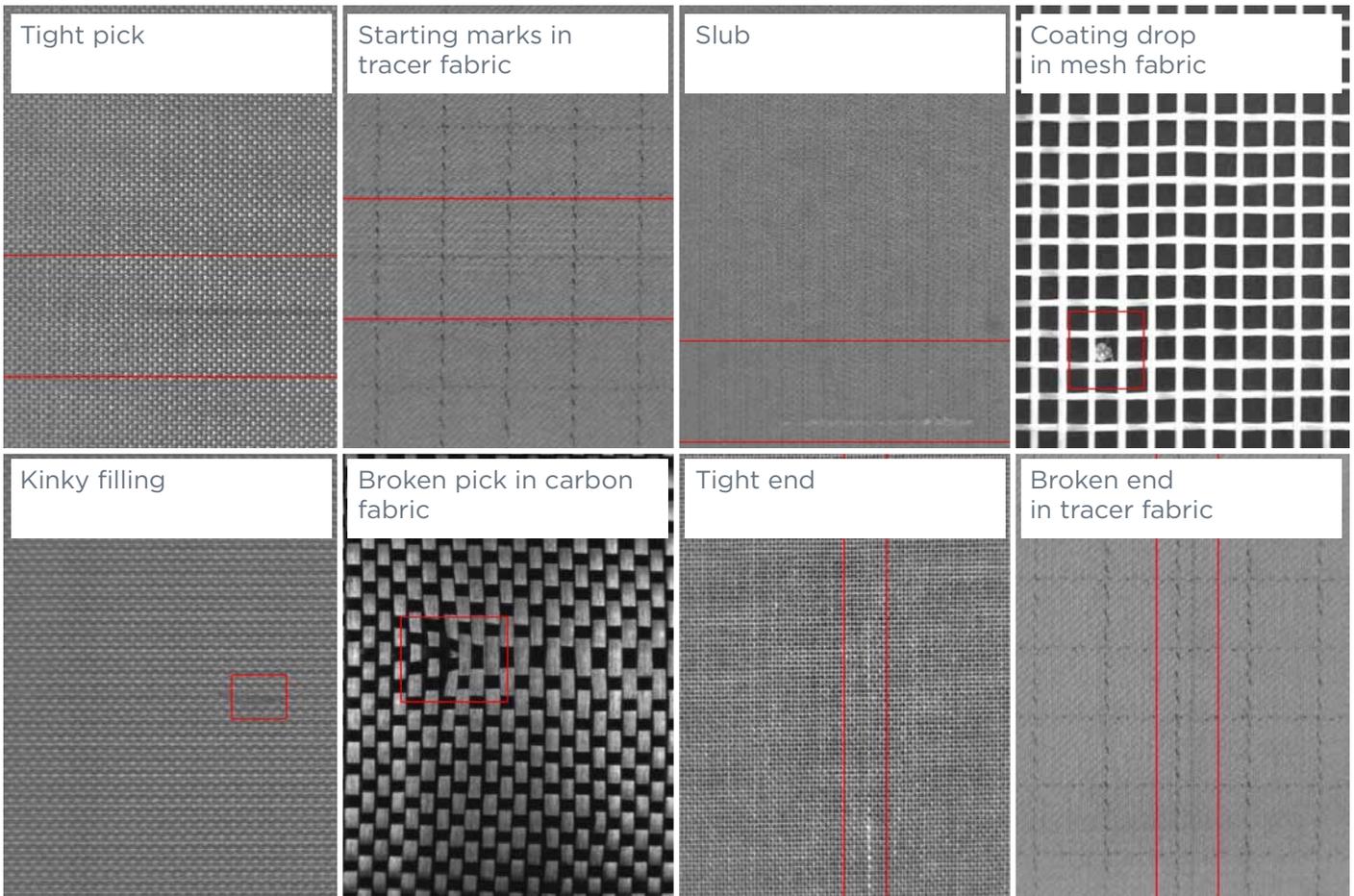
Specifications

- Maximum available scan width (reed width): 560 cm.
- Single panel looms (maximum 360 cm): single camera scanner (scan speed 54 cm/s).
- Multi-panel looms (maximum 560 cm): double camera scanner (scan speed 27 cm/s).
- Standard illumination: infrared LED. Blue LED optional for enhanced stain detection.
- Scanning resolution: 10 pixels/mm.
- Loom interface: VDI, Ethernet.
- Shop floor network: Ethernet.
- Power supply: 100 to 240 VAC / 50 to 60 Hz, 50 W power consumption.

Installation

On the off-loom take up or batching motion.

Typical defects in fabric detected by Cyclops



Principle of operation

The **CYCLOPS** on-loom fabric inspection unit uses one or two moving image acquisition heads, consisting of a camera and illumination unit, installed on the off-loom take up. While scanning across the fabric, images are taken and transferred to the image processing unit. Here, proprietary algorithms are applied to analyze the texture of the fabric and to detect deviations from standard. Any detected defect is signaled to the loom.

Setting up the **CYCLOPS** system is very simple. The scanning range is self-adjusted to the fabric position and width by automatic detection of the fabric boundaries. Illumination and camera settings are optimized by the calibration software module in relation to the optical characteristics of the fabric. Also, the structure of the fabric is automatically identified in order to calculate the algorithm parameters for optimal defect detection.

Inspection of kevlar and carbon fabrics

Due to their specular reflecting nature, kevlar and carbon fabrics are extremely difficult to inspect. A specially designed **CYCLOPS** measuring head exploiting the reflection characteristics of these fabrics, together with dedicated software algorithms, guarantee a 100% reliable on-loom inspection system for these high cost fabrics.

References



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