BMSvision

empowering productivity

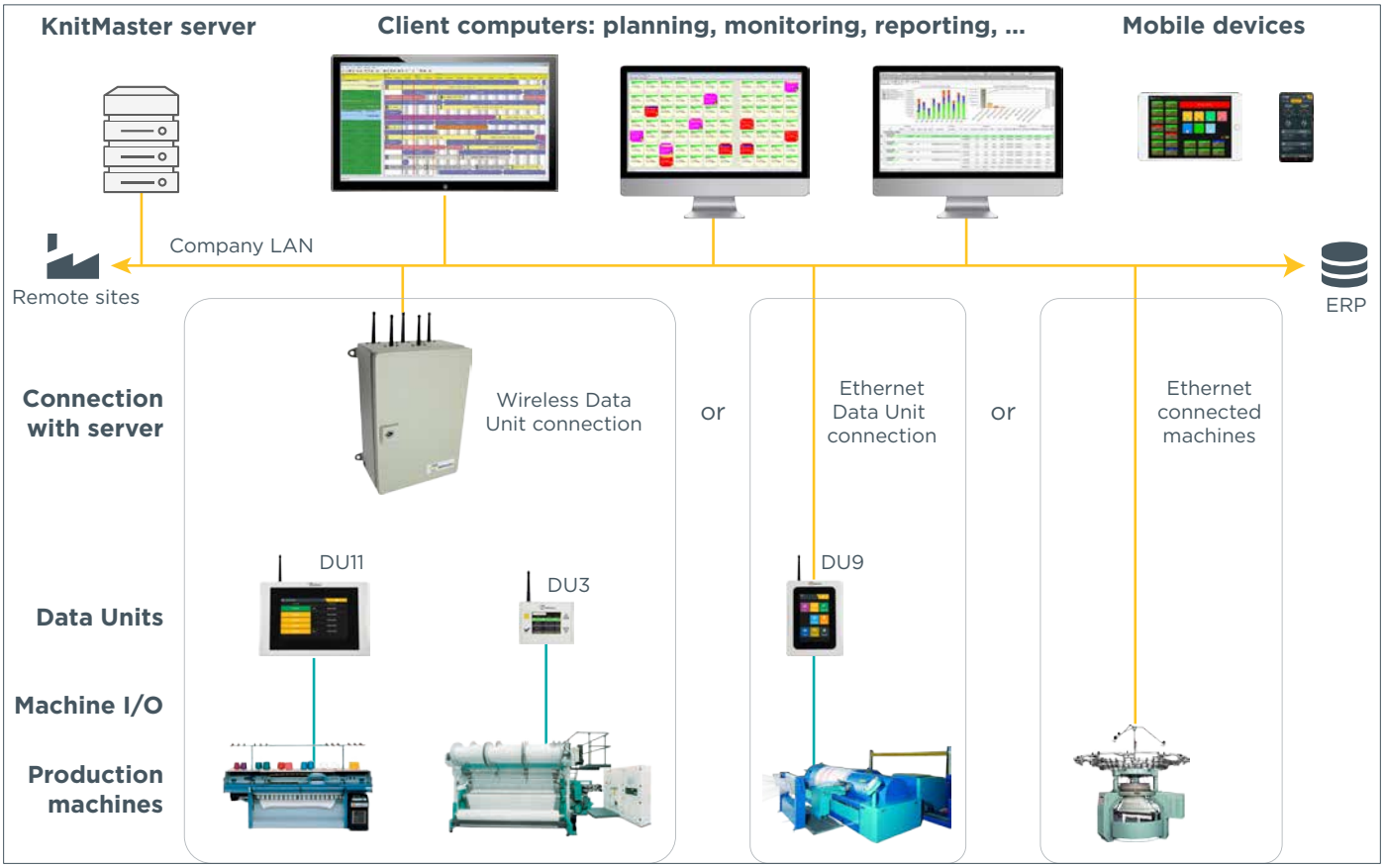
KnitMaster

Manufacturing Execution System (MES)

KnitMaster is the world's leading MES system for the knitting industry. It monitors and synchronizes all manufacturing and logistic activities within the knitting mill, from yarn purchasing and inventory up to the shipment of the finished fabric.

Powerful analysis tools allow quick identification of bottlenecks resulting in optimal usage of production capacities.

KnitMaster concept



Networking the machines

KnitMaster supports both cabled and wireless networks to connect the machines to the central server. Machines are equipped with one of BMSvision's Data Units (see next page) for automatic as well as manual data collection or linked directly to the server through their built-in Ethernet interface.

Connecting remote sites

KnitMaster supports the connection of multiple plants to one central server. On remote sites, the BMSvision Data Units are connected to the KnitMaster system via the company's multi-site LAN. A dedicated "multi-site consolidation module" on the central KnitMaster server allows integrated reporting for all sites into one single reporting environment.

System requirements

KnitMaster is Windows based and can be installed both on physical systems and in a virtualized environment. Application and database can run on separate servers. The database is Oracle or SQL driven. Also Terminal Services like Citrix are supported.

ERP system integration

KnitMaster is easily integrated with the customer's ERP system. Through a standard interface, order and product data is transferred from the ERP system and imported in the KnitMaster database.

The integrated export functionality allows a straightforward upload of production data, calculated production schedules, work in progress and performance indicators from KnitMaster to the ERP system.

Microsoft Dynamics AX
Microsoft Dynamics NAV
Microsoft Dynamics 365
intex
ORACLE
SAP
update
JOMAR
infor
datatex
we make IT work for you

Connecting machines to KnitMaster

DU9

Machines with parallel interface, preparation and finishing machines

The IoT ready Data Units **DU9**, **DU11** and **DU15** have been designed for maximum flexibility and optimal user friendliness. They feature a color touch screen and a graphical user interface and can be connected with wired Ethernet, with the proven BMSvision Bluetooth based wireless network interface or through the customer's Wi-Fi network. On screen language selection allows to switch between several western and Asian languages on the spot.

Machines with parallel interface, warp preparation and finishing machines are connected by means of either **DU9** or **DU11** Data Units. Production count and automatic stop signals, such as needle breakage, yarn breakage, doffing, ... are wired to the parallel inputs of the Data Unit.

On the **DU11** and **DU15**, documents can easily be downloaded from the server and visualized. This way, quality control documents, setup data, design information, ... are available right where the operators needs them. This is a major step towards "paperless production".

Special versions of the **DU11** are available for direct and sectional warpers as well as for sizing and finishing machines, allowing real time monitoring of speeds, yarn breaks and eventually process parameters such as temperatures and pressures.

All Data Units except **DU2P** can be extended with Backup & Recovery, allowing a minimum of 24 hours local data storage in case of server or network breakdown.

DU11

DU15

Machines with Ethernet interface

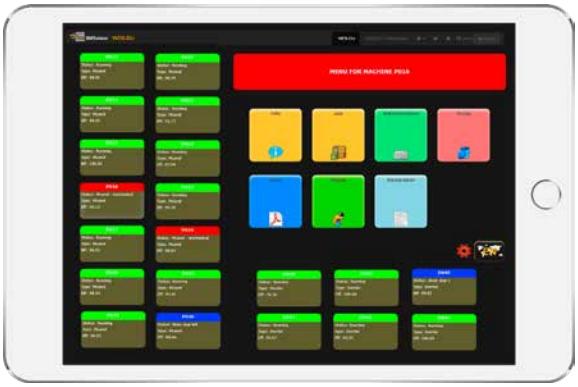
Latest generation looms equipped with Ethernet interface are either connected through a standard Ethernet network or by means of the **DU7** (wired or wireless) in case full back up and recovery is required.

Examples are the Karl Mayer warp knitting machine with KAMCOS controller and Mayer & Cie circular knitting machines.

The **OPCConnector** is a user-friendly tool allowing easy and straightforward integration of any machine OPC server available on the network. It can be configured to interface with any OPC UA server without the need for extensive programming thus reducing the total investment as well as the cost of ownership for the MES system.

WEB-DU: HMI for multiple machines

The **WEB-DU** application is used as HMI for a group of machines that are equipped either with **DU2P** or **DU7** headless devices for automatic data collection (production count, automatic stops, ...) or that are connected via Ethernet. **WEB-DU** can be implemented on any browser enabled touch screen device such as PC, tablet and smartphone. BMSvision offers the **WEB-DU** including a Touch Panel PC with a 15.6" display.



DU7

DU2P

Real time production visibility for quick response and analysis

Real time monitoring

KNITMASTER's most important real time analysis tool is the PLANTVIEW. On this color-coded layout of the mill, the machines are displayed in a number of colors, each color indicating a certain machine status or alarm condition.

The user selects the type of information to be displayed. User definable "filter sets" allow the user to display only these machines which correspond with a certain condition, for example all machines with an efficiency below 85%, all machines waiting for an intervention, machines producing a specific style, ...

A "mouse-click" on a specific machine opens a window with a detailed report showing all required information for the selected machine.

Reporting

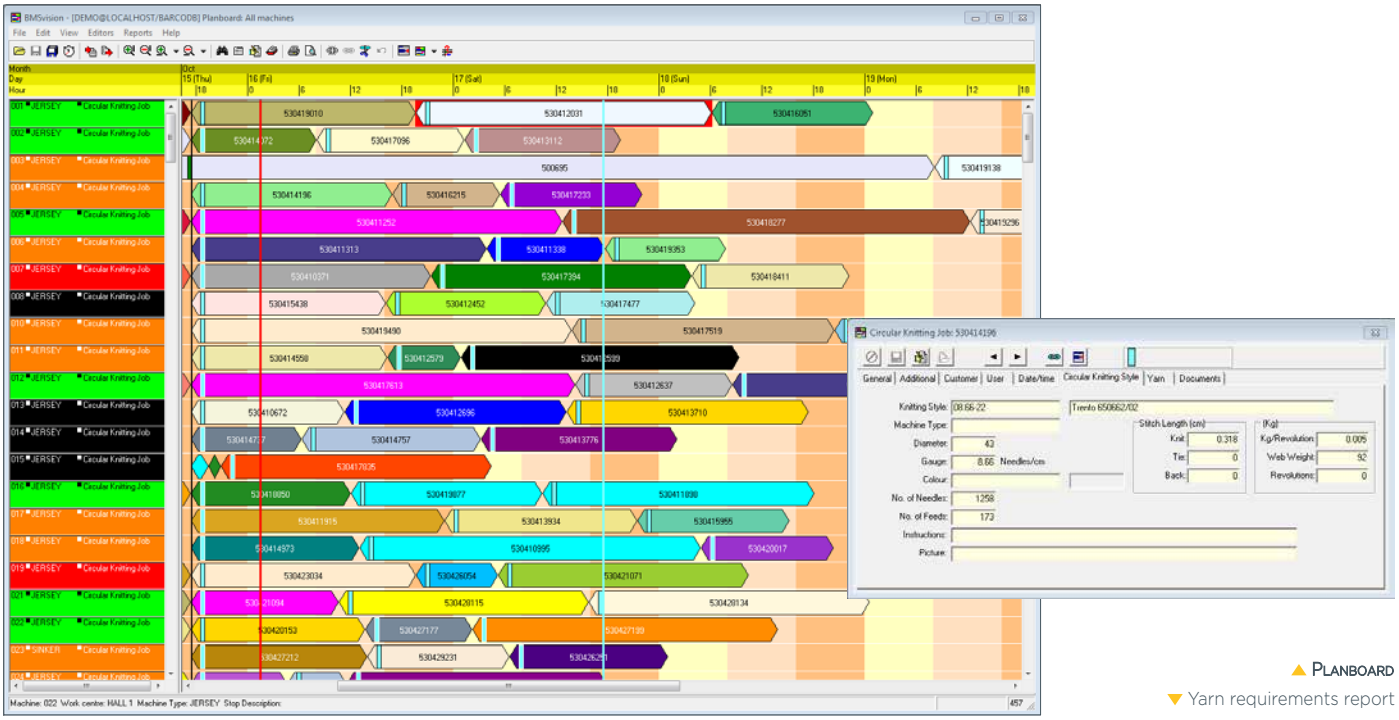
All data is stored in an Oracle or SQL relational database. By means of a powerful report and formula generator, featuring interactive reports and charts with multiple period selection and ad hoc filtering, ad hoc highlighting, users can define and configure their own calculations and reports.

The reporting module features color coding based on configured limits, scheduled report generation, different outputs etc.

Integrated graphics allow managers to build their own personalized "dashboards' for a quick and transparent analysis and evaluation of all Key Performance Indicators (KPI). With the "multi-site consolidation" module, managers can compare KPI's and processes between sites, allowing operations to learn and optimize from the best performers.

- Interactive reporting
- MANAGEMENT DASHBOARD on your mobile device

Production scheduling



▲ PLANBOARD
▼ Yarn requirements report

Real time job schedule

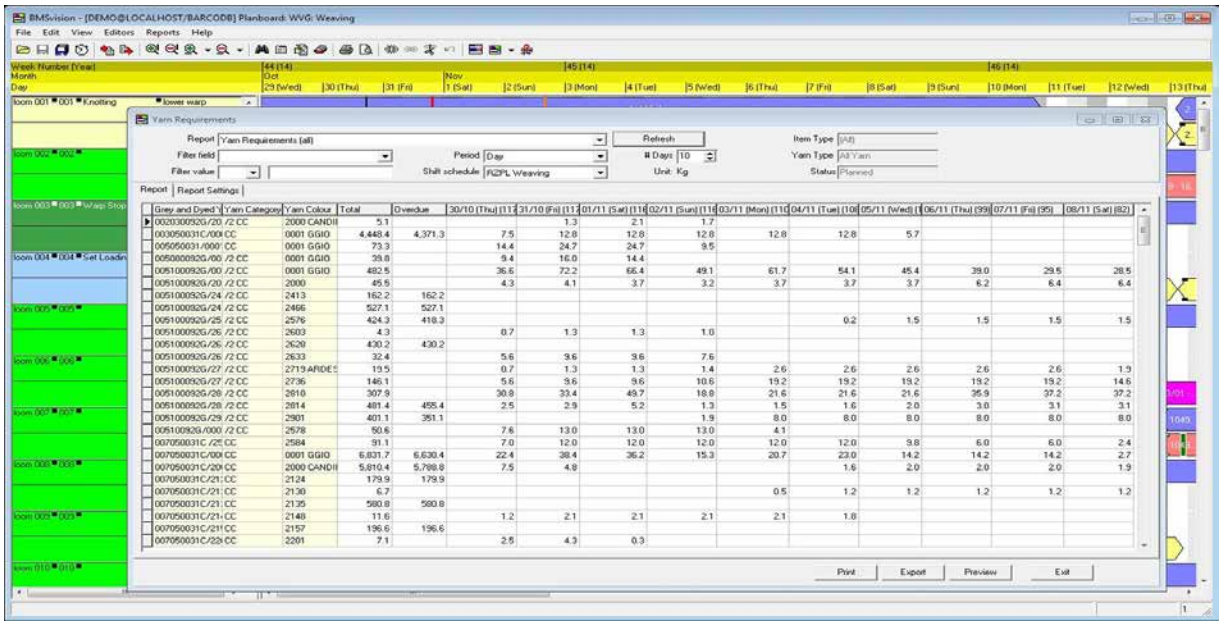
With KNITMASTER, the planner conducts his demanding job by means of an electronic planboard. Integrated with the style database and the monitoring system, the PLANBOARD software automatically calculates the time needed for every order and updates it based on real time information such as actual speed, efficiency and stop level.

The KNITMASTER scheduling software supports multiple planning levels: some knitting mills only require job scheduling while other companies also want to schedule and follow up on individual pieces. Even preventive maintenance can be visualized and taken into account. Production orders can be entered manually in the system or can be downloaded from the ERP system.

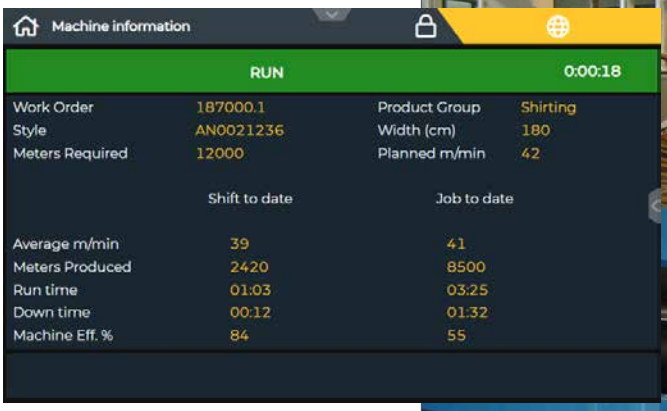
Target length control and yarn requirements calculation

The target roll length can be downloaded from the server to the Data Unit at the machine. Upon reaching the length, the Data Unit can stop the machine and activate a doffing lamp to inform the operator that the machine is ready for doffing.

As the style definition file contains yarn type, yarn count, number of feeds, needle density, ... KNITMASTER can calculate yarn requirements to fulfill the orders planned. Several reports are available such as a consumption report used to transfer yarn from inventory to the knitting department and reports with requirements of yarn to be dyed or to be purchased.



Integrating additional departments



▲ DU11 finishing order status screen
▶ DU11 on a finishing machine

Monitoring and planning preparation and finishing machines

KnitMaster can also be extended towards the warp preparation and finishing departments. Each of the machines in these departments is equipped with a DU11 Data Unit.

Also the planning of the preparation department is important. From the warp out prediction in the warp knitting department, the warps to be prepared are available in the system. Warp beam tickets can be printed and the correct length of the warp is automatically assessed by the system.

In combination with the company's ERP system, KnitMaster is the perfect tool to provide visibility throughout the finishing department. Based on routing database in the ERP system, production orders are generated for each individual process step and scheduled by means of the KnitMaster Planboard.

The operator, before starting the process, identifies the batch number and the process code by scanning the barcoded routing card.

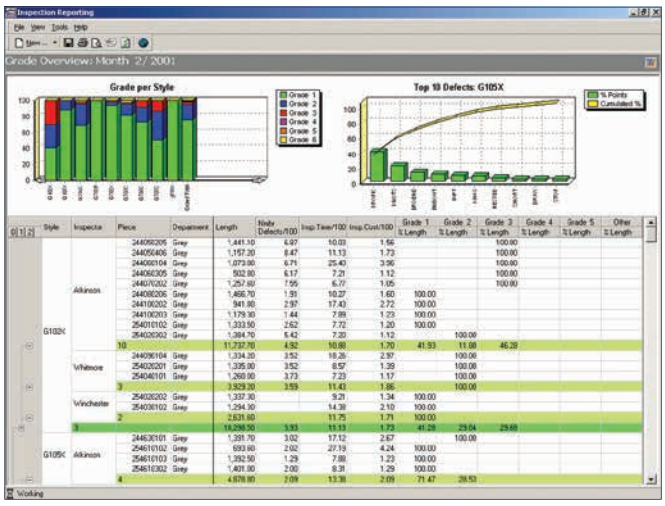
Through the export mechanism, KnitMaster continuously updates the ERP system on the status of each finishing batch.

Fabric inspection

Both grey and finished inspection departments can be integrated in the KnitMaster system. In the inspection departments, the frames are equipped with "touch screen" based data entry terminal (QT). Linked with the length meter, this terminal offers a Windows based user interface for defect entry. The "defect codes" are shown as "buttons" on the screen and the inspector enters the defect just by tapping the corresponding button. Screen layouts are configured to meet the customer's requirements and information is displayed in the local language.

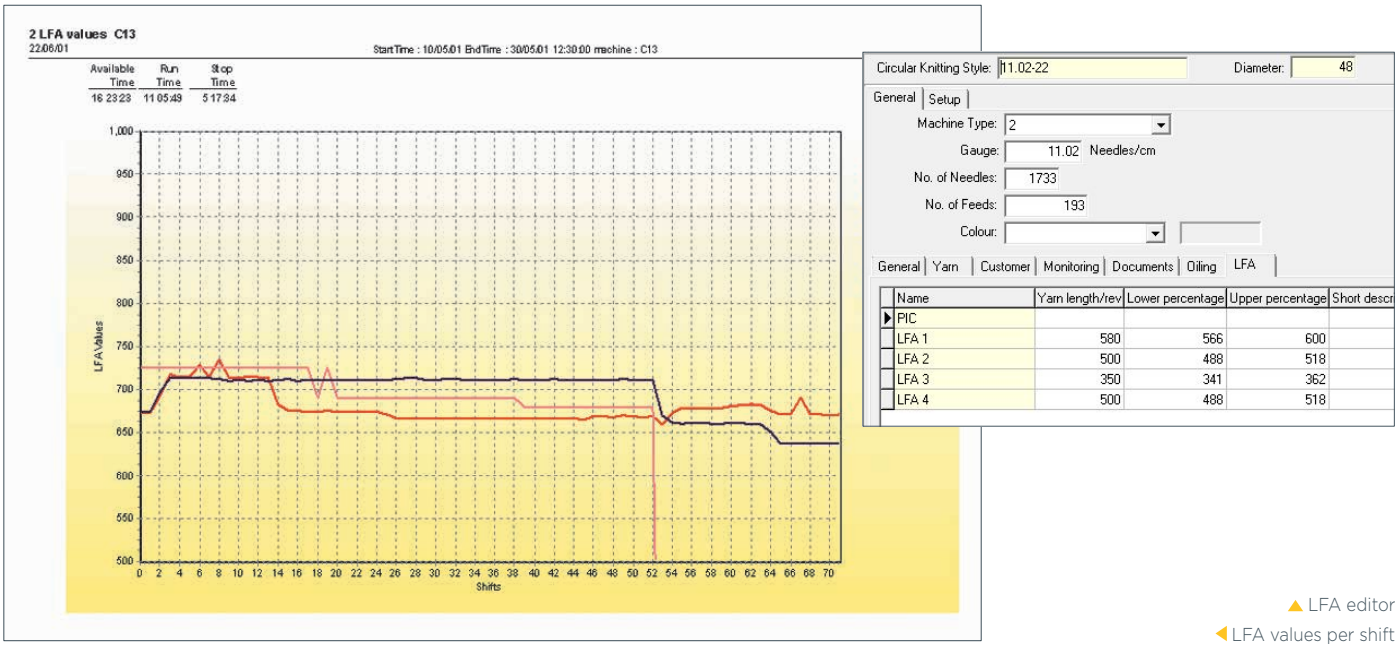
While inspecting, the piece map is continuously displayed and a grade calculation is available on the inspection terminal.

◀ QT on an inspection table
▼ Grade overview report



For more information, read the QT brochure on our website.

Options



▲ LFA editor

◀ LFA values per shift

LFA Monitoring

The signals from each of the yarn consumption measuring devices are wired into one of the fast counter inputs of the Data Unit on the machine. Combined with the machine speed (RPM), the KnitMaster software calculates the LFA values in real time and compares them with the standard values in the style database. In case of too high deviation from standard, the machines are automatically flagged or even stopped by the system.

This feature guarantees continuous quality monitoring and prevents the production of too heavy or too light pieces.

Automatic oiling

KnitMaster can be extended with an optional module to automate the oiling functions of the machine. Based on user definable rules, oiling can be activated by means of a declaration on the Data Unit or automatically based on pre-defined criteria, such as oiling when the machine restarts after it has been stopped for a certain time period.

Preventive maintenance

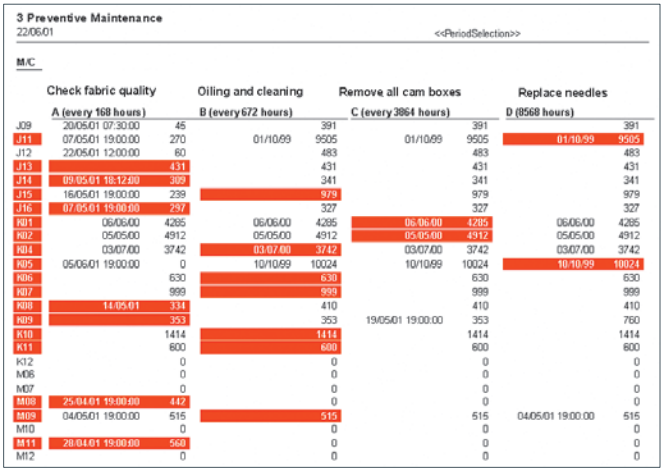
On circular knitting machines, particular actions and checks need to be carried out on a regular basis. These include checks on fabric quality, oilers, jets and drives, cleaning, ... For each of these actions, the user defines the time in between two interventions. Based on the monitoring information, the system reports the machines which are due for a next intervention.

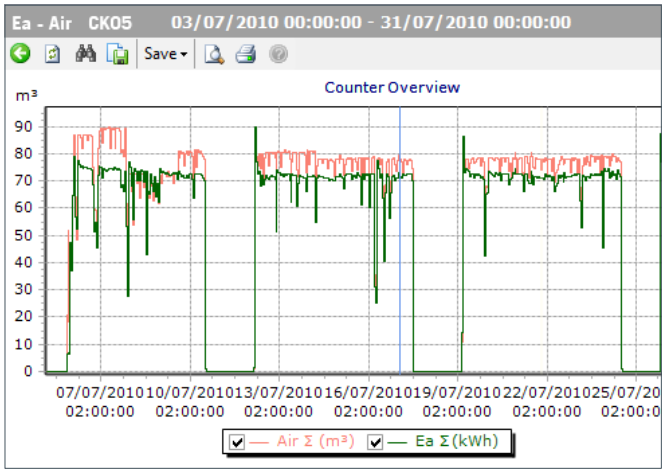
Energy Monitoring

With the EnergyMaster module, the KnitMaster system is extended with a powerful tool to optimize the use of energy in the plant. Both power meters and compressed air sensors on the machines can be connected to the Data Units on the machines and consumption data is passed on to the server using the KnitMaster data collection network. Correlating the production data with energy consumption data allows the evaluation of the energy component in the overall production cost of the order or style.

▼ Preventive maintenance

▶ Trend of electricity and compressed air consumption for a selected machine





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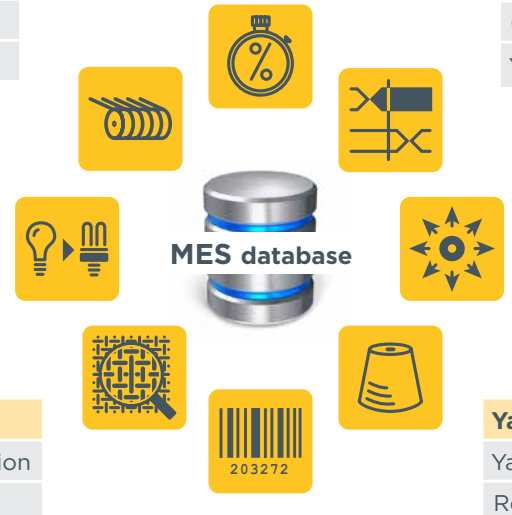
FEIN JERSEY GROUP
DARLINGTON A MOORE COMPANY
ELCATEX

KnitMaster modular concept

Monitoring and reporting
- Real time data collection
- Report and formula generator
- Key Performance Indicators (OEE)

Preparation and finishing
- Monitoring and reporting
- Scheduling
- Ticket printing

Scheduling and order follow up
- Real time graphical planboard
- Ticket printing
- Order status reporting
- Yarn requirement calculation



Energy monitoring
- Analyze and optimize consumptions
- Energy cost per style and order
- Climate monitoring

ERP interfaces
- Download from orders and style data
- Upload order progress
- Upload production information

Fabric inspection
- On loom, grey and finished inspection
- Touch screen terminals (QT)
- Optimized cutting

Yarn inventory management
- Yarn contract management
- Reservation for warp and weft yarn
- Planning and follow up of dye lots

Machine automation
- LFA monitoring
- Automatic oiling
- Preventive maintenance

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