



+ PSI Technology Platform

## Converting 4.0 – Predictive Maintenance

Source: Kampf

PSI Technology platform for predictive and automated maintenance in the Industry 4.0

- + Classification and Qualitative Labeling of maintenance big data
- + Existing expert knowledge combined with historicized and current data
- + Different prioritization of maintenance criteria
- + Automated parameter setting as well as extended detection of anomalies in historicized and current maintenance data by Machine Learning
- + Develop customer benefits together with partners – live connectivity and interoperability on a personal and systemic level



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### Productivity, availability and quality are decisive competitive features in film processing

For the processing of web-shaped materials with a thickness of only a few micrometers, the produced parent rolls, which can have a diameter of 1700 mm, a width of 11 m and a weight of up to 26000 kg, are finished into many individual intermediate products according to the customer's application and requirements. Special rewinding stations are installed in the individual slitting machines, which are designed to meet individual end customer requirements and therefore have to be compact and efficient due to the wide range of applications.

Process data such as speed profiles or system-related dynamic factors, variable foil types, running lengths, foil width-dependent web tensions and roll weights, as well as sensor data such as temperature, humidity or vibrations, play a decisive role in achieving high total plant efficiency.

### KAMPF already offers its customers digital value-added services with the@vanced

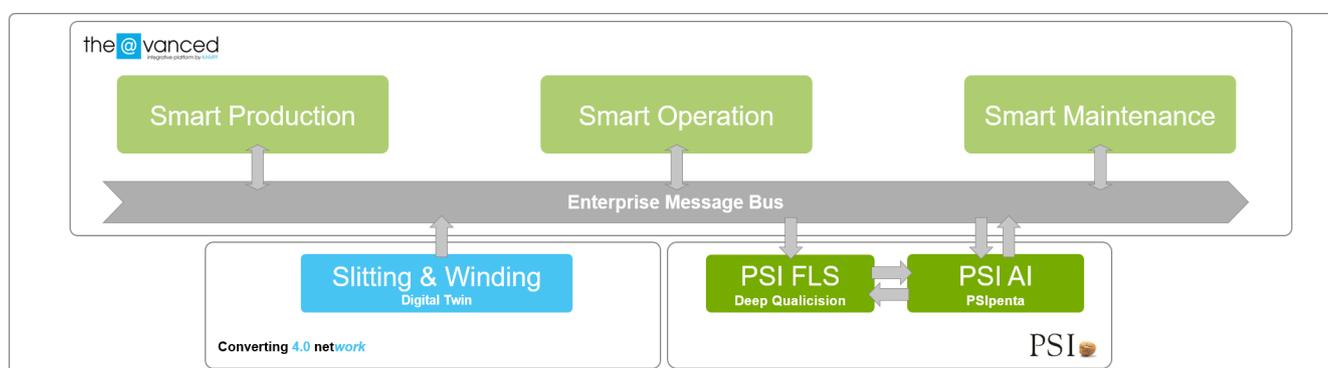
As an integrative software platform, the@vanced networks machines and their integrated sensors and additional components with each other and offers the possibility of collecting data, visualizing and analyzing them individually. the@vanced communicates with on-site planning and control systems - PSIpenta in this case - or with other external software platforms and is the basis for big data applications, artificial intelligence, predictive maintenance and machine learning. The present specific application is another important step towards predictive maintenance and AI as well as for the KAMPF digitization initiative Converting 4.0 network, and the PSI Technology Platform.

### Predictive maintenance with automatic classification of sensor data

Predictive maintenance supported by intelligent software Deep Qualicision, distinguishes between the selection of relevant criteria such as temperature, air humidity, vibrations, operating hours, last maintenance date as well as their negative, neutral and positive effects on machine maintenance. For this purpose, secured evaluation functions based on the extended fuzzy logic used in Deep Qualicision are defined in advance for the individual criteria based on expert knowledge. The machine data can be classified, for example, according to the categories "Urgent maintenance requirement", "Mid-term maintenance requirement" or "No maintenance requirement". The resulting maintenance demand is transferred to surrounding planning and control systems (PSIpenta).

### Automated realtime anomaly detection in big data by Qualitative Labeling

Once the basis for automatic classification for situational maintenance has been developed, sensor data delivered by a maintenance-relevant object, e. g. a machine, can be classified as data records automatically with Deep Qualicision according to the defined and relevant maintenance criteria. Furthermore, it is also possible to set priorities for the criteria differently in order to give them a higher or lower weighting in the interactions between the criteria and thus to categorise the maintenance relevant signals. As a decision support system, Deep Qualicision enables automatic situational or predictive maintenance as well as anomaly detection for early-warning systems based on large amounts of data (big data).



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