

Smart Factory 4.0 - Experience Tomorrow's Production Today

Industry 4.0 is a term that is currently on everyone's minds when it comes to the subject of networked production in the digital factory of the future. The concept is discussed in associations, industries and companies, and is certainly interpreted and understood in different ways.

WAFIOS, too, has the subject of Industry 4.0 as a main driver of innovation firmly anchored in its corporate strategy in the term Smart Factory 4.0.

Its cornerstones are...

...the "flexibilization" of production to shorten delivery times

..."automization" of production to optimize machine utilization ... "locally networked added value" to increase component quality

... "intelligent data analysis" to increase machine availability

... and "global networking" to simplify standardized process quality. Cyber security should thereby be used to help ensure the safety of production facilities, data and know-how.

The development stages shown as examples below represent a simplified version of WAFIOS' overall concept for the production of tomorrow.

... Stage 1 is comprised of cyber-physical systems (CPS): Characterized by the combination of information-processing and physical processes.

CPS offer interfaces for networked communication.

One example is the compression spring machine that uses the control program to manufacture springs and makes this production data available via interfaces.

... Stage 2 is represented by the Internet of Things (IoT): CPS are connected locally and globally in production via the IoT.

An example is the autonomous production cell with main control station.

... Stage 3 is the Smart Factory: Because of increased flexibilization and automation, networked CPS lead to versatile, efficient, self-controlling intelligent factories.

One example is the fully automated logistics system for staging material and/or automatic data synchronization for location-independent interchangeable parts production at a consistently high process reliability and quality.

... Stage Industry 4.0: Supplements the Smart Factory concept with new business models, e.g. by coupling production and services (hybridization). WAFIOS exhibited initial solutions at the Wire & Tube in Dusseldorf.

With *iQsmartbend*, WAFIOS showcased an innovative solution for process optimization in wire bending. The machine operator can transmit the geometrical data of a bent part to a computer cluster at WAFIOS at the push of a button. The optimum machine parameters are calculated for the bending sequence within a short period of time (depending on the part geometry) and are then automatically sent from there to the wire bending machine.

Besides significantly reducing set-up times, the output rate can be considerably increased, depending on the bent part, while maintaining or increasing the quality of parts. The hybridization presented here involves data transfer, external computing power (WAFIOS) and optimization algorithms especially developed for the machines and will be available for WAFIOS wire and tube machines in the future.

For WAFIOS compression spring machines, the real-time processing of production data (in process) using *iQcontrol* has already been available on the market for a long time.

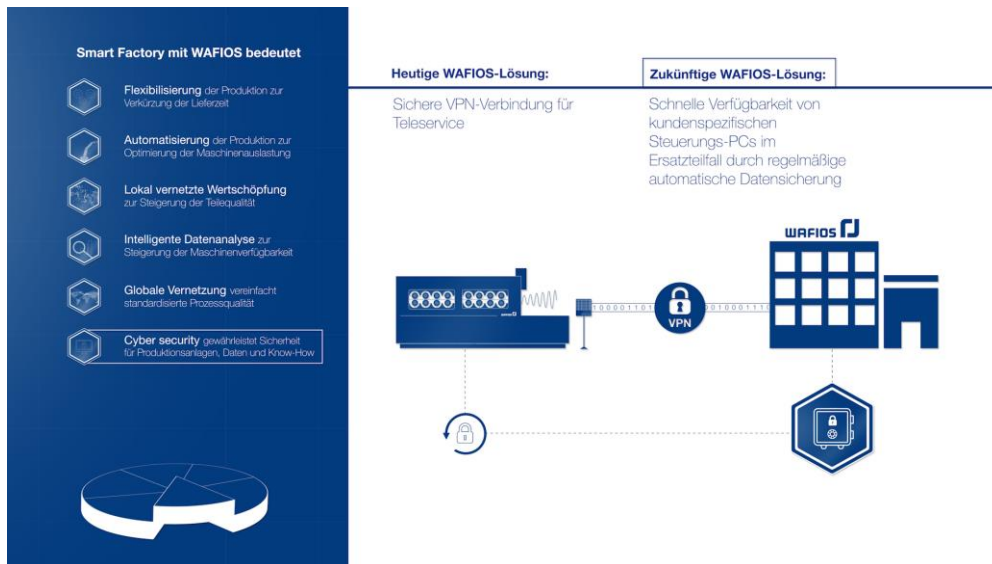
The spring length is corrected during the coiling process and is controlled in such a way that rejects are minimized. *iQautopitch* for WAFIOS compression spring machines and *iQinspect* for WAFIOS wire and tube bending machines offer solutions for connecting external measuring devices with the manufacturing units. Some areas of application are the reduction of set-up times, increased cost savings

with testing tools and a lower reject rate or the statistical process control on a random basis, etc...

Further developments are planned in the next step to network existing and future individual solutions in the global production network.



Pic. 1 WAFIOS structure industry 4.0



Pic. 2 WAFIOS „smart factory“ exemplified by „cyber security“

