Food Factories of the Future

How Industry 4.0 Technologies can improve your business
Introduction.

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Position sensors
Sensors for motion control
Industrial imaging
Safety technology
Process sensors
Industrial communication
IO-Link
Identification systems
Condition monitoring systems
Systems for mobile machines
Connection technology
Software
Power supplies
Accessories
Cloud Services
What is most important?

- Constant product quality in your process
- Higher efficiency = Cost reduction
- Environmental tasks = savings on utility bills
- More Transparency in Production Maintenance
- Future: CPF? Cyber-Physical-Factory
Popular keywords

Digital modeling and fabrication

Intelligent Maintenance Systems

Industrial Internet

Industry 4.0

Big data

M2M

Cyber Physical Systems

IoT

Machine to machine

SCADA

Internet of Things

Industrial control system
Steps of industrial manufacturing

From Industry 1.0 to Industry 4.0: Towards the 4th Industrial Revolution

1. Industrial Revolution
   - Through introduction of mechanical production facilities powered by water and steam
   - End of 18th Century

2. Industrial Revolution
   - Through introduction of mass production based on the division of labour powered by electrical energy
   - Start of 20th Century

3. Industrial Revolution
   - Through introduction of electronics and IT for a further automation of production
   - Start of 70ies

4. Industrial Revolution
   - Based on Cyber-Physical Production Systems
   - Today

"automation + IT"

"PLC automation"

"loom"

"conveyor belt"
More factory automation technologies in food plants
Example: Robots in Filling Area

• More automation means more efficiency in:
  • Filling, packaging, conveying...
More information from your sensors
Continuous Development to BIG DATA.

ifm introduces the first electronic flow monitors, start of the fluid sensors range.

IO-Link

Introduction of inductive and capacitive sensors by the ifm founders Robert Buck and Gerd Marhofer.

Presentation of ifm’s first own control systems for industrial use, and later for mobile vehicles.

Identification systems from ifm: optical (reading 2D codes) and via radio (RFID).

The third dimension at a glance. Visual assessment of distance, level or volume with the efector pmd3d 3D vision sensor.


The Ifm Foundation.

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More information from your production
Industrie 4.0 – IT vs. Production?

IT-experts say:
- 94%: „Networking between **Automation- and IT-World** (Hard-, Software and Telecom) is overwhelming enterprises.“
- 71%: „Enterprises under-estimate the costs for data collection and data storage.“

Production experts say:
- 90%: „**Efficient data exchange** is most important for Industrie 4.0“
  - Machine data 72%
  - Process- and quality data 70%
  - For Supply Chain 58%
- 84%: „**Connectivity between machine and ERP** is the key factor.“

„We are sitting on a mountain of data today but are not capable of using these data structured and networked to optimize our process control.“

*Head of Production*

95% of machine data today are „Dark Data“ – Content unknown and therefore useless

To find the needle you need the haystack...

The CLOUD?
What does the ifm Cloud look like?

SaaS – Software as a Service

- Global availability and support 24/7
- Fast implementation – with or without ERP connectivity (SAP)
- Always up-to-date – industrial application packages
- No investment in new software (WYSIWYG)
- High security level – even with critical data (e2e encryption)
ifm Cloud Applications

Cloud-APPs eg.

- **LR SMART OBSERVER**: Machine data acquisition for process control and diagnosis
- **LR DEVICE**: Remote Services and spare parts order management with SAP integration
Example for Cloud-APPs

LR SmartObserver

- Facebook of sensors: All relevant machine data in one cockpit:
- Process data, alarms and charts
Remote Services with LR DEVICE

OEM with
- 2,000 Service engineers
- 5,000 independent system integrators

Remote Service Technician

Data-collectors (IPCs)

Parametrizing, Templates for data sets, Read historian etc.

Latest Firmware

System integrator
On-site with PC
Energy Savings in your Plant
EDM – Application Monitoring Energy Consumption

User Benefits:

● Energy cost per produced piece
● Energy cost monitoring for compressed air
● Optimization and increase of efficiency though improved transparency
● Quick and simple installation
EDM – Energy Data Acquisition

● **Data capturing via**
  - IO Link Sensors (Temperature, pressure, flow, pieces/counter, etc.)
  - TCP/IP (intelligent sensors for electrical energy)
  - Modbus TCP (intelligent sensors for electrical energy)
  - S0 Impulse (energy sensors with impulse output)
  - Connectivity to machine controls possible
  - Connectivity to existing sensors/infrastructure possible

● **Data processing**
  - Sensor data are decentralized converted to process values
  - Calculation of heat quantity from flow rate and temperatures

● **Future proof concept**
  - Data acquisition expandable to the complete plant and company
  - Transfer and handling of the data in the cloud possible
EDM – Energy Data Reporting

- Cost monitoring
  Visualization of energy cost per produced piece
Condition Based Maintenance
Remote CBM

Water pumps

Evaluation Unit
Vibration sensors
Temperature sensors
Inductive sensors

LR Agent CP

SMARTOBSERVER

SAP®
Solution packages for food applications

Corporate IT Network Maintenance

PC, Server

Parameters, Events Diagnostics, Identification etc.

CBM = Vibration Analysis
ifm Standard Solution Packages available for

- Pumps
- Fans (Cooling, Ventilation)
- Material Handling Robot
- Hydraulic Systems (Water, Oil)
- Motors, Gear boxes (Conveyors)
Main Areas of IIoT Applications

Examples:

- **Remote Services** with IO-Link-Sensors (Identification, Parameterising, Diagnosis)

- RFID and Multicode-Readers for **Traceability** and Assembly of the whole Supply Chain

- 3D- and 2D-Sensors for **Quality Monitoring** and Historian

- **Energy management** for Power meters, compressed air and leakage monitoring

- **Condition Based Monitoring** for Motors, Gearboxes, Fans and Pumps.
Application Decanter OEM

GEA customer site

SAP

HANA Cloud IoT

LR Agent embedded

M-Guard

Ethernet

IPC unit

Data

Decanter

ERP

PLCs

Evaluation unit

Mission Control Center

GEA Group
Remote Services one step ahead

Industry 4.0 - integrated
Remote Services, Maintenance and Repair

- Planning of After Sales capacity worldwide
- Easy connection to customer’s IT-systems
- Protection against plagiarism
- Automated ordering of spare parts
- Highly improved quality management
- Improved documentation for warranty situations
- Possibility of operating, insurance and financing models
Conclusion:
Food Factories of the Future
Transparency, Flexibility, Individualization and Integration are key principles

Context of Industry 4.0 along the Value Chain

- Predictive Maintenance
- Digital Product Memory
- Remote Service Management
- Track & Trace
- Smart Products
- Adaptive Logistics
- Energy Management
- Resilient Production
- Performance based Contracting
- Smart Data

R&D | Sales | Supply Chain | Manufacturing | Aftermarket Service

Source: SAP
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For ifm Industry 4.0 means:

... the right information

... at the right time

... at the right recipient

= Solutions from sensor to ERP (SAP) and back ...
Collecting information
(read from the PLC by means of the **LR AGENTs** or directly from the sensors, identification / image processing systems by means of the **LR AGENT EMBEDDED** (lot core))

Bundling and distributing information
by means of IO-Link, Ethernet, the Y path and the connectivity agents

Machines act autonomously / automatically
on the one hand via the real-time network e.g. when the machine is switched off, on the other hand by linking and analysing information on computers and servers ... to SAP and back