



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Biofuels

Innovative Process Automation Solution

“You can’t optimize what you haven’t measured”



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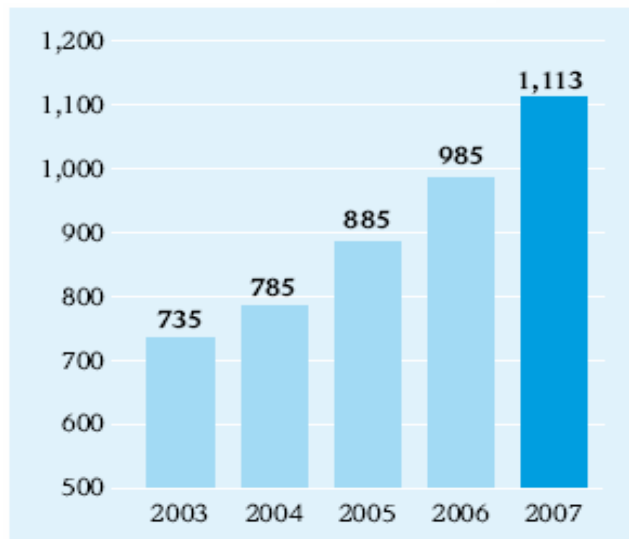


Endress+Hauser key facts

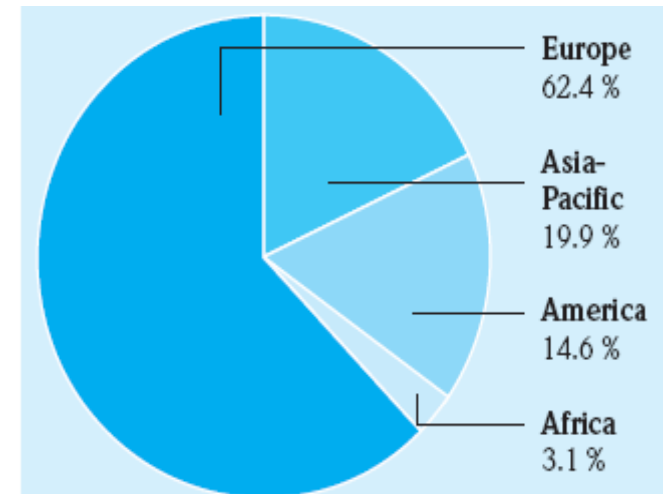
- International solution supplier with a wide range of process measurement instrumentation for production and logistics in the process industries
- Consultancy and service in 85 countries
- Headquarter in Reinach (Switzerland)
- CEO: Klaus Endress



Net Sales in Mio. Euro

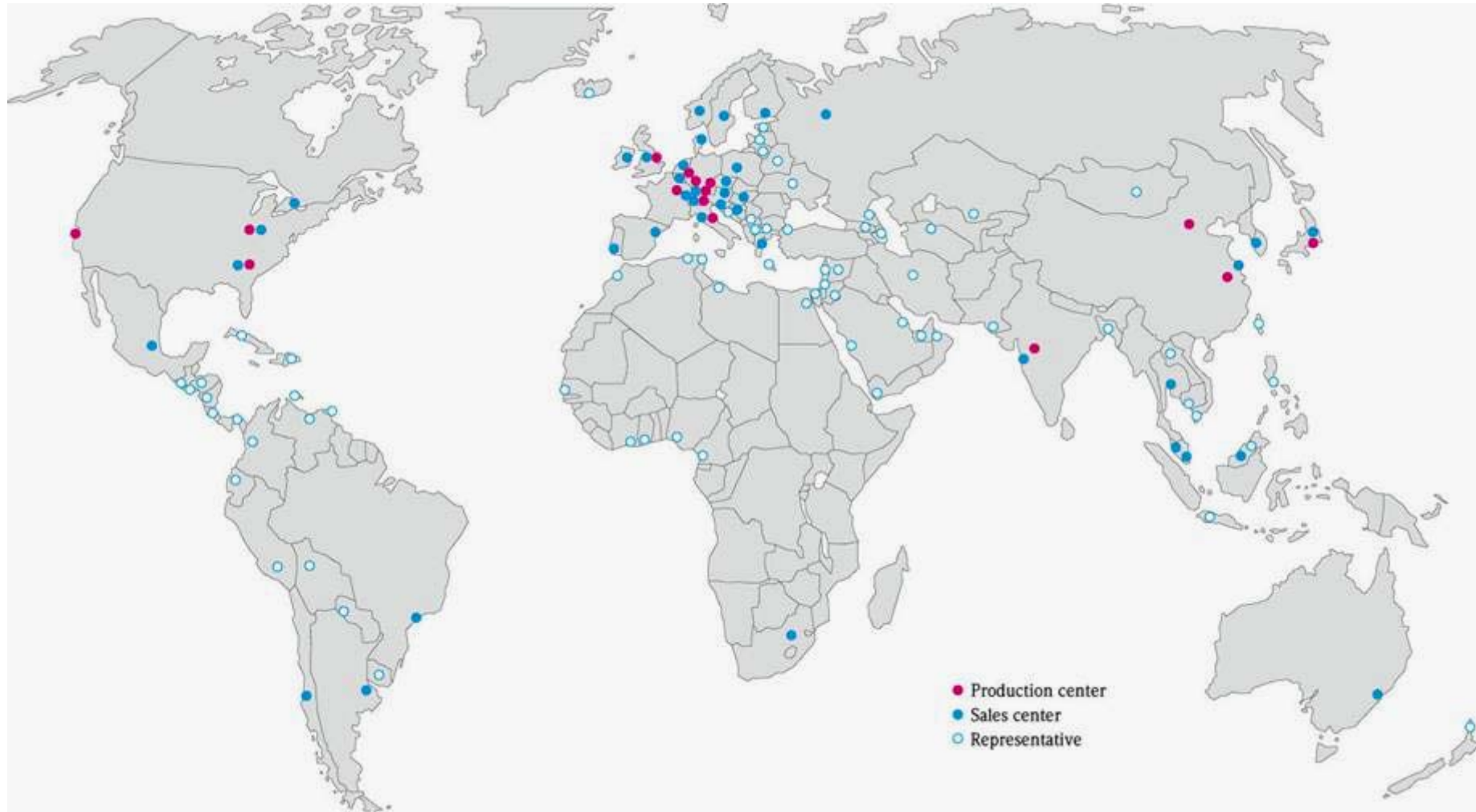


Net Sales by region (2007)





Strong Presence Worldwide



We Understand our Customer's Business

- We offer products, services and solutions in best price and performance for our key industries.



Pharmaceutical



Environment



Food & Beverage



Pulp and Paper



Chemical



Renewable Energy



Energy



Oil & Gas



Primaries



Our Offering: Leading Edge Field Instrumentation



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Solutions

Biodiesel





Biodiesel Feedstock



Rapeseed Oil



Soya Oil



Palm Oil



Sunflower Oil



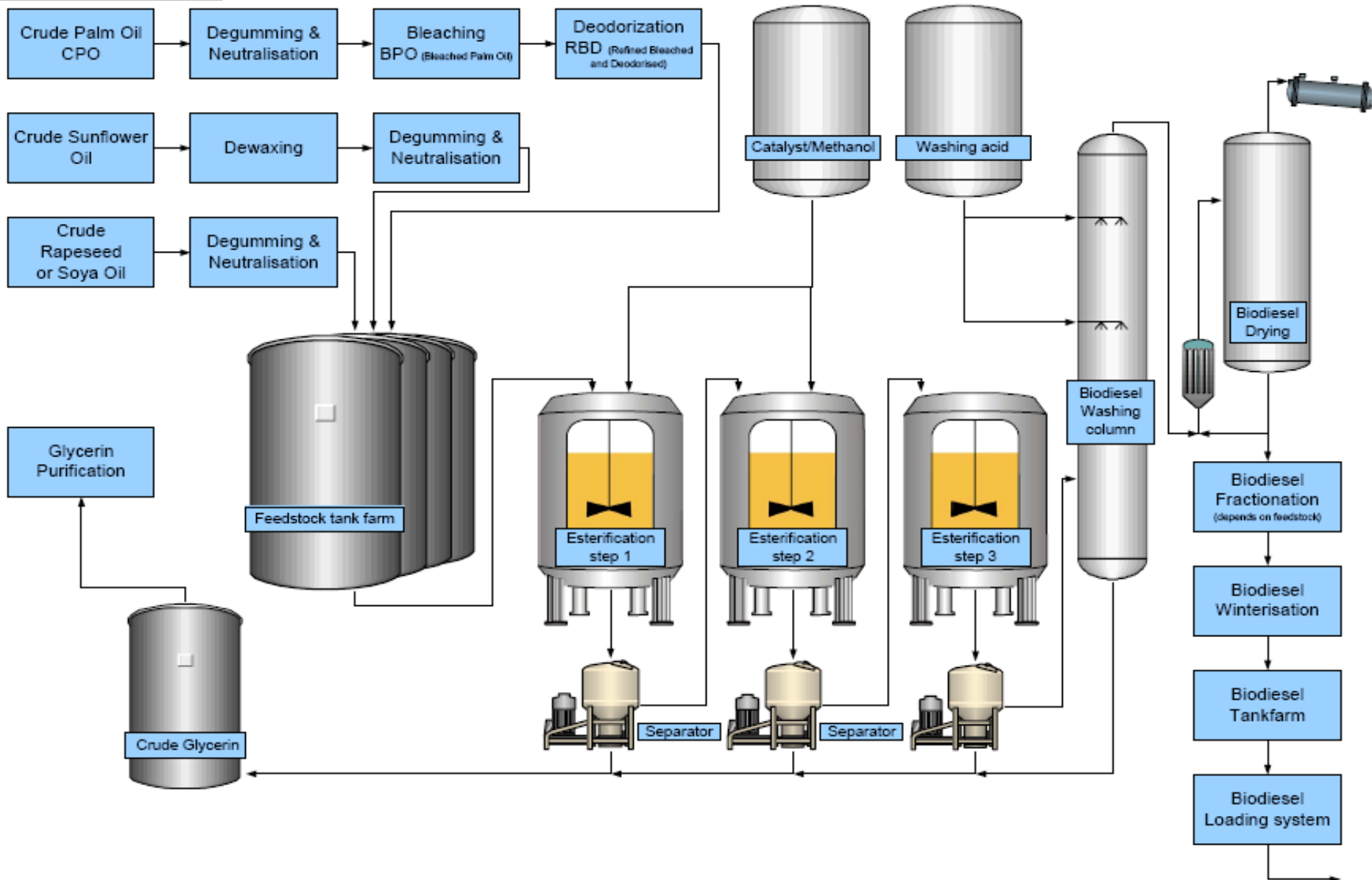
Jatropha Oil



Recycling Plant Oil



Biodiesel Process Map





High Quality Requirement



Several feedstock's and changing market requirement demands highest product quality.

Online analytics guarantees quality in real time before products will be filled to the tank farm or delivered to customer.

- No risk of spoiling product in the tank farm
- Reduce cost of laboratory analytics
- Reduce risk of customer complaints

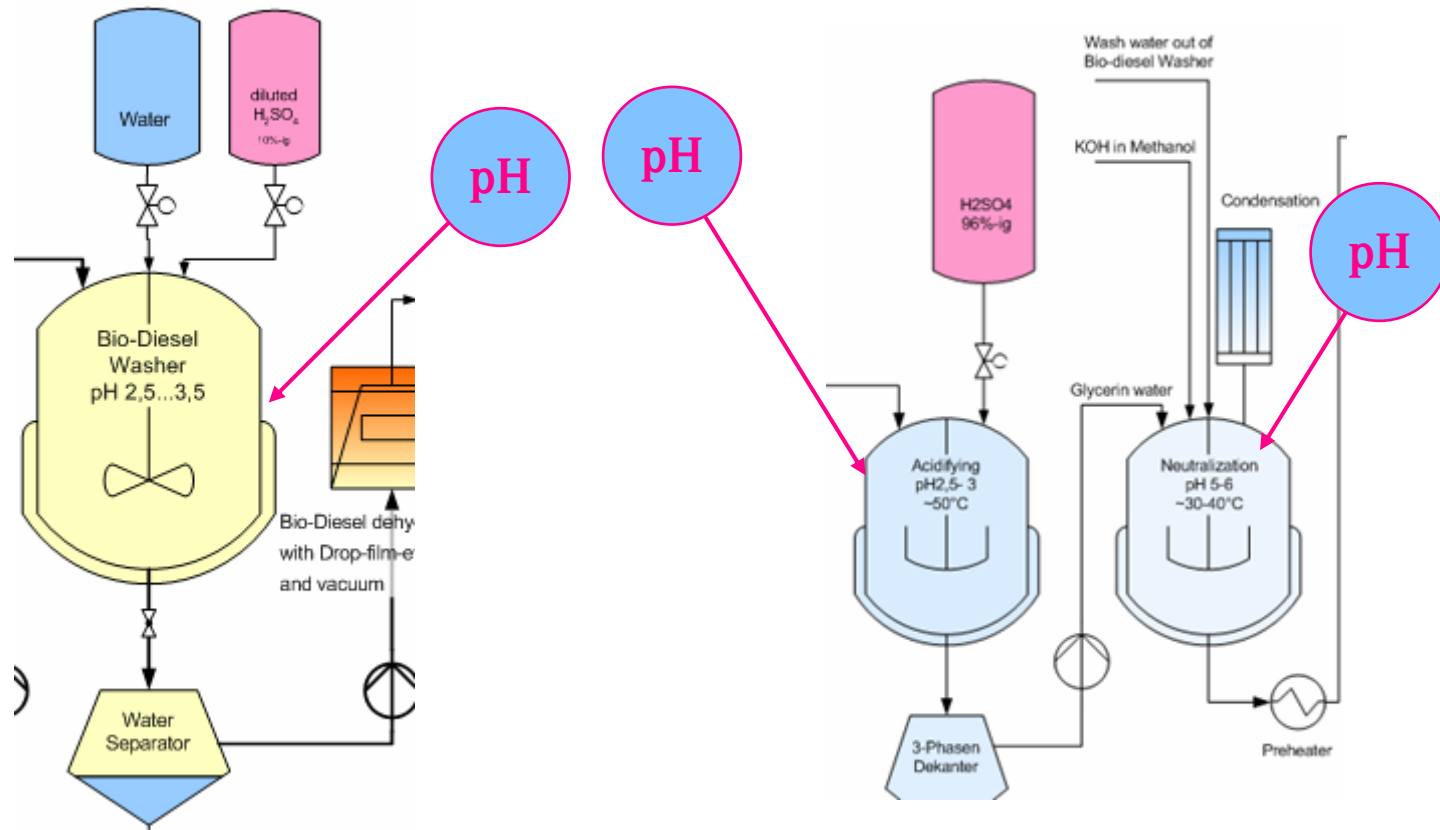
DIN EN 14214

USA ASTM D6751-07a



pH Measuring Solution

In the production of Biodiesel the pH-value is essential and will be used to control the process. The requirements of the pH measurement are extraordinary because there are hardly water in the process and the process tend to soil the electrodes.





Online pH Measurement



pH measurement with fully automated cleaning and calibration to control the Biodiesel cleaning or the Glycerin treatment

- Reduce cost of ownership through less labor cost
- Reduced down time with automated maintenance
- Reduce down time with pre calibrated Memosens pH-electrode



Memosens – Sensor with Memory

Memosens turns the pH sensor into a digital sensor with integrated memory



pH sensors with Memosens technology store the actual calibration data as well as other information used for predictive maintenance eg. overall time in operation, maximum and minimum pH value, maximum and minimum temperature.



Digital pH Sensors with Memosens

Safe connector system



Memosens eliminates problems based on:

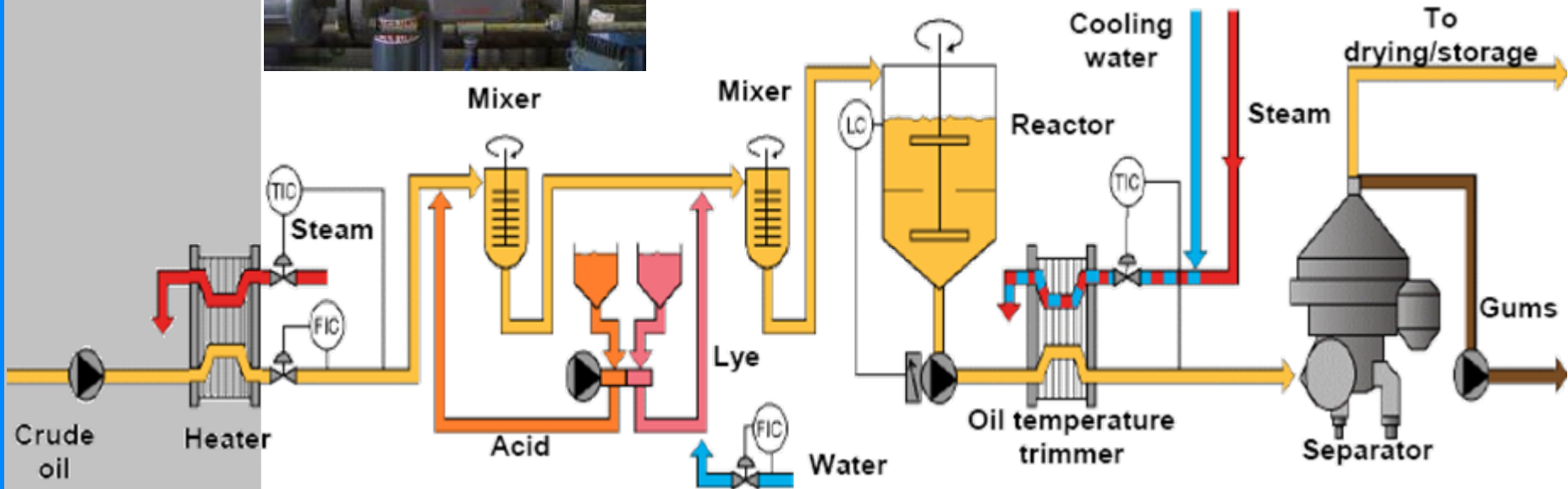
- Corrosion
- Contacting problems
- Salt bridges
- Moisture
- Leakage
- High impedance connection
- Ground loops



Degumming of crude Vegetable Oil



Prosonic Flow 92F Ultrasonic Flow measuring system the ideal solution for non conductive liquids like vegetable oil or Biodiesel





Tank Farm Automation

Many different products with special needs,
Measuring Level and Limit with:

- Liquiphant M FTL51 as Limit switch
- Micropilot M FMR240 Level Radar

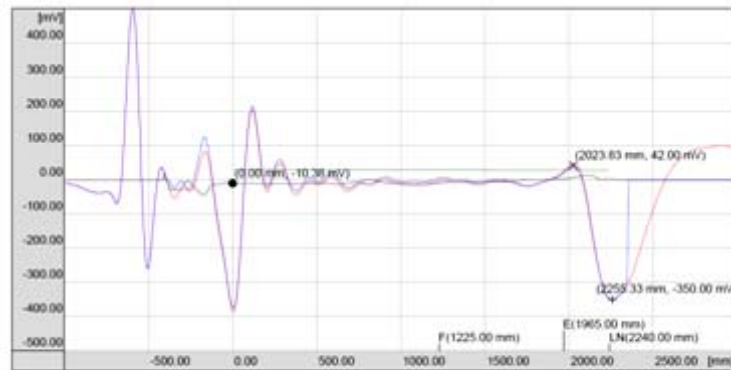




Level Interface Measurement

Levelflex FMP40

In a phase separation process



Legende

- Hüllkurve
- Map
- Differenzkurve
- Schwelle Echo

Kurvenr: 361/161

Zeit: 26.07.2005 14:16:07





Ensure the Profitability with high Accurate Dosing

The right quantity in the process builds the basic of the Chemistry and decides over the profitability of the process.



Example:

- Model : Promass 83F
- Application : Dosing of RBD Palm Oil, Catalyst, Methanol
- Accuracy : 0.1% (83F)
- Max Temperature 200°C
- Vertical Mounted flow going upwards, for draining and also increased back pressure to compressed micro bubbles



Sulphuric Acid Tank

Level Measurement with:
Level-Radar FMR 245

Limit Detection with:
Vibration Limit Switch FTL51





The Cooling System



Pressure and Temperature control of the Cooling system.



References with BioDiesel Technologies



BioDiesel  Technologies





References in Biodiesel





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Solutions

Ethanol





Example: Feedstock Bioethanol

Corn



Grain



Sugar cane



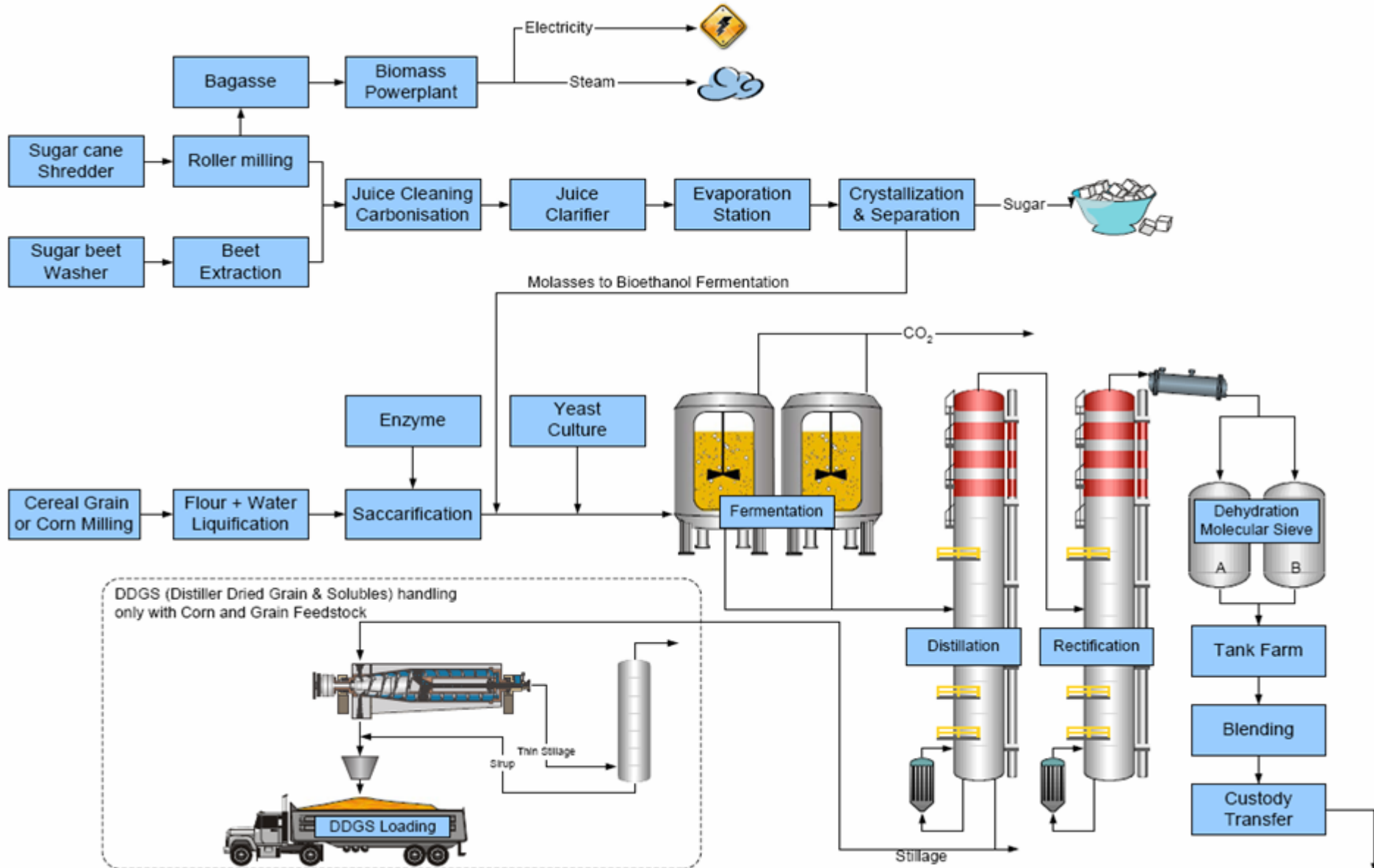
Sugar beat



Depends on the feedstock
there are different
process requirements!

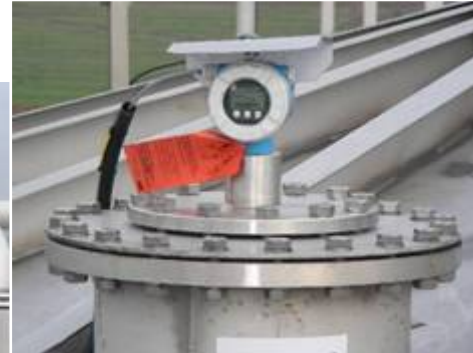


Process Map



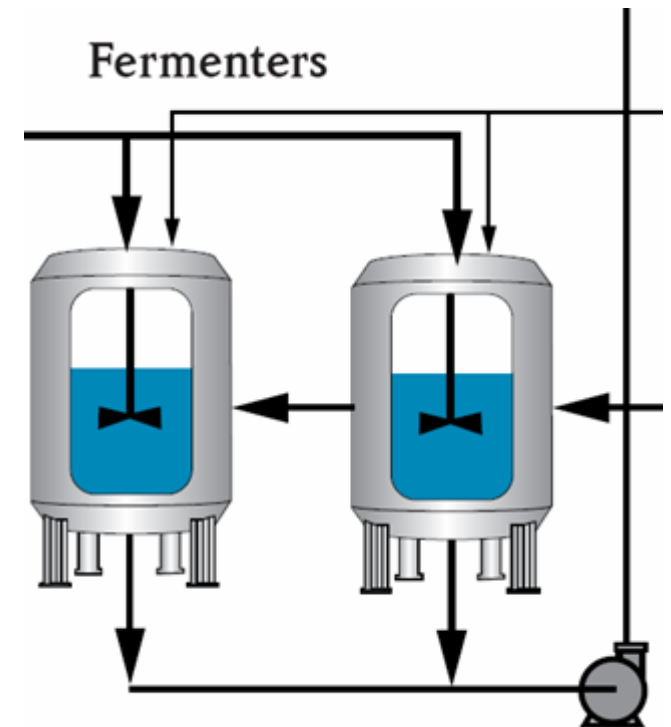


The Fermentation



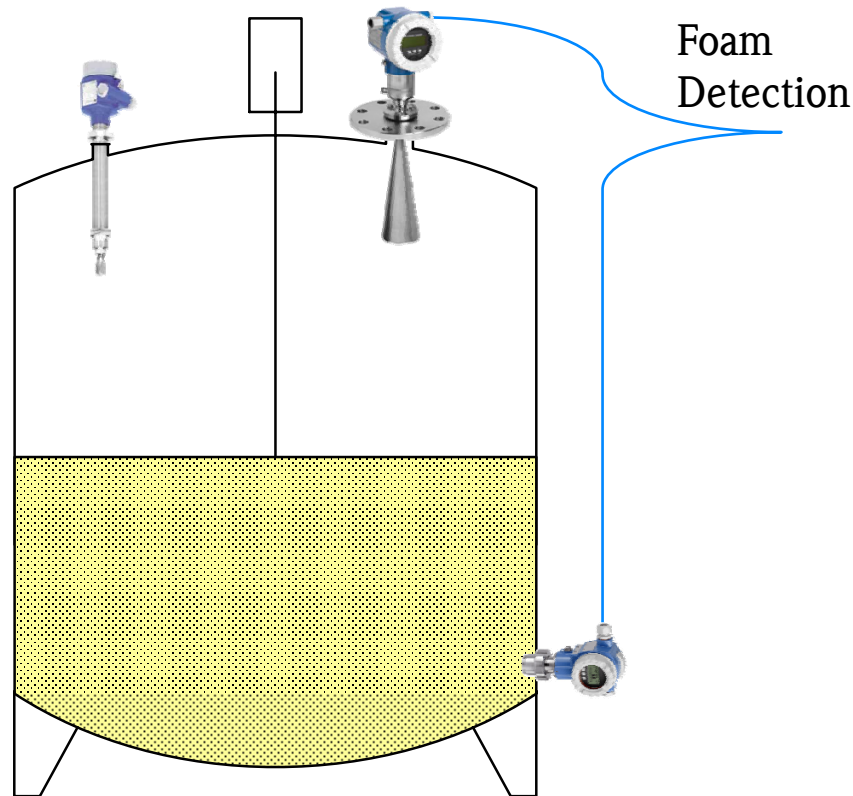
Fermenters are huge tanks with capacity of $\sim 1000\text{m}^3$

- Level with Micropilot
- Pressure with Cerabar, for foam detection and protection of the Fermenter of over- and under pressure





Yeast Culture and Fermentation

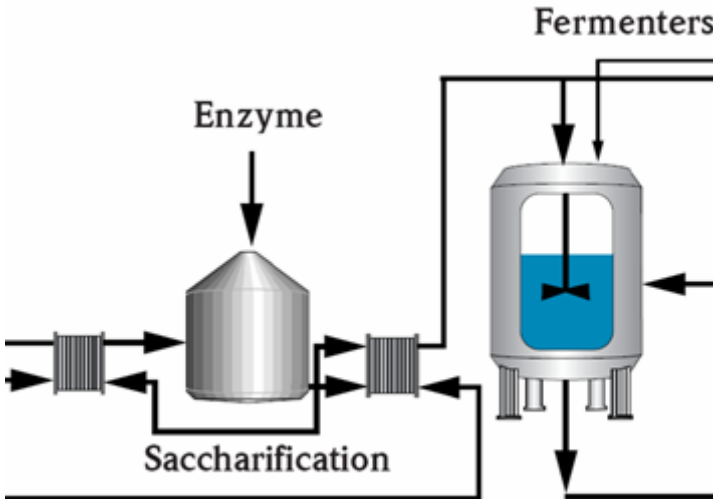


With:

- Liquiphant Level switch
- Cerabar Hydrostatic Level measurement
- Micropilot Level measurement



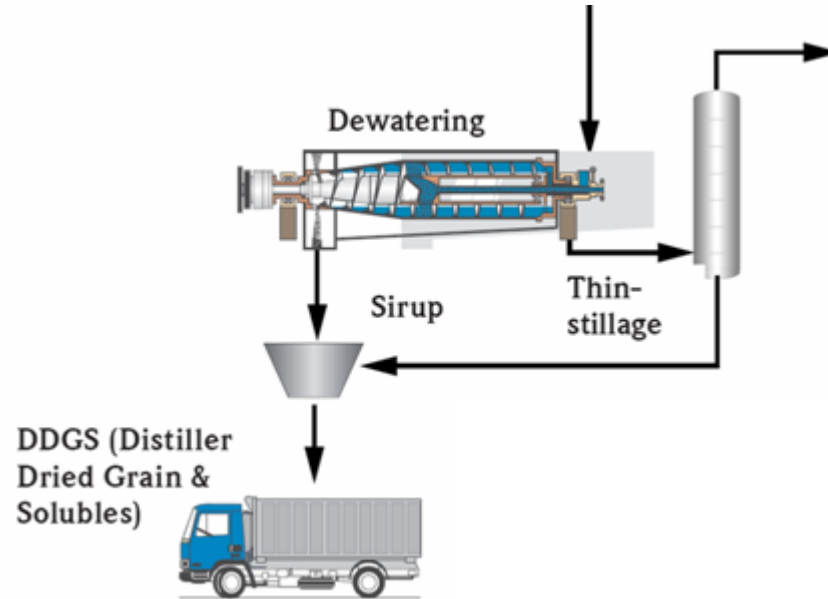
Ethanol Production needs Heat exchanger



Endress+Hauser measuring devices for Flow, Pressure and Temperature to measure the heat consumption and to control the process.



Ethanol Production



Dewatering with:

- Flottweg Centrifuge
- Promag 55S Electromagnetic Flow Measuring System for liquids with solids content



Ethanol References with Endress+Hauser

Plant Name	Country	Location	EPC	Size approx. t/a
Wyoming Ethanol	USA	Torrington, WY,	Delta T	60'000
MGP	USA	Riga, MI	Delta T	210'000
Madrid Ethanol	USA	Wheatland, NE	Delta T	150'000
United Ethanol	USA	Milton, WI	Delta T	150'000
Pinal Energy	USA	Case Grande, AZ	Delta T	200'000
Baird Energy	USA	Coshockton, OH	Delta T	210'000
Cascade Grain	USA	Clatskan, OR	Delta T	410'000
Didion Milling	USA	Kansas	Delta T	200'000
Ottertale Ethanol	USA	Minnesota	Delta T	200'000
MBE / Verbio	Germany	Greppin	GEA Wiegand	60'000
NBE / Verbio	Germany	Schwedt	GEA Wiegand	180'000
Südzucker Ethanol GmbH	Germany	Zeitz	Vogelbusch	150'000
Agrana Bioethanol GmbH	Austria	Pischelsdorf	Frings Austria GmbH	180'000
Biohim	Kazakhstan	Astana	Frings Austria GmbH	60'000
Abengoa	USA		pilot Plant	
Monsanto Envirochem	USA			
Pacific Ethanol	USA			140'000
Enviral	Slovakia	Leopoldov	Gea Wiegand	
Tabov (Distillery)	Russia		Ferrostaal	
Total Production with Endress+Hauser Technology				> 2'560'000





Truck Loading



Overfill protection:

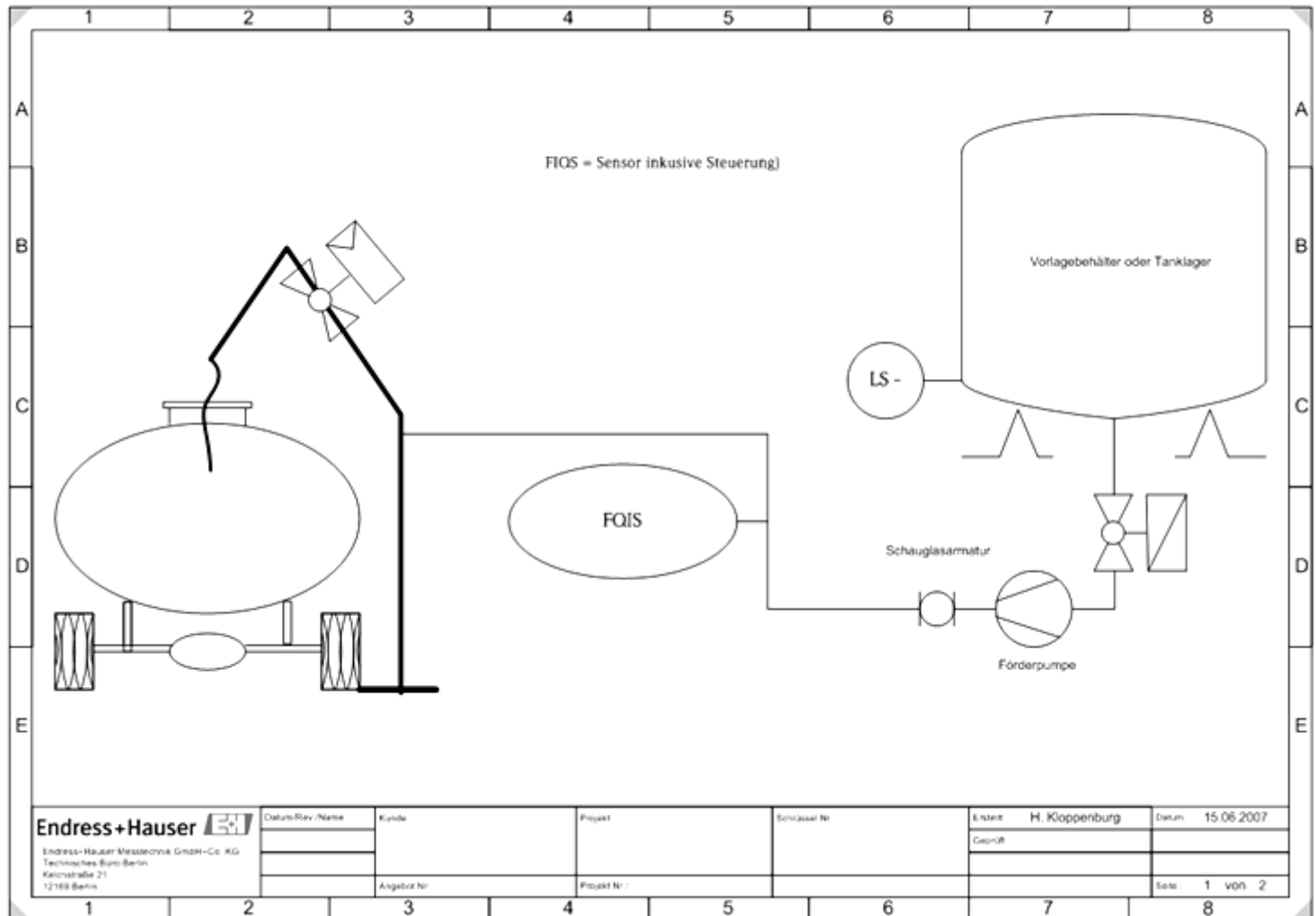
Liquiphant M vibration limit switch FTL51 special version with a protection tube.





Principal Drawing

For the best accuracy, the Bio-Diesel has to be bubble free and closing valve is placed on the end of the filling arm.





Biodiesel Loading

Promass 84F Coriolis Mass Flow Measuring System
The universal flow meter for custody transfer.
Together with the measured temperature
we are calculating standard volume by 15°C





Application on a Ethanol Loading Plant



Train / Truck Loading





Total Cost of Ownership

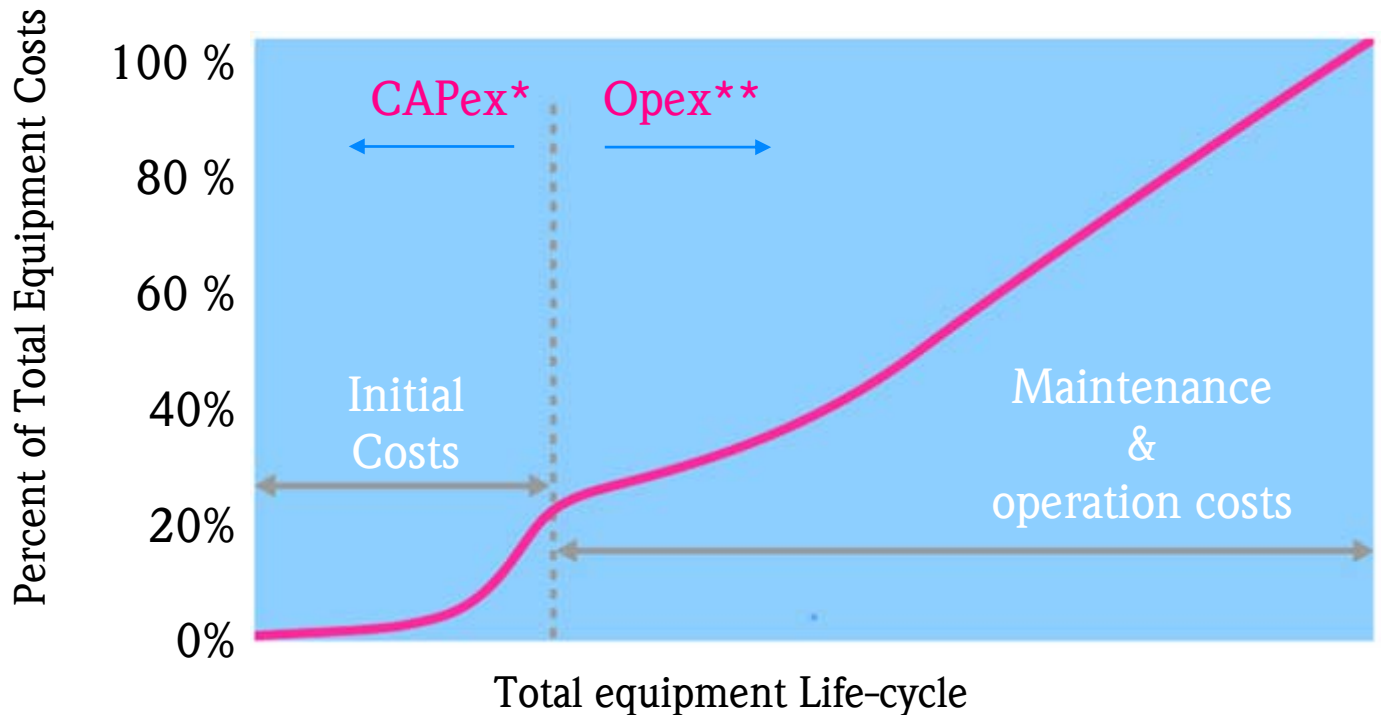


1. Instrumentation
2. Engineering
3. Operation cost
 - Maintenances
 - Calibration
 - Trouble shooting
 - Spare parts
 - Staff training
 - Shut down time



Different phases, different costs, different requirements

Most Plant Asset Management systems are static and focus on just one phase of the life cycle.



* Capital expenditure
** Operational expenditure

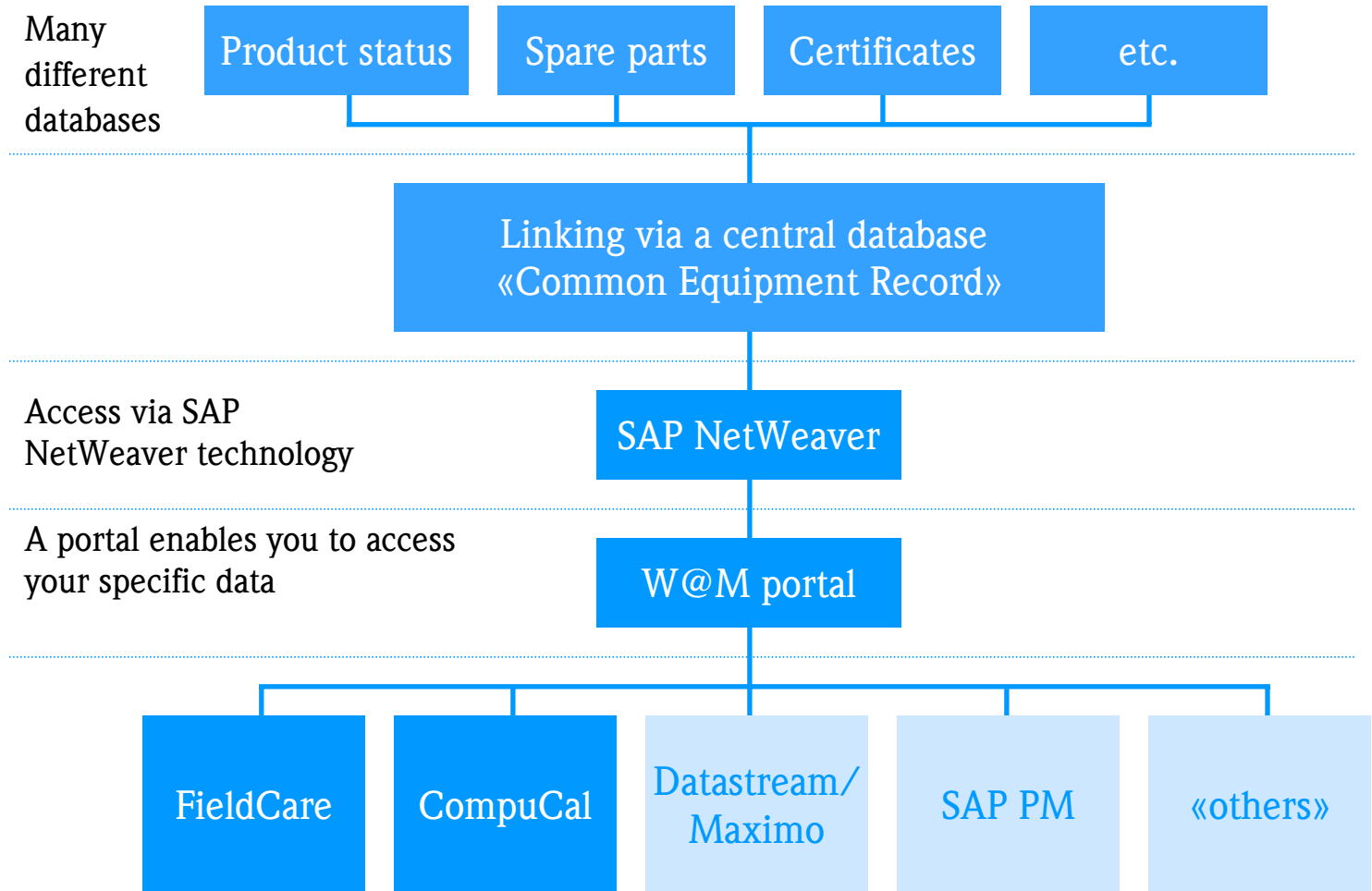


Life Cycle of a Field Instrument



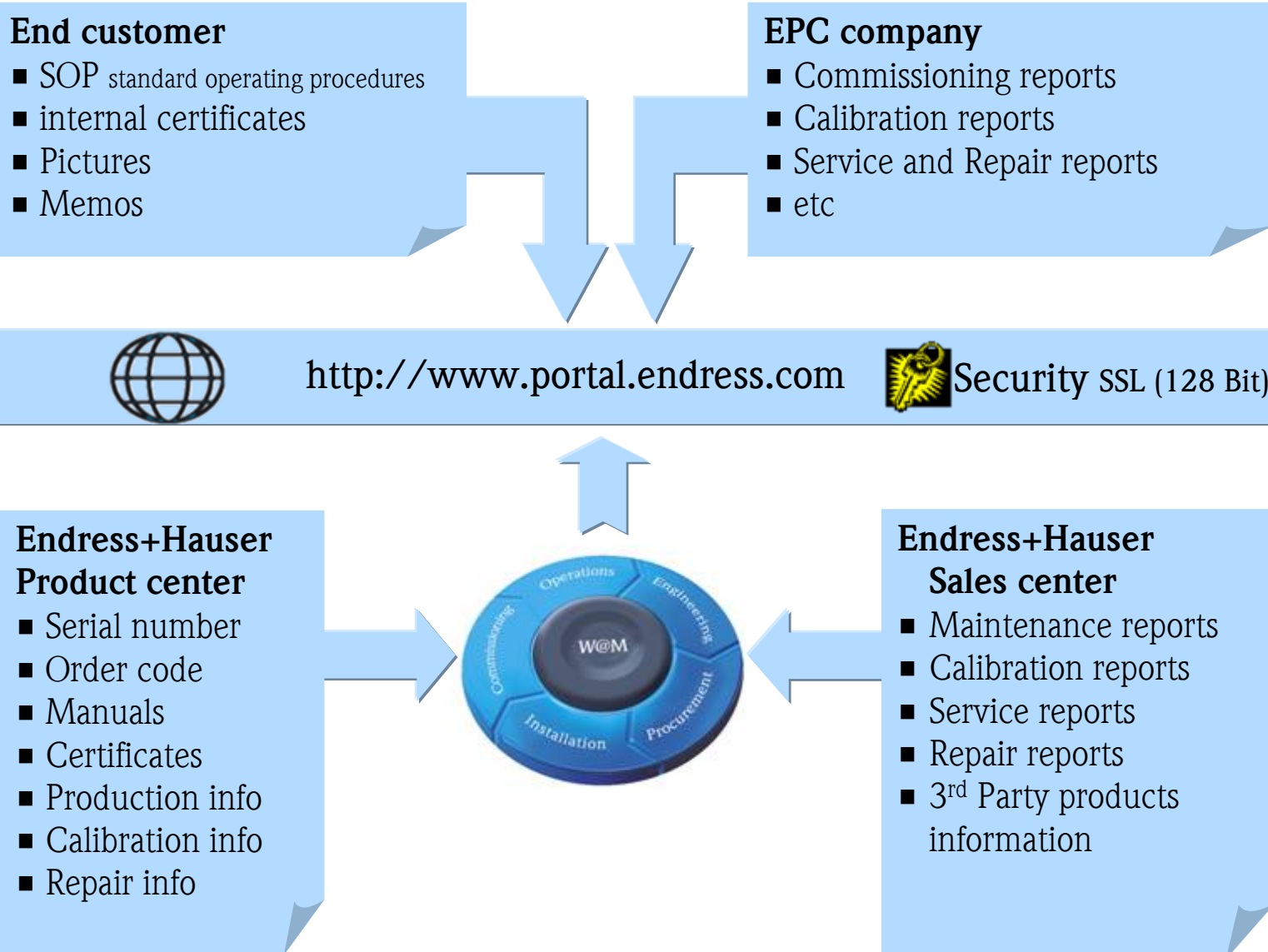


Providing relevant Information





W@M Technology and how it works



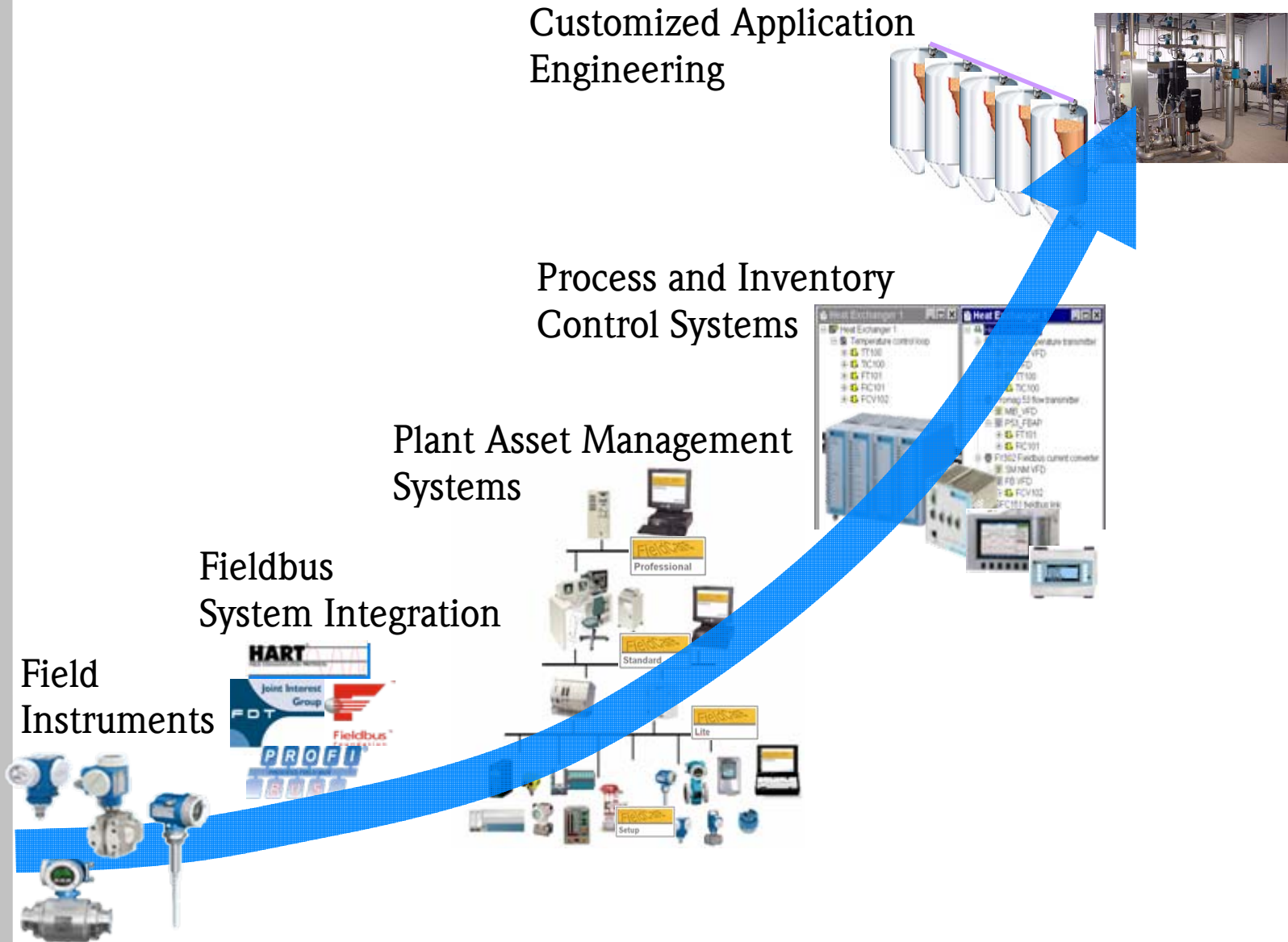


Companies relying on W@M



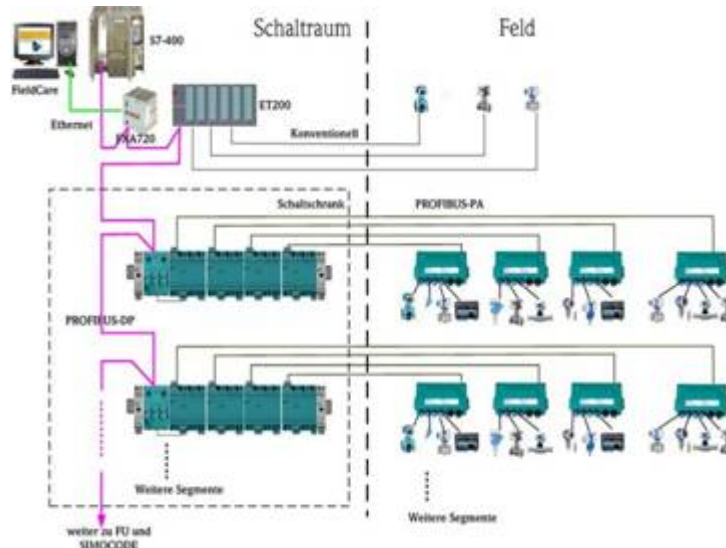


Solutions from Sensors to Engineered Applications





Field Installation with Profibus PA





What do you expect from your Partner?



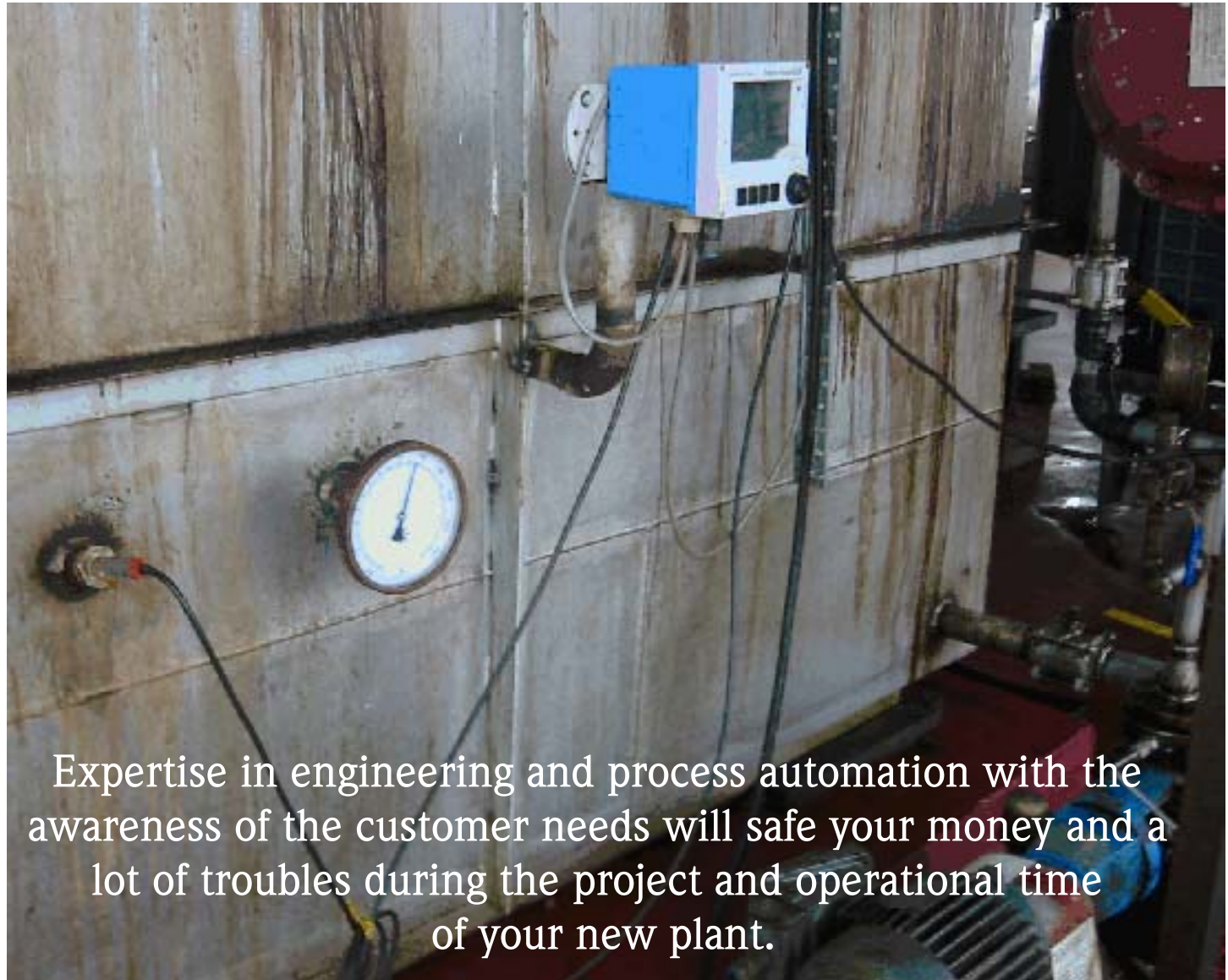


What do you expect from a Partner?





What do you expect from a Partner?



Expertise in engineering and process automation with the awareness of the customer needs will save your money and a lot of troubles during the project and operational time of your new plant.