

## Fluidengineering and Service – worldwide.

### Fluidengineering for optimisation, maintenance and training.

The complete package of technical service:

#### Service Centre

- Maintenance and commissioning
- Overhaul and repair
- Analysis (e.g.: Oil and cooling lubricant analysis)

#### Development and Design

- Highly focused and market-oriented
- State of the art technology and international approvals

#### Training Centre

- Structured and comprehensive knowledge about hydraulics, measuring technology and maintenance
- On site training with our customers



Brochure: Accumulators DEF 3.000 /...



Brochure: Filtration Range DEF 7.000 /...



Br.: Files for Industrial Processing DEF 7.000 /...



Brochure: Systematic Fluid Service DEF 7.928 /...



Brochure: Compact Hydraulics DEF 5.300 /...



Brochure: Accessories DEF 6.100 /...



Brochure: Electronics 18.000 /...



Broch.: Cooling Systems DEF 5.700 /...

**Global presence. Local expertise.**  
**www.hydac.com**



- HYDAC Headquarters
- HYDAC Companies
- HYDAC Distributors and Service Partners

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**HYDAC**

**INTERNATIONAL**

**Condition Monitoring for efficient Life Cycle Cost Management.**



Headquarters Germany



HYDAC China



HYDAC Denmark



HYDAC USA

**HYDAC**

**Your professional Partner for Condition Monitoring.**

With over 4,000 employees worldwide, HYDAC is one of the leading suppliers of fluid technology, hydraulic and electronic equipment.

We are the professional partner in the area of Condition Monitoring. Our knowledge and skill combined with our high level of research and development capabilities means that we are on the same wavelength as our customers. We offer complete systems and components to monitor industrial and mobile machines.

### Global yet local.

With 40 overseas subsidiaries and over 500 distributors and service partners, HYDAC is your reliable partner worldwide.

### System solutions. One supplier. One contact.

Wherever you need us, we are there to help you find the most effective solution – for every application, from components to a complete system.



HYDAC India



HYDAC France



HYDAC Brasil



HYDAC Australia

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## Life Cycle Cost Management by HYDAC Condition Monitoring.

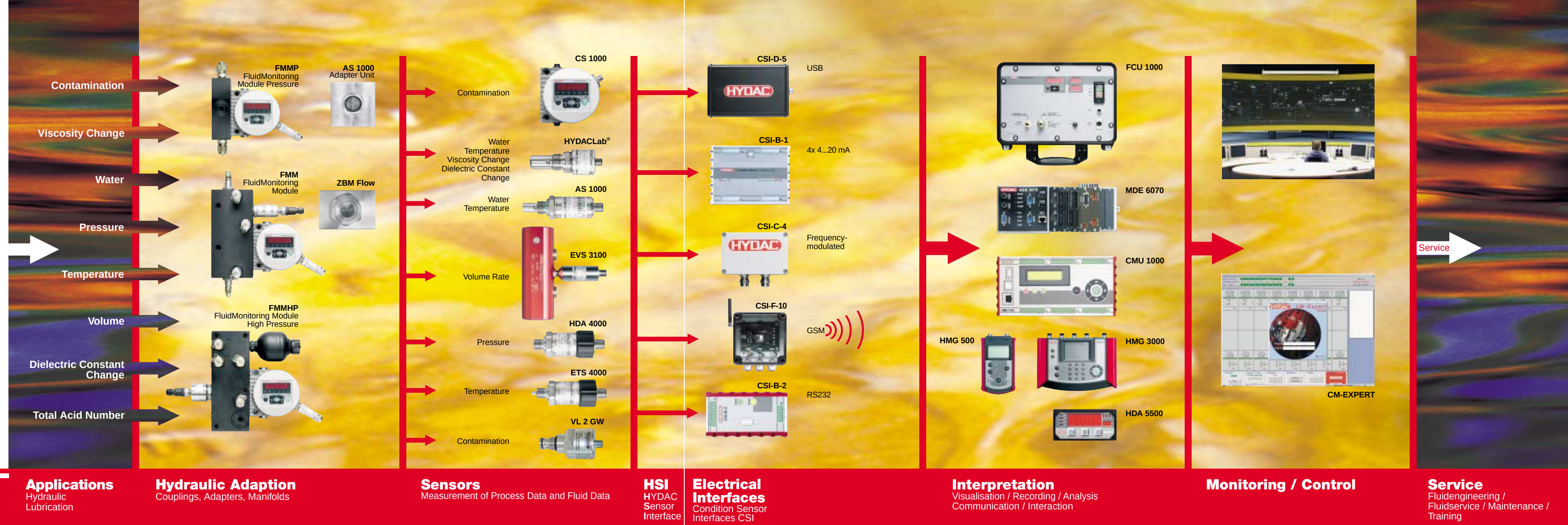
Condition Monitoring is the **collection** and **interpretation** of data from machines, systems and their components, with the aim of conducting predictive maintenance programs based on the system condition.

The term Life Cycle Cost (LCC) describes the cost analysis of a machine cycle or facility cycle from acquisition to decommissioning. The goal to reduce costs is the future focus of machine manufacturers and users. A promising and efficient solution to reduce the LCC arises from applying modern Condition Monitoring systems to fluid power equipment.

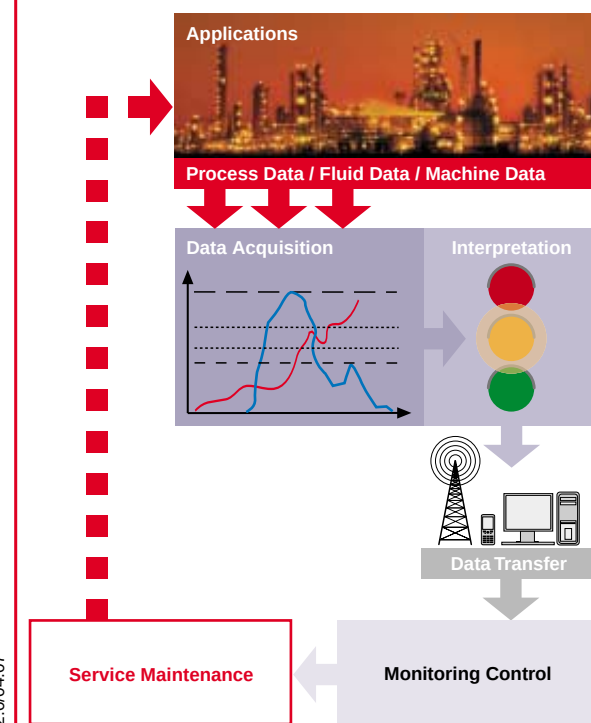
To reach this goal HYDAC offers an extensive product programme of components and systems as well as application specific service activities. It includes solutions for all areas of Condition Monitoring systems:

### Data acquisition, Interpretation, Monitoring/Control

The approach is suitable for the operator, service provider, maintenance engineer and machine manufacturer.



## Philosophy.



## Integration Concept.

### Data acquisition

The operation data of the machine or system are measured continuously by a variety of sensors:

#### Process data

(e.g. pressure, temperature, flow rate, liquid level ...)

#### Fluid data

(e.g. contamination, water content, viscosity ...)

#### Machine data

(e.g. start/stop, cycle time, energy, consumption, errors ...)

### Interpretation

The gathered data is analysed and interpreted using HYDAC's long standing experience in Fluidengineering. The interpretation of process, fluid and machine data provides a much deeper understanding of the system condition than conventional limited monitoring.

### Monitoring / Control

Finally the simplified data in various forms is presented to the operator. This enables him to optimally monitor and control the machine. A corresponding service message or activity is initiated.

### Service concepts

This condition based monitoring procedure will lead the machine operator or manufacturer to better service decisions.

## Product Programme.

The CM programme is characterised by the following features:

**Modular open structure / easily expanded if needed**

**Open hardware structure / not exclusive to one producer**

**Offline / online architecture**

**Universal integration capability**

In addition to sensors to measure the essential data in fluid power applications the HYDAC product programme includes modules and interfaces for simple system integration:

**Mechanical Conditioning Modules**  
(e.g. couplings, adapters, manifolds ...)

#### FMM - Modules

- Adjusting of the necessary flow rate
- Combines different connection possibilities for CS 1000, AS 1000 and HYDACLab®
- Easy integration capability

### Sensors (process data, fluid data)

#### HYDACLab® – Oil Condition Sensor

- Rel. change in viscosity:  $\pm 30\%$  of initial value
- Rel. change in dielectric:  $\pm 30\%$  of initial value
- Rel. humidity: 0 ... 100 % saturation
- Temperature: -25 ... 100 °C
- Output signal: sequential 4 ... 20 mA, switching output, HSI
- Operating range: 0 ... 50 bar

#### CS 1000 – ContaminationSensor

- ISO4406 (1999/1987), NAS 1638, SAE AS 4059
- Output signal: 4 ... 20 mA, 0 ... 10 V, RS 485, relay output, HSI
- Operating range: 0 ... 300 bar, 0 ... 85 °C

#### VL 2 GW: DirtController

- Inlet pressure (up to 25 bar)
- Differential pressure (up to 5 bar)
- Output signal: 4 ... 20 mA, relay outputs
- Operating range: -40 ... 85 °C

#### AS 1000 – AquaSensor

- Rel. humidity: 0 ... 100 % saturation
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### Sensors- and Communication Interfaces

(e.g. 4 - 20 mA, 0 - 10 V, relay outputs, CAN, Ethernet, GSM, USB ...)

**Interpretation** (Visualisation, Recording, Analysis, Algorithms ...)

#### CMU 1000 – ConditionMonitoring Unit

- Real time controller for data analysis
- 8 analogue input signals or HSI components
- Interfaces: RS 232, Ethernet (RJ45), ...
- Switching outputs
- Parameterisation with PC-USB interface
- Data storage: SRAM, Flash, USB stick

#### MDE 6070 – CM-Expert

- Industrial PC
- 52 signal inputs single wire or RS 485 (extendable)
- All industrial interfaces
- Up to 15 plug-in modules (analogue and binary, in-/outputs: frequency, particles, relay ...)

#### FCU 1000 – FluidControl Unit

- Portable service unit for temporary measurement of solid particle contamination and water content
- Integrated pump allows the operation at pressureless reservoirs
- Internal data memory and PC communication
- Fluids up to 350 mm<sup>2</sup>/s

## Customer Benefits.

- Permanent monitoring and documentation of the machine process
  - Automatically generated warning of reaching pre-determined data levels
  - Immediate alert of overshooting critical safety levels
  - Avoiding early failures and consequential damage
  - Use the full life cycle capacity of the components
  - Support for redesign work
  - Increasing the machine availability
  - Optimisation of the safety and quality levels of the machine process
  - Optimisation of the maintenance and service activities
  - Demand oriented use of material- and personal recourses
  - Support in case of damage: claim management
- Life Cycle Cost Management by HYDAC Condition Monitoring**

## Application fields.

- Aerospace
- Automotive industry
- Food industry
- Laboratory and inspection systems
- Machine tools industry
- Machining centres
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- Mining
- Mobile hydraulics
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- Pharmacy
- Plastics machines
- Power stations
- Semiconductor industry
- Steel plants
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- Wind power



The HYDAC logo is a red oval with the word "HYDAC" in white, bold, sans-serif capital letters.

# INTERNATIONAL

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# HYDAC

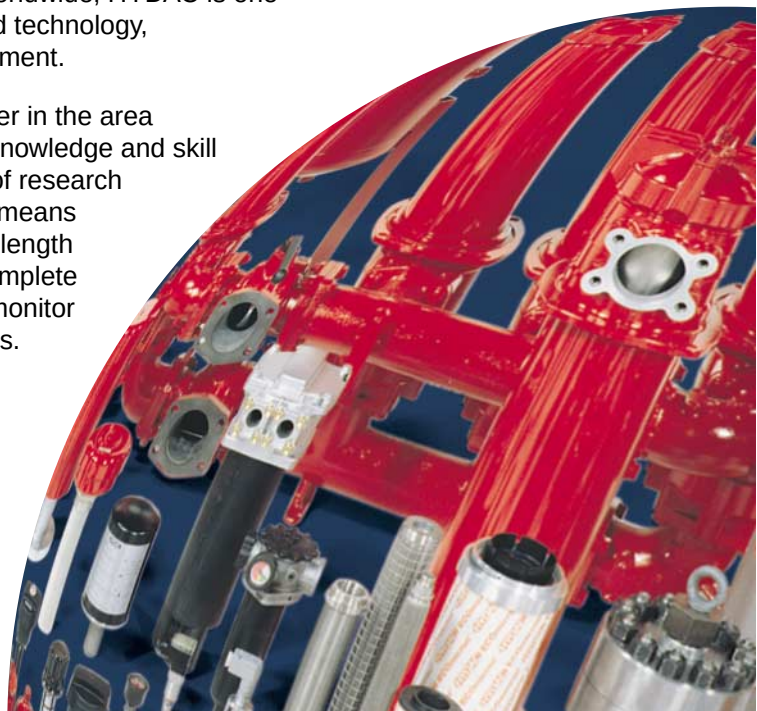
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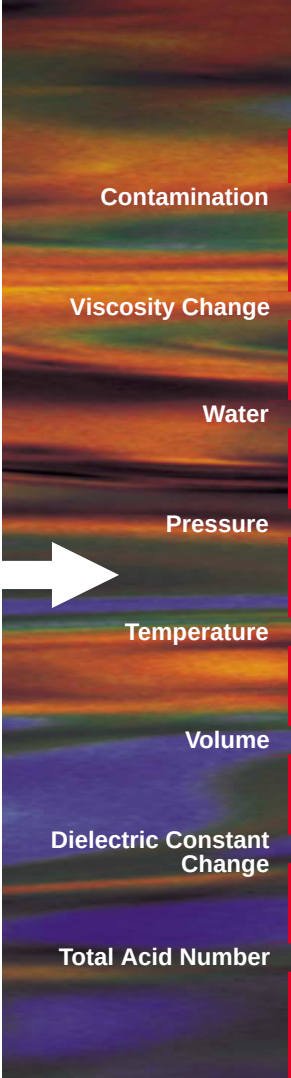
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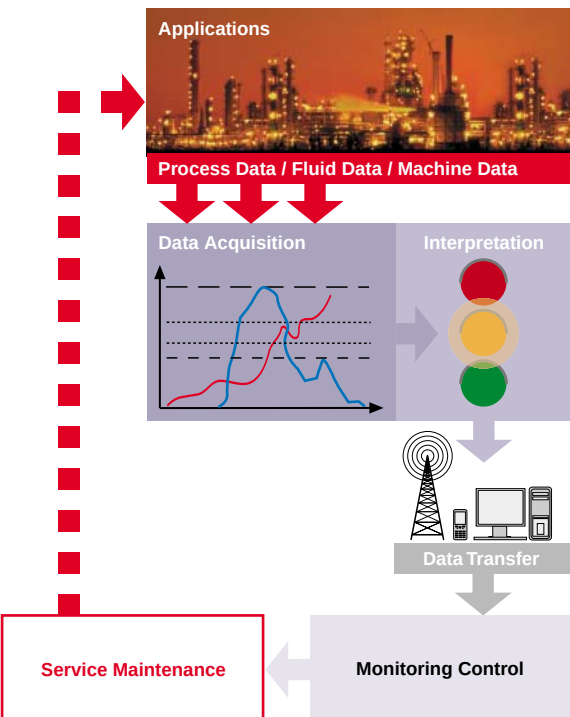
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**Applications**  
Hydraulic  
Lubrication

## Philosophy.



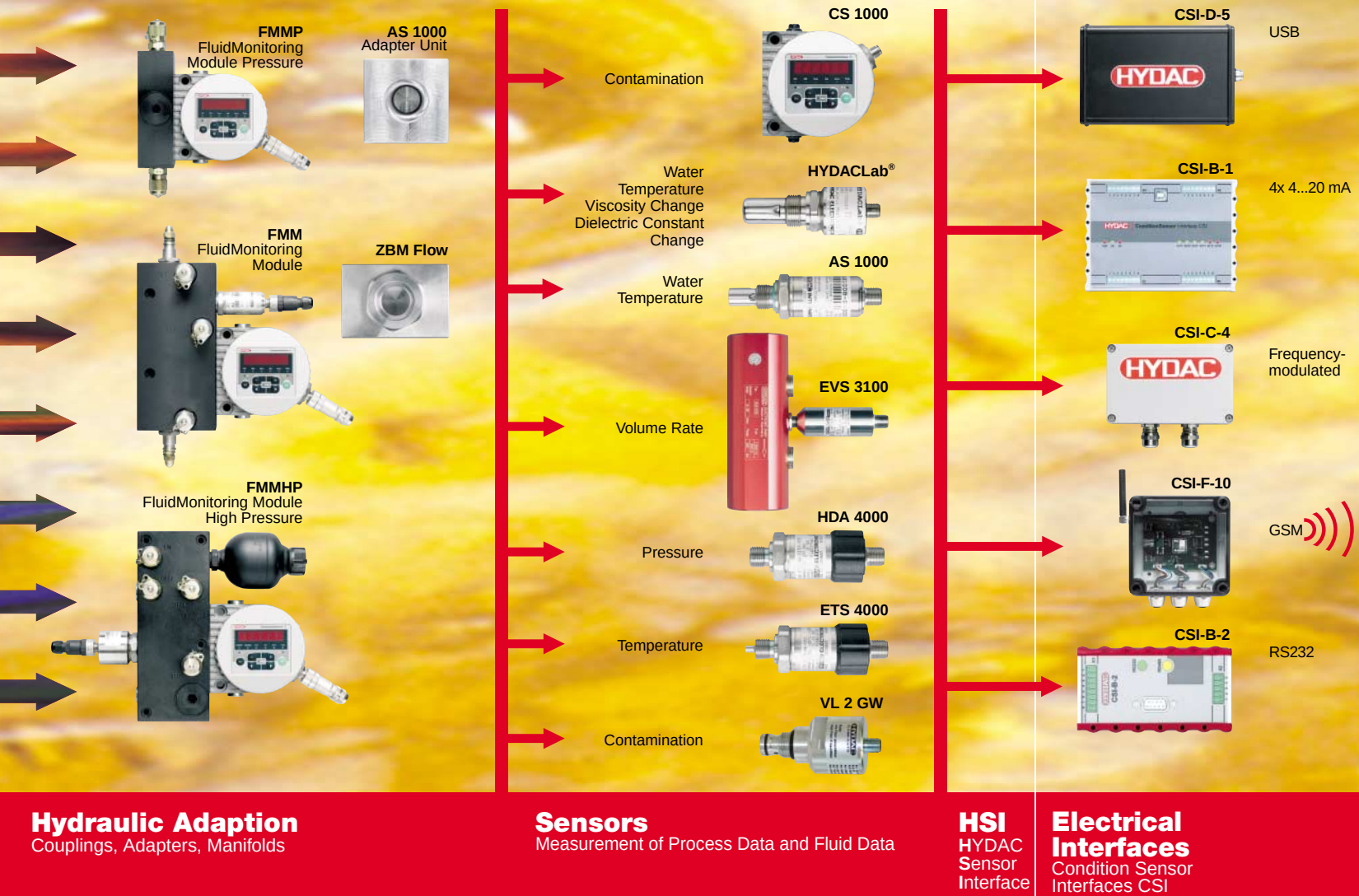
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FCU 1000



MDE 6070



CMU 1000

HMG 500



HMG 3000



HDA 5500



CM-EXPERT

Service

## Interpretation

Visualisation / Recording / Analysis  
Communication / Interaction

## Monitoring / Control

## Service

Fluidengineering /  
Fluidservice / Maintenance /  
Training

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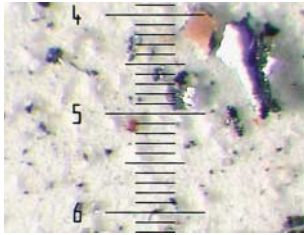
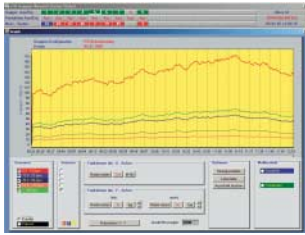
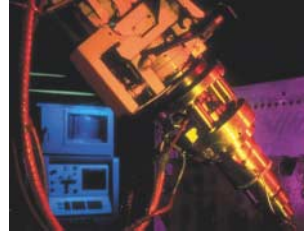
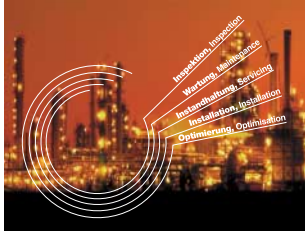
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