



# Full protection for machines and equipment. Your path to Industry 4.0.

Our plant is  
running smoothly

Condition monitoring systems



[ifm.com/gb/solution](https://ifm.com/gb/solution)

50<sup>th</sup>  
ifm anniversary  
experience in automation.

# ifm application solution: Condition-based maintenance for more efficiency and quality

**„Your advantages  
are obvious“**

## Continuous diagnostics:

- > Condition-based maintenance as required instead of fixed service intervals.  
Replacement of parts can be planned.

## > Cost reduction

## Early detection:

- > Basic monitoring, vibration diagnostics on rolling element bearings. Early detection of motor damage, dry running or cavitation.

## > Prevention of unplanned downtime

## Maximum efficiency:

- > Data acquisition and analysis.  
Cleaning as required.

## > Process optimisation

## Easy integration:

- > Application solution from the sensor to the evaluation and network-based analysis tool.

## > Implementation independent of your IT department

## Scalable:

- > Can be extended to other applications and/or ERP systems.

## From sensor to ERP

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**Sensors, connectivity  
and software**

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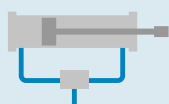
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**From sensor to ERP**

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# ifm application solution: Powerful sensors, connectivity and software

The solution  
for smooth  
processes

**Software –**  
Visualise, log and  
export process data



**LR SMARTOBSERVER**  
*Application software for  
condition monitoring*

- Condition monitoring of machines and equipment
- Organisation of maintenance
- Alarm management for
  - maintenance
  - warning and control limits
  - alarm escalation
- Process value analysis (correlation)

- Online visualisation of measured values
- Customer-specific live status display

**Your advantage:**

- Improved machine uptime
- Increased machine performance and effectivity
- Reduced wear
- Reduced faults and incidents

**Connectivity –**  
Process, address and  
transmit process data



**IO-Link masters – robust field bus modules  
with safe connection**

- Reliable transmission of machine data, process parameters and diagnostic data
- Offers all the advantages of IO-Link communication

**Diagnostic unit VSE – online condition  
monitoring with fieldbus interface**

- Process data acquisition from vibration sensors
- Reliable transmission of process parameters for the condition-based diagnostics of machines and equipment

**Sensors –**  
Acquire process values

**Acceleration sensors**

- Measurement of dynamic forces at the machine surface
- Early detection of damage to rotating machine parts
- Replacement can be carried out early before a failure occurs

**Diagnostic units**

- Evaluation of several dynamic signals
- Alarm messages in the event of exceeded thresholds

**Pressure sensors**

- Pressure losses are detected immediately, e.g. leakage or burst pipe
- Robust pressure measuring cells, resistant to pressure peaks

**Temperature sensors**

- Detection of surface temperatures as an additional indicator for wear
- Detection of overload due to increasing machine temperature

**Flow meters**

- Early detection of leakage
- Cooling of machine parts can be monitored
- Recording of the energy consumption / need

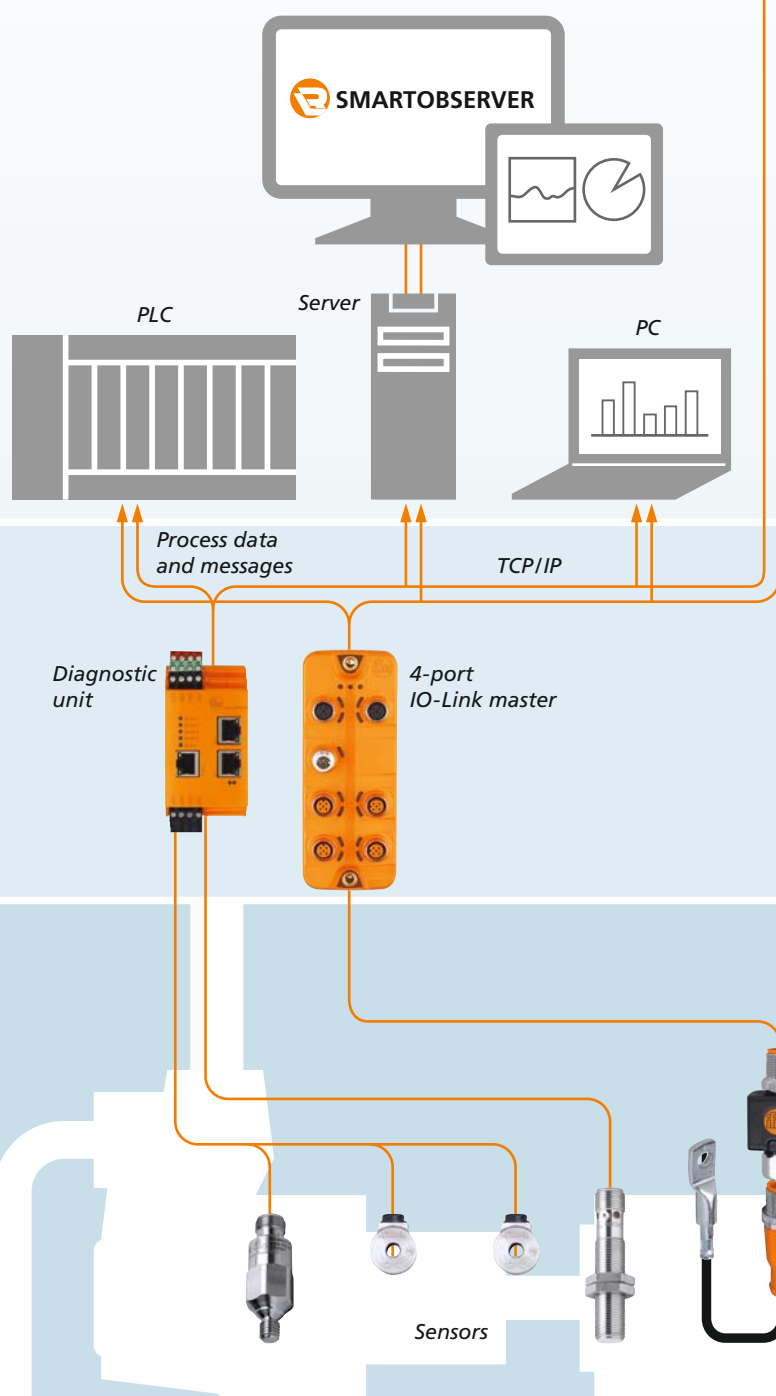




ERP systems, e.g.



- Improved product quality
- Reduced maintenance costs
- Ensured safety and health at work
- More company success and customer satisfaction



#### Point level detection and continuous level measurement

- Run-dry monitoring, e.g. of pumps
- Level monitoring of tanks

#### Inductive sensors

- Speed detection on rotating parts as information for vibration diagnostics
- Precise position detection of workpieces, workpiece carriers and machine parts

#### Systems for oil quality monitoring

- Monitoring the contamination of oils
- Machine and equipment protection by permanent monitoring of oil moisture

# Monitoring and condition-based maintenance of fans









**Continuous diagnostics:**  
Detection of fan damage with full coverage of the real operating hours.

**Early detection:**  
Monitoring for damage to rotor blades, wheel / rotor unbalance vibration, shaft misalignment, damage to rolling element bearings, unbalance and wear.

**Maximum efficiency:**  
Permanent diagnostics of dirt accumulation e.g. on rotor blades.

**Easy integration:**  
ifm provides individual solutions which are suited for different types of fans.

	Application for 1 fan				Without additional service	
	Sensors for installation on the motor Variable design				Preconfigured hardware and software	
Basic package		①	Vibration sensor screw mounting or vibration sensor adhesive mounting with cable		③	Temperature sensor and measured signal converter for temperature sensors
						
		②	Inductive sensor for rotational speed detection			Connection cable with socket (cable length selectable)
Enhancement packages	Application for up to 7 fans				Without additional service	
	Application for 8 to x fans				With additional service	
	Bearing diagnostics				With additional service	



**For industrial  
applications**



## Fan applications

Radial fans with direct or belt transmission as well as axial fans, as used in:

- dust extraction systems
- fresh and exhaust air in paint shops
- workshop ventilation
- air-conditioning systems
- external ventilation of motors
- mining
- extraction systems in foundries
- oil mist extraction on machine tools
- air supply for combined heat and power plants / waste incinerators



*Looseness,  
unbalance*



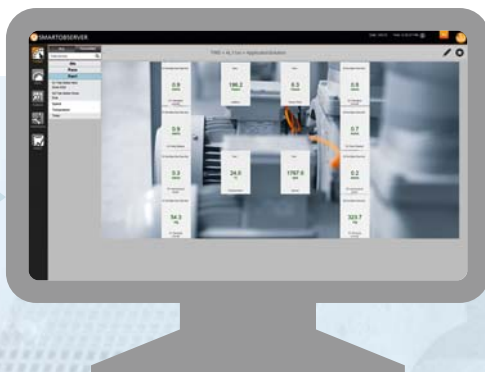
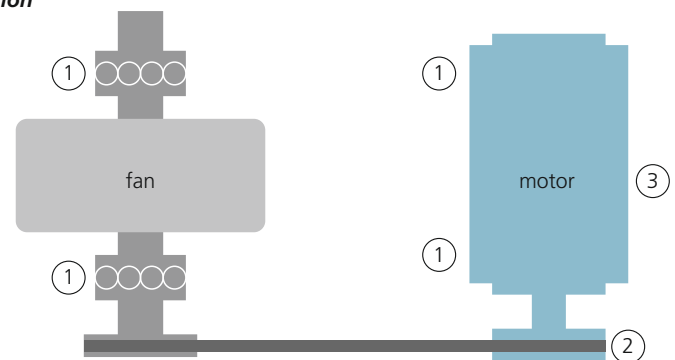
*Misalignment*



*Rolling  
element bearing*



*Contamination*



As an option connection to ERP  
systems, e.g. SAP

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**SMARTOBSERVER**



"Since we started using the ifm fan monitoring, the rotor blades are only cleaned if required.  
This saves us 15,000 euros a month."  
(maintenance engineer from the automotive industry)

# Monitoring and condition-based maintenance of pumps



## Continuous diagnostics:

Detection of pump damage with full coverage of the real operating hours.

## Early detection:










Basic monitoring, monitoring for cavitation, cavitation caused by soiling, motor damage, shaft misalignment, unbalance vibration or dry running.

## Maximum efficiency:

Permanent diagnostics keep pressure and flow within tolerance.

## Easy integration:

ifm provides individual solutions suited for different types of pumps.

	Application for 1 pump				Without additional service	
	Sensors for installation on the motor Variable design			+	Preconfigured hardware and software	
Basic package		① Vibration sensor screw mounting or vibration sensor adhesive mounting with cable		③ Temperature sensor and measured signal converter for temperature sensors		IPC incl. condition monitoring software LR SMARTOBSERVER
						Diagnostic unit
		② Inductive sensor for rotational speed detection		Connection cable with socket (cable length selectable)		Power supply
Enhancement packages	Application for up to 7 pumps				Without additional service	
	Application for 8 to x pumps				With additional service	
	Bearing diagnostics				With additional service	





For industrial  
applications



## Pump applications

Centrifugal pumps, as used in:

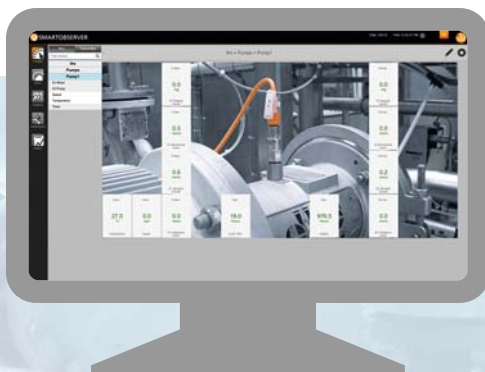
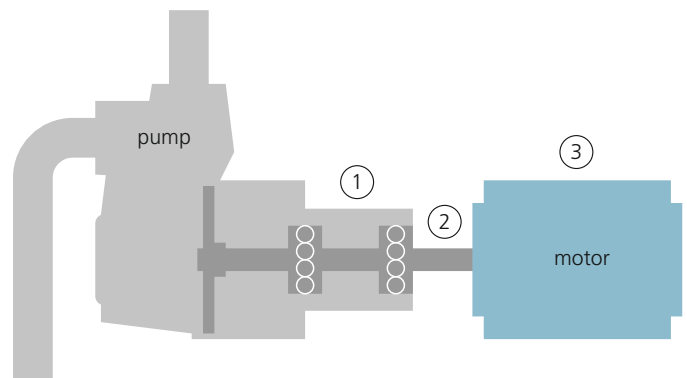
- coolant systems for machine tools
- boreholes
- water supply
- sewage disposal
- cooling circuits
- sewage treatment works
- motor cooling supply systems
- lubricant circuits on presses



Misalignment



Pump  
eccentricity,  
cavitation



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As an option, connection to ERP  
systems, e.g. SAP

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"Thanks to the monitoring, regular  
maintenance of the large pumps can be carried  
out as needed. Instead of every 5 years, it can  
be carried out every 6 years now. This way,  
we save several thousand euros."  
(statement from a water supplier)

# Monitoring and condition-based maintenance of compressors



## Continuous diagnostics:

Detection of motor damage with full coverage of the real operating hours.

## Early detection:








Monitoring of unbalance, wear and overall vibration. Detection of unbalance vibration, shaft misalignment and rotor wear in the compressor.

## Maximum efficiency:

Permanent diagnostics of winding problems or dirt accumulation in the electric motor by temperature measurement.

## Easy integration:

ifm provides individual solutions suited for different types of compressors.

	Application for 1 compressor		Without additional service	
	Sensors for installation on the motor Variable design		Preconfigured hardware and software	
Basic package		① Vibration sensor screw mounting or vibration sensor adhesive mounting with cable		③ Temperature sensor and measured signal converter for temperature sensors
		② Inductive sensor for rotational speed detection		Connection cable with socket (cable length selectable)
				IPC incl. condition monitoring software LR SMARTOBSERVER
Enhancement packages				Diagnostic unit
				Power supply
	Application for up to 7 compressors		Without additional service	
	Application for 8 to x compressors		With additional service	
	Bearing diagnostics		With additional service	



For industrial  
applications



## Compressor applications

Screw compressors,  
as used in:

- compressed air supply for machine tools
- general compressed air supply
- food industry
- granule conveying on injection moulding machines
- sealing air monitoring on machine tools
- assembly lines in the automotive industry
- placement of electronic components
- weight compensation on presses



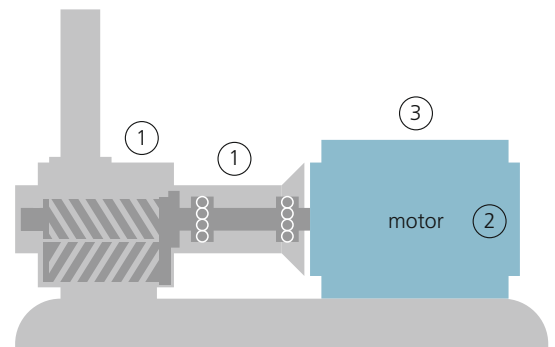
*Looseness,  
unbalance*



*Misalignment*



*Contamination*



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As an option, connection to ERP  
systems, e.g. SAP

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"The detection of damage to the rotor bearing meant that maintenance only needed to replace the bearings. Without monitoring and early intervention the rotors would have been damaged as well and we would have had to replace them. We saved approx. 15,000 euros."  
(maintenance manager in a foundry)





# Monitoring and condition-based maintenance of cooling circuits



## Continuous diagnostics:

Monitoring of heat transfer and flow with full coverage of the real operating hours.

## Early detection:








Detection of leakage in the pipe or in the flexible hose system. Kinks in the hose or blockage by particles in the cooling water circuit are detected early.

## Maximum efficiency:

Permanent diagnostics of contamination, e.g. in the filter or at the welding gun.

## Easy integration:

ifm provides individual solutions which are suited for different cooling water systems.

Basic package	Application for 1 cooling circuit			Without additional service	
	Variable sensor design			Preconfigured hardware and software	
		① Flow meter		IO-Link master	 IPC incl. condition monitoring software LR SMARTOBSERVER
		② Temperature sensor		Connection cable with socket (cable length selectable)	 Power supply
		③ Pressure sensor			
Enhancement packages	Application for up to 7 cooling circuits			Without additional service	
	Application for 8 to x cooling circuits			With additional service	
	Bearing diagnostics			With additional service	





For industrial  
applications



### Cooling circuit applications

Monitoring of cooling water  
systems, as used in:

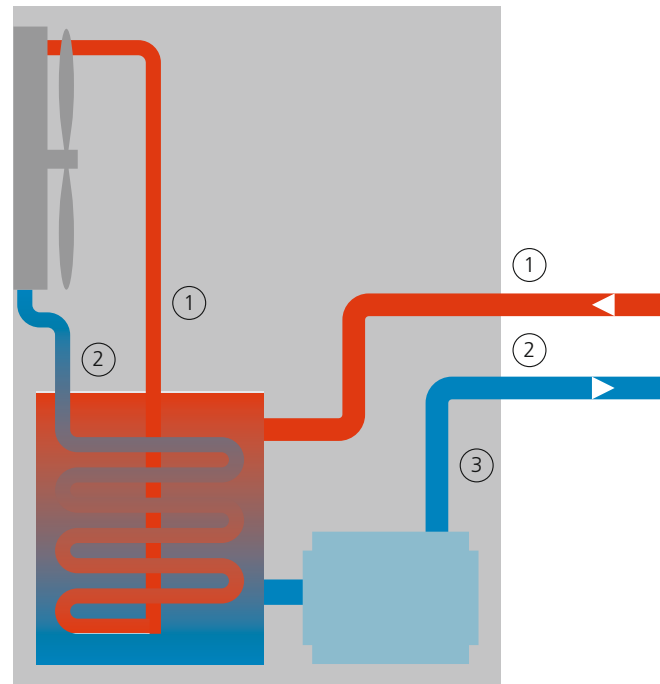
- injection moulding machines
- machine tools with spindle cooling
- robot welding guns
- heat exchangers
- all machines with cooling and heating



Leakage



Contamination



As an option, connection to ERP  
systems, e.g. SAP

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"We can detect even very small leaks.  
The systems have been working reliably  
and without maintenance for years."  
(maintenance engineer from  
the automotive industry)

# Monitoring and condition-based maintenance of compressed air systems

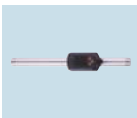
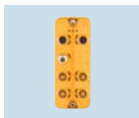





**Continuous diagnostics:**  
Full coverage of the real operating hours.

**Early detection:**  
Monitoring of machine and equipment parts for leakage.

**Maximum efficiency:**  
Permanent monitoring of the parts, resulting in higher performance and ensured quality.

**Easy integration:**  
ifm offers solutions for different machine and equipment parts.

Basic package	Application for 1 cylinder				Without additional service	
	Sensors for leakage monitoring Variable design				Preconfigured hardware and software	
		①	Compressed air meter		IO-Link master	 IPC incl. condition monitoring software LR SMARTOBSERVER
		②	Cylinder sensor			 Power supply
Enhancement packages	Application for up to 7 cylinders				Without additional service	
	Application for 8 to x cylinders				With additional service	



*For industrial applications*



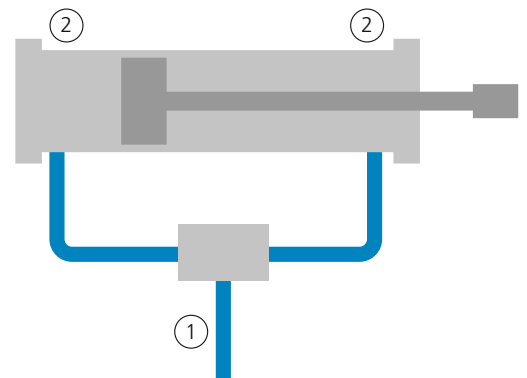
## Applications for compressed air systems

**Monitoring of production machines and important compressed air consumers:**

- Condition-based maintenance of the components
- Identification of cost drivers
- Replacement of parts can be planned
- Constant quality of the products made
- Machine performance ensured by the online measurement
- Scalable enhancements
- Reduction of compressed air costs
- Detection of the actual operational performance of a cylinder



*Leakage*



As an option connection to ERP systems, e.g. SAP

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**"Since we started detecting leakage we make savings every day and can ensure the quality of our products by monitoring the cylinders."**  
(maintenance manager final assembly white goods)











# Monitoring and condition-based maintenance of hydraulic power packs



**Continuous diagnostics:**  
Monitoring of the tank level, run-dry protection.

**Early detection:**  
Identification of flow disturbances and level monitoring

**Maximum efficiency:**  
Higher uptime by permanent diagnostics and monitoring of the process values.

	Application for 1 hydraulic power pack				Without additional service	
	Sensors for installation on the power pack Variable design				Preconfigured hardware and software	
Basic package		① Level sensor + probe		④ Pressure sensor		IPC incl. condition monitoring software LR SMARTOBSERVER
		② Level sensor for point level detection		⑤ Temperature sensor		Power supply
		③ Mechatronic flow meter		IO-Link master		
Enhancement packages	Application for up to 7 hydraulic power packs				Without additional service	
	Application for 8 to x hydraulic power packs				With additional service	





For industrial  
applications



## Hydraulic applications

### Monitor hydraulic power packs:

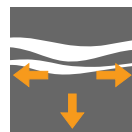
- Measurement of the level in the tank
- Temperatures in the tank of the hydraulic power pack
- Detection of the flow velocity in the hydraulic power pack
- Pressure detection in the hydraulic system
- Overflow prevention – pressure in the hydraulic system
- Run-dry protection – detection of the tank levels
- Detection of the volumetric flow quantity of the hydraulic oil



Leakage



Flow



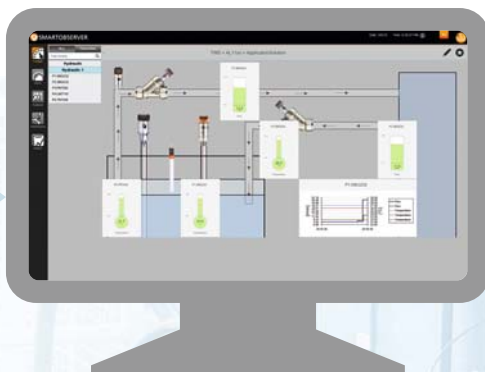
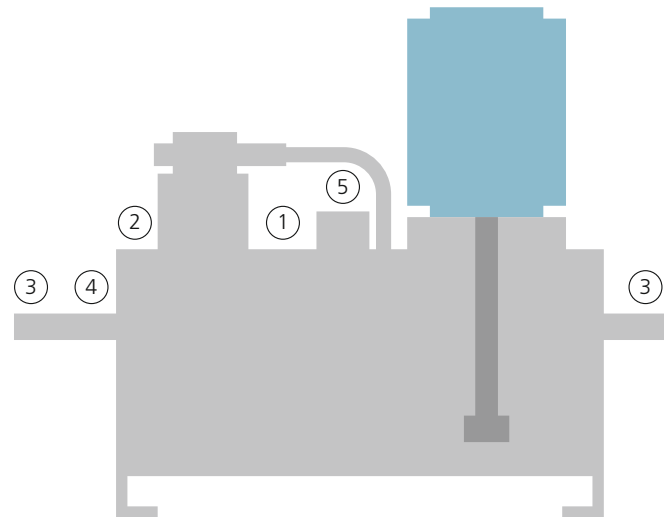
Pressure



Temperature



Level



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As an option, connection to ERP  
systems, e.g. SAP

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"Thanks to the monitoring  
of the hydraulic system we managed  
to optimise the maintenance cycles and  
to refill oil as needed."  
(maintenance engineer  
automotive supplier)



# ifm system sales – Solutions for your installation from a single source

## Competence:

Trust our application know-how. We have been developing automation solutions for our customers for 50 years and know tomorrow's requirements.

## Automation from a single source:

We do not only offer hardware, but also the matching software and IT connection.

## Personal contact:

You have a permanent contact who supports your project on site.

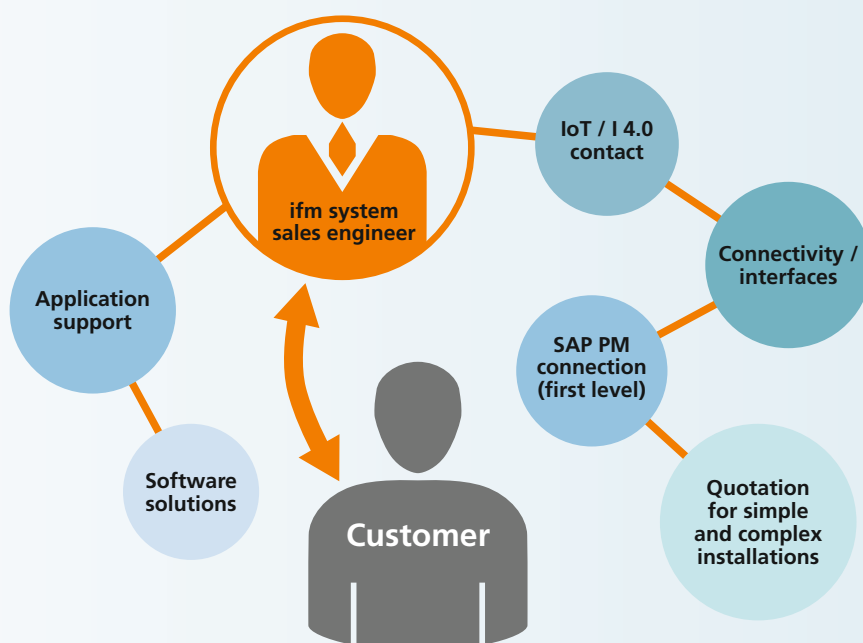
## Together:

We support your project from advice and quotation to commissioning. Even after project completion, we will continue to support you as a reliable partner.

### *ifm system consulting.*

You want to make your application transparent? Fans, pumps, cooling circuits or screw conveyors: Our system consultants help you to find the ideal solution for monitoring your installation. Our service includes competent advice at your site, a fair offer, personal project assistance and support for set-up. We offer sensors, evaluation systems and software for connection to ERP systems – all from a single source. Together we will make your project successful.

Do not hesitate to contact us:  
[info@ifm.com](mailto:info@ifm.com)



### *ifm system sales network*

Your personal ifm system sales engineer will provide you with the entire ifm know-how to implement and optimise your plant monitoring.

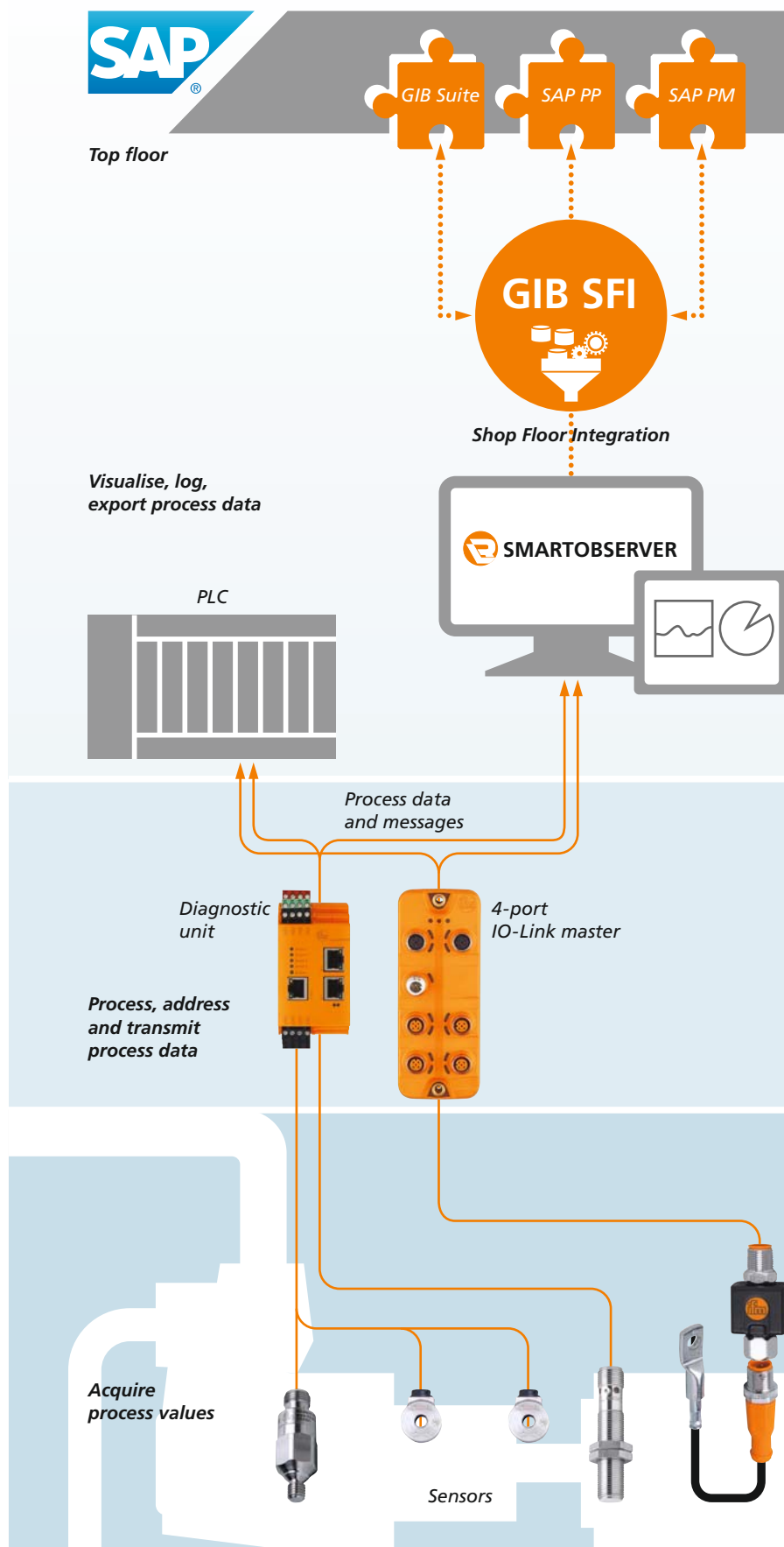
## Data integration “from the sensor to ERP” – your advantages:

- **Processing of real-time information from production in SAP-ERP**
- **Common templates for the sensor-based triggering of follow-up activities in SAP**
- **Predictive maintenance as needed**
- **Cost reduction due to optimised stock of spare parts**
- **Coordinated maintenance and production planning**
- **Quick and easy introduction**

The software component “Shop Floor Integration (SFI)” allows the exchange of data between an SAP system and the heterogeneous world of sensors, controllers and machines.

With the SFI solution you can pre-process events and process-relevant information from the connected source systems and transmit this, based on rules, to a connected SAP system. With minimal integration effort the SFI enables to trigger and control follow-up activities and processes.

GIB Suite – Supply Chain Excellence  
 GIB SFI – Shop Floor Integration  
 SAP PP – Production Planning  
 SAP PM – Plant Maintenance



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**Identification systems**



**Condition monitoring  
systems**



**Systems for  
mobile machines**



**Connection  
technology**



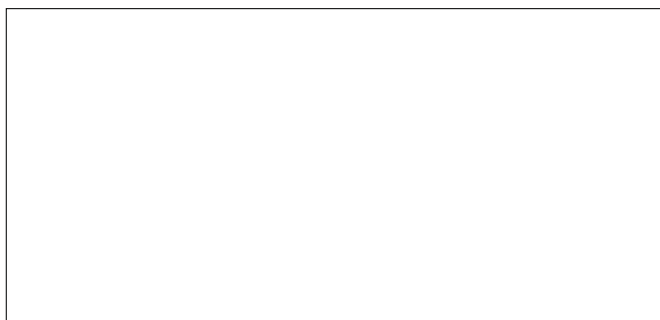
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**Power supplies**



**Accessories**



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