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

Our plant is running smoothly

Condition monitoring systems

ifm.com/gb/solution
### ifm application solution: Condition-based maintenance for more efficiency and quality

#### 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

„Your advantages are obvious“
<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensors, connectivity and software</td>
<td>4 - 5</td>
</tr>
<tr>
<td>Fans</td>
<td>6 - 7</td>
</tr>
<tr>
<td>Pumps</td>
<td>8 - 9</td>
</tr>
<tr>
<td>Compressors</td>
<td>10 - 11</td>
</tr>
<tr>
<td>Cooling circuits</td>
<td>12 - 13</td>
</tr>
<tr>
<td>Compressed air</td>
<td>14 - 15</td>
</tr>
<tr>
<td>Hydraulic power packs</td>
<td>16 - 17</td>
</tr>
<tr>
<td>From sensor to ERP</td>
<td>18 - 19</td>
</tr>
</tbody>
</table>
ifm application solution: Powerful sensors, connectivity and software

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)

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
• 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.

---

<table>
<thead>
<tr>
<th>Basic package</th>
<th>Application for 1 fan</th>
<th>Without additional service</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sensors for installation on the motor</td>
<td>Preconfigured hardware and software</td>
</tr>
<tr>
<td></td>
<td>Variable design</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Vibration sensor screw mounting or vibration sensor adhesive mounting with cable</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Inductive sensor for rotational speed detection</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Temperature sensor and measured signal converter for temperature sensors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Connection cable with socket (cable length selectable)</td>
<td></td>
</tr>
</tbody>
</table>

**Enhancement packages**

<table>
<thead>
<tr>
<th>Application for up to 7 fans</th>
<th>Without additional service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application for 8 to x fans</td>
<td>With additional service</td>
</tr>
<tr>
<td>Bearing diagnostics</td>
<td>With additional service</td>
</tr>
</tbody>
</table>
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

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.

---

### Basic package
- Application for 1 pump
- Sensors for installation on the motor
  - Variable design
- Preconfigured hardware and software

1. Vibration sensor screw mounting or vibration sensor adhesive mounting with cable
2. Inductive sensor for rotational speed detection
3. Temperature sensor and measured signal converter for temperature sensors

---

### Enhancement packages
- Application for up to 7 pumps
- Application for 8 to x pumps
- Bearing diagnostics

- Without additional service
- With additional service

---

- IPC incl. condition monitoring software LR SMARTOBSERVER
- Diagnostic unit
- Power supply
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

"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)
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.

---

**Basic package**

- Application for 1 compressor
  - Without additional service
  - Preconfigured hardware and software

  **Sensors for installation on the motor**
  - Variable design
  - Vibration sensor screw mounting or vibration sensor adhesive mounting with cable
  - Inductive sensor for rotational speed detection
  - Temperature sensor and measured signal converter for temperature sensors
  - Connection cable with socket (cable length selectable)

**Enhancement packages**

- Application for up to 7 compressors
  - Without additional service

- Application for 8 to x compressors
  - With additional service

- Bearing diagnostics
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

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.

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<table>
<thead>
<tr>
<th>Basic package</th>
<th>Application for 1 cooling circuit</th>
<th>Without additional service</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Variable sensor design</td>
<td>Preconfigured hardware and software</td>
</tr>
<tr>
<td></td>
<td><img src="icon" alt="Flow meter" /></td>
<td><img src="icon" alt="IO-Link master" /></td>
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<td></td>
<td><img src="icon" alt="Temperature sensor" /></td>
<td><img src="icon" alt="Connection cable" /></td>
</tr>
<tr>
<td></td>
<td><img src="icon" alt="Pressure sensor" /></td>
<td><img src="icon" alt="IPC incl. condition monitoring software LR SMARTOBSERVER" /></td>
</tr>
<tr>
<td></td>
<td><img src="icon" alt="Power supply" /></td>
<td></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
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<th>Without additional service</th>
</tr>
</thead>
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<tr>
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</tr>
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<td>Bearing diagnostics</td>
<td>With additional service</td>
</tr>
</tbody>
</table>

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12
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

“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.

<table>
<thead>
<tr>
<th>Application for 1 cylinder</th>
<th>Without additional service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensors for leakage monitoring</td>
<td>Preconfigured hardware and software</td>
</tr>
<tr>
<td>Variable design</td>
<td></td>
</tr>
<tr>
<td>① Compressed air meter</td>
<td>IO-Link master</td>
</tr>
<tr>
<td>② Cylinder sensor</td>
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</tbody>
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<table>
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</thead>
<tbody>
<tr>
<td>Power supply</td>
</tr>
</tbody>
</table>

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</tr>
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<td></td>
<td></td>
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<tr>
<td>Application for 8 to x cylinders</td>
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</table>
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

"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.

<table>
<thead>
<tr>
<th>Basic package</th>
<th>Application for 1 hydraulic power pack</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Sensors for installation on the power pack</td>
<td>Variable design</td>
<td>Preconfigured hardware and software</td>
</tr>
<tr>
<td>1 Level sensor + probe</td>
<td>4 Pressure sensor</td>
<td></td>
</tr>
<tr>
<td>2 Level sensor for point level detection</td>
<td>5 Temperature sensor</td>
<td></td>
</tr>
<tr>
<td>3 Mechatronic flow meter</td>
<td>6 IO-Link master</td>
<td></td>
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</tbody>
</table>

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<th>Enhancement packages</th>
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<th>Without additional service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application for 8 to x hydraulic power packs</td>
<td>With additional service</td>
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</tbody>
</table>
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

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

*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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