

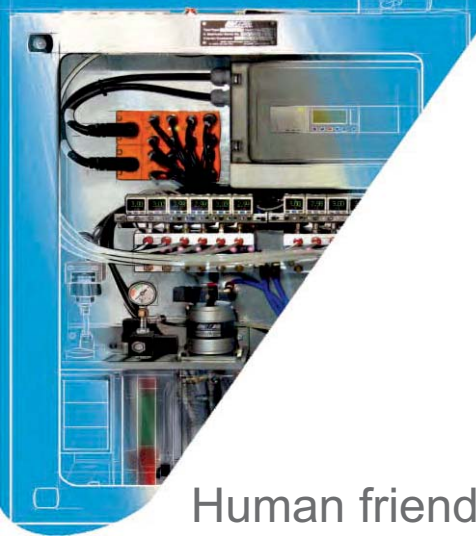


Since **1986** the excellence in the field of automatic lubrication

Human friendly  
**technologies**

Industry 4.0 by MWM





## Human friendly technologies in the 4.0 era for the manufacturing industry

The economy is at the threshold of the fourth industrial revolution.

The technical foundation for these endeavours are intelligent and digital networked systems.

With their help a highly self-managed production should become possible: men, machines, plants, logistics and products communicate with each other and directly cooperate in the Industry 4.0.

In this context, **the sensors' role is a very important issue**: they enable the exchange of information, strategic topic to the industrial process management.

The sensors and embedded systems allow nowadays a great density of information, a process quality and transparency, which was unimaginable before. Moreover, the new concepts of decentralized controls and maintenance management are very effective.

MWM acquired in this field a position as market leader in the automatic lubrication systems for process control technology.

With extensive knowledge of lubrication systems, going back over 30 years, and in a constant program of research in cooperation with University POLITECNICO of Milan, our company has developed a wide range of electronic sensors by focusing on solutions for customer applications to detect the lubricant flow rate (oil-air lubrication, oil mist lubrication, spray,

injection or liquid oil lubrication).

The sensors work with different operating principles: photodiodes, laser beams, etc. and represent a proprietary technology, protected by international patent.



## Sensors' technologies: prospects in 4.0 industry

MWM sensors and technological resources enable the company to cope with **many tribological situations**, encountered in the lubrication of components and manufacturing machine operation.

For example, we can provide solutions to:

### **Rely on 100% safe lubrication**

Immediate detection of the parameters out of the operational range:  
Total control over:

- oil streak flow presence
- lubricant flow rate
- flow rate in oil mist lubrication
- air and oil pressure
- oil level
- air flow rate

### **Reduce your machine downtime and maintenance**

Preventing spindle's bearings and mechanical key component's damage, and associated service costs and downtime.

### **Provide automation and connectivity for process management**

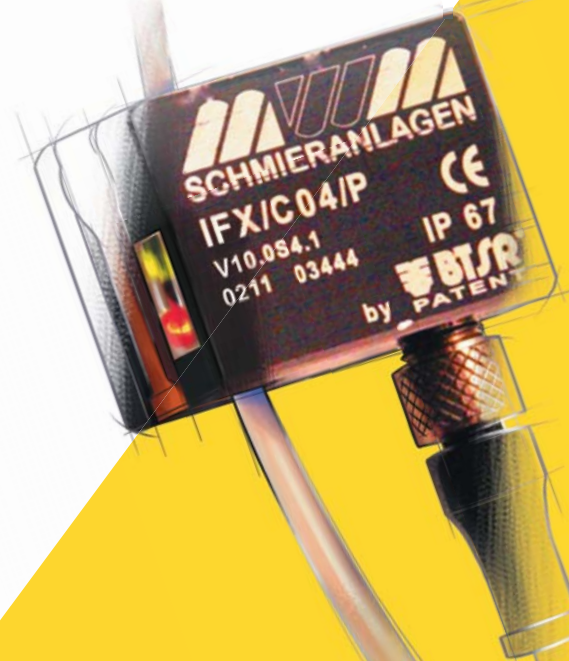
The real-time approach is to enhance transparency of the current machine status, evaluating the information gained in combination with existing data to allow purposeful diagnostics and remote control. The data can be sent to maintenance and production engineers and operators to optimize machine performances and to study critical cases.

### **Set need-based lubrication**

Detect and digitally monitor the lubricant flow rate. Information on oil flow rate can be used to process-based adjustment of oil supply and parameters.

### **Provide a value-added machine retrofitting**

The sensors can be installed on older machines to improve reliability.





## Sensors' product range

MWM Schmieranlagen developed innovative laser and optical based electronic sensors to analyse the wave spectrum of light interaction with flowing oil.

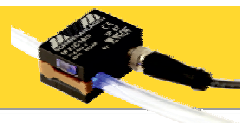
Our leading sensors are currently:

- Optical sensor IFX-C for oil streaks detection in Air Oil systems
- Optical programmable sensor IFX-F for monitoring of oil mist lubrication
- Laser flow rate sensor IFL-O to measure minimal oil flow rate.
- Sensor IFX-SC, to monitor the rotary joint fluid leakage

These solutions reflect the latest state-of-the-art technology, relating to the monitor of even minimum oil quantities flowing in difficult and different operating conditions.

MWM has been the first manufacturer of lubrication systems to introduce and patent inductive control devices and the same for optical oil streak sensors in Air+Oil minimum quantity lubrication applications, in a continuous effort to provide greater value and overcome operational challenges.

IFX-C04  
IFX-C06



Air+Oil lubrication:  
**Streak sensors**  
Type IFX-C04 (C06)

IFX-S08



Spray Lubrication:  
**Inject-Spray sensors**  
Type IFX-S08

IFL-O



Minimal-oil lubrication:  
**Laser sensor**  
Type IFL-S

IFX-F08/06  
IFX-F12/10



Oil mist lubrication:  
**Oil mist sensor**  
Type IFX-F

IFX - SC08

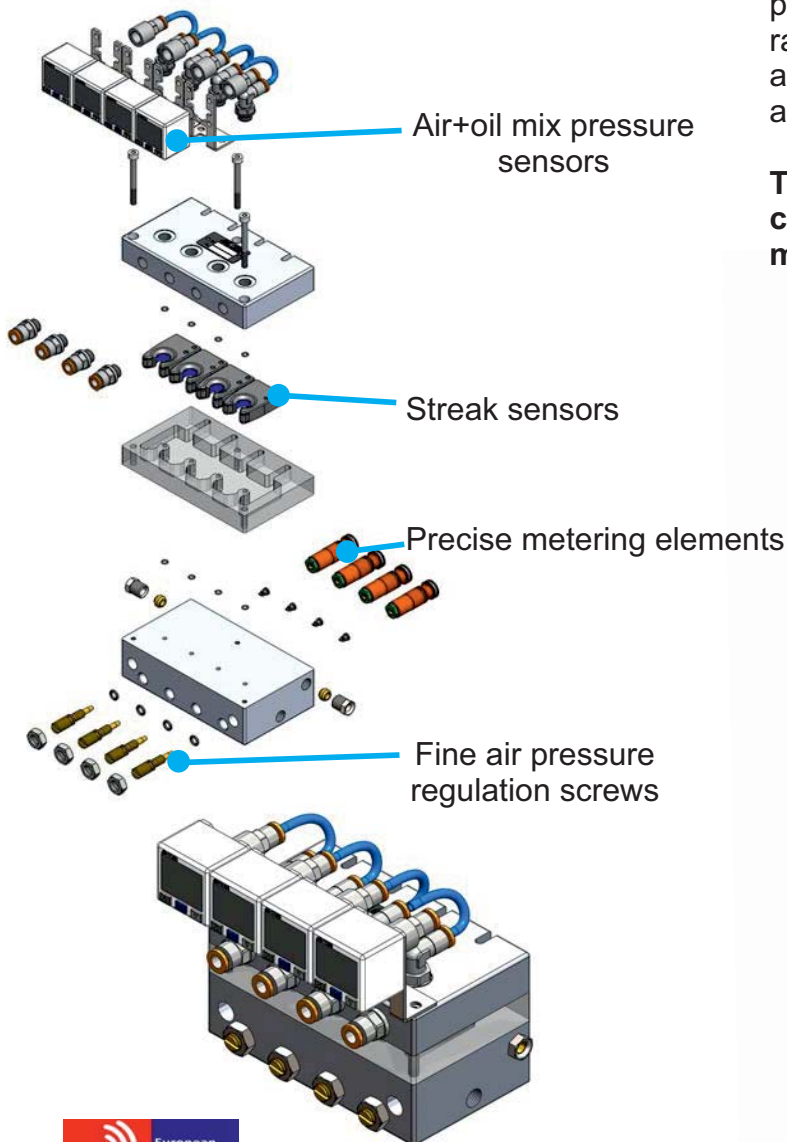


Fluid leakage monitoring  
**Leakagesensor**  
Typ IFX-SC08

## Air-Oil Mixer: All-in-one solution for the best integration of the sensors' system

The patented Mixer MVF-AX (European Patent Certificate N2427301) is **the heart of the MWM air+oil system**, and is the exclusive patented mixer on the market.

The automatic monitoring of the air-oil mixture is carried out through a compact module, consisting of:



- Precise metering elements from 10 mm<sup>3</sup> (100% QA tested)
- Optical oil streak sensors performing directly the oil flowing detection to the lubricating point (MWM international patent)
- Digital air pressure sensors with dual threshold

This concept is designed to assure a precise oil delivery and the correct air flow rate, together with a constant monitoring of all parameters which are visually displayed and digitally encoded.

**The special feature of this unit is the capacity to blend High Tech with the maximum operational safety.**





## Cost-benefit analysis of introducing a sensor- monitored lubrication

In this context, it should be considered that ca. 30% of spindle failure are usually resulting from lack of proper spindle lubrication, and the spindle is a high value critical component that need special attention.

### Estimate of program cost:

- Equipment modification
- Software modification
- Personnel training

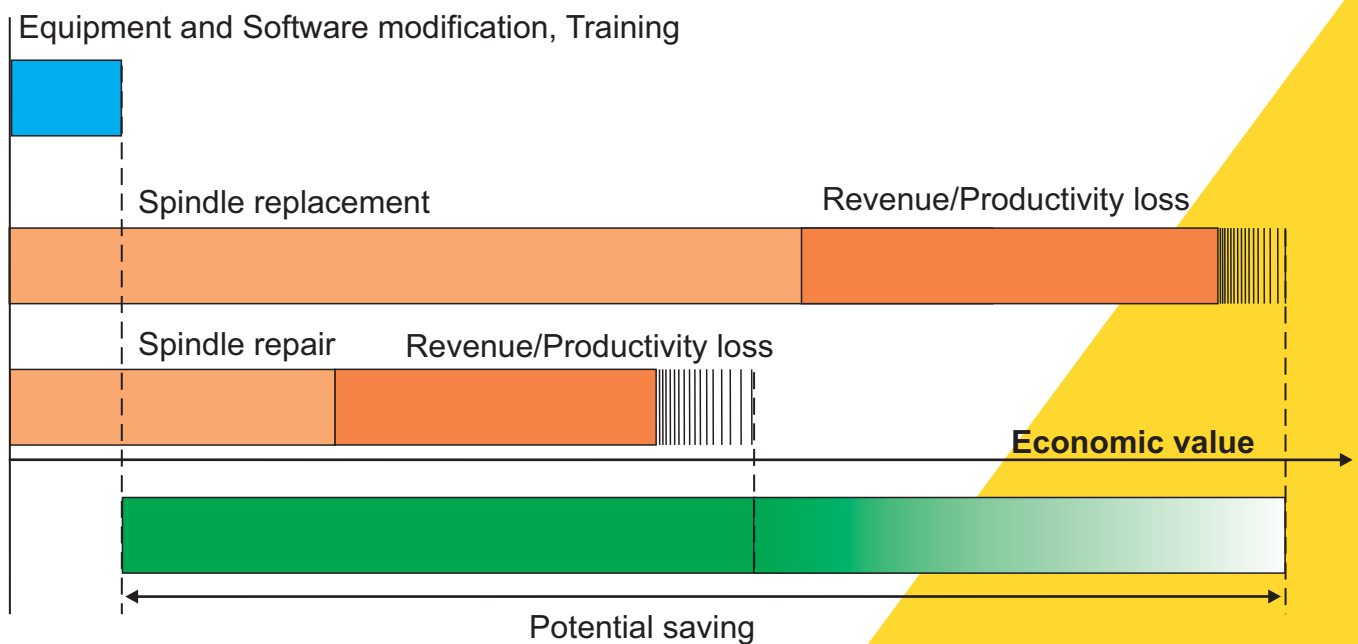
### Program saving (example):

Saved cost to repair a spindle failure (can be 25-30% of the new one) or replacement cost.

Saved downtime cost should include:

- Revenue lost
- Productivity cost
- Cost of intangibles (ex. reputation costs)

## Example of associated cost-saving potential



## Applications

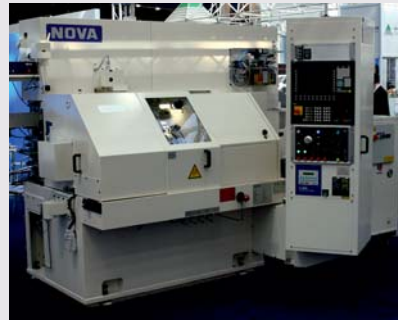
Air+Oil minimal lubrication systems offer the most advanced solution for the lubrication of high speed bearings without creating overheating due to an excess of lubricant. The MWM Air+Oil minimal lubrication assure a trouble-free machine operation and a maximum bearings life.

MWM designs and produces from standard Air+Oil lubrication systems, managed by the machine tool CNC, to top systems fully equipped with optical streak sensors and digital pressure sensors with SW management.

The main fields of application for MWM technology are:  
high-speed bearings used in spindles, high speed gears, recirculation ball screws, linear guides and sliding surfaces.

Important application areas are: high speed milling and turning machines, cutting and grinding machinery, for the steel industry, grinding and polishing machines for marble, wood and metals, textile machinery, rotating machines for power cables and steel ropes, centrifuges and decanters in food and chemical industry and any other machinery where bearings have to work at high speed and/or high power.

A special application are the ZT units for tests benches used in spindle manufacturing or repair, where flexibility in change of outlets number and full round-the-clock monitoring and surveillance are an absolute need.



**Grinding machines**



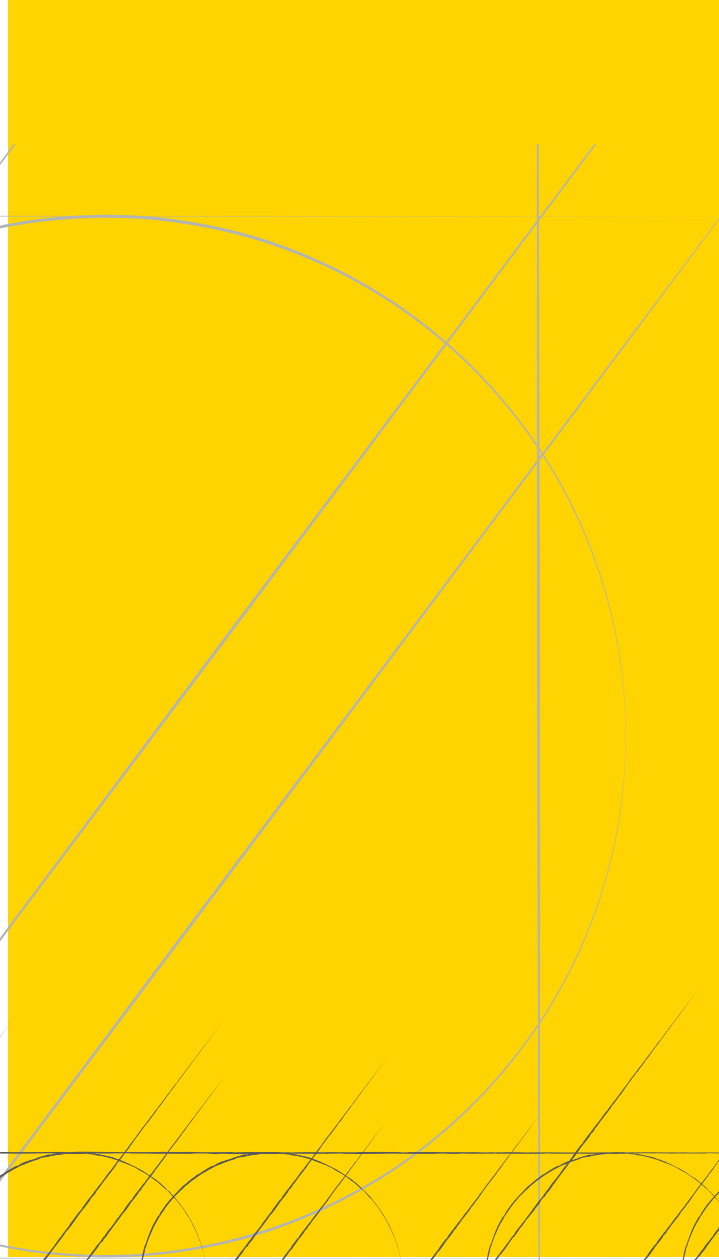
**Machining centres**



**Milling and Boring machines**



**Centrifuges and decanters**



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