ifm efector

Insuring machine uptime around the clock

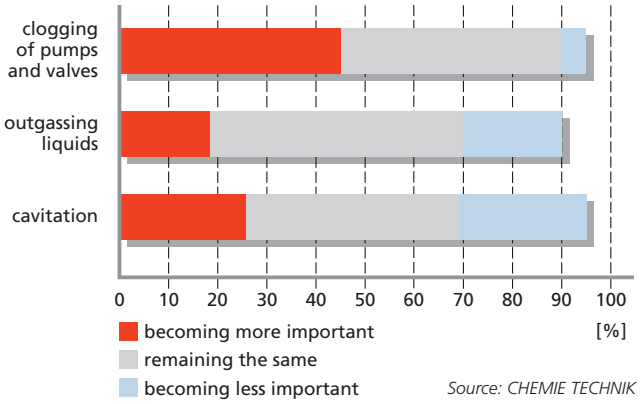
System pressure monitoring. Condition-based pump diagnostics.

Pressure sensors

For industrial applications

PIM Series pump diagnostic pressure sensor. System pressure and pump diagnostics.

Problems areas when using pumps.



According to many operators using pumps, frequent problem areas include clogging of the pump or valves, cavitation, and outgassing liquid as frequent problem fields when pumps are used.

Pump diagnostic sensor in sanitary areas…

Condition-based maintenance.

*The diagnostic function of the **PIM** sensor enables safe operation of pumps and systems.*

The PIM sensor is installed permanently on a pump to continuously monitor its high frequency pulsations.

With the continuous monitoring of a pump,the sensor can be perfectly integrated into a condition-based maintenance program.

This permits longer maintenance intervals, which in turn leads to lower costs.

Routine maintenance can be planned, and therefore, the reliability of pump systems is improved, and machine uptime is increased.

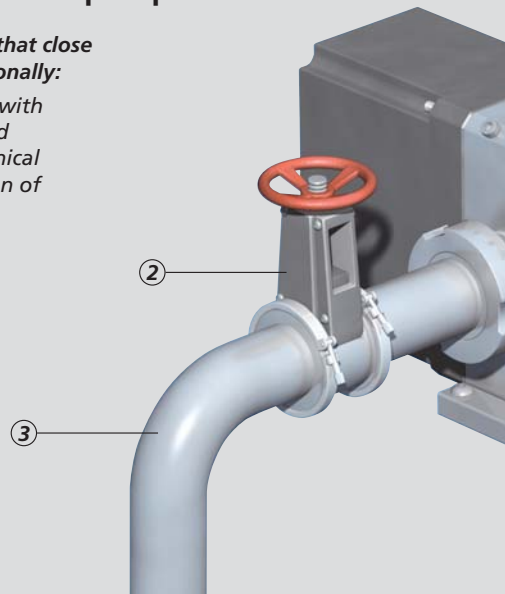
Expensive damage caused by the failure of pumps is avoided.

By integrating a real-time maintenance program, the PIM sensor can save time for maintenance personnel and reduce downtime.

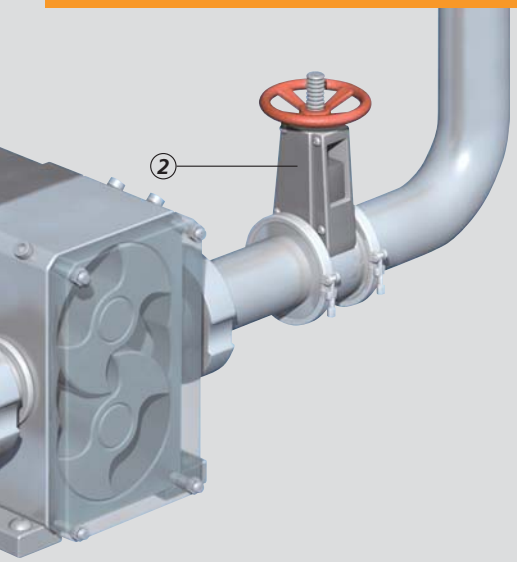
Early diagnosis of faults on pumps

(2) Valves that close unintentionally:

Problems with valves lead to mechanical destruction of pumps.

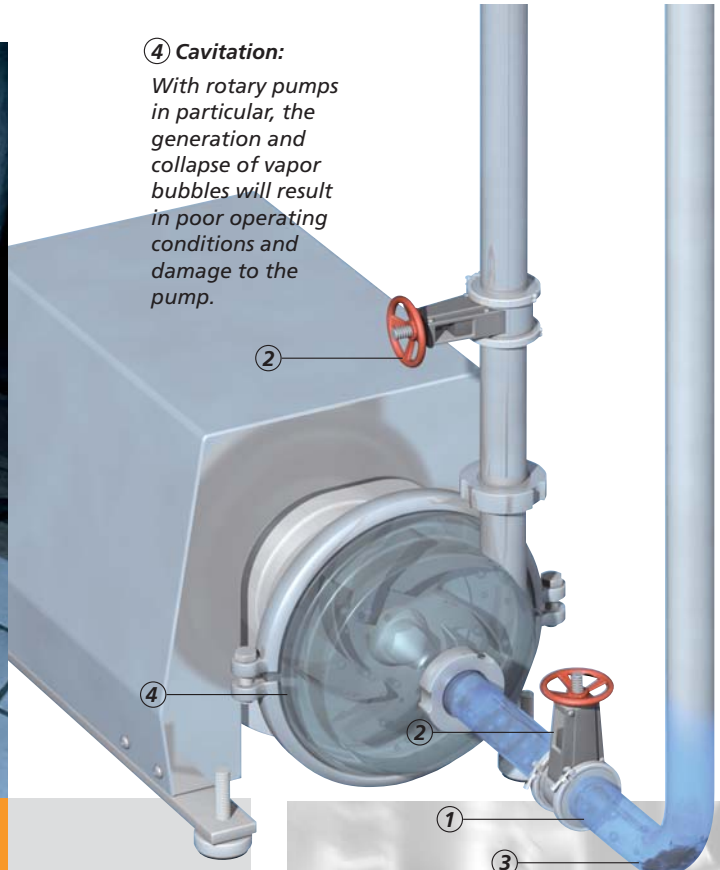


...or in waste water technology.



④ Cavitation:

With rotary pumps in particular, the generation and collapse of vapor bubbles will result in poor operating conditions and damage to the pump.



① Outgassing / air entrainment:

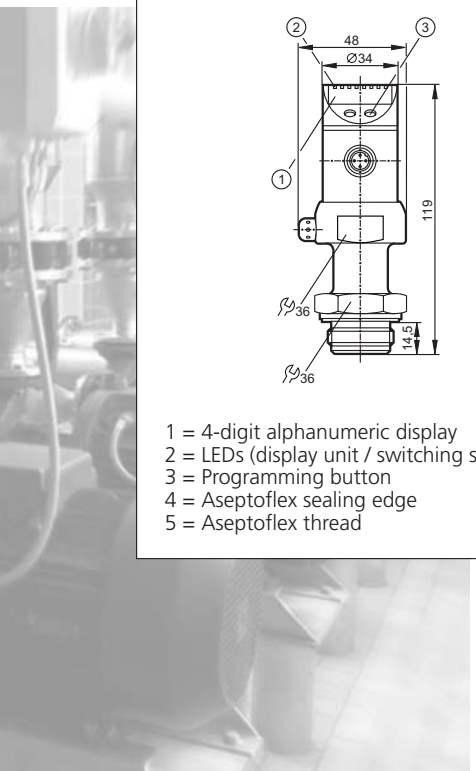
Outgassing or air entrainment results in damage to the pump with an adverse effect on the process due to thermal or mechanical overload.

③ Deposits / clogging in pipes:

Deposits and clogging in the suction area cause cavitation which in turn leads to pump damage.

Technical data pump diagnostic sensor

Application	**Liquids**			
Electrical design	**DC**			
Type of connection	**3-wire**			
Process connection	**Aseptoflex adapter thread**		**G 1" BSPP adapter thread**	
Pressure range [bar]	**25**	**10**	**25**	**10**
Order no.	**PIM093**	**PIM094**	**PIM693**	**PIM694**
List Price [USD]	**$573.00**	**$573.00**	**$573.00**	**$573.00**
Operating voltage [V]	18...32 DC			
Current consumption [mA]	< 50			
Current rating [mA]	250			
Analog output for static pressure (scalable) [mA]	4...20			
Binary diagnostic output for dynamic pressure	yes			
Medium temperature [°C]	-25...125 (145 max. 1 h)			
Accuracy / deviation [in % of the span]				
Deviation of the characteristics	< ± 0.2			
Linearity	< ± 0.15			
Hysteresis	< ± 0.15			
Repeatability	< ± 0.1			
Long-term stability	< ± 0.1			
Temperature drift:				
Zero	< ± 0.15			
Span	< ± 0.1			
Materials wetted parts	high-grade stainless steel (316S12); ceramic (99.9% Al_2O_3); PTFE			
Protection rating	IP 69 K			
Connection	M12 connector			



1 = 4-digit alphanumeric display
2 = LEDs (display unit / switching status)
3 = Programming button
4 = Aseptoflex sealing edge
5 = Aseptoflex thread

Cordsets - M12 Micro DC

Description	Part no.	List Price [USD]
Connector (4-pin), 5m grey, PVC cable	**E18109**	$22.00
Connector (4-pin), 10 m grey, PVC cable	**E18110**	$32.00
Connector (4-pin), 5 m grey, PVC cable	**E18112**	$22.00
Connector (4-pin), 10 m grey, PVC cable	**E18113**	$32.00

Required accessories

Description	Part no.	List Price [USD]
For PM09 Series: 1.5" Tri-clamp fitting	**E33001**	$72.00
For PM09 Series:2" Tri-clamp fitting	**E33002**	$72.00
For PM09 Series: Weldable adapter	**E30052**	$56.00
For PM69x Series: G1 BSPP weldable adapter, 316 stainless steel	**E30013**	$39.00

*Additional aseptoflex adapters available on request.

Increase machine uptime with condition-based fault analysis.

PIM Series pump diagnostic pressure sensor

The PIM pressure sensor detects potential pump damage caused by cavitation, trapped air or gas, blockages and deposits.

Continuous monitoring
The sensor continuously monitors a pump to provide numeric indication of the system pressure and offers independent diagnosis of the pump's operating condition.

Any pump disturbances such as trapped air in the medium, clogged filters, deposits in pipes or improperly opened valves are monitored.

Multiple outputs
An analog output signal is provided for the static pressure and a binary diagnostic signal for monitoring the condition of the pump.

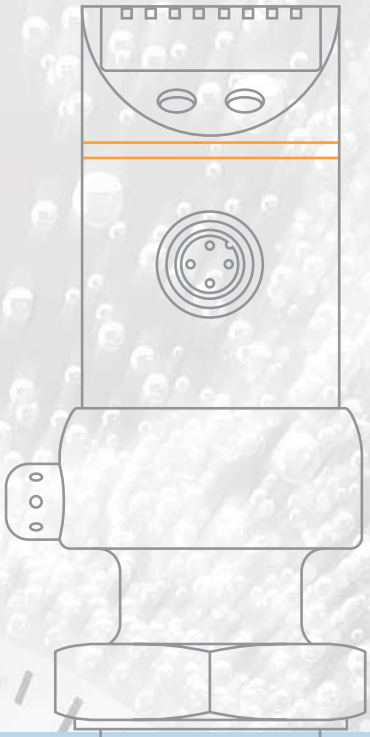
Quick setup with visual display
The sensor and its teach function are quickly setup using the numeric pushbutton display.

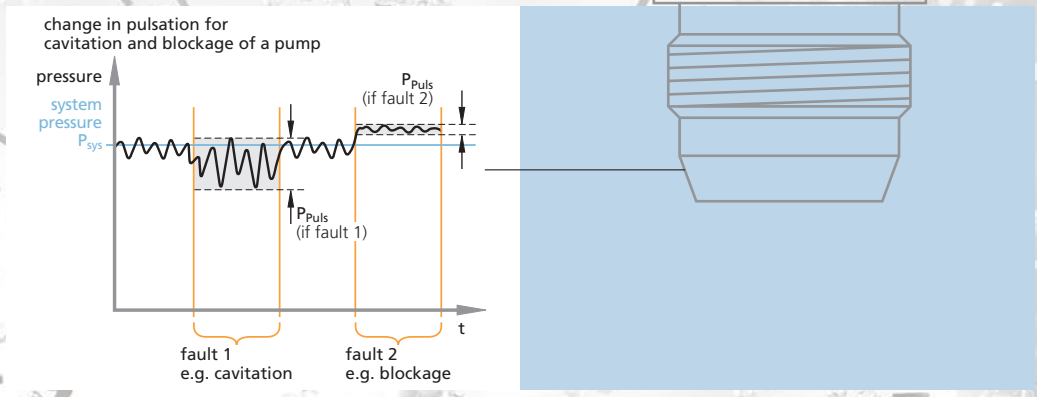
The sensor's display provides a numeric value for system pressure and a graphic trend display of the operating state of the pump.

Sanitary or industrial applications
The stainless steel PIM pressure sensor is designed for sanitary and industrial applications. A variety of adapters for sanitary applications offer a secure fitting in washdown, CIP and SIP conditions.

A compact sensor – two functions

In a pressurized system, the pressure can be broken down into two parts: static pressure (system pressure P_{sys}) and pulsation or dynamic pressure (pulsation P_{puls}). The pulsation level depends on the dynamic influences of a system, e.g. the presence of running pumps, switching valves, etc.





***efector PIM** sensor measures the high-frequency pulsations of a properly operating pump and stores it as a reference. If changes occur in the system, the pulsations will change. These changes are immediately detected by the sensor.*

*Given that the dynamic proportion changes with the amount of the static pressure, the **PIM** evaluates a standardized signal, i.e. the dynamic pressure P_{puls} is kept in proportion to the static pressure P_{sys}.*

When the set maximum permissible pulsation is exceeded or the minimum permissible pulsation is not reached, the binary diagnostic output switches.

Position sensors and object evaluation

Inductive sensors
Inductive safety technology
Magnetic and cylinder sensors
Capacitive sensors
Actuator and valve sensors
Photoelectric sensors
Object evaluation systems

Fluid and diagnostic sensors

Level sensors
Flow sensors
Pressure sensors
Temperature sensors
Diagnostic systems

Networking and controls

Identification systems
Control systems for mobile vehicles
Evaluation systems, power supplies
AS-i bus system
Connection technology

Lit. No. B10907

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