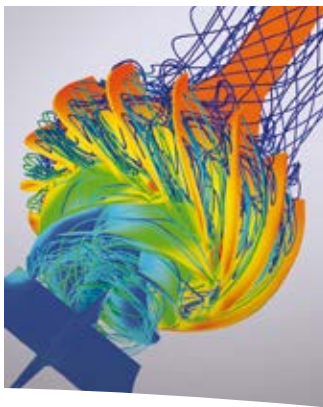




## ***IPS Detect Online Condition Monitoring***



***Experience In Motion***



## ***Pump Supplier to the World***

*Flowserve is the driving force in the global industrial pump marketplace. No other pump company in the world has the depth or breadth of expertise in the successful application of pre-engineered, engineered, and special purpose pumps and systems.*

### ***Life Cycle Cost Solutions***

Flowserve provides pumping solutions that permit customers to reduce total life cycle costs and improve productivity, profitability and pumping system reliability.

### ***Market-Focused Customer Support***

Product and industry specialists develop effective proposals and solutions directed toward market and customer preferences. They offer technical advice and assistance throughout each stage of the product life cycle, beginning with the initial inquiry.

### ***Broad Product Lines***

Flowserve offers a wide range of complementary pump types, from pre-engineered process pumps to highly engineered and special purpose pumps and systems. Pumps are built to recognized global standards and customer specifications.

Pump designs include:

- Single-stage process
- Between bearings single-stage
- Between bearings multistage
- Vertical
- Submersible motor
- Positive displacement
- Vacuum & Compressor
- Nuclear
- Specialty

### ***Product Brands of Distinction***

*ACEC™ Centrifugal Pumps*

*Aldrich™ Pumps*

*Byron Jackson® Pumps*

*Calder™ Energy Recovery Devices*

*Cameron™ Pumps*

*Durco® Process Pumps*

*Flowserve® Pumps*

*IDP® Pumps*

*INNOMAG® Sealless Pumps*

*Lawrence Pumps®*

*Niigata Worthington™ Pumps*

*Pacific® Pumps*

*Pleuger® Pumps*

*Scienco™ Pumps*

*Sier-Bath® Rotary Pumps*

*SIHI® Pumps*

*TKL™ Pumps*

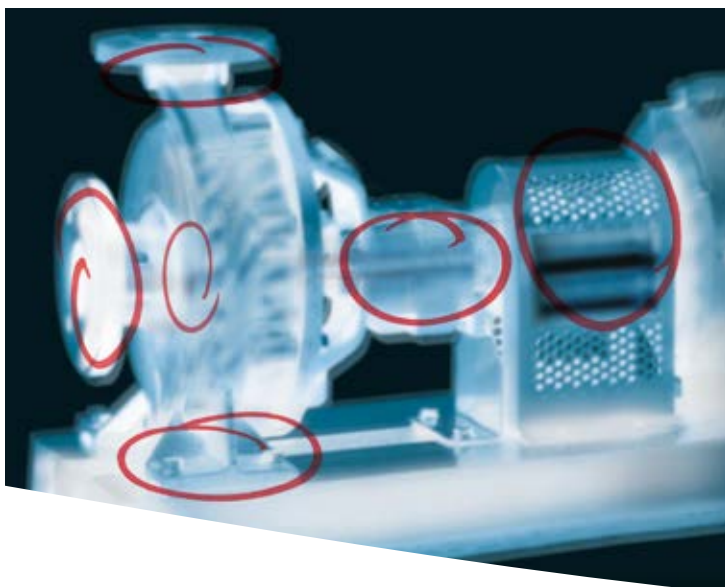
*United Centrifugal® Pumps*

*Western Land Roller™ Irrigation Pumps*

*Wilson-Snyder® Pumps*

*Worthington® Pumps*

*Worthington Simpson™ Pumps*



## IPS Detect ... Early failure detection

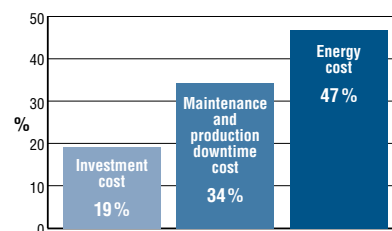
If you look at the life cycle costs of rotating machines, it is clear that, in addition to energy costs, service and maintenance costs present the greatest source of savings potential. The goal here is to reduce service and maintenance costs through the use of efficient and intelligent condition monitoring systems and to avoid high costs due to loss of production.

Early detection and diagnosis of failure maximizes the lead time for maintenance and ensures optimal machine availability, production, efficiency and reliability. Currently, a large number of machines are monitored using hand-held vibration measuring instruments. However, since this method only captures a snapshot of the machine's operating condition, the information obtained can usually only be interpreted by vibration specialists in order to determine a prognosis for the remaining lifetime of the machine.

Through online condition monitoring, the operator can determine the vibration data and thus the operating condition on an ongoing basis. Failure or wear in monitored machines can be detected at an early stage by increased vibration. If the velocities from recent days or weeks are compared with each other, for example, then the remaining lifetime of the machine can be determined. This enables a sudden total loss or production downtime to be avoided.

### Maintenance strategies

With an online monitoring system, maintenance work can be planned, expensive consequential damage avoided and system processes optimized. This enables the life cycle costs to be reduced considerably.



### Benefits of online condition monitoring

#### Life cycle costs

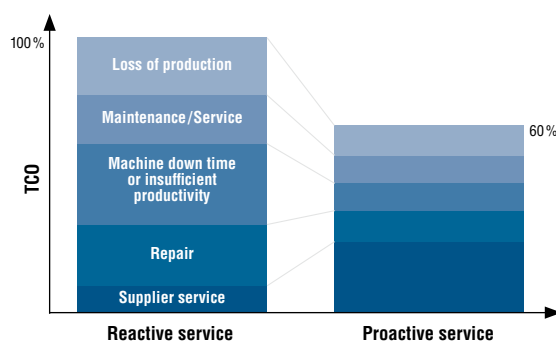
- Minimized maintenance and production downtime costs
- Prevention of total losses

#### Process optimization

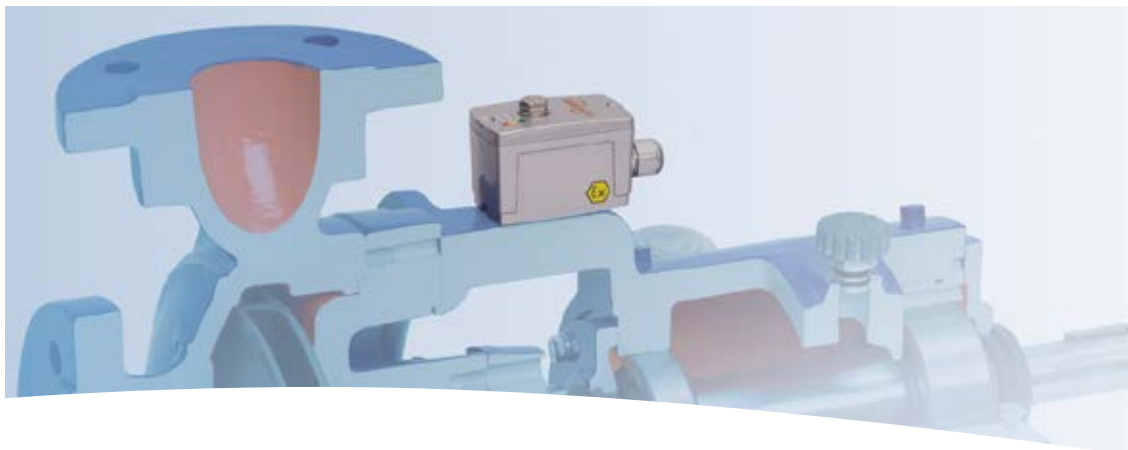
- Production processes
- Condition-based maintenance
- Reduced need for spare parts

#### System safety

- Minimized risk for people and the environment
- Detection of unacceptable operating conditions



*Online, safe and cost-efficient ... the IPS Detect sensor*



The IPS Detect sensor is the ideal solution for all rotating machines for which online vibration monitoring has not been used up to now due to cost reasons.

It can be used for all types of machines and is easy to install. The IPS Detect sensor with "Ex ia" ATEX certification is also optionally available for use in zone 1.

The sensor measures the vibration velocity in accordance with DIN/ISO 10816 in the context of preventive maintenance and the acceleration spectrum up to 5.6 kHz; that said, the acceleration spectrum is divided into frequency bands and unacceptable operating conditions (cavitation etc.) are thus detected.

### ***IPS Detect online solutions at a glance***

**LED display**



**Distributed control system**



**Remote diagnosis**



### ***Online monitoring with LED display***

The IPS Detect sensor measures vibration velocity and acceleration every 30 seconds (over 1,000,000 measurements per year). Through the intelligent evaluation of this data with the defined boundary values as per DIN/ISO 10816, the machine's condition can be displayed via integrated LEDs. Furthermore, instances of boundary values being exceeded are logged in the sensor's error memory.

### ***Can be used anywhere***

- All rotating machines with a speed >240 rpm
- For applications in non-hazardous and hazardous areas
- Compact and easy to install
- Power supply 11 – 30 V DC
- 4 – 20 mA HART® current interface
- Can be used at up to 160/80 °C (320/176 °F)

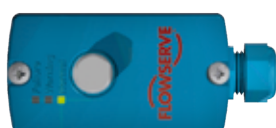
### ***Cost-efficient***

Due to its low investment costs and simple installation, the IPS Detect sensor is a highly cost-efficient alternative to hand-held vibration measurements.

### ***Detect operating conditions safely***

- Unbalance
- Maximum flow exceeded
- Misalignment of pump and drive
- Mechanical friction of rotating components
- Pipeline forces
- Loose mechanical components
- Bearing wear
- Magnetic coupling desynchronisation
- Coupling wear
- Resonance frequencies
- Cavitation
- Fluid noise

## IPS Detect LED display



11 – 30 V DC  
Electrical  
connection  
box

The basic component of each IPS Detect LED online condition monitoring system is the sensor that is attached to the machine being monitored and provided with a power supply of between 11 and 30 V DC. This power is supplied via the existing electrical connection box that already supply other installed sensors (temperature, pressure, etc.).

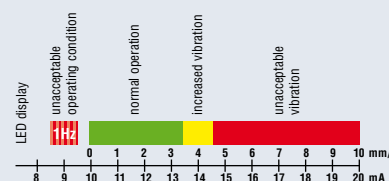
Only the IPS Detect LED sensor is required for a visual on-site display of operating conditions. The condition of each machine is shown by the LEDs on the sensor (green, yellow, red).

### Technical data for IPS Detect LED

- Vibration velocity values (RMS 10(4) Hz – 1 kHz; 0 – 20 mm/s) in accordance with DIN/ISO 10816, 5199, 9905
- Condition monitoring at up to 5.6 kHz (normal/unacceptable operating condition)
- 4 – 20 mA HART® current loop
- Installation up to 160 °C (320 °F) surface temperature through cooling units
- LED display green, yellow and red
- Integrated error memory
- Simple installation on pump
- No experience with vibration-measuring technology required
- Installation in hazardous areas (up to zone 1)

### Condition information via LEDs

LED normal (green)	normal operation
LED warning (yellow)	increased vibration
LED failure (red)	unacceptable vibration
LED failure (flashing red)	unacceptable operating condition



### Simple installation

- Installation of sensor on machine with M8 hexagonal bolt or adhesive adapter
- Electrical connection (11 – 30 V DC)
- Calibration with push button

*IPS Detect  
Distributed  
control system*



The 4 – 20 mA current interface is used for transferring the IPS Detect data for the integration of online condition monitoring in existing control or process control technology. This data can, of course, also be transferred via wireless technology.

If the transferred data is also to be recorded for subsequent evaluation, the IPS DataUSB trend data memory is also installed. Using IPS Vibrosoft software, the error memory can be read and a professional trend data analysis carried out.

***IPS DataUSB trend data memory***

- Vibration data for process adjustment
- Long-term data storage
- Direct USB communication
- Evaluate trend data quickly
- Simple power supply















***IPS Vibrosoft software***

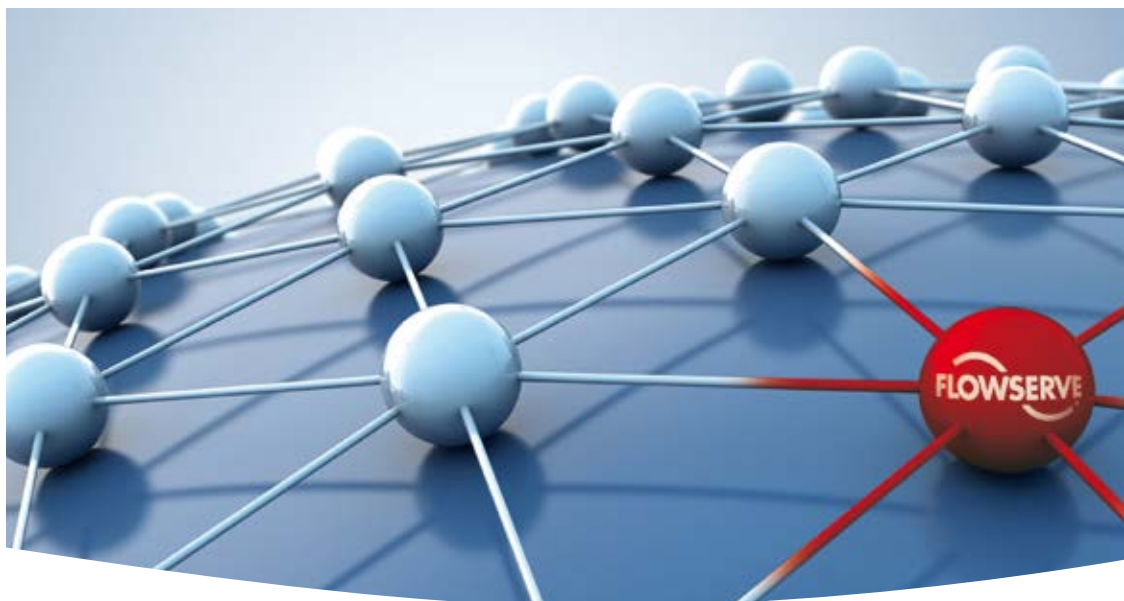
- Condition monitoring
- Configuration
- Error memory
- Data analysis
- EDD/DTM



***Options***

	Standard		Advanced		Professional	
Condition information	 Warning/ Failure via LEDs		 Warning/ Failure via LEDs  Error memory analysis		 Warning/ Failure via LEDs  Error memory analysis  Trend data analysis	
	Installation components	 Process control DCS input module		  Process control DCS input module Desktop computer/laptop		   Process control DCS input module Desktop computer/laptop
Data transfer		Two-wire cable      Field bus remote IO		LAN	WIFI	EDD/DTM

## IPS Detect Remote diagnosis

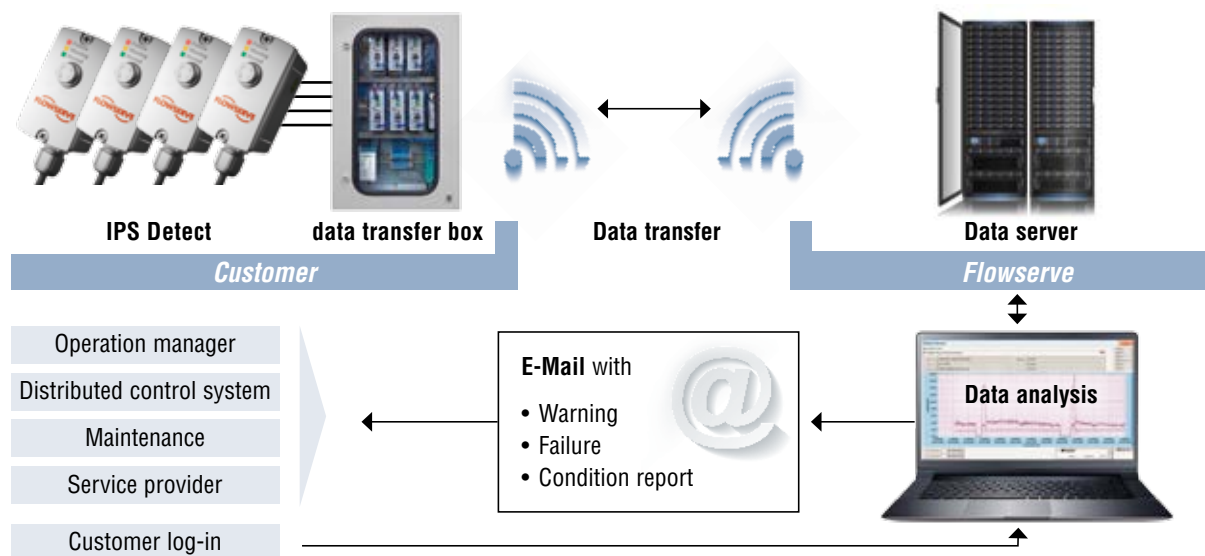


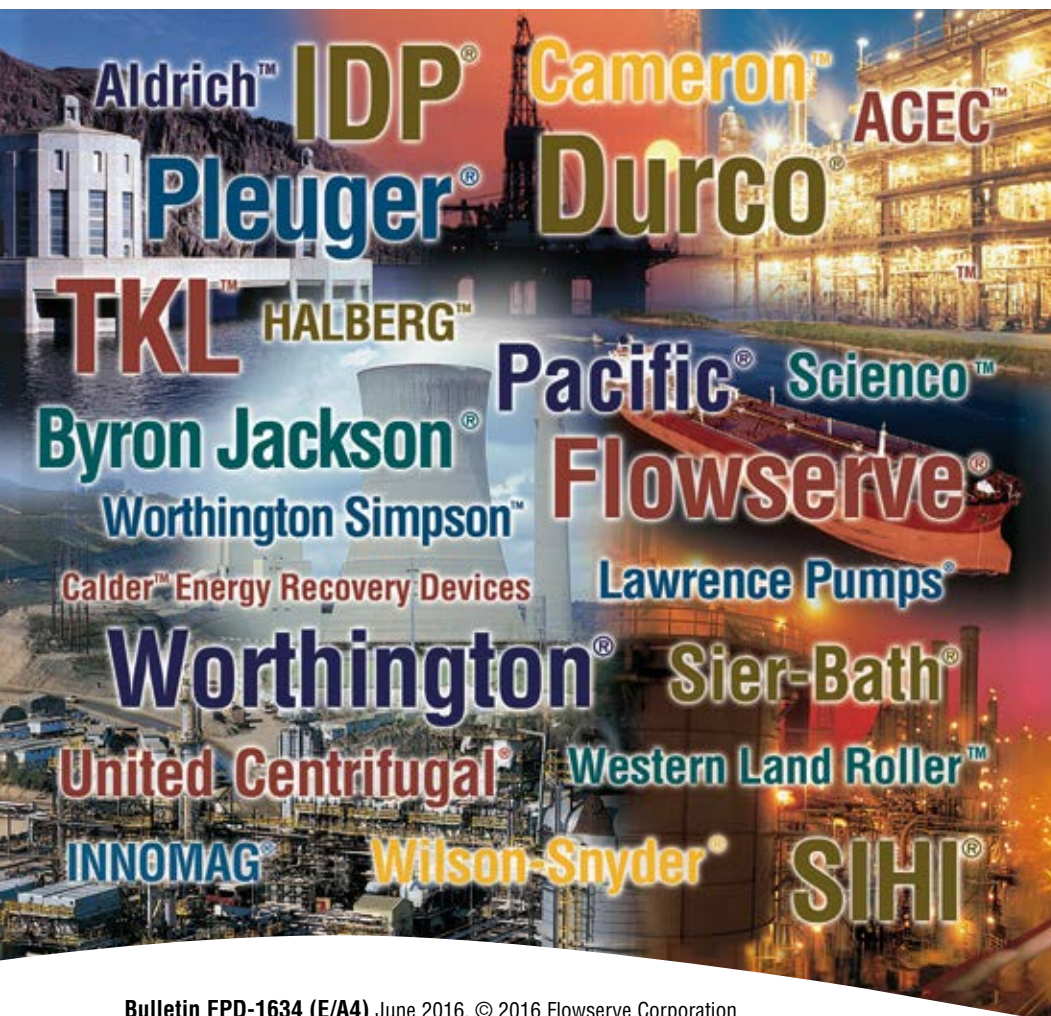
For remote online condition monitoring, we developed the IPS Detect iCMS (intelligent condition monitoring system) service agreement, i.e. the machine to be monitored is equipped with IPS Detect and the data transfer box on site. The measured data are transferred to the data server via the GSM modem and then saved and analyzed by a special software. If there are any deviations from the permissible vibration boundary values, an e-mail containing additional information about the warning or failure message is automatically sent to the customer (operation manager, distributed control system, maintenance, etc.). In the case of a failure message, our vibration experts will develop a detailed analysis of the trend data, through which potential process optimizations can be introduced.

### IPS Detect iCMS service agreement

- Two years contract
- Purchase or rental of hardware (sensor and data transfer box)
- Simple installation on site
- 24/7 online condition monitoring (1,000,000 measurements per year)
- Warning and failure messages are sent via e-mail (condition report with measurement protocol)
- Condition reports are sent via e-mail every three months
- Detailed analysis (in the case of failure) by our specialists
- Customer log-in on data server

### IPS Detect iCMS





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