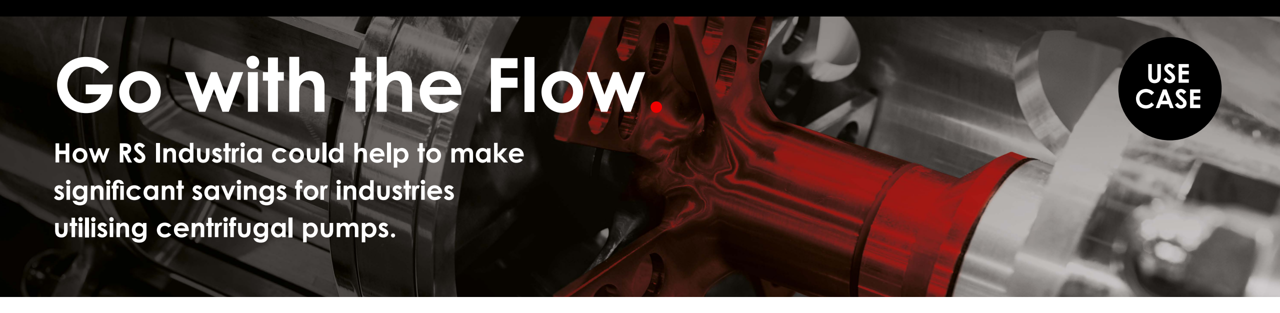
INDUSTRIA



Go with the Flow.

USE CASE

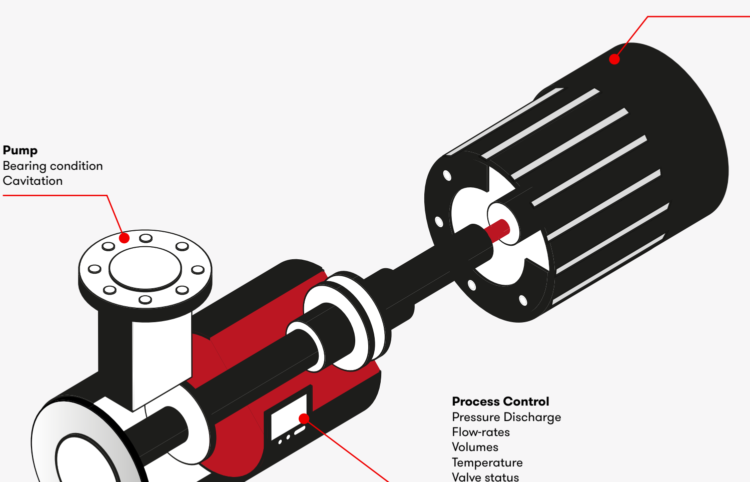
How RS Industria could help to make significant savings for industries utilising centrifugal pumps.

Introduction.

Centrifugal pumps are commonly used for pumping water, solvents, organics, oils, acids, bases and any low viscosity liquids in both industrial, agricultural and domestic applications.

It is the most common design of pump in use, accounting for over two thirds of pumping applications, and consists of a pump head containing the main working elements of a shaft and impeller, which rotate to produce flow and pressure when driven by a motor.

What we monitor.



The Challenges.

Energy

Pumps are heavy energy users, but their energy consumption often goes unnoticed due to most of them operating in remote or difficult to reach locations. Most pumps are stop/start or variable speed, making energy consumption hard to capture unless directly measured.

Operations

Pumps that run in a Duty / Standby controlled system can experience problems if the duty load is not evenly balanced. A standby pump (and associated valves and pipe network) that has not been run in a long period may need flushing and cleaning before operating again. There is also a risk that the standby pump may not start due to lack of running, just when it is required.

Maintenance

Unbalanced load sharing can cause bearings to fail due to being static too long, or duty pump mechanical stress transfer. Mechanical issues such as looseness, misalignment and unbalanced shafts will reduce the life of the asset; and process-related issues such as cavitation or water hammer are damaging to the asset and surrounding plant.

Pump bearing-blocks can suffer from product ingress, particularly if acidic or corrosive. All of these conditions will dramatically shorten the life of the asset, whilst in-service failures can often lead to the loss of the current product batch or stop the production process entirely.

Our Solutions.

Energy

Energy data can often be collected directly from the variable speed drive, when one is used. If no electrical consumption data is available, then energy meters or current transformers can be easily installed, which can pass data directly to RS Industria.

Operations

Process data such as running speed, pressure, flow and temperature can often be captured directly from the PLC or control system. This will aid accurate operational recording as well as aid problem solving.

Often other setup and operating parameters such as valve setpoints can also be captured, further enhancing the ability to problem-solve production issues. Where PLCs are not used, a separate data collection unit can be fitted to mirror existing control signals, which is then connected to RS Industria.

Maintenance

Much of the energy data collected can also be used as leading indicators of failure for the pump or pump motor, as tracking current and torque changes in the electrical load can be used to indicate physical changes in the system. Using the additional process parameters, we can build a picture of how the asset performs from a reliability standpoint.

Additional protection of the motor and pump bearings can be added using a vibration sensor, thus monitoring other mechanical stresses such as looseness, misalignment, impeller wear and cavitation.

Your Benefits.

Typical Cost Savings

Better operating insight means better management of processes and their assets, resulting in lower operating costs. Here are some examples, based on our real-world experience in production environments:

Energy

The site can now quantify the energy cost per pump as well as highlight wasted energy from over-operation (running without purpose). The data also enables continuous monitoring of the pump and system efficiency.

Illustrative savings – based on a standard 22Kw industrial pump:

22KW running 4,380Hrs @ 50p kWh = £48,180 per annum. Energy saving estimate: 10% = £ 4,800 per annum

Operations

The monitoring data will enable a better understanding of pump run-times, prolonging the life of the assets by balancing the operations – particularly between duty and standby assets. Data can also reveal operational issues that affect the pump block filters, such as increased pressure downstream or a lack of supply upstream.

Illustrative savings:

Loss of a product batch due to a pump failure: £2,000.

Maintenance

Monitoring leading indicators of failure, reduces the risk of unplanned failure and avoids secondary damage, reducing spend on parts and components.

Vibration data can show lubrication and wear status of drive and pump bearings..

Illustrative Savings:

Typical MTTR of a pump is between 4-6 hours, downtime cost @ £3,000/ hour.

Replacement pump unit: £3,000 each.

Total potential loss: £9,000 from one failure event

Payback & ROI

These indicative calculations show that the system could potentially pay for itself, on electricity savings alone, within 7 months.

70% ROI

Payback within 7 months.

Year 1 Cost – £2,800

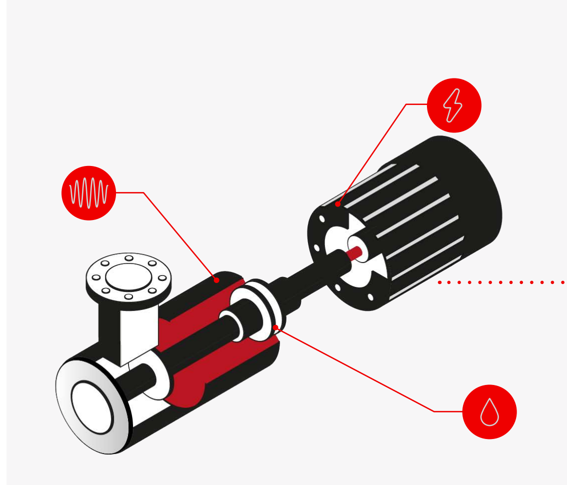
Annual Monitoring Cost – £1,600*	
Set Up Costs	Hardware – £200
	Commissioning – £1,000

* This represents the pump's share of the monthly ongoing service cost of £995, which includes 100 parameters

Savings – £15,800

- **Electricity – £4,800**
- **Operational – £2,000**
- **Maintenance – £9,000**

Modular Framework.



14 parameters

12 | 14 | 10 | 11

= 47 unique parameters

Start Simple, Grow Smart.

Modular and Secure

RS Industria is a modular system, providing an advanced, robust and cyber-secure framework into which any number of assets can be connected. This cloud-based system provides the following;

- **Asset Dashboards** – Designed for the specific asset type being monitored
- **Functional Dashboards** – Displaying Energy, Utilities, Compliance or Uptime for multiple assets, individual production lines or site-wide – all in one place.
- **Rules & Alerts** – Notifications and Warnings sent by SMS or email – or to the mobile app
- **Mobile App** – Real-time data display and alerts - Putting the data in the hands of those who need it, where they need it, when they need it.

Multi-Purpose Data.

Data Integration

As RS Industria integrates data from multiple sources, the system can re-purpose and combine data to extend the scope for asset insight.

Data Options

	Energy	Operations	Maintenance
Voltage	✓	✓	✓
Current/Power	✓	✓	✓
Torque	✓	✓	✓
Start/Stop/Runtime		✓	✓
Fault/Operating Mode		✓	✓
Pressure		✓	✓
Flow		✓	✓
Volume		✓	✓
Temperature (Medium)		✓	✓
Valve Status		✓	✓
Filter Condition		✓	✓
Vibration-based			
Bearing Damage Indicator[1]			✓
Lubrication Warning Indicator (over/under lubricated)			✓
Mechanical Stress Indicator (looseness, misalignment, cavitation, unbalance)			✓
Primary Paramaters	3	8	3
Re-purposed Parameters	–	3	11

Data Integration

As RS Industria integrates data from multiple sources, the system can re-purpose and combine data to extend the scope for asset insight.

For example, monitoring electrical drive voltages and current enables the system to calculate torque.

All three of these of these variables can be used to not only better understand the energy usage of an electrical drive, but also its physical condition and whether it is operating outside its normal parameters.

High current and torque might indicate a bearing problem, a conveyor belt sticking or a batch of ingredients with the wrong viscosity.

1. **Bearing Damage Indicator** – Using frequencies from selected areas of the spectrum to rapidly identify when a bearing is being damaged, long before such damage is evident, or a failure occurs.
2. **Lubrication Failure Indicator** – this value uses specific frequencies to warn if a bearing is insufficiently lubricated, whether the lubricant is manually or automatically delivered.
3. **Mechanical Stress Indicator** – This uses all frequencies to detect any looseness, misalignment, cavitation or imbalance in the asset or it's mountings.

These indicators can be further enhanced by using the operating data to provide context such as variable loading.

Multi-Purpose data offers significant benefits over the use of dedicated single-purpose monitoring systems:

- **Single point of integrated data** – enables comparison between different variables, potentially offering greater insight
- **Context-sensitive alerts** – take account of normal operational variances to avoid false alarms

Gain Asset Insight Now

Find out how we can help lower energy usage, enhance reliability and improve operational performance: in a way that is simple, fast and affordable.

1 Book Requirements Review

Review your requirements with one of our consultants. We'll help you prepare for the next step in the process, which is a detailed discussion with one of our solution design engineers. To book a Requirements Review, **click this link.**

2 Browse Our website

To find out more details including:
- Real-world case studies
- Use-cases like this one
- Product videos
...and more. Visit our website to see what is possible with RS Industria.

https://www.rs-industria.com

3 Contact Us directly

+44 (0)333 2470235

rs-industriasupport@rs-components.com

Start Simple Grow Smart®