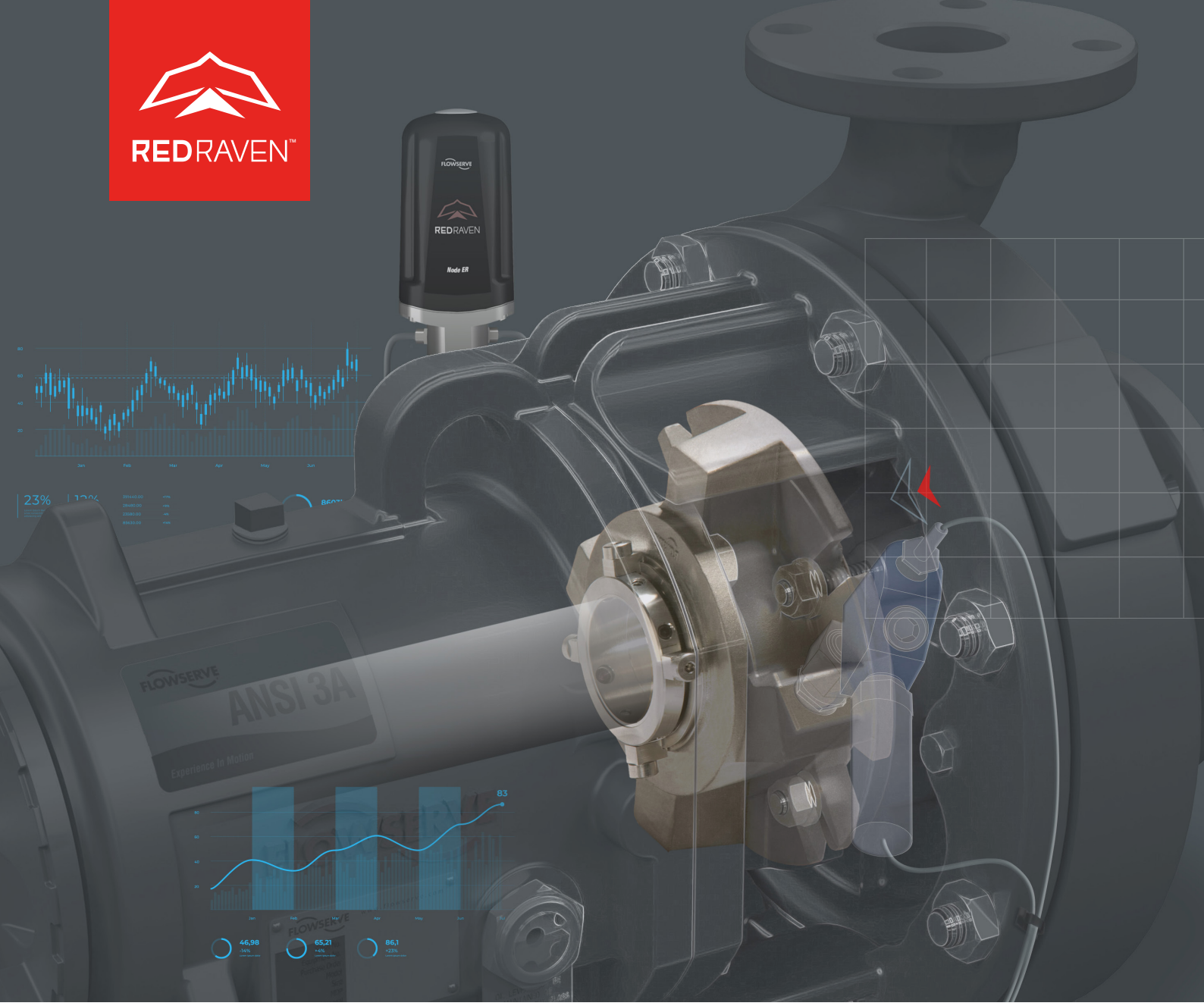
REDRAVEN™



REDRAVEN IoT SOLUTIONS FOR SEALS

The next evolution in proactive maintenance

FLOWSERVE

RedRaven IoT Solutions for Valves

Discover and understand conditions inside mechanical seals

Today's plants must maintain production rates, while faced with challenges associated with aging equipment, complex datasets, and limited equipment-specific expertise and maintenance personnel. These can lead to equipment failure, emergency repairs, safety hazards, and lost revenue from unplanned downtime, which rarely comes from a single factor. RedRaven is an internet of things (IoT) platform that measurably mitigates these challenges and risks by analyzing equipment performance data with technology specifically designed for pumps, valves and seals. This gives you a clearer understanding of how to increase the efficiency, productivity and reliability of the equipment you use every day.

Mechanical seal performance data is often the best and earliest indicator of a critical system problem, even when the seal is not the root cause. There have been few options for monitoring mechanical seal internal performance or accurately understanding how the pump and seal interact in various operational environments. Because of these blind spots, many critical pump performance issues go undetected, until it's too late.

Proactive solutions for today's production challenges

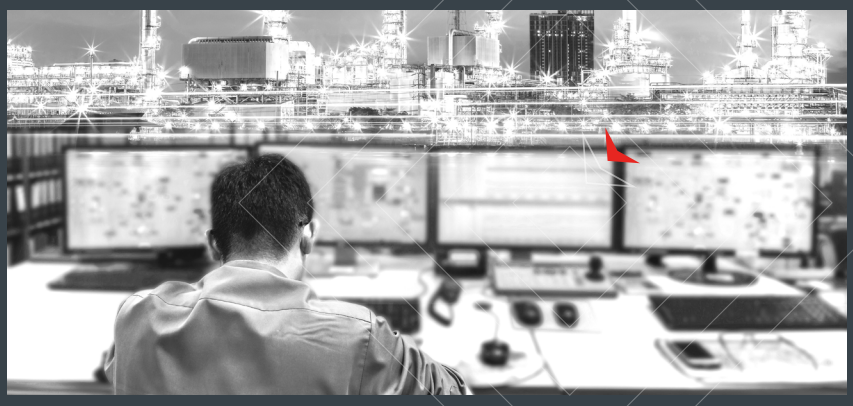
Proactive mechanical seal maintenance is one of the best ways to improve equipment reliability in fluid motion and control processes. With RedRaven, you'll be able to monitor mechanical seal temperature, pressure, flow and levels, enabling your plant operators and technicians to virtually see inside mechanical seals. When a seal environment degrades, RedRaven proactively alerts you.

With wireless and wired connectivity options, RedRaven can monitor hundreds of mechanical seals from various manufacturers across large plants. Then it correlates the seal performance and health data with pump condition data, which means you can take corrective actions sooner, often preventing unplanned shutdowns. By proactively addressing equipment issues, you can improve uptime, lower maintenance costs, and — most importantly — increase safety and reliability.

Comprehensive updates about equipment conditions

With RedRaven IoT solutions for seals, you can discover and understand conditions inside the seal chamber and support system, which enables you to:

- Monitor temperature, pressure level and flow
- Analyze and predict seal performance
- Avoid unplanned downtime
- Plan maintenance proactively
- Optimize processes



How you'll benefit with RedRaven

- **Improved reliability** through proactive maintenance
- **Increased confidence** with reliable, data-backed failure analysis
- **Reduced time** looking for data to use in failure analysis
- **Shortened operator rounds** to inspect running equipment

RedRaven IoT Solutions for Valves

How RedRaven works

RedRaven works with your existing or new sensors to take readings on mechanical seals and support systems from Flowserve and other manufacturers. You can also gain additional insights about seal conditions from our experienced seal and RedRaven specialists.

What RedRaven really gives you: Well-informed decisions

Condition monitoring insights

- You'll see a detailed view of the health of mechanical seals through an online cloud portal and can consult with Flowserve seal specialists for analysis when needed.
- Our condition monitoring program combines sensors and an advanced visualization portal to help you proactively identify and address issues before they cause downtime and disruptions.

Predictive analytics

- Near real-time equipment analysis enables you to predict why critical assets may experience issues and take preventive action.
- You can identify potential issues earlier than traditional inspection rounds and prevent disruptions before they lead to downtime.

Industries and applications

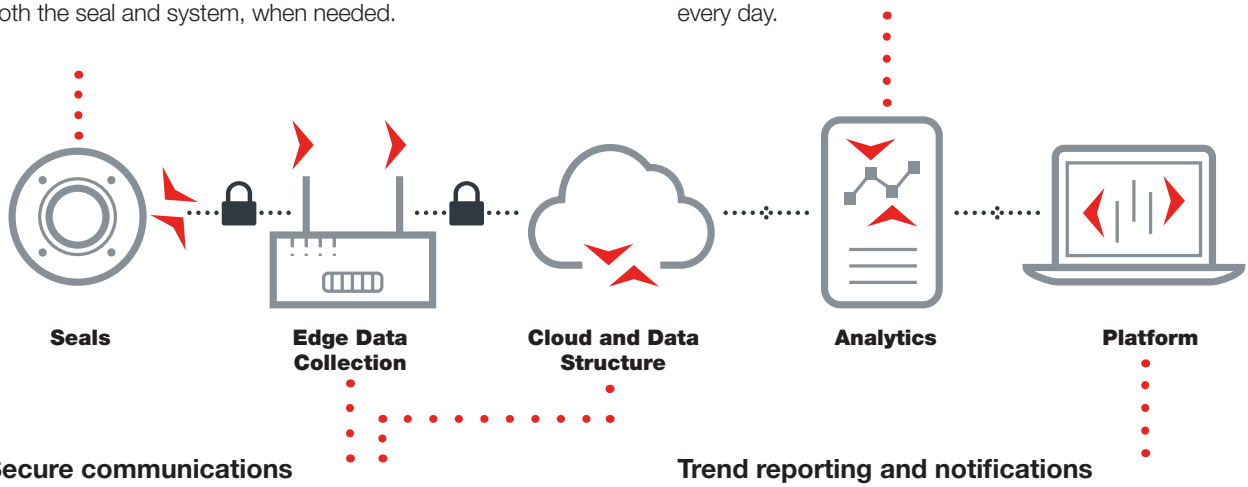
- Condition monitoring of all pumps with mechanical seals
- Predictive analytics for critical pumps with mechanical seals
- Broad range of industries: chemical, pharmaceutical, power, water, general industry, oil and gas

Seals with existing or additional sensors

RedRaven works with wired and/or wireless sensors to alert you when a mechanical seal deviates from normal operating conditions. Readings are taken through existing seal chamber and support system ports; new connections can be made to both the seal and system, when needed.

Application-specific analysis

Equipment performance data is analyzed with technology designed specifically for pumps, valves and seals, so you can gain a clearer understanding of how to increase the efficiency, productivity and reliability of the particular equipment you use every day.



Secure communications

The system architecture collects data from equipment sensors and transmits it via a secure encrypted network.

Trend reporting and notifications

Trend reports provide insights into equipment performance over time, while emails and alerts inform you when a seal experiences a problem so you can take immediate action.

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RedRaven IoT Solutions for Valves

RedRaven vs. other seal monitoring systems

	RedRaven	Other providers
Support	Global network of full-time engineering support for process equipment condition and network availability Quick Response Centers and technical centers around the world	Typically limited real-time monitoring, on-demand equipment troubleshooting Device manufacturers offer only network support with limited equipment knowledge
Alerts	Engineering-based thresholds and analytics In-house analytics development No training time needed	Provides condition monitoring with thresholds and alerts Often uses machine learning that requires baselining to look for changes Relies upon third-party consultant relationships
Communication methods	Wireless sensors: LoRa (long-range) Wired sensors Wireless connection between edge data acquisition (DAQ) and Flowserve database through SIM	Bluetooth short-range wireless connections Mesh networks Wired sensors
Available sensors	Long-range wireless area network (LoRaWAN): pressure, temperature, 4-20 mA input, dual digital input Wired: works with any available commercial sensor (directly measures seal chamber temperature and pressure; available for all support system monitoring points)	Limited sensor options above 125°C (257°F) Indirect seal chamber temperature reading Embedded sensors
Area classification	ATEX Zone 1, Class 1 Div 1	Safe area with limited expansion to Class 1 Div 1 and Class 1 Div 2

Expand your knowledge to improve plant performance and reliability

With RedRaven, you can avoid unplanned downtime by discovering reliable data about the condition of mechanical seals — along with an understanding of what the data means. RedRaven predicts equipment failure and alerts you early with recommendations for corrective actions. You also can be more confident in the reliability of your connected spare equipment to avoid startup failures.

RedRaven from Flowserve is a comprehensive IoT solution for pumps, valves and seals. You can expand your knowledge and options about how to avoid equipment failure or what to fix when it occurs. You can improve root cause analysis (RCA) because RedRaven monitors conditions at previously unavailable points.

You'll also save time and money by avoiding unnecessary equipment maintenance while directing resources to troubled assets, equipment and processes that require attention.

With RedRaven, you'll gain visibility of more system components. And our global specialists will share insights and recommendations to improve the lifespan of your seals.

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