



AI Based Equipment Predictive Maintenance Solution for Oil & Gas Industry

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ABOUT RONDS

Ronds is a high-tech enterprise which provides equipment predictive maintenance products and services. We have been focusing on predictive maintenance for more than 20 years and possess strong professional capabilities. We serve industrial enterprises in **40+ countries and regions** around the world and assist in their digital transformation.

20+

Years experience in predictive maintenance field

2,000+

Customers worldwide

NO.1

Market share in China predictive maintenance

900,000+

Sensors installed

200,000+

Machines connected to RONDS platform

35,000+

Closed-loop cases

300+

Algorithm models





The Challenges of Equipment Maintenance in Oil & Gas

Current State of Equipment Maintenance in the Oil & Gas Industry

The oil & gas sector operates within complex industrial processes, encompassing vast facilities and numerous equipment units. Daily maintenance and management pose significant challenges.

Challenges in Equipment Maintenance in the Oil & Gas Industry

Vast facilities

Personnel shortage

High-risk equipment

High production continuity

Complex industrial processes

Expert reliance

Improper equipment maintenance can lead to safety accidents!

On May 1, 2023, a chemical company experienced a catastrophic explosion resulting from a hazardous substance leakage caused by equipment mechanical failure. This tragic incident led to 9 fatalities.



Traditional handheld inspections require large manpower and not timely



The oil and gas plant is huge and requires a large amount of manpower to do inspections every few hours. The equipment may failed due to untimely inspections and poor inspection quality.

How AI Based Online Monitoring Create Reliability



XX Petrochemical Plant:

A real case of Emergency Maintenance on a High-Risk Pump Malfunction in Early Morning

01 Oil Vacuum pump with RONDS advanced sensors



Atmospheric-vacuum pump
Conveying medium: Oil with catalyst

02 AI Alarm there is a bearing damage in the early morning at 5:23am

Alarm Point	Alarm Level	Alarm Index	Alarm Value
Motor DE 2H	Level 3	Low freque...	3.39
Motor DE 2H	Level 3	Velocity ov...	1.71 mm/s
Diagnosis Conclusion Rolling bearing damage			
Maintenance suggestions 1. Pay attention to the abnormal noise and temperature of the equipment and check it as soon as possible; 2. Check the lubricating oil status and improve the bearing lubrication.			

05 Customer start maintenance



At 6 am, on-site engineer feedback that the pump had been shut down and maintenance was underway. It was discovered that the bearing cage was severely deformed.

04 RONDS expert start precise diagnosis

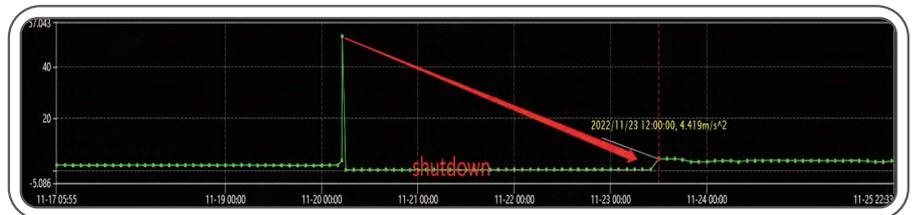
At 5:37am, RONDS submitted the following report:
Analysis conclusion:
The vibration at two measuring points of the motor surged suddenly, related to a sudden deterioration of the bearing. The bearing cage might have fractures, and the roller might be damaged.
Maintenance suggestion:
Shut down the equipment and inspect for bearing damage.

03 According to AI, customer shutdown and switch the pump



06 Maintenance successful, equipment back to normal

Following the maintenance, the equipment resumed normal operation upon restarting.



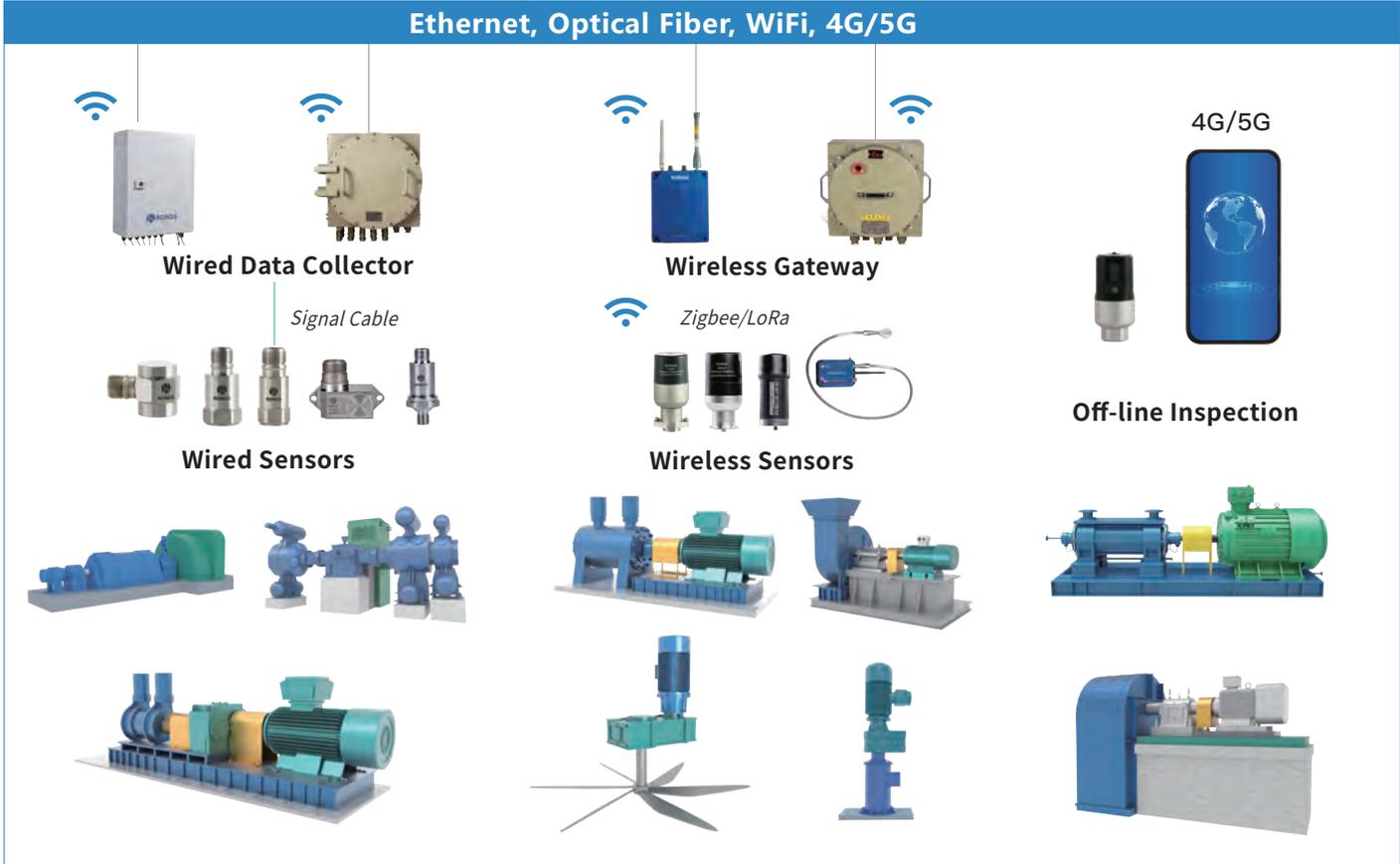
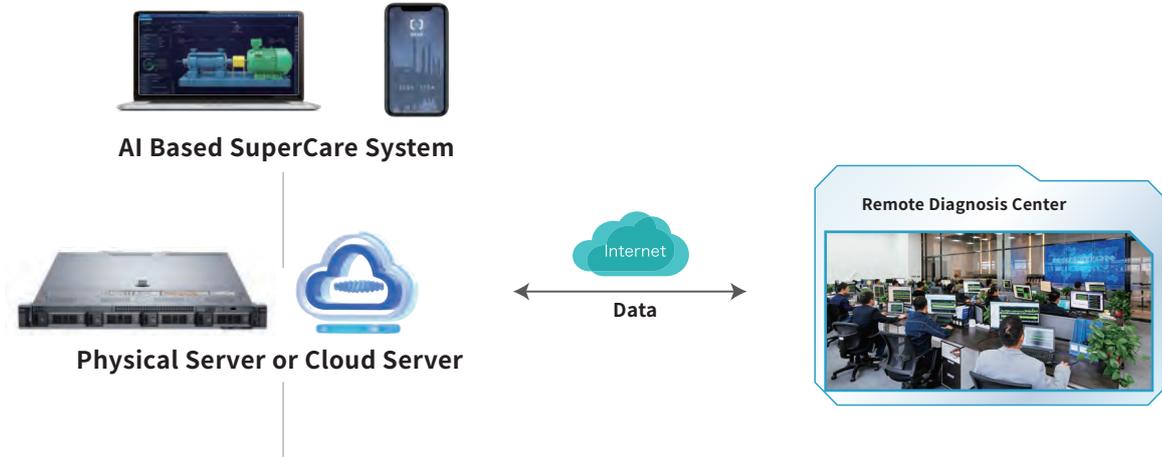
Case Value

The equipment was a high-risk pump used for conveying hazardous materials. The malfunction occurred unexpectedly in the early hours of the morning. Through timely warnings and precise diagnosis, the on-site team successfully averted a potential high-risk pump safety incident arising from an unexpected mechanical failure.

Online Monitoring + AI Technology + Expert Diagnosis + Advanced Management = Reliability



Online Monitoring System Architecture and its Values



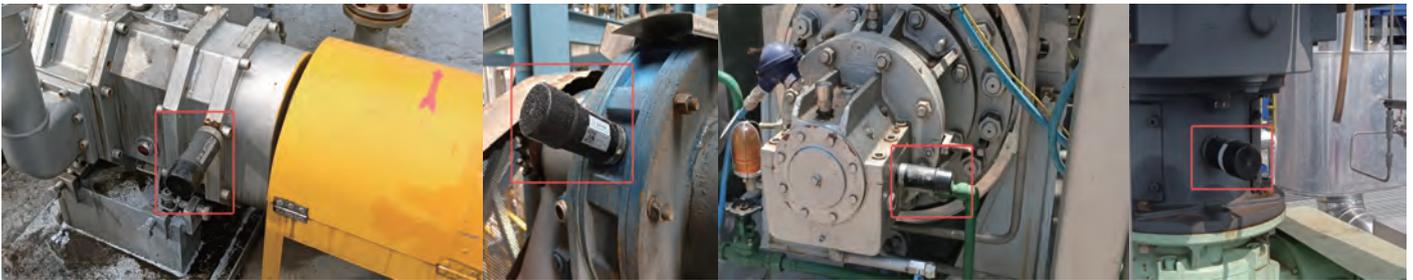
- Reduce unplanned downtime by **60%-90%**
- Decrease maintenance costs by **20%-30%**
- Extend equipment lifecycle by **10%-15%**
- Increase equipment availability by **10%-20%**
- Minimize spare parts inventory by **20%-30%**
- Decrease equipment scrapping and rework by **25%-50%**
- Boost production capacity by **20%-25%**
- Enhance maintenance efficiency by **30%-50%**

Not Only Advanced Hardware But Also Intelligent Terminal



Try our future star— Most advanced 3 in 1 intelligent wireless sensor

- Vibration+Temperature+Speed
- From 0.1Hz to 20KHz frequency response and 0.02Hz resolution
- Edge computing ability and AI alarm
- IP68 for harsh environment
- ATEX certification, suitable for explosion-proof areas



- Applied to over 20 industries
- Over 40000 new installations in the past 1 year
- The choices of giant enterprises (Installed including SINOPEC/PetroChina/BASF...)

World Leading Edge Computing Ability



- Alarm triggered collection
- Dozens of intelligent KPI
- Long time waveform
- Equipment shutdown and automatic sleep for saving power consumption



- Self-adpted threshold
- Working condition recognition
- Error signal recognition



- Green channel for uploading alarm data
- Encrypted transmission

Create a rich product matrix for the future



Wired Sensors



Speed & Motor Condition



Oil Sensors



Inspection Camera



Wireless Sensors



High Frequency Impulse



Angle & Angular Velocity



Inspection Robot



AI Based Predictive Maintenance System—SuperCare



- Visualization
- User Friendly
- Smart
- Customized
- Flexible & Compatible
- Collaborative

Ronds Predictive Maintenance System:

Ronds software enables 24/7 real-time monitoring of industrial equipment by utilizing status data. This is achieved through the integration of cutting-edge technologies such as big data, cloud computing, and AI. The system is capable of accurately predicting machinery faults and providing detailed diagnostic conclusions. Furthermore, it offers a comprehensive equipment operation and maintenance process, which facilitates a closed-loop PDCA cycle.



Ronds Predictive Maintenance APP:

Ronds mobile application provides functions similar to those of the PC system, enabling users to access real-time equipment status information from anywhere and any time.

Key Feature — AI Diagnosis

- Diagnosis conclusion: Rolling bearing light damage
- Maintenance: 1. Pay attention to the abnormal noise and temperature of the equipment during the off-line inspection;
- 2. Check the lubricating oil status and improve the bearing lubrication.

Intelligent Alarm
Distinguish alarm levels by different colors, alarm by directional indicators, it preliminarily locate the cause of failure.

Intelligent Diagnosis
The intelligent diagnosis conclusion given by AI can locate the specific fault type

Alarm Value
Alarm value at each measuring point

Measuring Point Name	Channel Amplitude	Data Time	Alarm Level
Pump load end 3H	1.327 mm/s	2022-12-24 14:00:00	Level 2
Pump load end 3V	1.126 mm/s	2022-12-24 14:00:00	Normal
Pump load end 3A	1.001 mm/s	2022-12-24 14:00:00	Normal

Automatic Interception of Alarm Waveform
Include trend, time waveform and spectrum

Comprehensive Service Capabilities Ensure Application Effectiveness



Ronds Remote Diagnosis Center



24/7 Expert monitoring



Expert consulting



Evaluation after onsite maintenance



Monthly health report



Diagnostic skill training



Diagnosis center system consulting

Powerful Diagnostic Team

- CAT IV : 6
- CAT III: 24
- CAT II: 41

Powerful Diagnostic Capability

- Online monitoring Equipment number: 200,000
- Closed-loop fault cases number : 35,000
- Number of industries covered: 22



Mobius Authorized Partner

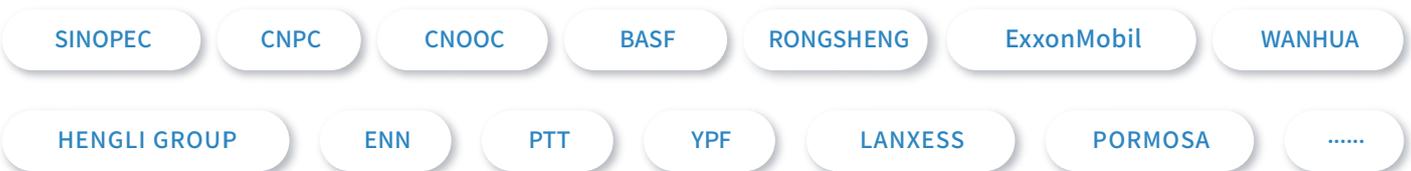
Our services have gained recognition from global customers



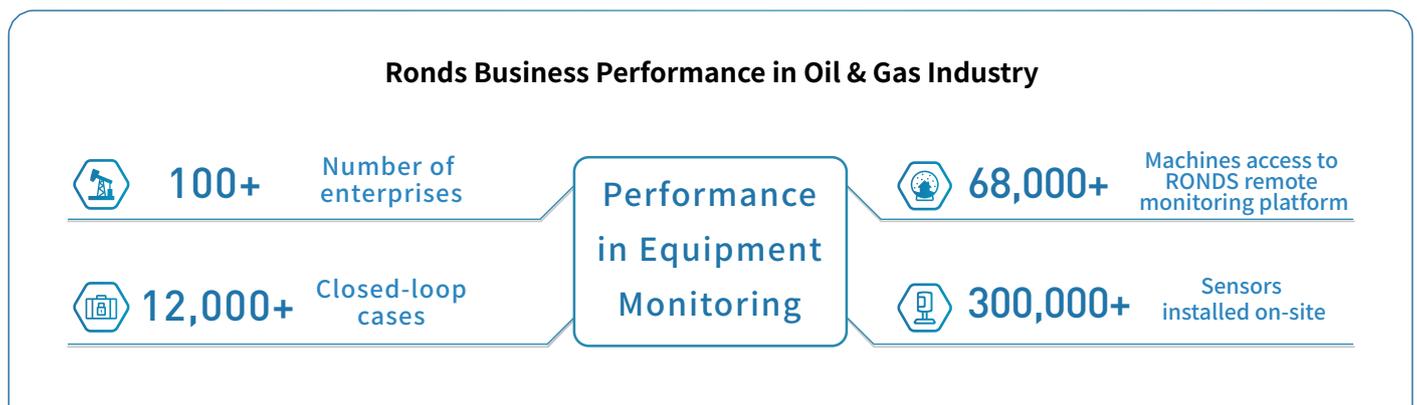
We Have Extensive Experience in Oil and Gas Industry



We are the Best Choice for Global Oil & Gas Enterprises



Performance Accumulation of Oil & Gas Industry



We are Diagnostic Experts for Pumps and Fans



- Pump and Fan Number Monitoring in Our System: **67,000+**
- Pump Type Number Monitoring in Our System: **25**
(Including centrifugal pump, vacuum pump, gear pump, roots pump, reciprocating pump etc.)
- Blower Type Number Monitoring in Our System: **13**
(Including centrifugal fan, axial flow fan, mixed flow fan, roots fan, screw fan, etc)
- Pump and Fan Fault Cases: **16000+**
- Pump and Fan AI Algorithm: **80+**

Application Case in SINOPEC



Cooperation Introduction



Ronds covering **32 companies** in Sinopec
(Including Guangzhou, Shanghai, Zhongke, Tianjin, Yangzi, etc.)

Total sensor installed: **200,000+**

Total equipment monitoring: **40,000+**

Successful cases: **5,000+**



Deeply Strategic Cooperation

- 2022 Signed a framework agreement worth **27.59 million US dollars**, aim to comprehensive coverage all the fans and pumps.
- 2024 Signed a framework for reciprocating compressor.
- Based on overall planning and customer needs, collaborate to develop customized big data equipment comprehensive management system.

Biggest Project in SINOPEC

SINOPEC Guangzhou

- Monitoring equipment: 2700+
- Sensors installed on-site: 16000+
- Successful cases: 1100+
- Starting date: August/2018



Application Value

≤2%↑
Equipment failure repair rate
(Before 4%)

20months↑
MTBF of Pump
(Before 18months)

≤0.8%↑
Emergency repair man-hour rate
(Before 9%)

≤ 2times/year↑
Unplanned shutdown maintenance frequency of 100 devices
(Before 5 times)

Clients Products and Services Covering 40+ Countries



RONDS in MENA

- UAE
- MOROCCO
- SAUDI ARABIA
- LEBANON
- TURKEY
-



A TOP MINING COMPANY (Morocco)



A RO BARGE (Saudi Arabia)



A TOP CEMENT COMPANY (Saudi Arabia)



A TOP FOOD AND BEVERAGE COMPANY (Saudi Arabia)



A TOP STEEL COMPANY (Kuwait)



A TOWER PUMP ROOM (UAE)

Other Typical Global Customer

- POSCO
- BAOWU
- ANSTEEL
- SIERRA GORDA
- VALE
- CHINA RESOURCES
- BUNGE
- LG
- CONCH
- CODELCO
- CHINALCO
- MICHELIN
- CHN ENERGY
- VOLKSWAGEN
- OCEANIA DAIRY



Make Industry Better

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