

# Grundfos iSolutions Monitor (China)

Industry 4.0, the fourth wave of industrial revolution, is sweeping the world with great speed. With "interconnection" as the core feature, driven by the Industrial Internet of Things (IIoT) and Cyber-Physical System (CPS), Industry 4.0 promotes the intelligent transformation of production and manufacturing by integrating innovative technologies such as data acquisition, big data, cloud platform and artificial intelligence.

As a global leader in the pump industry, Grundfos helps customers achieve Industry 4.0 by providing digital intelligent solutions to enhance the operation and maintenance of pumps. Grundfos iSolution Monitor is a digital platform that helps customers realize intelligent diagnosis and predictive maintenance of pumps.

## Grundfos iSolutions Monitor (China)

Grundfos iSolutions Monitor (China) manages the whole life cycle of the pump equipment. It monitors the daily operation status, post-maintenance, efficiency and energy consumption of the pump, and provides reliable solutions for users' optimization decisions through digital means, and ultimately realizes predictive maintenance.



## Grundfos iSolutions Monitor (China)

### Customer Value

#### Real-time Interconnection

Due to a lack of convenient and effective data tools, the current status of the pump system is unknown and there are no timely alerts for potential issues.

- [1] Real-time connectivity
- [2] Diagnosis report on a regular
- [3] Diagnosis report on a regular basis



#### Stability and Reliability

Without having a professional pump technician to identify risks or potential issues, shutdowns and downtimes are unplanned and costly.

- [1] Reduce unplanned shutdown by approximately 70%
- [2] Improve equipment operation efficiency
- [3] Significantly enhance equipment stability to ensure the safety of assets



#### Intelligence and Efficiency

Increasing labor costs and unoptimized systems result in ineffective operations and unpredictable, expensive maintenance costs.

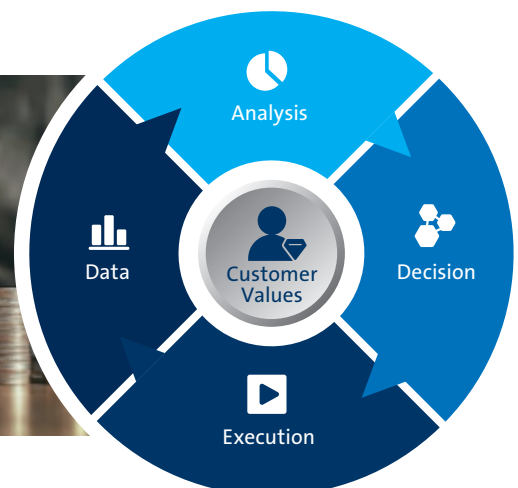
- [1] True unattended operation
- [2] Reduce maintenance costs by approximately **30%**
- [3] Facilitate platform transformation and upgrade, enabling end-to-end management



#### Energy Saving and Environmental Protection

A lack of data and insights makes it challenging to optimize energy consumption and maximize operational efficiency.

- [1] Improve energy utilization and unit energy efficiency
- [2] Optimize asset utilization to achieve operationalexcellence



# Grundfos iSolutions Monitor (China) Features

Grundfos iSolutions Monitor (China) provides predictive diagnosis of equipment faults by combining vibration data, AI, algorithms and fault knowledge for intelligent condition monitoring. The platform helps achieve optimal health and operation of the pump, improving the efficiency and reliability of the system.



### Health Assessment

Rapid and accurate evaluation of pump health status

- Real-time health monitoring
- Health trends tracking
- Visualization of vibration levels
- Visualization of fault data



### Abnormal Diagnosis & Analysis

Root cause analysis and trend predictions

- Vibration analysis (sound wave, frequency spectrum & fault frequency)
  - Pump trend analysis
- Root cause analysis & diagnostic report
- Performance analysis



### Lifetime Prediction

Uses a predictive algorithm to evaluate the remaining life of the pump and its key components

- Remaining life prediction of the pump
- Remaining life prediction of spare parts
- Fault risk prediction



### Fault Knowledge Library

Supports the accumulation and application of fault knowledge

- Incident management
  - Event review
- Fault management



### Pump Maintenance Advice

Suggest the best maintenance time and means

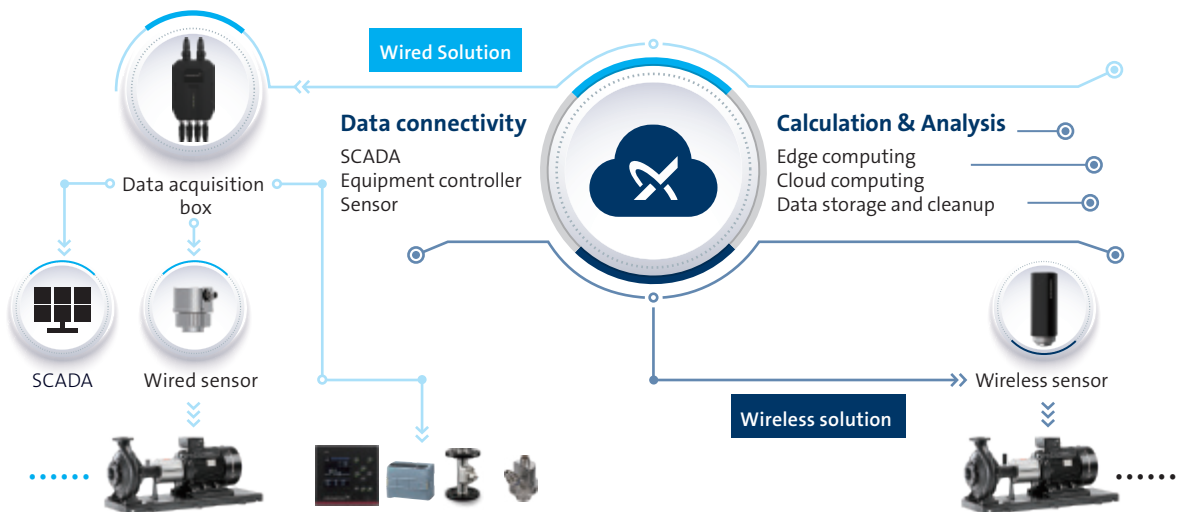
- Suggestions on maintenance time
- Suggestions on maintenance means



### Event Management

Realize the closed loop management of alarm, diagnosis and processing

- Delegate tasks
- Track processing status
- Track completion status



01

## Health assessment

Health assessment is conducted based on the pump vibration signal, and is assisted by pressure, flow, temperature, current, voltage and other signals. It uses an algorithm to integrate and evaluate the data from multiple sources and visualizes the health status and health trend of the pump.



### Main Features

- Collect and present the vibration data and other parameters
- Support health assessment based only on vibration values, vibration characteristic values, and multiple data source integration
- Support multi-pump health status comparison



02

## Abnormal Diagnosis & Analysis

Abnormal Diagnosis & Analysis is conducted based on the combination of a data-driven model and mechanism model to analyze and diagnose the alarm generated by the system. The purpose of this function is to quickly find the specific components and root cause of the fault, and automatically or manually issue the diagnosis report to provide technical support for maintenance.



### Main Features

- Supports customized alarm logic and notification logic configuration
- Supports trend analysis, waveform analysis, spectrum analysis, fault spectrum analysis and other advanced vibration analysis
- Supports customized chart analysis and identification
- Supports the issuance of automatic diagnostic reports



03

## Lifetime Prediction

Lifetime Prediction is based on fault indicators and prediction of key components. Predictive results are used to inform the equipment maintenance personnel of the remaining life of the whole pump and achieve greater predictive maintenance capabilities.



### Main Features

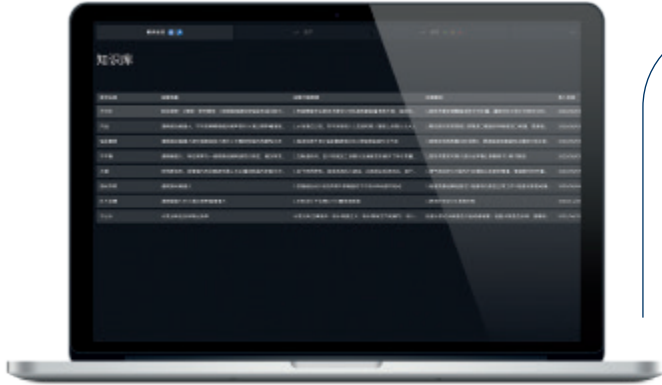
- Display of status and operation hours
- Pump and component life prediction
- Remaining life analysis based on failure modes



# 04

## Fault Knowledge Library

Fault Knowledge Library can store the pump related fault knowledge and case data. It uses corresponding data models to integrate the data uniformly and according to pump and fault type. Fault knowledge is primarily used to support rule-based fault diagnosis and processing, while cases are used for data-driven diagnosis.



### Main Features

- Display of design life and operation hours
- Pump and component life prediction
- Remaining life analysis based on failure modes

# 05

## Pump Maintenance Advice

Pump Maintenance Advice is given with the aim to reduce maintenance costs and improve maintenance efficiency. Through data and analysis results provided by basic functions such as water pump health assessment, abnormal diagnosis and analysis, life prediction and other functions, the system will suggest the optimal maintenance time and methods for different water pumps.



### Main Features

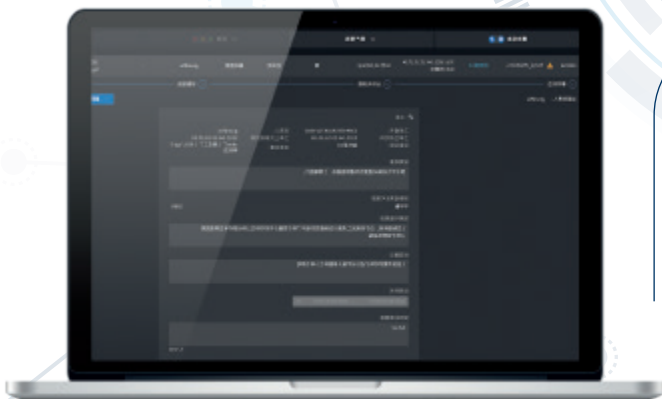
- Give optimization advice on maintenance object, maintenance time and maintenance method
- Support maintenance strategy development for individual pumps or pump set



# 06

## Event Management

Event Management integrates alarm, diagnostic analysis, processing and tracking based on specific events. Each specific task is assigned to individuals in a step-by-step method, creating a collaborative closed-loop management of personnel, equipment and events.



### Main Features

- Supports the automatic generation and download of work order
- Supports task assignment and tracking
- Supports trackability of process

# Grundfos iSolutions Monitor (China)

## Accessories

### Technical data of data acquisition box



Category	Property	Value
Outdoor installation requirements	Pillar dimension	<ul style="list-style-type: none"> <li>Cylindrical: diameter 27-34 mm</li> <li>Square: side length 25 mm</li> </ul>
		Operating temperature
Working conditions	Humidity	95% RH
	Power module	Input AC 220 V, 10 W
Power supply cable	<ul style="list-style-type: none"> <li>IEC: 0.5 - 0.85 mm<sup>2</sup></li> <li>UL: 20-18 AWG</li> </ul>	Use a 3-core cable that meets the requirements of the National Electric Code. Use copper or copperclad aluminum conductors only. Use a power cable with an outer diameter of $\phi$ 4-8 mm only.
	Communication interface	
Recommended communication cable/CIO cable	<ul style="list-style-type: none"> <li>screened, double twisted-pair</li> <li>cross-section: 0.2 - 0.3 mm<sup>2</sup></li> <li>AWG: 24 - 20</li> <li>maximum cable length: 1200 m</li> </ul>	Use a communication cable with an outer diameter of $\phi$ 4-6 mm.
	Network cable	
Vibration acquisition parameters	Number of vibration signal channels	2 channels per each of the three axes
	Type of vibration sensor supported	acceleration
	Sample frequency	max. 32 kHz, configurable
	Sample resolution	24 bit
	Frequency response	3 Hz - 2 kHz (-3 dB)
IO Port	Acceleration range	±5 g
	Interface type	CIO 1, CIO 2, CIO 3, CIO 4
Others	Weight	about 1000 g
	IP class	IP65
	OTA	yes

### Technical data of wireless sensor



Category	Property	Value
Vibration measurement	Range of acceleration	±5 g
	Frequency response	3 Hz - 2 kHz (-3 dB)
	Sensitivity	160 mV/g ± 10%
	Axial direction	X, Y, Z
Temperature measurement	Measurement range	-10 to +110 °C
	Accuracy	±3 °C
Output	Signal types	digital, wireless
	Interface types	NB-IoT
	Sample interval [minutes]	30, 60 (default), 90, 120
	Transmission interval [minutes]	30, 60, 90 (default), 120, 240
Power supply	Power type	lithium thionyl chloride batteries (not chargeable)
	Battery capacity	19,000 mAh
	Battery life (at 25 °C, transmitting eigenvalues every 1.5 hours and waveform every 24 hours)	2 years
Working conditions	Operating temperature	-20 to +80 °C
	Humidity	95% RH
Structure	Weight	about 350 g
	Installation method	magnetic or glue-adhered
Certification	IP grade	IP65
	Explosive-proof grade	Ex ia IIC T4 Ga
Others	OTA	yes

### Technical data of sensor



Category	Property	Value
Vibration measurement	Range of acceleration	±5 g
	Sensitivity	160 mV/g ± 10 %
	Frequency response	3 Hz - 2 kHz (-3 dB)
	Axial direction	X, Y, Z
Working conditions	Operating temperature	-20 to +80°C
	Humidity	95% RH
	Weight	about 208 g
Structure	Shell material	stainless steel
	Connector	aviation plug (5 pins)
	Installation method	glue-adhered
Certification	IP grade	IP65

## INDUSTRIAL APPLICATIONS



Food and Beverage



Automotive



Wind Power



3C Electronics



Commercial building



Municipal Water