

# Three tips for smarter maintenance in the water processing industry

Practical examples and solutions for updating maintenance strategies in water processing applications



**How can water processing facilities and portable plants ensure 24/7 monitoring of equipment? How can real-time data analysis help reveal potential issues in advance? Here are three practical tips for implementing smarter maintenance in the water industry.**

Continuity of operation is key in the water industry and even the failure of a single component can have a massive impact on operations. On the other side, energy and maintenance expenses are a major part of the lifecycle costs of pumping systems.

For example, membrane filtration water treatment systems can be vulnerable to damage and wear

caused by pressure peaks. It is important to monitor key assets, and detect any abnormal vibrations, inefficient system operation, erosion of components, and cavitation.

Another typical failure is caused by hydraulic hammering in the pipes, that may cause dislocation of the joints and weakening of the wall material, bearing wear, shaft vibration, cavitation and insulation degradation.

Here are three practical tips for updating maintenance in the water processing industry:

## ✓ Maintenance Tip 1

Ensure lubrication in bearing parts of cooling water circulation pumps

## ✓ Maintenance Tip 2

Avoid pump cavitation by detecting air in the system and ensure a consistent flow of water

## ✓ Maintenance Tip 3

Detect degree of deterioration in pumps instead of elapsed time

OMRON offers a complete range of products for smarter maintenance solutions.

## Maintenance Tip 1

### Ensure lubrication in bearing parts of cooling water circulation pumps

#### Issue:

A pump is used for circulating water throughout the facility. Bearing abnormalities can cause a pump failure. This is often caused by a lack of lubricating oil in bearing parts.

#### Solution:

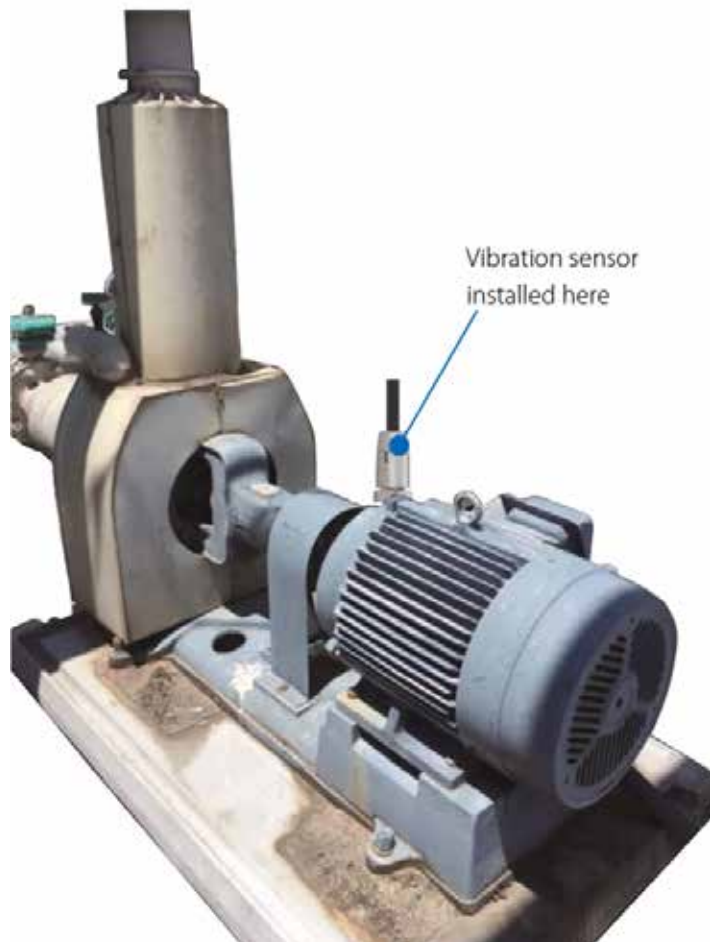
By installing a vibration sensor to the pump, abnormalities can be detected and solved before failure. This makes it possible to detect when bearing grease has degraded or dried up, or when foreign matter has entered the system. Acceleration measurement results are obtained from the OMRON K6CM-VBM condition monitoring device. This enables quantifying the status and an alarm can be set for the output threshold default.

For example, a measurement value under normal operation is around 0.6 G. A measurement value of 1.5 G means that the bearing is not sufficiently lubricated and the operation is abnormal. A warning alarm threshold can be set for 0.99G and a critical alarm threshold at 4.08G.

OMRON's Remote Access Solution RT1 can collect data cyclically from the vibration sensor and send the data securely to a cloud-based system. This data can be accessed remotely to find out exactly what the issue is and for example the spare parts needed to be replaced. This ensures continuity of service and reduces the impact of emergencies. Even if connectivity to the cloud is not available at that time, data is stored and sent to cloud when the connection is up again.

The data can be collected by the controllers or directly by intelligent devices. Even in case of a hard power off of the plant, by connecting a small uninterruptible power supply (UPS) to the RT1 Series Remote Access Solution it is possible to send data and trigger e-mails or a text message to the maintenance team to provide all the information needed for fixing the issue or taking actions.

This reduces travel cost and the effect of urgencies.



## Maintenance Tip 2

### Avoid pump cavitation by detecting air in the system and ensure a consistent flow of water

#### Issue:

Washing water is pumped with a motor-driven pump to a washing tank. However, pockets or cavities can form in the process, resulting in pump cavitation. Pump cavitation can be described as the creation and collapse of the air bubbles in a fluid. When the air bubble enters the pump, it causes an air lock. It is not always possible to have safe access to the pump station due to adverse weather conditions, hazardous locations or security measures.

#### Solution:

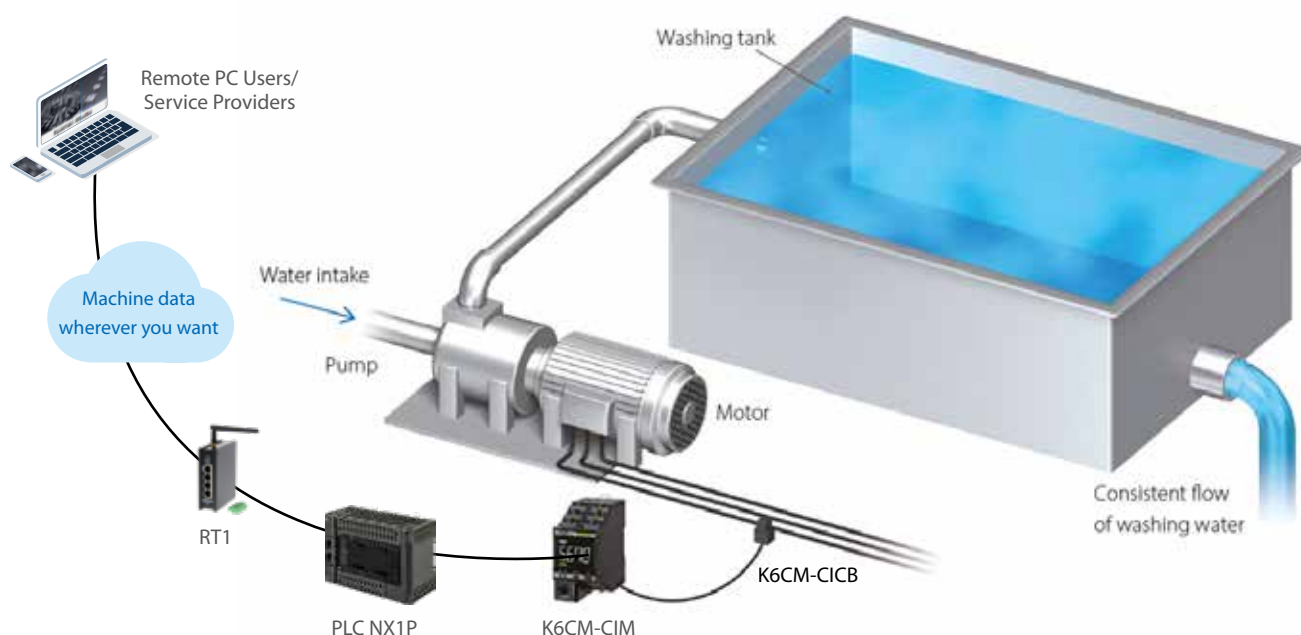
By installing a K6CM-CIM condition monitoring device, cavitation can be avoided in the pumping application by detecting air in the system. Thanks to the solution, degradation level measurement results can be obtained. When the measurement value reaches the set alarm threshold, the solution detects the air locks in pumps so that the system can be maintained before degradation causes it to shut down.

For example, the motor operation conditions are at 11kw/200V/4poles and the inverter drive frequency is 60Hz. The failure mode load abnormality indicates cavitation. The degradation level under normal operation is for example 20 and under abnormal operation 75. The alarm threshold for a warning can be set at 30, and the alarm threshold for critical at 50.

By installing OMRON's Remote Access solution to the cabinet, is not necessary to open it to access the controller and devices for tuning or maintenance actions.

A remote connection can be established from the office or another safe environment. The maintenance team can also get access to one or more IP-Cameras to monitor the conditions of the pump and get an actual look at what is happening. This limits the risk for the operator caused by hazardous conditions at the location.

Warranty or contracted service agreements require support personnel to have access to equipment as well. However, these can interfere with troubleshooting needs. Thanks to a secure remote access gateway, the remote access solution from OMRON makes it possible to manage these agreements without limiting service. Unlike with other remote solutions, the VPN-like access makes it unnecessary for the maintenance team to be present at the local machine or plant. OMRON's Remote Access Solution allows collecting data from distributed pumping systems to create a constant connection between plants.



## Maintenance Tip 3

### Detect degree of deterioration in pumps instead of elapsed time

#### **Issue:**

When a motor for a pump in a facility deteriorates over time, it may be difficult to plan preventative maintenance at the right time. Remote connectivity seems to be the ideal solution here, but how can you prevent unauthorized access to machine data and control? Cyber security is a key element to keep in consideration when a remote access solution is present on a plant.

#### **Solution:**

A solution with a condition monitoring device can assess the right timing for maintenance based on the degree of deterioration instead of elapsed time. It can automatically notify the user when to perform maintenance. Alarm thresholds can be set based on the application.

OMRON's secure Remote Access Solution offers an AES 256 bit-encrypted tunnel based on TLS that is audited by ProtectEM, based on JIST SP800, ISECOM OSSTAM, BSI, ISA99, and IEC62443. This ensures secure remote access to the PLC, controllers, and other network devices, free from potential hacking or malware.

If there is no LAN available in the facility, another way to get remote access is needed. Fortunately, OMRON's Remote Access Solution also provides 4G cellular and WiFi-based units that enable remote access wherever there is cellular or WiFi service.



OMRON offers a complete range of products for smarter maintenance solutions.



### **Remote access**

Access machine data everywhere via a secure connection WIFI/4G/LAN connection. Execute a quick connection to a machine to get relevant information and to monitor machine status. Access to IP camera can help understand the issue.



### **Compact automation**

Get full equipment data visibility and remote access with a controller that can collect data produced by sensors and actuators.



### **Condition monitoring**

Monitor key assets of the machine (motor current/vibration/temperature/insulation resistance), detect abnormal working conditions and share information and trends via EtherNet/IP.



### **Monitoring relay**

The smarter way to protect your system and increase safety, thanks to redundancy with the inverter protection functions. Monitor for incorrect phase sequence and phase loss. No heat generation due to nearby inverters installation



### **Power supply**

Visualize and control the condition of power supplies and load check centrally. Visualize the time to replace power supplies.



### **Inverters**

Be proactive against potential failures and predict drive failures with ageing models for critical components (fan, IGBT, ...). Designed for 10 years of maintenance-free use.

For more details on OMRON's solutions for smart maintenance, please contact us or visit <http://industrial.omron.eu>.