TRICO

THE PERFECT FIT

Sensei MACHINE VITALS™

Compatible with a Diverse Range of Equipment

Designed for Versatility

Machine Vitals™ is a game-changer in equipment monitoring, changing the way maintenance professionals assess the condition of their equipment. By seamlessly integrating multiple sensors into a compact and wireless device, Machine Vitals provides data on various equipment parameters. This allows maintenance teams to proactively identify potential issues before they escalate, leading to enhanced equipment performance and reduced downtime. With Machine Vitals, maintenance becomes a proactive process, ensuring optimal efficiency and productivity.

Designed for versatility, Machine Vitlas can be used on a wide range of equipment, including pumps, gearboxes, and more. Its advanced technology enables it to monitor crucial parameters such as temperature, pressure, humidity, and more. By continuously analyzing this data, maintenance professionals can gain valuable insights into the condition of their equipment, enabling them to make informed decisions about maintenance and repairs. With Machine Vitals, equipment monitoring becomes effortless, allowing maintenance teams to stay ahead of potential problems and maximize the lifespan of their assets.

Parameters Monitored

- Temperature
- Humidity
- Pressure
- Acoustic
- Acceleratory Variance

Industrial Gearboxes

Industrial gearboxes play a crucial role in various applications across manufacturing, power generation, and other industries, serving as the mechanical workhorses that transmit power and control speed. Ensuring the longevity and reliability of these critical components is paramount to maintaining operational efficiency.

INDUSTRIES SERVED

Industrial gearboxes are employed in a myriad of applications, including:

Manufacturing Machinery: Gearboxes are integral components in manufacturing equipment such as conveyors, agitators, and extruders, where they control rotational speed and torque. Metal extruders are a good example of this industry.

Pulp and Paper: Gearboxes are used in various machines and equipment throughout a pulp and paper plant to transmit power, control speed, and facilitate specific functions in the manufacturing process. Chippers, debarkers, pulpers, fourdriniers, presses, dryers, mixers, conveyors, slitters, and washers are all candidates for gearbox placement.

Power Generation: Gearboxes are vital in power generation processes. They are used to connecting turbines and generators to regulate speed and convert rotational energy into electrical power. These include cooling tower fans, belt feeders and conveyors, crushers, and separators.

Mining Operations: Heavy-duty gearboxes are utilized in mining equipment for tasks like crushing, grinding, and transporting materials. Conveyors, crushers and screens, and slurry pumps are common applications.

Water and Wastewater: Gearboxes are employed in these processes for clarifiers and sifting equipment. PD pumps, agitators and mixers, and decanter centrifuges are all more examples of gearbox placement in this challenging environment.

Renewable Energy: Wind turbines and solar tracking systems use gearboxes to adapt varying speeds to generate consistent power output. Hydropower turbines, solar trackers, and biogas generators also incorporate gearboxes in their industry.

Preventing Gearbox Failures

Understanding the common causes of gearbox failure is crucial for implementing effective preventive maintenance strategies. Some prevalent failure causes include:

Failure Cause	Parameters to Monitor	Reason
Lubrication Issues	Temperature Humidity Vibration Oil Analysis Acoustic	Inadequate lubrication or contamination of lubricants can lead to increased friction, wear, and ultimately, gearbox failure. Regularly checking for and monitoring oil contamination, including particles and water, ensures the lubricant's effectiveness. Filtration systems and online oil analysis can help detect and address contamination issues. Monitoring the humidity inside the bearing housing compared to the external environment can indicate condensation and water.
Misalignment	Temperature Vibration Acoustic	Improper alignment of gears can cause uneven loading and wear, reducing the gearbox's operational lifespan.
Overloading	Temperature Vibration Acoustic	Exceeding the gearbox's designed load capacity can result in accelerated wear and fatigue, leading to failure.
Temperature Extremes	Temperature Vibration Acoustic	Operating gearboxes outside recommended temperature ranges can accelerate wear and compromise lubrication properties.
Contamination	Pressure Temperature Humidity Vibration Oil Analysis Acoustic	Filtration systems and online oil analysis can help detect and address contamination issues. Monitoring Humidity inside the bearing housing compared to the external environment can indicate condensation and water. Sudden changes in pressure can indicate plugged filters and desiccant breathers.

EXTENDING GEARBOX LIFESPAN

Implementing a comprehensive monitoring system that focuses on key sensing parameters is crucial for preventing premature industrial gearbox failure. By actively monitoring temperature, oil level, vibration, pressure, and oil contamination, operators can detect issues in their early stages and implement timely maintenance, ultimately extending the lifespan and reliability of industrial gearboxes. This proactive approach not only reduces downtime and maintenance costs but also contributes to overall operational efficiency and productivity.

Failure Statistics

Machine Vitals plays a crucial role in preventing such failures by continuously monitoring critical parameters and providing early warning signals to allow for timely maintenance interventions.

30-50%
Inadequate Lubrication

20 - 30%
Contamination (Lubrication)

15 - 20%
Installation/ Alignment Issues

5 - 10%
Overload

0 - 5%
Handling Issues

Industrial Pumps

Industrial pumps are indispensable components across various sectors, serving as the heartbeat of many processes by transporting liquids for cooling, lubrication, and a myriad of other applications.

INDUSTRIES SERVED

Industrial pumps are use in an array of applications, including:

Water Management: Industrial pumps play a pivotal role in water treatment plants, managing the flow of water for purification, distribution, and wastewater treatment.

Oil and Gas Industry: Pumps are integral to the extraction, transportation, and refining processes in the oil and gas industry, facilitating the movement of crude oil and various petroleum products.

Pulp and Paper Industry: Industrial pumps are utilized in various machines and processes to facilitate the movement, transfer, and circulation of fluids. Pumps are used in conjunction with digesters, refiners, and pulp washers. Also included are headbox pumps, press pumps, dryer pumps, calender pumps, clarifier pumps, and recovery boiler pumps.

Manufacturing Machining: Pumps are used in manufacturing for tasks such as coolant circulation, hydraulic systems, and material transfer in production lines.

Chemical Processing: Industrial pumps are critical for handling and transferring chemicals in various industrial processes, ensuring precise and controlled fluid movement.

Power Generation: Pumps are employed in power plants to circulate coolant, control steam flow, and facilitate the movement of various fluids in the generation process. These include ID and FD Fan lube oil pumps, Condensate Pumps, Circulating Water Pumps, Boiler Feed Water Pumps, Rotary Atomizers, and Turbine Lube Oil Pumps, among others.

Preventing Pump Failures

Bearing failure in industrial pumps is a frequent problem resulting in substantial downtime and maintenance expenses. Below are the leading causes of pump bearing failure and the parameters to monitor for prevention:

Failure Cause	Parameters to Monitor	Reason
Lubrication Issues	Oil Level Oil Analysis Temperature	Inadequate lubrication or contamination of the oil can lead to bearing failure. Monitoring the oil level and ensuring the quality of the lubricant helps prevent issues such as overheating and excessive wear.
Misalignment	Temperature Vibration Acoustic	Misalignment of the pump shaft and bearing can cause increased vibration levels. Monitoring vibration helps detect misalignment early, allowing for corrective measures to be taken to prevent excessive stress on the bearings.
Overloading	Temperature Vibration	Monitoring the temperature and vibration conditions helps operators ensure that the pump operates within its designed capacity, preventing premature bearing failure.
Contamination	Oil Analysis Temperature Humidity	Particulate contamination in the oil can accelerate wear and damage to bearings. Regularly monitoring the particle count in the lubricant helps identify contamination issues early, allowing for filtration or oil replacement before considerable damage occurs. Monitoring humidity inside the bearing housing compared to the external environment can indicate condensation and water.
Improper Installation or Maintenance	Temperature Vibration Pressure	Incorrect installation or inadequate maintenance practices can contribute to bearing failure. Monitoring the temperature and vibration levels provides insights into the overall health of the pump and its components. Sudden changes or abnormalities may indicate installation or maintenance issues that need attention. Monitor bearing housing pressure as compared to the external environment to ensure shaft seals are working properly.

EXTENDING PUMP LIFESPAN

Implementing a comprehensive monitoring system including temperature, humidity, oil level, vibration, pressure, audio parameters, and oil analysis is crucial in preventing premature bearing failure in industrial pumps. By actively monitoring these parameters, operators can detect issues early, enabling timely maintenance and enhancing the lifespan and efficiency of pumps. This proactive approach minimizes downtime, reduces repair costs, and improves the overall safety and reliability of industrial operations.

Failure Statistics

Up to 50% of pump failures are due to bearings. Below are the causes for the bearings to fail.

35%
Poor
Lubrication

35%
Fatigue

15%
Installation/
Alignment Issues

15%
Contamination
(Lubrication)

Hydraulic and Storage Tank Systems

Hydraulic tank systems are commonly used in various industries where hydraulic power is required for machinery and equipment. These systems store hydraulic fluid and provide a reservoir for the hydraulic system.

USAGE OF HYDRAULIC RESERVOIRS

Hydraulic Reservoirs are used for several reasons, including:

Hydraulic Fluid Storage: Hydraulic reservoirs store hydraulic fluid, which is essential for transmitting power and facilitating the movement of components in hydraulic systems.

Temperature Regulation: Reservoirs help regulate hydraulic fluid temperature by dissipating heat generated during system operation, preventing overheating, and maintaining optimal fluid viscosity.

Air Separation: Reservoirs allow air to separate from the hydraulic fluid, minimizing the risk of air bubbles entering the system and causing cavitation.

Contaminant Settling: Solid contaminants present in the hydraulic fluid settle at the bottom of the reservoir, reducing the risk of damage to system components.

Preventing Hydraulic System Failures

Understanding the factors contributing to hydraulic system failure is crucial for implementing effective maintenance strategies. Common failure causes include:

Failure Cause	Parameters to Monitor	Reason
Contamination	Humidity Oil Analysis	Contamination accounts for a significant percentage of hydraulic system failures, leading to issues such as valve and pump damage. Comparing internal humidity and external environment humidity can indicate the formation of condensation and the presence of water/moisture contamination.
Overheating	Temperature	Overheating is a prevalent cause of hydraulic system failure, resulting in damage to seals, hoses, and other components.
Fluid Degradation	Oil Analysis Vibration Acoustic	Degradation of hydraulic fluid contributes to pump and valve wear.
Leaks	Fluid Level Pressure	Hydraulic fluid leaks are a common issue, leading to reduced system efficiency.
Cavitation	Pressure Vibration Acoustic	Cavitation can cause damage to pump components, contributing to system failure.

EXTENDING HYDRAULIC SYSTEM LIFESPAN

To prevent premature hydraulic system failure, it is crucial to proactively monitor key parameters. Operators can achieve this by implementing a comprehensive condition monitoring system, incorporating sensor technology for temperature, humidity, oil level, vibration, pressure, and audio. By detecting potential issues at an early stage, operators can schedule timely maintenance, resulting in extended lifespan and improved reliability of hydraulic systems. This proactive approach not only minimizes downtime and maintenance expenses but also enhances operational safety and efficiency.

Failure Statistics

70-90% of hydraulic system failures are due to air and water contamination.

Versatile Sensor Solutions

Machine Vitals versatility extends far beyond pumps, gearboxes, and hydraulic reservoirs, offering expansive utility in the realm of condition monitoring across various industries. Its adaptable technology makes it an ideal solution for a wide range of equipment, ensuring precise and reliable data collection for predictive maintenance strategies. Whether it's in pulp-n-paper, energy, water and wastewater treatment, manufacturing, or other industries, Machine Vitals seamlessly integrates with a variety of equipment, enhancing operational efficiency and minimizing downtime. By providing critical insights into equipment health, it supports a proactive approach to maintenance, aligning perfectly with the needs of maintenance and reliability professionals.

Condition Monitoring Solutions

We encourage you to explore our Sensei IIoT Network Solutions. Stay informed about the latest advancements in the industry and discover additional options that may **PERFECTLY FIT** your specific needs at www.tricocorp.com. Remember, knowledge is power, and finding the right tools to optimize your operations is key. So, go ahead, explore, and unlock the full potential of IIoT and condition monitoring technology.

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