# USER MANUAL

# IoT-Based Water Pump Monitoring System

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## About this manual

This manual is designed to help users understand, install, and operate the IoT-Based Water Pump Monitoring System efficiently. The system leverages IoT technology to provide real-time monitoring, alerts, and insights into pump performance, minimizing failures and optimizing operation.

### Key Notes:

- Please read the manual thoroughly before using the system.
- Ensure all components are connected correctly to avoid malfunctions.

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# 1. Introduction

## 1.1 Overview

The IoT-Based Water Pump Monitoring System ensures efficient water pump operation by continuously monitoring critical parameters such as flow rate, pressure, voltage, current, and vibration. Sensor data is transmitted to a cloud platform for real-time analysis and user alerts.

## 1.2 Purpose

This system helps:

- Reduce pump downtime.
- Prevent expensive repairs by providing early warnings.
- Ensure reliable water supply.

## 1.3 Intended Audience

This manual is intended for homeowners, and technicians responsible for monitoring water pump performance.

# 2. Getting Started

## 2.1 System Components

1. **Microcontroller (ESP32):** Handles data processing and transmission.

2. **Sensors:**

   - Water Flow Sensor (YFS-201)
   - Pressure Sensor (1-1.2 MPa)
   - Current Sensor (ZMCT103C)
   - Voltage Sensor(ZMT101B)
   - Vibration Sensor (SW-420)
3. **Cloud Platform:** For real-time monitoring and alerts.

## 2.2 Installation Steps

1. **Mount the Sensors:** Attach sensors to the pump securely.
2. **Connect the Microcontroller:** Use the labeled ports to connect the sensors to the ESP32.
3. **Power On the System:** Ensure the system is connected to a stable 5V DC power source.
4. **Wi-Fi Setup:** Configure Wi-Fi.

# 3. Features and Operation

## 3.1 Real-Time Monitoring

- View parameters such as flow rate, pressure,current,vibration and voltage on the dashboard.
- Track pump health through vibration data.

## 3.2 Alerts and Notifications

- Set thresholds for flow rate, pressure, current, vibration and voltage.
- Receive push notifications for abnormal readings, such as low water pressure or high vibrations.

## 3.3 Data Logging

- Access historical data/ graphs on the cloud for performance analysis.
- Export logs for operational tracking.

# 4. User Interface

## 4.1 Dashboard Overview

The dashboard provides:

- Real-time sensor data visualization.
- Alerts section for active warnings.
- Historical graphs for trend analysis.

## 4.2 Alerts Configuration

- Set custom thresholds for each parameter.
- Enable or disable specific alerts based on your needs.

## 5. Troubleshooting

**Common Issues and Solutions**

| Issue | Possible Cause | Solution |
|---|---|---|
| No data displayed on the app | Wi-Fi not connected | Recheck Wi-Fi credentials. |
| Incorrect sensor readings | Sensor misalignment | Reposition and recalibrate. |
| No alerts received | Notifications disabled in the app | Enable notifications in settings. |

## 6. Specifications

| Component | Specification |
|---|---|
| Microcontroller | ESP32 with built-in Wi-Fi |
| Sensors | Flow, Pressure, Voltage, Vibration,Current |
| Power Supply | 5V DC |
| Operating Temperature Range | -10°C to 60°C |
| Connectivity | Wi-Fi (802.11 b/g/n) |