



PUMP MONITORING UNIT

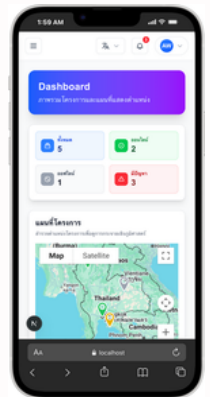
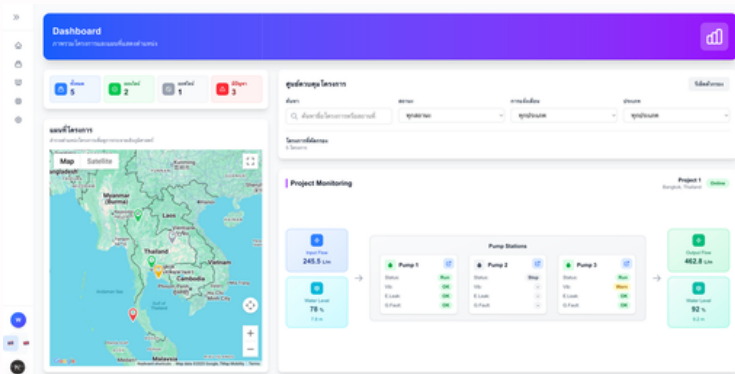
"Every time everywhere"

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Intelligent Pump Protection & Performance Monitoring System

The Pump Monitoring Unit (PMU) is an advanced system designed to continuously monitor, analyze, and protect pump operations in real time. It enhances system reliability, minimizes unplanned downtime, and extends the service life of critical equipment in pumping stations.



I. ELECTRIC MOTOR MONITORING MODULE

1.1 KEY FEATURES

Real-Time Monitoring

Continuous measurement of key operating parameters:

- Flow Rate (Q)
- Suction & Discharge Pressure
- Motor Current & Voltage
- Vibration & Temperature

Intelligent Alarm System

Immediate alerts for abnormal conditions such as:

- Bearing Failure
- Overload / Dry Run

Predictive Maintenance

Advanced analytics to detect early signs of failure and reduce maintenance costs.

Data Logging & Reporting

Long-term data storage with exportable reports for engineering analysis and compliance.

Remote Monitoring (IoT Ready)

Compatible with SCADA systems, cloud platforms, and mobile access.

1.2 WHY CHOOSE THIS SYSTEM

Designed for heavy-duty pump applications

Proven performance in large-scale pumping stations

Easy installation and integration

High accuracy with engineering-grade reliability

1.3 SYSTEM CAPABILITY

- Suitable for all pump types:
 - (Vertical Turbine, Axial Flow, Split Case, Submersible)
- Seamless integration with existing systems:
 - (SCADA / PLC / VSD)
- Multi-pump monitoring in a single platform

1.4 BENEFITS

- Reduce pump station downtime
- Lower operation & maintenance (O&M) costs
- Improve system efficiency
- Early detection of potential failures
- Support compliance with industrial and government standards

1.5 SYSTEM ARCHITECTURE

Sensors → PMU Controller → HMI / SCADA → Cloud / Remote Access

1.6 OPTIONAL FEATURES

- AI-based fault prediction
- Real-time dashboard visualization
- Mobile monitoring application
- Automatic reporting (Daily / Monthly)

1.7 INSTRUMENTATION & MEASUREMENT SYSTEM

MEASUREMENT SYSTEM

OVERVIEW

The PMU integrates a wide range of industrial-grade instruments to ensure accurate, reliable, and continuous monitoring of all critical parameters in pump, engine, and gearbox systems.

SYSTEM FEATURES

- Industrial-grade sensors (IP65–IP68 available)
- High accuracy & long-term stability
- Compatible with harsh environments
- Easy integration with PMU / SCADA / PLC

OPTIONAL FEATURES

- Redundant sensors for critical systems
- Explosion-proof (Ex-proof) instruments
- Wireless sensor integration
- Calibration certification (ISO compliant)

ENGINEERING ADVANTAGE

All instruments are selected and configured based on:

- Hydraulic performance requirements
- Pump system design conditions
- International standards (ISO / IEC / ANSI)

Instrument

- Pressure
- Flow
- Vibration
- Temperature
- Speed
- Level
- Electrical

1.8 CONTROL & COMMUNICATION SYSTEM

- Industrial PLC Controller
- Reliable real-time control with expandable I/O and SCADA compatibility
- Data Logger (USB / SD)
- Continuous data recording with easy export for analysis
- LAN / Wireless LAN
- High-speed local communication and SCADA integration
- Bluetooth
- Quick access for configuration and maintenance
- 3G / 4G / 5G / IoT / LoRa
- Remote monitoring for any location, including unmanned stations
- RS485 Modbus Protocol

- Standard communication for seamless integration with devices
- Cloud Server Integration
- Real-time monitoring, data storage, and multi-site access

SYSTEM CAPABILITIES

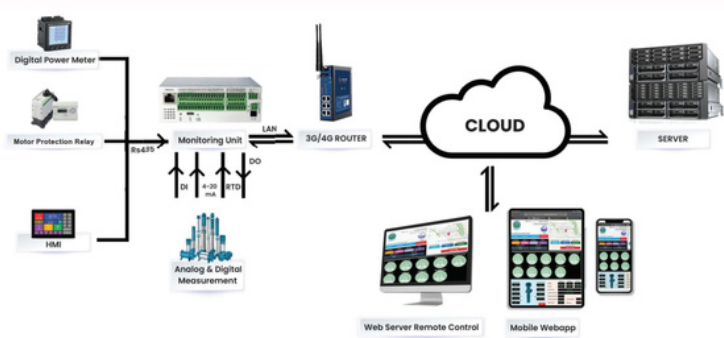
- Real-time monitoring & control
- Multi-device communication support
- Scalable architecture for future expansion
- Compatible with existing infrastructure

CYBER & DATA FEATURES

- Secure communication protocols
- User access control levels
- Data encryption (optional)
- Event & alarm logging

BENEFITS

- Centralized monitoring and control
- Reduced on-site inspection requirements
- Faster decision-making with real-time data
- Improved operational efficiency
- Ready for smart infrastructure & Industry 4.0



2. ENGINE & GEARBOX MONITORING MODULE

2.1 OVERVIEW

The PMU system is fully compatible with engine-driven pumping units and gearbox-driven systems. It provides comprehensive monitoring and protection for diesel engines, gear transmissions, and auxiliary systems, ensuring stable operation under heavy-duty conditions.

2.2 KEY FEATURES (ENGINE & GEAR SYSTEM)

Engine Performance Monitoring

- Engine Speed (RPM)
- Oil Pressure
- Coolant Temperature
- Fuel Consumption / Level
- Exhaust Temperature

Gearbox Condition Monitoring

- Gearbox Oil Temperature
- Oil Pressure / Lubrication Status
- Vibration (Gear Wear Detection)
- Shaft Alignment & Load Monitoring

Load & Torque Monitoring

- Shaft Torque Estimation
- Power Transmission Efficiency
- Overload Detection

Start/Stop & Protection Logic

- Auto Shutdown for critical faults
- Low oil pressure protection
- Over-temperature protection
- Overspeed / Underspeed protection

2.3 MEASURED PARAMETERS (ENGINE & GEARBOX)

Engine Speed:RPM monitoring

Oil Pressure:Engine & gearbox lubrication

Temperature:Engine coolant & gearbox oil

Vibration:Gear wear & imbalance detection

Fuel Level:Fuel consumption monitoring

Torque (Calculated):Shaft load estimation

Exhaust Temp:Engine performance condition

2.4 CONTROL & INTEGRATION

- Compatible with Engine Controllers:
 - (Deep Sea, SmartGen, ComAp, etc.)
- Communication Protocols:
 - Modbus RTU / TCP, CANBus, Ethernet
- Integration with:
 - SCADA / PLC / Remote Monitoring Systems

2.5 BENEFITS FOR ENGINE-DRIVEN SYSTEMS

- Prevent catastrophic engine failure
- Detect gearbox wear before breakdown
- Optimize fuel consumption
- Improve overall system efficiency
- Reduce maintenance and overhaul cost

2.6 APPLICATIONS

- Diesel Engine Driven Pump Stations
- Flood Control & Emergency Pumping Systems
- Irrigation Systems (No Grid Power Areas)
- Industrial Backup Pump Systems

2.7 ADVANCED FUNCTIONS

Engine Load Optimization: Automatically analyze load vs performance to maintain optimal operating range

Gearbox Health Index

Condition-based scoring for predictive maintenance planning

Blackout / Emergency Mode

Auto-start and monitoring during power failure conditions

Historical Trend Analysis

Track engine and gearbox performance over time

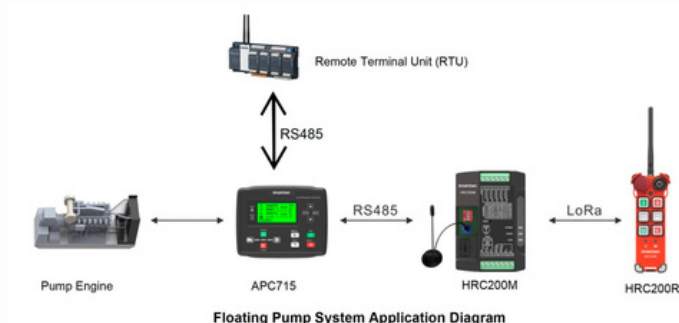
2.8 SYSTEM ARCHITECTURE (ENGINE DRIVEN SYSTEM)

Sensors (Engine + Gearbox)

- PMU Controller
- Engine Controller (Optional)
- HMI / SCADA
- Cloud / Remote Monitoring

2.9 OPTIONAL ADD-ONS

- Fuel efficiency analysis dashboard
- Maintenance scheduling system
- Remote diagnostics support
- SMS / Email alarm notification





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