Wisper CMS Software Modules: Technical Overview

Wisper CMS offers several core modules designed for in-depth data analysis, refined asset tracking, and proactive equipment management.

1 Equipment Overview

This module provides the deepest technical data analysis, crucial for formulating precise maintenance strategies.

- **Health Status Metrics**: The system uses a dual-tab approach, providing both the cumulative **Overall Health Status** (objective assessment over time) and the **Current Status** (real-time, potentially fluctuating based on immediate operational conditions).
- **Diagnostic Scoring**: The Diagnostic Score Radar Chart visualizes performance against different fault modes. Critical failures are scored below 30 (Red), major alerts at 60 (Orange-Red), and warnings are between 60–80 (Yellow-Green). Diagnostic results are calculated hourly.
- **Intelligent Diagnosis Score Analysis**: Tracks historical health status trends to analyse fault progression patterns and correlate diagnostic scores across metrics, enabling visual prediction of future operational trends.
- **Indicator Monitoring Trend**: Displays real-time data, updated every **5 minutes** via edge computing.
    - **Monitored Data**: Tracks three-axis vibration data, including: Vibration velocity Root Mean Square (RMS), Acceleration RMS (low-frequency and high-frequency totals), and Temperature measurements.
    - **Threshold Configuration**: Features preset national standard thresholds. Administrators can configure these to trigger monitoring alerts, setting three levels of thresholds, cumulative data counts (N consecutive entries surpassing the threshold), and daily alert intervals.
    - **Data Retention**: Historical health status data can be reviewed from **1 to 6 months** on the interface; indicator monitoring trend data is viewable for the past **two months**. All older data is retained for model iteration.
- **Core Diagnostic Indicators**:
    - **Health Metrics**: Calculate scores for specific fault modes, including rotor imbalance, misalignment, mechanical looseness, abnormal rolling bearings, poor bearing lubrication, gear meshing failures (fixed-axis), and rolling bearing damage.
    - **Vibration Metrics**: Statistical values based on international standard libraries, including root mean square velocity, root mean square acceleration, and steady-state impact intensity.

2 Diagnostic Analysis (Advanced Tools)

For technical users with diagnostic capabilities, the platform provides advanced tools for in-depth analysis:

- **Waveform Trend Chart**: Displays trend diagrams for high-frequency acceleration, low-frequency acceleration, and velocity. Allows visual inspection of time-domain graph and amplitude spectrum when clicking a specific time point.
- **Spectrum Diagrams**: Includes standard Spectrum of Amplitude, Multi-time Domain Spectrum (for comparing spectra across different time intervals.
- **Envelope Demodulation**: Allows selection of data frequency bands and time points for detailed fault characteristic analysis.
- **Waterfall Diagram**: Available for visualization and analysis based on measurement point and time point selection.

3 Equipment Information (Asset Management)

This module centralizes and manages equipment metadata essential for maintenance planning and inventory.

- **Equipment List Management**: Supports the creation, editing, and **batch importing** of equipment information, including asset numbers, manufacturer details, and physical location data.
- **Measurement Point List**: Records critical sensor metadata, including **sensor SN, measurement point ID, installation location, data type, and three-axis parameters**.
- **Equipment Ledger**: Provides a hierarchical view of the organizational structure and includes a **3D Panoramic View**. This view allows binding the monitored equipment to a 3D model, where users can manually adjust and mark measurement points to display location and real-time indicator data.

4 Alarm Management

This is the control centre for configuring proactive alerting rules.

- **Alarm Processing**: Alarm records are categorized as **All, Unprocessed, Processed, or Closed**.
- **Intelligent Diagnostic Alarm Configuration**: Allows specialized diagnostic engineers to create, edit, or delete fault-specific alarm policies.
- **Equipment Threshold Alarm Configuration**: Enables professional diagnostic engineers to set precise threshold alerts for each data type at measurement points, ensuring alerts are triggered based on configured criteria (threshold value, cumulative count, and daily interval).

5 Reporting Management

This module ensures diagnostic conclusions lead to actionable maintenance and system refinement.

- **Diagnostic Report**: Expert-provided report that details the component failure, fault mode, severity, trend changes, possible causes, and specific maintenance recommendations.
- **Maintenance Report**: Functions as a critical feedback loop for the AI system. Users must input maintenance details, including the faulty component, repair time, documented procedures, and supporting photos (e.g., disassembly photos). This on-site assessment data is used to continually optimize the diagnostic algorithms for the specific operational variations of each piece of equipment.

- **Weekly Report**: Provides an expert summary and comprehensive analysis of the overall device health status.

6 Knowledge Base

The Knowledge Base supports standardized fault identification and visualization.

- **Fault Standard Library**: Lists standard fault modes with corresponding professional and general indicators, providing fault interpretation, root causes, and suggested measures. This library can be configured by users under expert guidance.
- **3D Model Library**: Stores standard equipment models, allowing users to bind monitored equipment to the models for real-time visualization.