

The background of the slide is a collage of industrial images. The top right shows a close-up of a large, complex mechanical assembly, possibly a turbine or a large pump, with many curved, ribbed components. The bottom right shows two large, white, hyperboloid cooling towers of a power plant, with steam or smoke rising from them. The left side of the slide is a dark blue geometric shape that contains the title text.

Vibration Monitoring System



Company Introduction

NADA is a global leader
in condition monitoring & diagnostics of rotating machines.

Under the corporate foundation philosophy “**Communication with machines**”, we provide full product lineups for vibration measurement including online vibration monitoring/diagnosis system, portable vibration analysis equipment, vibration sensors, and automatic sensor calibration system.

NADA offers PdM (Predictive maintenance) services – through which customers’ factories and facilities are diagnosed and managed – as well as the ISO 18436-2 training.

In recent years, NADA is expanding its business in establishing Smart Factory by utilizing A.I., Big Data and wireless technologies.



Vibration Monitoring
System



Diagnosis
Consulting



Condition Monitoring
& Diagnostics Training



Smart Factory
Solutions



SIL2



24/7 Technical Support

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What is VMS ?

Vibration Monitoring System



VMS is a real-time online monitoring system for turbines and other critical rotating equipment in plants which allows users to anticipate and prevent an unexpected failure.

VMS enables users to perform condition-based predictive maintenance by systematizing vibration data & analysis know-hows.

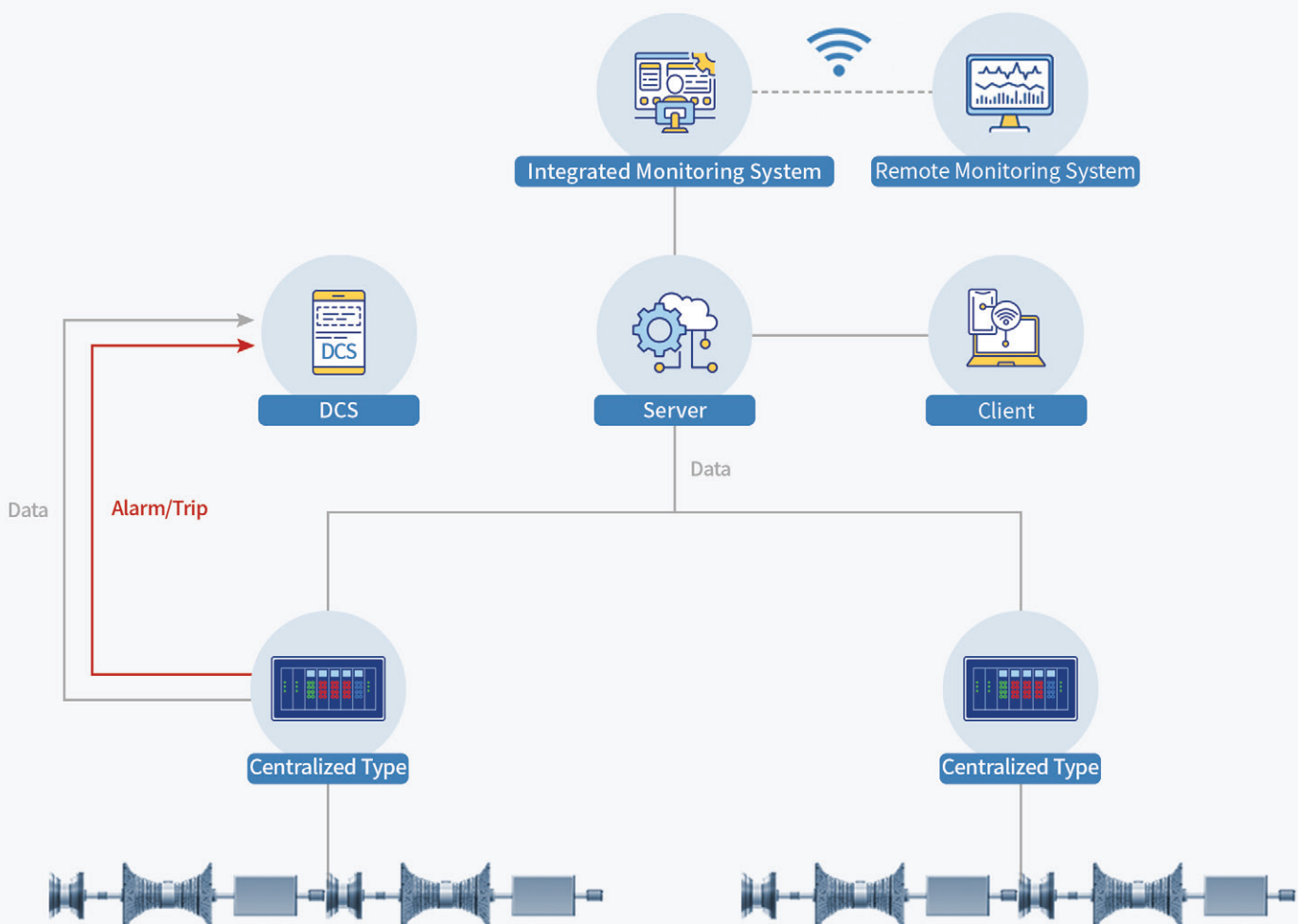


Features

- Fully compliant with API 670
- Stand-Alone Type Module
- 4 or 8 Analog Input Channels (per module)
 - Real-time signal processing
 - Displacement, Velocity, Acceleration
 - Thrust, Expansion, Eccentricity, etc.
- 2 Tacho Input Channels (per module)
 - RPM (Keyphasor)
- Sensor Compatibility
- Redundant Power Supply
- Hot Swap
- LED Display - Sensor Status
- 4~20mA Output (to DCS)
- 16 or 8ch Relay Out / Buffered Out
- Watchdog - Self-Diagnosis
- Tested for Protection against Earthquakes, Shocks, Electromagnetic Waves

System Configuration Centralized Type (A-type)

- Real-time vibration monitoring of critical rotating equipment in plants
- Maximum number of 6 VDPMs (Vibration Monitoring Processing Module) per rack
- Communication with other control systems (OPC, Modbus, Etc.)



Independent OS (Operating System)

Simultaneous multi-channel measurement

Independent operation of 8 channel module

Detailed analysis of high-speed DSPs & high frequency bands

Integrated signal processing by a single type module

Raw data backup before and after an alarm

Rear Power [V-net 7210]

Free Volt
(AC 110~220V)



Relay Out [V-net 7310]

16 Ch Relay Output

[V-net 7311]

8 Ch Relay Output +
8 Ch Buffered Output



Rear Rec. Output [V-net 7410]

40 Ch, 4~20mA



Hot Swap

Modules can be removed
and reinserted
without removing rack power

Sub Rack [V-net 7100]

19" 4.5U, Max 48 Ch

Power Module [V-net 7200]

Dual Power
(AC 100~240V, 1A)

Power Status LED + 5V
Power Status LED +24V
Power Status LED - 24V



Vibration Data Processing Module [V-net 7300]

Displacement, Velocity,
Acceleration, Current
Input Voltage Max $\pm 10V$

LCD Display

IP, Connectivity Status or
Alarm, Bypass Status

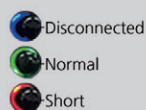
Input Signals

Displacement, Velocity,
Acceleration, Current,
Pressure, Temperature,
Thrust, Eccentricity, Zero-speed, Expansion, Etc.



LED Display

Sensor Status



Rec. Output Module [V-net 7400]

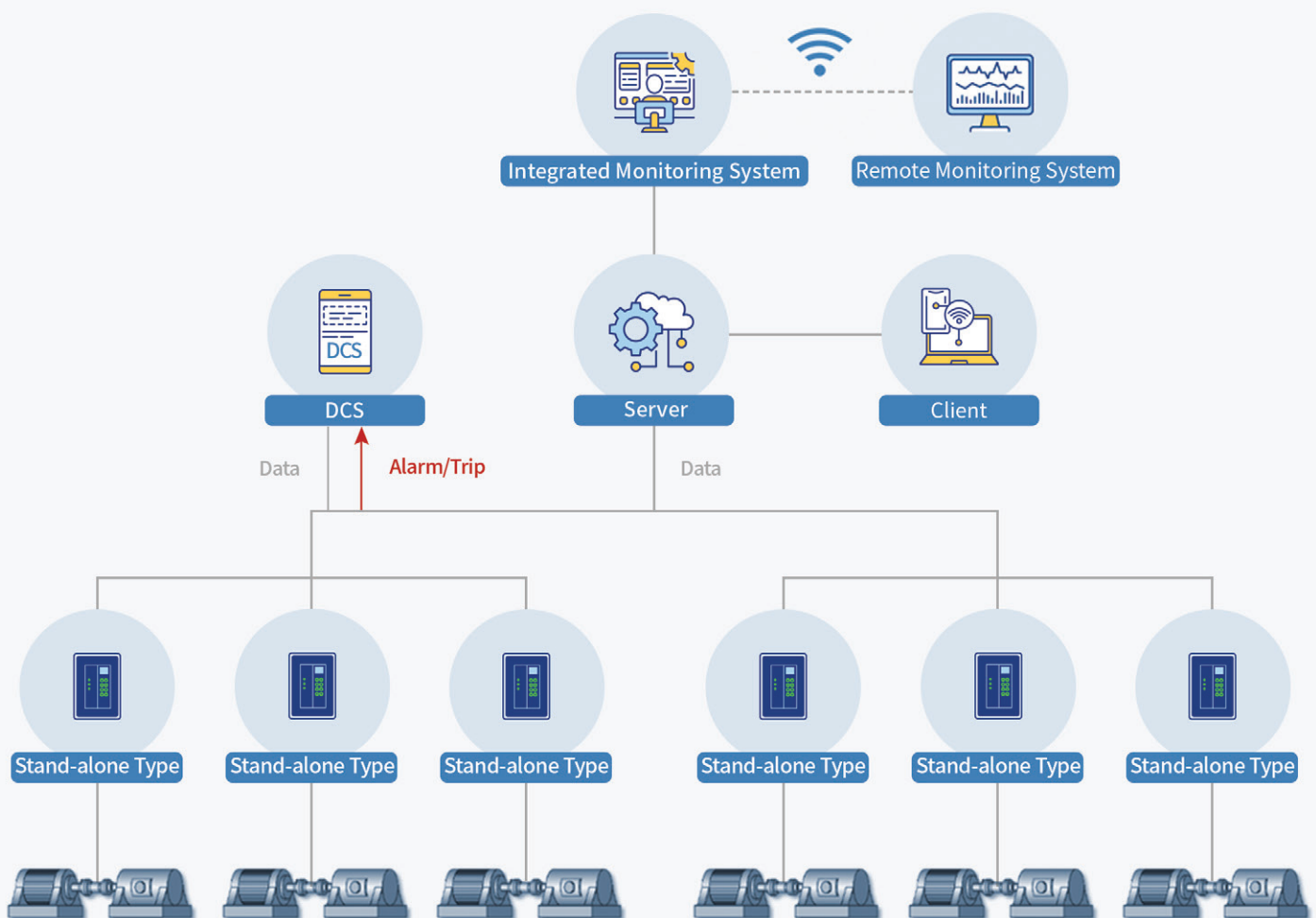
4~20mA Output

Power Status
Input Status
Output Status



System Configuration Stand-alone Type (B-type)

- VDPM (Vibration Data Processing Module) can work on its own. “Stand-alone Type”
- Users can minimize noise caused from lengthy hard-wired connections by receiving sensor signals from a close distance.
- Therefore, flexible designing of VMS is possible depending on circumstances.



Integrated Function Module
(vibration, temperature, pressure, power, expansion, etc.)

- Reduced Cost
- Easy Spare Parts Management
- Easy Maintenance

Independent Operation of a 8-channel Module (Stand-Alone Type)

- Minimized Noise
- Minimized Installation Costs

Built-in algorithm for determining the cause of a failure

- Automatic Analysis of the Cause of a Failure
- Failure Forecast



Rec. Output Module [V-net 7400]

Power & Signal Status



Power Status
Input Status
Output Status



Power&16Ch Relay Module [V-net 7310]

8Ch Relay Output + 8Ch Buffered Output
[V-net 7311]

Single Rack Unit [V-net 7110]

Vibration Data Processing Module [V-net 7300]

Displacement, Velocity,
Acceleration, Current
Input Voltage Max $\pm 10V$

LCD Display

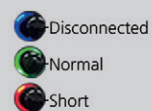
Shows IP address, Connectivity Status

Input Signals

Displacement, Velocity, Acceleration, Current,
Pressure, Temperature, Expansion, Torque, Etc.

LED Display

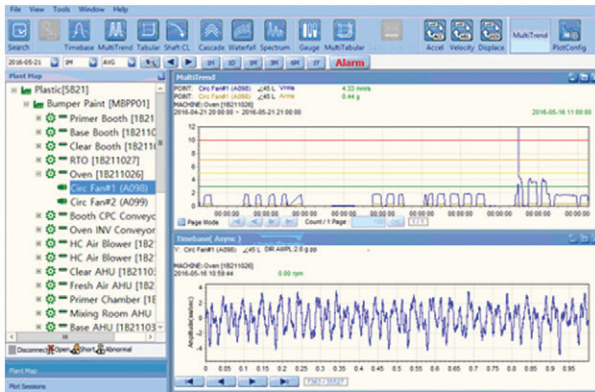
Sensor status



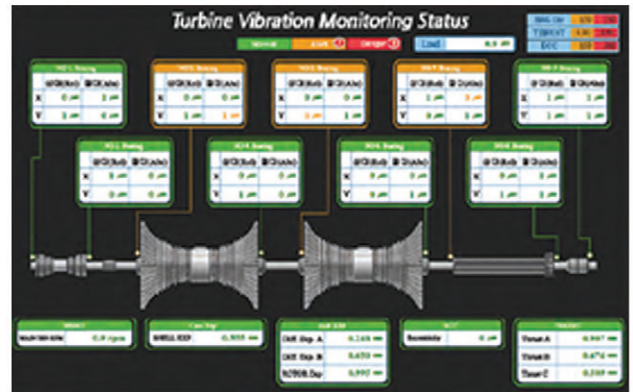
Analysis software

Monitoring

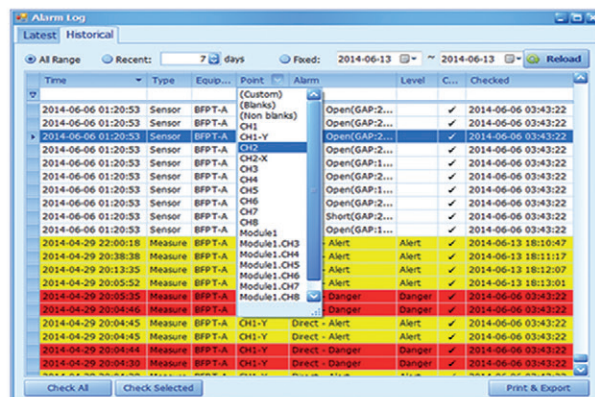
User-friendly Interface



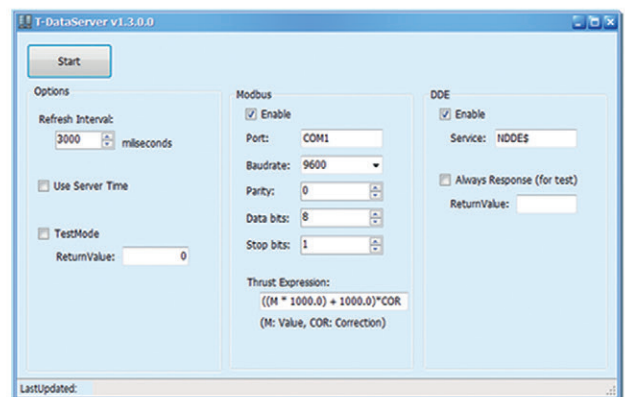
Mimic



Alarm Management



Convenient System Settings



Multiple Languages Supported (Korean, English, Chinese)

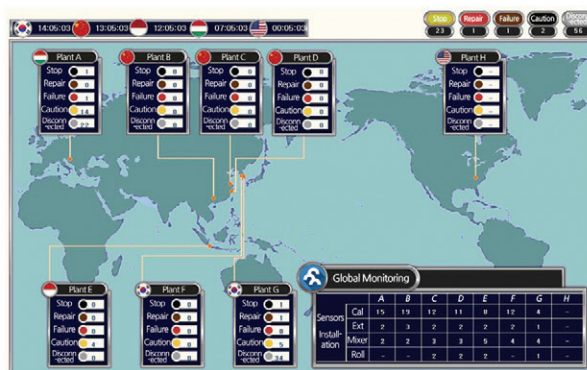
Detailed Settings

Auto-Report Generation Function

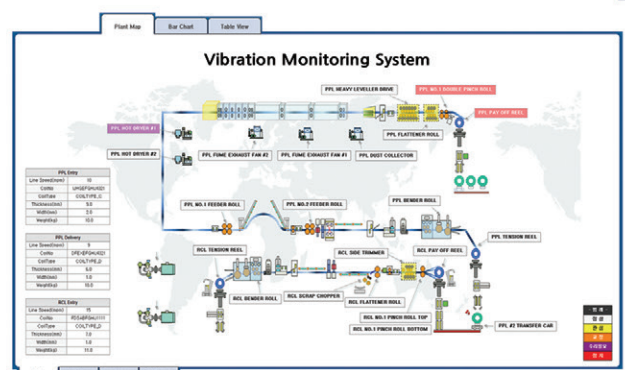
High-Speed DSP / High Frequency Band Monitoring

One-Way Remote Monitoring (*Optional)

Global Monitoring



Plant Monitoring



Analysis

Types & Causes of a Failure in Turbines and Other Critical Rotating Equipment

Fluid Vibration

Oil Whip & whirl
Steam Whirl
Fuel Shortages

Miscellaneous Vibration

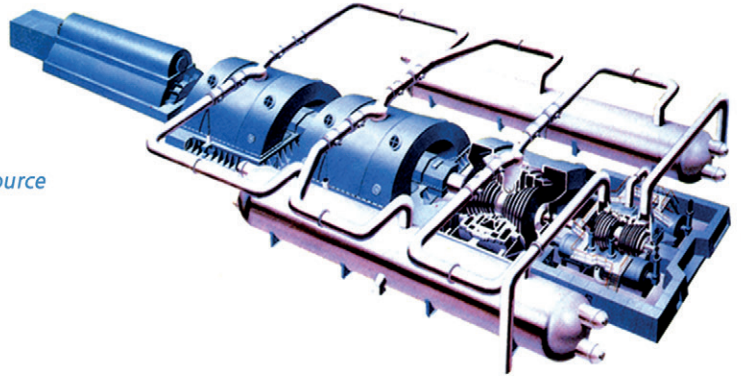
Impellor Vibration
Torsional Vibration
Maneuvering Shock

Mechanical Vibration

Unbalance
Frame Resonance
Axis Misalignment
Critical Speed
Bearing Vibration
Rubbing

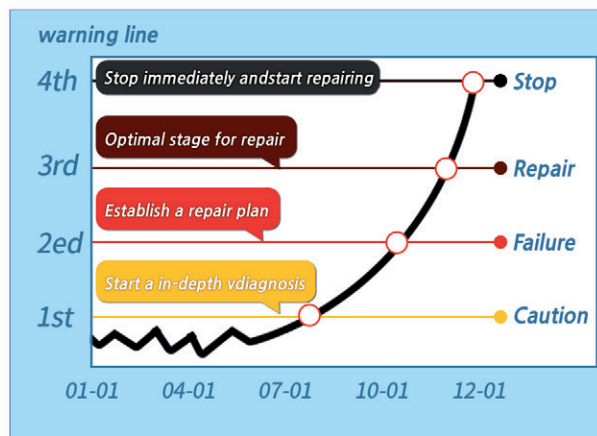
Electrical Vibration

Pore Inequality
Vibration due to Electrical Source
Winding Inequality

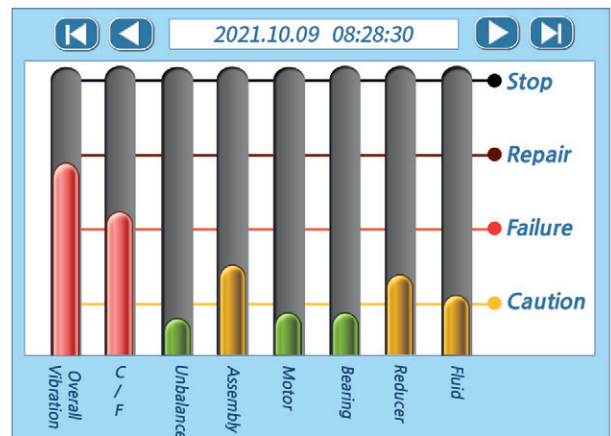


Failure Forecast Program

Failure Forecast Trend



Causal Spectrum of Failure

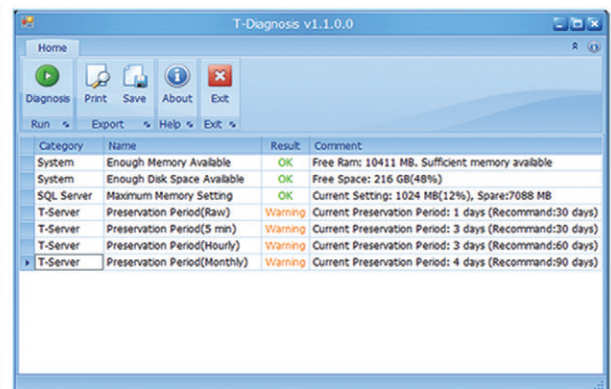


User-Friendly Analysis

Various Vibration Analysis Tools



Self-Diagnosis Fuction



Accessories

Sensors

Uniaxial Accelerometer



ND102



ND192



ND104



ND915
(Zone 0&1)



ND935
(Zone 2)



ND916
(Zone 0&1)

Velocimeter



NDVE135



NDVE136

Triaxial Accelerometer



ND115

Proximity Probe



NDPR SERIES

Wireless Sensor



Smart Works -
VibLow One

Others

Magnetic Base



Junction Box



Hardware

Test / Inspection	- Protected against Earthquakes, Shocks, Electromagnetic Waves	Input Channel	- Analog Input 8CH, Tacho 2CH, 1 Rack=48CH
Input Voltage	- Max $\pm 10V$	Input Sensor	- Vibration (Proximity Probes, Velocimeter, Accelerometer(ICP)), Temperature, Pressure, Current, Etc.
DC Measuring	- 0.1Hz LP Filter (-3dB)	Input Signal	- Voltage Output Sensor (AC,DC,AC+DC), Current Output Sensor, Velocimeter
AC Measuring	- 0.1Hz HP Filter (-3dB)	Alarm Buffer	- When an alarm is occurred, raw data prior to/after the event can be saved or transmitted
DO Module	- 16point (Relay Dry Contact)	Frequency Resolution	- Max. 25,600 Hz / Max. 25,600 Lines
Signal Processing Method	- Digital Signal Processing	Trigger	- Start Trigger, Amplitude Trigger, RPM Trigger
A/D Resolution	- 24bit	External SD Memory	- Data backup when an alarm is occurred
Power	- Dual Power (AC 100~220V)	Internal Memory	- Mobile DDR 256MB
Host Interface	- Ethernet (Max. 100 Mbps)	Power Supply	- PoE : Power Supplied via LAN cable
Storage	- Manual & Automatic		
Data Collecting Interval	- 0.1 Sec		

Software

T Server

Multi Processor Analysis Function	- Up to 64 CPU core support - FFT, Order, RPM, Gap, Crest Factor - Bandpass, Order Bandpass, Envelop Bandpass
Data Link	- Embedded OPC Server - Embedded Modbus Server (Ethernet/ASCII/RTU)
Self Diagnosis	- Automatic Server Diagnosis - Periodical Report Generation
Storage	- Microsoft SQL Server support - Unlimited Data/Alarm Retention Period

T DataServer

Modbus	- Embedded Modbus Master/Slave Server - RTU, ASCII Mode Support - RS232C, RS485, Ethernet Support - PI Support (Optional License)
OSI Soft PI	- Embedded OPC Server
Microsoft OPC	- Alarm Level Node Support
Microsoft DDE	- Embedded DDE Server & Embedded NDDE Server
SQL	- Any ODBC based SQL Server Support - Triggered Transfer Support

T Monitor

Plant Map	- Customized plant map / equipment mimic - Optimized in both high / low definition
Analysis Plots	- Trend, Multi Trend, Bode, Orbit, Timebase, OTB, Spectrum - Full Spectrum, Cascade, Waterfall, Full Spectrum Waterfall - Polar, XY Graph, Cause-Failure Spectrum
Session Manager	- Plot Session Save/Load function - Default session settings for each point & equipment are supported
Alarm Lists	- Real-time & historical alarm lists are supported - Alarm searching/filtering in Excel-like fashion - Interworking trend function
Cursor Function	- Interworking data cursors between plots - Various spectrum cursors are supported (Harmonic, Sideband)
Convenience	- Quick search function - Supported in Korean, English, Chinese - Reporting function

T Configuration

System Setup	- Easy settings via Drag & Drop function - You can set up Mimic Point
Various Settings	- You can set up alarm values simultaneously - You can set up how long you want to save data - You can set up user authority



NADA Business Area



. Nuclear Power Plants

Korea Hydro&
Nuclear Power

Shin-Kori Nuclear Power Plant Unit 5,6's Auxiliary Device, VMS
UAE Barakkah Nuclear Power Plant's Pipe Monitoring, VMS
Kori Nuclear Power Plant Unit 3,4's Core Rotary Device, VMS
Kori Nuclear Power Plant Unit 3,4's Turbine Generator, TSI
Hanbit Nuclear Power Plant Unit1, VMS



. Coal-fired Power Plants

Korea East-west
Power
Hyundai Engineering
Korea Electric Power
Rolls-Royce

Dangjin Coal-fired Power Plant Unit 1-4 Project, VMS
Donghae Coal-fired Power Plant Unit 1,2 Project, TSI
Kalsel-1 Coal-fired Power Plant, VMS
Large turbine Power Generator Monitoring System, VMS
Luwuk Coal-fired Power Plant in Indonesia, VMS



. Hydro Power Plants

Korea Hydro&
Nuclear Power

Paldang Hydro Power Plant Unit 1-4 Project VMS
Euiam Water-turbine Generator Unit 1,2 Project VMS
Chengsong Hydro Power Plant, VMS
Hwachen Hydro Power Plant, AI-based VMS
Namgang Hydro Power Plant Unit 1,2 Project, VMS

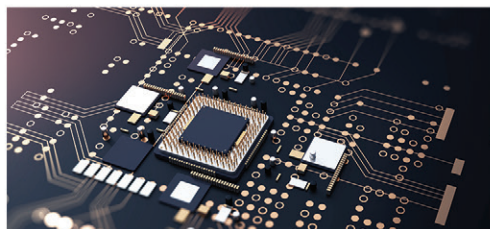
Andritz Hydro



. Wind Turbines

Korea East-West
Power
Korea South-East
Power

Development of AI-based Failure Prediction and
Diagnosis System for Wind Turbine and Tower
Samchenpo Wind Turbine, VMS



· Electronics / Battery / Display

Samsung SDI

VMS for Battery Cathode, Anode Mixers
CMS for Tianjin/Xian/Malaysia/Hungary Plants
CMS for Agitators

LG Electronics

CMS for Material Handling System

LG Display

Panel Manufacturing Plant's CMS in Guangzhou

Kolon Industry

VMS in Gimcheon Plant

Winia Mando

Air Compression Fault Anyalysis System

BOE, China

Stacker Crane's CMS in Chengdo



· Tire

Hankook Tire

Global Integrated Monitoring System, CMS
Smart Factory in Geumsan Plant, CMS

Kumho Tire

CMS in US Plant

Nexon Tire

Smart Factory for Gwangju Rolling Process's F/S Calender, CMS
Refining/Rolling/Extrusion Equipment's CMS



· Steel mill / Machinery

POSCO

STS Sodunsanse Factory's CMS in Pohang
KR Vibration's Real-time Monitoring System in Gwangyang, VMS
Wireless Monitoring System for Raw Material Transporting Device in Gwangyang
Gwangyang 1-7 CGL Zinc Pot's VMS
Roll Impact Monitoring System/ Predictive Diagnosis/ POL's CMS
Rolling 3,4 plant's VMS

Doosan

Heavy BG Frame's Painting Plant, CMS
Predictive Maintenance System in Engine BG G2 Plant, CMS
Machine Tool's VMS



· Automobile

Hyundai Motors

Ulsan Plant 5's CMS
Fault Analysis System for Automatic Transmission in India and Czech Plant
Alabama&Georgia Plant's CMS in USA
Machine Tool's VMS and Portable Vibration Analysis Equipment
CMS in Mexico Plant (MMX)
Cold Tester's Fault Analysis System in Hwaseong Plant

Hyundai MOBIS

KIA Motors



· Petrochemical

KOGAS

LNG Terminal in Pyengtaek, VMS

Hyundai Oil Bank

Vibration Consulting

Yeocheon

Turbine Generator, VMS

Petrochemical

Nitric Acid Plant 2's Turbine, VMS

Huchem

Portable VMS

SAUDI ARAMCO

Dahej Plant, VMS

ONGC/India

CPI-1 Project, CMS

Kolon



“Communication with machines”

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