

VM-7 Series Monitor

Condition Monitoring System of Large Rotating Machines



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* Specifications, outline drawings and other written information can be changed without notice.

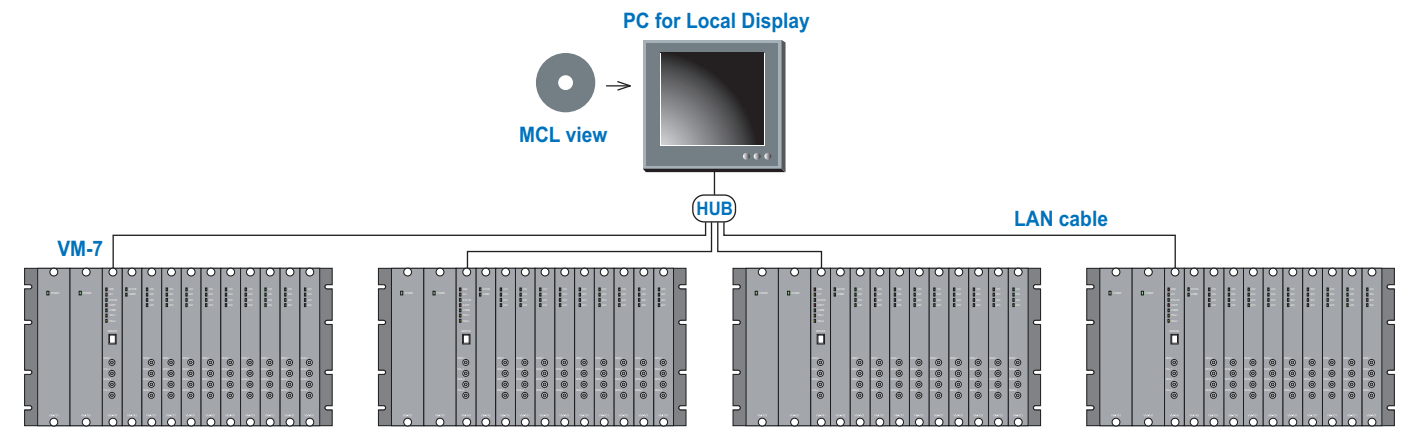
New Monitor Derived from Advanced and

VM-7 Series – Simple, Highly Functioning and Consistent Performance



LOCAL PC CONNECTION

Up to 4 VM-7 racks can be connected to local PC. (MCL View software installation required.)



MODULE MOUNTABLE SLOT NUMBER

Slot No. P1 P2 0 1 2 3 4 5 6 7 8 9 10



Module	Slot No.												
	P1	P2	0	1	2	3	4	5	6	7	8	9	10
VM-75□1 Power Supply Module (primary)	○												
VM-75□2 Power Supply Module (secondary)		○											
VM-741 Local Communication & Phase Marker Module			○										
VM-742 Host Network Communication Module				○	○								
VM-701 Vibration/Displacement Monitor Module				○	○	●	●	●	●	●	●	○	○
VM-702 Absolute Vibration Monitor Module				○	○	●	●	●	●	●	●	○	○
VM-703 Tachometer & Eccentricity Monitor Module				○	○	○	○	○	○	○	○	○	○
VM-704 Temperature Monitor Module				●	●	●	●	●	●	●	●	○	○
VM-706 Rod Drop Monitor Module*1				○	○	●	●	●	●	●	●	○	○
VM-721 18-CH Relay Module													○
VM-731 Analysis Module*2, 3													○
VZ-71 30mm (W) Blank Panel			—*4	○	○	○	○	○	○	○	○	○	○
VZ-72 50mm (W) Blank Panel	—*5	○											

*1 : VM-706 Rod Drop Monitor module is under development.

*2 : ● indicates modules data transmitted to VM-731 Analysis Module.

*3 : VM-731 Analysis Module occupied 2-slot space. Install slot 8 & 9 or slot 9 & 10.

*4 : Local Communication & Phase Marker installed in slot 0 with any rack design.

*5 : Primary power supply installed in slot P1.

PRIMARY SPECIFICATIONS

Module	Item	Specifications									
19"-Rack	Size	482.6 (W) × 265.9 (H) × 350.0 (D) mm									
	Max. No. of Mountable Module	<ul style="list-style-type: none"> • Power Supply Module... 2 • Host Network Communication Module... 2 • 18-CH Relay Module... 1 • Local Communication & Phase Marker Module... 1 • Monitor Module... 10 • Analysis Module... 1 <p>* Regarding module and mountable slot number, refer to the chart on page 6 'MODULE MOUNTABLE SLOT NUMBER'.</p>									
Power Supply Module	Power (rating)	100-240VAC / 110VDC / 24VDC									
Local Communication & Phase Marker Module	Phase Marker Input	RD-05A or FK-202F Transducer × 2CH									
	Communication Port	Front USB × 1 (for PC for service and maintenance purpose) Rear Ethernet 10BASE-T × 1 (for PC for permanent display)									
	Parameter from Digital Communication Part	<p>* MCL View Software installation on PC required.</p> <p>[Bar graph] Digital indication of measure value, Bar graph indication of measure value, GAP (bias) voltage indication, Alarm setting value, Alarm status, Channel bypass status, Danger bypass status, Power OK status, Tag No, Serial No, Channel name</p> <p>[Train] Machine train diagram, Measure value, Alarm setting value</p> <p>[Trend graph] Cursor function, Data compression function</p> <p>[Relay status] Relay status, Relay logic</p>									
Monitor Module	Digital Display Accuracy (on Display Software for PC)	<table border="1"> <thead> <tr> <th>Vibration/Displacement/Eccentricity</th> <th>± 0.5 % of F.S. at 25</th> <th>± 1.0 % of F.S. at 0 to 65</th> </tr> </thead> <tbody> <tr> <td>Rotor Speed</td> <td>± (0.003 % of rdg. + 1 rpm) at 25</td> <td>± (0.03 % of rdg. + 1 rpm) at 0 to 65</td> </tr> <tr> <td>Temperature</td> <td>± (1 + 0.5 % of F.S.) at 25</td> <td>± (1 + 1.0 % of F.S.) at 0 to 65</td> </tr> </tbody> </table>	Vibration/Displacement/Eccentricity	± 0.5 % of F.S. at 25	± 1.0 % of F.S. at 0 to 65	Rotor Speed	± (0.003 % of rdg. + 1 rpm) at 25	± (0.03 % of rdg. + 1 rpm) at 0 to 65	Temperature	± (1 + 0.5 % of F.S.) at 25	± (1 + 1.0 % of F.S.) at 0 to 65
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Recorder Output (4 to 20mA/DC or 1 to 5VDC)	<table border="1"> <thead> <tr> <th>Vibration/Displacement/Eccentricity</th> <th>± 0.5 % of F.S. at 25</th> <th>± 2.0 % of F.S. at 0 to 65</th> </tr> </thead> <tbody> <tr> <td>Rotor Speed</td> <td>± 0.5 % of F.S. at 25</td> <td>± 2.0 % of F.S. at 0 to 65</td> </tr> <tr> <td>Temperature</td> <td>± (1 + 0.5 % of F.S.) at 25</td> <td>± (1 + 2.0 % of F.S.) at 0 to 65</td> </tr> </tbody> </table>	Vibration/Displacement/Eccentricity	± 0.5 % of F.S. at 25	± 2.0 % of F.S. at 0 to 65	Rotor Speed	± 0.5 % of F.S. at 25	± 2.0 % of F.S. at 0 to 65	Temperature	± (1 + 0.5 % of F.S.) at 25	± (1 + 2.0 % of F.S.) at 0 to 65	
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Number of Alarm Contact Output	SPDT × 6 points										
18-CH Relay Module	Number of Alarm Contact Output	SPST × 18 points									
Analysis Module	Number of Input	Vibration-24 points, Temperature-48 points (within the same rack) * Refer in 'MODULE MOUNTABLE SPOT NUMBER' on page 6.									
	Analysis Parameter	Phase Analysis (0.5X, 1X, 2X, Not-1X) and FFT									
Host Network Communication Module	Communication Protocol	Modbus/TCP Ethernet 10BASE-T (Communication ports at rear side)									
	Parameter from Digital Communication Part	<ul style="list-style-type: none"> • Measured value • Gap voltage • Danger status • Alert status • OK Status • Danger Bypass status • Danger & Alert Set value • OK limits set value • CH Defeat status • Alarm set multiplier status • Special filter ON/OFF status • Power-OK status • Amplitude and phase angle of 0.5X, 1X and 2X and amplitude of Not-1X* <p>(* Can be applied when the Analysis Module is installed.)</p>									

RACK AND MODULE



* Regarding module and mountable slot number, refer to the chart on page 6 'MODULE MOUNTABLE SLOT NUMBER'.

MONITOR MODULES AND MONITORING PARAMETERS

Monitor Module	Monitoring Parameter	Number of Inputs	Number of Outputs	Input Transducer
VM-701 Vibration / Displacement Monitor Module	Displacement Vibration	4	4	FK or VK
	Velocity Vibration	4	4	CV
	Acceleration Vibration	4	4	CA
	Dual Path Vibration	2	4	CV or CA
	Thrust Position	4	4	FK or VK
	Differential Expansion (Single Input)	4	4	FK or VK
	Ramp Differential Expansion	4	2	FK or VK
	Complementary Input Differential Expansion	4	2	FK or VK
	Case Expansion/Complementary Expansion	3	3	FK, VK & LS + VM-21
	Case Expansion	4	4	LS + VM-21
VM-702 Absolute Vibration Monitor Module	Shaft Relative Vibration and Shaft Absolute Vibration or Casing Vibration	4	4	FK or VK & CV (for 2CH)
VM-703 Tachometer & Eccentricity Monitor Module	CH1	2	2	FK, RD or MS
	CH2	0	1	Rotor Speed of CH1
	CH3	1	2	FK or VK & φ
VM-704 Temperature Monitor Module	Temperature	6	6	TC or RTD

Experienced Sensor Technology

Monitoring System for Rotating Machinery

The VM-7 Series Monitors are optimal applications for large rotating machinery, petrochemical plant turbines and compressors, or power plant turbines and compressors. Suitable with various monitoring parameters, shaft vibration, casing vibration, shaft position, rotor speed, and temperature, in accordance with American Petroleum Institute (API) Standard 670 'Machine Protection Systems'. In addition, other parameters used for TSI (Turbine Supervisory Instruments) of power plants, such as differential expansion, valve position, eccentricity, etc. are applicable.

Analysis and Diagnostic System Connection

On the rotating machinery monitoring system, vibration analysis during regular operation is critical, as well as with transient data (analysis on machine start-up and shut-down time). Installing VM-731 Analysis Module in VM-76 Instrument Rack, make direct RV-100 Large Rotating Machinery Analyzing System connections possible, without external analyzing processor (AP-10).

Reliability and Maintainability

Redundant power supply and host network communication provide superior operating consistency. Greatly reduced potential monitoring malfunctions or DCS and other host network data transmission failures caused by power supply or communication module problems. All module installation and removal accomplished from front. Modules are replaceable while powering up without disconnecting the wiring on the back panel.



Comprehensive System

4-CH Vibration/Displacement Monitor or 6-CH Temperature Monitor Module, up to 10 slots per rack, mountable. For 19 in. rack, max. 40 vibration or 60 temperature channels mounted.

(Note: If all monitor module mountable slots are used.)

Create Own System

VM-701 Vibration/Displacement Monitor Module is applicable with 11 standard type parameters including vibration, thrust, and differential expansion. Use own PC*1, original monitoring system can be designed.

(*1 VM-772 Field Configuration Software installation required.)

Monitor Module Alarm 18-CH Relay Module

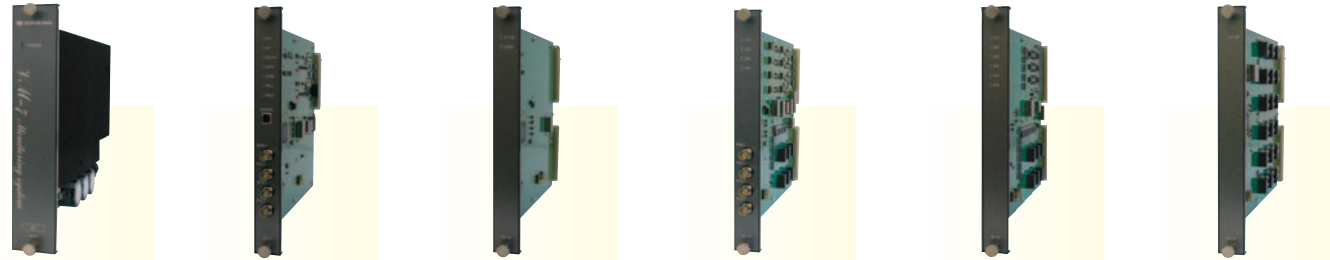
Features 6 relays on each monitor module, AND/OR and special alarm logic programmed. For basic 2 channel relay program application, 2-point contact output application, exclusive relay module not needed.

VM-721 18-CH Relay Module is available for multiple contact output and complex alarm setups.

Environmental Achievement

VM-7 series featured sustainable advancement. 1. Lead free soldering 2. Can be disassembled and sorted by metal, resin and other material type for future recycling. 3. Uses ABS resin, no harmful gas is generated if burned.

VM-7 MONITOR MODULES



VM-75 Power Supply Module
VM-741 Local Communication & Phase Marker Module
VM-742 Host Network Communication Module
VM-701 Vibration/Displacement Monitor Module
VM-704 Temperature Monitor Module
VM-721 18-CH Relay Module

VM-76 Instrument Rack

6U, 19 in. 482.6 mm (W) x 265.9 mm (H) x 350mm (D)

VM-761 – Featured European I/O terminal type.

VM762 – Featured D-sub I/O connector type.

VM-75 Power Supply Module

Three types rated voltage, 100 - 240 VAC, 24 VDC and 110 VDC. Up to two power supplies per rack mountable for redundant power supply.

VM-741 Local Communication & Phase Marker Module

Connect back communication ports and PC*1, using exclusive Ethernet, transmitting data and displaying bar graph, trend graph or alarm status on local PC monitor available.

(*1 VM-771 MCL View Software installation required.)

Connect front USB ports and service PC*2, various monitor module setups accomplished.

(*2 VM-772 Field Config Software installation required.)

VM-742 Host Network Communication Module

Connect back communication ports and DCS (Distributed Control System), using exclusive Ethernet and transmitting measured value, alarm status and other data to host PC. Use Modbus/TCP communication protocol.

VM-70 Monitor Module

Receive input signals from various monitoring parameters, including Non-contact Pickup, Acceleration Transducer, Thermocouple, RTD, process obtained signals, and demonstrate measured value outputs, alarm contact outputs and other alarm functions.

There are 6 relays in each monitor.

Note: Regarding monitoring parameter type and no. of monitor module channels, refer to Monitor Module and Monitoring Parameters on page 5.

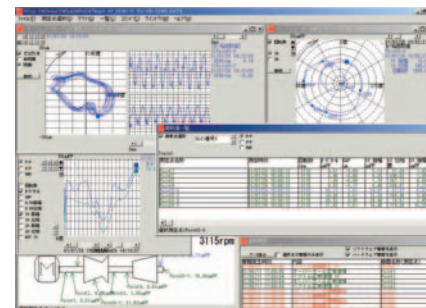
VM-721 18-CH Relay Module

Individual relay module features 18-point alarm contact output. Alarm output type AND/OR and 2 out of 3 logic are programmable on any monitor module/channel/contact in the same rack.

VM-731 Analysis Module

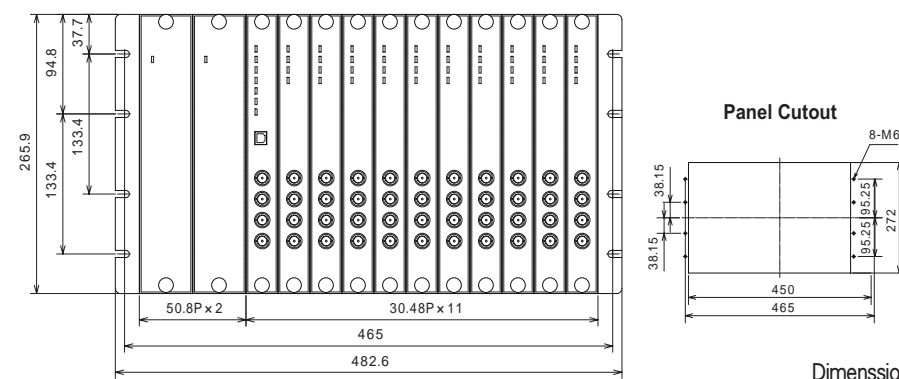
Utilize phase marker signals (max. 2-ch) and vibration waveform signals (max. 24-ch)*3, transmitted through back plane in the rack. Perform phase and FFT analysis and directly transfer analysis and waveform data to RV-100 System View Station via exclusive Ethernet. In case temperature monitor module is installed in the rack, temperature data is also transmittable to View Station.

(*3 Vibration monitor installed only Slot no. 3-8.)



RV-100 ViewStation Screen

VM-76 Instrument Rack Frontpanel View



SOFTWARE

VM-771 MCL View

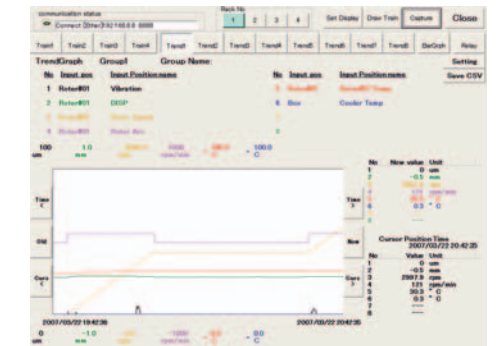
MCL View displays measurement values and other monitoring status of each module. (Software installation required.)



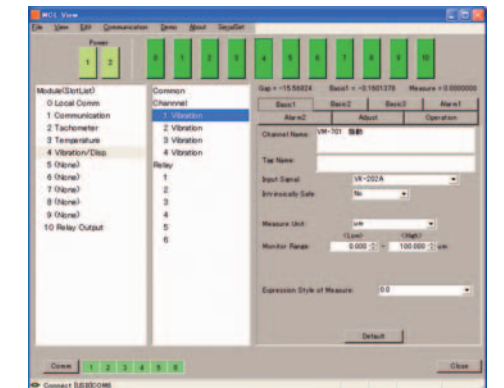
Bar graph screen

VM-772 Field Config

Utilize Field Config Software installed Notebook PC, performs settings and adjustment of each module.

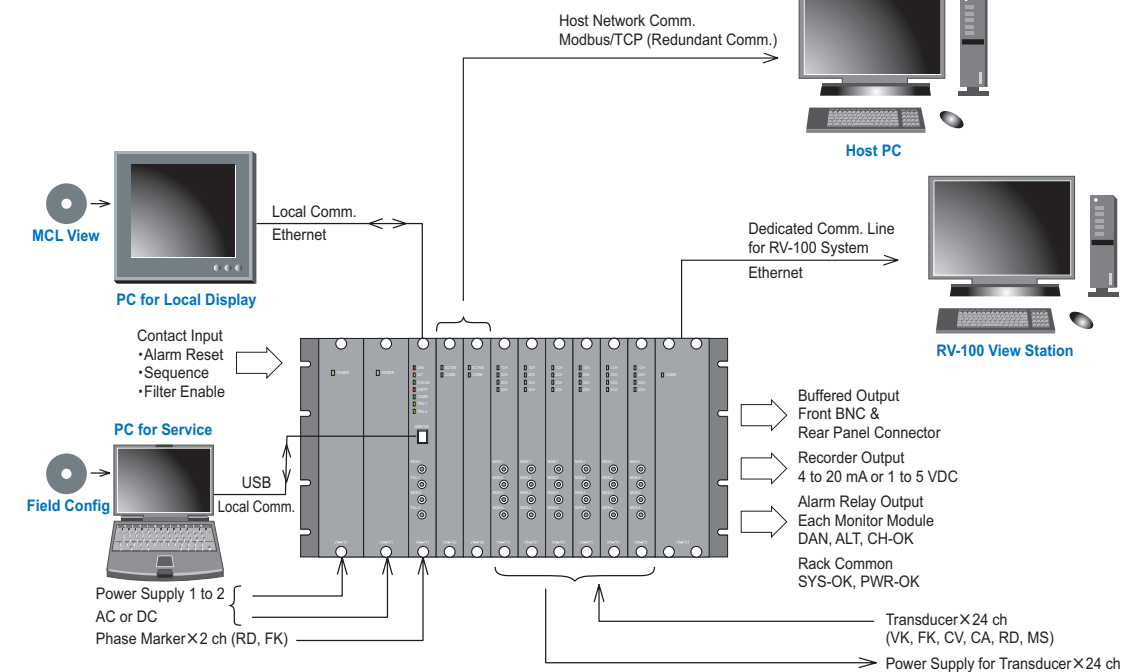


Trend graph screen



Field Config Screen

STANDARD SYSTEM CONFIGURATION



VM-7 SERIES

※ For details of specifications, outline drawings, or model code numbers, go to the Shinkawa Sensor Technology website (<http://www.sst-shinkawa.co.jp>).