

TSC

Vibration Analysis



VM87 Moragheb Machine Monitoring System

Tavator Sepahan Asset Condition Monitoring



Protection from catastrophic Failures

In the most important process plants such as oil, gas and petrochemical, chemical, power generation, cement and steel plants there are many critical machines such as turbines, generators, compressors, pumps, fans, that they have to work continuously and safely every hour of every day. A failure in one critical machine isn't just inconvenient, it can be catastrophic. On the other hand repair costs and loss of production in the machine failures can results in millions of dollars loss in yearly profit. So mechanical condition monitoring is more than just a good idea, it's a necessity.

Today there are so much machine condition parameters that can measure with state of the art systems and continuously monitor critical asset. Parameters such as

- Vibration
- Temperature
- Speed
- Process parameters
- Performance
- and numerous other condition indicators

You can prevent mechanical failures by condition monitoring and protection systems and reach many benefits such as:

- Enhanced protection from catastrophic failures
- Improvement in machinery reliability/availability
- Fewer process stoppages
- Enhanced maintenance/outage scheduling
- Lower maintenance and repair costs
- Longer intervals between outages
- Reduced insurance percentages

VM87 Moragheb machine monitoring system is one reliable system for protection and on-line condition monitoring of critical assets offered by Tavor Sepahan Co.



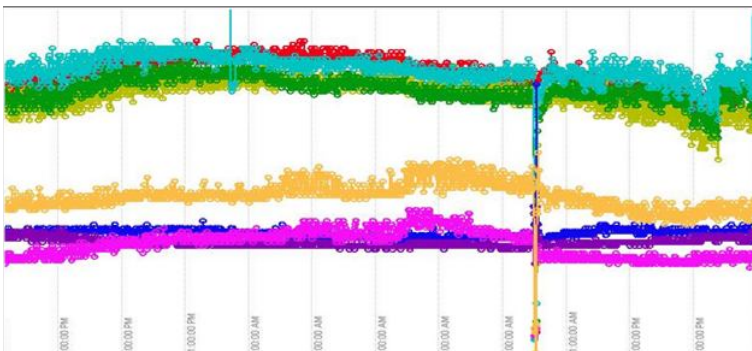
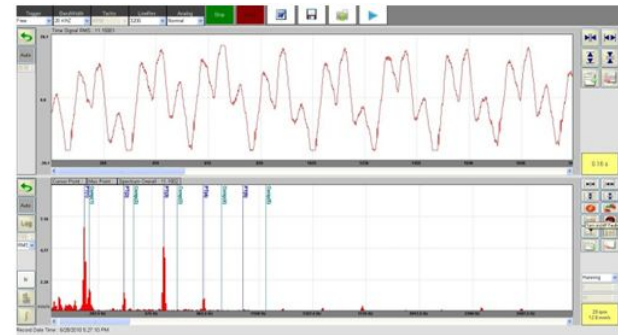


On-Line Asset Condition Monitoring

Today modern maintenance programs including Reliability Centered Maintenance (RCM) and Proactive Centered Maintenance (PCM) need reliable tools to manage assets in a factory safely and with high availability and less repair and outage. Condition Monitoring (CM) is the one important technology utilized in the RCM and PCM. Off-line CM is a proven method used in many industrial facilities around the world but there are a lot of benefits in On-Line CM not discovered for many factories. Critical assets must be monitored continuously as well as protecting measurements to detect many incoming faults for maintenance engineers for best maintenance/repair scheduling.

Previous custom machine protection systems used only for machine protection but today, with the aid of modern digital processing technology, protecting systems is extended to a complete Protection/On-Line CM systems. On-Line CM covers all of Off-Line futures and many CM properties that cannot be obtained in the custom Off-Line CMs such as:

- Automatic CM Parameter measurement in the case of protection parameters changes.
- Trend assessments for any change in any parameter changes.
- Automatic fault detection in the Run-Up/Cast-Down, Vector changes, Shaft centerline history,...
- Speed change monitoring.
- Performance monitoring in gas turbines and compressors
- Any definable parameter monitoring in the special applications.
- ...



These abilities can improve machine reliability and availability automatically and reduce human interface errors in the machine maintenance systems.

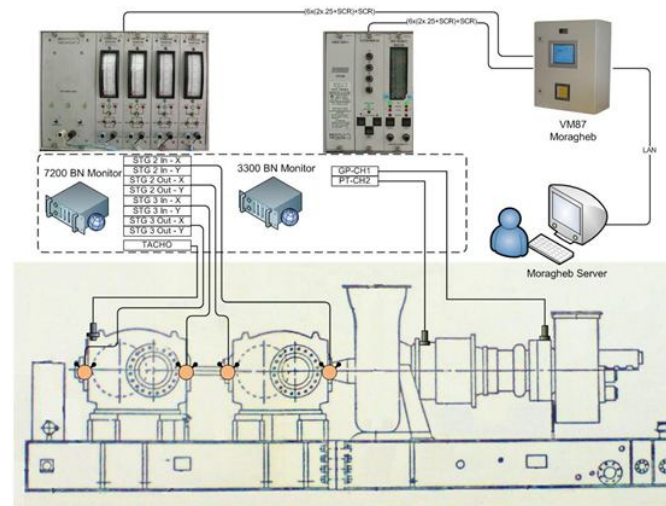
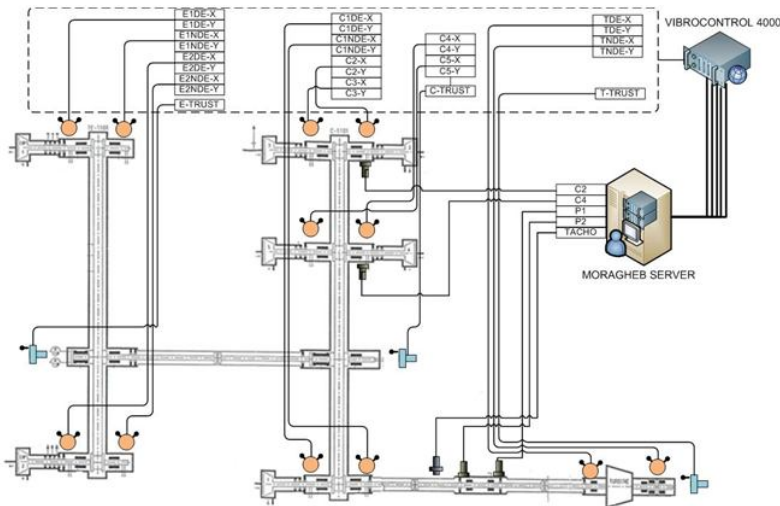
VM87 Moragheb On-Line CM system can cover all of the new features of an On-Line CM for critical assets. It can be added to the current protection systems and eliminates sensor installation and cabling expenses for upgrading a custom protection system to one complete protection/On-Line CM system.



VM87 Moragheb – Compact and Reliable

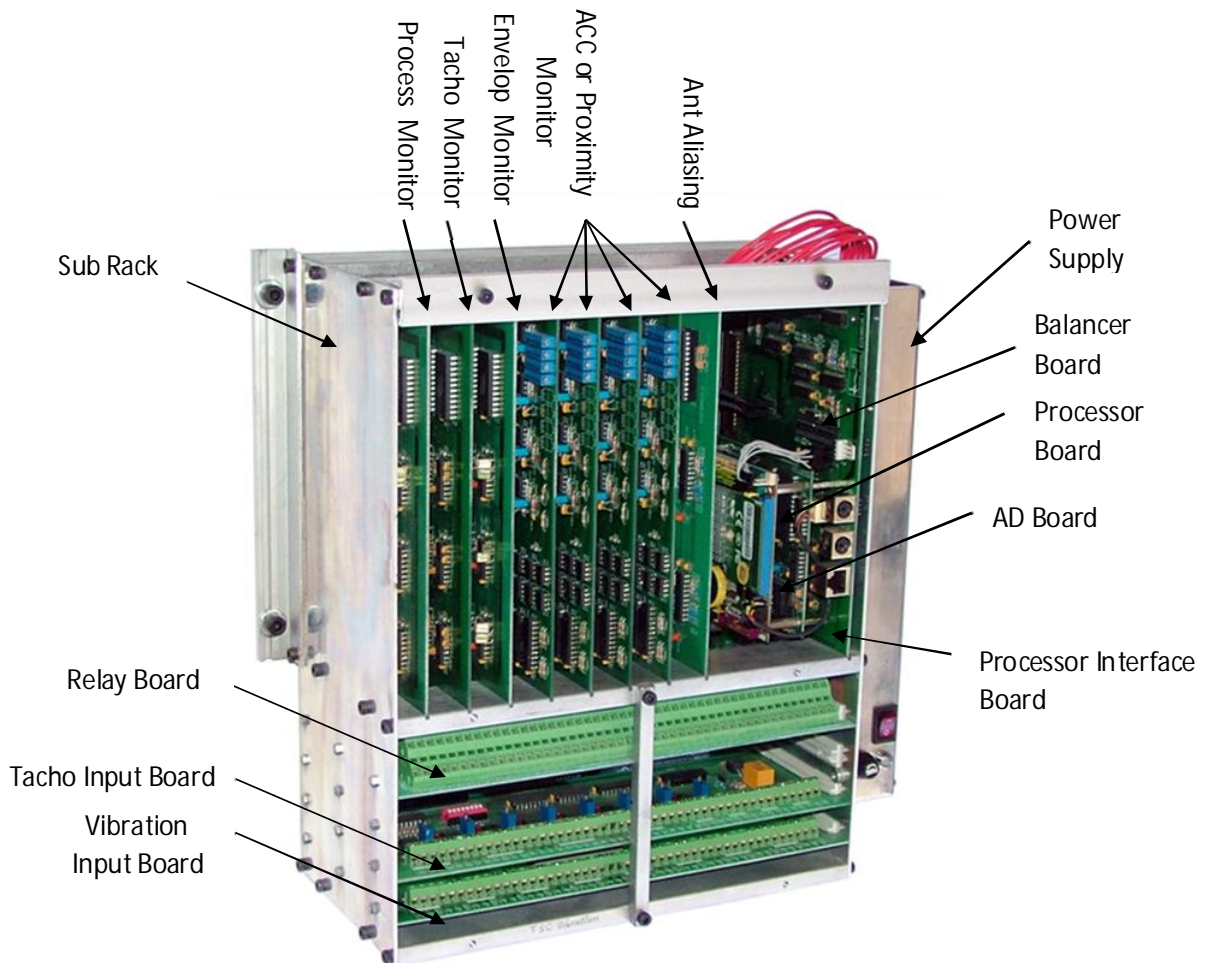
After introducing 8Ch VM84, TSC develop VM87 16Ch complete protection/CM system for use in various environments as indoor or outdoor and as a modular monitor for combination of any channel type and numbers. This system can be used as a protection only, CM only or a complete protection/CM machine monitoring systems. VM87 is offered in any simple, explosion proof or in rack combination for use in the control rooms. Up to 16 VM87 can be connected to each other to constitute unique private LAN network and connecting to one Moragheb Server software in CM application. Protection in VM87 is implemented in an independent layer from CM layer and all overall vibration readings can be transferred to control room with one pair cable connected to all VM87s as a serial bus. This is very valuable feature in reducing cabling expenses. High resolution colored graphic display used for user friendly barograph, trend and vector display of up to 16 vibration, 8 speed and 8 non vibration values. Several self-diagnosis such as continues indication of sensor, cable and cart failure in the VM87, enables it as a reliable monitor for use as auto-shutdown system. Relay cart in the VM87 covers all alarm management features for acknowledge and reset and registering all alert and danger alarms.

Moragheb Server Software 87 (MSS87) is the only private software for database management and CM applications that can connected to all VM87s in the private LAN network and it is possible to control all VM87 in the network from Moragheb Server. Moreover you can reach to MSS87 from any point of your company network. It is very valuable features in remote CM in offshore machine monitoring systems.



VM87 Measurement Capabilities

Measurements	Modules			
	8700/41	8700/42	8700/51	8700/61
Seismic vibration – Acceleration Sensor	●			
Seismic vibration - Velocity Sensor	●			
Radial vibration (proximity probes)		●		
Radial Position (proximity probes)		●		
Axial Position (proximity probes)		●		
Eccentricity (proximity probes)		●		
Phase reference			●	
Rotor speed			●	
Differential expansion				●
Case expansion				●
Temperature				●
Process variable signals				●
Reciprocating compressor rod position		●		



Applications

VM87 has many combination of measurements listed in the above table and so it can be used for a wide range of rotating and reciprocating machinery in many industries. The following are some applications:

- Turbines; Steam, Gas, Hydraulic and Wind.
- Compressors; Reciprocating, Centrifugal, Axial, Screw
- Pumps; Horizontal, Vertical, Centrifugal, Reciprocating
- Gears
- Fans, Blowers
- Cooling tower/heat exchanger fans
- Electric Motors and Generators
- Turbo-Expanders
- Agitators, Mixers, Centrifuges, Extruders
- Ball Mills, Crushers, Pulp Refiners, Pelletizers
- Any Rotating and Reciprocating Machine.

Flexible Design and Support

TSC has several skilled team in mechanical, electronic and computer area and If you have a specific machine or application, just ask us. Our applications engineers can develop a solution that's right for you. TSC can develop any combination of hardware and software for your asset management improvement in your factory critical machinery.

Moragheb Server Software (MSS) can be viewed in any location in the network and even in the internet, so you can use Remote Diagnosis Services in TSC for special problems in your machinery. Any application such as SMS and Email Alarm annunciation is available if you have internet support in your MSS network.

TSC as a designer and producer of Machine Monitoring Systems such as VM87 has specialized team for install and support these products. We have successfully completed installation, repair, machinery diagnostic, balancing and alignment works in many oil, gas, petrochemical, chemical, power, steel and cement plants in Iran. We can offer complete machine monitoring system projects for any machinery including following steps:

- Complete pre-wired, pre-tested cabinet packages for your VM87 racks and associated instrumentation
- Transducer and monitor system installation
- System integration services for connection of VM87 monitoring systems to third-party control and automation systems
- Complete project management scope
- Product verification and repair
- Training, including product operation, product maintenance, and machinery diagnostics



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