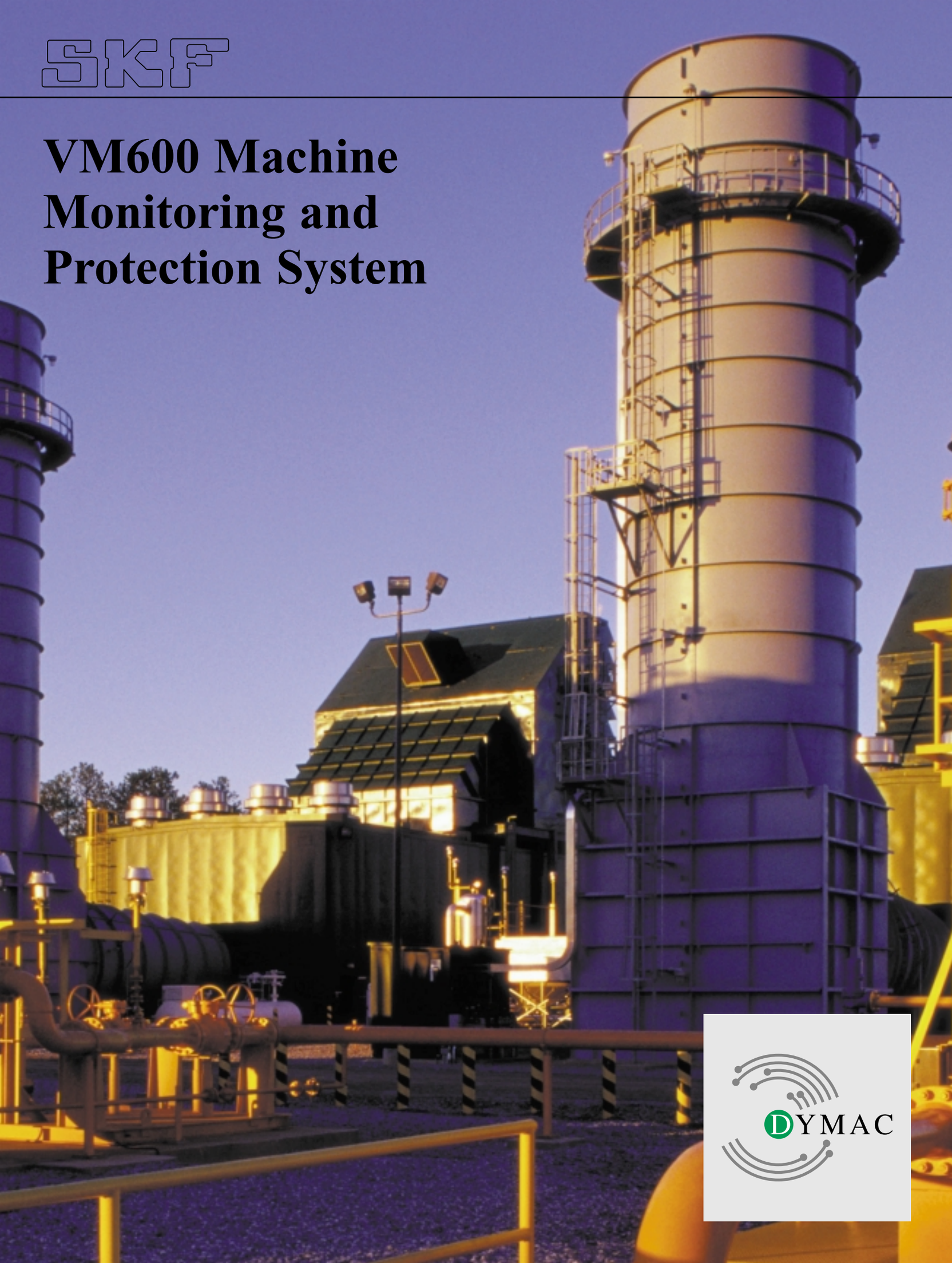
SKF

VM600 Machine Monitoring and Protection System



DYMAC

Our business is protecting yours

Power Generation, oil and gas production and distribution, petrochemical processing, gas turbine marine propulsion -- these are typical areas where high-value, critical rotating machinery is employed.

Safety has always been a major issue and protection systems, including vibration parameters, are frequently mandatory.

As the need to provide continuously increasing value to owners and shareholders grows more imperative, so pressure is increasing on operators to reduce the cost of running and maintaining their machinery.

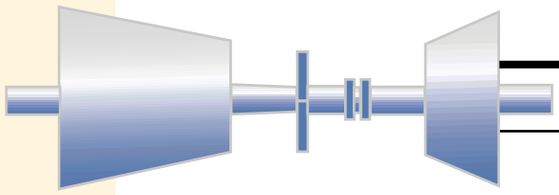
DYMAC™* offers total system integration by bringing advanced condition monitoring and protection systems into a plant-wide control platform. This integration leads to the avoidance of costly unexpected down-time and reduced operating and maintenance costs.
The end result is not only improved profitability, but also a better and safer environment.

**DYMAC is an SKF Group company*

Main features and benefits

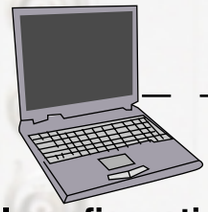
Traditionally, separate systems have been provided for machinery protection, on-line condition monitoring, and machinery performance assessment. However, the VM600 Series uses the latest digital signal processing technology -- and industry standard communications interfaces -- to deliver the most up-to-date, integrated, modular, scaleable solution to all machinery protection, condition and performance monitoring requirements, within a single system framework. Only two types of signal processing modules are required -- one for protection and one for condition and performance monitoring data acquisition. Each card can perform all of the necessary signal processing tasks, with input from any appropriate sensor, simplifying specification, installation, training and spares holding.

- All monitoring functions (absolute and/or relative vibration, dynamic pressure, displacement, orbit, S_{max}, position, expansion, etc.) available on a single card
- Communications over Ethernet or serial links using standard protocols
- Remote configuration, interrogation and support
- Local display of levels and status
- Protection functions independent of condition monitoring functions
- API-670 compliant
- Comprehensive voting logic combinations
- Cards are hot-swappable
- Dual redundant power supplies and communication links
- One 6U rack accommodates up to 48 protection channels or 192 condition monitoring/process inputs.
- "Platform independent" software --Windows™ NT/2000, SCO Open Server (UNIX), Linux



Triple redundant connections

M800A
or other
protection
system

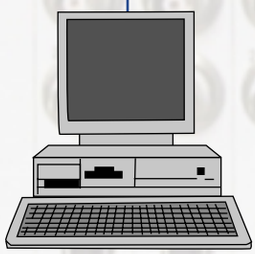


Local configuration

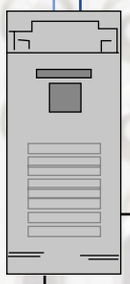
Support for redundant Ethernet

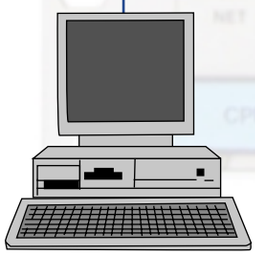
Internet

Modem
ISDN
Router
Wireless
Satellite
GSM



Display client
• data display and analysis





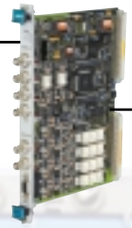
Display client
• data display and analysis

Reciprocating
monitoring

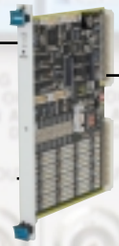
Database

Performance
monitoring

FT 3000
Overspeed Protection



MPC 4



CMC 16

For serial or Ethernet connections
-- stand alone version available

CPU M

VM600

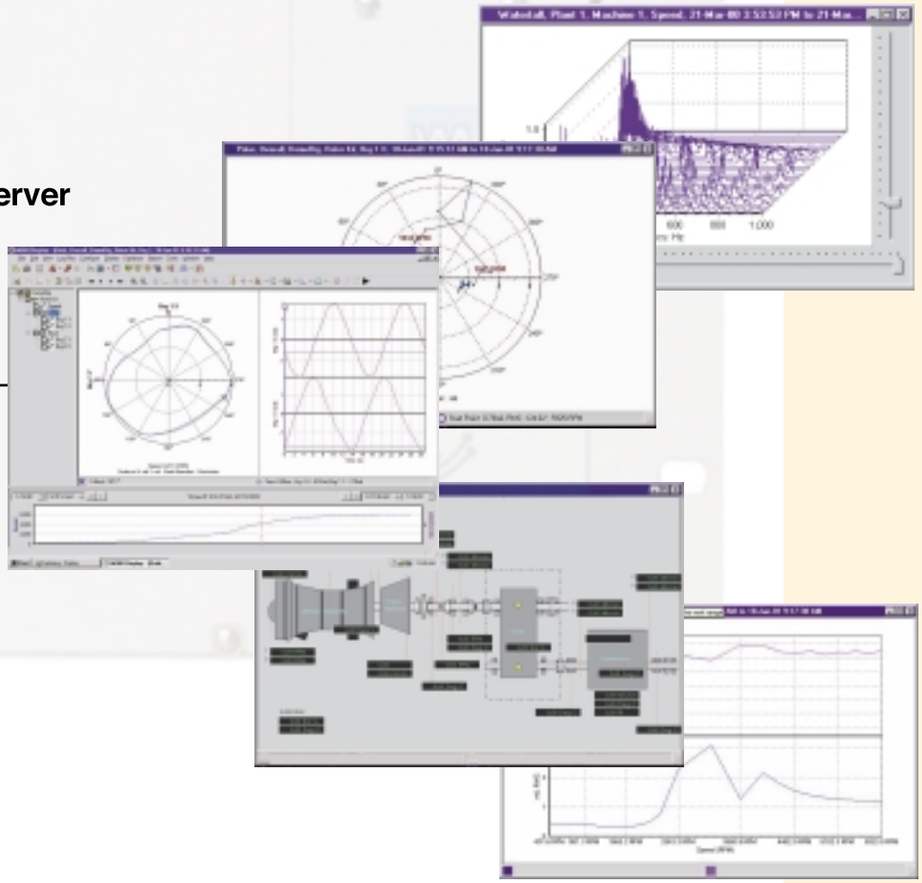
DCS

Support for redundant serial links

Support for industry
standard protocols

Aquisition and monitoring server

- system configuration
- data collection and storage
- data display and analysis



SKF
Machine Analyst

Decision
support system

DYMAC

Physical arrangement

MACHINERY PROTECTION CARD (MPC 4)

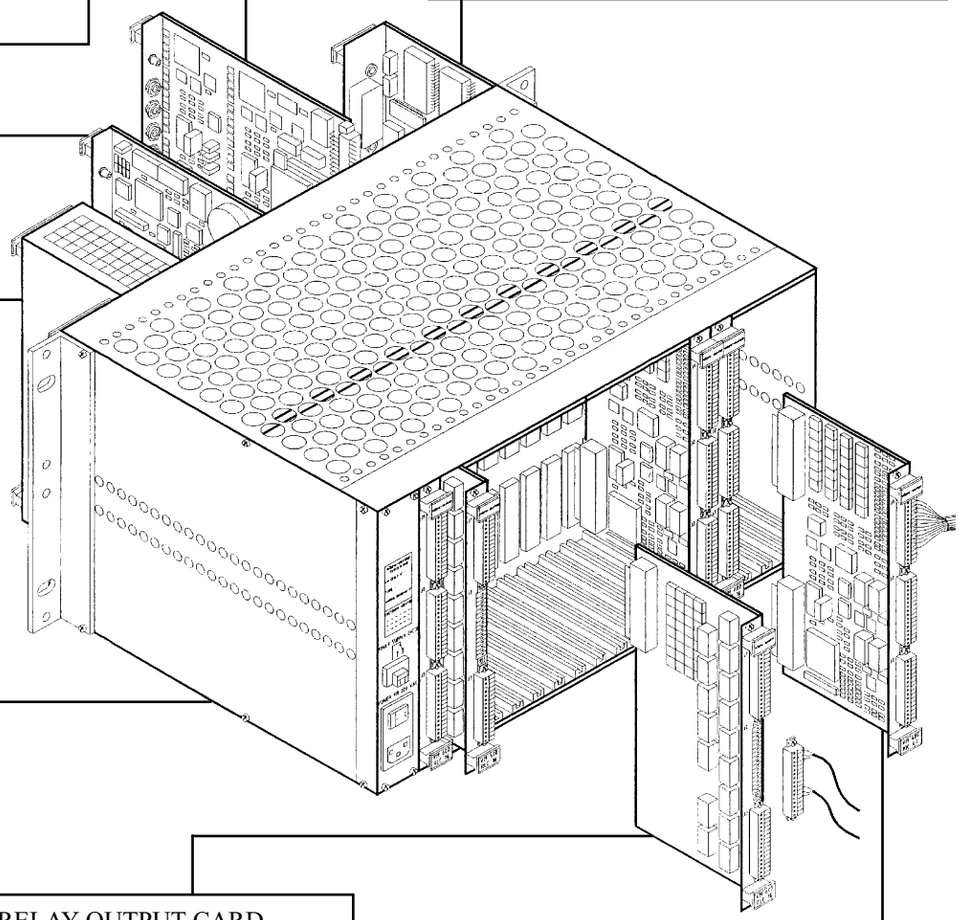
- ¥ Continuous on-line protection
- ¥ 4 dynamic/process inputs
- ¥ 2 speed/tacho inputs
- ¥ Accepts all vibration, dynamic and static inputs from all the usual types of sensors
- ¥ Latest DSP technology
- ¥ Buffered analogue outputs on front panel for analysers
- ¥ All machinery parameters, including configurable broad band and tracking filters
- ¥ API - 670 standard protection

CENTRAL PROCESSOR UNIT CARD (CPU M)

- ¥ Optional central processing unit for control of external communications
- ¥ Manages rack configuration
- ¥ Modem, serial or network links using standard protocols
- ¥ Links to local and remote PCs
- ¥ Front panel (local) LCD display
- ¥ Optional local terminal
- ¥ Up to 5 comms ports (redundant links are supported)

CONDITION MONITORING CARD (CMC 16)

- ¥ Intelligent data acquisition, logging by schedule or by exception
- ¥ 16 channels, up to 4 configurable as speed or phase reference channels
- ¥ Accepts all vibration, dynamic and static inputs from all the usual types of sensors
- ¥ Latest DSP technology
- ¥ Automatic capture of runup/rundown
- ¥ Built in data buffer, no loss of acquisition if host PC or network fails
- ¥ High resolution FFT processing
- ¥ Configurable 10 bands per channel extraction
- ¥ Multiple machine monitoring



POWER SUPPLY

- ¥ All usual AC and DC inputs
- ¥ Single or dual redundant
- ¥ Status relays
- ¥ High performance, high reliability

RACK ASSEMBLY

- ¥ Standard 19 format, cubicle or panel mounting
- ¥ Up to 12 machinery protection cards or condition monitoring cards can be mixed
- ¥ 6U & 3U versions
- ¥ VME back plane
- ¥ Screw-terminals for inputs and outputs
- ¥ Flexible signal and relay communications
- ¥ Easy cable and power management
- ¥ Robust construction
- ¥ Full EMC compliance

RELAY OUTPUT CARD

- ¥ Additional relays to IOC
- ¥ 16 relays with change-over contacts
- ¥ Driver inverter logic
- ¥ High through power
- ¥ Low contact resistance
- ¥ Low capacitance

IOC INPUT/OUTPUT MODULES (IOC)

- ¥ IOC 4 for machinery protection card includes 4 programmable relays
- ¥ IOC N for central processing unit, provides rear access for communication links
- ¥ IOC 16 for condition monitoring card, provides signal conditioning and routing
- ¥ Screw terminal connections
- ¥ Individual buffered 1:1 outputs on front pannel

SKF

DYMAC total system capability

SENSORS & SIGNAL CONDITIONING
A full range of industrial accelerometers, velocity transducers, eddy current probes, dynamic pressure sensors, air gap sensors, and ice detectors for high temperatures and other harsh environments.

MACHINERY PROTECTION SYSTEMS
Fully autonomous protection systems for instant detection of machinery problems. Protection for both excessive vibration and over-speed conditions. A single universal card accepts input from all dynamic and static sensors, and provides a comprehensive array of processing and voting logic, with analogue, DC and digital outputs to other systems.

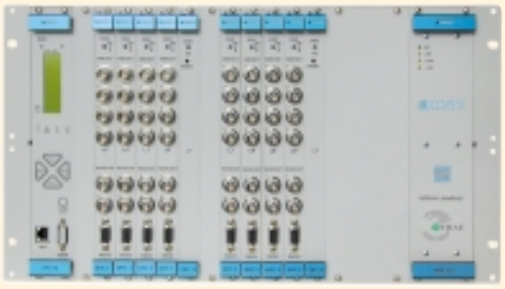
MACHINERY CONDITION MONITORING
On-line and off-line hardware and software solutions for prediction of machinery problems in advance. Automatic high-speed detection of run-up/ coast-down and 'upset capture' data, 16 channel parallel data acquisition cards, all dynamic and static inputs. Sophisticated Condition Monitoring software for machinery monitoring and analysis, including continuous streaming technology, logging by exception, interfaces to portable devices and DCS systems, and a full array of diagnostic tools such as Fast Fourier Transform (FFT). Remote access over modem, network or internet. Specialised applications including hydro turbines and reciprocating compressors.

MACHINERY PERFORMANCE MONITORING
Basic Package -- manual or automatic data entry, simple performance calculations and trending of aero thermal parameters.

Advanced package -- automatic data entry, modelling refined with experience, comparison of actual against expected performance giving a true online picture of machinery behaviour for decision support.

Maintenance Optimisation -- fuel used, emissions, calculation of emission taxes, parts life calculation for hot components, predicted and measured calculation for maintenance actions.

SERVICE AND SUPPORT
Help and advice from trained and qualified staff are available across the globe through the DYMAC network. Service may range from simple instrument installation support, through to training (on-site or at a DYMAC facility); up to results-based machinery maintenance contracts involving SKF Reliability Systems.



With more than 35 years experience in production and service of instruments for monitoring, analysis and diagnosis of mechanical behaviour of critical machinery, DYMAC's commitment is to provide the optimum combination of product, people and skills to ensure that machinery health monitoring is an added value component of the customer's business.

To optimize this, a strategic alliance between DYMAC and Vibro-Meter's Industrial & Marine division was formed. Combining the offering of the two groups into one comprehensive range of machinery management solutions and services, customers will experience a responsive and flexible approach in meeting their monitoring and protection needs, together with the best possible customer support.

vibro-meter

Vibro-Meter continues its relationships with major machinery manufacturers and packagers by concentrating on OEM accounts. DYMAC, known for tailored solutions to end-users in many industries and for comprehensive local support, concentrates on end-user applications.

Vibro-Meter SA is a member company of Meggitt PLC, an international group engaged in the design and manufacture of high integrity products for Aerospace, Electronics and Industrial Controls markets worldwide.

DYMAC is part of the Reliability Systems unit of the worldwide AB SKF Group. Combining nearly 100 years of bearing and industry knowledge, SKF Reliability Systems offers technology product and service solutions designed to increase plant efficiency and profitability.

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