

[illegible]

Key Benefits



Improved Efficiency

Reliable diagnostics reduce downtime and bring increased overall efficiency



Lower Capital Costs

By extending machine service life capital costs are reduced



Better Health Data

Allows predictive maintenance, avoiding and limiting machine damage



Improved safety

Unexpected machine failure increases risks of damage and injury



Data availability

Data is delivered to your desktop either locally or remotely



Reduced Servicing

Only repair or replace parts that are damaged or worn out



Lower Repair Costs

Recognize problems before they cause serious damage



Reduced Downtime

Machines can be maintained while in service



Less Shutdowns

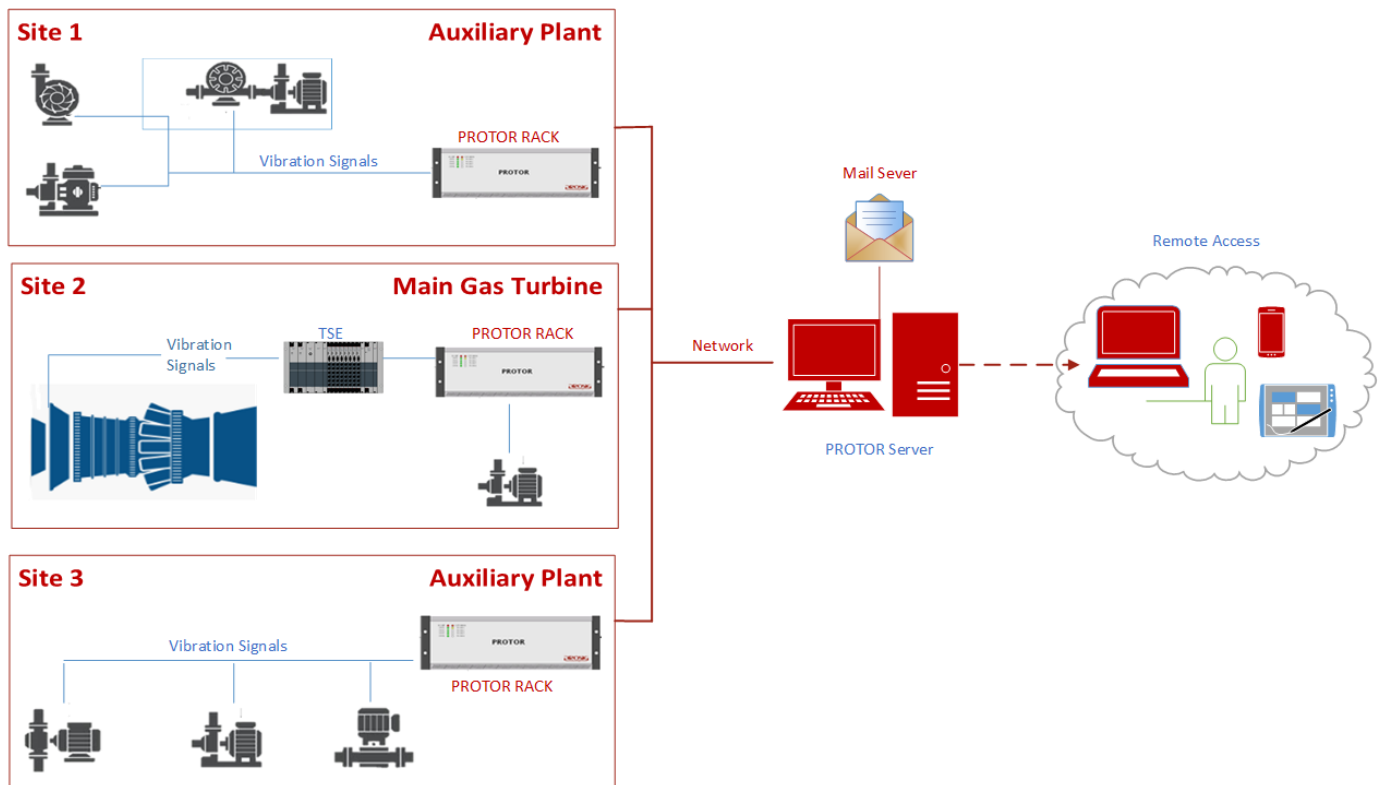
Scheduled maintenance can coincide with production requirements

PROTOR



Monitor & Protect Your Assets

PROTOR is the ideal, investigative tool for condition monitoring of rotating machinery. PROTOR can be supplied as a rack-mount version for permanent installation or as a portable unit. Both are rugged and designed to withstand typical Power Station environmental challenges. PROTOR is available in a number of formats to provide total flexibility in terms of number of channels and machines to monitor.



The standard unit provides stand-alone monitoring and storage for up to 32 channels and 4 tachometer or phase reference signals.

When less channels are required then the system can be configured with either 8,16 or 24 channels supporting 1,2 or 3 tachometer signals respectively.

The system can be configured to monitor a single machine where all 32-channels are captured relative to one phase reference or for multi-machine operations where a tachometer signal can be associated with each 8-channel block of channels.

PROTOR



Monitor & Protect Your Assets

Data Acquisition and Storage

PROTOR provides high quality, high-speed data acquisition and analysis. Data is acquired synchronous to a once per revolution tachometer signal to provide high accuracy harmonic and sub-harmonic measurements or time-based for slow speed conditions or where a tachometer signal is not available. A standard signal conditioning module allows inputs to be taken from accelerometers, velocity or displacement probes. The system also supports IEPE/ICP © transducers. Signal conditioning parameters such as gain, AC/DC coupling and anti-aliasing filter selection are programmable. PROTOR signal inputs are true-differential, high common-mode and so suitable for typical transducer signals in an industrial environment. PROTOR can be used alongside an existing Protection or Supervisory system, in cases where raw signals are shared then high-impedance galvanic isolation can be fitted as an option.

The system detects plant operating conditions such as Onload, Overspeed, Run-up, Run-down, Barring and Slow Roll and adapts its acquisition technique accordingly.

User Interface

User access is provided either by standard monitor, keyboard and mouse ports or by Ethernet or by external modem. Remote access is also possible using a 3G router. Typically access will be via a Notebook computer running Windows and using an Ethernet connection. Connection may also be via an existing station network which would then provide local area connection or even remote connection should Wide Area or VPN facilities be available. Using either connection PROTOR may be configured and set to work, thereafter the system may be left unattended to collect and store data to its internal disk.

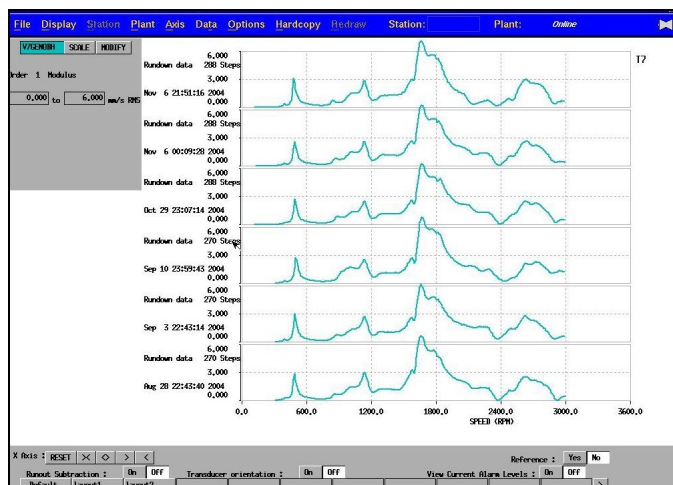
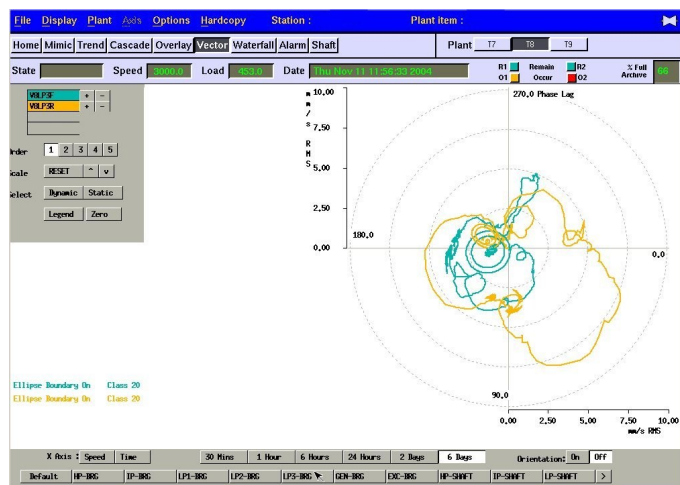
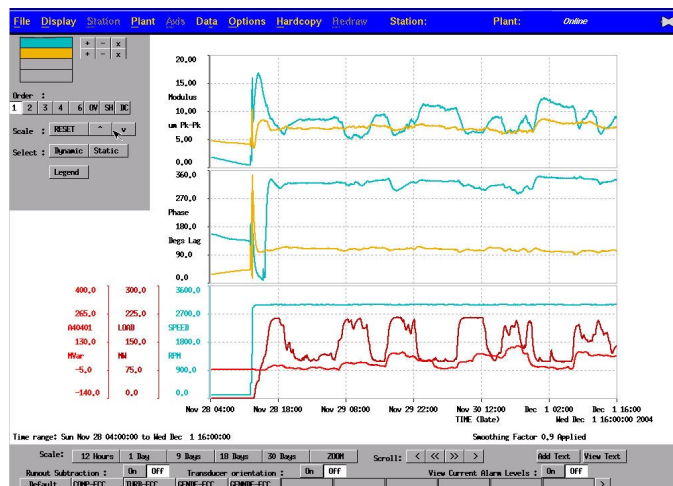
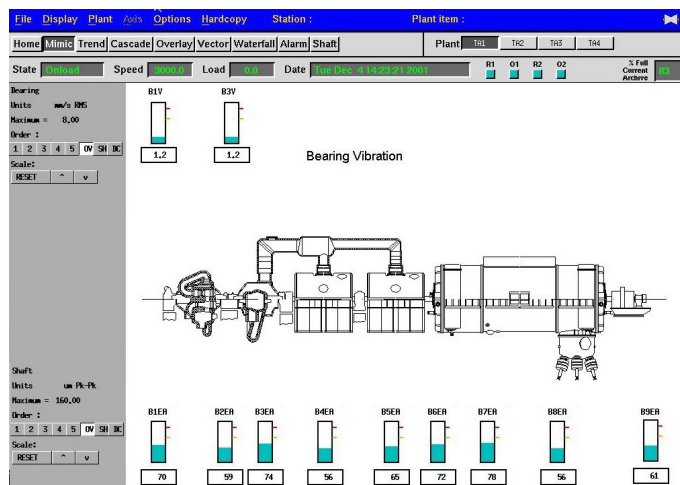
PROTOR provides a simple to learn, intuitive Graphical User Interface. This allows the user to select the type of display and the channels to be displayed by pop-up and pull-down menus using 'point and click' selection and the graphical selection of the data to be displayed.

PROTOR allows screen shots to be easily cut and pasted into standard Windows software and data to be easily exported.

PROTOR



Screenshots



Key Features

Displays

Run-ups	Mimic diagrams
Run downs	Orbits
Vector plots	Numerical Displays
FFT's	Trend Plots
Order plots	Bode Plots
Waterfalls	Shaft Gaps Displays
Cascade and Overlay X-Y Plots	Demand Time and Spectra
Combined vibration and plant process parameter plots	Reference overlays during run-up and rundown

Alert Processing

Amplitude exceedance for overall and selected orders
Exceeding elliptical boundaries in amplitude and phase
Exceeding difference in RMS and sum of harmonics
Exceeding sub-synchronous amplitude
Step Alerts
Banded spectra alerts
Vibration alerts dependent upon plant process parameters
Filtering of wild alerts

Data Acquisition

Synchronous or time based
All channels sampled simultaneously
Total of 16,24 or 32 channels which may be either dynamic or static
Groups of 8 channels may be associated with phase reference signal
Differential buffered inputs, low pass filtering, AC/DC Coupling
Support for wide variety of transducers

PROTOR



Specification

Power Requirements	24V DC. External 110/220V AC to 24V DC power supply included.
Input channels	16, 24 or 32 channels per chassis. Multiple chassis may be configured for expansion
Resolution	16-bit
Maximum Sample Rate	20k samples/second/channel
Input Frequency Range	DC to 10KHz
Input Coupling	Programmable DC Direct , AC with 1Hz high pass filter.
ICP Transducer support	4mA supply from 24V source
Input Voltage	Programmable $\pm 24V$, $\pm 10V$, $\pm 1V$, $\pm 100mV$
Input Impedance	800 k Ω . Galvanic isolation available as an option.
Maximum Common Mode Voltage	$\pm 200V$ common mode compliance. Galvanic isolation available as an option.
Anti-aliasing Filter	Programmable 8-pole Butterworth low-pass filter in range 200Hz to 20KHz.
Phase matching	Better than 1deg between channels. Phase compensation for filter delays performed.
Tacho Input Range	$\pm 24V$
Tacho Frequency Range	0 to 120,000 RPM
Tacho Conditioning	Dedicated conditioning for 2 tachometer signals per unit. Programmable threshold, slope and re-trigger period.
Speed Reading Accuracy	Better than $\pm 1RPM$
Synchronous Sampling	Programmable synchronous sampling circuitry to provide 16,32,64,128 or 256 pulses per cycle.
Constant Sampling	Programmable constant rate sampling clock.
Frequency Analysis	Overall level and DC component Harmonic amplitude and phase analysis for orders 1x, 2x, 3x, 4x and selected order. Sub-synchronous amplitude and Frequency Non-synchronous energy Window selection (Hanning or Flat-top) Spectral Banding mode



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