



PROTOR Mobile

Multi-channel vibration condition monitoring system



Introduction

PROTOR Mobile is the fifth generation of multi-channel, portable system from Beran and offers unrivalled capability in a compact form factor weighing less than 7kg with powerful diagnostic capability.

Portable diagnostic capability

Providing a powerful vibration condition monitoring system for all of your strategic plant items where both real-time and remote diagnostic monitoring is required.

Typical applications include:

- Plant commissioning
- Return-to-service
- Balancing
- Troubleshooting
- Unattended diagnostics

Designed for rotating machinery

- Steam turbines
- Gas turbines
- Hydro turbines
- Feedwater pumps
- Gearboxes
- Machinery requiring continuous monitoring

Key features

- Up to 32 parallel dynamic channels, 4 speed signals, optional 16 DC process channels
- 24-bit ADC resolution
- Machine operating speeds from stopped (0rpm) to 50,000rpm
- Dynamic channels support Acceleration, Velocity, Displacement or Dynamic Pressure
- Simultaneous acquisition of vibration and process data
- Integral ICP support and Hi and Low pass filters
- 50kHz measurement bandwidth per channel
- Multiple FFT line resolution, programmable FFT bands
- Up to 16 harmonic orders magnitude and phase, sub-synchronous levels, intra-harmonic level, gap
- Assignment of dynamic channels to multiple speed signals
- RPM and Time based acquisition control plus configurable event conditions
- Real-time and historic displays include Time Domain, Synchronous Time Domain, FFT, Full Spectrum, Waterfall, Cascade, Orbit, Orders Text, Bode, Polar, Shaft Centre-Line
- Overlay capability to display real-time run-up / run-down files with historic baseline reference
- Post-processing conversion between Acceleration, Velocity and Displacement units
- File export into CSV format
- Interface to OSI Soft™ PI and third party applications using OPC interface
- Two high speed GBit LAN ports
- Remote 4G access
- Lightweight – less than 7kg
- Rugged case and lightweight padded bag carry options
- Outline dimensions 390mm (W) x 120mm (H) x 290mm (D)
- Input power, 24VDC via 95-240VAC, 45-65Hz (external)



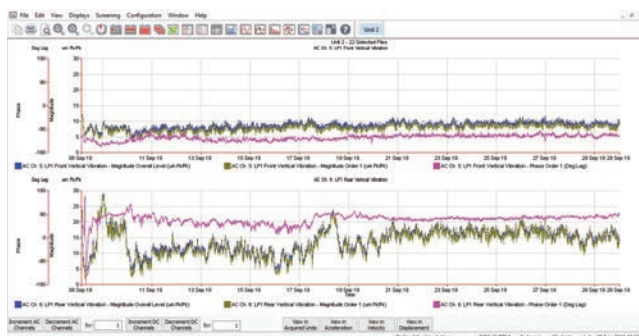
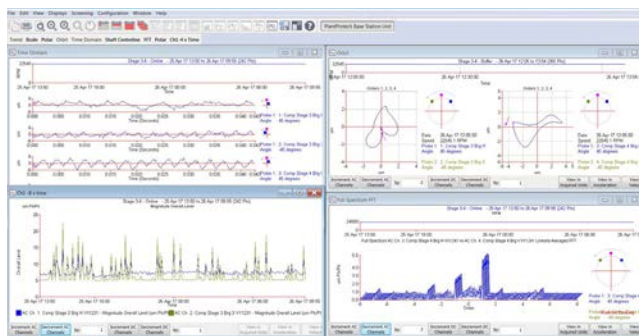
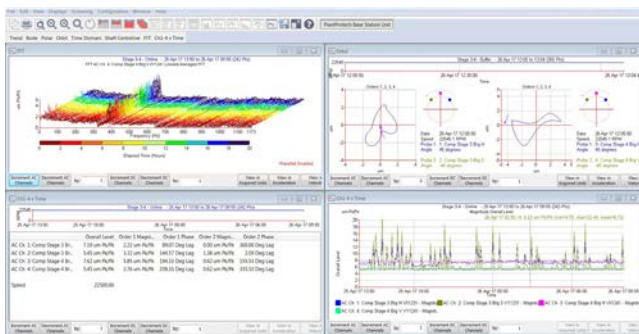
Powerful Diagnostic Software Displays

The combination of rapid deployment, powerful data acquisition and versatile displays makes PROTOR Mobile the perfect partner for your condition monitoring regime.

Diagnostic software

PlantProtech Vision software has been the industry standard for diagnostic monitoring of strategic machinery assets such as turbine generators and other critical plant items and has now been further developed.

Data is stored for easy user access under site name, machine monitored and machine operational condition such as run-up/ online. All user graphical displays can be exported to office type applications.



Displays include:-

- Overall levels
- Peak to peak levels
- Order locked vibration levels, magnitude and phase
- Speed value
- Shaft centre line
- Filtered, unfiltered orbits
- FFT spectra, FFT waterfall
- FFT Bands
- Full Spectrum
- Synchronous / Asynchronous Time Domain
- Polar plot
- Alarms
- Alarm logs
- DC Gap and Bias Voltage
- Process parameters
- Trend displays
- Overlay displays

Flexible measurement regime

The PROTOR Mobile provides a very powerful and flexible monitoring regime under automated control:

- User-configured time, level and/or RPM based acquisition intervals
- Data acquired on alarm or trigger event
- High resolution buffer files auto-store for pre-and-post event capture
- Multiple data acquisition regimes may be configured for different plant operating modes

The user can configure the PROTOR Mobile to store data at periodic time intervals or as a result of speed change during a transient event. All acquisition is controlled independently for each monitored machine. Using the PROTOR Mobile provides a flexible monitoring approach to ensure high resolution data can be captured preceding, during and after any event.

Powerful Condition Monitoring Alarms and Third Party Integration

User configured alarms capture high resolution data in case of machine event. Integration to third party databases such as OSIsoft PI™.

Process parameters

Process (DC) parameters may be acquired directly by Protor Mobile using either 0-10Vdc voltage, 4-20mA or thermocouple signals with full galvanic isolation capability using the external module or by network connection to external third party databases.

Integration with third party applications

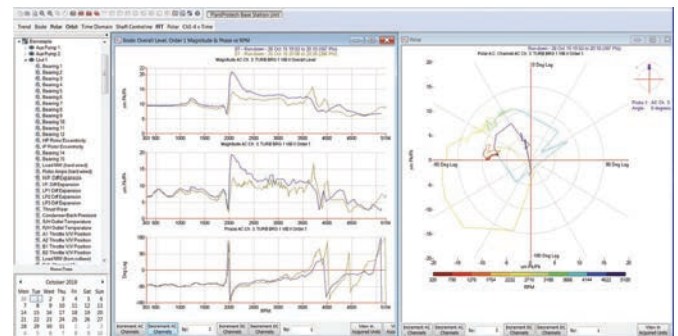
The PROTOR Mobile unit is a self-contained vibration condition monitoring system that can be expanded by integration with other third party applications where other tools and analysis may be required.

- Interfaces to OPC databases
- Interface to OSIsoft PI™
- Data export into CSV

Alarms

Powerful Alarm and Alert conditions may be configured to trigger and capture condition indicators across a wide range of signal parameters. This includes Overall Level, Orders, Spectral Band, DC parameters and the trigger conditions may be generally set as absolute hi and low levels, step changes and vector / ellipse changes. Additional conditions may be applied to each Alarm and Alert to automatically enable during certain machine operating conditions, i.e. an Alert that is only active after a machine is within a defined speed range or when the generational load is >90%, for example. This capability significantly reduces the number of false triggers and is also invaluable when an Engineer is trying to isolate an intermittent machine fault only occurring under certain conditions.

An internal log records alarm activations to assist the user in reviewing events.



Portable Stand-Alone and Network Operation

Autonomous vibration and condition monitoring system for automated data and event capture with multi user access.



Stand-alone operation

The PROTOR Mobile can operate fully stand-alone, with all data acquisition and storage performed internally with no requirement for an external PC. This allows fully unattended operation without the risk of equipment theft or a PC malfunction compromising the acquisition tasks. Plant condition information is able to be viewed remotely in real-time and historic stored data using PlantProtech Vision software.

Networked operation

The PROTOR Mobile can be connected by LAN, WAN, WiFi, 4G connections for stand-alone operation or for remote access from around the world with the appropriate user passwords.

- Password protected access levels
- Data recording is constantly active as pre-configured by the user depending on various plant states
- Multiple users can access real-time and historic data analysis diagnostic tools using an easy and intuitive to use Windows®-based application
- Users with the right level of password access can configure the measurement, analysis and alarm settings over Ethernet, WiFi or 4G connections from anywhere in the world
- Data acquisition and storage is unaffected by any failures in the network ensuring a highly reliable and fault tolerant system

- Easy to configure and use
- Windows® front end
- Range of real-time and historic data displays
- 4G, WiFi, LAN, WAN connectivity

PROTOR Mobile

Overview Specification

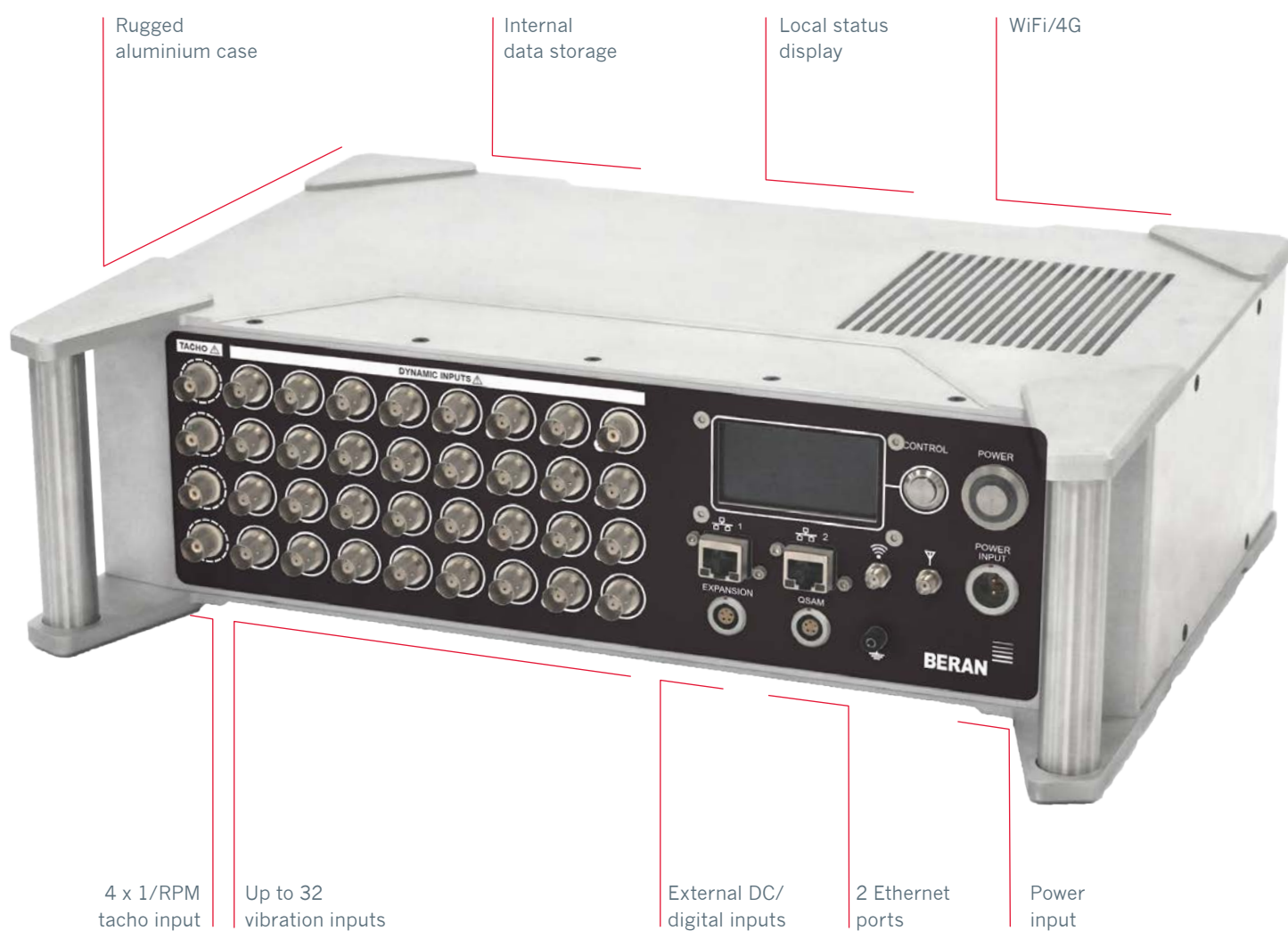
Specification

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|--|---|
| Number of Vibration Channels | 16 or 32 parallel channels |
| Vibration Input Type | Acceleration, velocity, displacement, $\pm 24\text{Vdc}$ and ICP Inputs |
| Vibration Input Connector | BNC |
| Analogue to Digital Convertor Resolution | 24-bit |
| Bandwidth | 50kHz measurement bandwidth per channel |
| Speed Signals | 4x speed signals (1/RPM) |
| Tacho Input Type | TTL, proximity probe, $\pm 24\text{Vdc}$ |
| Tacho Trigger Edge | Fixed voltage trigger or “adaptive” automatic triggering |
| Tacho Input Connector | BNC |
| Process Channels | 16x hardwired inputs $\pm 10\text{Vdc}$ |
| Process Channel Input Connector | BNC, external module |
| Transient Data Capture | Independently configurable per monitored machine |
| Data Storage | Internal solid state hard drive |
| Communication | 2x Ethernet ports, USB, integral 4G modem, WiFi |
| Supported Protocols | OSISoft PI™ / OPC |
| Computer Requirements | Standard PC/laptop operating Windows® |
| Size | 390mm (W) x 120mm (H) x 290mm (D) |
| Weight | < 7kg |
| Temperature | -20deg C to +70deg C |
| Humidity | 5% to 95% non-condensing |
| PSU | External – 110Vac to 240Vac auto ranging |
| Transit Case | Pelicans and soft case options available |



PROTOR Mobile Overview Specification

The PROTOR Mobile is truly mobile, weighing less than 7kg and having remote access through 4G and WiFi connections.



Beran Instruments

Decrease risk and increase your revenues with our proven PlantProtech™ Condition Monitoring Solutions.

PlantProtech™ is Beran's platform for condition monitoring of rotating machinery, built on over thirty years of industrial experience and innovation.

The PlantProtech hardware / software family is in use throughout the global power industry, installed on Nuclear, Fossil, Hydro, CCGT, Combined Cycle and Renewables.

Originally designed to meet the requirements of the UK power generation industry, our PlantProtech systems have been proven to pay for themselves many times over. As user requirements have increased, the PlantProtech range has developed accordingly.

By means of continuous on-line vibration monitoring, changes in the health of the plant may be detected early. Powerful analysis tools allow the root cause of the problem to be identified, enabling operators to make crucial decisions, and in many cases, plant can be run with confidence through to planned outage or scheduled maintenance.

The PlantProtech range of integrated hardware and software products provides you with a solid foundation, which can be expanded as required, ensuring the safe and efficient continued operation of your assets.



This document is not contractual. Beran maintains a policy of continuous product development and improvement. This specification may change without notice.

Beran Instruments is registered to BS EN ISO 9001:2015 / AS9100

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