AVT RELIABILITY

...it's in our DNA

Machine Sentry®

Condition Monitoring Solutions

- **Flexible condition monitoring system** for vibration analysis, process parameters, visual inspection and oil analysis capabilities
- **Automatic fault diagnostic assistant** advises on common vibration problems (similar level to a Category II vibration analyst)
- **Bluetooth® 3-axis vibration and temperature sensor** (patent pending)
- **Additional support** for Category II, III and IV available from our expert analysts

www.avtreliability.com

Next Generation Condition Monitoring

We all want to get better performance from our business, and to improve performance requires good analytics.

A condition monitoring program is key to improving the performance of your plant and machinery but often companies are put off by the high cost and skill levels required to implement successfully.

Machine Sentry® is a revolutionary new approach to condition monitoring that offers a cost effective solution coupled with high level analysis support which is available to you no matter what size your company.

Machine Sentry® is simple to use, low cost and fast. It includes an automatic fault diagnosis assistant that can be used to help identify potential issues with rotating equipment.

Machine Sentry® does not require you to employ highly qualified reliability engineers as you can access our team of condition monitoring experts (one of the largest in Europe).

AVT Reliability® can provide a full condition based maintenance service, or you can “do it yourself”.

CM Competency Levels as defined by ISO 17359 and ISO 18436-2				
	Data Collection			
	Category I	Category II	Category III	Category IV
Vibration Analysis				
Experience & Training	Qualified to ISO 18436-2 >6 months practical experience	Qualified to ISO 18436-2 >3 years practical experience	Qualified to ISO 18436-2 >5 years practical experience	Qualified to ISO 18436-2 >10 years practical experience
Data Collection	Accurate repeatable data collection with single channel equipment (including tri-axial sensors)	Ability to use multi-channel devices	Multi-channel and online systems capability	As III & subject matter expert
Data Analysis	Able to identify bad readings and determine common faults	Able to detect majority of failure modes including early stage bearing defects	As II, including high-speed turbomachinery diagnostics, run-up & run-down diagnostics	As III & subject matter expert
Program design inc. building databases	N/A	Able to set-up standard CM routes using templates and ISO standard alarms	Able to analyse historical data and set-up alarm levels based on statistical information	As III & subject matter expert
Statistical alarm review and setting	N/A	N/A	Able to analyse historical data and set-up alarm levels based on statistical information	As III & subject matter expert Manages FMECA program to link failure mode with criticality
Thermography	IR Cat I Qualified IRT Standards Able to use a range of cameras and understand how to take good readings >6 months practical experience	IR Cat II Qualified IRT Standards >3 years practical experience	IR Cat II Qualified IRT Standards >5 years practical experience	IR Cat II Qualified IRT Standards >10 years practical experience
Oil Analysis	ICML MLA Level I Able to collect good samples and action data provided by an oil lab >6 months practical experience	ICML MLA Level I As CAT I plus able to establish lube-sample points / routes >3 years practical experience	ICML MLA Level II Advanced analysis capabilities including interpretation of lab results >5 years experience	Subject matter expert >10 years experience

> “AVT Reliability provide Condition Monitoring services for many blue chip clients, on hundreds of sites.”

MACHINE SENTRY®

Machine Sentry®

Machine Sentry® is a unique Condition Based Maintenance (CBM) solution which integrates all condition monitoring techniques and watchkeeping data, enabling effective maintenance planning and management reporting.

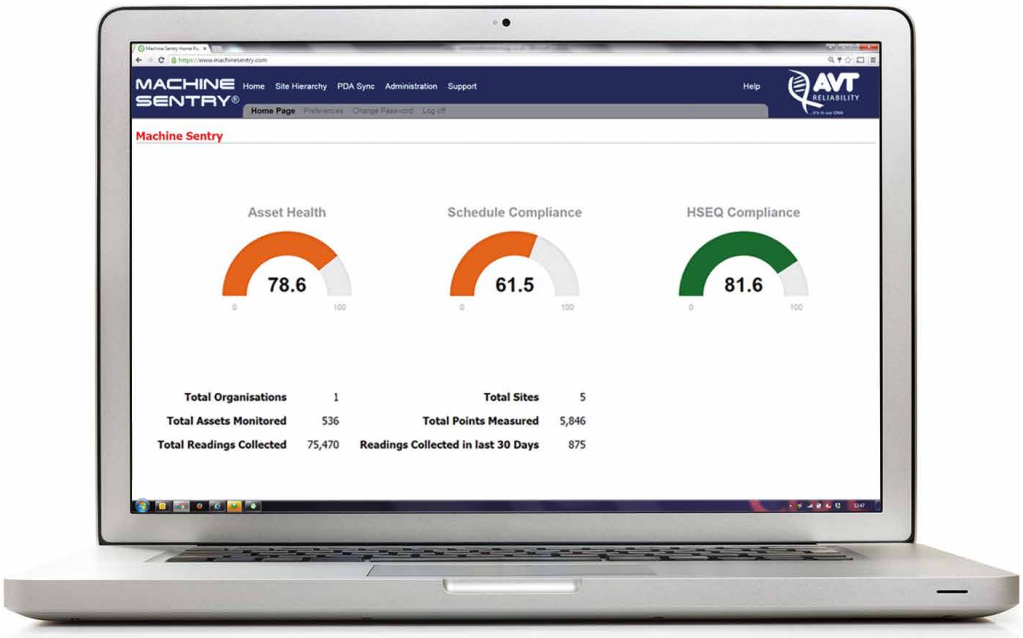
Machine Sentry's vibration analysis hardware and software runs on off-the shelf PDA's and via the internet; making it the most versatile and cost-effective solution on the market.

System Includes:

- **Modular Cloud Based Machine Sentry® Software** – Features include: action tracking, watchkeeping, process measurements, thermal imaging, inspections, lubrication management, dashboard and reports
- **Vibration Analysis** – With intelligent tri-axis vibration and temperature sensor (patent pending) plus a choice of hand held PDA
- **Fault Diagnosis Assistant** – Automatically diagnoses potential problems and suggests verification procedures to confirm
- **Oil Analysis** – Laboratory oil analysis data is automatically mapped and integrated into the Machine Sentry® database for easy access by all users

Features

- Cost effective condition monitoring eliminates the need for expensive data acquisition systems and highly trained reliability engineers
- Integrates all condition monitoring techniques and watchkeeping data, enabling effective maintenance planning and management reporting
- Machine Sentry® can be used either as a stand alone tool or alongside your existing enterprise system (e.g. SAP, Maximo, PEMAC, etc)
- Access to world leading condition monitoring engineers – providing detailed diagnosis and advice
- Easily configurable for future expansion



Machine Sentry® is a web hosted condition monitoring solution that provides detailed condition monitoring tools supported by world leading condition monitoring engineers.

Secure access to the software is available from anywhere in the world via a standard web browser. In addition, the mobile software operates on industry standard Windows Mobile PDA's (Android support available Q3 2016) or other compatible devices.

Machine Sentry® can collect and report on the following types of data:

- Vibration data using our patented Bluetooth® 3-axis sensor
- Thermal images and temperatures
- Process parameters such as pressures and flow rates
- Visual inspection lists
- Lubrication usage
- Lubrication analysis results

> Turn any Windows PDA into a powerful condition monitoring data collector.

And provide

- Visual indication of machine status
- Action tracking
- Data review and analysis
- KPI's and summary dashboards
- Management Reports

Vibration Analysis

The Machine Sentry® mobile sensor is a wireless intelligent tri-axial vibration and temperature sensor (patent pending) which connects via a Bluetooth® enabled PDA to the Machine Sentry® software.

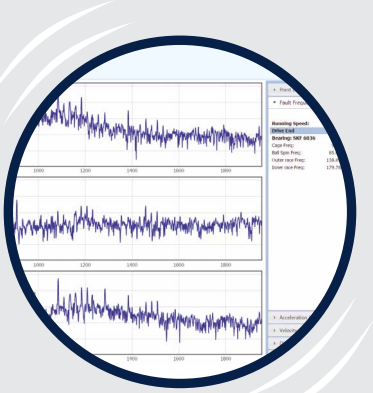
The sensor incorporates a quad channel multiplexed data acquisition system which utilizes 3 internal accelerometers to give full 3-axis support. An additional sensor can be connected to the 4th channel allowing simultaneous 4 channel data collection.

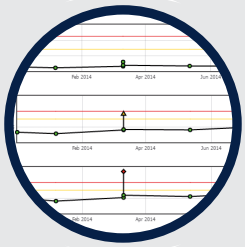
The Machine Sentry® mobile sensor is paired to an “off the shelf” Windows Mobile PDA using standard Bluetooth® communications. This permits data collection from up to 10m away allowing assets which would be difficult to monitor using a traditional wired accelerometer to be measured with ease (e.g. collection points behind guards, or large, moving assets such as gearboxes on agitators).

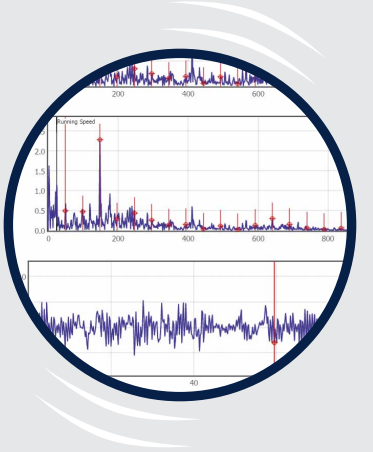
The integral rechargeable battery offers 80 hours of continual operation between recharges allowing a full weeks data collection between charges.

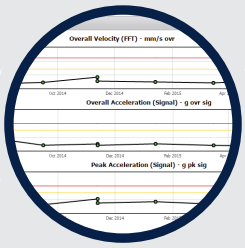
The sensor has an inbuilt magnet which allows correct and repeatable orientation when performing multi-axis data collection.

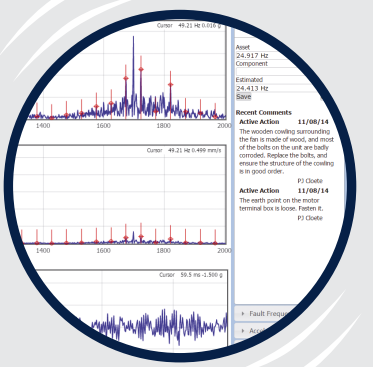
> “Machine Sentry® is the CBM and Reliability tool of choice for many international blue-chip organizations.”











DIAGNOSIS AT YOUR FINGERTIPS

Fault Diagnosis Assistant

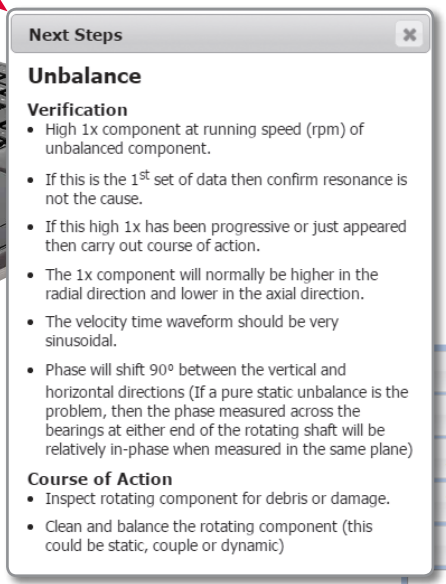
Machine Sentry® contains an integrated automatic fault diagnostic assistant which offers advice on many common vibration problems which can be detected by a category II vibration analyst.

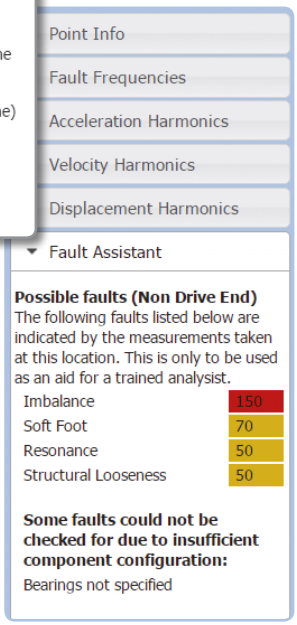
Faults diagnosed include:

- Imbalance
- Bent Shaft
- Resonance
- Parallel, Angular, or Complex Misalignment
- Cocked Bearing
- Structural, or Rotating Looseness
- Blade or Vane Pass Issues
- Soft Foot
- Cavitation
- Lack of Lubrication
- Gear Misalignment
- Gear Backlash / Eccentricity
- Gear Broken Tooth
- Gear Tooth Wear
- Bearing Stage 2, 3, or 4

The fault diagnosis assistant compares and evaluates multiple vibration measurements taken on an asset in a similar time window to better evaluate the presence of different failure modes.

As well as helping the user diagnose faults which are present in the asset, the assistant also suggests verification steps which should be carried out to confirm diagnosis.





Analyst Support

Need extra assistance?

For customers who do not employ experienced condition monitoring engineers, AVT Reliability provide access to Europe's largest pool of condition monitoring experts. These experts can review clients data and deliver practical guidance that will improve plant reliability.

Oil Analysis

Oil analysis is performed routinely as part of a condition based maintenance strategy to provide powerful information on lubricant and therefore machine condition.

Trending oil analysis sample results over the life of a machine, can help extend Mean Time Before Failure (MTBF) and eliminate costly breakdowns.

Laboratory oil analysis data is imported automatically creating a record with all data necessary for the analysts to provide a recommendation to the maintenance team.

AVT's analysts have qualifications from the International Council for Machinery Lubrication (ICML) and are certified in compliance with ISO standards.

Training Services

AVT Reliability offer a range of recognized training courses in Vibration, Lubrication and Pipework Vibration analysis that result in recognized qualifications and certification.

All our trainers are highly qualified, certified and have many years of practical experience in the application of condition monitoring technologies. Courses are delivered to international standards – ISO 18436 and BINDT PCN, ICML, Energy Institute.

> "The most versatile and cost-effective condition monitoring and maintenance system solution on the market."

Specification

Tri-axial Vibration and Temperature Sensor	
Measurements	
Vibration	2Hz to 4kHz Overall velocity, -16 to 16g Amplitude Range
Temperature	-40 to 115ºC Accuracy +/-0.5ºC (0-60ºC), +/-1.5ºC (-40-115ºC)
Resolution	51,200 lines
Aux Input (Optional)	ICP powered or unpowered +/- 24v
Outputs	Wireless Bluetooth® connection to PDA (or Laptop / Mobile device) connected to Machine Sentry® software via Windows mobile < 6.5.3
Wireless Range	~10m
Battery Type	Li-Ion 3.7v 2000mAh
Battery Life	80 Hours (continuous operation)
Battery Recharge Time	~20hrs
Power	6v (For battery recharge only)
Environmental	
Ambient Temperature Range	0ºC to 40ºC operating, -20ºC to 70ºC Storage
Sealing	IP67
Weight	330g
Dimensions	63mm (h) x 42mm (w) x 115mm (l)
Approvals	CE

AVT RELIABILITY

1975
AV Technology Ltd formed by Dr. Robin Monk, one of the first Vibration Analysis experts

1976
AVT Ltd formed

2001
AVT acquired by Shell Oil

2005
AVT acquired by IONIX

2013
AVT acquired by AESSEAL®

2015
AVT Reliability Ltd formed

AVT Reliability now has more than 100 fully employed professional CBM engineers at locations in the UK and mainland Europe.

The comprehensive AVT Reliability program covers Asset Integrity, Performance Monitoring, Training, Maintenance Consultancy and Total Pump Management / Products to Manufacturers.

AVT Reliability are certified to ISO 17359 and ISO 9001. Accredited by UKAS as a Machine Sentry® Directive Notified body, and are ICML and BINDT members.

Proud members of the AES Engineering Ltd group of companies "passionate about reliability"

AESSEAL®
EXPERIENCE THE EXCEPTIONAL

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