Vibration Mote Model 3

WIRELESS CONDITION MONITORING SENSOR
FOR FIXED & VARIABLE SPEED ROTATING EQUIPMENT

THREE SENSORS IN ONE

TEMPERATURE　　　　**TRI-AXIAL VIBRATION**　　　　**MAGNETIC FIELD**

Petasense

CONTINUOUS CONDITION MONITORING
for fixed/variable speed rotating equipment

The Vibration Mote, Model 3 (VM3) is a 3-in-1 wireless sensor that measures triaxial vibration, surface temperature and running speed, providing a holistic approach to condition monitoring of critical rotating equipment.

Simply insert a standard battery, connect to WiFi and start monitoring the health of your assets from anywhere.

The Petasense **ARO Cloud** uses machine learning algorithms, coupled with a comprehensive library of assets and failure modes, to continuously assess asset health. **Web and Mobile Apps** allow you to monitor your assets remotely and receive actionable insights through real-time notifications.
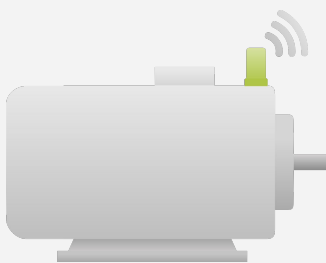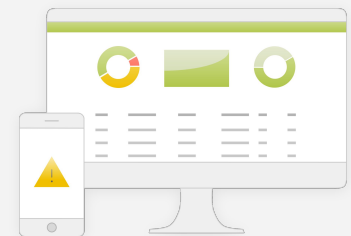
VIBRATION MOTE
Easily mount on rotating equipment and send asset condition data over WiFi

ARO CLOUD
Predict asset health and optimize performance using machine learning

WEB + MOBILE APPS
Visualize asset health data receive actionable insights with real-time notifications

*Use of Vibration Motes requires an active subscription to the Petasense ARO Cloud.

PERFORMANCE MEETS SIMPLICITY

DETECT ISSUES EARLIER

High bandwidth, triaxial vibration sensor with 5,500 Hz frequency response in all 3 axes and up to 8000 lines of resolution, providing the perfect balance between battery life and resolution. Detect:

- Misalignment
- Imbalance
- Gearbox defects
- Looseness
- Cavitation
- Early stage bearing wear

MONITOR FIXED SPEED OR VARIABLE SPEED EQUIPMENT

Integrated magnetometer provides simultaneous measurements to collect running speed, vibration and temperature. This solves a challenging problem of trending readings for variable speed or intermittently operating assets.

COLLECT MEANINGFUL DATA

Advanced Machine Learning at the Edge is built into VM3, providing smart measurements such as:

- **Event-based measurements**
  Taken only when asset is on and/or operating at a specific running speed, enabling consistent trending
- **Coordinated measurements**
  All Motes on asset train to take synchronous measurement

5 YEAR BATTERY LIFE

Based on two measurements per day. Machine learning at the edge and sensor design optimizes battery life.

FLEXIBLE DEPLOYMENT

Data transmission over standard WiFi, with no additional hardware or proprietary network required. Instant measurements provide an option for plants without WiFi, by taking readings via iPhone or iPad. "Hot Mote" capabilities enable usage for troubleshooting and multi-phase measurements.

NEVER LOSE YOUR DATA

If the wireless network goes down, the Motes have onboard storage to prevent data loss. Data gets automatically transmitted once the connection is re-established.

ADVANCED PREDICTIVE ANALYTICS SOFTWARE
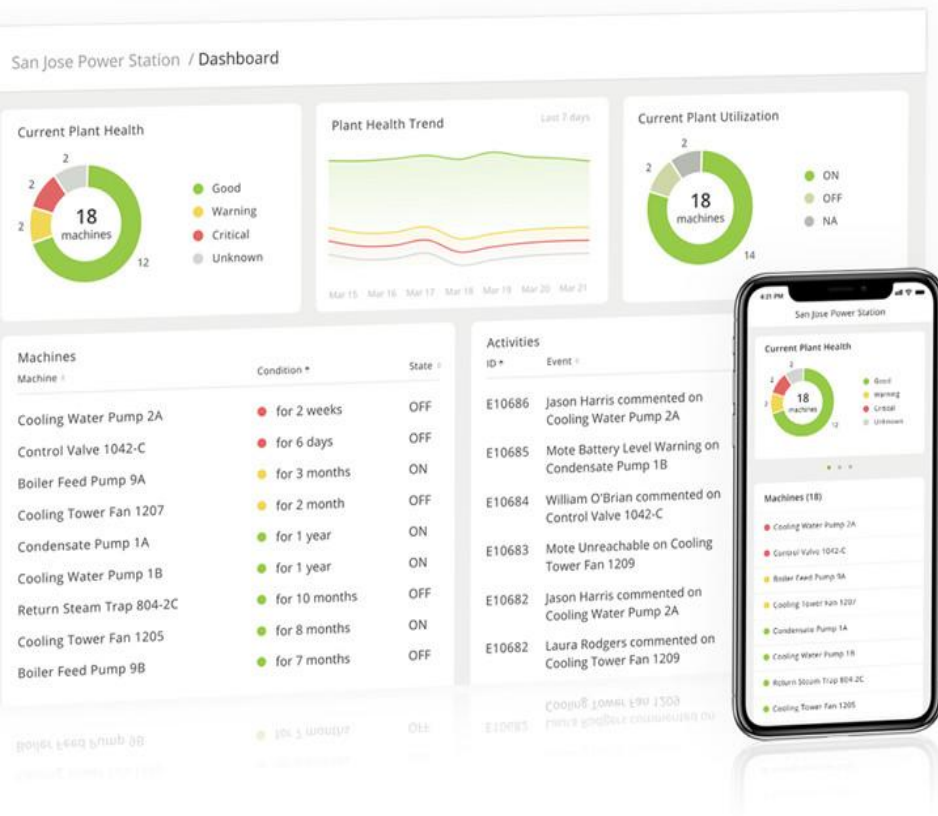
Petasense ARO: Asset Reliability & Optimization

brings together sensor data, asset knowledge, physics based modeling and machine learning analytics to get the most out of any industrial asset. Implement a wireless IoT based predictive maintenance program (PdM) for all critical equipment.

MACHINE LEARNING ANALYTICS

Advanced ML algorithms generate Asset Health Scores for each unique asset in real-time. By analyzing over 20 features within each sensor reading, the algorithm can detect anomalies weeks or months before a failure occurs and present a single indicator of asset health.

ADVANCED ANALYST TOOLS

ARO Cloud has an intuitive-user interface with all the features that an analyst will need to diagnose developing problems, without the complexity.

MONITOR ANY CRITICAL ASSET

The Vibration Mote can be used for any rotating asset in conjunction with the Petasense Transmitter to monitor any asset from a single software. Static equipment like steam traps, valves and electrical panels can be monitoring alongside rotating assets.

INTEGRATE 3RD PARTY SYSTEMS

Bring in data from a variety of sources to create a complete model of real-time asset conditions. RESTful APIs allow easy connection with historians, analytics, CMMS, SCADA systems and other software.

PROACTIVELY MONITOR YOUR ASSETS

MINING & METALS

- Evaporators
- Finishers
- Conveyors

CRITICAL FACILITIES

- Air handler units
- Exhaust fans
- Chillers

OIL & GAS

- Gas compressors
- Centrifugal pumps
- Gearboxes

POWER GENERATION

- Chill and boiler pumps
- Cooling towers
- Generator fans

PHARMACEUTICALS

- Homogenizers
- Agitators
- Mixers

JOIN A COMMUNITY OF INDUSTRY LEADERS

"Petasense caught a significant issue with an air handling unit that saved valuable biological experiments for our client. Everyone benefits from the sheer value this technology brings."

SENIOR DIRECTOR OF RELIABILITY

"The Motes alerted us about a major inefficiency in the operation of our pump system and we have taken corrective action.
Looks like another win for Petasense!"

DIRECTOR OF OPS & MAINTENANCE

VIBRATION SENSOR

Accelerometer	Tri-axial MEMS
Frequency Response	2 to 5,500 Hz (+/- 3 dB)
Measurement Range	+/- 2g to +/- 16g
AD Conversion	16 Bit
Sensitivity	0.061 mg/LSB
Sampling Rate	26.7 kHz

VIBRATION MEASUREMENT OPTIONS

Measurement Type	Bandwidth	Resolution
Overall (RMS)	N/A	N/A
Full Bandwidth (Time-waveform)	2 to 5,500 Hz (+/- 3 dB)	8000 LOR (0.625 Hz)
High Resolution (Time-waveform)	2 to 1,000 Hz (+/- 3 dB)	4000 LOR (0.25 Hz)

TEMPERATURE SENSOR

Measurement Range	-40°C to 85°C (-40°F to 185°F) (+/- 5% accuracy)

MAGNETIC SENSOR

Digital Output	i2C
Magnetic Field	Full scale adjustable from +/- 4 gauss to +/- 16 gauss
Sampling Rate	Up to 1 KHz

MEASUREMENT FREQUENCY OPTIONS

Interval-based	Measurement taken at specified time interval (e.g. every 3 hours)
Schedule-based	Measurement taken at specified times/days (e.g. every Monday at 9:00 AM)
Event-based	Measurement taken based on specified asset state or running speed (e.g. every time the asset turns on OR when the asset runs at 1600 RPM)

PHYSICAL

Dimensions	*Height:* 58.1 mm (2.29 inches) *Max diameter (S-ring):* 38.7 mm (1.52 inches)
Weight	125 g
Mounting (recommend epoxy or stud)	*Epoxy:* Thermally conductive two-part epoxy ([8329TCM](#)) *Stud:* 6.35 mm (¼ inch) 28 UNF
Materials	*Cover:* Food-grade polycarbonate *Base, Mount and S-ring:* Corrosion-resistant Stainless Steel (SS316)

ENVIRONMENTAL

Operating Temperature Range	-40°C to 85°C (-40°F to 185°F)
Storage Temperature	< 85°C (185°F) without battery
Shock Resistance	2 meter fall, 16 g continuous vibration
Certifications	Class I Div 2 (ABCD), IP67, NEMA 4, FCC, CE, RoHS compliant

POWER

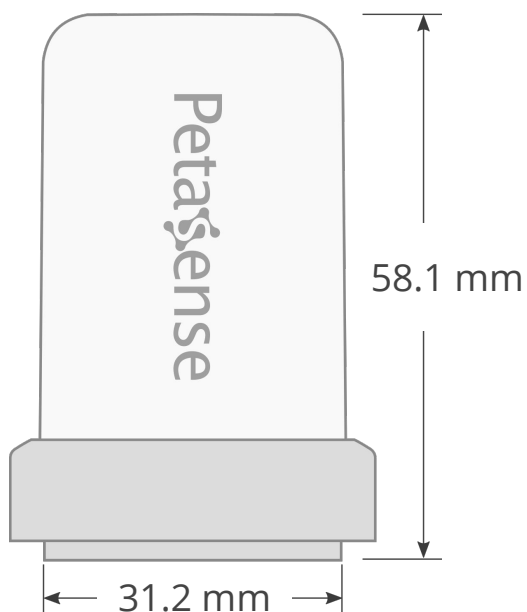| Source	CR123A 3V Lithium
Battery Life	5 years, based on measurement interval configuration

CONNECTIVITY

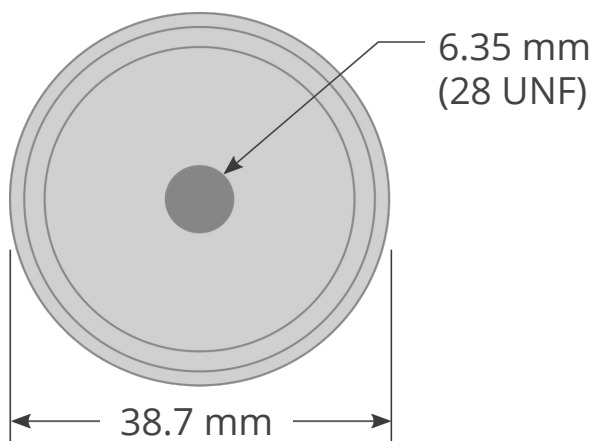| Wireless Protocol	WiFi (2.4 GHz, 802.11 b/g/n) (Bluetooth can be used to trigger on-demand readings)
Antenna	Integrated antenna with -0.4 dBi max gain
Processor	32-bit 144 MHz ARM Cortex M4F (remote firmware updates)

ACCESSIBILITY

User Interface	Web: Internet browser access Mobile: iOS application available in App Store
Security	TLS 1.2 with AES encryption

VIBRATION MOTE DIMENSIONS

FRONT

Petasense

58.1 mm

31.2 mm

BOTTOM

6.35 mm
(28 UNF)

38.7 mm

TOP

31.7 mm