

# ProSmart®

Predictive Condition Monitoring



*Engineered for life*

# Identifying and Solving problems before they impact production.

*“Time is the most valuable thing a man can spend.”*

— Theophrastus, Philosopher

## Minimizing Process Downtime

Early warning and advanced diagnostics enable maintenance activities to be planned instead of reactive.

## Continuous Monitoring of Machine Health

Automated data collection and analysis every 5 seconds; saving you time from routine data collection.

## Advanced Diagnostic Tools

Tying both machinery health and process conditions, ProSmart speeds your root cause diagnosis.

## Automatic Notification of Machinery Issues

Resources focus only on machines in need, maximizing productivity.



## Applications



### Primary Services

A machine does not have to be a critical asset to have a massive impact on plant production when it goes down. Unfortunately, it is a costly proposition to continuously monitor anything but your most critical machines. ProSmart solves this problem by providing near continuous monitoring on machines at an installed cost that is fractions of traditional systems.



### Remote Locations

Monitoring hundreds of small cogeneration plants, each with 20-30 pieces of rotating equipment, created a significant challenge for this customer. How do you ensure equipment availability and uptime without adding dedicated resources to each plant? ProSmart solved this by providing data collection and advanced analysis capabilities to each machine, all tied into the Internet and providing access worldwide and to the best vibration analysts available.



### Problem Solving

Periodic bearing failures on your compressor are more than just aggravating; the repair costs and lost production is costly. The challenge of diagnosing problematic equipment is that they typically fail when you're not there. ProSmart has solved this problem by providing the ability to process conditions and motor load conditions in addition to machinery vibration and temperature. Sampling every 5 seconds for 24 hours-a-day means that ProSmart is there when you're not.



### Resource Optimization

Walking around and collecting data takes valuable time away from the real capabilities of your vibration analysts — solving problems. In addition, the walk-around misses critical transients and changes in the operating conditions of your equipment which can lead to faulty conclusions. ProSmart solved this problem by automating the data collection of one customer's system. This enabled their monitoring program to be expanded without having to add hard-to-find resources.

# How it Works

## Web based...

client eliminates software installation and management costs.

### HOSTED PLATFORM

The ProNet user interface provides the ability to view, analyze, and store data in a secure environment anywhere in the world.

With online reports that range from supervisory overviews to detailed analysis windows, ProSmart provides benefits to each level of your organization.



## Wireless architecture...

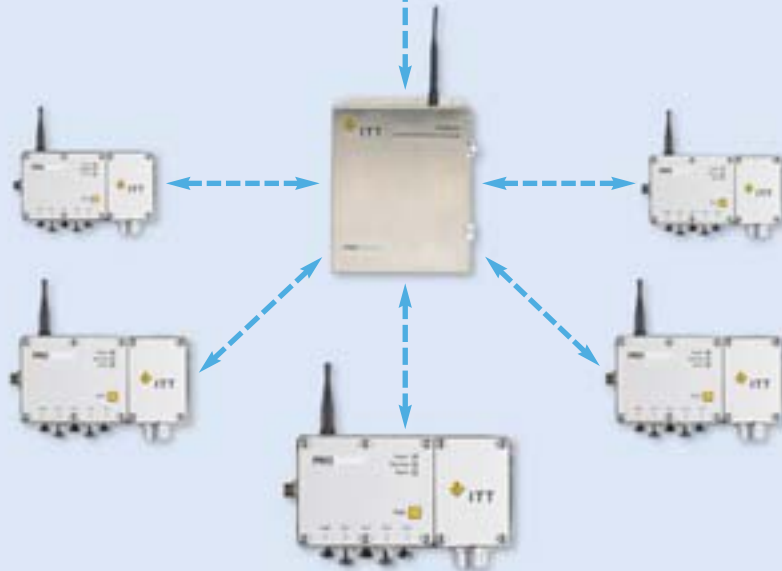
reduces installation costs and complexity.

### COMMUNICATION MODULE

As the gateway to the Internet, the ProSmart CM provides a secure connection to the ProNet platform via LAN, DSL, cell, or 802.11 wireless routers.

### DATA MONITOR

Integrated processing capabilities allow 22 channels of information to be collected every 5 seconds, 24/7/365.



## ProSmart delivers...

key machinery health data directly to you

### MACHINE LEVEL

ProSmart can be used to provide continuous machinery monitoring of all your rotating equipment. Standard process signals can be integrated for greater diagnostic capabilities.



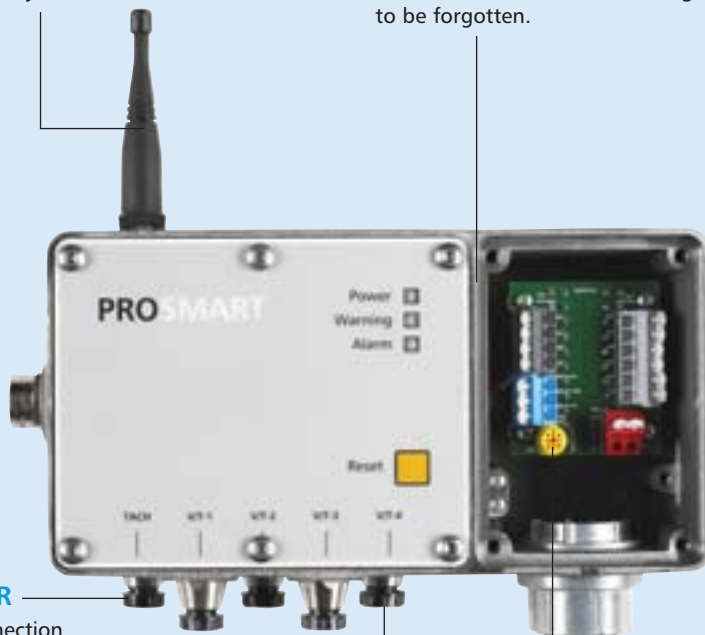
# Data Acquisition and Analysis

## WIRELESS

2.4 GHz 200 mW (North America) power in FCC unlicensed band provides up to 3 KM of point-to-point communication range, and up to 9 KM in Hybrid MESH mode.

## 304 SS

Investment cast enclosure rated for NEMA 4X provides protection in the harshest industrial environments. Approved for Class I, Division 2, Group ABCD, T4 hazardous areas. Designed to be forgotten.



## TACHOMETER

Plug & Play connection for tachometer input simplifies and speeds field installation.

## VIBRATION/TEMPERATURE

Plug & Play connections simplify and speed field installation of the ProSmart Vibration/Temperature sensors. Each sensor is capable of monitoring 3 axes of vibration and temperature.

## SIMPLIFIED CONNECTIONS

Easy-to-access terminal blocks for power and process signals ease installation. Required input power 12-24VDC readily available from flexible sources.

- Qty 3 4-20 mA Inputs
- Qty 2 Digital Inputs
- Qty 1 Form C Relay

## Processing Power

A powerful digital signal processor, capable of analyzing 22 channels of data every 5 seconds, including 4,000 line spectrums on 12 channels of vibration data, the ProSmart DM22x brings intelligence to your machines.

### ITT VT-03

3-Axis Vibration & Temperature MeMs based accelerometer  
Dynamic range +/-6G  
5-3500 Hz



### IMI VS-03

3-Axis Vibration Piezoelectric based accelerometer  
50 G dynamic range  
5-3500 Hz



### IMI VT-01

Single Axis with Temperature IC Piezoelectric based accelerometer  
50 G dynamic range  
5-3500 Hz



### ITT ST-02

Inductive Speed Sensor  
5mm sensing range



### Process Transmitters

Ability to integrate any standard process signal adds diagnostic capability.



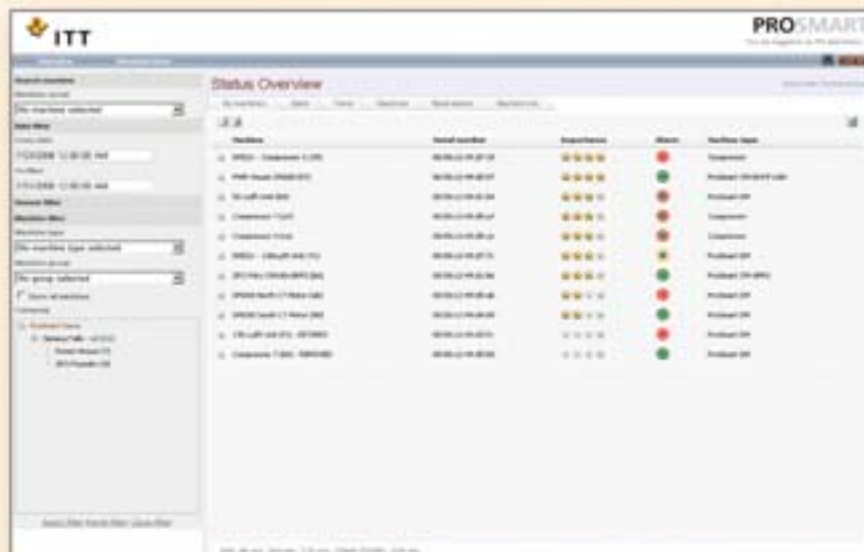
## ProNet

## Dashboards



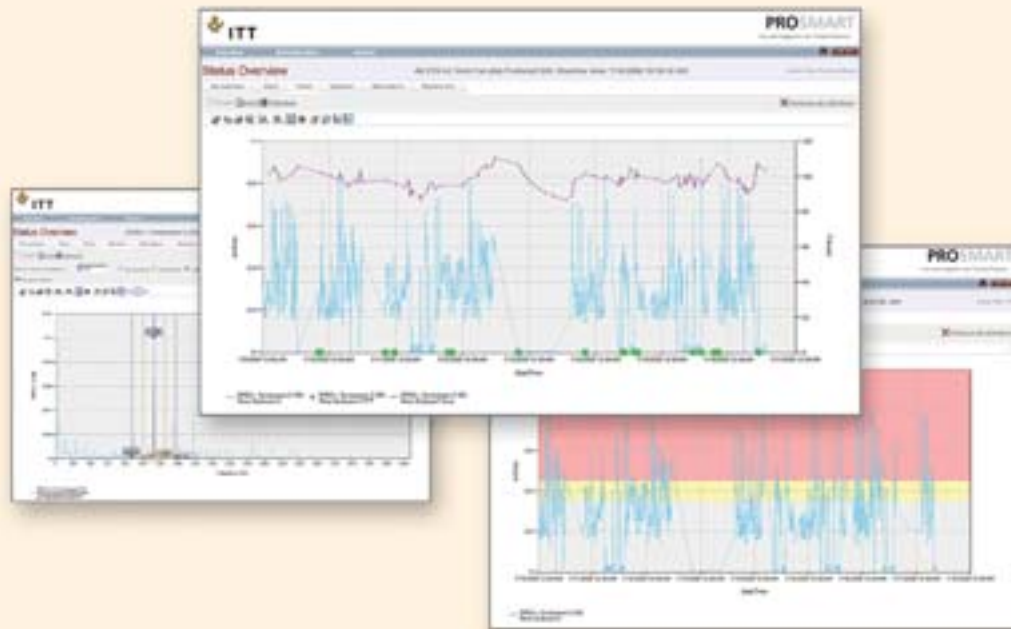
Dashboards take the abstract nature of your machine data and ties it into a visual representation of your machine. ProNet uses easy-to-understand status circles to quickly identify the condition of each machine. A rollover 'quick-view' plot of critical data can be viewed from the Dashboard.

## My Machines



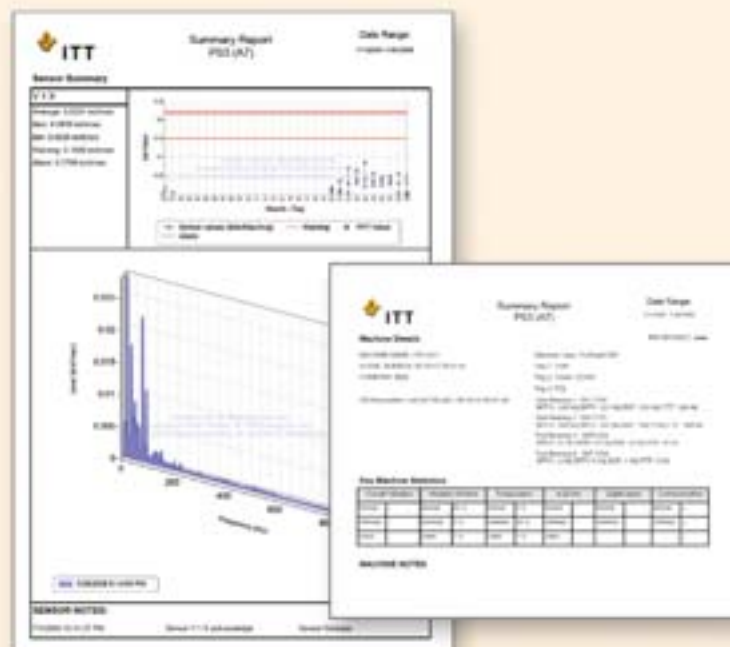
ProNet provides the ability to easily manage the machine you are monitoring by automatically sorting machines based upon user-defined machine importance, then by alarm state. Status circles on each page quickly and easily identify machine condition.

## Trends



ProNet provides the ability to trend and overlay data to easily visualize the interaction between different signals and perform root cause diagnosis. Advanced analysis tools, such as time waveform and spectral data with harmonic and side band cursors are available.

## Reports



Reports can be easily created and published on a periodic basis. Report options include statistical averages of key sensor data, overall trends with high-low-averages, and notes and actions taken on different alarm conditions.

# Technical Specifications

INPUT VOLTAGE	12 -24 VDC
VIB/TEMP SENSOR	12 channels vibration 4 channels temp
TACHOMETER INPUT	1 channel
4-20Ma ANALOG INPUT	3 channels 12 Ω resistance
DIGITAL INPUT	2 channels
FORM-C RELAY OUTPUT	1 channel resistive load
SAMPLING CYCLE	5 seconds
ANALYSIS DATA	FFT Spectrum and Time Waveform
FREQUENCY RANGE	5-3500 Hz
SPECTRAL BANDWIDTH	1 Hz and 0.25 Hz
DATA BLOCK LENGTHS	1024 AND 4096
WINDOWING	Hanning

RADIO FREQUENCY	2.4 GHz FHSS <sup>1</sup>
RADIO OUTPUT POWER	100 & 200 mW
WIRELESS PROTOCOL	proprietary FHSS
WIRELESS ARCHITECTURE	Point-to-Multipoint
TRANSMITTING RANGE	1.6 miles LOS <sup>2</sup> typical 650-130 ft
NETWORK PROTOCOL	Standard Ethernet
NETWORK ADDRESSING	DHCP or Static IP
GUI ENCRYPTION	128 Bit SSL
GUI BROWSER	Internet Explorer
NETWORK CONNECTIONS	LAN/DSL, GPRS/CDMA Modem ModBus/TCPIP Slave
OPERATING TEMPERATURE	-40°C to 70°C (-40°F to 158°F)
CERTIFICATION	CSA, FCC, CE, Class I, Division 2 Group ABCD T4

<sup>1</sup>Frequency Hopping Spread Spectrum

<sup>2</sup>Line of Sight

## Improving Plant Profitability

Our products leverage over 150 years of process machinery knowledge and provide enhanced control and continuous monitoring yielding increased UPTIME and decreased MAINTENANCE and ENERGY cost. The ProSmart predictive monitoring system identifies and solves problems before they impact production. Our PumpSmart control products provide advanced process control, valuable process knowledge without the need for additional sensors, enhanced reliability through failure prevention, and significantly lower energy costs – up to 65%. The 3196 *i-FRAME*™ provides early warning of improper operation before catastrophic failure through daily monitoring of thrust bearing vibration and temperature. LED's provide operators a visual indicator of equipment health.



PumpSmart



ProSmart



3196 *i-FRAME*™

Visit our Web site at [www.ittmc.com](http://www.ittmc.com)

