MachineSense's Power Analyzer electrical line monitoring system predicts the health of electrical motors and components, and provides detailed energy consumption information for connected devices.

Power Analyzer is used by many manufacturing operations and facilities management as a predictive maintenance tool. The system is used in the energy services industry as a guide to understanding and optimizing electrical power consumption.

Power Analyzer measures and analyzes voltage and current on all three phases, power factor, active power and energy, reactive power and energy, voltage and current total harmonic distortion, neutral imbalance as well as sag/swell event detection. Unlike other power monitoring devices taking manual on-spot measurements, Power Analyzer is typically permanently connected to a device, to provide for constant monitoring.

The clip-on toroid sensors are easily attached to the input power line and constantly monitor the supply line. Sensor data is transmitted by the on-board MachineSense Datahub via WiFi or Ethernet to a local router and to MachineSense’s cloud infrastructure.

MachineSense's proprietary analytics algorithm track and compare the collected data against a base line to determine the overall component health trending of components such as bearings, rotors, stators and heating elements. Phase imbalance can be detected and reported as well as current and historic electrical power consumption. Besides the visualization of valuable operating metrics, Power Analyzer accurately predicts and alarms for pending machine and component failures, thus significantly reducing unscheduled equipment downtime.

The Power Analyzer monitoring solution includes MachineSense's extensive Crystalball™ software, which enables the user to set up alarms and alarm recipients, provides six months of historic data with trend lines that show equipment performance, as well as serving as a dashboard for all monitored assets, by department or plant.

- Affordable, low investment and easy to install on existing equipment
- 24/7/365 constant automatic monitoring, no manual measurements
- Dedicated power supply, no need to change sensor batteries
- Easy to understand maintenance advice via text or email messages and handheld or desktop dashboards, no manual data analysis
- Accurate prediction of machine and component failures, no unscheduled machine downtime
- Real time and historic electrical power consumption data

How it WORKS

Power Analyzer toroids are placed directly on incoming power lines to automatically monitor power conditions and detect power anomalies. The sensor data transmits through a self-contained data hub directly to your router and onto cloud-based servers running powerful analytic software. Results are then transmitted from the server to either a desktop or user-friendly app where you will view power conditions with helpful advice to correct power anomalies.

1. Power Analyzer toroid connection to power lines
2. Power Analyzer and self-contained data hub
3. Router
4. Cloud-based servers
5. Mobile app
6. Desktop app

Measures:
- Average 3 Phase Voltage
- Average 3 Phase Current
- Power Factor
- Active “Working” Power
- Reactive “Non-Working” Power
- Cumulative Active Energy
- Cumulative Reactive Energy
- Power Quality Harmonic Distortion for Current & Voltage
- All Values Needed for Energy Optimization
- Reports Phase Imbalance

Analytics Packages:
- Energy Analytics Package (Standard)
  - Usage (24 hrs)
  - Voltage Imbalance
  - Current Imbalance
  - Voltage Sag
  - Voltage Swell
- Heater Bank Analytics Package (Optional)
  - Machine Utilization (24 hrs)
  - Voltage Imbalance
  - Current Imbalance
  - Voltage Sag
  - Voltage Swell
- Motor Analytics Package (Optional)
  - Machine Utilization (24 hrs)
  - Voltage Imbalance
  - Current Imbalance
  - Voltage Sag
  - Voltage Swell
  - Utilization Under Load (24 hrs)
  - Motor Winding (Stator)
  - Motor Bearing
Power Analyzer™ Single-port (with isolation) **SPECIFICATIONS**

### POWER

<table>
<thead>
<tr>
<th><strong>POWER</strong></th>
<th><strong>STANDARD</strong></th>
<th><strong>RANGE</strong></th>
<th><strong>ACCURACY</strong></th>
<th><strong>RESOLUTION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>IEC60059</td>
<td>0-50/100/300 amp per phase</td>
<td>± 0.3% Full Scale Span</td>
<td>0.01</td>
</tr>
<tr>
<td>Voltage</td>
<td>IEC60038</td>
<td>0-600 V</td>
<td>± 1.2% Full Scale Span</td>
<td>0.01</td>
</tr>
<tr>
<td>Apparent power</td>
<td>n/a</td>
<td>up to 310 KVA</td>
<td>1% (0.25 Kw MAX)</td>
<td>0.01</td>
</tr>
<tr>
<td>Total harmonic distortion (V)</td>
<td>IEC 61000-4-7</td>
<td>0-10% up to 5th harmonics (Published)/Up to 27th for THD</td>
<td>±2.5%</td>
<td>0.01</td>
</tr>
<tr>
<td>Total harmonic distortion (I)</td>
<td>IEC 61000-4-7</td>
<td>0-10% up to 5th harmonics (Published)/Up to 27th for THD</td>
<td>±2.5%</td>
<td>0.01</td>
</tr>
<tr>
<td>Voltage sag/swell</td>
<td>IEC 62052-11, IEC 62053-21</td>
<td>n/a</td>
<td>± 2%*</td>
<td></td>
</tr>
</tbody>
</table>

* under steady loads.

### MECHANICAL

- **Display**: Mobile /Desktop Android/iOS
- **Power supply**: 110-270V AC or 24 VDC
- **Dimensions**: length x width x depth 10.0 in X 7.4 in X 2.0 in (255.4 mm X 189.2 mm X 51.7 mm)
- **Weight**: 1.35 KG without current sensors
- **Safety**: IEC 60950-1

### ENVIRONMENTAL

- **Operating temperature**: 14° F to 149°F (- 10° C to 65° C)
- **Operating humidity**: <= 90%
- **Electromagnetic Compatibility**: IEC 61326-1

### CURRENT I/O

- **Number of inputs**: 3-phase current input
- **Current-100A**
- **Current-300A**

### VOLTAGE I/O

- **Number of inputs**: 3-phase voltage input
- **Voltage**: 0-600V (L-L)
- **FREQUENCY**: 47.5-63 Hz

### DATA ACQUISITION

- **Resolution**: 24-bit ADC sampling
- **Sampling frequency**: 1.024 MHz
- **Input signal frequency**: 47.5-63 Hz
- **Data storage internal flash memory (not user replaceable)**: 4 GB for local data storage during disconnection
- **Data rate to cloud**: 1 regular dataset per second. (voltage, current and power factor)

### VOLTAGE CABLE

- **Length**: 2 M
- **Weight**: 2.1 oz (60 g)
- **Clamp type**: Crocodile clamp with banana adapter
- **Cable specification**: PTFE Insulated 0.40 Sq.mm - Silver Plated Copper - 600 V - 6 Core - Shielded Cable Description: Awg.22/19/34 - SPC - E - 6 Core - TEF / SPC / TEF Cable OD: 4.50 mm + / - 0.50 mm
- **Shielding**: 90% shielding with silver plated copper
- **Connector**: PG-9 cable gland

### CURRENT CABLE

- **Length**: 2 M
- **Weight (including sensor)**: 5.3 oz (150 g)
- **Sensor type**: Split core CT
- **Cable specification**: PTFE Insulated 0.40 Sq.mm - Silver Plated Copper - 600 V - 6 Core - Shielded Cable Description: Awg.22/19/34 - SPC - E - 6 Core - EF / SPC / TEF Cable OD: 4.50 mm + / - 0.50 mm
- **Shielding**: 90% shielding with silver plated copper
- **Connector**: PG-9 cable gland