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.
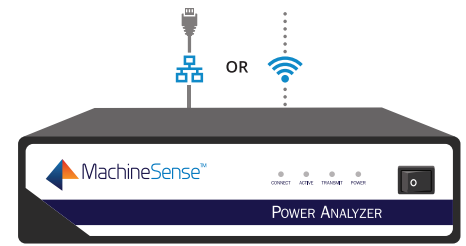
Measures:

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

Analytics Packages:

Energy Analytics Package (Standard)	**Motor Analytics Package (Optional)**
Usage (24 hrs)	Machine Utilization (24 hrs)
Voltage Imbalance	Voltage Imbalance
Current Imbalance	Current Imbalance
Voltage Sag	Voltage Sag
Voltage Swell	Voltage Swell
Heater Bank Analytics Package (Optional)	Utilization Under Load (24 hrs)
Machine Utilization (24 hrs)	Motor Winding (Stator)
Voltage Imbalance	Motor Bearing
Current Imbalance	
Voltage Sag	
Voltage Swell	

- 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
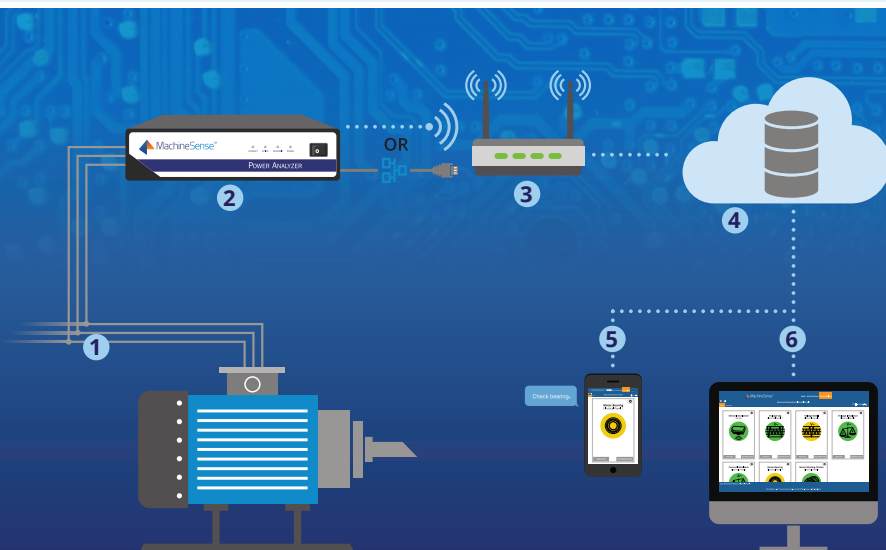
Power Analyzer™ Single-port (with isolation) **SPECIFICATIONS**

| POWER	STANDARD	RANGE	ACCURACY	RESOLUTION
Current	IEC60059	0-50/100/300 amp per phase	± 0.3% Full Scale Span	0.01
Voltage	IEC60038	0-600 V	± 1.2% Full Scale Span	0.01
Apparent power	n/a	up to 310 KVA	1% (0.25 Kw MAX)	0.01
Total harmonic distortion (V)	IEC 61000-4-7	0-10% up to 5th harmonics (Published)/Up to 27th for THD	±2.5%	0.01
Total harmonic distortion (I)	IEC 61000-4-7	0-10% up to 5th harmonics (Published)/Up to 27th for THD	± 2.5%	0.01
Voltage sag/swell	IEC 61000-4-30	Vsag< 0.8*Vnom, Vswell>1.2 * Vnom		
Energy	IEC 62052-11, IEC 62053-21	n/a	± 2%*	

* 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

Power Analyzer™ Sensors

100 Amp Current Sensor
for cable / conductor size up to 0.63 in diameter

Side View   Top View
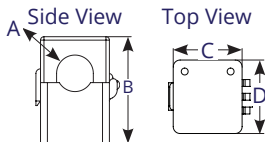
300 Amp Current Sensor
for cable/ conductor size up to 1.3 in x 1.7 in.

Side View   Top View

Power Analyzer™ Single-port

Side View

Top View
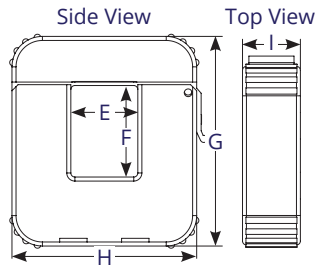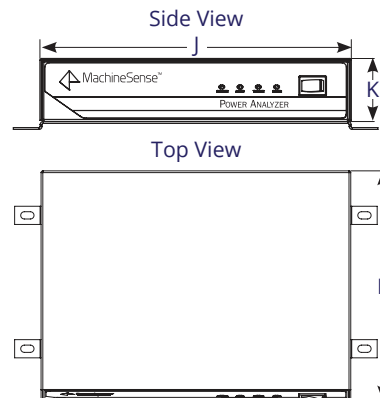
100 Amp Current Sensor	
A	5/8 in diameter (8 mm)
B	1.8 in (46.5 mm)
C	1.2 in (29.5 mm)
D	1.2 in (29.5 mm)
300 Amp Current Sensor	
E	1.3 in (33.5 mm)
F	1.8 (44.5 mm)
G	3.8 (97.0 mm)
H	3.6 in (91.5 mm)
I	1.2 in (29.5 mm)
Power Analyzer Single-port	
J	10.0 in (255.4 mm)
K	2.0 in (51.7 mm)
L	7.4 in (189.2 mm)

MachineSense™