

Power Optimizer®

Power Filter Module Specification Sheet



WARNING! DO - NOT - UNDER - ANY - CIRCUMSTANCES-TRY - TO - OPEN - POWER - FILTER - MODULE - AS - ALL - WARRANTIES - ARE - VOIDED - AND - THE - PATENTED - MICROCHIP - AND - CIRCUITS - WILL - BE - PERMANENTLY - DESTROYED!

Product Features

It is easy install and safety because parallel connect. 10% or higher up energy savings within 3 months.

Specification

Rating : ~480V,50/60Hz

Applicable Loads :in Parallel (Add type) several KVA

Mounting

a. Max. Ambient temperature Rating: 45°C

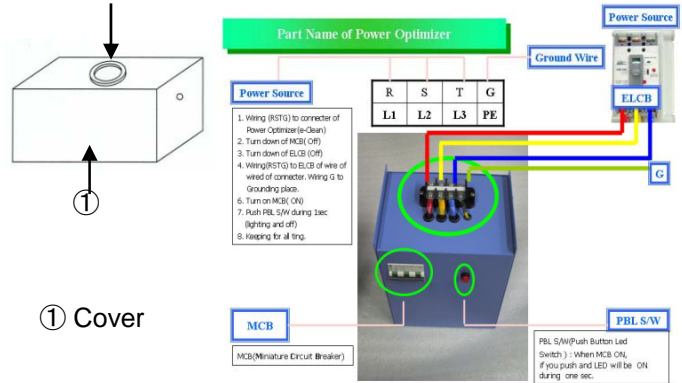
b. Circuit breaker

Rating : 480V,25A

c. Terminal for Field diagram wiring is hereunder:

- e. Run conduit and ac cable to the box and clamp the conduit in place using fittings suitable for outdoor use.
- f. Tightening Torque Range of terminal Block rating is 10.4 In.-lb.

Knockout diameters, side of box:
40 mm

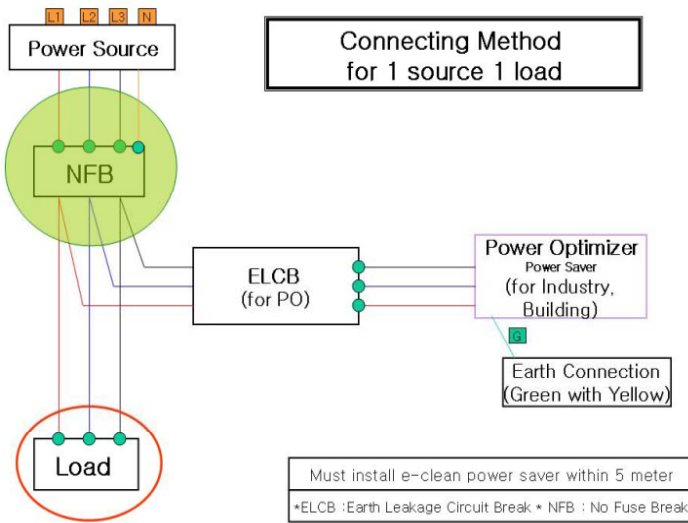


① Cover

CAUTION:

1. This product needs to connect with Enclosed Type1 only. Do not uses it outdoors without additional Rated Enclosure
2. These warranty does not apply when damage caused by:
 - Unbalanced Loads
 - High Voltage Spikes (higher than specified rage)
 - Irregular frequency
 - Violent Current Surges
 - Installation Operating outside of Range
 - (-20°Cand less than+45°C.)
3. Avoid excessive humidity, corrosion, and abnormal vibrations.
4. Cabling Must Meet or Exceed Local Codes and be sized to THINN Finely Braded Twisted Copper
5. When disconnecting Power Optimizer® from load,
 1. Power Optimizer mini-breaker Off
 2. Branch Circuit Breaker (GFI) Off
 3. separates cable from Branch Circuit Breaker
 4. separate from load.
6. Avoid and Protect from Sudden Impact To Cable or Device
7. . Avoid contamination from corrosive chemicals such as paint thinner, benzene, acids, etc., which cause damage
8. The Power Optimizer® is designed to operate effectively in range as stated on label

Warranty and Performance Guarantee Requires Registration with Manufacturer and should be completed within 30 days of installation.



d. Field wire size: When you connecting Power Filter Module unit to breaker (ELCB), you have to use with reference.

Power Optimizer®

Power Optimizer® , (PO), is a patented high technology product with and application methodology. providing the most cost efficient multidimensional solution to the problems facing all of us using electricity to provide our increasing energy needs.

It's design and function target the inefficiencies resulting from the delivery of Energy to the work load, reducing the resistance and increasing the conductivity of all electrical circuits and loads to which it is applied.



The Status Quo!

Up to the present moment, energy reduction projects have been a single dimension application.

Traditional methods to reduce KWH are typically designed to effectively control a single aspect of the power characteristics . Even if directed towards the load side characteristics, such as power factor, they often create more problems upstream from the loads, or when the loads are turned off can cause a great deal of negative impact. Common practices include:

- Peak shaving; Turn it off – Auto shut down!
- Retrofitting of light fixtures, - Reduce lumens!
- Power Factor compensation; Use the kVAR, (unbilled out of phase current is stored and reintroduced into the flow of power. grid
- Voltage regulation – Turn down the voltage, slow down the current and the load.
- Surge suppression. – a good idea

The above technologies all have appropriate uses and can solve a specifically targeted problem; however once chosen, they often require a great deal of maintenance, and cause other issue for the circuits, loads, and grid. By their very design, they often force limits or carry hidden costs that were not bargained for.

What Does the Power Optimizer® DO?

The Power Optimize® utilizes:
State-of-the-Art US Patented Technology and
installation methodology.

The Power Optimizer® is UL, CUL, and CE approved
to condition all types of electrical appliances, equipment
and circuits. Any Size – Any Type – Any Place!

The power Optimizer® reduces resistivity in the materials which transport
electrical energy to the intended workloads, improving conductivity of the
circuits and increasing the efficiency of the entire delivery system .

Power Optimizer® allows users to reduce power consumption without
negative impact on amount of work or time it takes to do it!



Power Optimizer® All Types of Loads

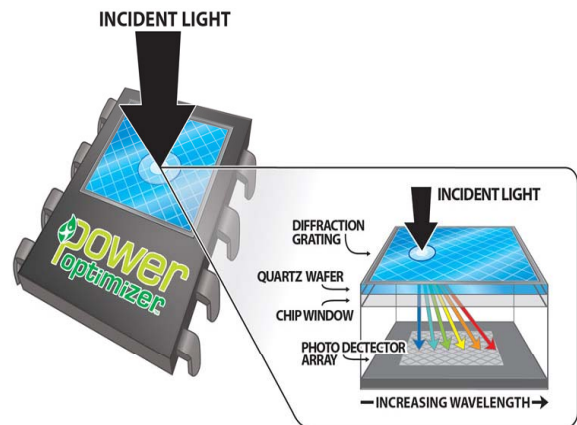
- Manufactured and proven to work with All types of loads...
 - Inductive
 - Resistive
 - Inductive lighting
 - Resistive lighting
 - Kinetic
 - AD
 - DC

- **Savings depend on matching the right Power Optimizer® model with the type of electric equipment and load profiles.**

How The Power Optimize® Works

At the core of the Power Optimize® is our patented semiconductor chip (SSC) and delivery system.

Power Optimizer® creates a “photoelectric effect” by introducing a filtered synthetic infrared wave, (in a specific wavelength), to a Special Semi-Conductor, (SSC), comprised of PLZT, (optic ceramic), along with our proprietary logic. The SSC together with the photosynthetic irradiation methodology, when pulsated in concert with the current’s frequency and voltage, generates a “mixed infrared wave energy.” Focused on consistently mitigating the excessive free electron movements and calming the vibration of the electrons, the Power Optimizer® creates multiple benefits in both the circuits and windings of the various loads.



- Installed in parallel to electrical panels or equipment
- UL and CE approved
- Compact size
- Light for easier handling & installation
- All components are concealed with no hazards
- No maintenance except making sure it is ON and properly connected to the running circuits and loads

Power Optimizer® Features and Benefits

Main Benefits of Choosing Power Optimizer®

- Reduces Energy Consumption (kWh) 8% -15%
- Reduces KVA Demand
- Reduces Joule Heat Losses
- Reduces Noise, Harmonics & Surges
- Extends Equipment and Appliance Life Cycles
- Improves the Environment due to reductions in demand for producing more energy , thereby reducing carbon emission into the environment.

**The Real Value of the Power Optimizer® is :
Allows users of Energy the Freedom to Choose their
own definition of Efficiency...
Reduced Cost or Increased Work Output
or Both!**

**True Energy Efficiency
Without
Compromise!**



Patented Semiconductor technology

Through the application of photoelectric coupling between photons (produced by the light energy), and the electrons which make up the current being conducted to the loads, along with the ions and phonons in the conductor material, (lattice).

- Stabilizes the vibration state of the ‘spinning electrons’ within the electrical circuits
- Controls irregular drifting of the otherwise free electrons at the atom’s outer orbit
- Reduces the energy robbing collisions thus resulting in decreased material resistivity, decreased heat, decreased harmonic distortion and decreased energy loss with No Change in Power Required to perform Work

For a more detailed explanation visit IEEE.com or read our published report: (included).

- “A Study Improving Electric Energy Efficiency by Using Infrared Rays”.



US007373535B2

(12) **United States Patent**
Kwon

(10) **Patent No.:** US 7,373,535 B2
(45) **Date of Patent:** May 13, 2008



With Power Optimizer®, it is now possible to address the more complicated aspects of Energy Efficiency by truly reducing kWh Demand and the subsequent supply requirements. To take full advantage of the Power Optimizer®'s multidimensional energy efficiency solution requires a complete paradigm shift on the part of the suppliers, managers, technical advisors and users of electric power.

Power Optimizer® technology is a three dimensional solution as kWh reduction is a result of several well documented scientifically proven internal influences which amplify over time through the interaction of The Power Optimizer® technology and the circuits conductors and loads.

. The collision amongst the electrons, the ions of the other atoms in the conductor, create an increased vibration state in what is referred to as phonons. effect the conductivity of the material being treated. and the mean free path which creates the conductive nature of the material.

By pulsing protons energy at a specific synthetic wavelength towards the electrons constituting the flow of current in a conductor, we create a cascading effects resulting in reduced spinning, vibration and the continuous calming of electrons flowing through the conductor and loads Irregular drifting of the valance electrons at the atom's outer orbit are changed from an outwards, leading to their streamlined, less chaotic, more laminar flow.

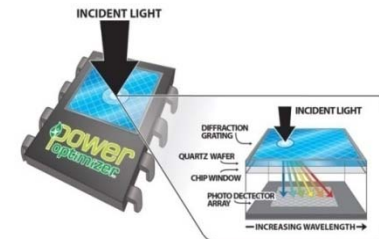
Bottom Line: Less Loss with more speed = lowering supply requirements.

The Power Optimizer® uses UL, CUL, CSA, CE Approved Components!

- Semi-conductor device which stores the light energy (SSC) ¹
- Surge Absorber – Protects against normal energy surges in circuit
- Noise limiter – Reduces harmonic Distortion
- Infrared Emitting Diode - LED
- Input current state display (LCD)²
- Oscillator limiter to correspond the frequency of the output signal with that of the ac power.
- 25 years of dedicated research, development testing and refining of the process to create a safe and consistent application delivery system and installation methodology.

Note 1: Consists of PLZT Ceramic based semiconductors and out patented proprietary logic boards.
(See Warranty for further explanation)

Note 2: Upon initial installation and energizing of the circuit allows for instant functional test...



Case study: office building



SNC • LAVALIN

SNC-Lavalin is one of the world's leading groups of engineering and construction companies, a key player in facilities, operations, management and infrastructure, with offices in 30 countries and projects in some 100 countries.



12% kWh Savings

Situation

A Power Optimizer™ was installed on a water chiller pump in SNC-Lavalin's head office located in Montreal, Canada in July 2007 and has been operating for over 16 weeks. Based upon the realized savings, SNC-Lavalin is planning to install Power Optimizers™ on all motors, lighting and electrical outlets throughout the 23 story building..

Loads

25 hp water chiller pump motor (600 volt, 1770 rpm, 60 hz), steady inductive load operating continuously (24 hours, 7 days a week).

Monitoring

kWh results were determined using a kWh meter installed by ProSonic, SNC-Lavalin's electrical contractor and were reviewed by an SNC-Lavalin engineering energy expert. Prior to installation, the average kWh consumption was 22.21. After installation it dropped to 19.55 kWh for 12% a savings and has continued for over 2 months. In addition the KVA decreased by 30.2% and the power factor improved by 26.1%.

Case study: Supermarkets

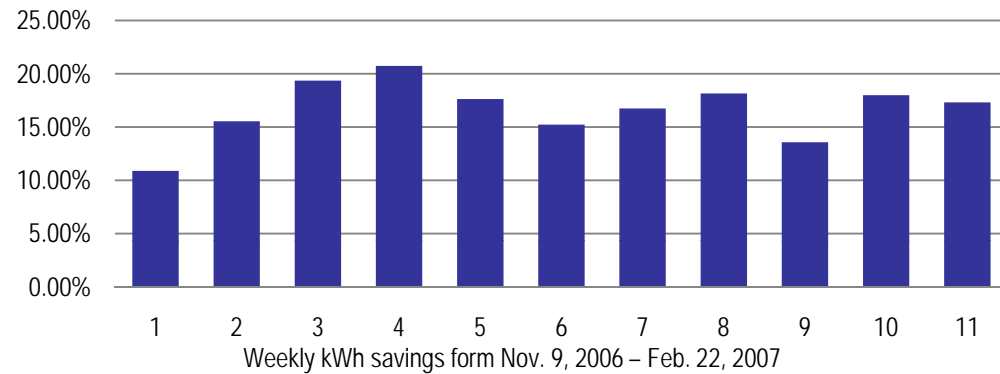


GS Supermarket

Leading South Korea supermarket chain, GS, is run by GS-Watson under a joint venture between GS Retail and A.S. Watson.



16.5% Average Savings



Situation

Power Optimizers™ were initially installed in 1 store. Based upon the savings results, 5 stores were added and 60 more stores will soon install units.

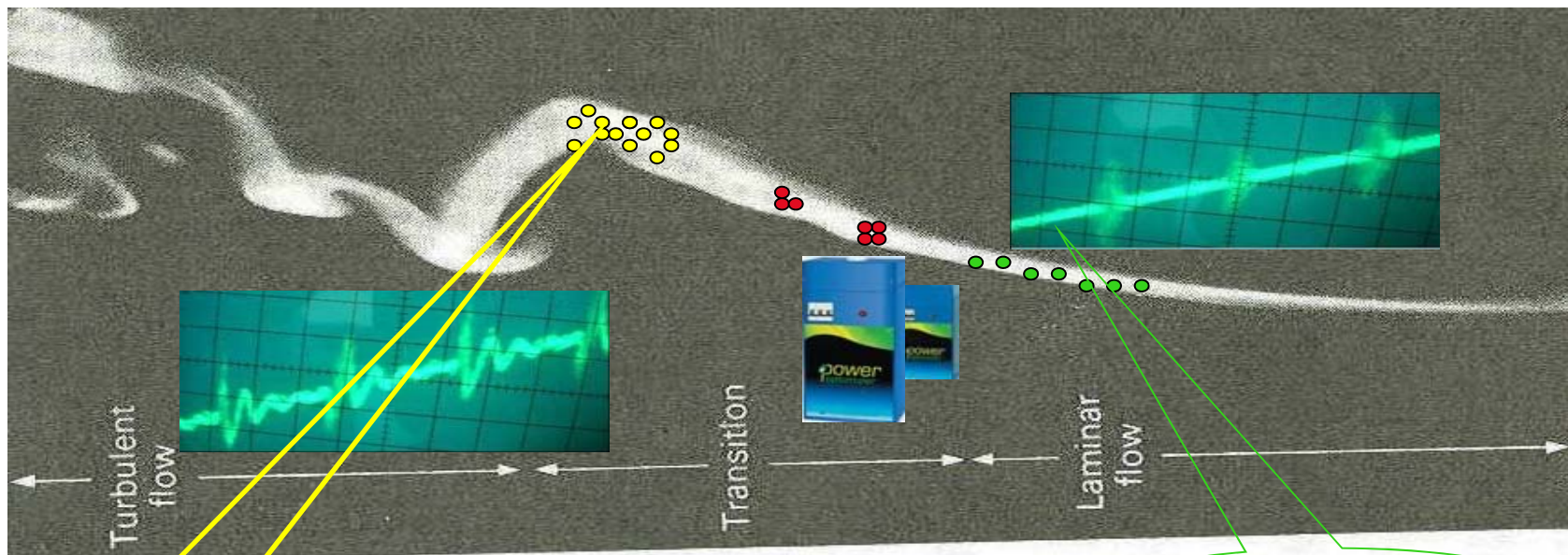
Loads

The store's inductive loads (refrigerator, cooler, pumps, etc.) as well as lighting.

Monitoring

kWh results were determined directly from utility statements using Korean Government certified meters. A kWh daily baseline of 1105 kWh was established during the four weeks before installation. The average kWh during the 11 weeks following installation was 924 for an average savings of 16.5% - which has been maintained.

Basic Fluid Mechanics describes Electric Current as the flow of electrons across a conductor



Rough: More energy loss

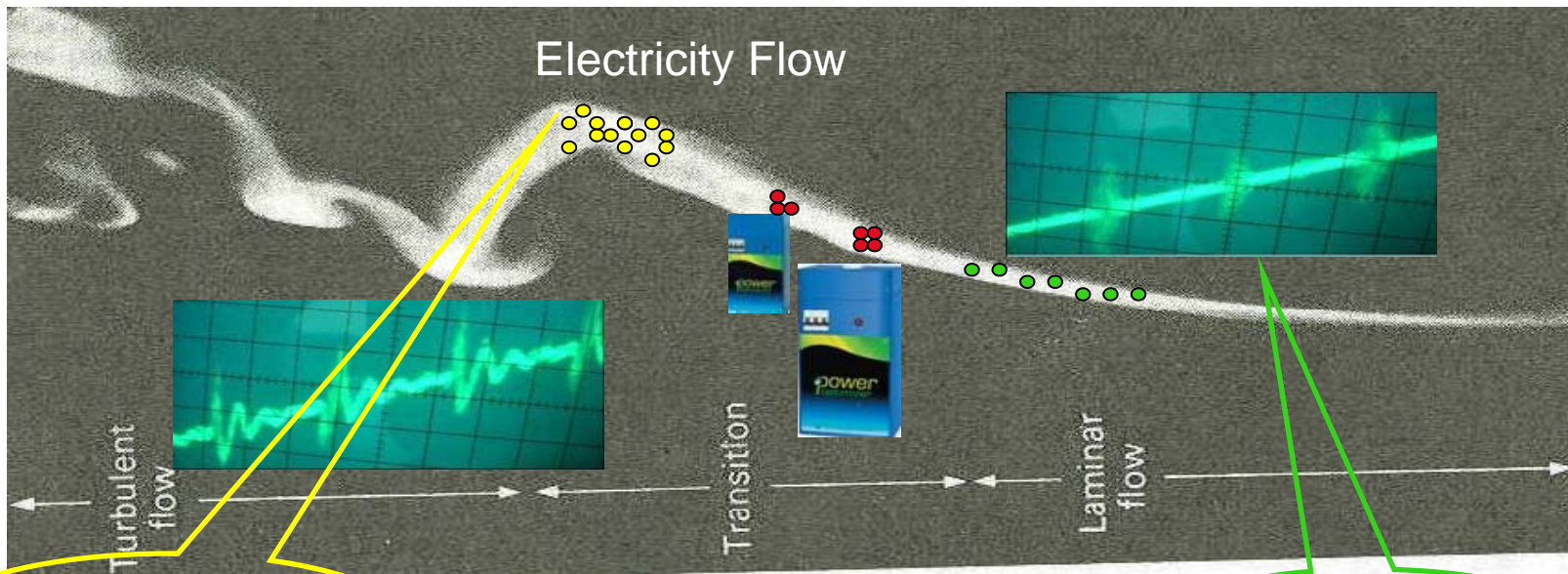
Smooth; Less energy loss

Power Optimizer® causes a transition in the Energy Flow, resulting from the effect of infrared light energy applied across a circuit connected to any load.



Power Optimizer® Usage Effects

Orderly electron flow



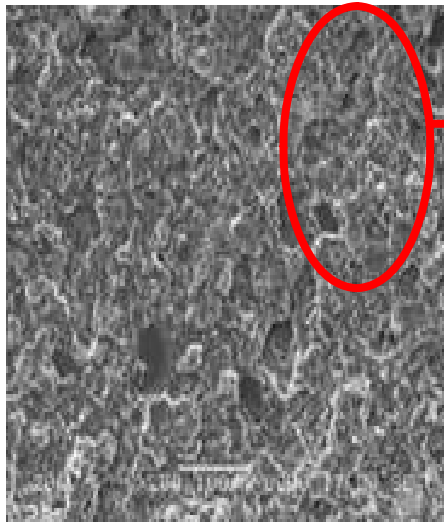
Chaotic
Substantial loss

Stable
Smaller losses

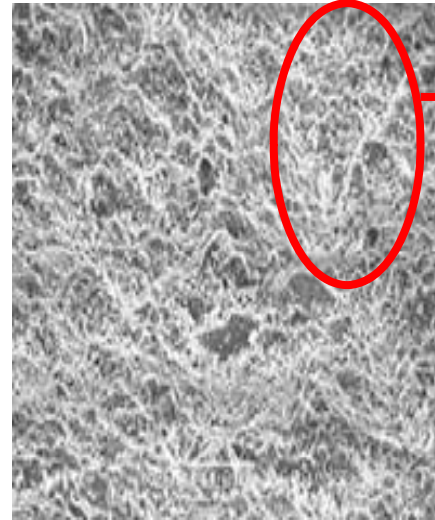
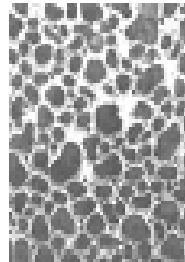


PO Use Effects

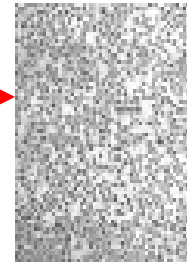
Changing the material resistance state of the conductor



(before PO use)



(few weeks into PO use)



Scan from Electron Microscope photographs

Relationship factors between the stress–strain curve and the resistance

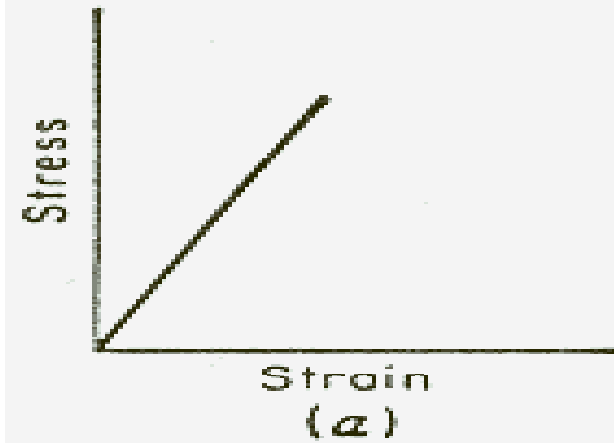


Fig. (a) stress-strain diagram before treatment with PO is closer to a hard wire.

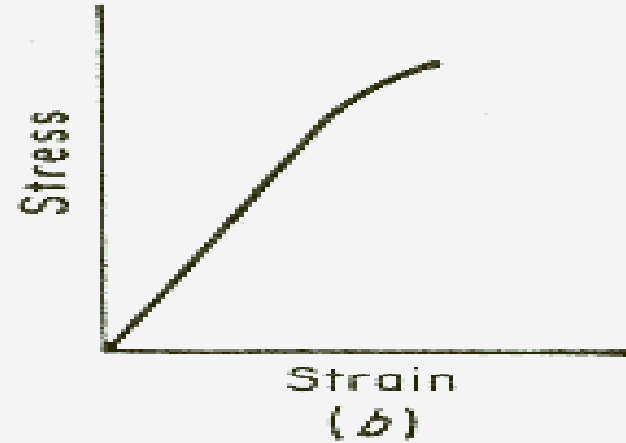


Fig. (b) stress-strain diagram after continued treatment with PO has the characteristic more like a soft wire.

*Note: Resistivity of copper wire ($\mu\Omega \cdot \text{cm}/20^\circ\text{C}$); a. hard wire 1.777, b. soft wire:1.724

After continuous treatment with the Power Optimizer®, (from 60 to 120 Days):

- The Yield Point and Ruptures Points are increased or (longer).
- Density of the wire increases (less brittle) higher.
- Wire is less brittle.
- Resistance is Decreased
- Conductivity is Improved.

Successfully Tested

From the MET-Labs test to the first US Beta-Test site, the Power Optimizer™ has consistently shown results in both lab settings and real world applications.

Savings Obtained and Validated by Clients:

Samsung - LCD – Korea -20%

Korea Telekom – MSC – 14,7%

Alcom – aluminum – Malaysia – 14%

Klokner KP - plastic – Germany – 13%

XXX – USA

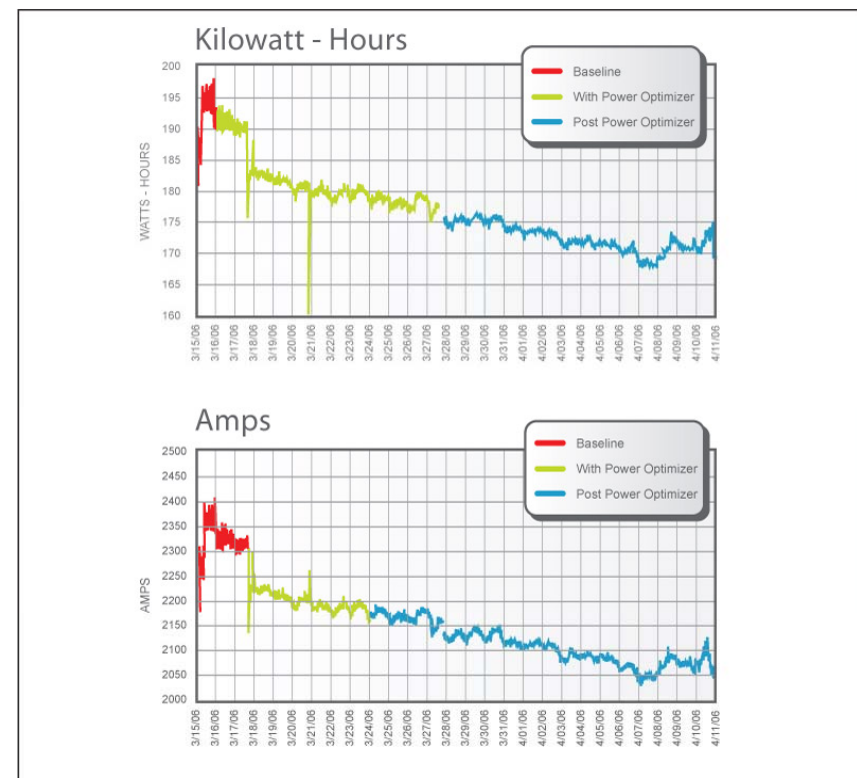
XXX - USA

LG Poland – refrigerators – 15%

Kennametal Poland – Zory – 20%

MET Labs Test of the 3Kva Power Optimizer™ on a 5-hp Motor

- The Power Optimizer™ shows a significant drop in both Kilowatt-Hours and Amps
- This translates into a Real-World Savings of **15%** on electric power consumption
- MET Labs is an independent testing facility that is recognized throughout the world
 - For more information on MET Labs visit METLabs.com



The 1st US Beta Site Test

- The first US beta site test of the Power Optimizer™ is currently being conducted at LA Cold Storage
 - For more information on LA Cold Storage visit LACold.com
- Installed on one of LA Cold Storage's Ammonia Compressor Pumps, the Power Optimizer™ has been proven to reduce the pump's electrical power consumption by **25%**



Industry Proven

Client. Challenge. Solution.

From Hitachi to WIA, Hotels to Restaurants, the Power Optimizer™ consistently helps our clients rise to their challenges while lowering their electrical costs.

Hitachi Electronic Product

Industry: Electronics

10% Savings

Client

Hitachi Electronic Products was established in 1989 as part of Hitachi, LTD's expansion into Malaysia's dynamic electronics industry. Progressing with the nation, HEPM is one of the primary manufacturers of DVD-ROM Drives in Malaysia.

Challenge

To bring their manufacturing facility in line with Hitachi Management's newly implemented Green Procurement policy.

Solution

Installing the Power Optimizer™ on their air compressor demonstrated HEPM's commitment to the Green Procurement policy and saved the company 10% on the electrical costs of running the compressor.

Website

http://www.hepm-hitachi.com.my/index_f.html

WIA Corporation

Industry: Machine Tooling **11% Savings**

Client

WIA is Korea's leader in integrated precision machinery. Their production ranges from core automotive parts, various CNC machine tools, robots, presses to a variety of industrial machinery and future-oriented aircraft parts.

Challenge

Never satisfied with their current level, WIA's machine tools division, number 1 in market share, continually seeks out the world's best in quality, productivity, and technical expertise for their R&D investments.

Solution

Installing a Power Optimizer™ to condition the entire machine tools division's factory saved WIA **11%** on the electrical cost of operating their market-leading division.

Website

<http://www.wia.co.kr/>

Dong-Eun Forging Co. Ltd.

Industry: Automotive

14% Savings

Client

DongEun Forging Co. Ltd., designated as a Promising Small and Medium Size Industry by the CGF, is a leading Korean producer of engine and transmission parts for automobiles.

Challenge

The opening of a second factory with their largest stamping equipment to date nearly doubled the company's expenditure on electricity.

Solution

By installing Power Optimizers™ on their 2500 ton and 1600 ton Stamping Presses, we were able to reduce the DongEun Forging Co.'s electrical expense on this equipment by **14%**.

Website

http://def.koreasme.com/index_e.html

Dong Ho

Industry: Textile

16% Savings

Client

Dong Ho is a leading South Korean producer of embossed, dyed, and split-suede leather for the industries of upholstery, footwear, handbags, and luggage.

Challenge

To reduce operating costs in order to stay competitive in a market that ranks 7th in the world in textile production.

Solution

By installing a Power Optimizer™ on their fiber machinery, Dong Ho was able to reduce their electrical expenditure on this key component by **16%**.

Website

<http://dong-ho.co.kr> *(Currently Down)*

Megaview Hotel

Industry: Lodging

17% Savings

Client

Megaview Hotel is a 94-room hotel in the heart of Kuantan, located just 15 miles from the Sultan Haji Ahmad Shah Airport in Malaysia.

Challenge

To improve the operational efficiency of their current chiller system that accounts for as much as 40% of their energy expense.

Solution

By installing a Power Optimizer™ on their chiller system, we were able to reduce the electrical expenditure on their chiller by **17%** and extend the functionality of their current system.

Website

<http://www.megaviewhotel.com/>

Permanis

Industry: Beverages

19% Savings

Client

A Malaysian soft-drink bottler, Permanis bottles for such soda brands as Pepsi Cola, Seven-Up, Wilson, Club, Miranda, Mountain Dew, Bleu, and A&W.

Challenge

With Asia becoming the fastest growing market (volume sales) for soda in the world, Permanis must find a way to increase output without incrementally increasing their bottling costs.

Solution

By Installing a Power Optimizer™ on the Air-Compressor used for Permanis' PET bottling process, Permanis was able to reduce the electrical energy costs of bottling by **19%** and successfully meet the increasing demand without lowering their profit margin.

Website

http://www.tradenex.com/sites/Permanis/f_main.htm

Chung Mu

Industry: Construction

23% Savings

Client

Chung Mu Co. is a leading producer of ready-mixed concrete for the areas of Tong Young, Geoje, and Gosung in South Korea.

Challenge

To gain a competitive edge over other REMICON (Ready Mixed Concrete) producers in their market.

Solution

Installing a Power Optimizer™ on their concrete mixer, the Chung Mu Co. was able to lower their electric costs by **23%** and gain the competitive edge that they were looking for.

Website

http://chungmuco.koreasme.com/index_e.html

Samsung SDI (M)

Industry: Electronics

33% Savings

Client

Part of the Samsung Group, Samsung SDI(M) is the first overseas manufacturing base for Samsung SDI Korea, a company which owns around a quarter of the world's color picture and color display tube market. They produce 14 million color CRT units annually and supply all of the parts and raw materials used in their production.

Challenge

To find a cost efficient solution for reducing the electric consumption of key components in their CRT manufacturing facility.

Solution

Installing a Power Optimizer™ on the main water pump lowered the electric cost of operating this key component by **33%**.

Website

<http://www.samsungsdi.com/contents/global/malaysia/main.jsp>

Power Optimizer™ Case Study



The Klöckner Pentaplast Group (KP) is one of the world's leading producers of films for pharmaceutical, medical device, food, electronics, and general-purpose thermoform packaging.



KP Films engaged Energy Automations Systems Incorporated (EASI), in Nashville TN, to find programs for reducing energy usage. EASI selected the Power Optimizer™ as an application for this program.

6 to 13% kWh Savings

Background



KP determines the amount of electricity consumed in film manufacturing by calculating the amount of kWh used per Kg. of film produced. KP's _____ plant manufactures packaging film for Oscar Mayer and selected this client's film manufacturing for the test.

Situation

Two 480 volt, 100KVA, inductive load Power Optimizers™ were installed by EASI on a KP _____. The data was collected by KP staff using a Shark 200 revenue grade meter with an accuracy of 0.2%. The data was then provided to EASI for analysis.

Results

A baseline of kWh/Kg. was first determined. This was followed by 3 measurement periods over 1 ½ months. EASI has had experience with the Power Optimizer's™ savings results taking place over time and wanted to provide an adequate period to monitor the results.

Run	Dates	kWh	Kg. Produced	kWh/Kg.	Savings
Baseline	1/08-1/13	17,410	131,682	0.132	-
PO run #1	1/14-1/18	21,686	167,821	0.129	2.26%
PO run #2	2/05-2/13	35,346	274,182	0.129	2.49%
PO run #3	2/27-3/05	33,314	290,523	0.115	13.27%