SEEGCO POWER

"TOTAL POWER CONDITIONING"

ELECTRICITY COSTS EATING AWAY YOUR COMPANY'S PROFITS?

WE CAN HELP

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I. COMPONENTS OF PURCHASED POWER

Intro: Familiarity with distinct yet interrelated aspects of a facility's power usage is essential to understanding how Seegco's Total Power Conditioning service results in significant cost savings via increased electrical efficiency.

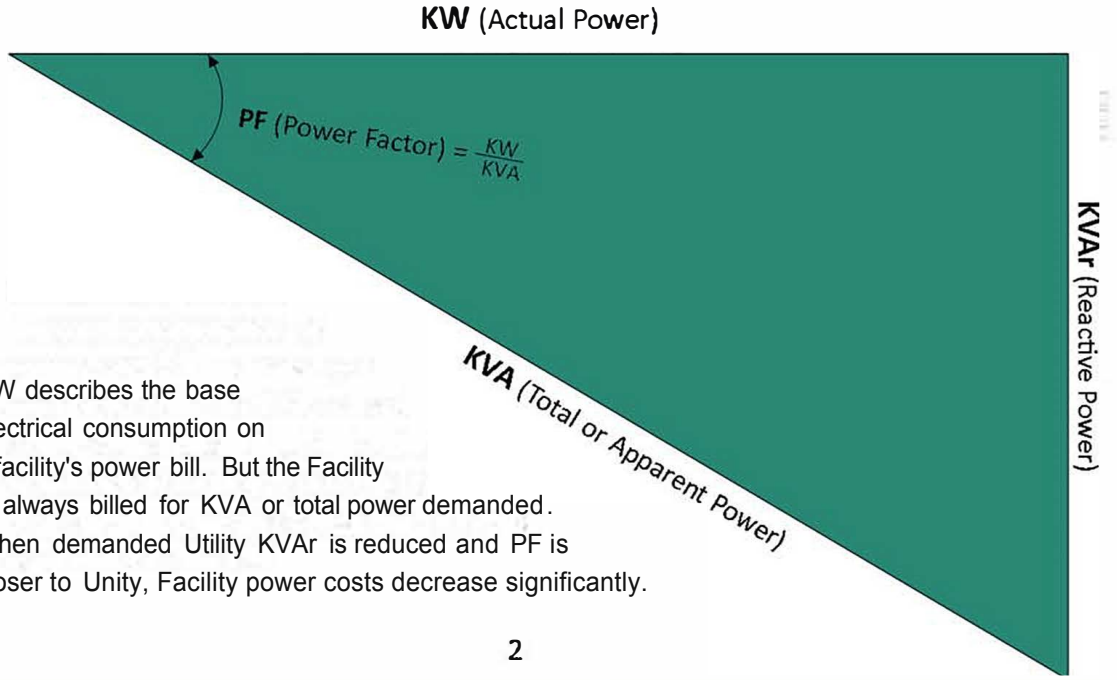
Basic Terms for Understanding a Power Bill:

Kilowatt (KW) is Working Power (also called Actual, Active or Real Power). This is the useful power that actually fuels working equipment.

Kilovolt Ampere Reactive (KVAr) is Reactive Power required by inductive loads; it is power used to create magnetic fields necessary to drive rotating equipment such as motors and compressors.

Kilovolt Amps (KVA) is Apparent or Total Power; essentially, the "vectorial summation" of KVAr and KW.

Power Factor (PF) is an expression of power use efficiency. It is the ratio between the KW and KVA drawn by an electrical load, where KW is the actual load power and KVA is the apparent load power. PF values range from O to 1, or are expressed as a percentage, where "1" or "100"% is known as "Unity."



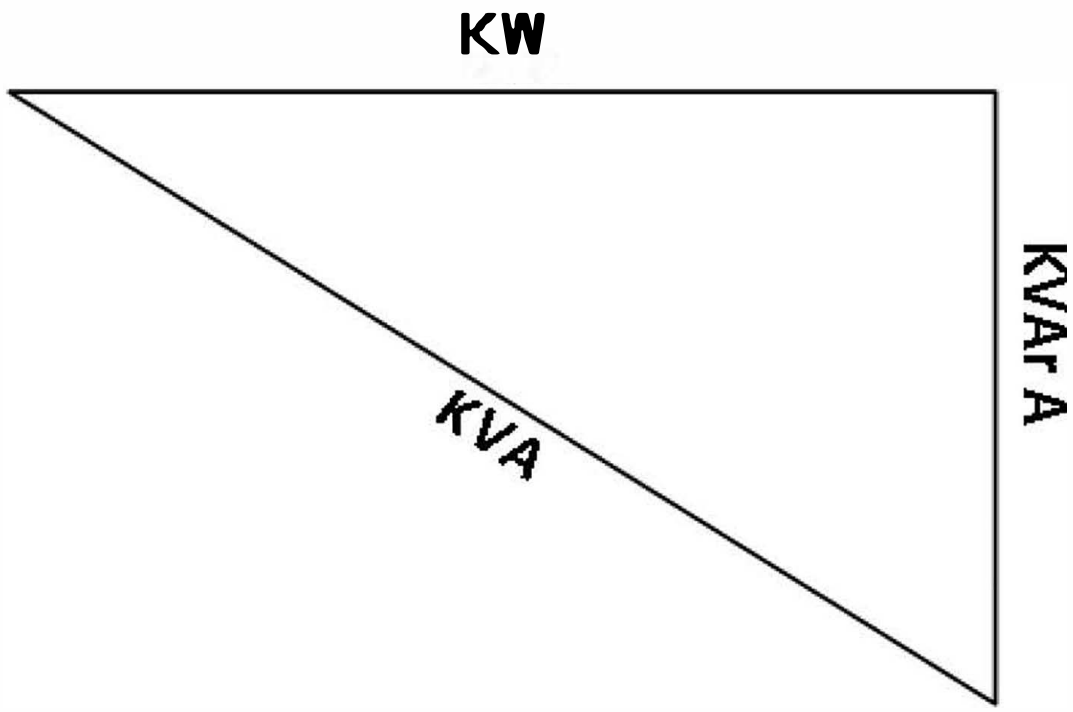
KW describes the base electrical consumption on a facility's power bill. But the Facility is always billed for KVA or total power demanded. When demanded Utility KVAr is reduced and PF is closer to Unity, Facility power costs decrease significantly.

II. THE "MITIGATOR"
Power Bills, Equipment Life, and Facility Health "Before and After" Considerations

What does Seegco's Mitigator machine actually do?

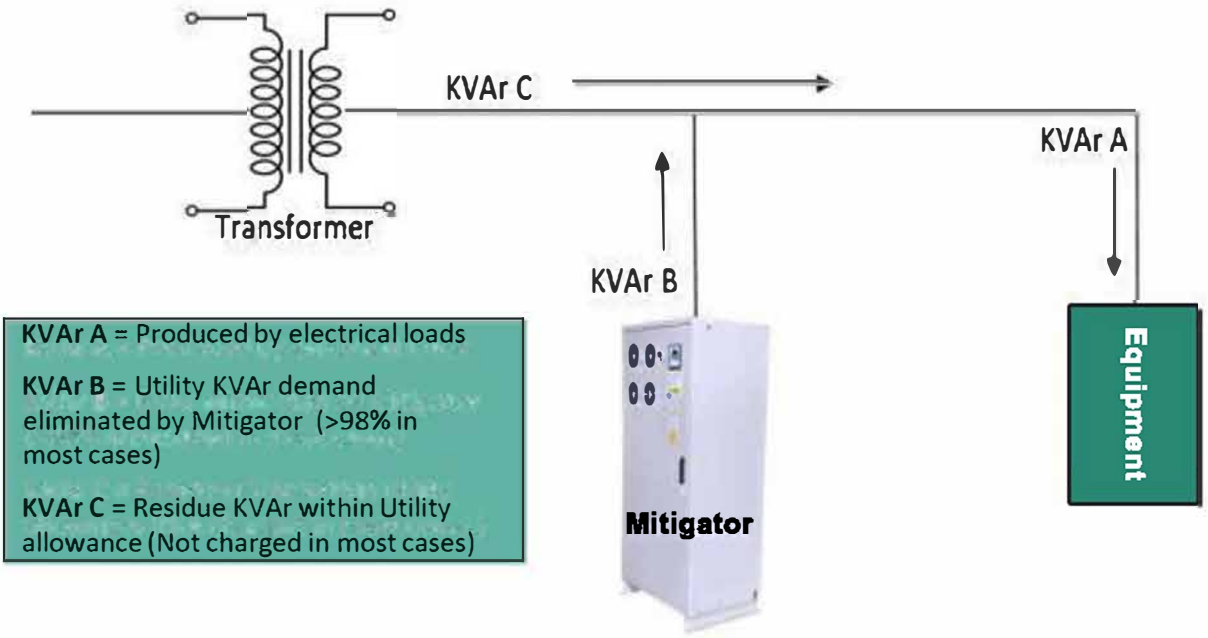
1. **Reduces Utility drawn KVAr:** the Mitigator reduces Utility drawn KVAr, in some cases, in excess of 97%. This lowers demand KVA that is shown on a facility's power bill. Consider the following diagrams which unfold the "before and:after" story.

Figure 1: *Pre*-Mitigator



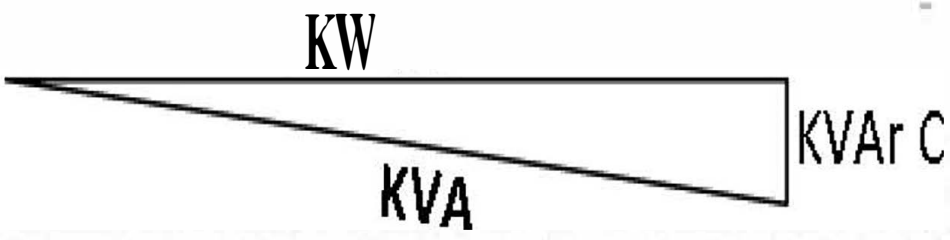
Prior to installing a Seegco Mitigator, a facility's reactive power (KVAr A in Figure 1) is supplied solely by the Utility company. Accordingly, the apparent power (KVA in Figure 1) is high because the Utility alone supplies both active and reactive power.

Figure 2: *Post*-Mitigator



The Seegco Mitigator (Figure 2) supplies reactive power to the load (KVAr B); accordingly, the Facility avoids having to draw ("buy") reactive power from the Utility. Seegco's Total Power Conditioning Service customers only purchase the difference between KVAr A and KVAr B, which is normally less then 10% of total KVAr -- purchase and penalty savings are substantial.

Figure 3: Decreased Demand for Utility KVAr



Reducing inefficiency (wastage and heat related equipment stress) results in smoother and cooler running equipment that draws fewer amps to produce identical working power. Lowering reactive power demand (KVAr C Figure 3) reduces costs paid for KVA, creates system capacity, and maximizes overall efficiency.

Notably, studies suggest that for every 10 °C (18 °F) increase in internal winding temperature, motor life is cut in half. Likewise, each percentage of efficiency improvement correlates with an equal reduction in life cycle costs.*

*taken from, http://www.weelectricmotors.com/How-heat-effects-a-motor-life_b_2.html

2. **Reduces KVA:** The Mitigator consistently reduces the total KVA in excess of 30%. KVA reduction is simply a reflection of reduced KVAr drawn from the Utility. As shown in Figures 1, 2 & 3, Working Power (KW) remains the same, but as Utility KVAr is reduced, total KVA is also reduced. Notably, Demand KVA is a number reflected on most power bills as a penalty. When PF is improved to near Unity, these penalties are avoided and Facilities are billed based almost solely upon working power used (KW or KWH).*

   * subject to load type , conditions, and power company

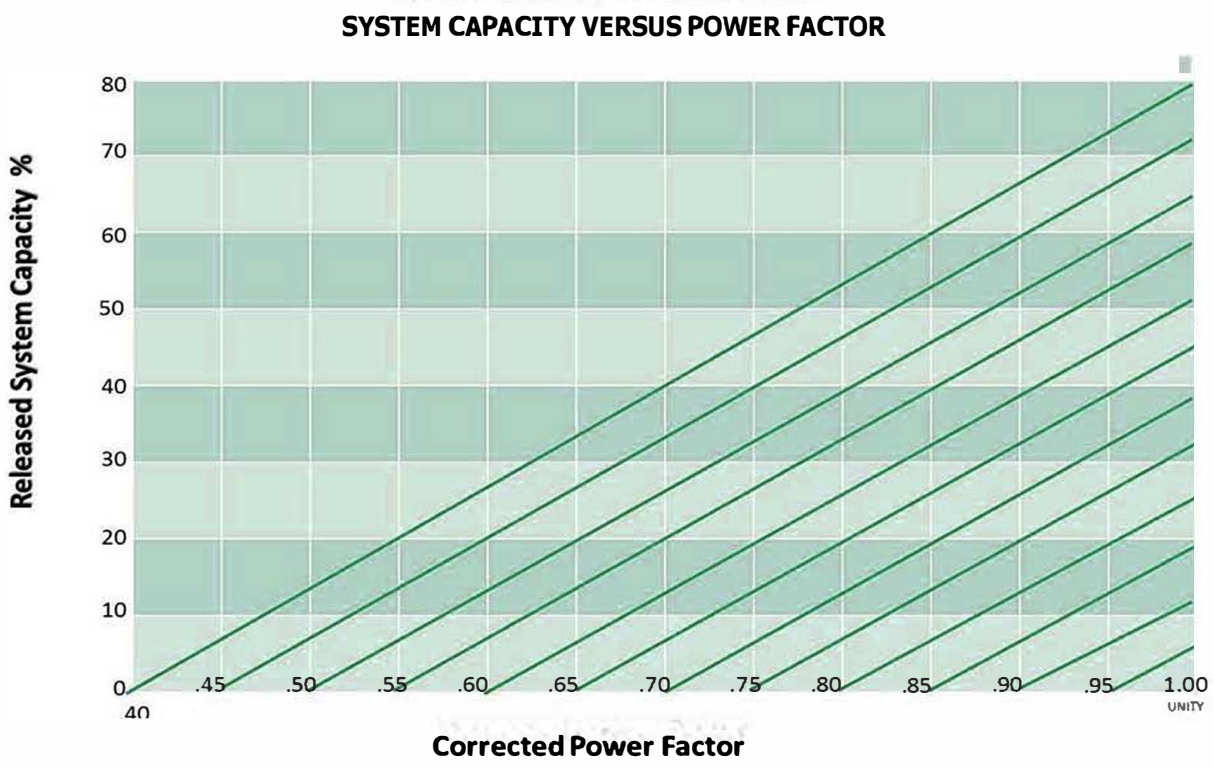
3. **Bringing Power Factor to Unity**:

   A. **Increases safety margins** on installed switchgear, and reduces spike and transient damage potential to expensive machinery.

   B. **Lowers Utility Fees by reducing peak KW billing demand.** Inductive loads which require reactive power lead to lower power factor. The increase in required reactive power (KVAr) causes an increase in required apparent power (KVA), which is supplied and billed by the Utility. Essentially, low PF causes the Utility to increase generation and transmission capacities in order to accommodate for the extra demand. Raising PF means using less Utility supplied KVAr. This results in less overall KVA, which translates into real dollar savings.

   C. **Eliminates Power Factor Penalties.** Utilities usually charge penalties when PF dips below 0.90 (some penalize at less than 0.95 and others actually refuse to supply facilities with PF below .85). Seegco's Total Power Conditioning service using customized Mitigators , eradicates penalties and any prospect of supply refusal.

D. **Increases system capacity** and **reduces system losses.** By installing our Mitigator, PF is improved to near Unity and system capacity is increased. Uncorrected PF causes power system losses in your distribution system. By improving PF, these losses are significantly reduced. Current rising energy costs make efficiency attractive. Lowering system losses expands system load capacity; in certain cases observed by Seegco and its associates, load capacities have increased by as much as 40% after Mitigator installation. For example, If the existing PF is below 0.70 and it is corrected to Unity, a 40% capacity increase results; this example is expressed on the chart below capturing PF related capacity trends.



E. **Increases Voltage.** In many locations low Facility voltage is a problem. As mentioned above, uncorrected PF causes power system losses in a distribution system. Notably, as power losses increase, voltage drops occur. This can cause overheating and premature failure of motors and other inductive equipment. By raising PF, voltage drops are minimized along feeder cables and these problems can be avoided. Motors will run cooler and more efficiently with an increase in capacity and starting torque.

4. **Mitigates Harmonics.** As an added feature, all Mitigators come equipped with **Harmonic Filtration capabilities**, which can be customized to suit any commercial or industrial environment. Just as high blood pressure can create stress and serious problems in the human body, high level harmonic distortion stresses both Utility and Facility distribution systems, including all the equipment that is serviced by both. This can result in a plant engineer's worst fear - "shut down" of important Facility equipment, ranging from a single machine to an entire line or process. Equipment shutdowns can be caused in many ways. For example, higher voltage peaks that are created by harmonic distortion place extra stress on motors and wire insulation, which ultimately results in insulation breakdown and failure. Additionally, harmonics increase RMS current, resulting in increased operating temperatures for equipment, greatly reducing longevity. Seegco's Mitigator abates these issues.

5. **Surge Protection:** Seegco's equipment provides protection against Utility and environmental transients.

6. Includes a **RealTime Smart Energy Monitoring System** that provides real-time online access by Seegco customers at any time.

TECHNOLOGY SUMMARY

Seegco Power's Total Power Conditioning Service with **Custom Mitigators and Monitoring** is unmatched in efficiency. Ultimately, benefits enjoyed by Seegco's commercial and industrial customers include:(1) lowered power costs, (2) increased system capacity, (3) reduced transient/spike damage potential, (4) prolonged machine life, (5) decreased parts replacement frequency and/or related maintenance, (6) minimized "down time" and (7) mitigated harmonics. This all translates into "competitive edge" in the form of increased profits through outright savings, and bolstered goodwill emanating from the ability of Seegco customers to serve their own customers in an uninterrupted and dependable manner. Seegco takes the job of helping its customers serve their own customers very seriously. With each Total Power Conditioning Service contract, Seegco truly inherits a new commercial partner with shared interest in continued power conditioning and savings.

II. SEEGCO'S TOTAL POWER CONDITIONING MONITORING

Seegco's Total Power Conditioning comes complete with a 24 hour monitoring service which tracks the performance of installed Mitigators at each facility. Continuous monitoring of Facility health and power efficiency has enormous benefits. Around the clock attention is given to each operatring Mitigator; if the system demonstrates a problem area or harmful harmonics trend, Seegco informs engineering staff at its customers' Facilities well before the onset of costly calamity. Likwewise, the Seegco Mitigator is constantly being monitored for adjustments and maintenance needs; this ensures that our power conditioning technology will continue to save our customers money and foster optimum Facility power health at all times.

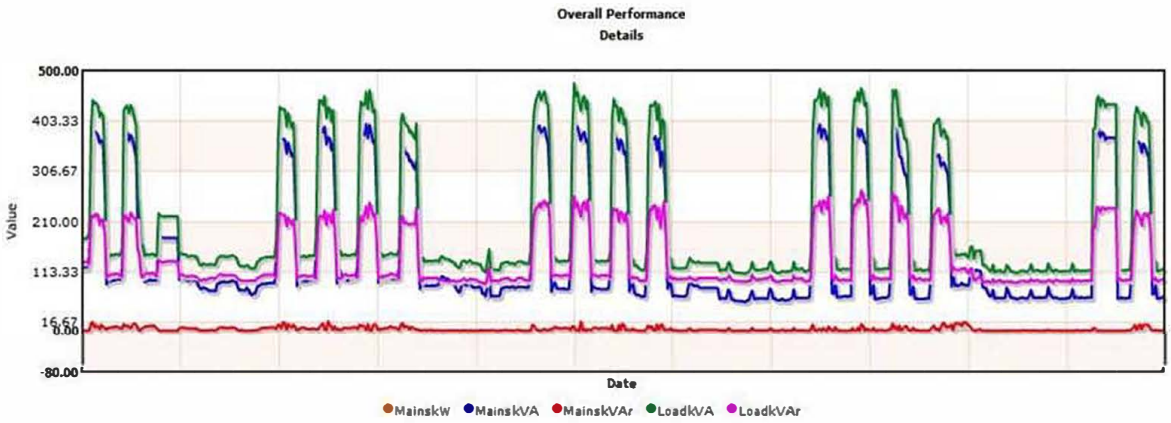
BACK OFFICE: THE LOOK OF REAL-TIME MONITORING

The **Dashboard** is the main page which permits the user to set specific date and time parameters that display information as shown below. The Mains information shows data *post*-Mitigator installation, and the Load information shows the data prior to Mitigator conditioning.

Overall Performance Record

Date	Time	Mains kW	Mains kVA	Mains PF	Mains kVAr	Load kVA	Load kVAr	Load PF
April 9, 2015	8:00:00	334.7	337.2	0.993	8.2	397.6	217.6	0.842
April 9, 2015	8:15:00	353.3	356.1	0.992	3.7	419	229.4	0.843
April 9, 2015	8:30:00	353.3	356.1	0.992	3.7	419	229.4	0.843
April 9, 2015	8:45:00	357.7	359.9	0.994	0.2	423.8	231.5	0.844
April 9, 2015	9:00:00	357.7	359.9	0.994	0.2	423.8	231.5	0.844
April 9, 2015	9:15:00	355.2	357.6	0.993	2.7	420.8	229.8	0.844
April 9, 2015	9:30:00	355.2	357.6	0.993	2.7	420.8	229.8	0.844
April 9, 2015	9:45:00	351.5	353.9	0.993	2.6	416.2	227.1	0.845

NOTE: All the above information can be exported to Word, Excel or CSV format if desired. As well, on the **Dashboard** there are a series of graphs representing the overall performance of Mains KW, Mains KVA, Mains KVAr, Load KVA, and Load KVAr. As well, there are individual graphs showing: Power Factor before and after the Mitigator, KVA before and after the Mitigator, and KVAr before and after the Mitigator. The graph below captures Overall Performance Details.



The **Individual Meter View** has 3 options in the display selection window:

- **Combined Dashboard** that displays online data of the parameters drawn from the mains and the Load parameters.
- **Mains Dashboard** that displays just the Mains parameters.
- **Panel Dashboard** that displays the Load parameters.

display parameters are self-explanatory. The saving values derive from efficiency improvements occasioned by Mitigator installation; comparison of pre and post-Mitigator installation demonstrates the actual savings. Seegco customers can monitor not only load and other information in real time, but also their actual real-time savings.

Combined Dashboard

Parameter	Value	Parameter	Value
V_A	348.20	V_ATHD	2.70
V_B	350.60	V_BTHD	2.60
V_C	350.40	V_CTHD	2.60

Parameter	Load	Mains
I_A	124.60	79.20
I_B	121.40	83.40
I_C	125.50	80.50
kVA	129.92	85.00
kW	84.50	84.50
kVAr	102.3	1.30
PF	0.65	1 LD
I_ATHD	6.10	9.50
I_BTHD	5.40	9.40
I_CTHD	6.10	10.80

Savings

Parameter	Values	Parameter	Values
I_A	45.4	kVA	44.92
I_B	38	kVAr	101
I_C	45	PF	0.35

Harmonics Mitigation
-12.73

Names	Values
Dev ID	34
Feeder Name	F34
Meter Model	isaver
Location	Canada
UpdateTime	4/9/2015 11:22:40 AM
Status	Good

Mains Dashboard

Parameter	Value	Parameter	Value	Parameter	Value
kVA	67.50	A kVA	22.10	kVAh	59582.10
		B kVA	22.70		
		C kVA	22.70		
kW	66.60	A kW	21.90	kWh	57141.50
		B kW	22.30		
		C kW	22.40		
kVAr	1.60	A kVAr	0.60	Lag kVArh	2731.10
		B kVAr	2.50		
		C kVAr	0.40		
PF	1 LD	A PF	0.989 LG	Saved kVArh	3169.40
		B PF	0.984 LD		
		C PF	0.987 LG		

V_A	V_B	V_C	AVG
240.70	241.10	242.00	241.27
V_{AB}	V_{BC}	V_{CA}	AVG
416.20	417.30	420.00	417.83
I_A	I_B	I_C	AVG
91.90	94.20	93.80	93.3
Param	A Phase THD	B Phase THD	C Phase THD
Voltage	1.50	1.30	1.70
Current	17.30	15.80	15.20

Panel Dashboard

Parameter	A Phase	B Phase	C Phase	Avg/Tot
Current	124.30	124.80	125.00	124.7
kVAr	29.70	29.90	30.00	89.60
kVAr	Lag kVArh	Saved kVArh		
89.60	0.00	73918.10		
Name	Value	Name	Value	
DevID	7	Meter Name	PF7	
Status	Good	Update Time	4/7/2015 1:55:43 PM	
Meter Model	isaver	Location	L7	

Alarm Name	A Phase	B Phase	C Phase	Other
Over Voltage	NIL	NIL	NIL	---
Over Current	NIL	NIL	NIL	---
Zero Voltage	NIL	NIL	NIL	---
Zero Current	---	---	---	NIL
Voltage THD	NIL	NIL	NIL	---
Current THD	Yes	Yes	NIL	---
Over Compensation	---	---	---	NIL
Under Compensation	---	---	---	NIL

The **Matrix View** is useful for multiple unit situations. It captures the on-line performance information of all units in operation. There are four information choices that can be displayed. A sample of two machines installed in the same location is shown below.

Select Online Data

TimeStamp	DevID	FeederName	Location	A	B	C	AvgPhaseVolt	AB	BC	CA	AvgLineVolt	A1	B1	C1	AvgCurr	HZ
4/7/2015 2:02:36 PM	1	PF1	L1	237.00	238.20	238.60	237.9	410.80	412.80	412.80	412.1	211.90	202.10	209.20	207.73	50.1
4/7/2015 2:02:16 PM	7	PF7	L7	240.40	240.90	241.70	241.0	415.70	416.90	419.70	417.4	82.50	89.50	88.60	86.87	50.1

The **Historical Trend** view shows a graphic display based on on-line historical data. If the pointer is placed on any portion of this graph, the date, Mains data and Load data at that point in time, can all be displayed. This is useful for historical analysis and Facility troubleshooting for the associated connected electrical load.

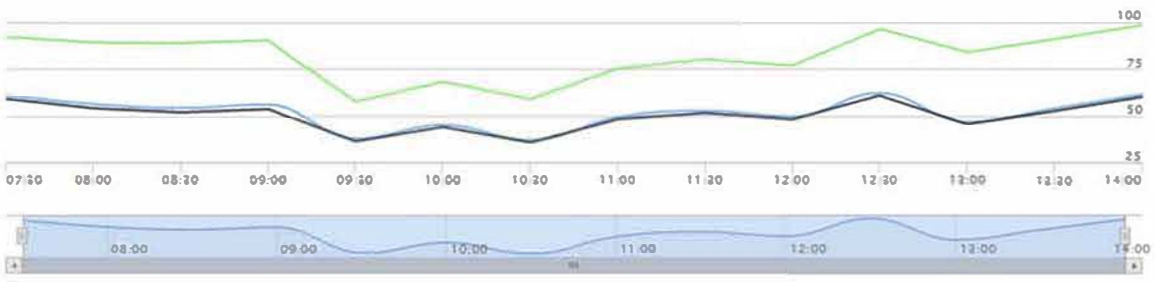
DateRange From 2015-04-07 07:07:00 To 2015-04-07 14:07:45 Select Meter PF7 Apply

Meter Name:	PF7	Customer Name:	Encorp_Styro	Device ID:	7
Meter Model:	mitigator	Panel Name:	NIL	Location:	L7

Over All Performance Details

Log Data

Zoom 1d 1w 1m 6m 1y All From Apr 7, 2015 To Apr 7, 2015



There are two types of **Reports** that can be generated. (1) The **Instant Report** details phase by phase information based on set time intervals over a selected period of days. The "reports" option on the main task bar allows the user to obtain a report of the unit's historic performance based on 5 Min, 15 Min, 30 Min, 45 Min or 60 Min, intervals. It also enables selection of different formats for report display, including the VAF format, Power Data, Energy Data, or Panel Data. The two samples below show the VAF format and the Panel View.

TimeStamp	AVolt	BVolt	CVolt	ABVolt	BCVolt	CAVolt	ACurr	BCurr	CCurr	HZ
4/7/2015 7:30:00 AM	236.50	236.90	237.50	409.00	409.80	412.50	95.30	96.90	99.40	50.20
4/7/2015 8:00:00 AM	239.70	239.80	240.60	414.30	414.90	418.10	57.90	60.20	62.40	50.11
4/7/2015 8:30:00 AM	237.60	237.90	238.60	410.90	411.60	414.30	81.20	82.70	85.20	50.12
4/7/2015 9:00:00 AM	240.20	240.30	241.20	415.10	415.90	419.00	42.70	41.90	41.90	50.10
4/7/2015 9:30:00 AM	239.70	240.10	241.10	414.30	415.70	418.70	74.20	77.60	78.40	50.17
4/7/2015 10:00:00 AM	239.10	239.60	240.50	413.50	414.80	417.40	57.00	59.00	58.00	50.18
4/7/2015 10:30:00 AM	239.70	240.40	241.00	414.60	415.80	418.50	60.80	62.20	61.40	50.18
4/7/2015 11:00:00 AM	238.60	238.90	239.70	412.40	413.40	416.40	67.90	69.40	71.00	50.16
4/7/2015 11:30:00 AM	238.90	239.10	240.10	412.80	414.00	417.00	66.60	67.00	66.70	50.17
4/7/2015 12:00:00 PM	240.30	240.40	241.40	415.20	416.10	419.40	59.00	66.20	66.30	50.18

These reports can be exported to word documents by choosing the export button below the main table. The following is an example of the word document exported.

TimeStamp	APanelCurr	BPanelCurr	CPanelCurr	TotkVAr	LagkVArh	SavedkVArh
4/7/2015 7:30:00 AM	105.70	106.00	106.20	74.40	0.00	73495.20
4/7/2015 8:00:00 AM	107.10	107.50	107.70	76.20	0.00	73531.40
4/7/2015 8:30:00 AM	106.30	106.70	106.80	75.20	0.00	73569.60
4/7/2015 9:00:00 AM	54.30	54.60	55.00	38.20	0.00	73593.90
4/7/2015 9:30:00 AM	70.70	71.20	71.30	50.80	0.00	73618.00
4/7/2015 10:00:00 AM	70.70	71.20	71.20	50.50	0.00	73642.00
4/7/2015 10:30:00 AM	88.50	89.10	89.10	63.40	0.00	73672.30
4/7/2015 11:00:00 AM	88.00	88.50	88.60	62.80	0.00	73700.90

The other reporting option (2) is the **periodic report** which allows date range display for daily averages on mains and locals.

DateRange From 2015-04-08 12 59 00 To 2015-04-10 12 59 29 Select Meter F31 Apply

Meter Name:	F31	Customer Name:	Norseman_structures	Device ID:	31
Meter Model:	[illegible]	Panel Name:	NIL	Location:	canada

Log Report

TimeStamp	Des	MainskVA	MainskW	MainskVAr	LoadkVA	LoadkVAr
08/04/2015	AVG	66.42	65.34	1.11	118.94	98.20
	MIN	61.60	60.10	0.00	112.00	93.30
	MAX	90.00	89.00	7.10	139.20	106.50
09/04/2015	AVG	192.97	191.35	2.17	250.58	156.32
	MIN	60.60	59.10	0.00	114.10	93.70
	MAX	374.60	372.50	17.80	438.90	239.90
10/04/2015	AVG	290.42	288.37	8.42	348.86	196.57
	MIN	62.90	62.20	0.00	117.80	97.30
	MAX	359.90	357.70	18.00	423.80	233.70

Mains VAF Report

TimeStamp	Des	PhaseVolt	LineVolt	kW	KVA	HZ
08/04/2015	AVG	353.80	606.60	65.40	66.19	59.84
	MIN	314.40	606.60	53.90	55.30	59.78
	MAX	356.83	616.80	98.70	99.40	59.92
09/04/2015	AVG	353.53	603.23	191.53	193.07	59.83
	MIN	312.60	603.23	54.50	55.80	59.76
	MAX	357.13	617.33	403.30	405.10	59.92
10/04/2015	AVG	352.09	604.17	283.65	285.63	59.83
	MIN	312.43	604.17	52.00	52.90	59.76
	MAX	356.90	616.90	373.30	375.20	59.89

SEEGCO POWER

POWERING PROFITS WORLDWIDE

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