

Power Analysis Summary

Introduction

This is a summary of the power conditions measured with these setup parameters:

Measurement File:

Start Time: 08/24/2016 11:36:00

End Time: 08/25/2016 11:36:00

Duration: 1 - 00:00:00

Company:

Contact:

Address:

City, State, Zip:

Plant #:

Location: Panel C-11, 600A, 480V, 3P, 3W

Power Configuration: 3-ph Delta

Nominal Voltage: 480V

Nominal Frequency: 60Hz

Instrument

The measurement was performed with an Electrex Power Quality Meter with these characteristics:

Instrument: PQ1

Voltage Inputs

A: A-A, 1.00:1

B: B-B, 1.00:1

C: C-C, 1.00:1

N: N-N, 1.00:1

Current Inputs

A: A-A, 1.00:1

B: B-B, 1.00:1

C: C-C, 1.00:1

N: N-N, 1.00:1

G: G-G, 1.00:1

Current Probes

A: 100-5000A Flexi-CT

B: 100-5000A Flexi-CT

C: 100-5000A Flexi-CT

N: NA

G: 20-1000A Flexi-CT

Summary

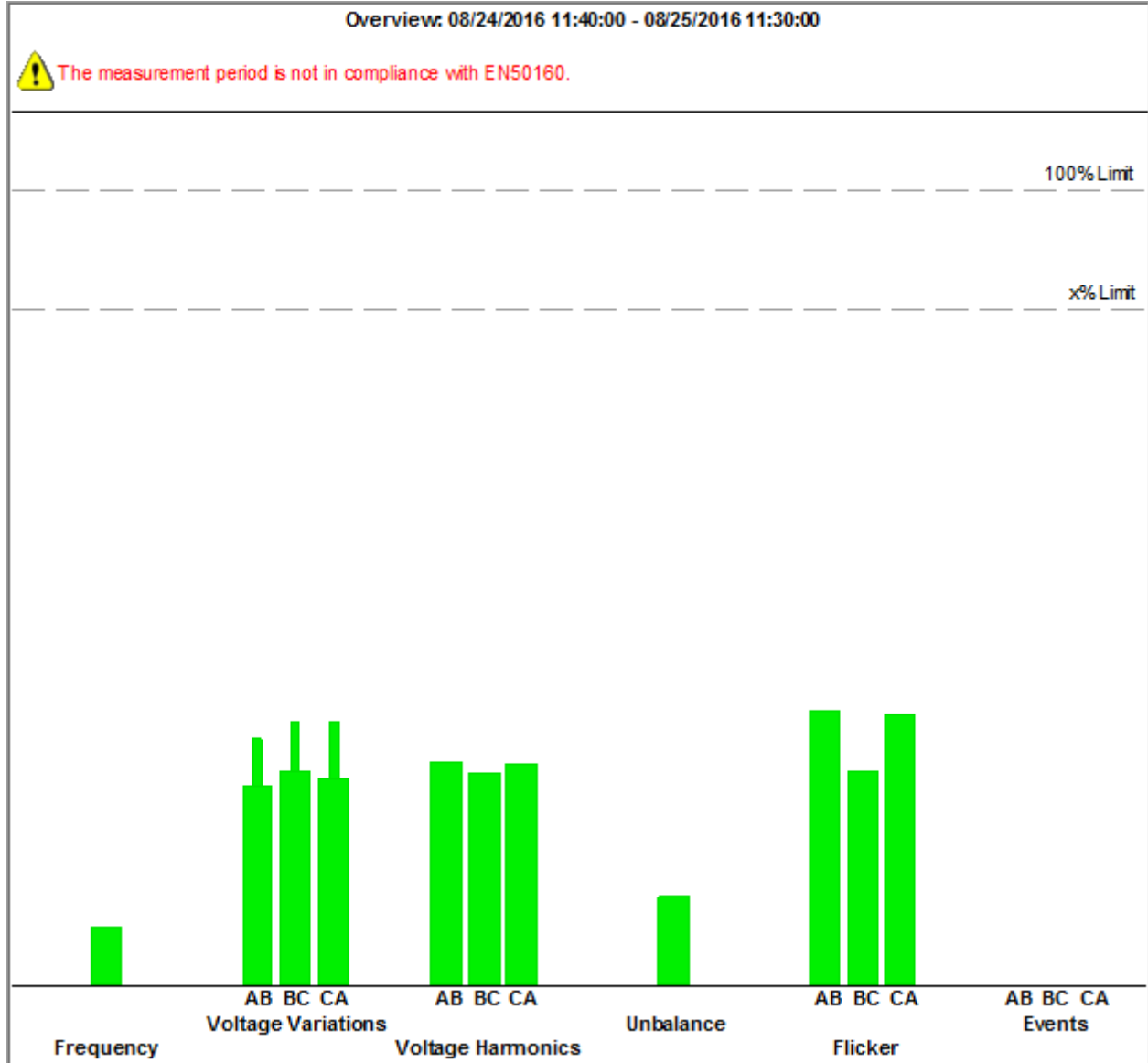
The Summary section compares the key power quality parameters to pre-defined levels. It consists of three elements: Overview, Events and Harmonics.

The overview summarizes the overall power quality for the chosen reporting period in six classes: frequency, voltage variations, voltage harmonics, unbalance, flicker and events. The total number of readings for each of these variables is compared to the 100% limits. A different percentage of the total number of readings (typically 95%) is also compared to specific limits. This allows a power quality survey according to international or local standards (e.g. EN50160).

The summary indicates the number of values within the limit and the extreme value measured during the selected period.

Summary

Overview Graph



Summary

Frequency

Settings

Required values within limit 99.5% of the time
 Maximum 99.5% / 100% +1/+4
 Minimum 99.5% / 100% -1/-6

Results

	99.5% Value	Extreme Value
% Within Limit	100.00%	100.00%
Maximum 99.5% / 100%	60.04Hz (0.07%)	60.04Hz (0.07%)
Time		08/24/2016 21:27:30
Minimum 99.5% / 100%	59.95Hz (-0.09%)	59.95Hz (-0.09%)
Time		08/25/2016 05:01:30

Slow Voltage Variations

Settings

Required values within limit 95% of the time
 Maximum 95% / 100% +10/+10
 Minimum 95% / 100% -10/-15

Results

	95% Value			Extreme Value		
	AB	BC	CA	AB	BC	CA
% Within Limit	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Maximum 95% / 100%	494.20V (2.96%)	495.27V (3.18%)	494.76V (3.08%)	494.93V (3.11%)	495.98V (3.33%)	495.94V (3.32%)
Time				08/25/2016 07:30:00	08/25/2016 06:30:00	08/25/2016 10:50:00
Minimum 95% / 100%	488.53V (1.78%)	489.56V (1.99%)	489.46V (1.97%)	487.40V (1.54%)	488.49V (1.77%)	488.14V (1.70%)
Time				08/25/2016 04:10:00	08/24/2016 13:00:00	08/25/2016 04:10:00

Summary

Voltage Harmonics

Settings

Required values within limit 95% of the time
 19. Order 95% / 100% 1.5/-

Results

	95% Value			Extreme Value		
	AB	BC	CA	AB	BC	CA
19. Order 95% / 100%	0.50%	0.47%	0.49%	(0.52%)	(0.50%)	(0.51%)
Time				08/25/2016 07:30:00	08/25/2016 07:30:00	08/25/2016 06:40:00

Unbalance

Settings

Required values within limit 95% of the time
 Maximum 95% / 100% 2/-

Results

	95% Value	Extreme Value
% Within Limit	100.00%	-
Maximum 95% / 100%	0.26%	(0.28%)
Time		08/24/2016 20:30:00

Summary

Flicker (Plt)

Settings

Required values within limit 95% of the time
 Maximum 95% / 100% 1/-

Results

	95% Value			Extreme Value		
	AB	BC	CA	AB	BC	CA
% Within Limit	100.00%	100.00%	100.00%	-	-	-
Maximum 95% / 100%	0.41	0.32	0.40	(0.41)	(0.32)	(0.40)
Time				08/24/2016 19:10:00	08/25/2016 05:10:00	08/25/2016 09:10:00

Events Summary

Settings

Number of allowed events 100

Results

	AB	BC	CA
Number of	0	0	0

Summary

Events

Settings

<i>Swell threshold</i>	110% of nominal voltage
<i>Dip threshold</i>	90% of nominal voltage
<i>Short Interruption</i>	< 5% of nominal voltage
<i>Long Interruption</i>	< 5% of nominal voltage, > 180s

Results

Swell

	AB	BC	CA
Quantity	0	0	0
Max. Value			
Max. Duration			

Dip

	AB	BC	CA
Quantity	0	0	0
Max. Value			
Max. Duration			

Short Interruption

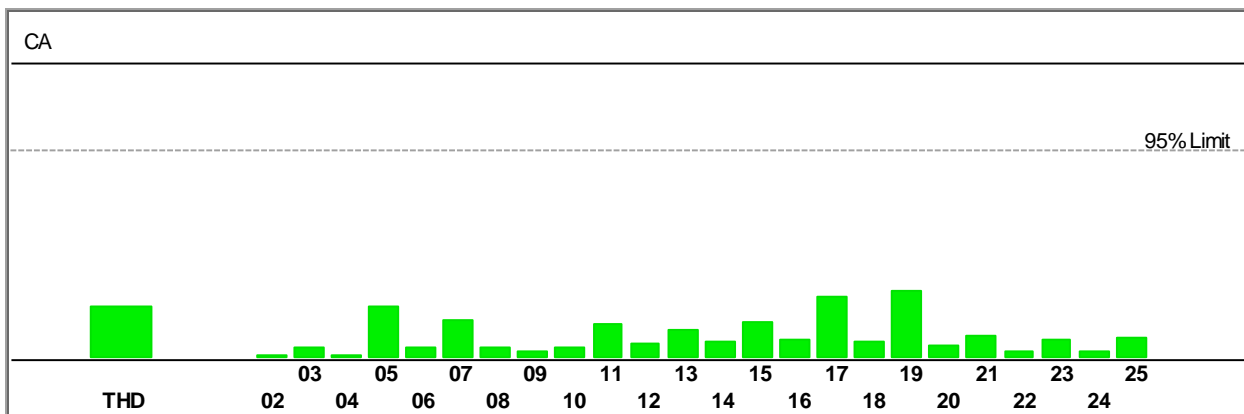
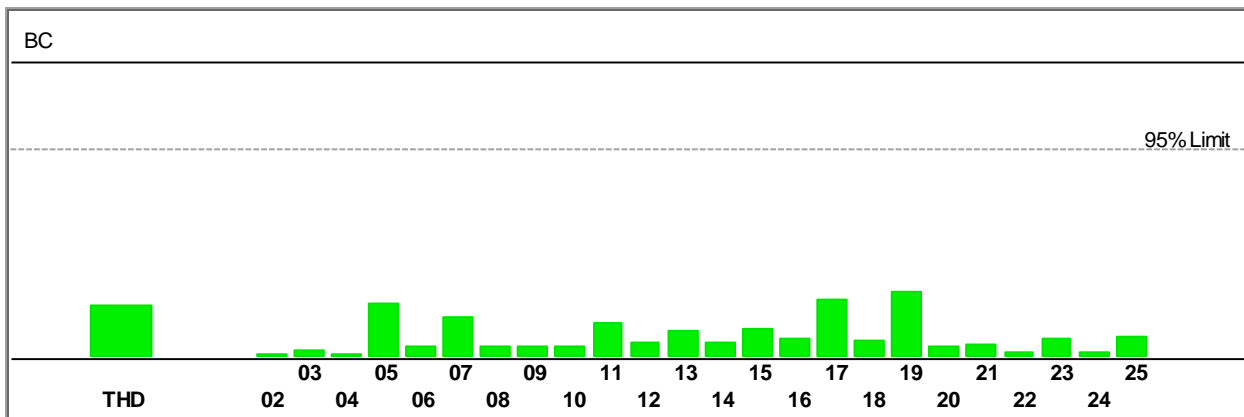
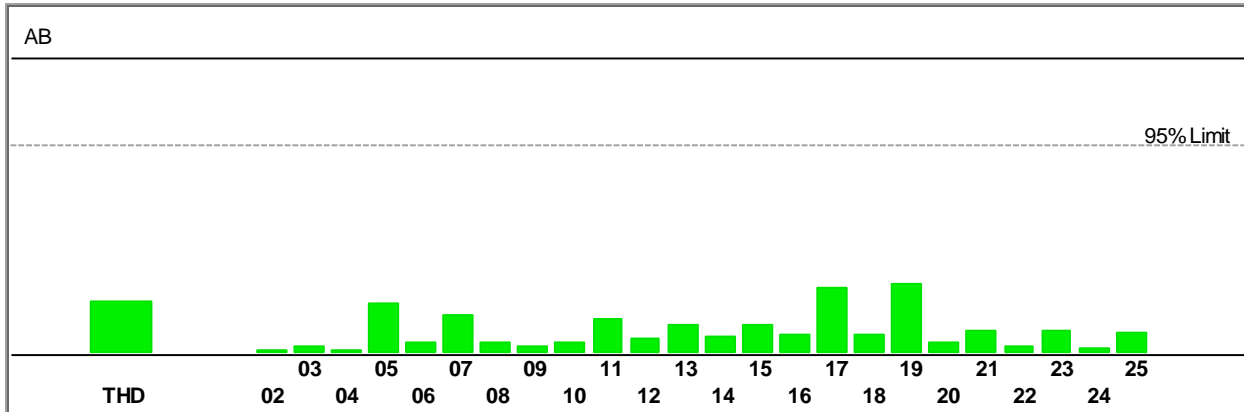
	AB	BC	CA
Quantity	0	0	0
Max. Value			
Max. Duration			

Long Interruption

	AB	BC	CA
Quantity	0	0	0
Max. Value			
Max. Duration			

Summary

Voltage Harmonics Graphs



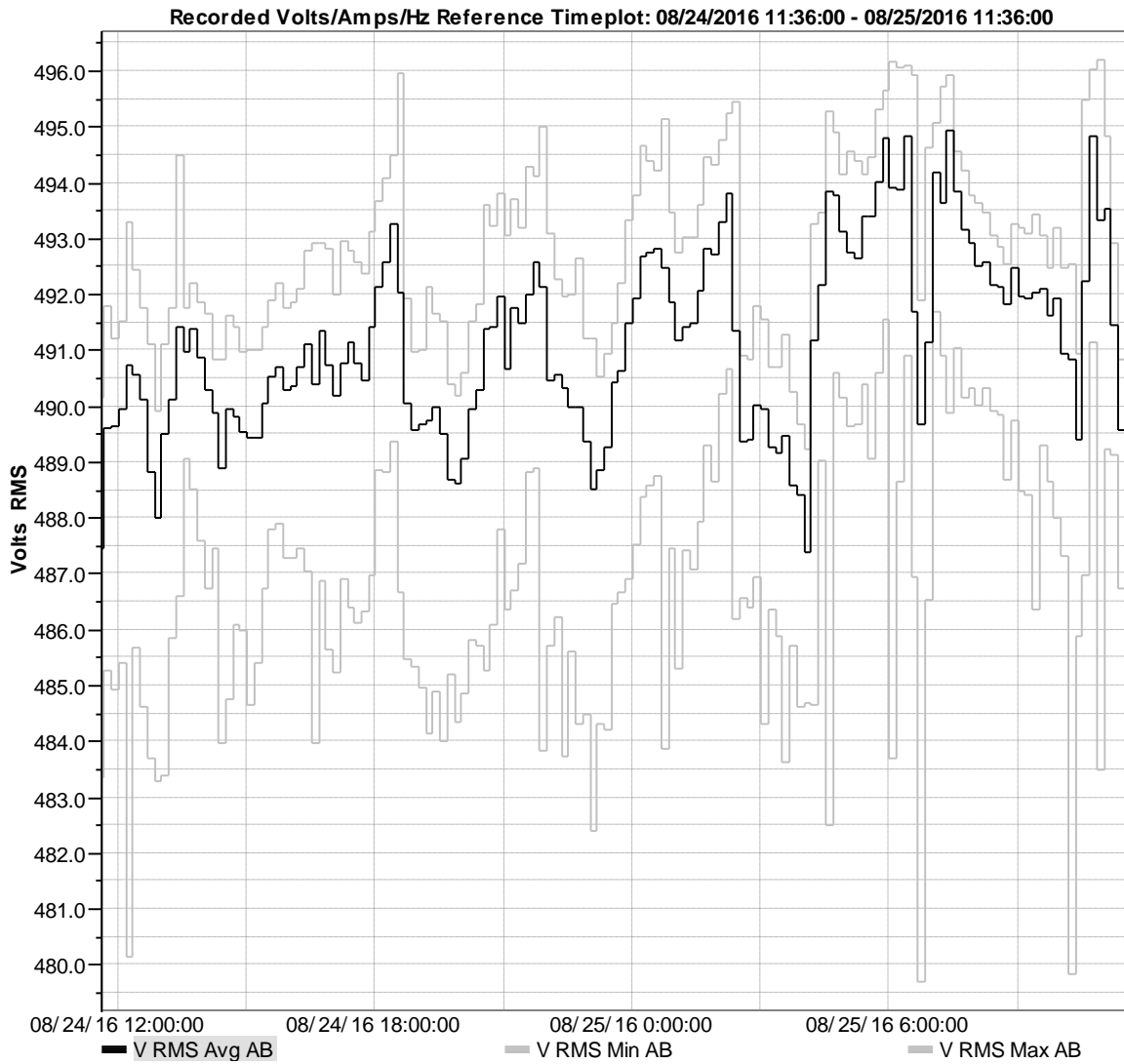
Volts/Amps/Hz

This section contains graphical summaries for each of the selected parameters during the monitor period.

Volts/Amps/Hz

10 Minutes Trend Data

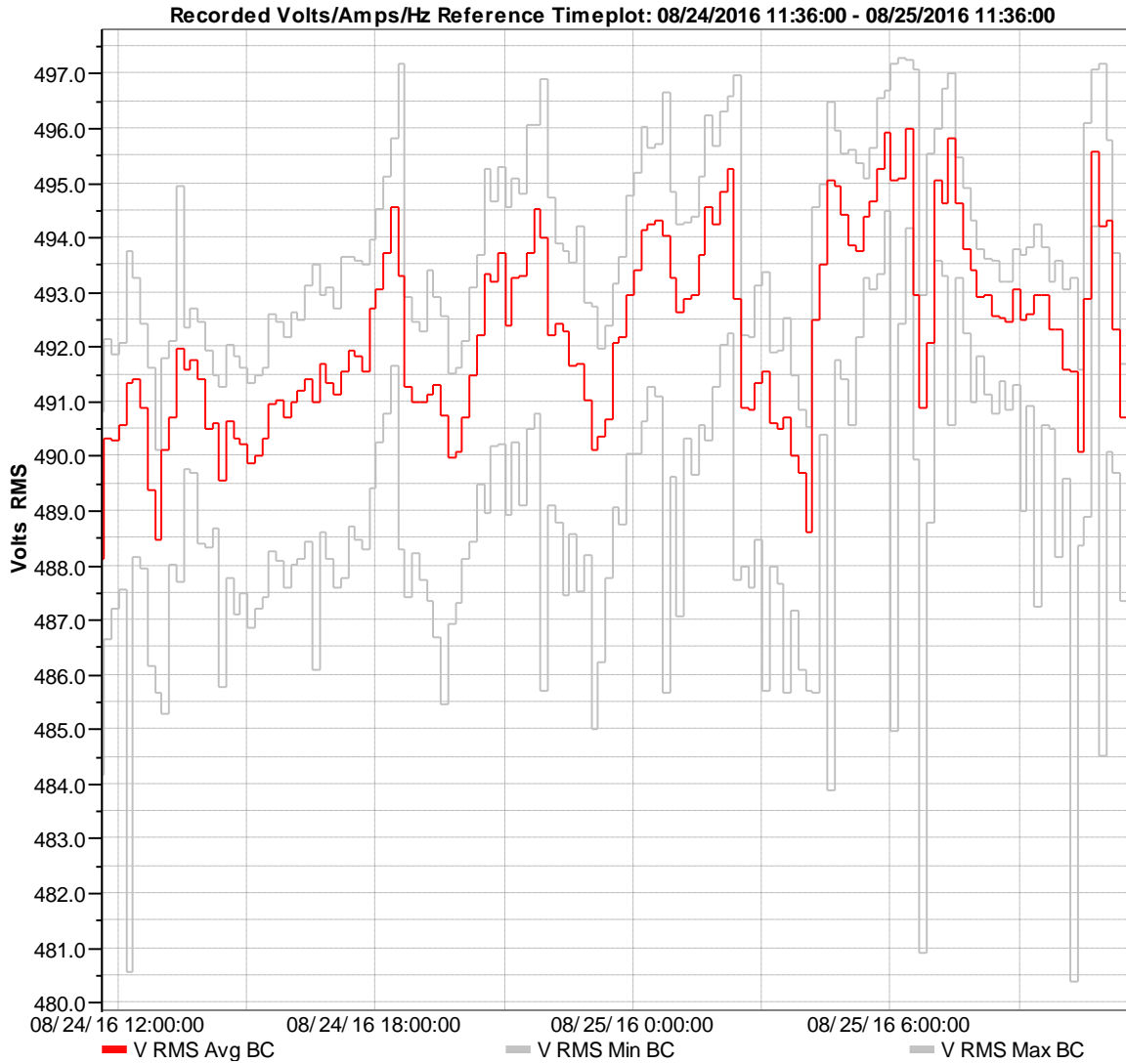
Phase	Max	Time	Min	Time
V RMS Avg. AB	494.93 V RMS	08/25/2016 07:30:00	487.40 V RMS	08/25/2016 04:10:00
V RMS Min AB	491.68 V RMS	08/25/2016 07:10:00	479.69 V RMS	08/25/2016 06:50:00
V RMS Max AB	496.22 V RMS	08/25/2016 11:00:00	489.24 V RMS	08/25/2016 04:10:00



Volts/Amps/Hz

10 Minutes Trend Data

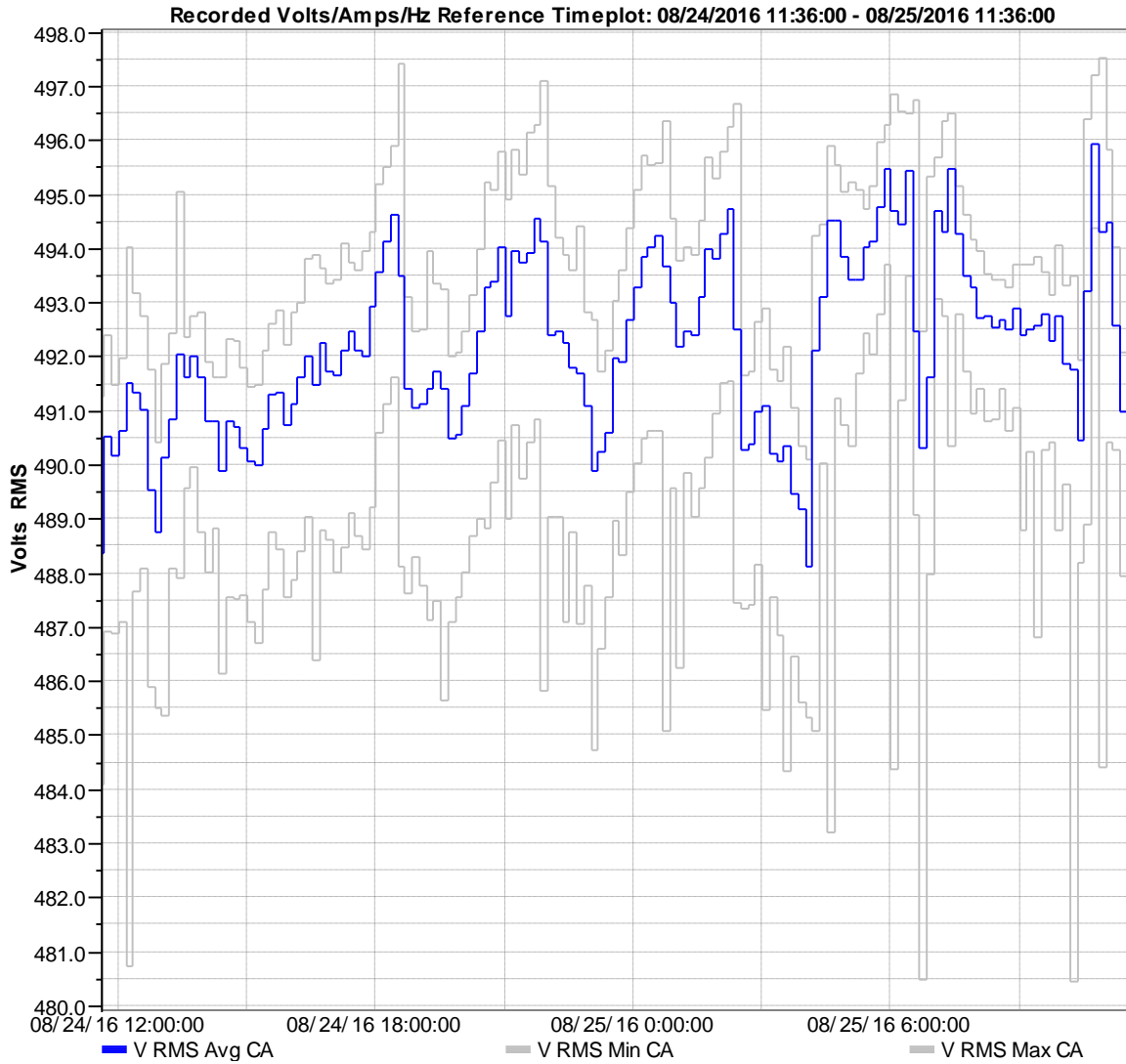
Phase	Max	Time	Min	Time
V RMS Avg. BC	495.98 V RMS	08/25/2016 06:30:00	488.13 V RMS	08/24/2016 11:40:00
V RMS Min BC	494.50 V RMS	08/25/2016 06:00:00	480.37 V RMS	08/25/2016 10:20:00
V RMS Max BC	497.31 V RMS	08/25/2016 06:20:00	489.74 V RMS	08/24/2016 11:30:00



Volts/Amps/Hz

10 Minutes Trend Data

Phase	Max	Time	Min	Time
V RMS Avg. CA	495.94 V RMS	08/25/2016 10:50:00	488.14 V RMS	08/25/2016 04:10:00
V RMS Min CA	494.37 V RMS	08/25/2016 10:50:00	480.44 V RMS	08/25/2016 10:20:00
V RMS Max CA	497.55 V RMS	08/25/2016 11:00:00	490.06 V RMS	08/24/2016 11:30:00

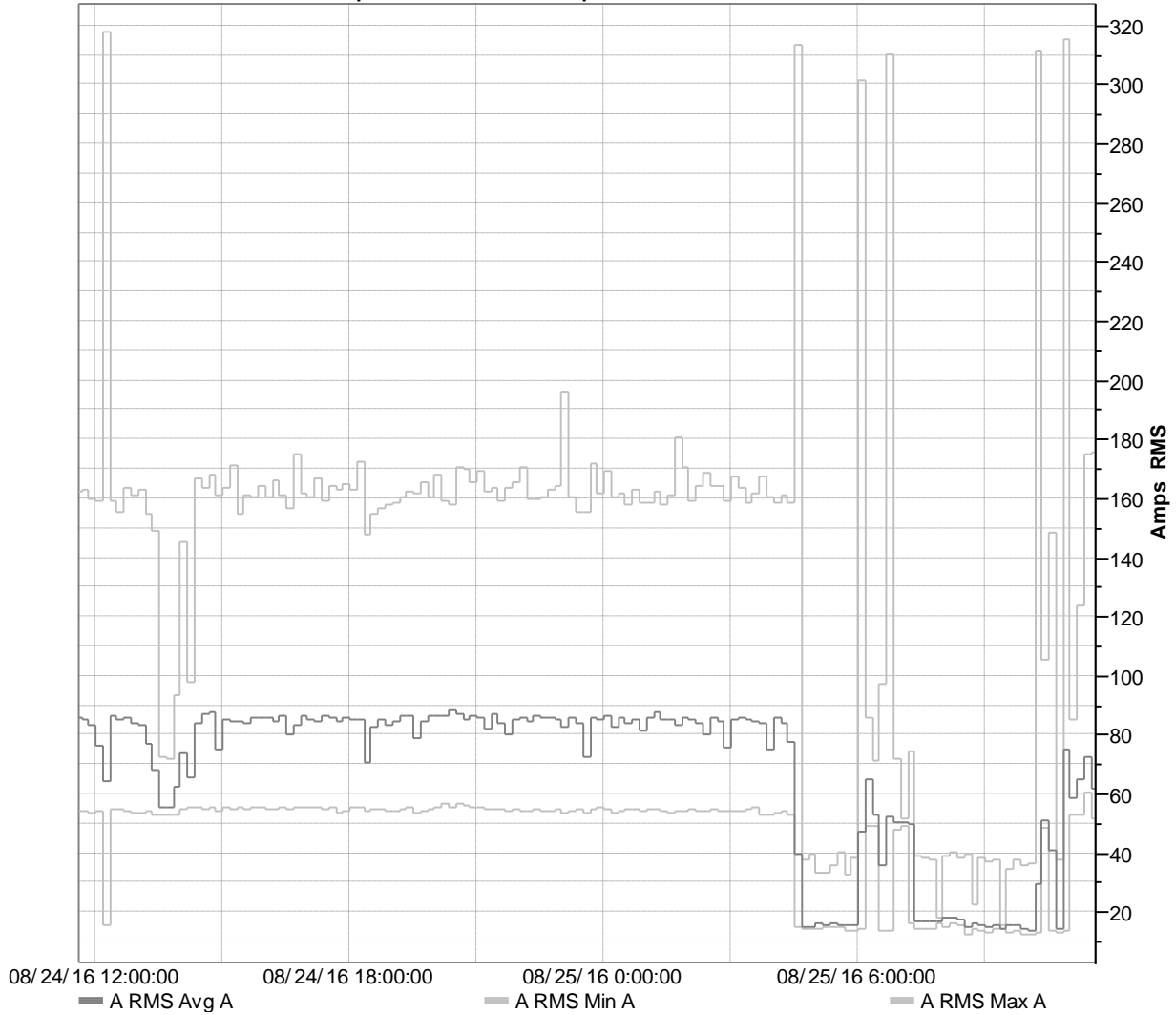


Volts/Amps/Hz

10 Minutes Trend Data

Phase	Max	Time	Min	Time
A RMS Avg. A	88.27 A RMS	08/24/2016 20:30:00	14.14 A RMS	08/25/2016 10:10:00
A RMS Min A	60.44 A RMS	08/25/2016 11:30:00	12.29 A RMS	08/25/2016 10:00:00
A RMS Max A	318.32 A RMS	08/24/2016 12:20:00	15.47 A RMS	08/25/2016 09:30:00

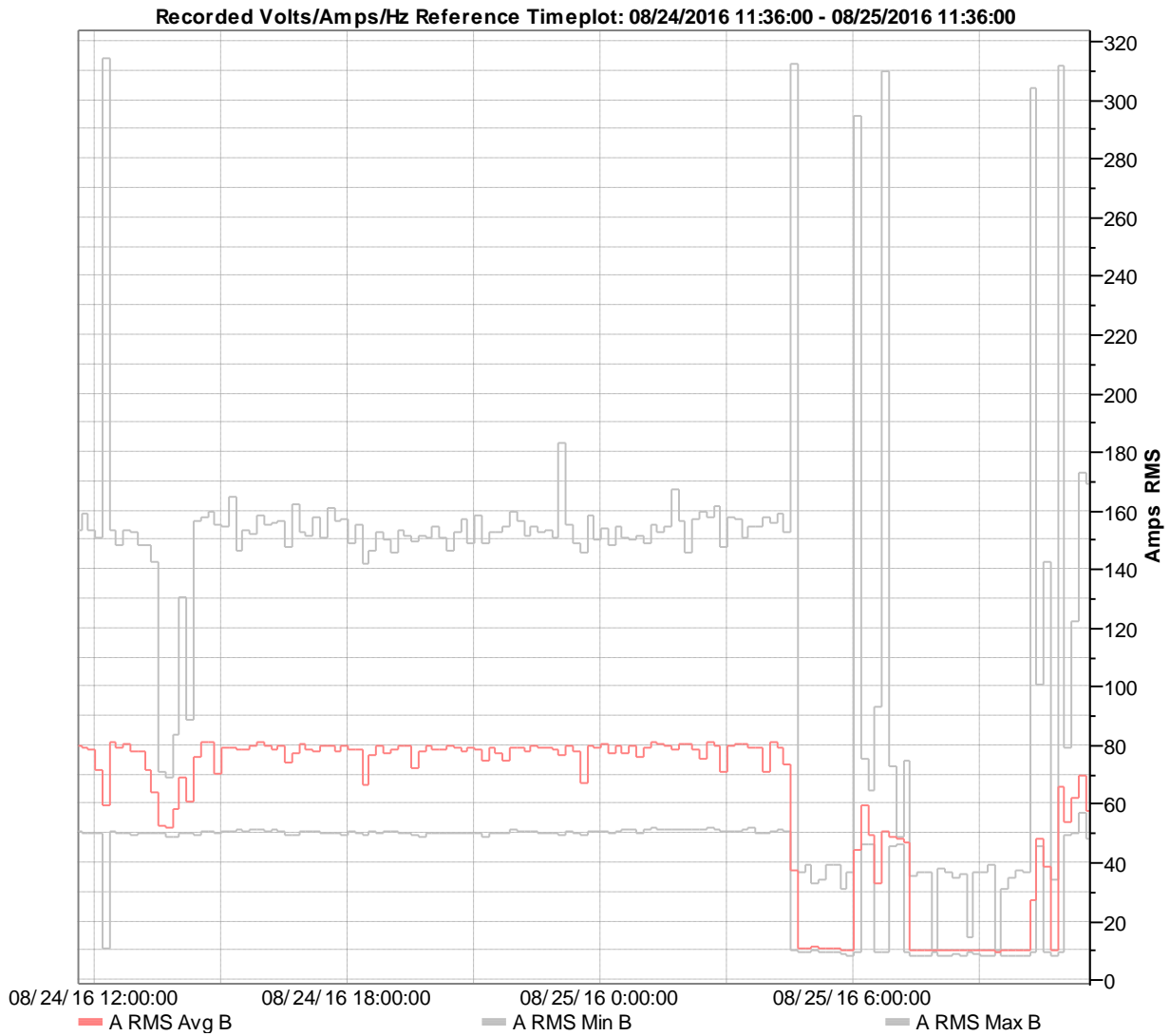
Recorded Volts/Amps/Hz Reference Timeplot: 08/24/2016 11:36:00 - 08/25/2016 11:36:00



Volts/Amps/Hz

10 Minutes Trend Data

Phase	Max	Time	Min	Time
A RMS Avg. B	81.46 A RMS	08/25/2016 01:20:00	9.88 A RMS	08/25/2016 09:30:00
A RMS Min B	56.97 A RMS	08/25/2016 11:30:00	8.05 A RMS	08/25/2016 09:20:00
A RMS Max B	314.66 A RMS	08/24/2016 12:20:00	10.12 A RMS	08/25/2016 09:30:00

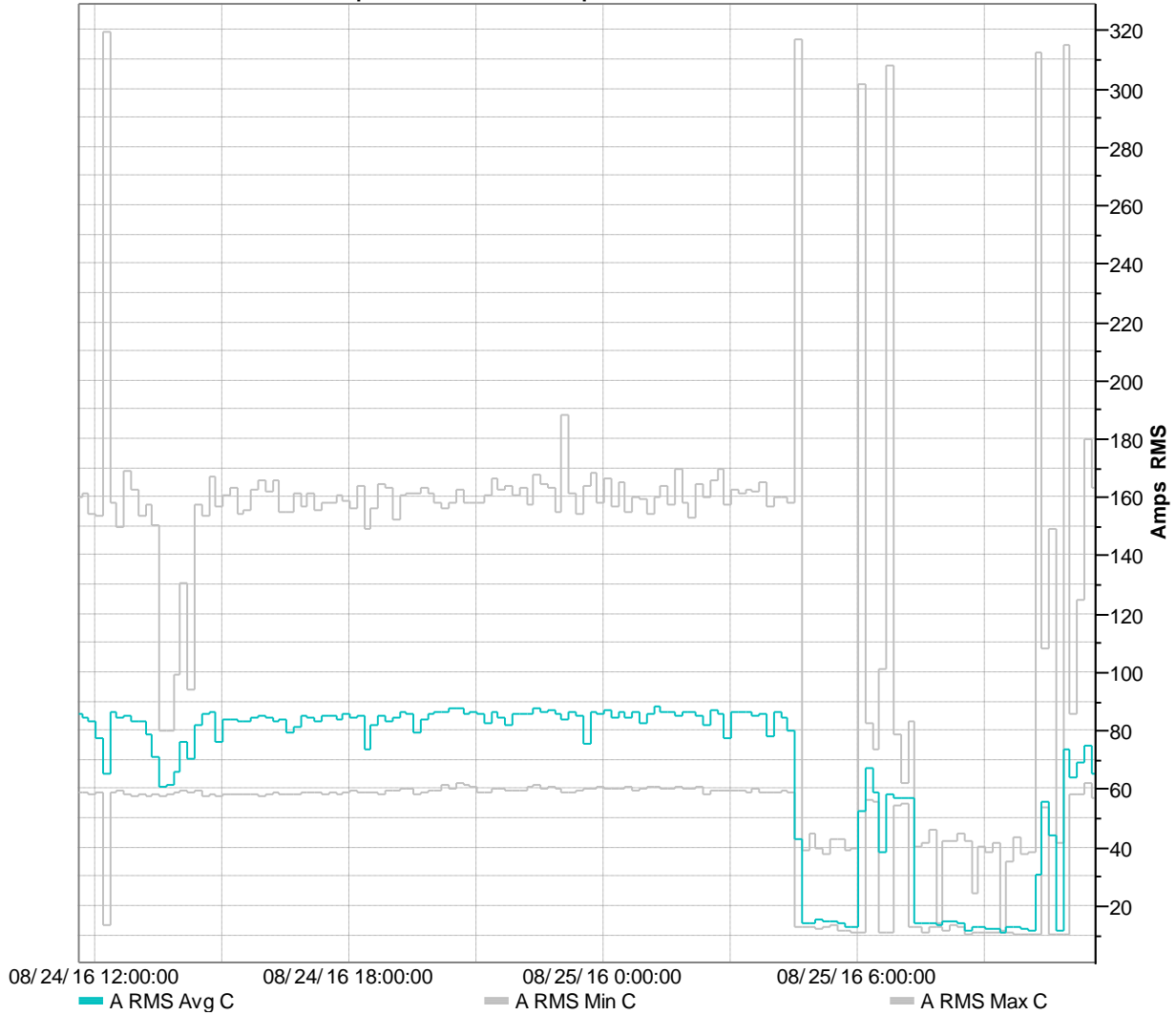


Volts/Amps/Hz

10 Minutes Trend Data

Phase	Max	Time	Min	Time
A RMS Avg. C	88.14 A RMS	08/25/2016 01:20:00	11.06 A RMS	08/25/2016 09:30:00
A RMS Min C	62.32 A RMS	08/24/2016 20:40:00	10.01 A RMS	08/25/2016 08:40:00
A RMS Max C	319.93 A RMS	08/24/2016 12:20:00	11.38 A RMS	08/25/2016 09:30:00

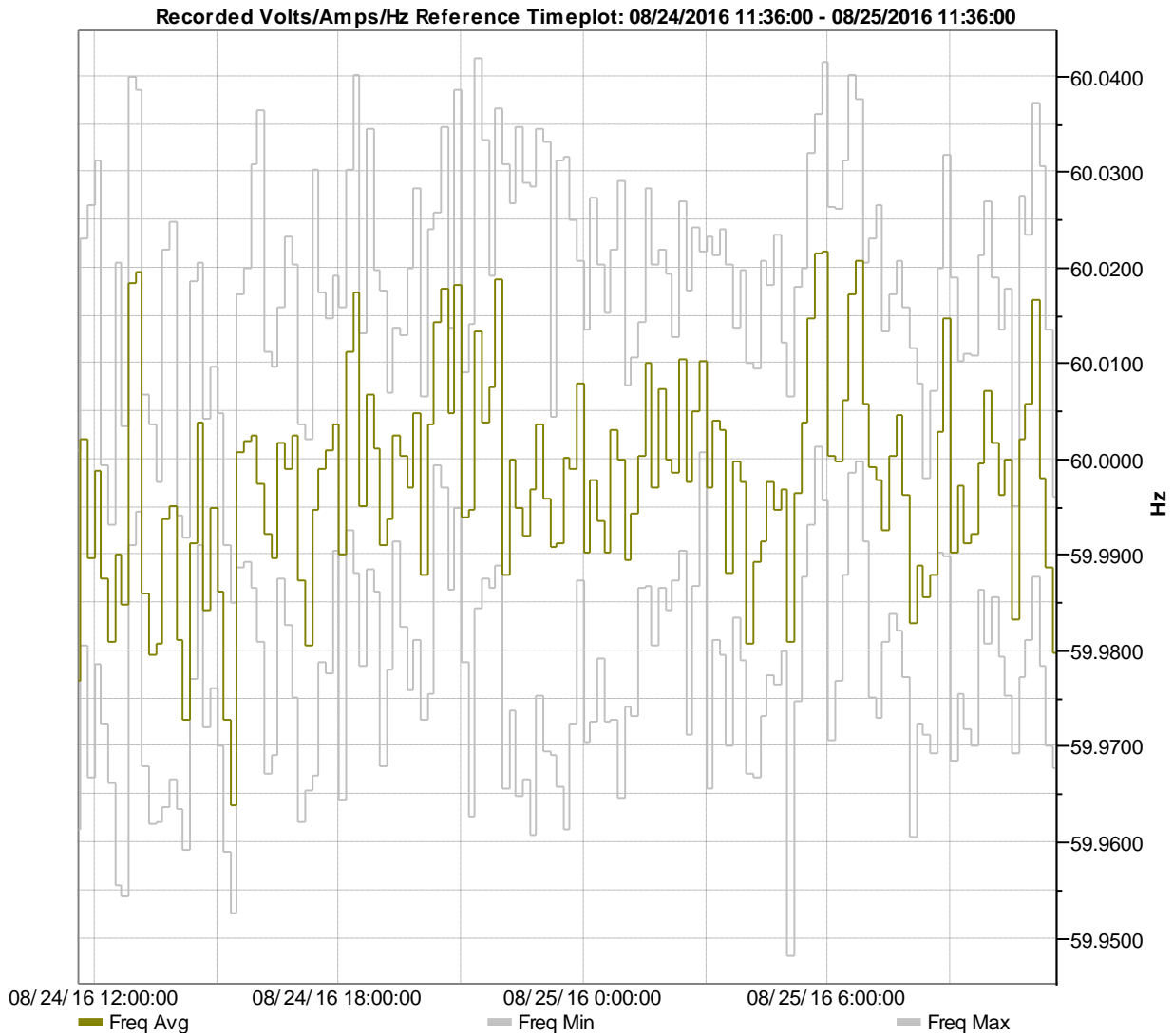
Recorded Volts/Amps/Hz Reference Timeplot: 08/24/2016 11:36:00 - 08/25/2016 11:36:00



Volts/Amps/Hz

10 Minutes Trend Data

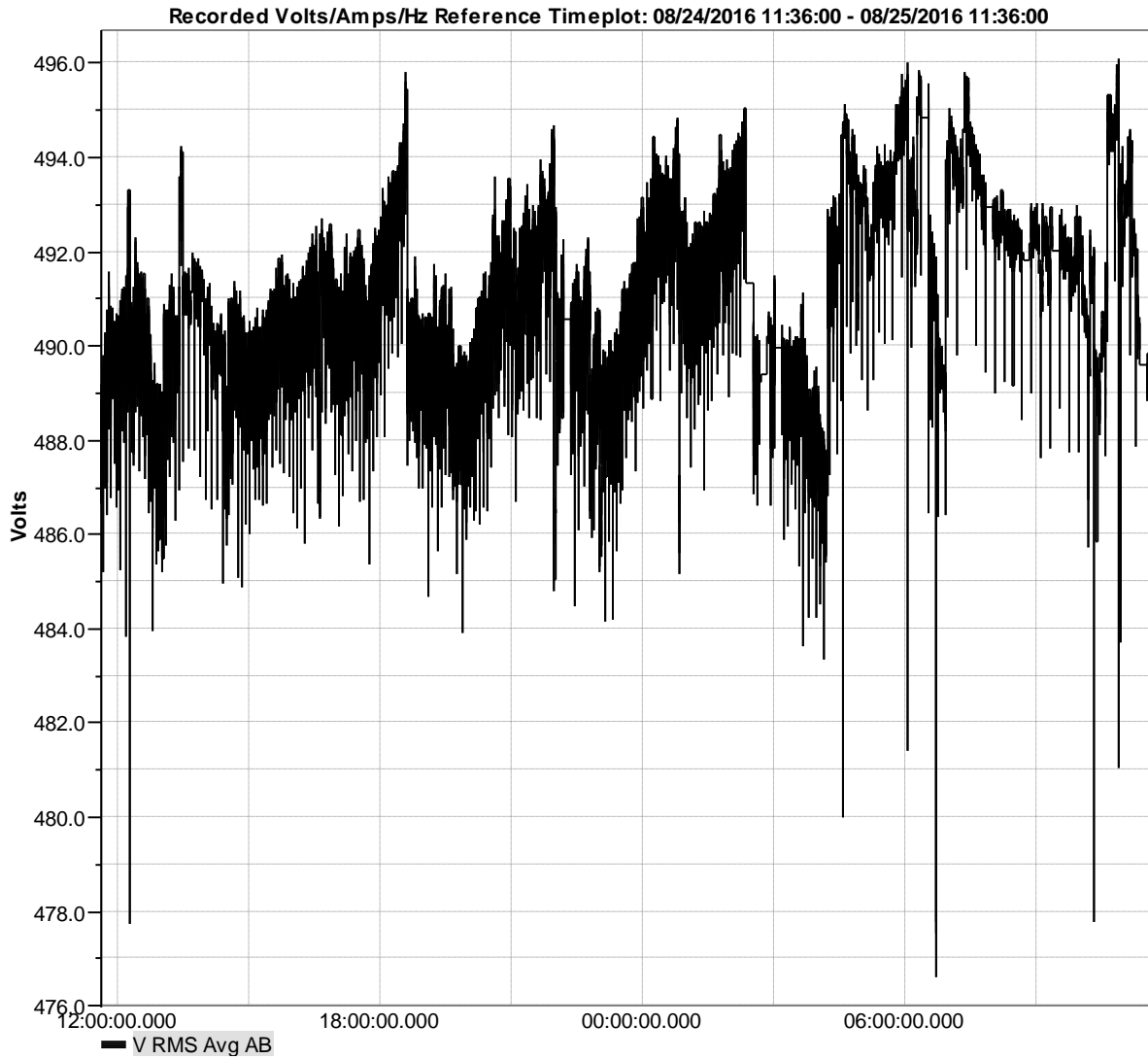
Phase	Max	Time	Min	Time
Freq Avg.	60.02 Hz	08/25/2016 06:00:00	59.96 Hz	08/24/2016 15:30:00
Freq Min	60.00 Hz	08/25/2016 05:50:00	59.95 Hz	08/25/2016 05:10:00
Freq Max	60.04 Hz	08/24/2016 21:30:00	59.99 Hz	08/24/2016 15:30:00



Volts/Amps/Hz

Detailed View

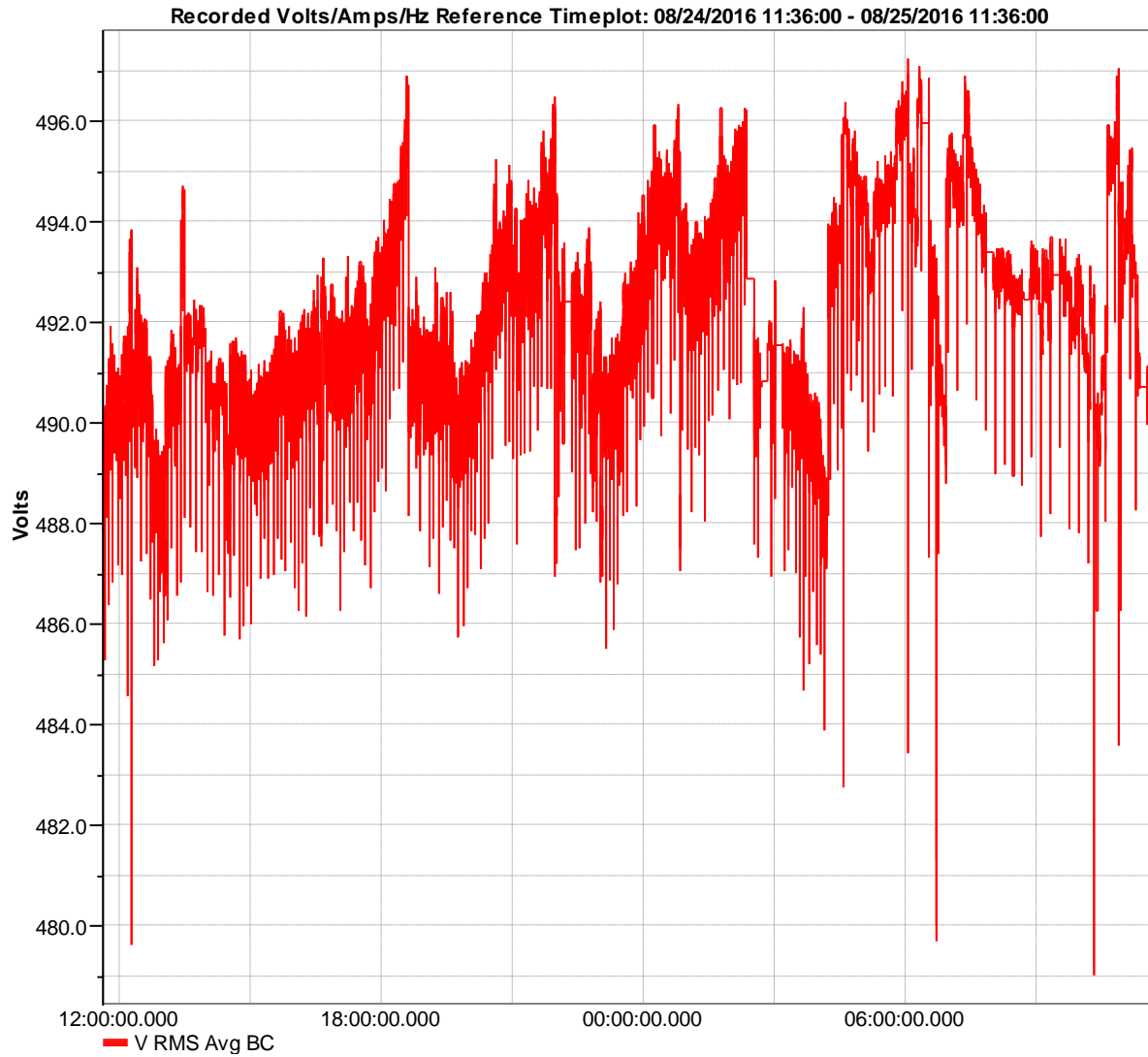
Phase	Max	Time	Min	Time
V RMS Avg. AB	496.12 V RMS	08/25/2016 10:52:06	476.59 V RMS	08/25/2016 06:42:30



Volts/Amps/Hz

Detailed View

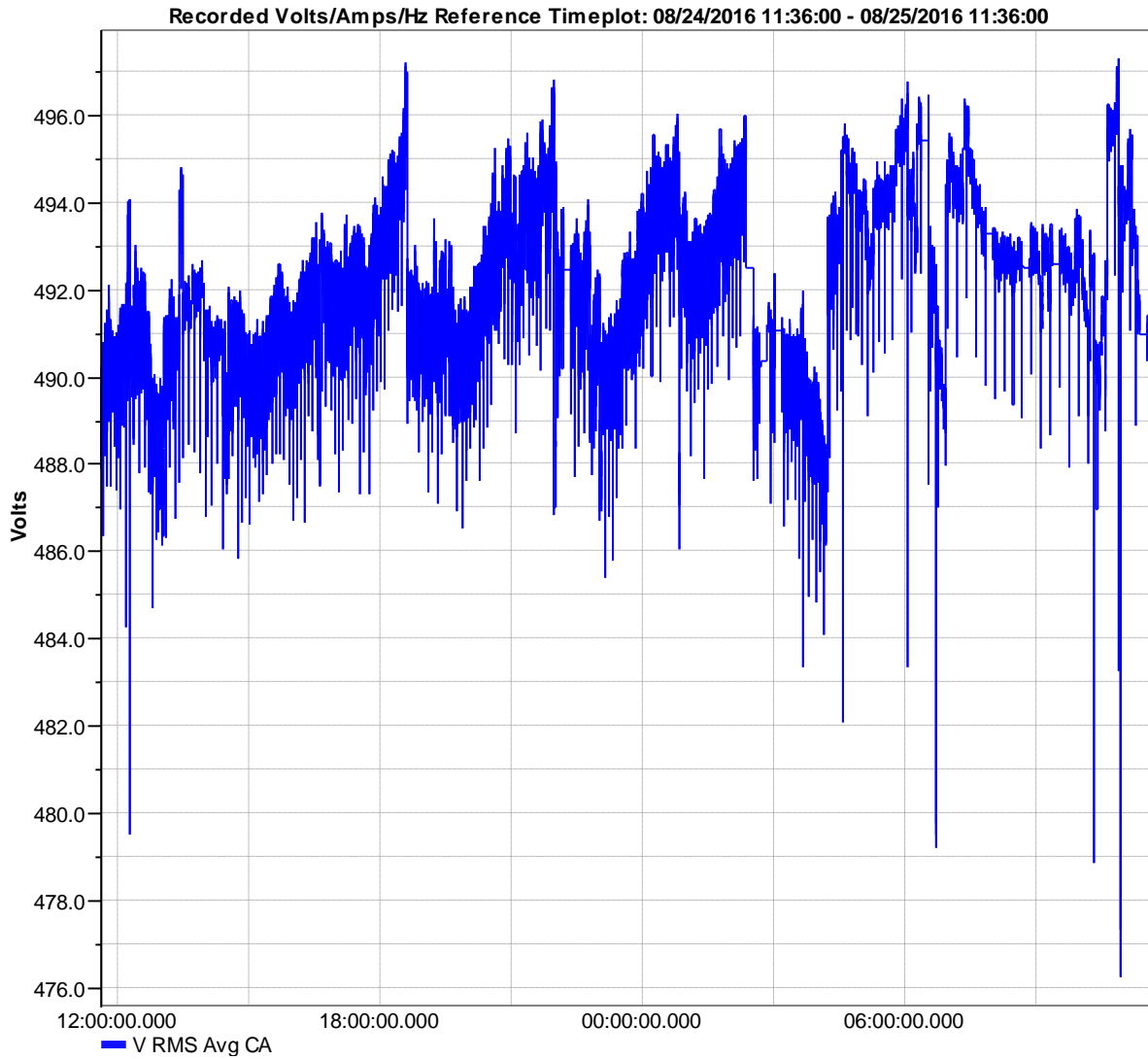
Phase	Max	Time	Min	Time
V RMS Avg. BC	497.27 V RMS	08/25/2016 06:01:54	479.02 V RMS	08/25/2016 10:17:36



Volts/Amps/Hz

Detailed View

Phase	Max	Time	Min	Time
V RMS Avg. CA	497.32 V RMS	08/25/2016 10:51:45	476.24 V RMS	08/25/2016 10:53:54

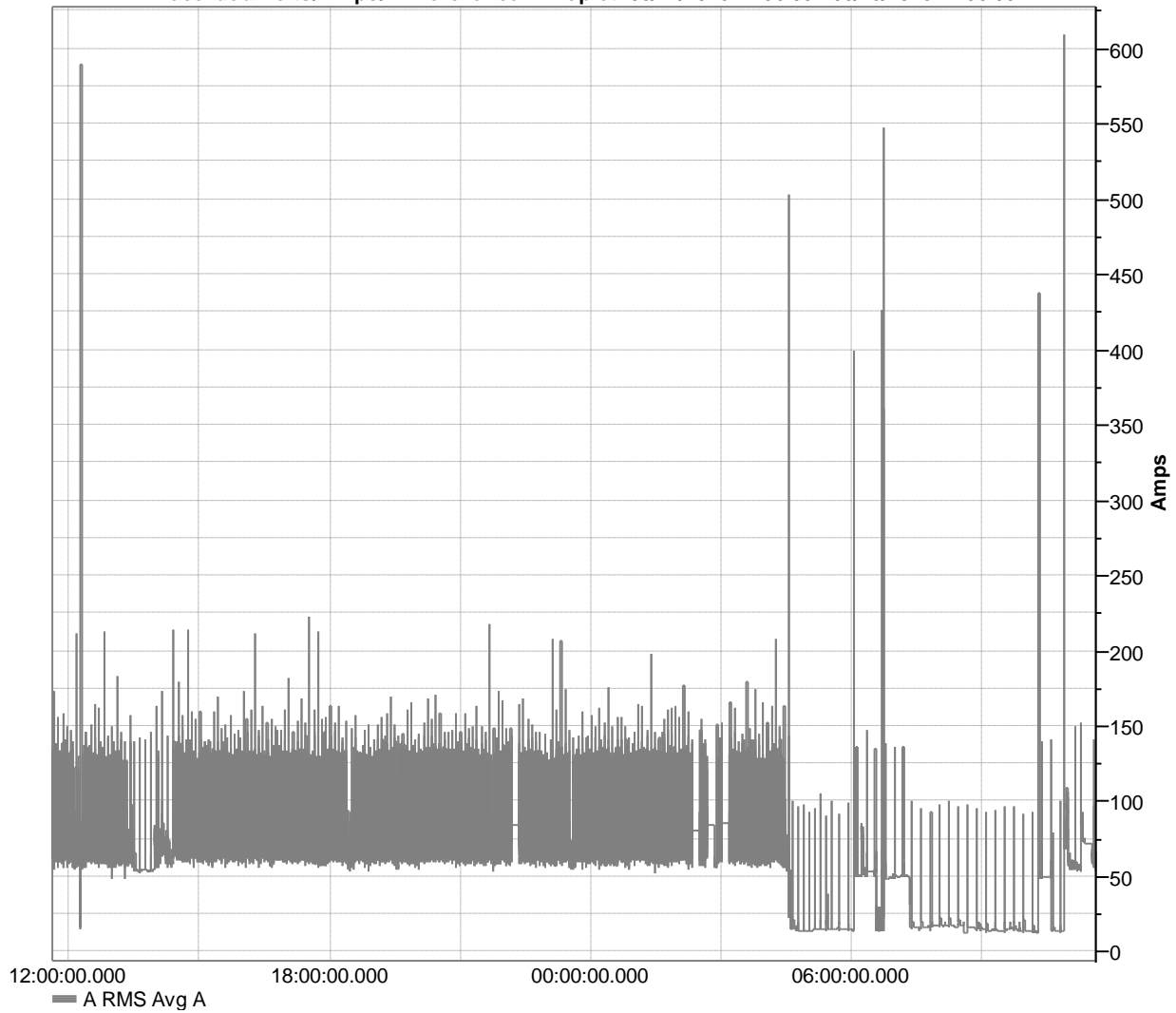


Volts/Amps/Hz

Detailed View

Phase	Max	Time	Min	Time
A RMS Avg. A	610.05 A RMS	08/25/2016 10:52:06	12.29 A RMS	08/25/2016 09:56:12

Recorded Volts/Amps/Hz Reference Timeplot: 08/24/2016 11:36:00 - 08/25/2016 11:36:00

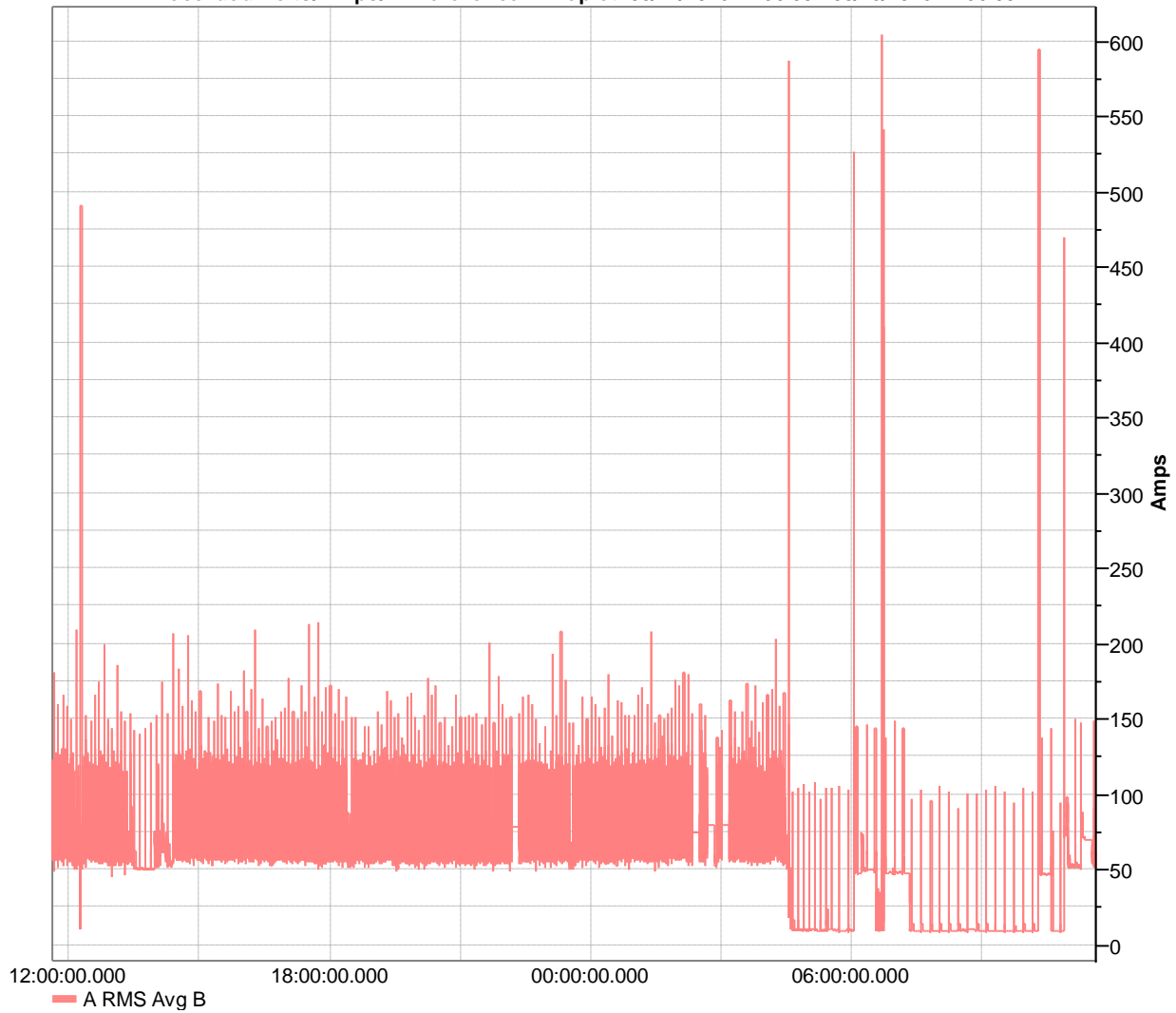


Volts/Amps/Hz

Detailed View

Phase	Max	Time	Min	Time
A RMS Avg. B	605.23 A RMS	08/25/2016 06:40:24	7.61 A RMS	08/25/2016 08:14:00

Recorded Volts/Amps/Hz Reference Timeplot: 08/24/2016 11:36:00 - 08/25/2016 11:36:00

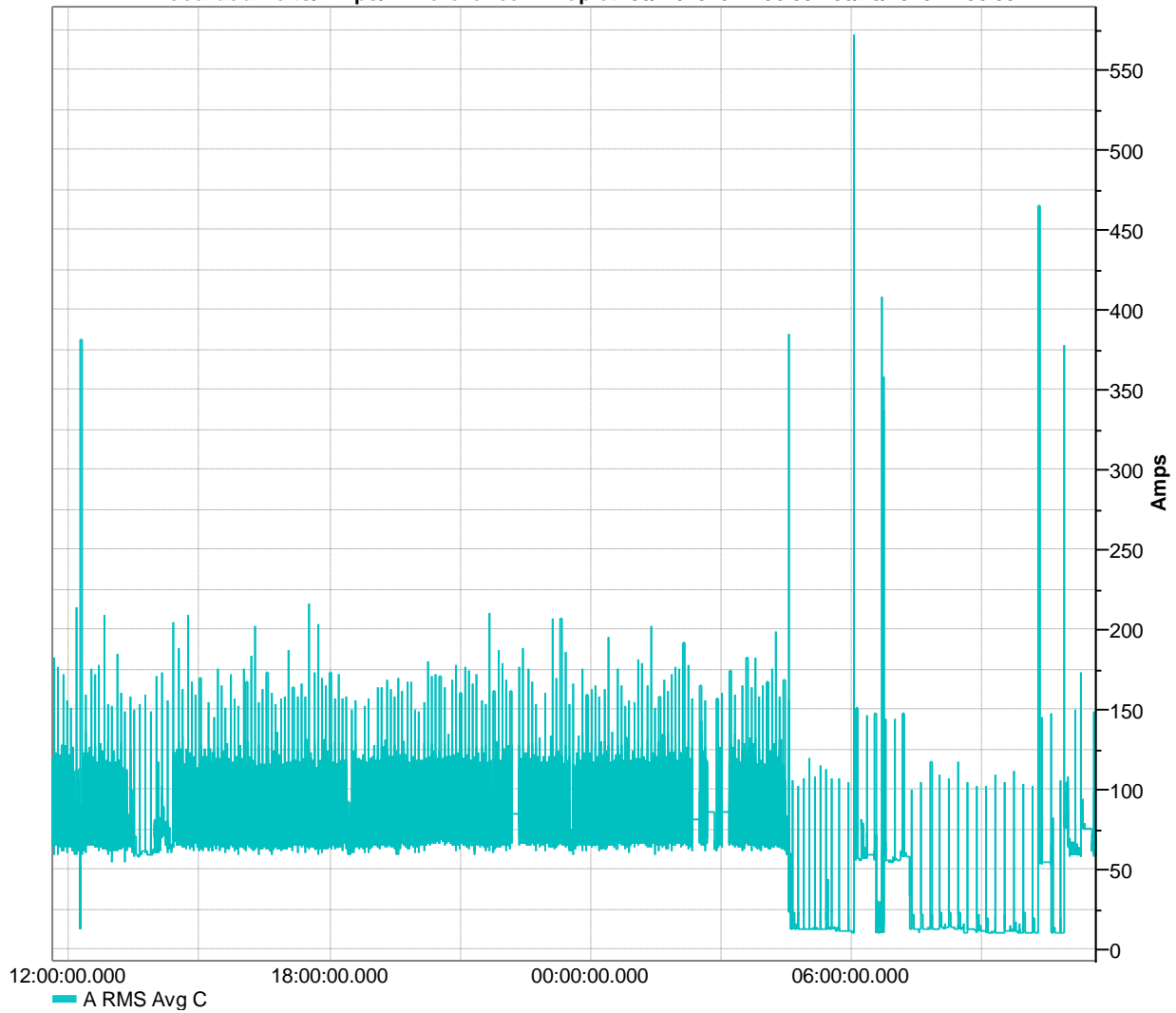


Volts/Amps/Hz

Detailed View

Phase	Max	Time	Min	Time
A RMS Avg. C	572.87 A RMS	08/25/2016 06:02:36	10.07 A RMS	08/25/2016 08:33:51

Recorded Volts/Amps/Hz Reference Timeplot: 08/24/2016 11:36:00 - 08/25/2016 11:36:00

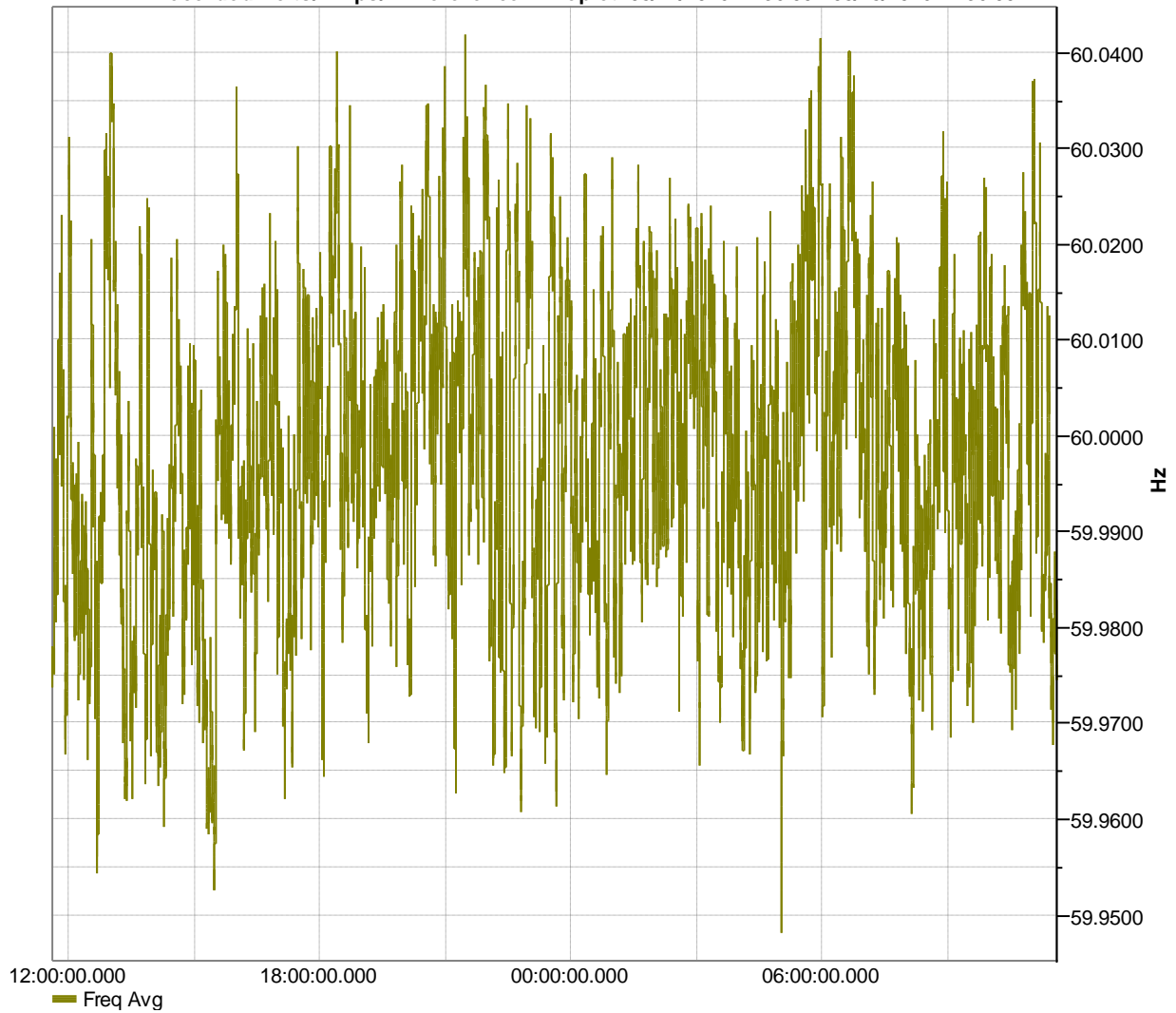


Volts/Amps/Hz

Detailed View

Phase	Max	Time	Min	Time
Freq Avg	60.04 Hz	08/24/2016 21:27:30	59.95 Hz	08/25/2016 05:01:30

Recorded Volts/Amps/Hz Reference Timeplot: 08/24/2016 11:36:00 - 08/25/2016 11:36:00



Events

The Events section is a summary of the voltage and current events that occurred at this location during the monitor period.

Events are defined as changes in the monitored voltage or current. These changes may be subtle or severe.

Tolerance curves provide a graphical representation of the likelihood of an event to disrupt equipment operations. Tolerance curves classify the event by magnitude and duration; there are standardized tolerance curves for voltage such as CBEMA or ITIC and for current, circuit breaker manufacturers supply curves of their equipments operation.

Events

Limit Configuration

Voltage Limits

	<	>
AN	- 10.0 % (432.0 V RMS)	+ 10.0 % (528.0 V RMS)
BN	- 10.0 % (432.0 V RMS)	+ 10.0 % (528.0 V RMS)
CN	- 10.0 % (432.0 V RMS)	+ 10.0 % (528.0 V RMS)
NG	- 0.0 % (0.0 V RMS)	+ 2.1 % (10.0 V RMS)
Impulse	500.0 V PK	
Show events	Combined	

Aggregate events 0 s

Current Limits

	>
A	1500.0 A
B	1500.0 A
C	1500.0 A
N	0.5 A
Show events	Combined

Aggregate events 0 s

Events

Events

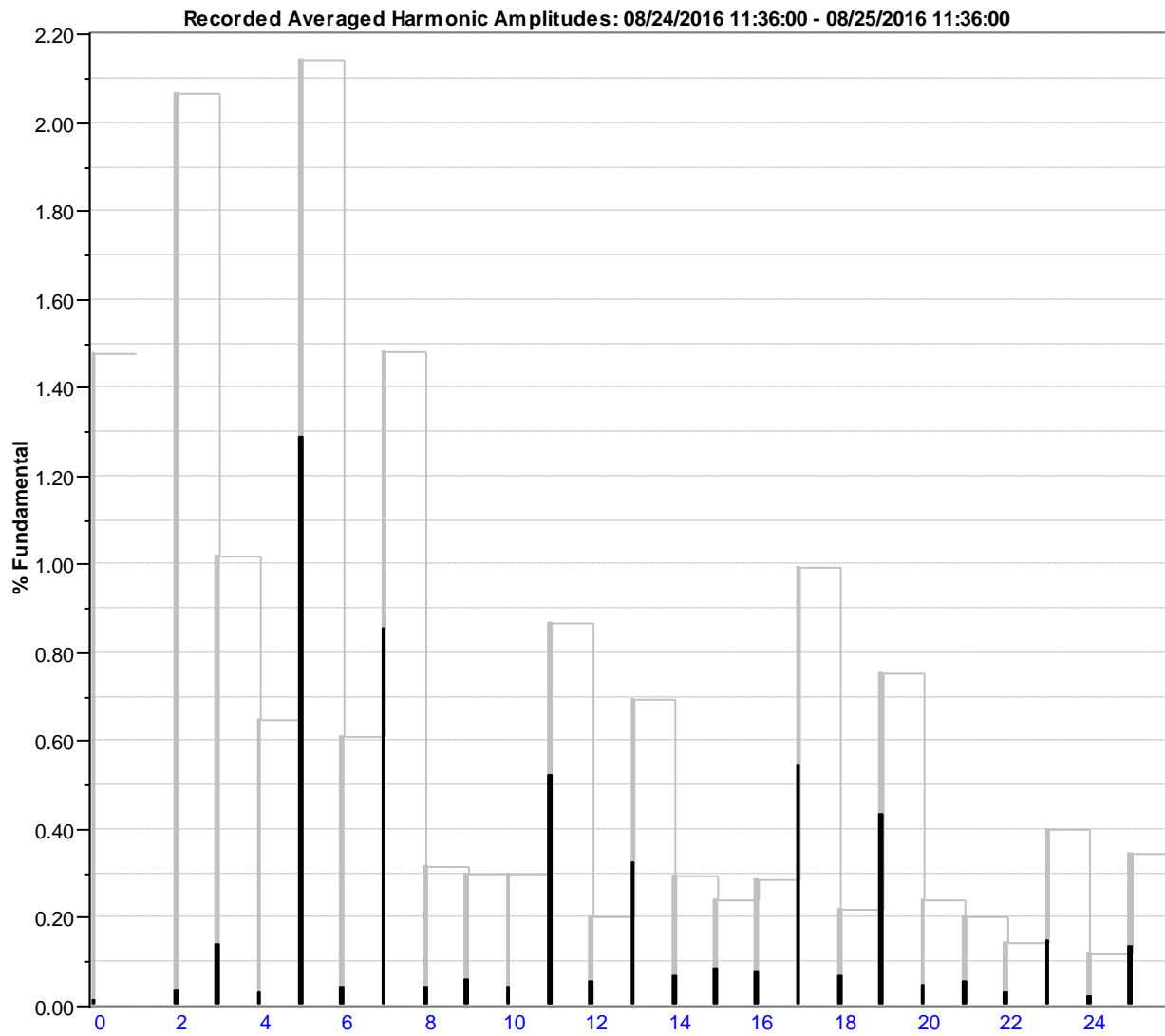
Harmonics/ Interharmonics

This section contains the voltage and current harmonics acquired during the monitor period. Harmonics may be represented in summary showing the overall harmonics in a spectral format or individual harmonics may be graphed over time to indicate the effects of harmonics and particular loads switching on.

Harmonics are typically caused by switching electronic loads. The distortion caused by harmonics can cause overheating in conductors and equipment and may cause equipment malfunctions.

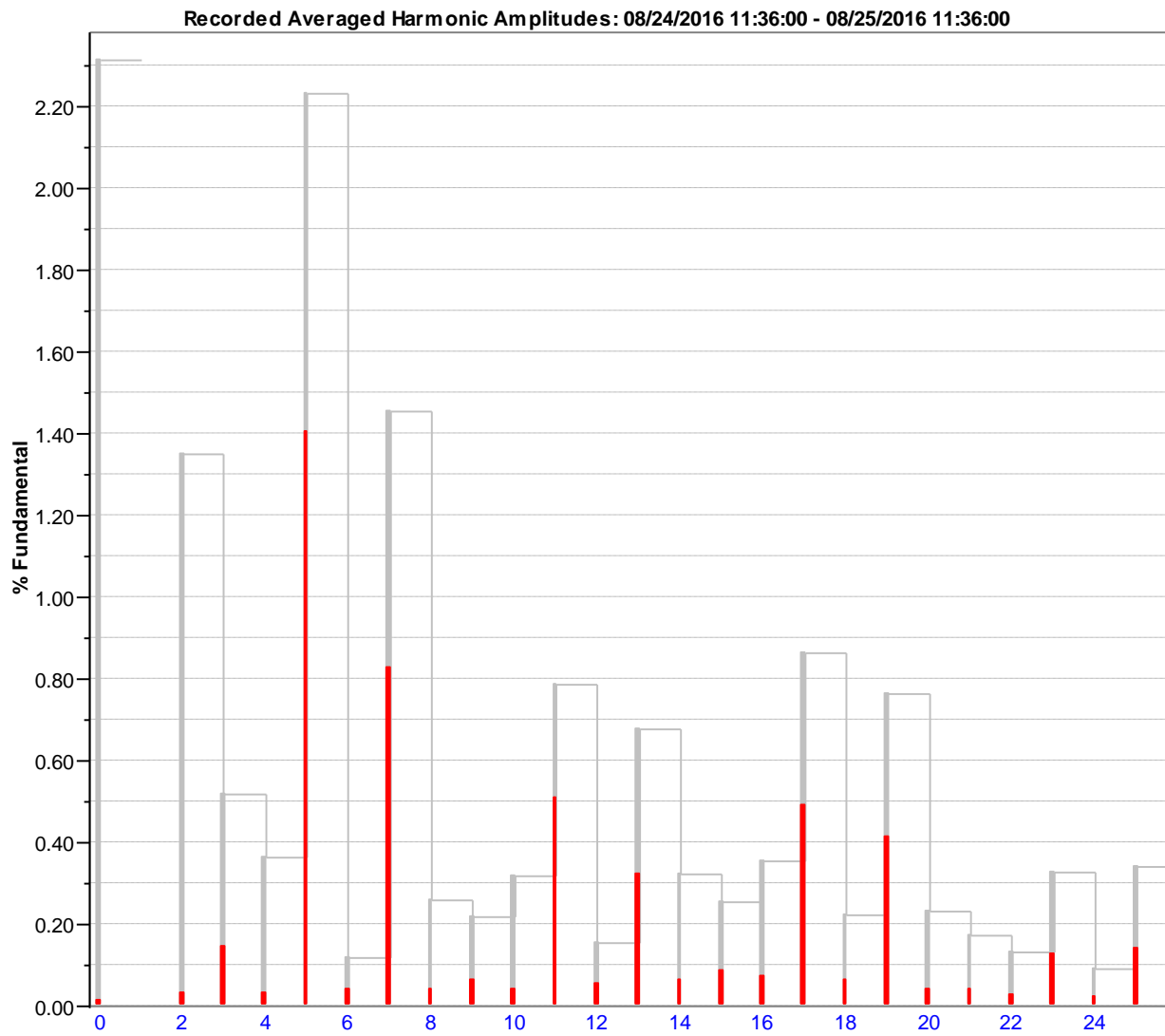
Harmonics/ Interharmonics

Phase	Max	Harmonic Order
V Harmonics Avg. AB	1.29 %	5
V Harmonics Max AB	2.14 %	5



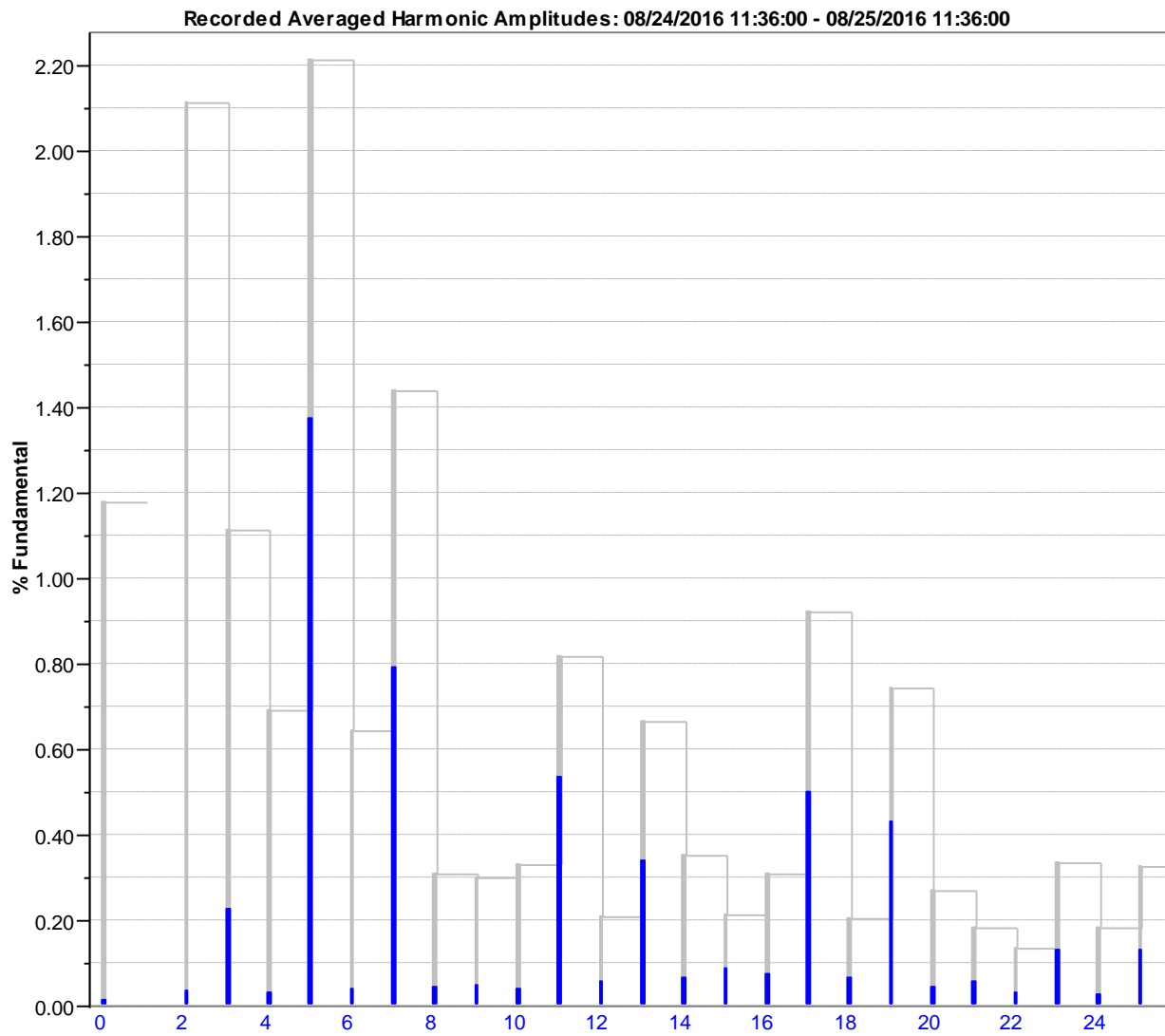
Harmonics/ Interharmonics

Phase	Max	Harmonic Order
V Harmonics Avg. BC	1.40 %	5
V Harmonics Max BC	2.31 %	0



Harmonics/ Interharmonics

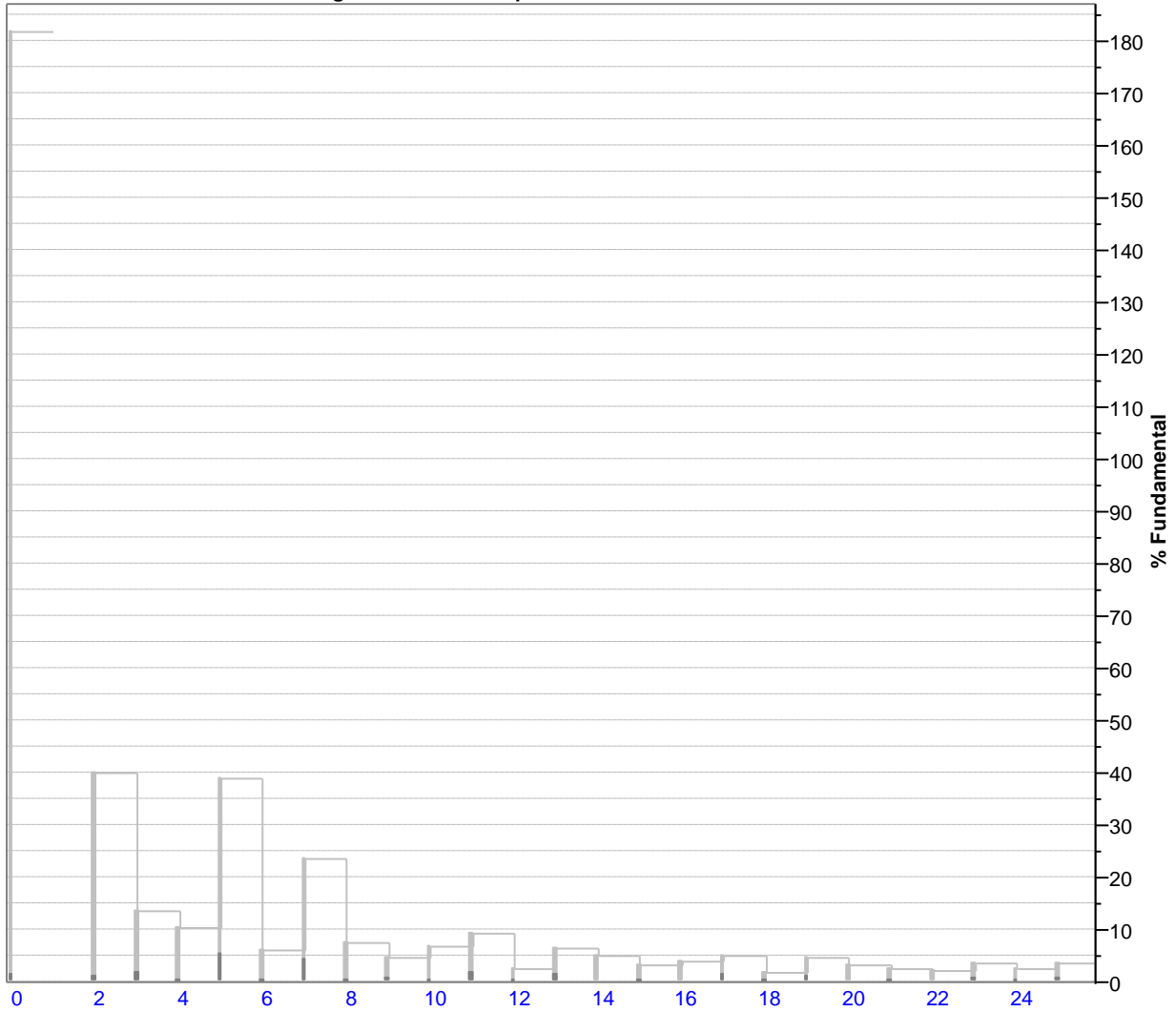
Phase	Max	Harmonic Order
V Harmonics Avg. CA	1.37 %	5
V Harmonics Max CA	2.21 %	5



Harmonics/ Interharmonics

Phase	Max	Harmonic Order
A Harmonics Avg. A	5.28 %	5
A Harmonics Max A	181.70 %	0

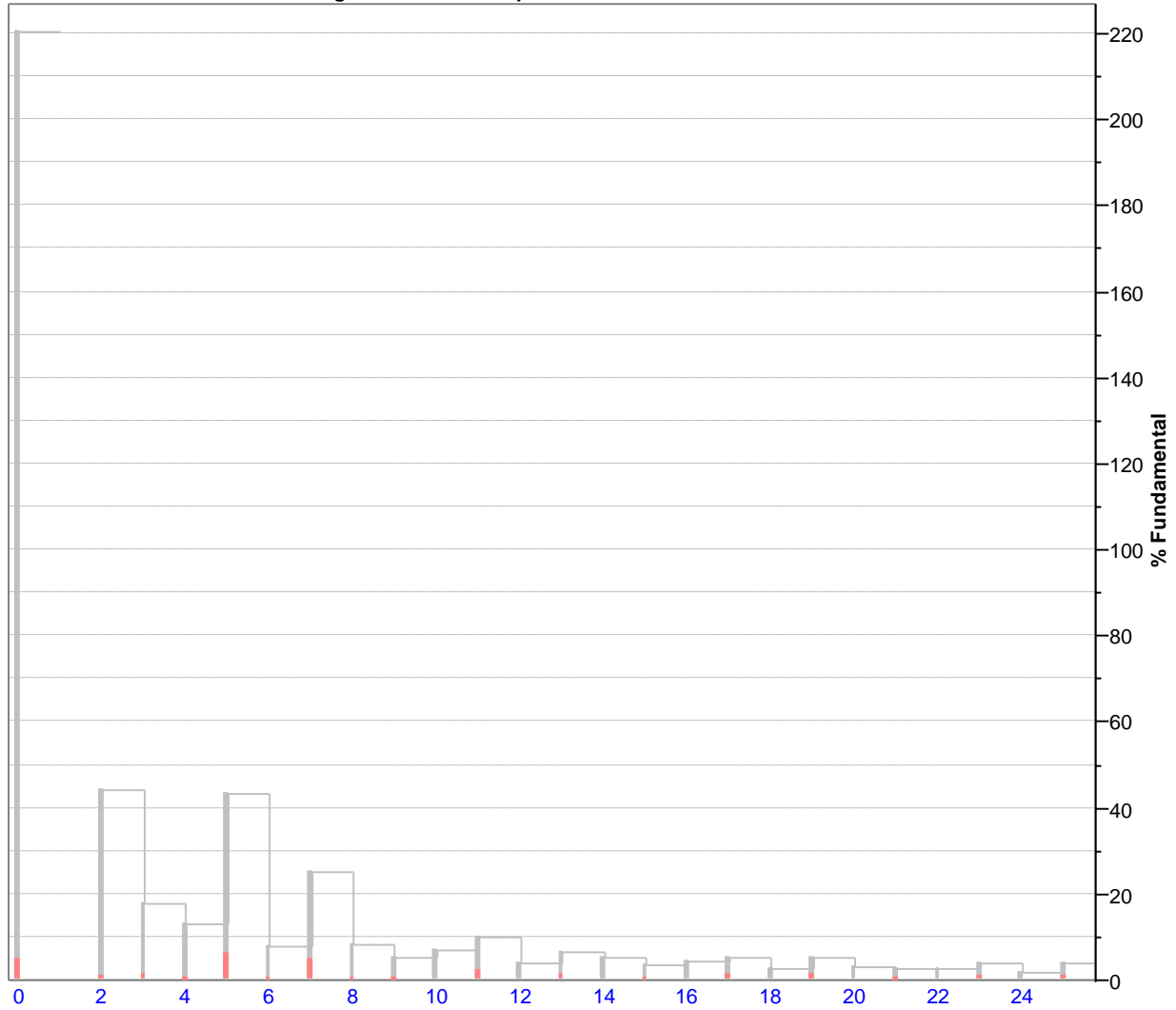
Recorded Averaged Harmonic Amplitudes: 08/24/2016 11:36:00 - 08/25/2016 11:36:00



Harmonics/ Interharmonics

Phase	Max	Harmonic Order
A Harmonics Avg. B	6.17 %	5
A Harmonics Max B	220.31 %	0

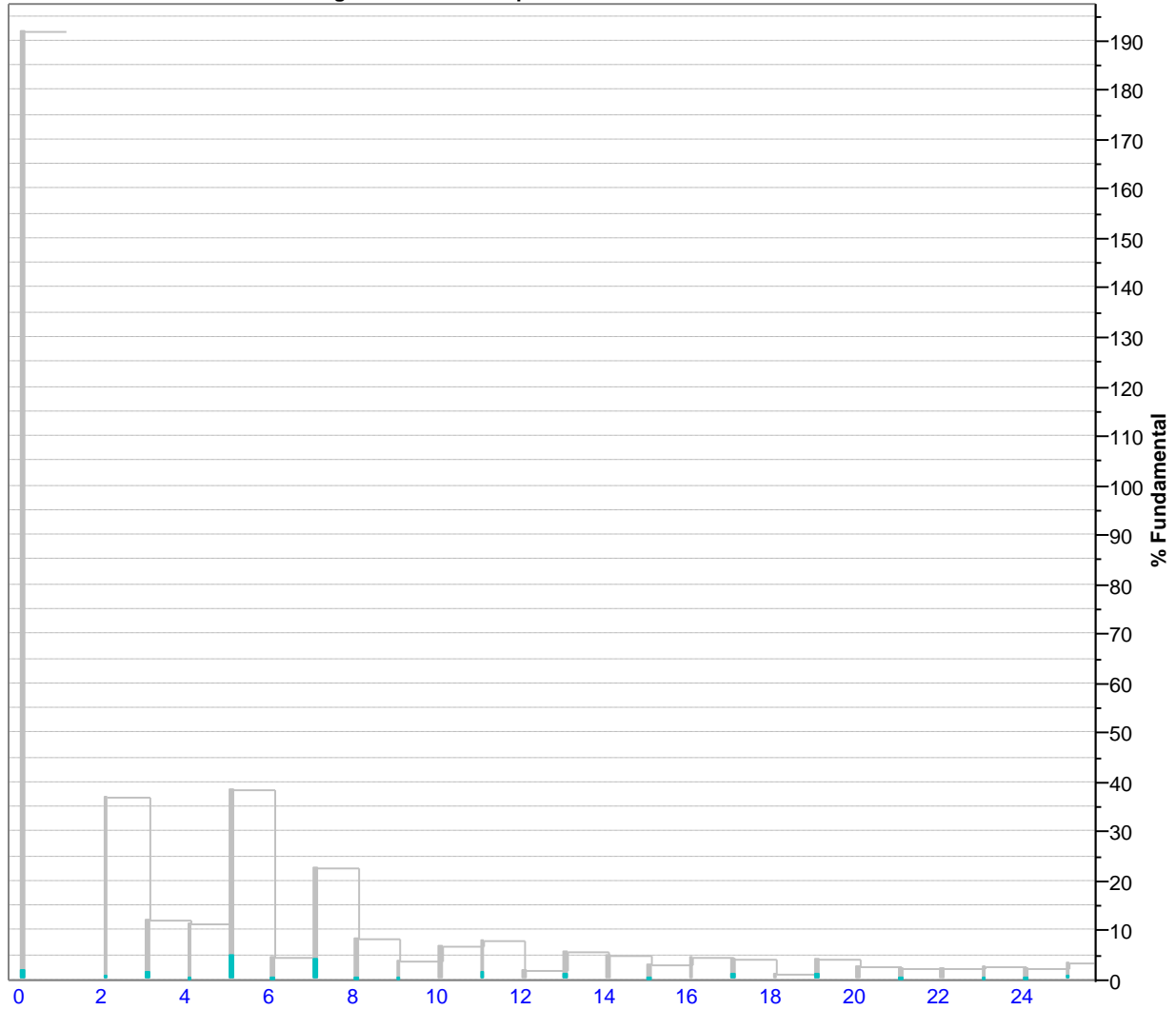
Recorded Averaged Harmonic Amplitudes: 08/24/2016 11:36:00 - 08/25/2016 11:36:00



Harmonics/ Interharmonics

Phase	Max	Harmonic Order
A Harmonics Avg. C	4.87 %	5
A Harmonics Max C	191.71 %	0

Recorded Averaged Harmonic Amplitudes: 08/24/2016 11:36:00 - 08/25/2016 11:36:00



Total Harmonic Distortion (THD) / Unbalance

This section contains summaries of THD for voltage and current. Additionally graphical summaries of voltage and current unbalance are displayed during the monitor interval.

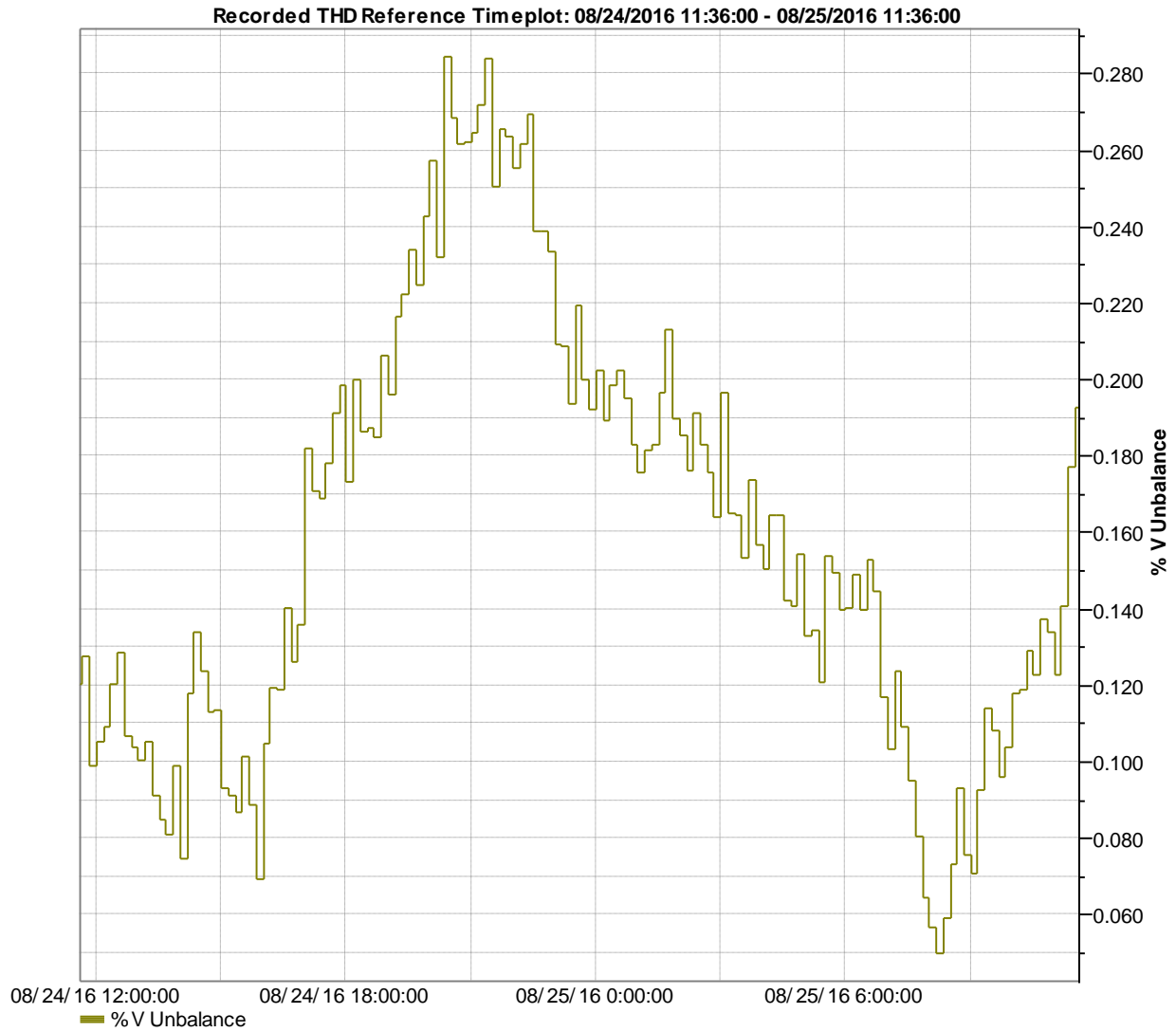
There are international standards recommending the allowable level of harmonic distortion, the levels vary depending on the operating voltage level, it is recommended that you consult the local prevailing standard for comparison with the levels found in this report.

Excessive voltage unbalance is an indication that one or two phases may be overloaded. A redistribution of the loads on one or more of the phases may be in order.

Excessive current unbalance also indicates a poor distribution of loads. Although there may be no corresponding voltage unbalance, excessive current unbalance may result in tripped circuit breakers or transformer overheating.

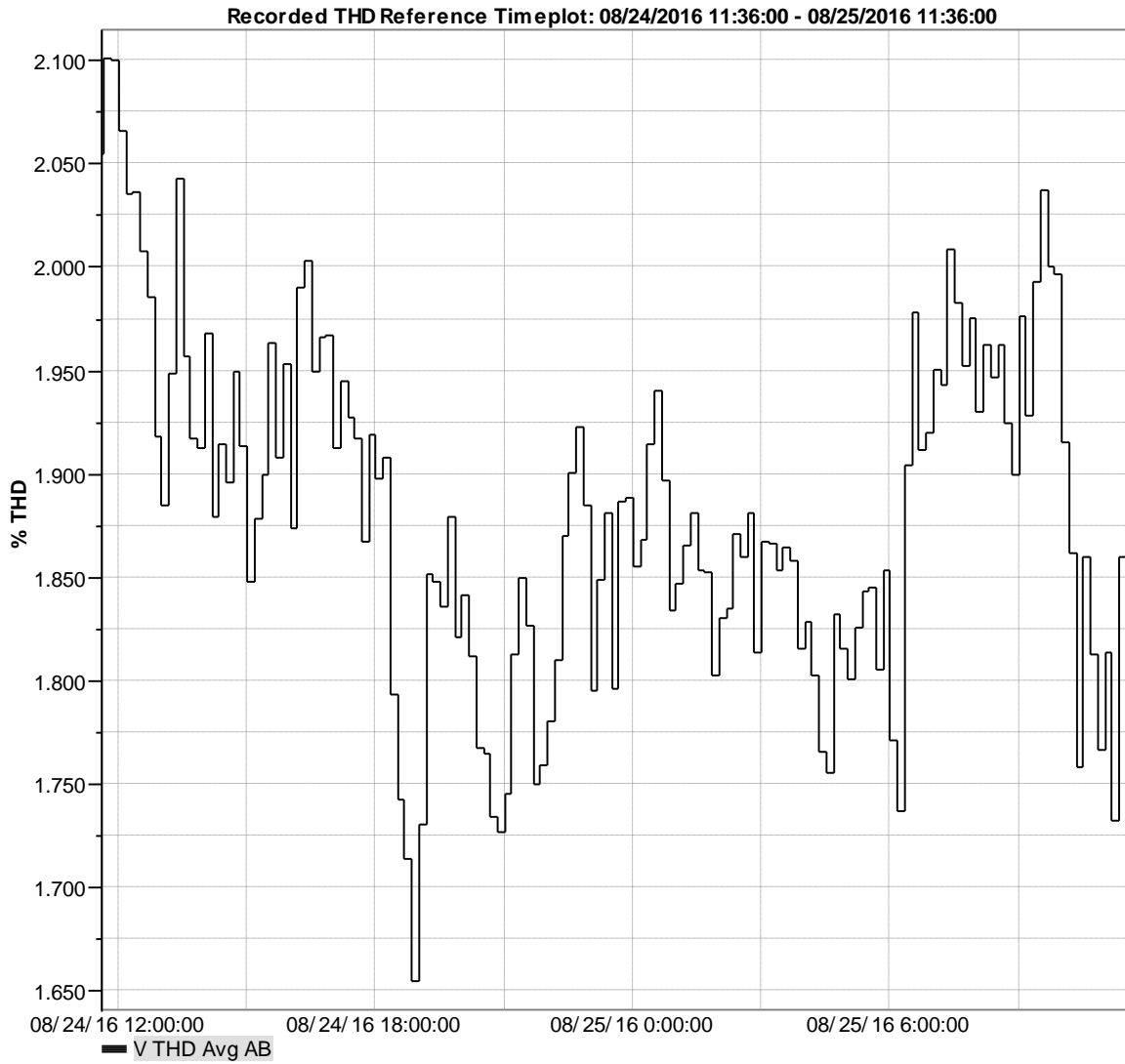
Total Harmonic Distortion (THD) / Unbalance

Phase	Max	Time	Min	Time
% V Unbalance	0.28	08/24/2016 20:30:00	0.05	08/25/2016 08:20:00



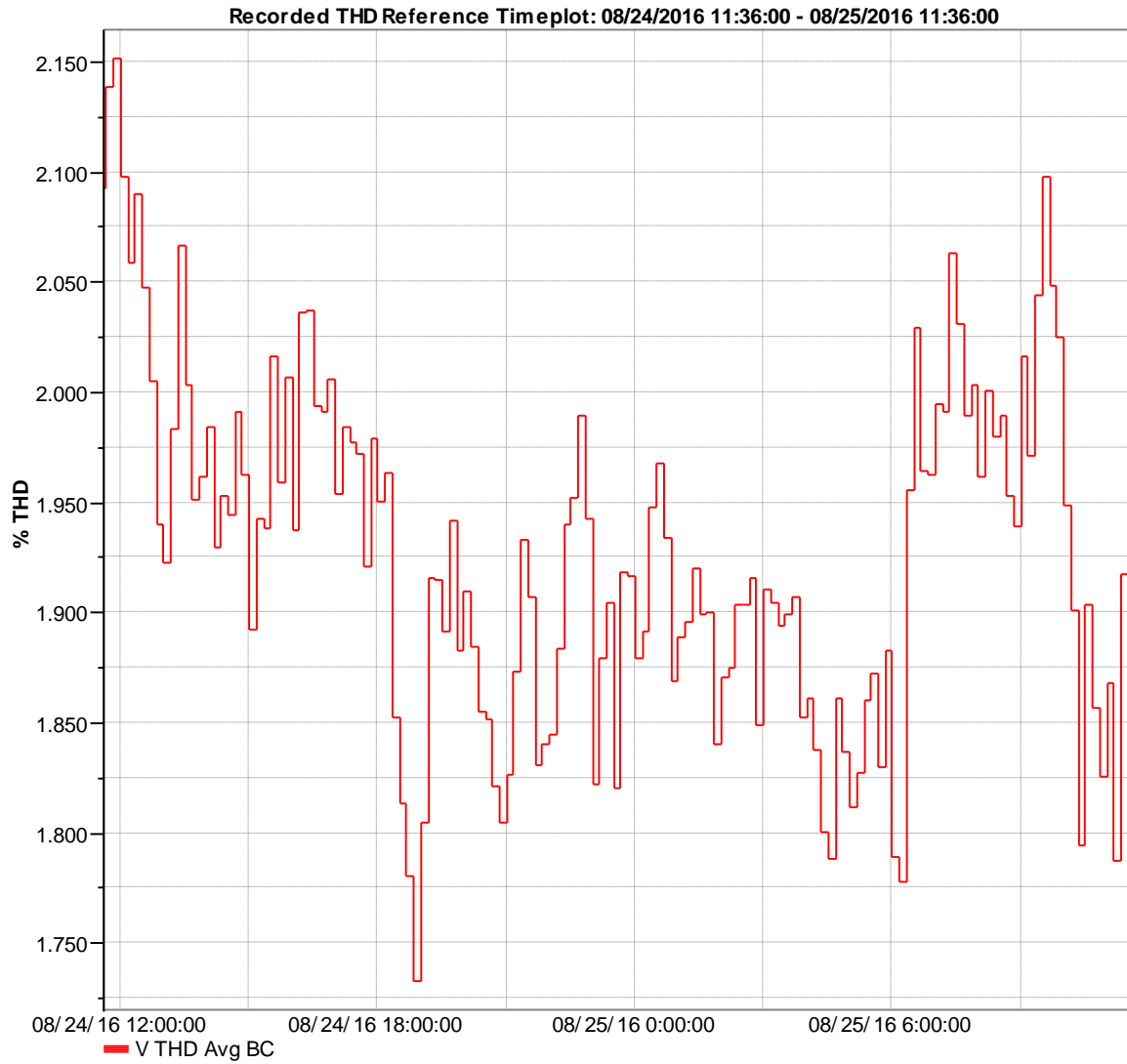
Total Harmonic Distortion (THD) / Unbalance

Phase	Max	Time	Min	Time
V THD Avg. AB	2.10 % THD	08/24/2016 11:50:00	1.65 % THD	08/24/2016 19:00:00



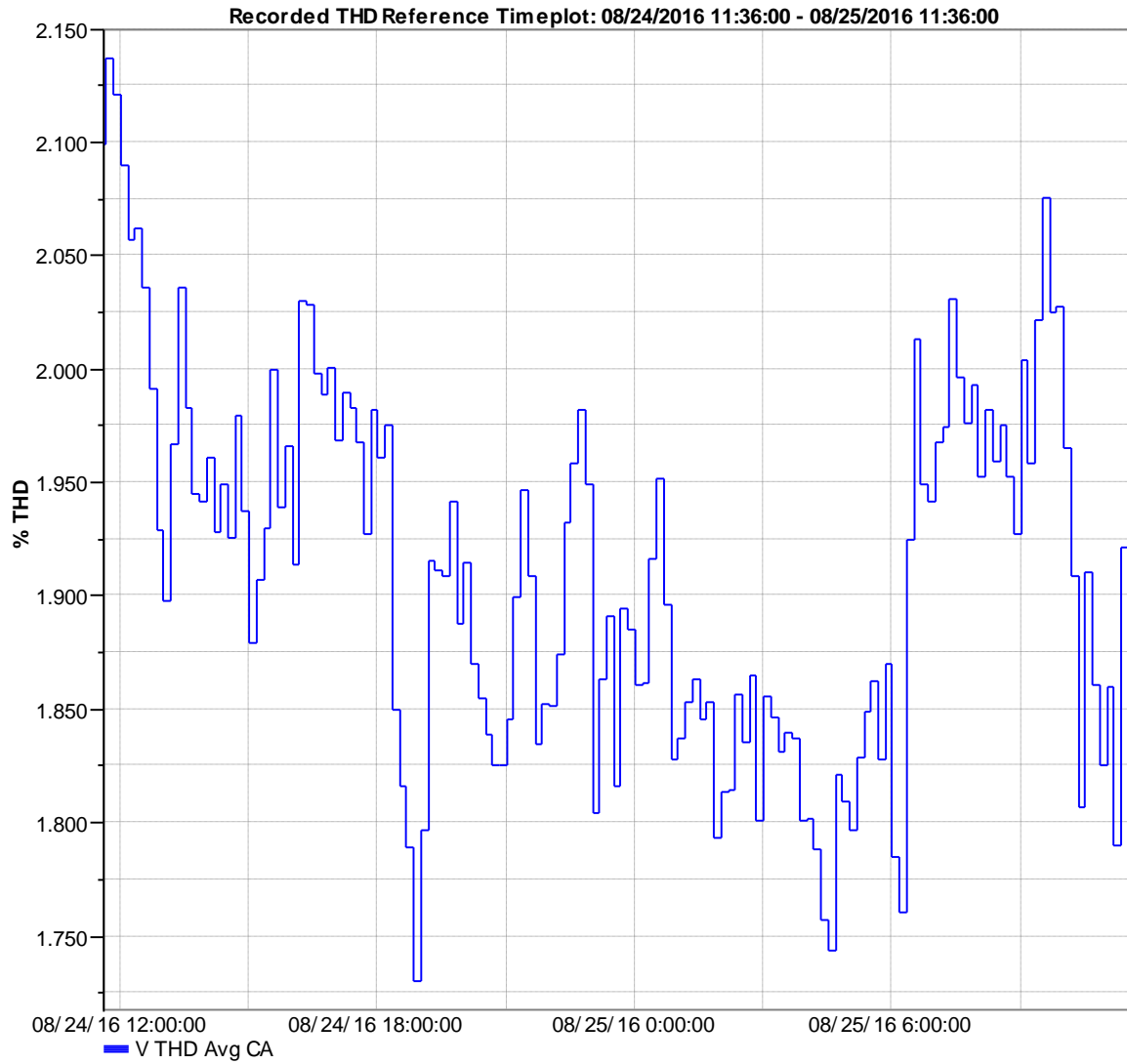
Total Harmonic Distortion (THD) / Unbalance

Phase	Max	Time	Min	Time
V THD Avg. BC	2.15 % THD	08/24/2016 12:00:00	1.73 % THD	08/24/2016 19:00:00



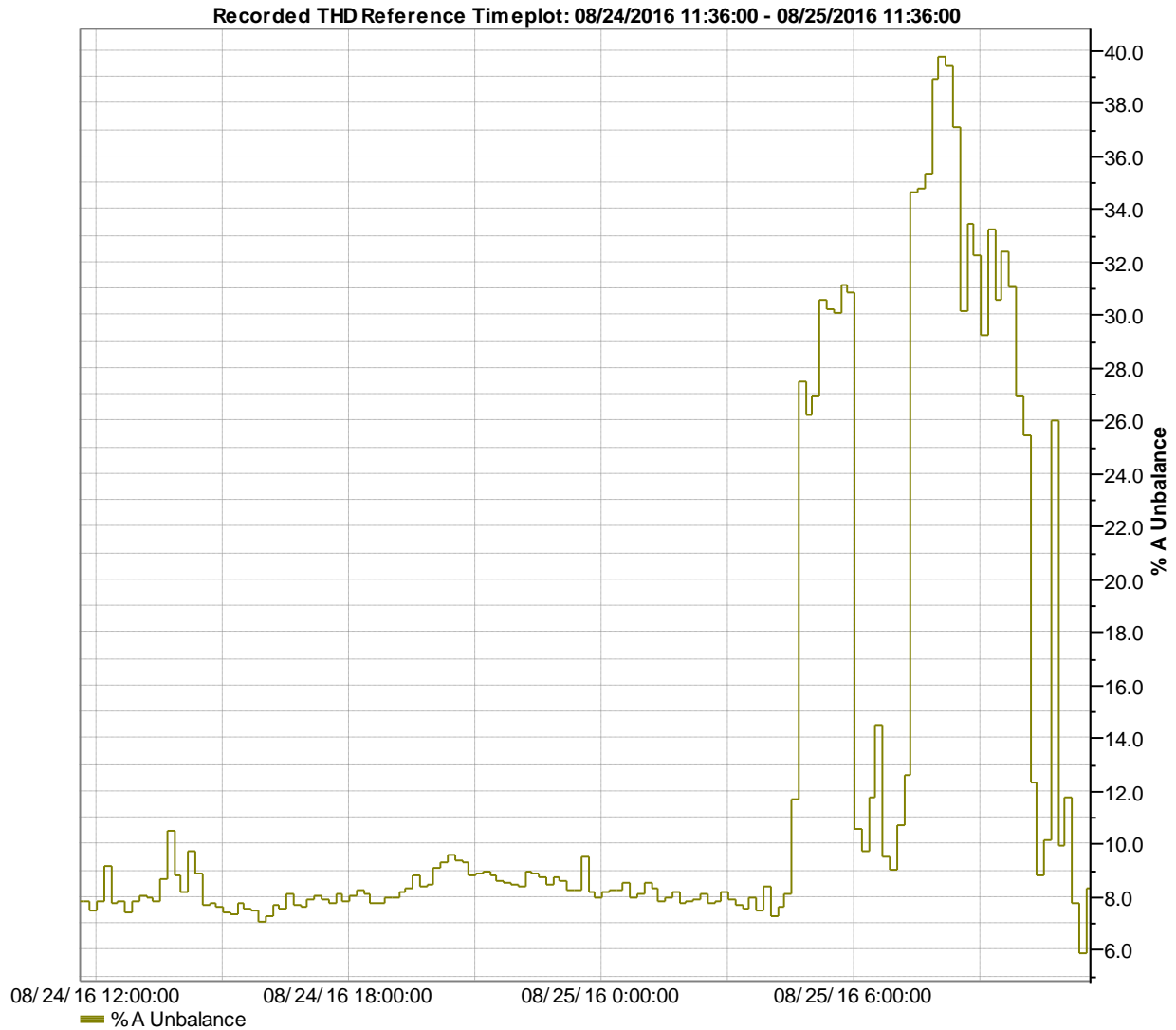
Total Harmonic Distortion (THD) / Unbalance

Phase	Max	Time	Min	Time
V THD Avg. CA	2.14 % THD	08/24/2016 11:50:00	1.73 % THD	08/24/2016 19:00:00



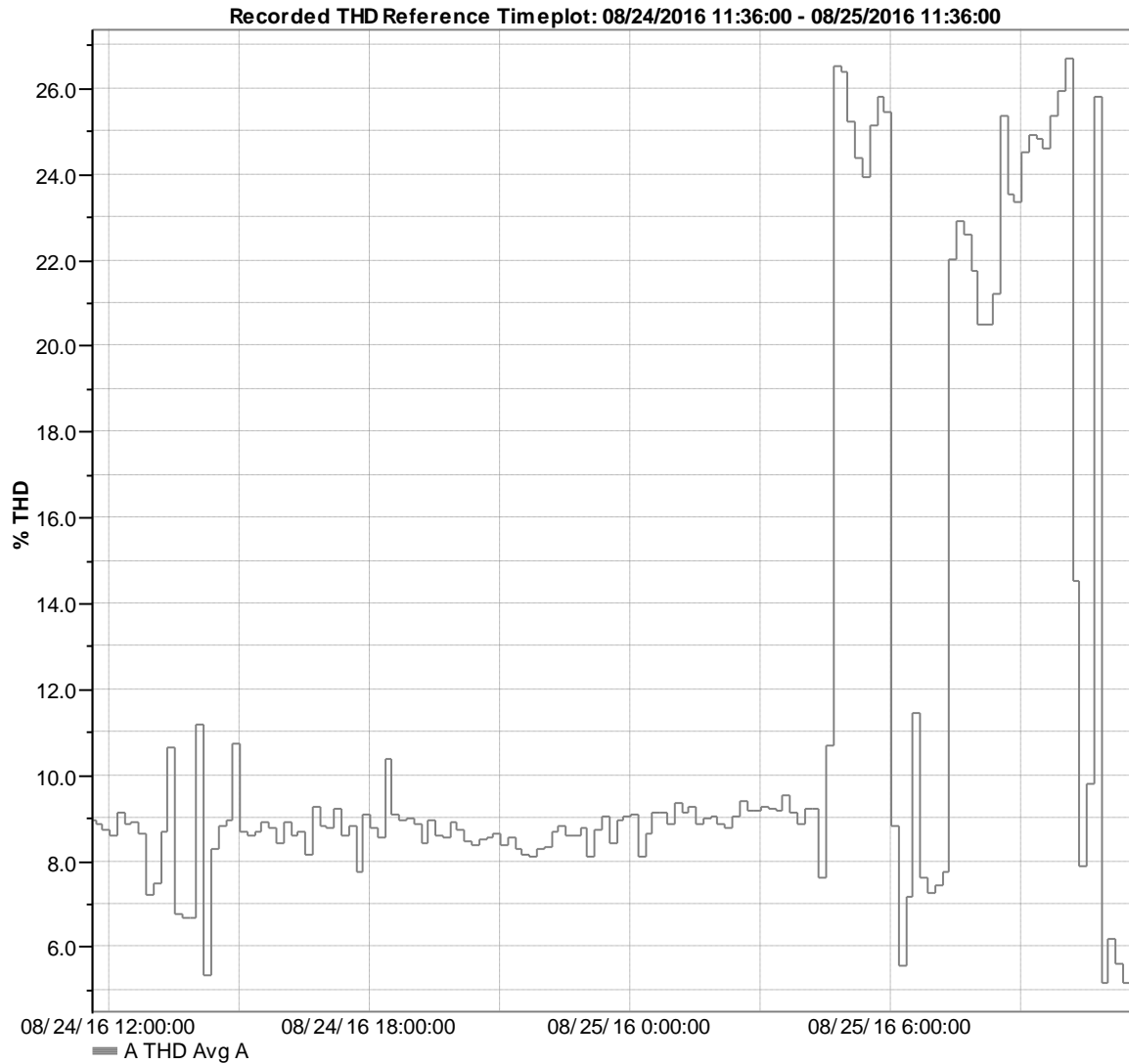
Total Harmonic Distortion (THD) / Unbalance

Phase	Max	Time	Min	Time
% A Unbalance	39.82	08/25/2016 08:10:00	5.84	08/25/2016 11:30:00



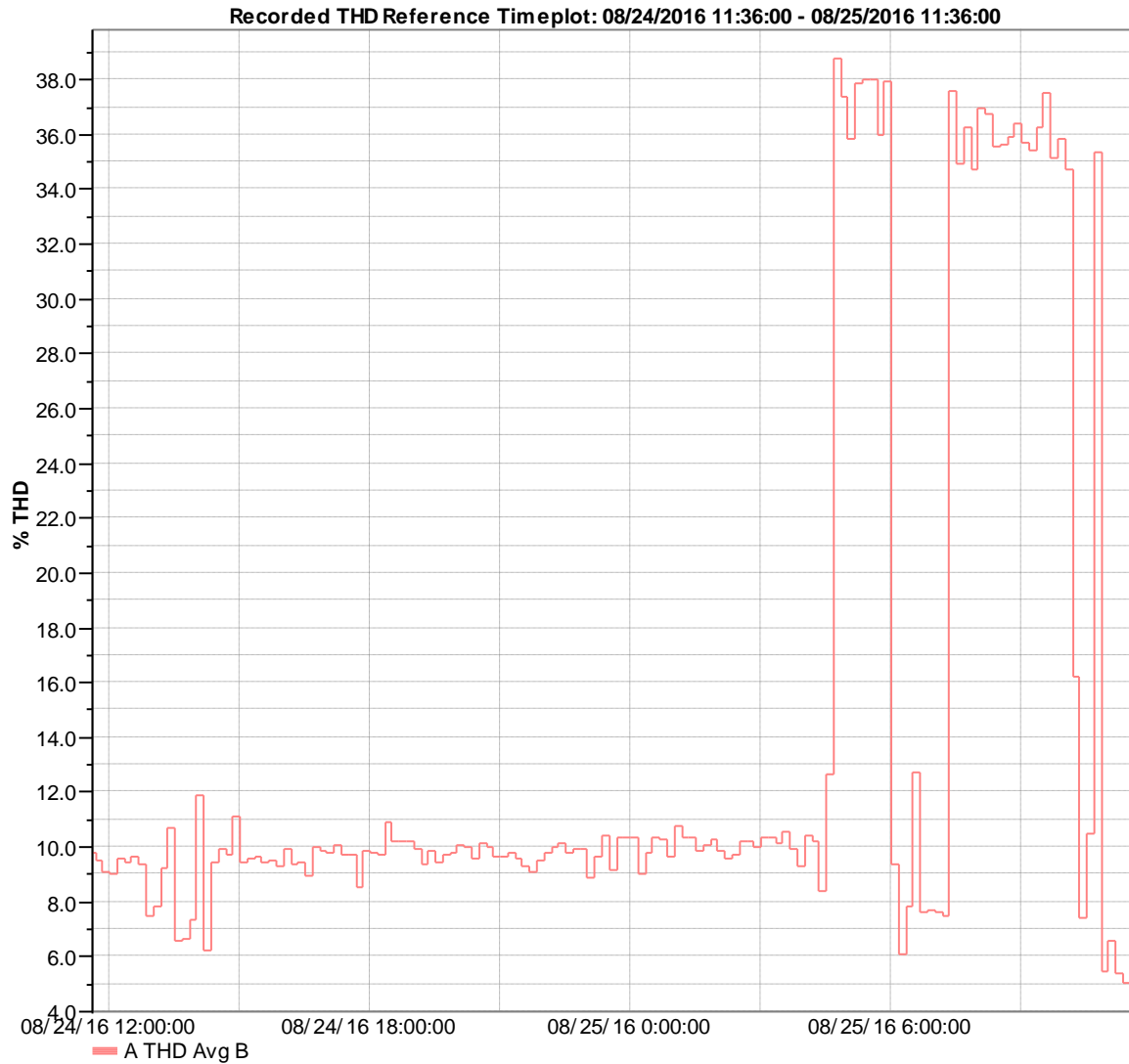
Total Harmonic Distortion (THD) / Unbalance

Phase	Max	Time	Min	Time
A THD Avg. A	26.73 % THD	08/25/2016 10:10:00	5.15 % THD	08/25/2016 11:30:00



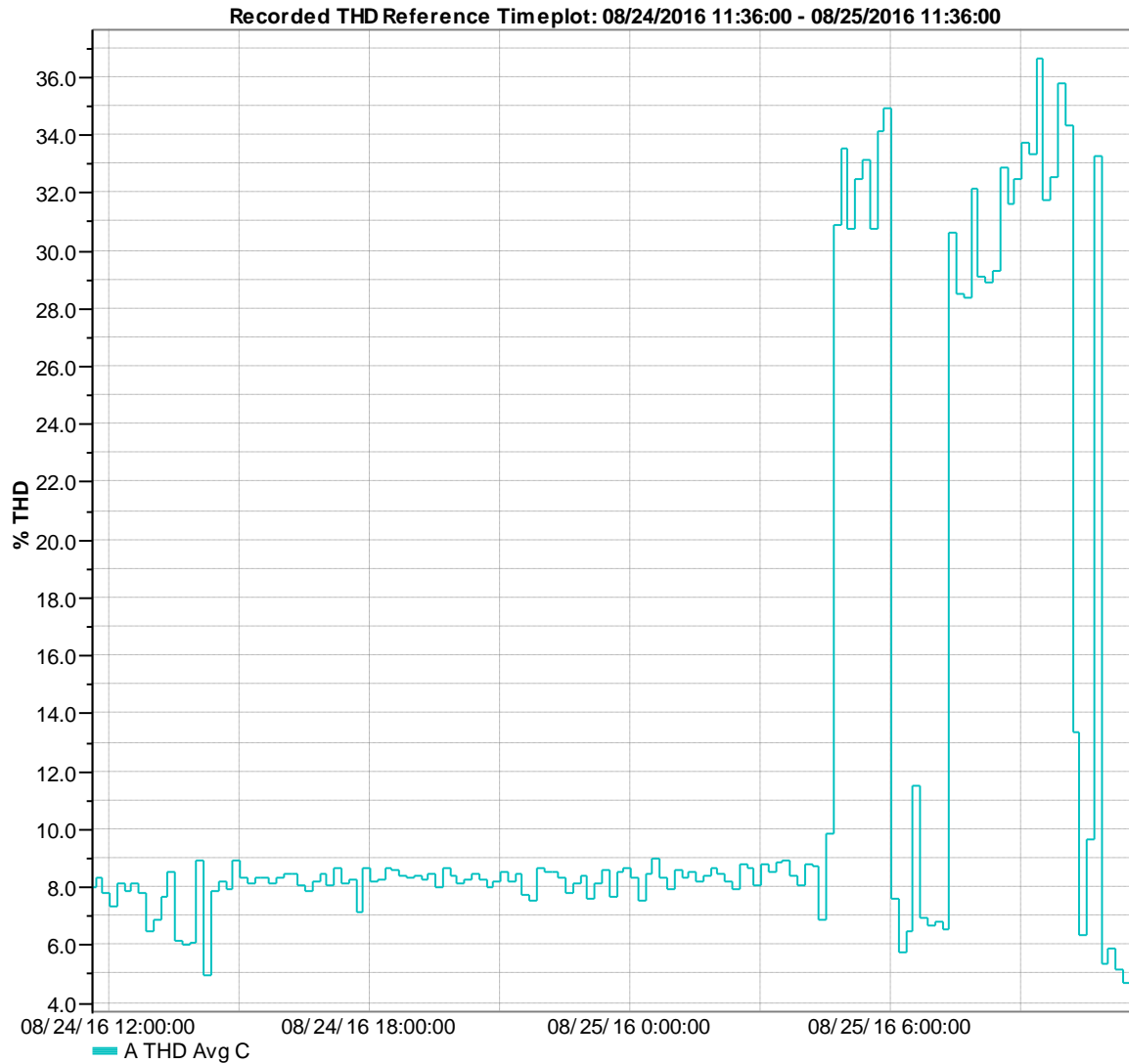
Total Harmonic Distortion (THD) / Unbalance

Phase	Max	Time	Min	Time
A THD Avg. B	38.82 % THD	08/25/2016 04:50:00	5.01 % THD	08/25/2016 11:30:00



Total Harmonic Distortion (THD) / Unbalance

Phase	Max	Time	Min	Time
A THD Avg. C	36.68 % THD	08/25/2016 09:30:00	4.67 % THD	08/25/2016 11:30:00



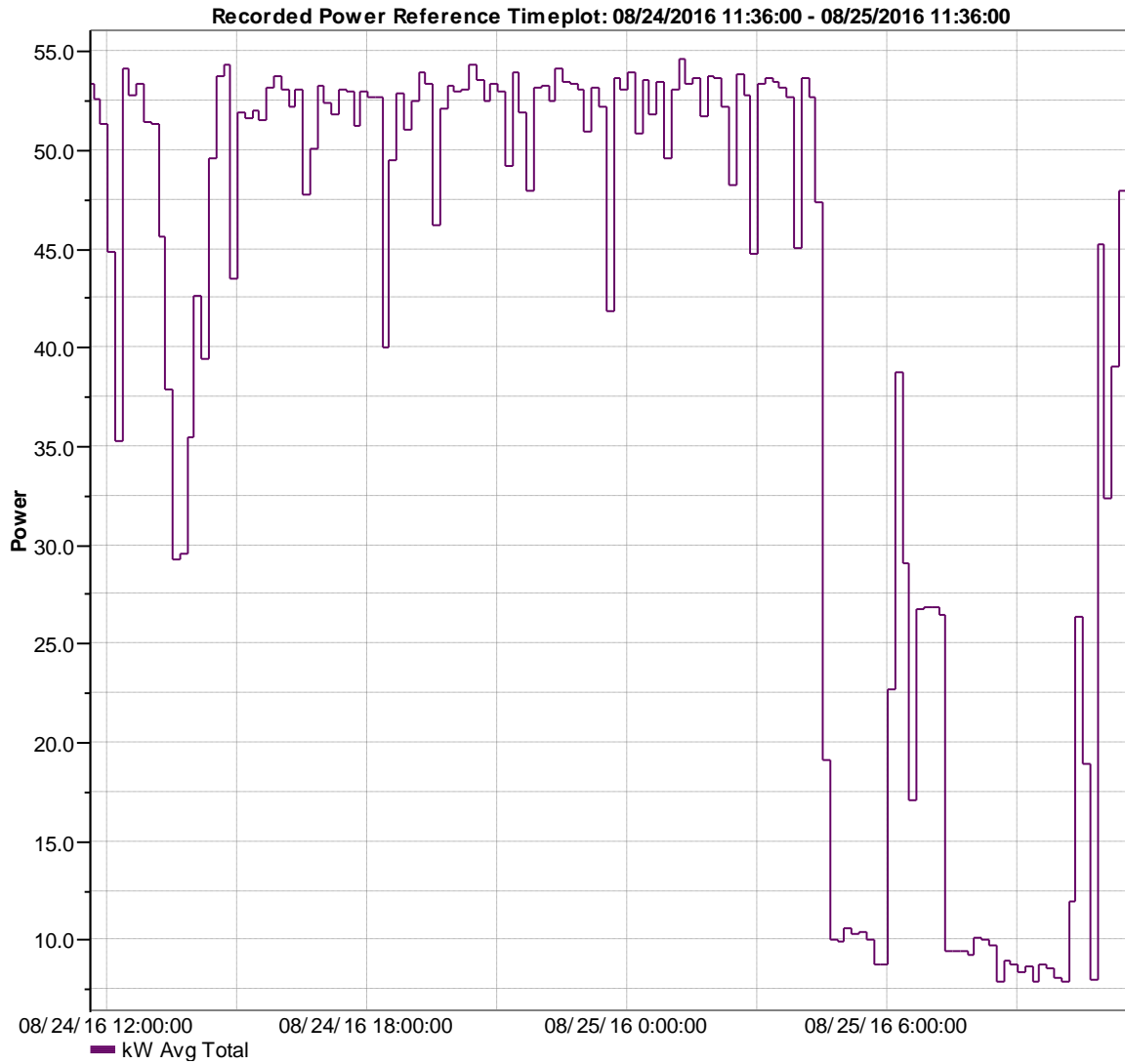
Power/Energy

The VA, var, Watts, power factor and energy by phase and totals acquired during the monitor period are graphed or totals shown in tabular form.

Power

Demand Period: 10 min

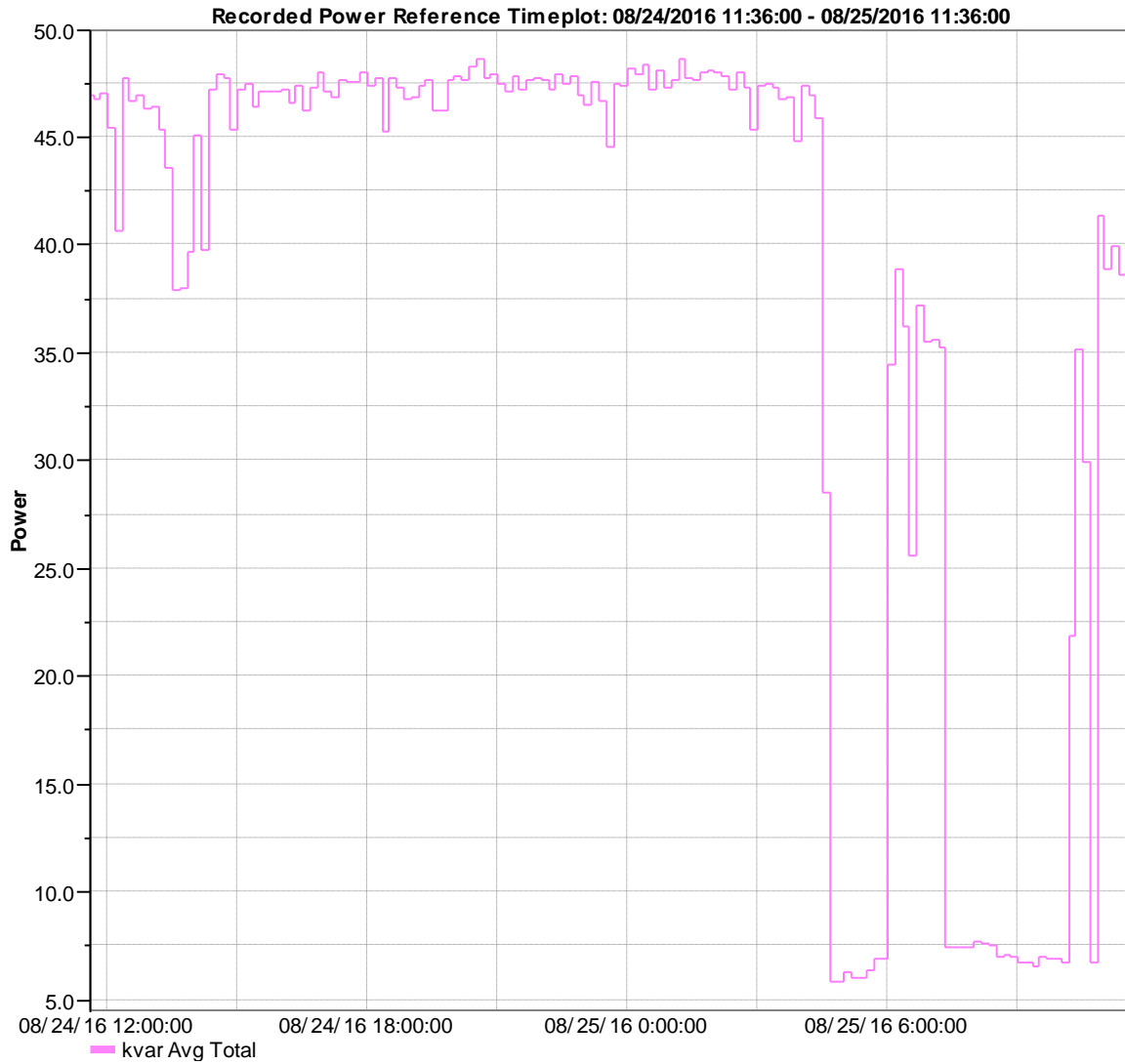
Phase	Max	Time	Min	Time
kW Avg. Total	54.68 kW	08/25/2016 01:20:00	7.86 kW	08/25/2016 09:30:00



Power

Demand Period: 10 min

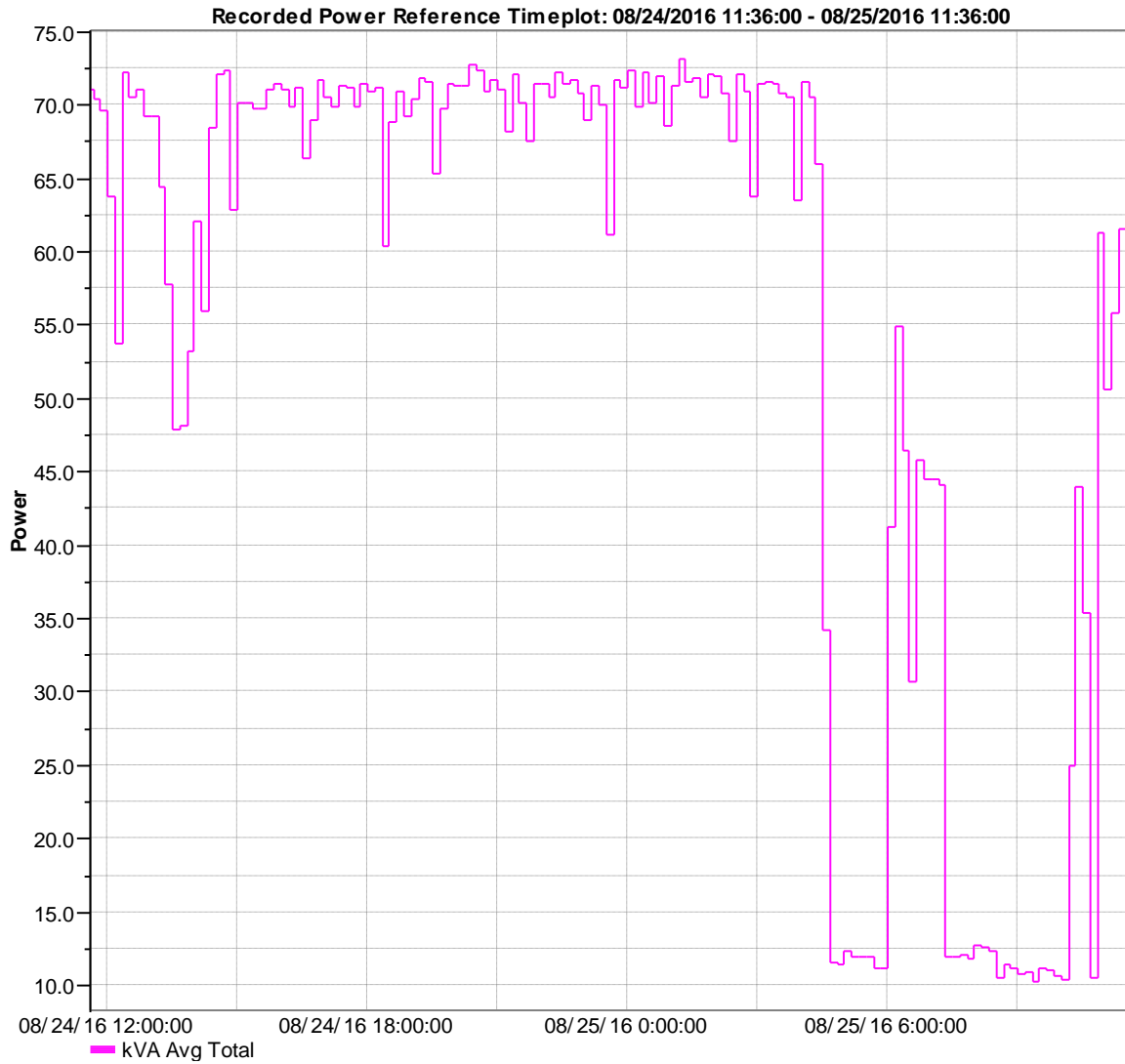
Phase	Max	Time	Min	Time
kVAR Avg. Total	48.68 kVAR	08/25/2016 01:20:00	5.80 kVAR	08/25/2016 05:00:00



Power

Demand Period: 10 min

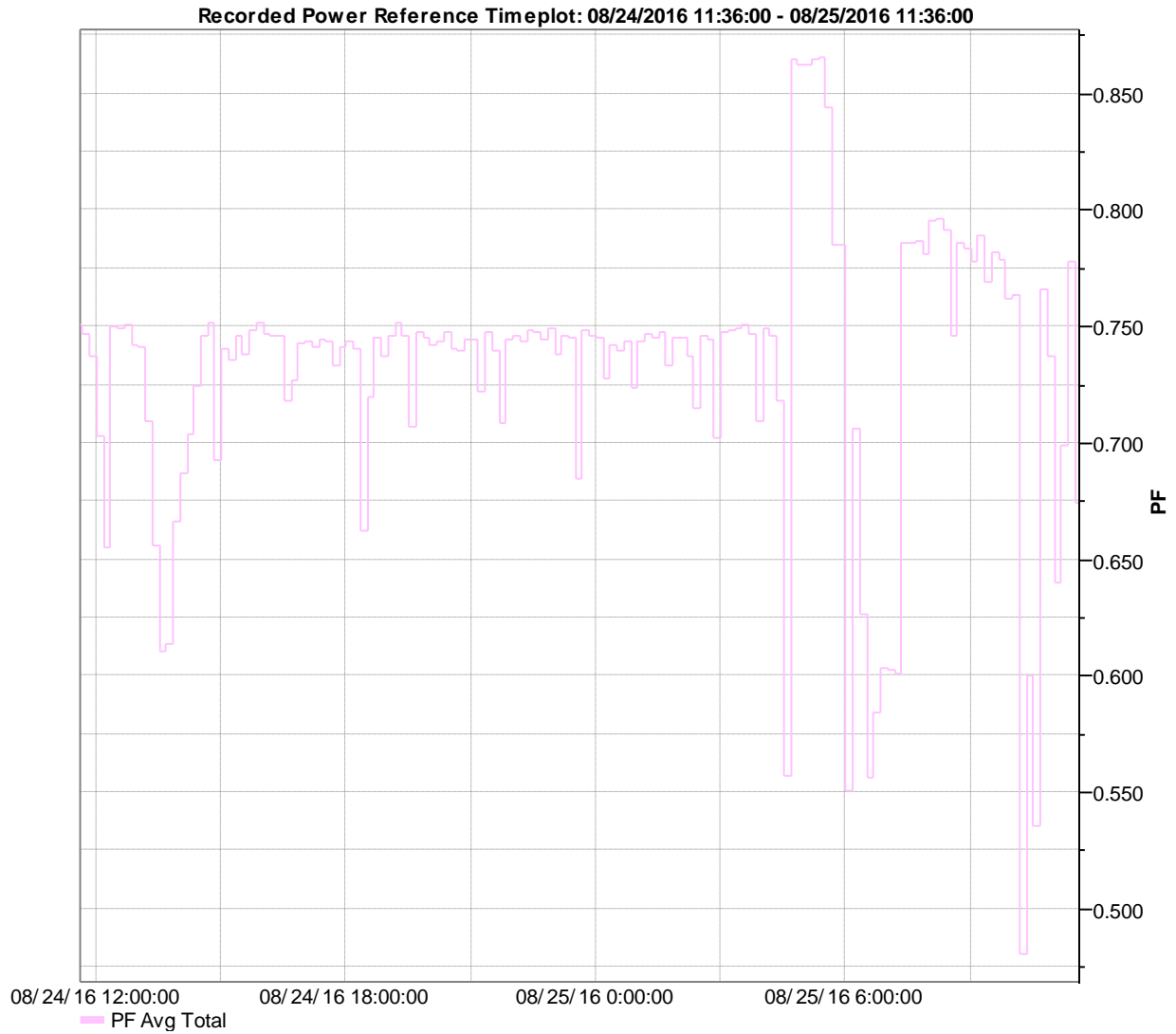
Phase	Max	Time	Min	Time
kVA Avg. Total	73.21 kVA	08/25/2016 01:20:00	10.21 kVA	08/25/2016 09:30:00



Power

Demand Period: 10 min

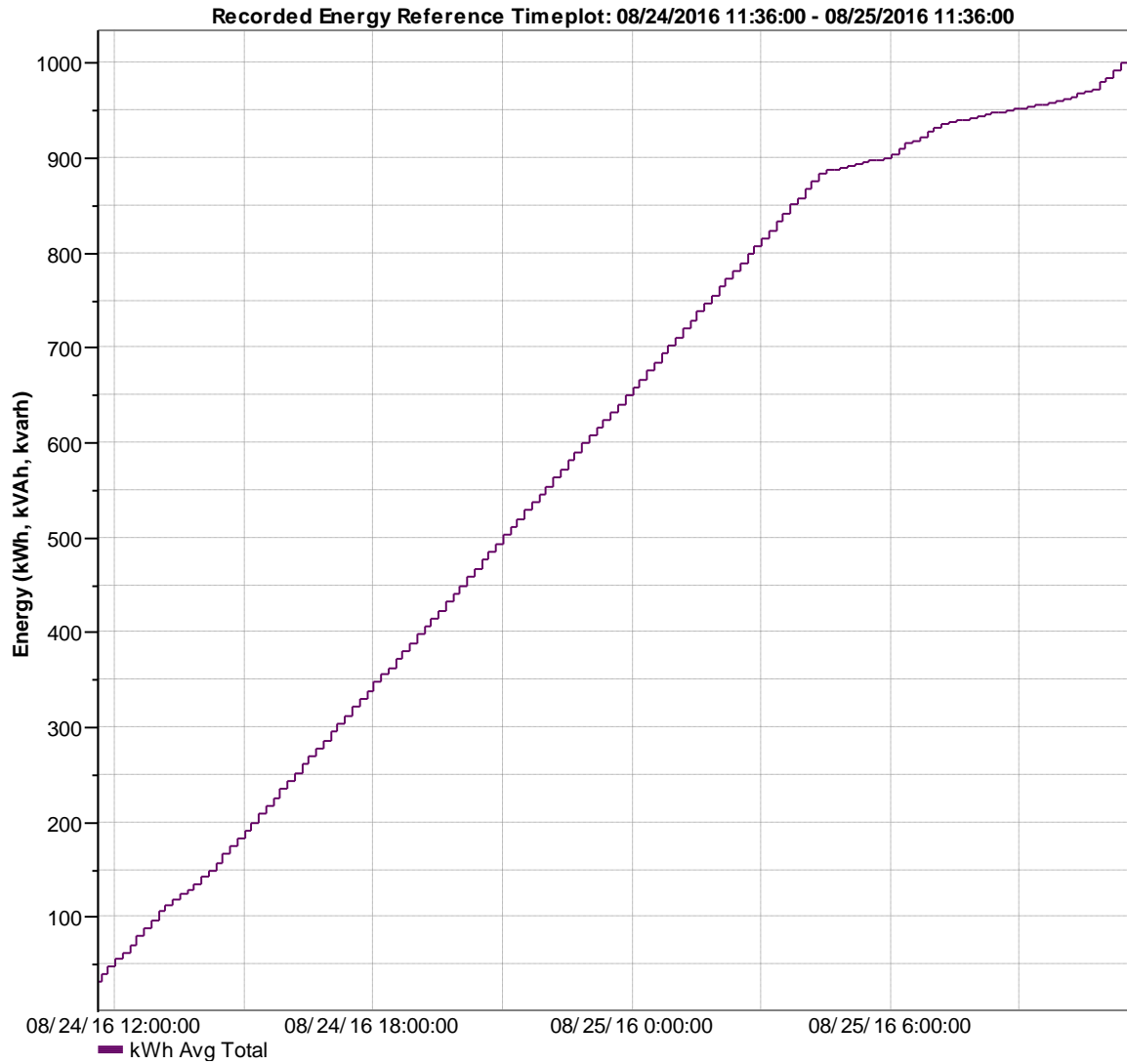
Phase	Max	Time	Min	Time
PF Avg. Total	0.87 PF	08/25/2016 05:30:00	0.48 PF	08/25/2016 10:20:00



Energy

Demand Period: 10 min

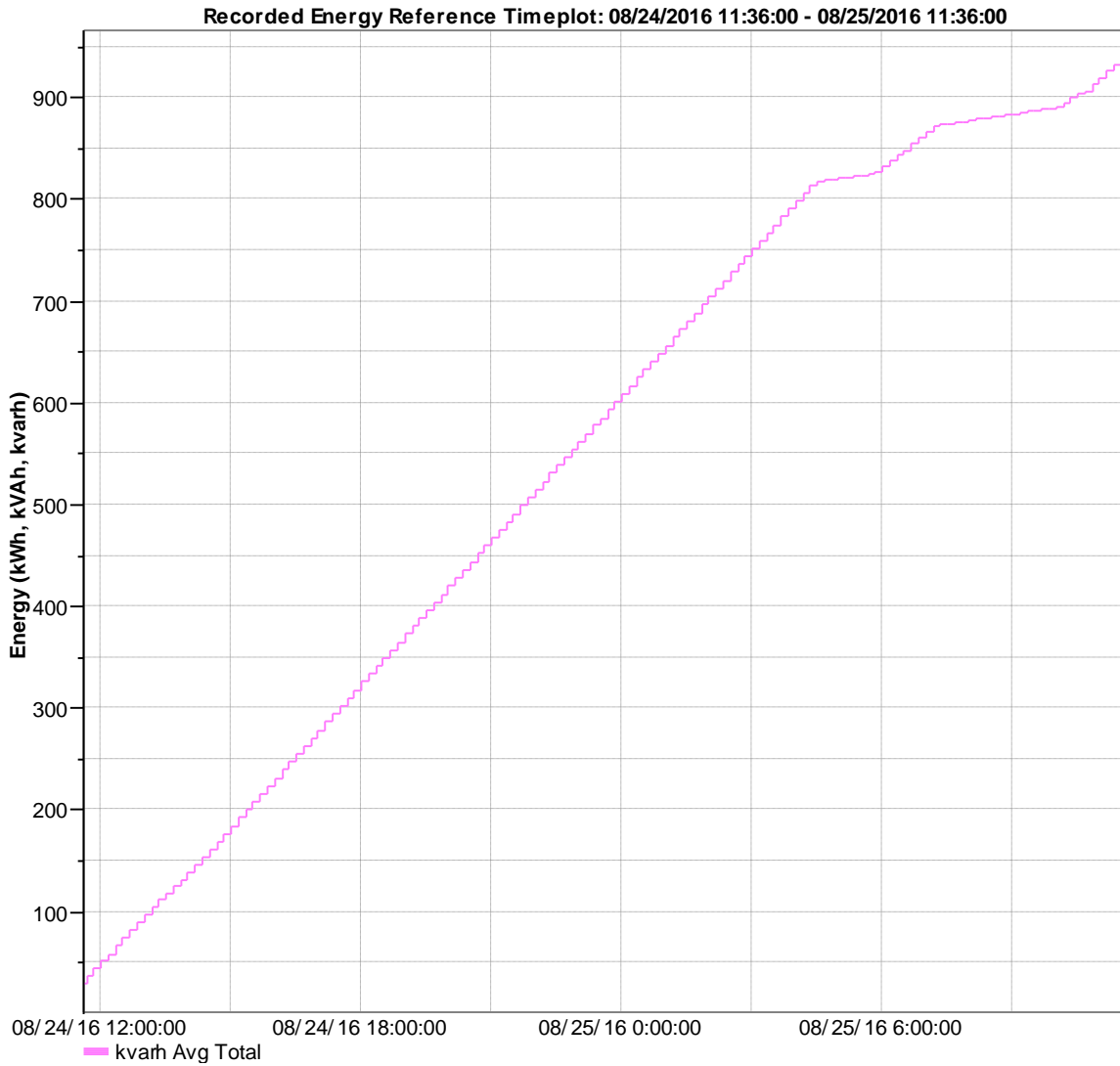
Phase	Max	Time	Min	Time
kWh Avg. Total	1005.64 kWh	08/25/2016 11:40:00	22.62 kWh	08/24/2016 11:30:00



Energy

Demand Period: 10 min

Phase	Max	Time	Min	Time
kVARh Avg. Total	939.16 kVARh	08/25/2016 11:40:00	20.89 kVARh	08/24/2016 11:30:00



Energy

Demand Period: 10 min

Phase	Max	Time	Min	Time
kVAh Avg. Total	1380.66 kVAh	08/25/2016 11:40:00	30.81 kVAh	08/24/2016 11:30:00

