

Hydro-Electric Reactor -Test results witnessed and recorded by: Robert Tomasian, P.E.

Report prepared by: TomTech Engineering, Inc.

Test date: March 27, 2013 at Huntington Beach CA

Attention: Cogar International Energy Corporation

Date prepared: March 29, 2013

To improve on the reactor's previous Input/output Efficiency test, on March-20 2013, which resulted to a 78.0% max. Efficiency, modifications were made to upgrade the auxiliary motor driver to 250HP.

The subsequent March-27 reactor Input/Output Test employing the modified system yielded the following results:

CONNECTED RESISTIVE LOAD (KW)	480V-3PH UTILITY , "SCE", INPUT CURRENT (AMPS)	REACTOR OUTPUT VOLTAGE (VOLTS)	REACTOR MOTOR INPUT SPEED (REV./MIN.)	INPUT POWER AT 85% P.F. (KW)	OUTPUT EFFICIENCY
0.0	81.4	410.0	2900	57.46	N/A
50.0	127	410.0	2900	89.64	55.8%
100.0	173	410.0	2900	122.11	81.9%
150.0	223	410.0	2900	157.4	95.3%
175.0	244	410.0	2900	172.22	101.6%
200.0	269	410.0	2900	189.87	105.3%

Note-1) The KW loss due to feeder conductors is neglected.

The KW loss, estimated 10-15 KW, of un captured generated wind is neglected .

Note-2) 85% P.F. was recommended by the SCE utility engineers based on motor nameplate ratings.

Note-3) Input utility voltage is assumed to be constant at 480V L-L-3PH.

Note-4) the connected load-bank employed was of a purely resistive type with "external fan" setup.

Note-5) to prevent motor overheating, the reactor's max. operating capacity was estimated to 200KW.

Note-6) to prevent any mechanical damages as a result of excessive vibration, the input motor speed was set to 2900RPM Max.

Conclusion:

Based on the above test results, and pending upon instrumentation accuracy tolerance, the reactor's output efficiency exceeded **100%** at 175KW connected-load and **improved further** at 200KW connected-load.

The above test results suggest that the reactor's outputs 200 **KW** using only **189.87KW** and without even considering the KW loses due to cable resistance and un-captured wind.

(Conclusion Continued)

Adjustments to minimize the feeder KW losses, improving the system power factor, and converting the un- captured generated wind to usable output will further improve the reactor's efficiency.

My Background:

I'm an independent professional electrical engineer specialized in power distribution and energy management with over 27 years in the field of power distribution and building electrical engineering.

Sincerely,

Robert Tomasian, P.E
TomTech Engineering, Inc.
818-219-7192
Roberttomasian@aol.com

NOTE: Since the comprehensive tests conducted on March 27th, 2013, the Hydro-Electric Reactor technology has been upgraded to generate commercial-level quantities of electricity. The efficiency of the system has also been greatly enhanced.

Robert Tomasian, P.E
TomTech Engineering, Inc.
March 29th, 2014

Attached are the reports as requested,
The final test results showed the following:

1. Input Power from Edison Grid was 227 amps = 152 KW
2. Output power from the Hydro-Electric Reactor was recorded (Selected) at 250 KW on the Load Bank.
3. The Net Power was 98KW.

Please note :

However, the Amps regulator was not adjusted to reflect the true amps output from the **Generator**. Minor adjustments on the voltage regulator will correct this problem.

We did not manually switch power from Edison to the reactor motor because it is advisable to use only the Automatic Transfer Switch Control.

Renan Gongora

ATS & Electrical Controls Specialist

ABM Electrical Power Services, LLC

720 S. Rochester Ave., Suite A, Ontario, CA 91761

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[909-261-8009](tel:909-261-8009) (Cell)

Renan.Gongora@abm.com | www.abm.com



Electrical
Power Services

Job Site:

**Cogar International Energy Corp.
15171 Pipeline Lane
Huntington Beach, CA 92649**

Power Quality Test Report

*REACTOR PROJECT

03.27.2015

Power Quality Field Engineer:
Renan Gongora

Project # FS002085

Edison_27Mar15_Test Conclusion

Edison 27Mar15 Test Conclusion

ABM REPORTS AND MISC\Reactor Project_20Mar15\EDISON FINAL_27MAR15.log

Test began at 03/27/15 18:27:55

Test ended at 03/27/15 18:39:31

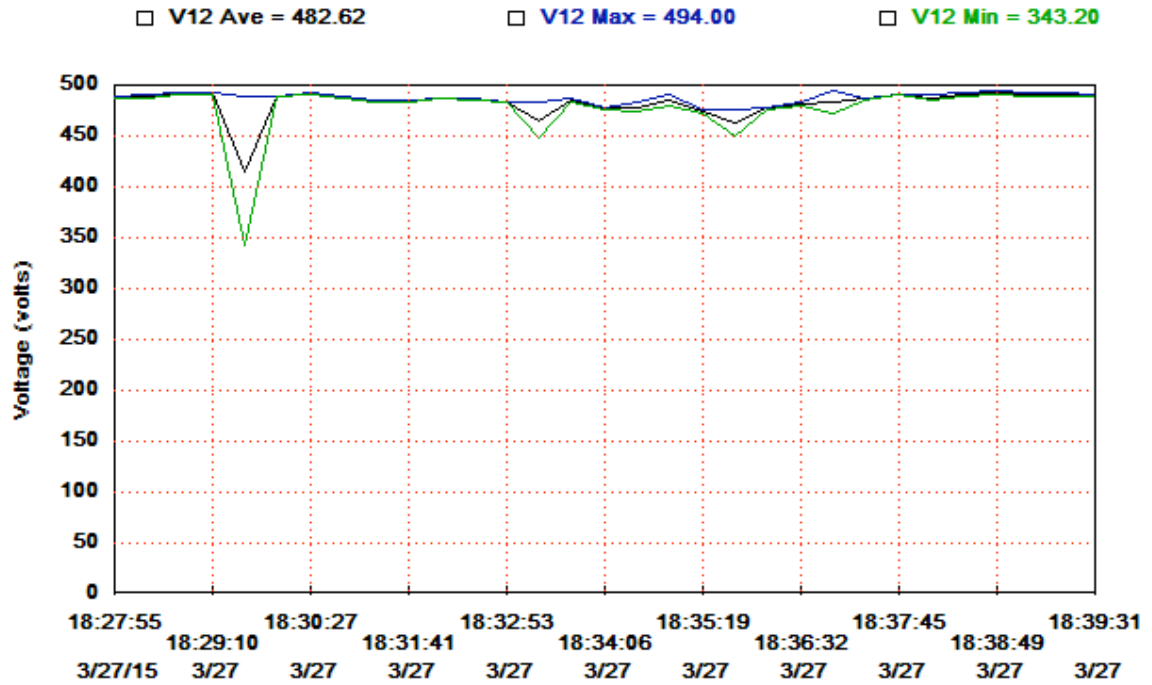
<u>Measurement</u>	<u>Value</u>	<u>Units</u>
Voltage, Phase 1, Ave:	482.6	volts
Voltage, Phase 1, Max:	494.0	volts
Voltage, Phase 1, Min:	343.2	volts
Voltage, Phase 2, Ave:	482.5	volts
Voltage, Phase 2, Max:	527.0	volts
Voltage, Phase 2, Min:	345.8	volts
Voltage, Phase 3, Ave:	481.6	volts
Voltage, Phase 3, Max:	492.9	volts
Voltage, Phase 3, Min:	369.5	volts
Current, Phase 1, Ave:	89.2	amps
Current, Phase 1, Max:	247.6	amps
Current, Phase 1, Min:	0.0	amps
Current, Phase 2, Ave:	90.5	amps
Current, Phase 2, Max:	247.3	amps
Current, Phase 2, Min:	0.0	amps
Current, Phase 3, Ave:	88.8	amps
Current, Phase 3, Max:	242.7	amps
Current, Phase 3, Min:	0.0	amps
True Power, Phase 1, Ave:	22117.6	Watts
True Power, Phase 1, Max:	63385.6	Watts
True Power, Phase 1, Min:	0.0	Watts
True Power, Phase 2, Ave:	22529.1	Watts
True Power, Phase 2, Max:	63488.0	Watts
True Power, Phase 2, Min:	0.0	Watts
True Power, Phase 3, Ave:	22081.2	Watts
True Power, Phase 3, Max:	61849.6	Watts
True Power, Phase 3, Min:	0.0	Watts
VA Power, Phase 1, Ave:	24543.5	VA
VA Power, Phase 1, Max:	68044.8	VA
VA Power, Phase 1, Min:	0.0	VA
VA Power, Phase 2, Ave:	25070.2	VA
VA Power, Phase 2, Max:	68403.2	VA
VA Power, Phase 2, Min:	0.0	VA
VA Power, Phase 3, Ave:	24366.4	VA
VA Power, Phase 3, Max:	66150.4	VA
VA Power, Phase 3, Min:	0.0	VA
Power Factor, Phase 1, Ave:	0.81	
Power Factor, Phase 1, Max:	1.00	
Power Factor, Phase 1, Min:	0.52	
Power Factor, Phase 2, Ave:	0.82	
Power Factor, Phase 2, Max:	1.00	
Power Factor, Phase 2, Min:	0.36	
Power Factor, Phase 3, Ave:	0.77	
Power Factor, Phase 3, Max:	1.00	
Power Factor, Phase 3, Min:	0.07	
Total Power Factor:	0.90	

Frequency, Ave:	60.0	Hz
Frequency, Max:	60.7	Hz
Frequency, Min:	59.5	Hz
THD, Voltage, Phase 1:	3.5	%
THD, Voltage, Phase 2:	3.6	%
THD, Voltage, Phase 3:	3.7	%
THD, Current, Phase 1:	53.9	%
THD, Current, Phase 2:	56.7	%
THD, Current, Phase 3:	47.0	%
THD, Current, Neutral:	0.0	%
Energy, Phase 1:	4.62635	KWH
Energy, Phase 2:	4.71385	KWH
Energy, Phase 3:	4.61990	KWH
Energy, Total Elapsed:	13.96009	KWH
Energy, estimated per month:	52747.5	KWH
Cost, Total Elapsed:	\$0.44	\$
Cost, estimated per month:	\$1,672.09	\$
(at \$0.03170/KWH)		
Peak Demand:	187545.6	Watts @ 03/27/15 18:34:55
Peak Ave VA:	200755.2	VA @ 03/27/15 18:34:31

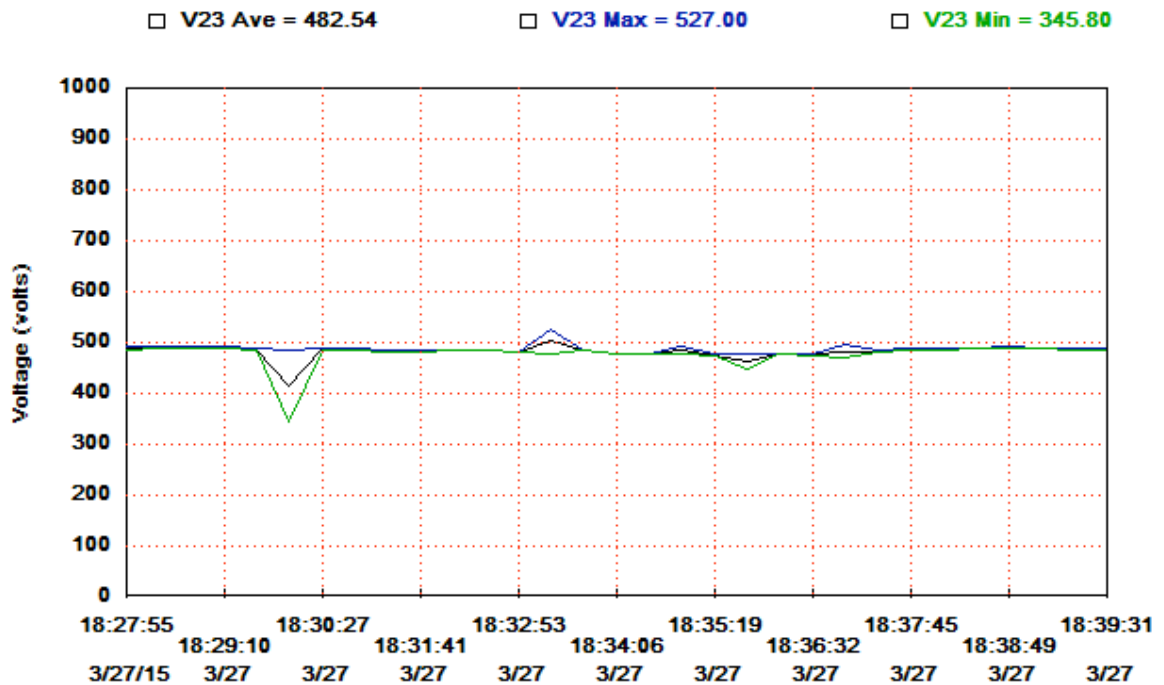
Report Prepared by: Renan Gongora
 ABM Electrical Power Services. LLC.
 720 S. Rochester Ave Suite. A
 Ontario, CA 91761

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 Email: renan.gongora@abm.com

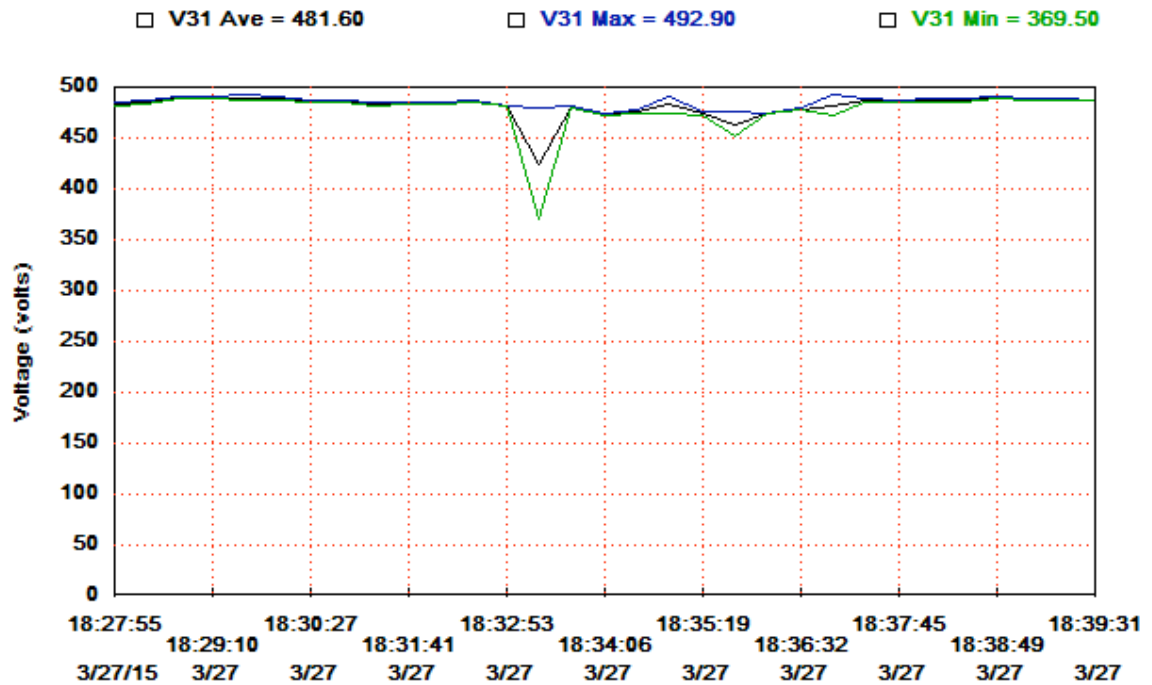
Edison_27Mar15_Test Conclusion



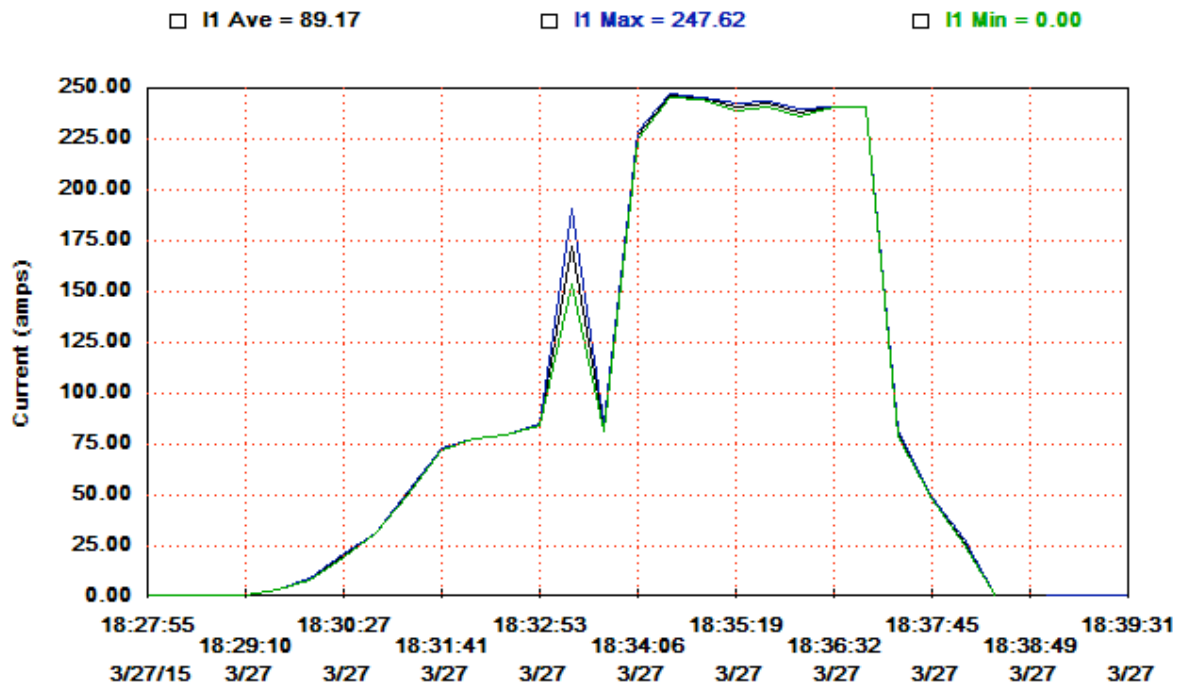
Edison_27Mar15_Test Conclusion



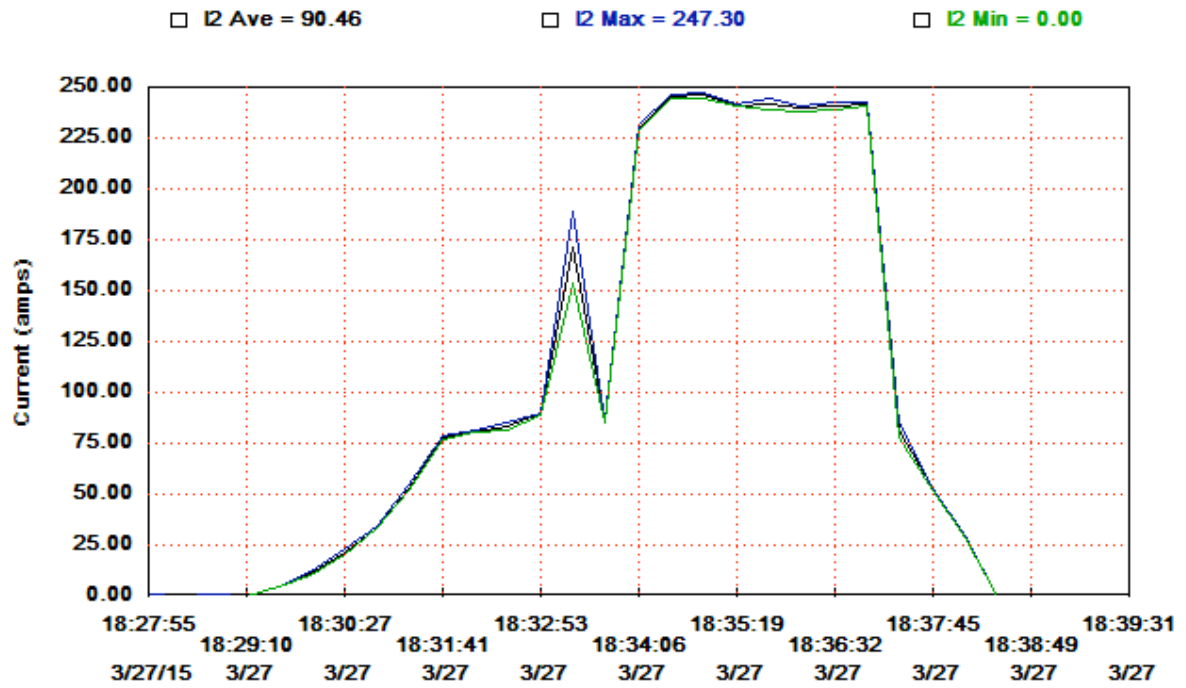
Edison_27Mar15_Test Conclusion



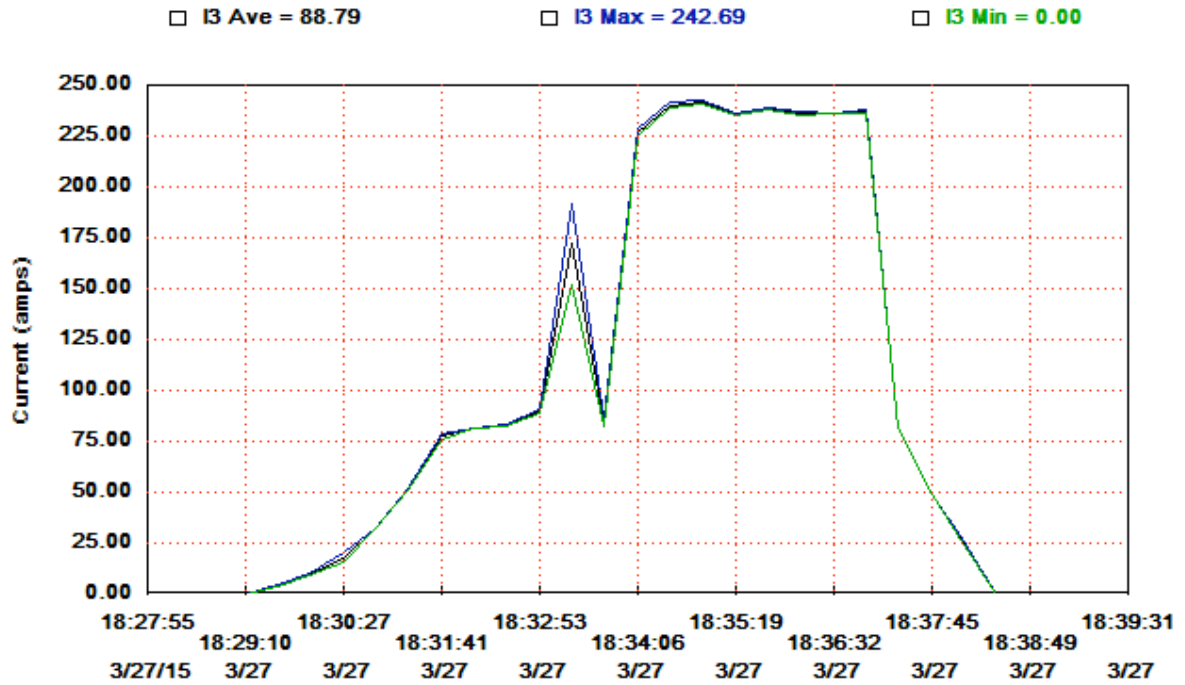
Edison_27Mar15_Test Conclusion



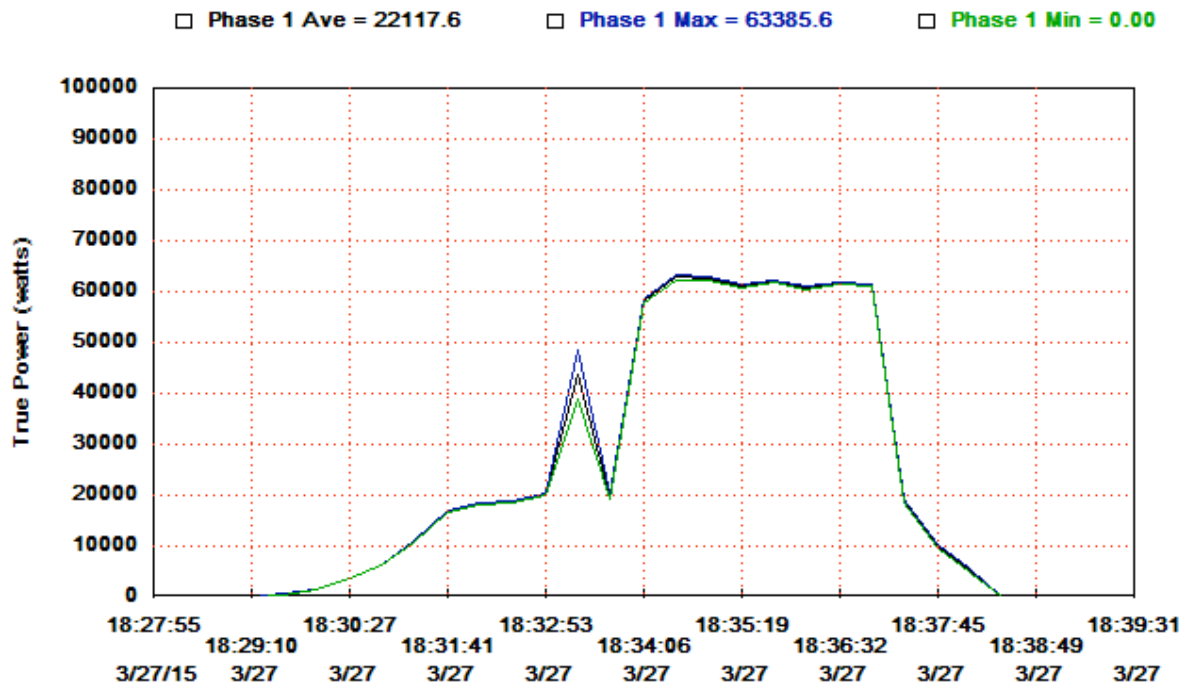
Edison_27Mar15_Test Conclusion



Edison_27Mar15_Test Conclusion

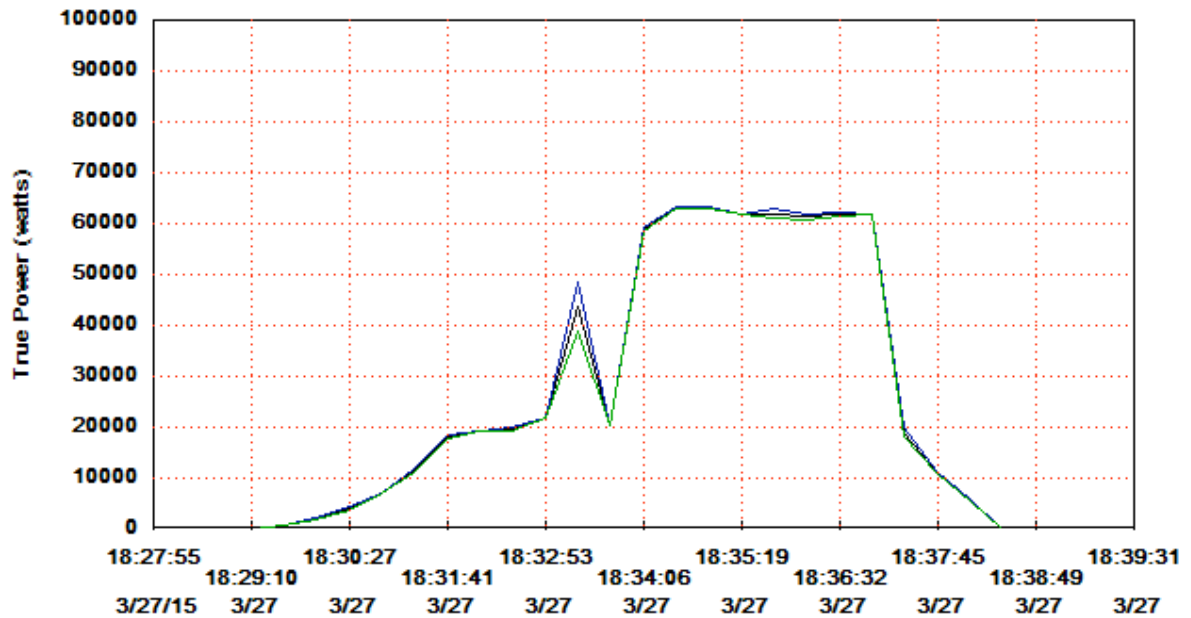


Edison_27Mar15_Test Conclusion



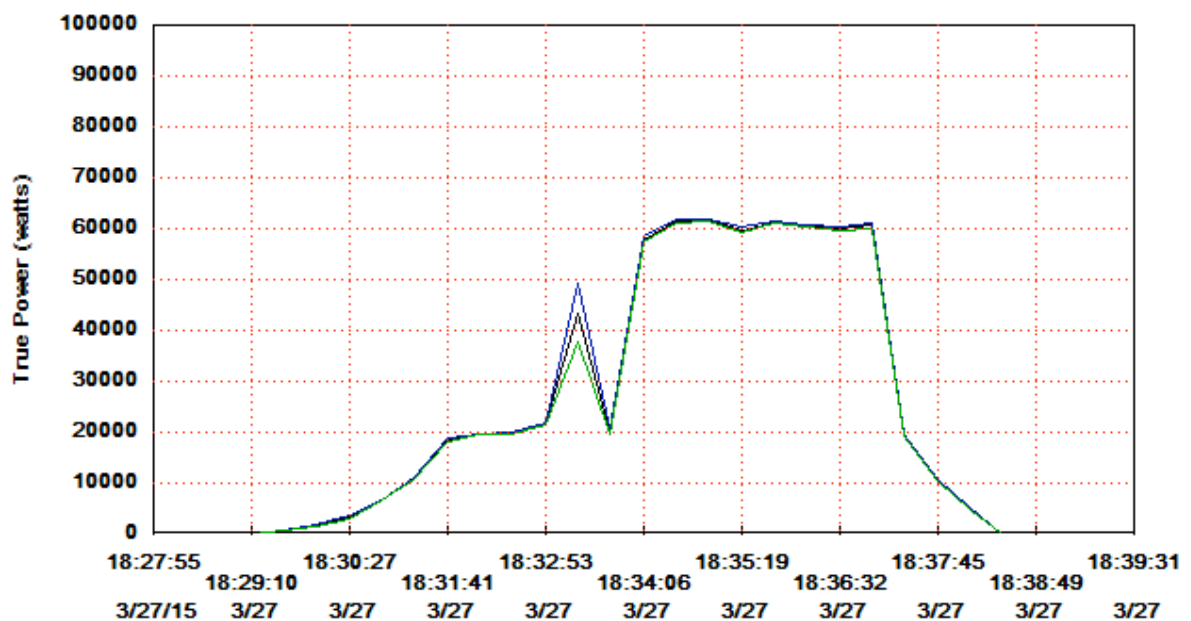
Edison_27Mar15_Test Conclusion

Phase 2 Ave = 22529.1 Phase 2 Max = 63488.0 Phase 2 Min = 0.00



Edison_27Mar15_Test Conclusion

Phase 3 Ave = 22081.2 Phase 3 Max = 61849.6 Phase 3 Min = 0.00

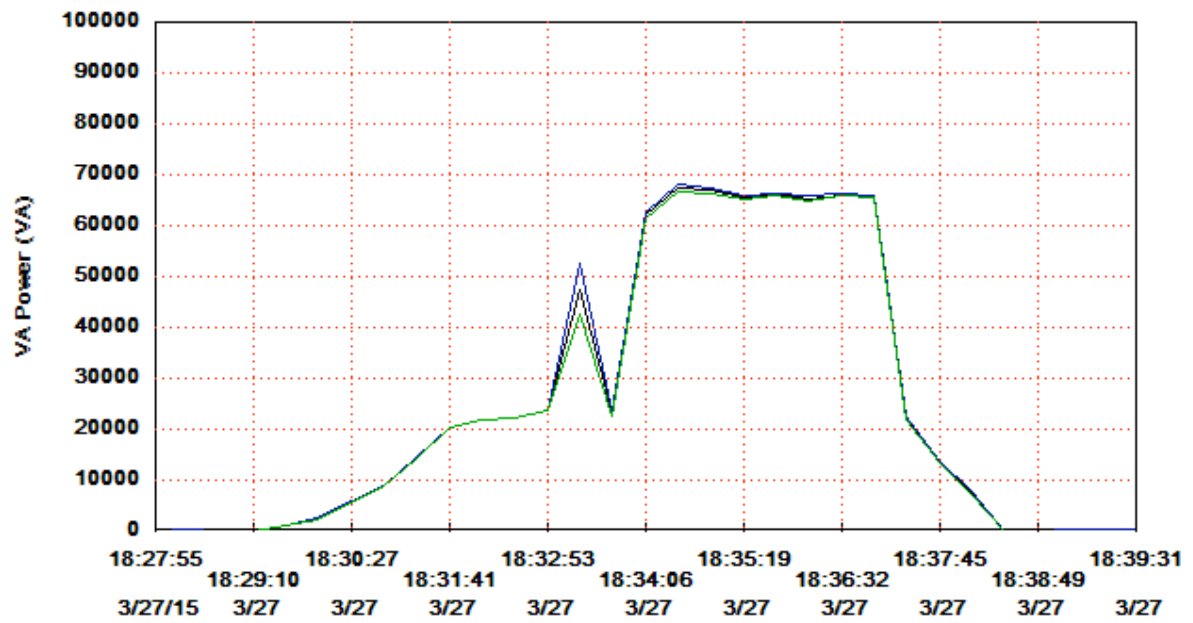


Edison_27Mar15_Test Conclusion

Phase 1 Ave = 24543.5

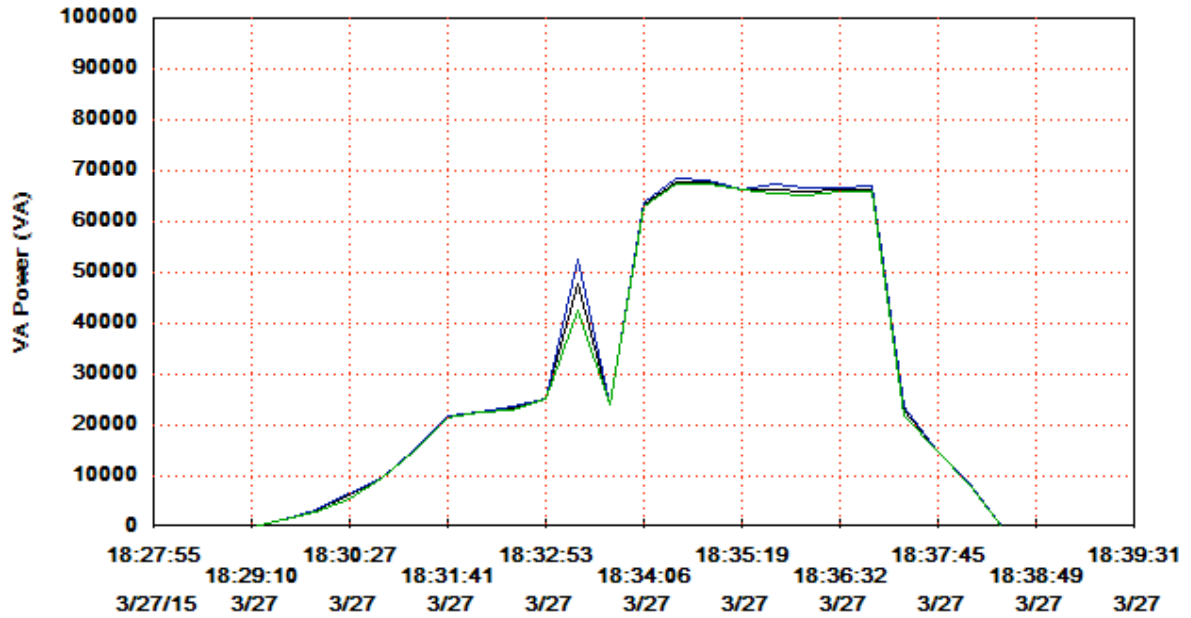
Phase 1 Max = 68044.8

Phase 1 Min = 0.00



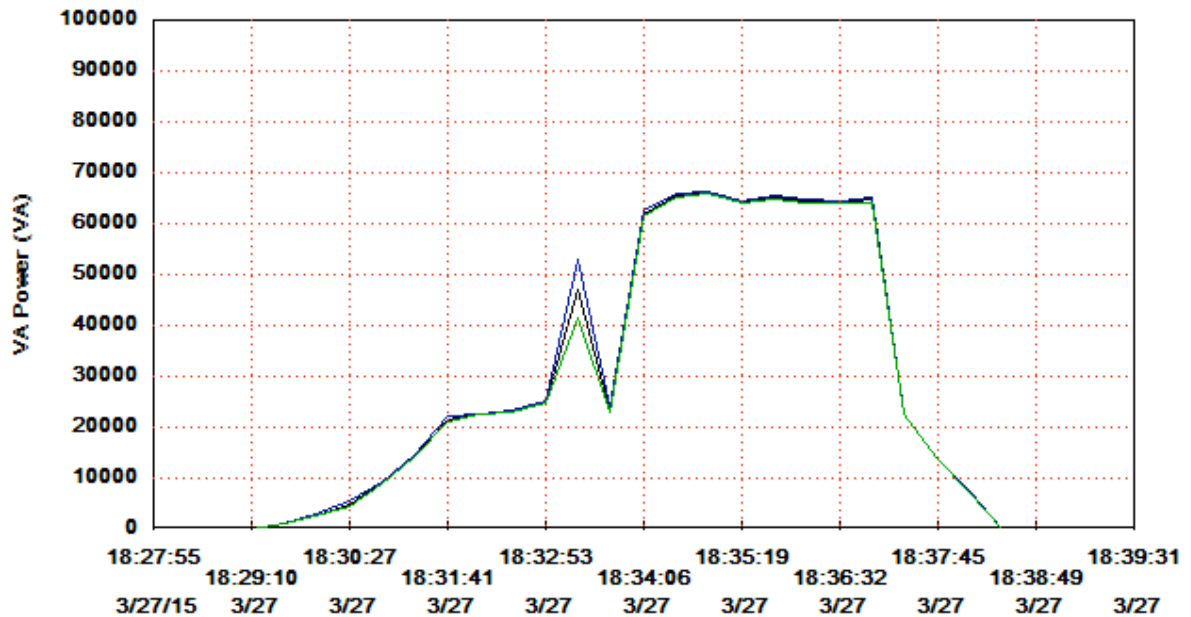
Edison_27Mar15_Test Conclusion

☐ Phase 2 Ave = 25070.2
 ☐ Phase 2 Max = 68403.2
 ☐ Phase 2 Min = 0.00

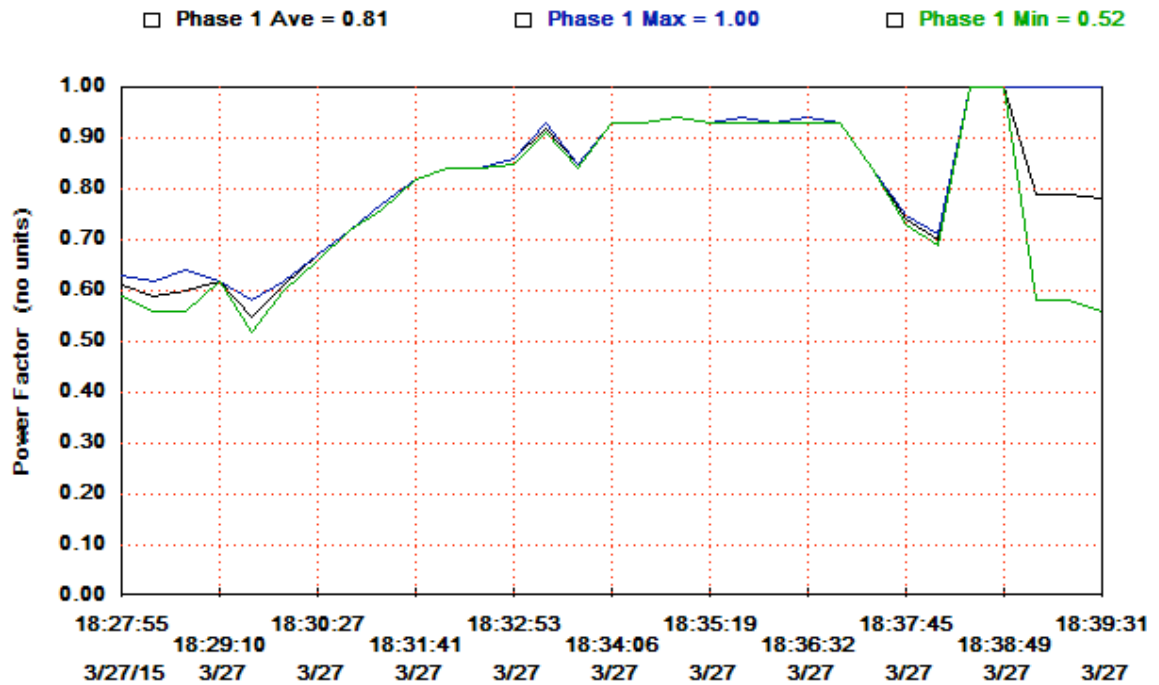


Edison_27Mar15_Test Conclusion

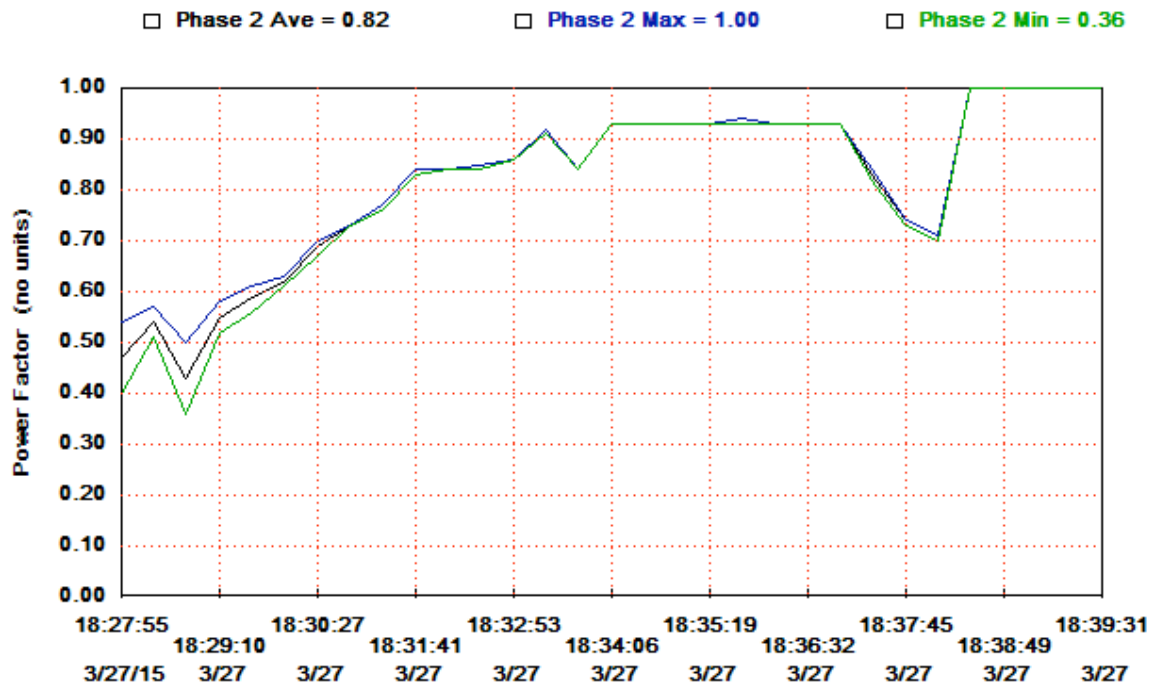
☐ Phase 3 Ave = 24366.4
 ☐ Phase 3 Max = 66150.4
 ☐ Phase 3 Min = 0.00



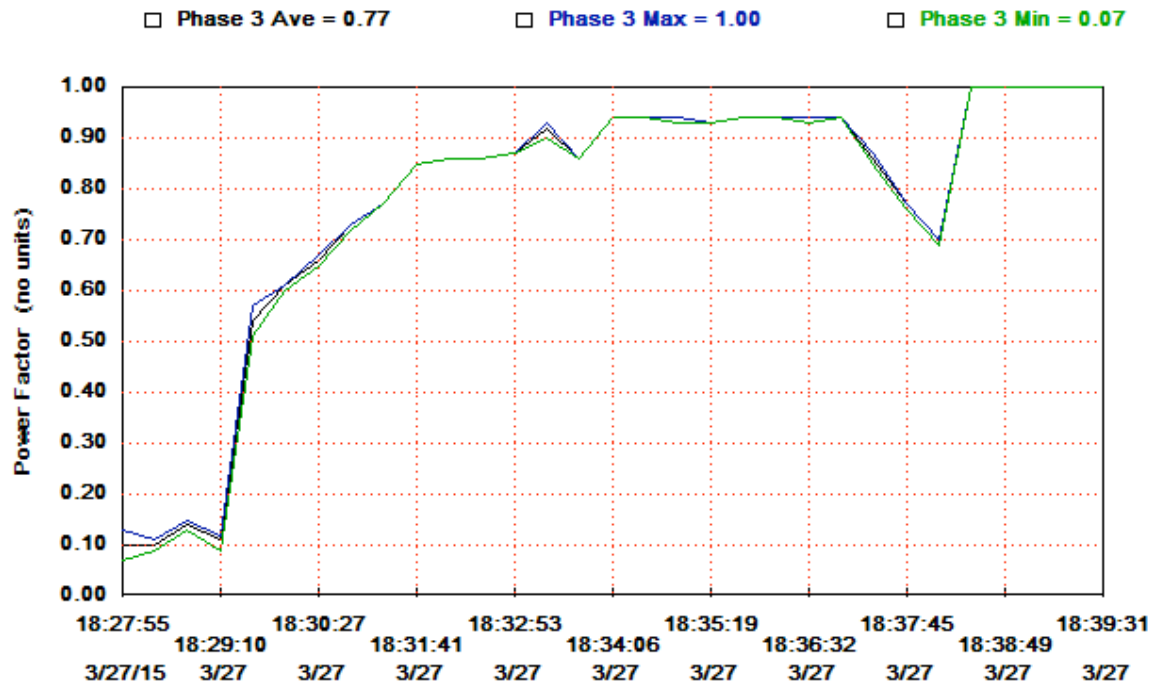
Edison_27Mar15_Test Conclusion



Edison_27Mar15_Test Conclusion

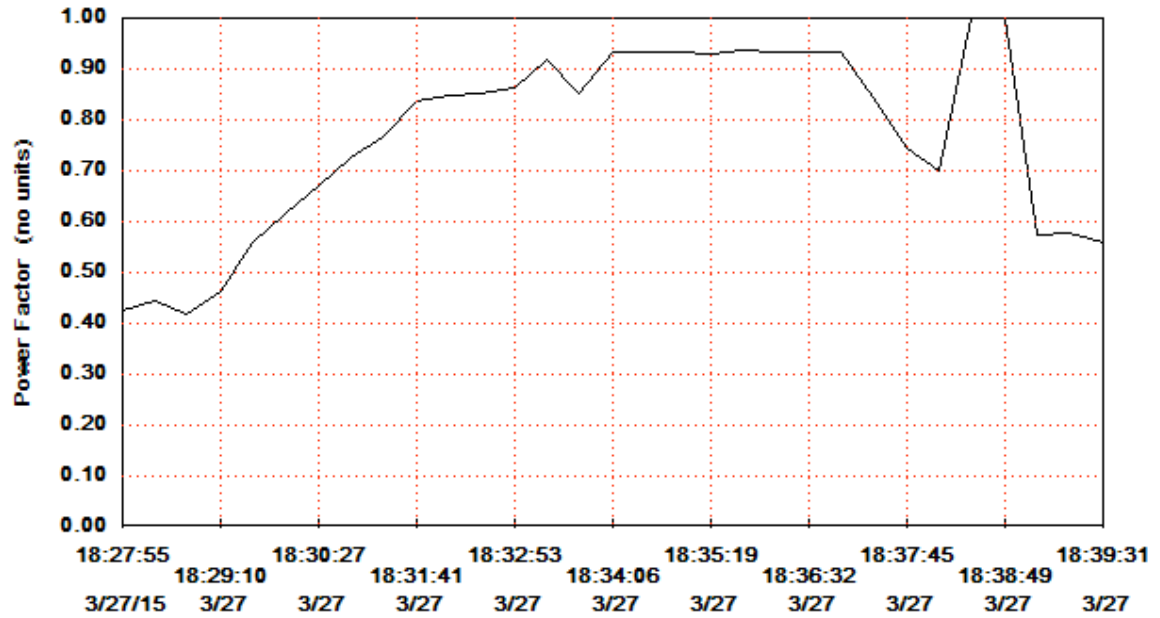


Edison_27Mar15_Test Conclusion



Edison_27Mar15_Test Conclusion

□ Ave Total = 0.77

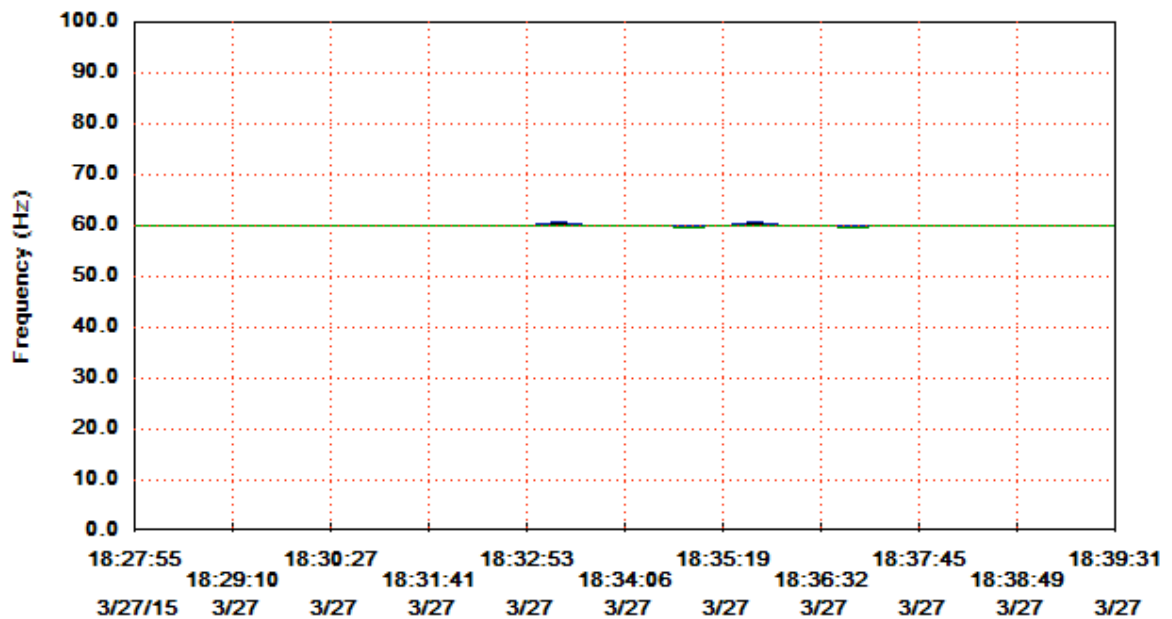


Edison_27Mar15_Test Conclusion

□ Ave Freq = 59.99

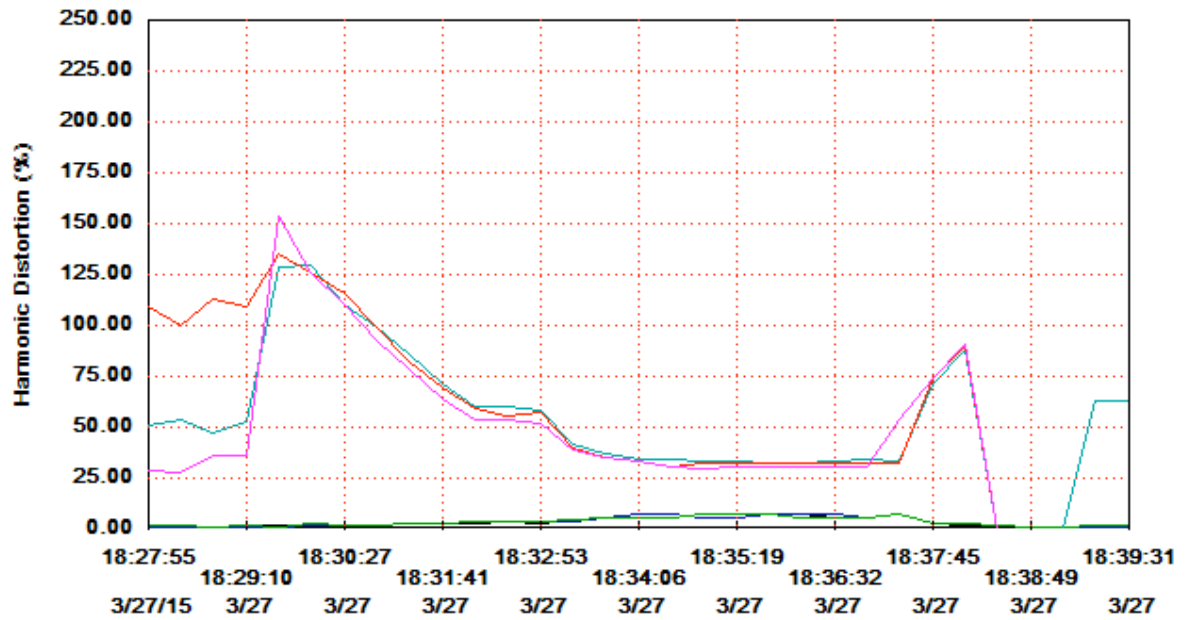
□ Max Freq = 60.70

□ Min Freq = 59.50



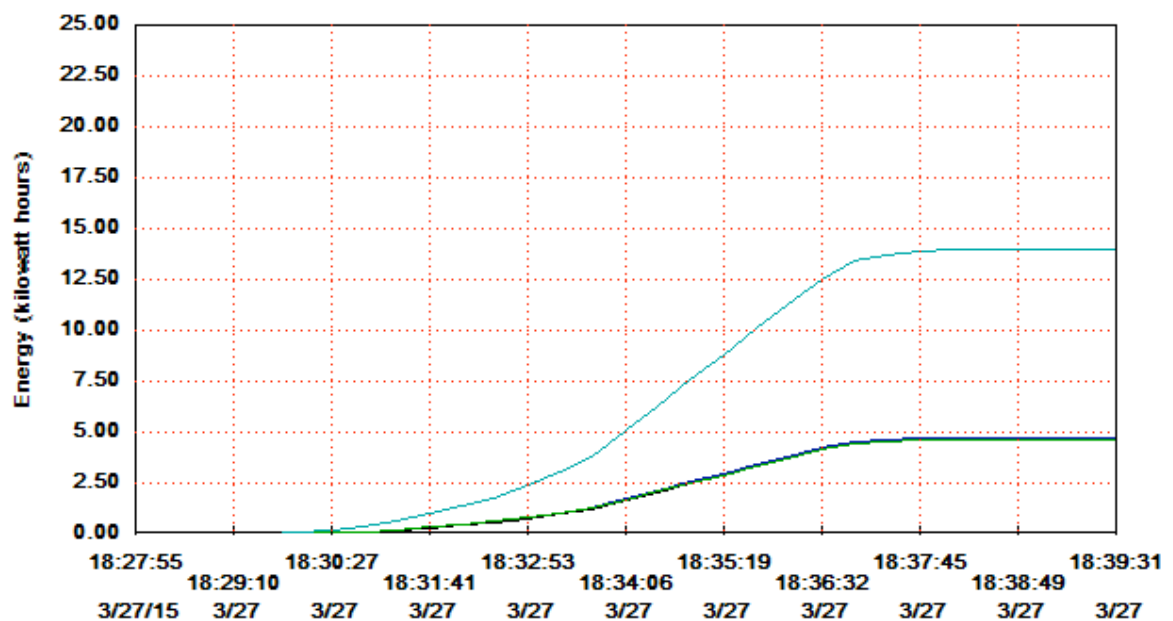
Edison_27Mar15_Test Conclusion

☐ V12 = 3.45 ☐ V23 = 3.58 ☐ V31 = 3.74 ☐ I1 = 53.87
☐ I2 = 56.68 ☐ I3 = 47.00 ☐ In = 0.00



Edison_27Mar15_Test Conclusion

☐ Phase 1 = 4.63 ☐ Phase 2 = 4.71 ☐ Phase 3 = 4.62 ☐ Total = 13.96



Load Bank_27Mar15_Test Conclusion

Load Bank 27Mar15 Test Conclusion

ABM REPORTS AND MISC\Reactor Project_20Mar15\LOAD BANK FINAL_27MAR15.log

Test began at 03/27/15 18:28:14

Test ended at 03/27/15 18:39:09

<u>Measurement</u>	<u>Value</u>	<u>Units</u>
Voltage, Phase 1, Ave:	116.1	volts
Voltage, Phase 1, Max:	442.1	volts
Voltage, Phase 1, Min:	0.0	volts
Voltage, Phase 2, Ave:	115.5	volts
Voltage, Phase 2, Max:	438.8	volts
Voltage, Phase 2, Min:	0.0	volts
Voltage, Phase 3, Ave:	114.4	volts
Voltage, Phase 3, Max:	444.1	volts
Voltage, Phase 3, Min:	0.0	volts
Current, Phase 1, Ave:	32.9	amps
Current, Phase 1, Max:	212.5	amps
Current, Phase 1, Min:	0.0	amps
Current, Phase 2, Ave:	32.5	amps
Current, Phase 2, Max:	209.2	amps
Current, Phase 2, Min:	0.0	amps
Current, Phase 3, Ave:	33.4	amps
Current, Phase 3, Max:	217.9	amps
Current, Phase 3, Min:	0.0	amps
True Power, Phase 1, Ave:	6481.4	Watts
True Power, Phase 1, Max:	40576.0	Watts
True Power, Phase 1, Min:	0.0	Watts
True Power, Phase 2, Ave:	6402.5	Watts
True Power, Phase 2, Max:	39763.2	Watts
True Power, Phase 2, Min:	0.0	Watts
True Power, Phase 3, Ave:	6403.6	Watts
True Power, Phase 3, Max:	39795.2	Watts
True Power, Phase 3, Min:	0.0	Watts
VA Power, Phase 1, Ave:	6498.7	VA
VA Power, Phase 1, Max:	40620.8	VA
VA Power, Phase 1, Min:	0.0	VA
VA Power, Phase 2, Ave:	6440.1	VA
VA Power, Phase 2, Max:	39814.4	VA
VA Power, Phase 2, Min:	0.0	VA
VA Power, Phase 3, Ave:	6420.5	VA
VA Power, Phase 3, Max:	39852.8	VA
VA Power, Phase 3, Min:	0.0	VA
Power Factor, Phase 1, Ave:	0.99	
Power Factor, Phase 1, Max:	1.00	
Power Factor, Phase 1, Min:	0.60	
Power Factor, Phase 2, Ave:	0.96	
Power Factor, Phase 2, Max:	1.00	
Power Factor, Phase 2, Min:	0.26	
Power Factor, Phase 3, Ave:	0.99	
Power Factor, Phase 3, Max:	1.00	
Power Factor, Phase 3, Min:	0.22	
Total Power Factor:	1.00	

Frequency, Ave:	27.7	Hz
Frequency, Max:	65.4	Hz
Frequency, Min:	0.0	Hz
THD, Voltage, Phase 1:	9.7	%
THD, Voltage, Phase 2:	8.6	%
THD, Voltage, Phase 3:	7.4	%
THD, Current, Phase 1:	0.5	%
THD, Current, Phase 2:	1.8	%
THD, Current, Phase 3:	0.5	%
THD, Current, Neutral:	0.0	%
Energy, Phase 1:	2.60827	KWH
Energy, Phase 2:	2.57821	KWH
Energy, Phase 3:	2.57981	KWH
Energy, Total Elapsed:	7.76629	KWH
Energy, estimated per month:	31181.4	KWH
Cost, Total Elapsed:	\$0.25	\$
Cost, estimated per month:	\$988.45	\$
(at \$0.03170/KWH)		
Peak Demand:	119072.0	Watts @ 03/27/15 18:34:19
Peak Ave VA:	119232.0	VA @ 03/27/15 18:34:19

Report Prepared by: Renan Gongora
 ABM Electrical Power Services. LLC.
 720 S. Rochester Ave Suite. A
 Ontario, CA 91761

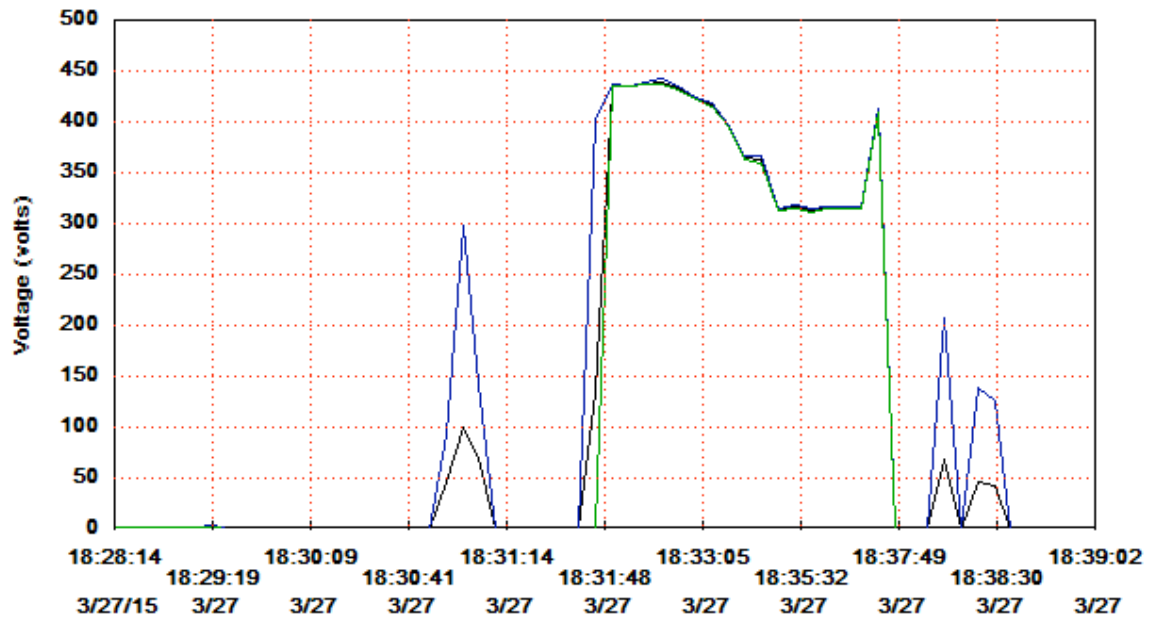
Phone: 800-597-1225
 Email: renan.gongora@abm.com

Load Bank_27Mar15_Test Conclusion

□ V12 Ave = 116.06

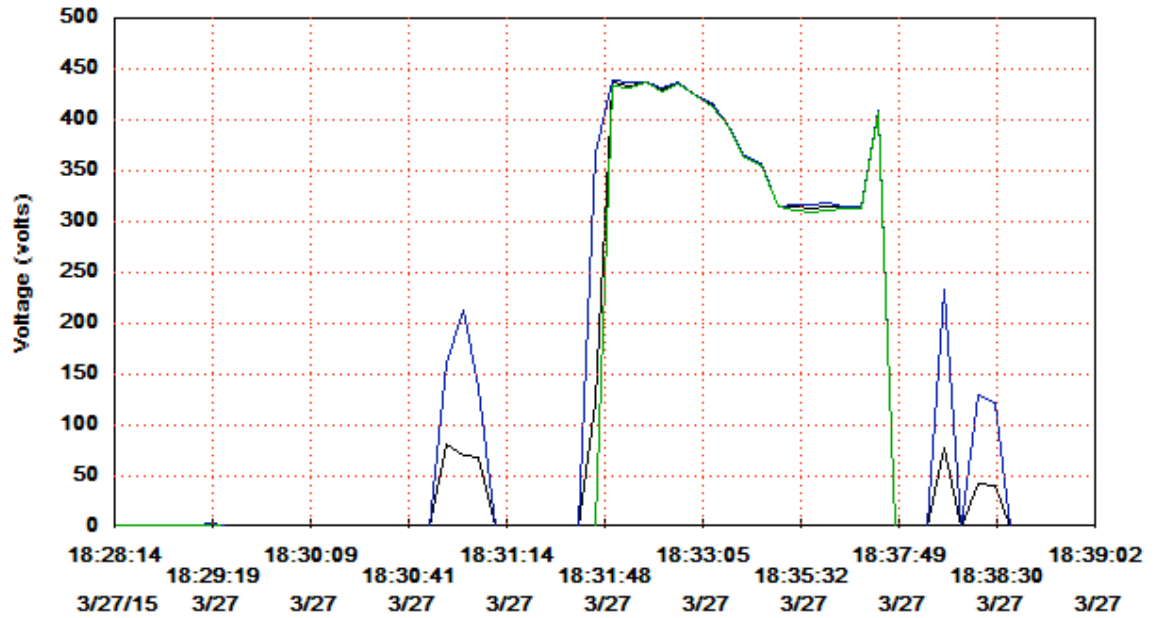
□ V12 Max = 442.10

□ V12 Min = 0.00



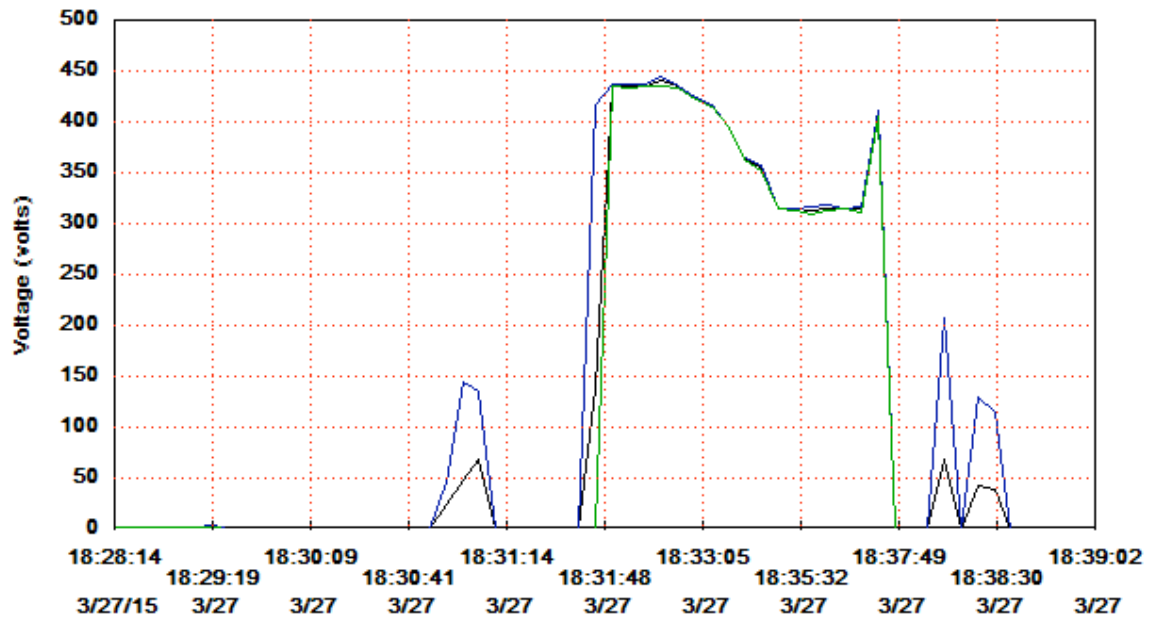
Load Bank_27Mar15_Test Conclusion

☐ V23 Ave = 115.55
 ☐ V23 Max = 438.80
 ☐ V23 Min = 0.00

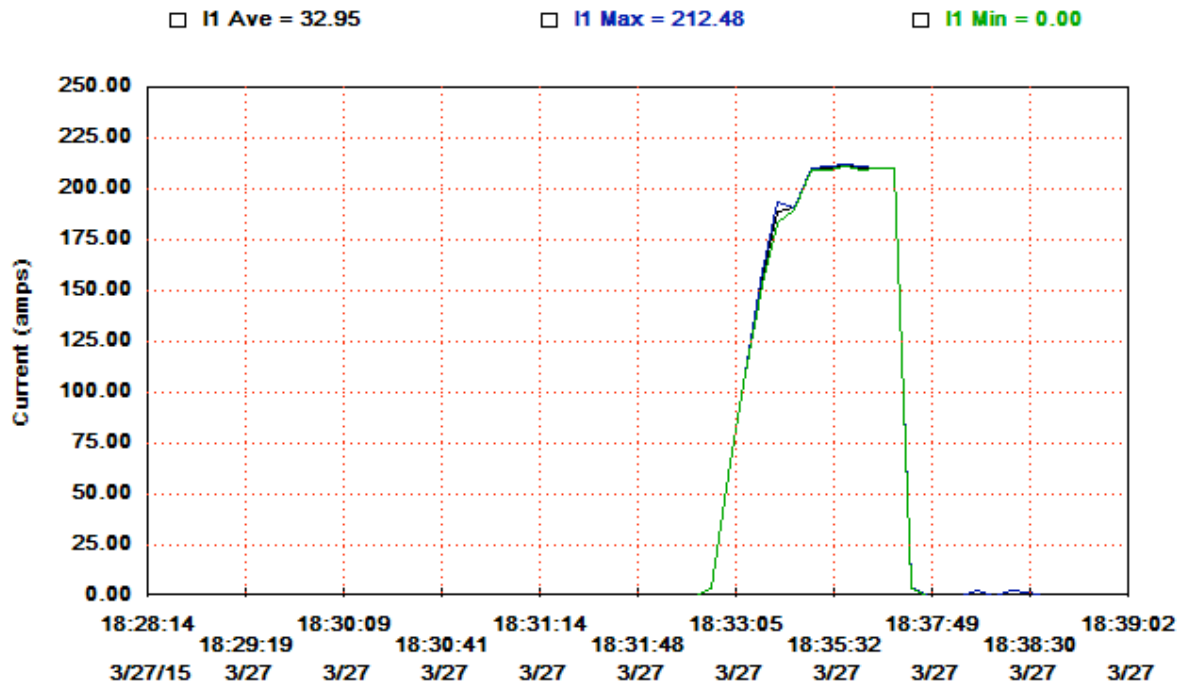


Load Bank_27Mar15_Test Conclusion

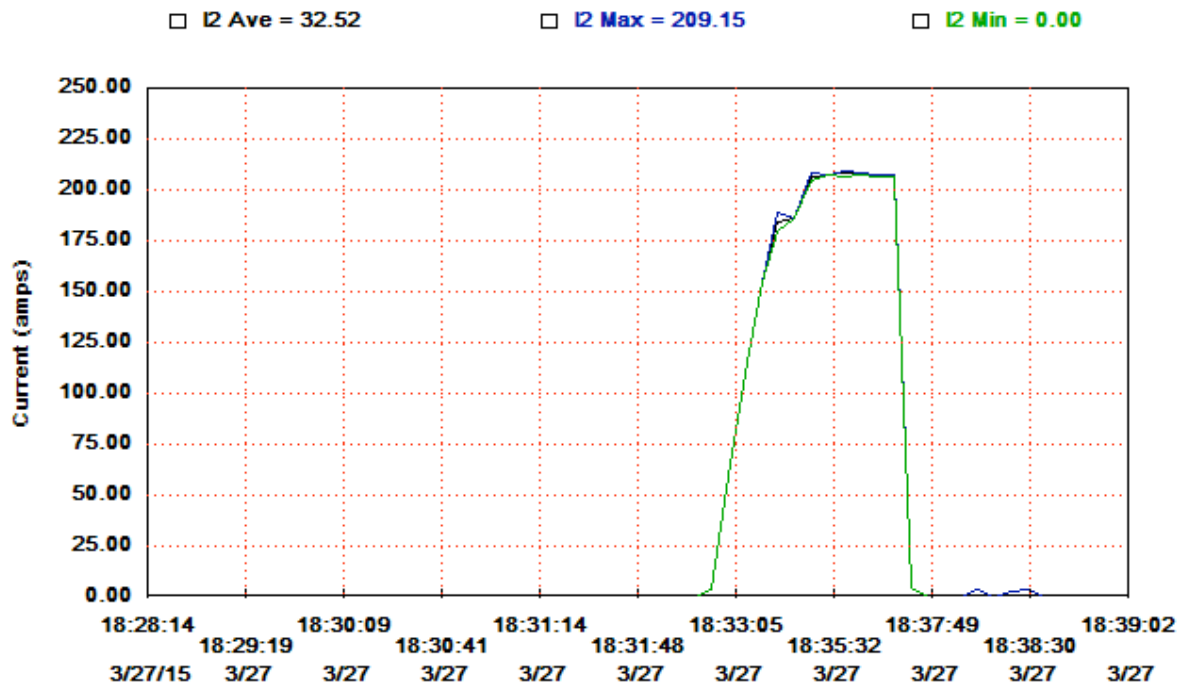
☐ V31 Ave = 114.43
 ☐ V31 Max = 444.10
 ☐ V31 Min = 0.00



Load Bank_27Mar15_Test Conclusion



Load Bank_27Mar15_Test Conclusion

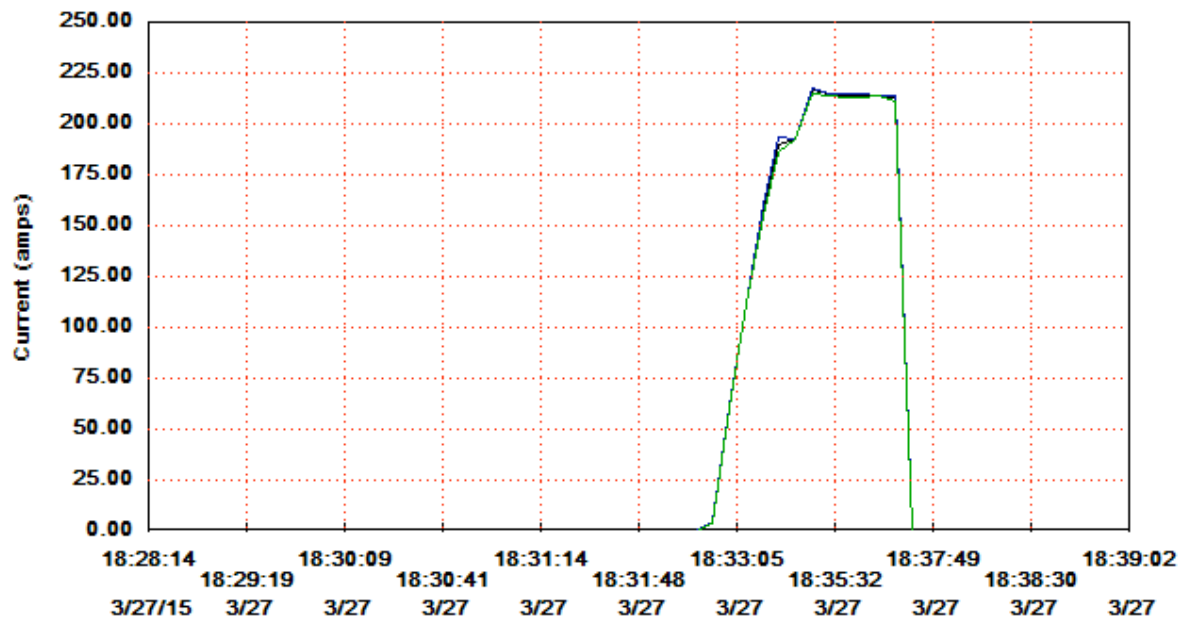


Load Bank_27Mar15_Test Conclusion

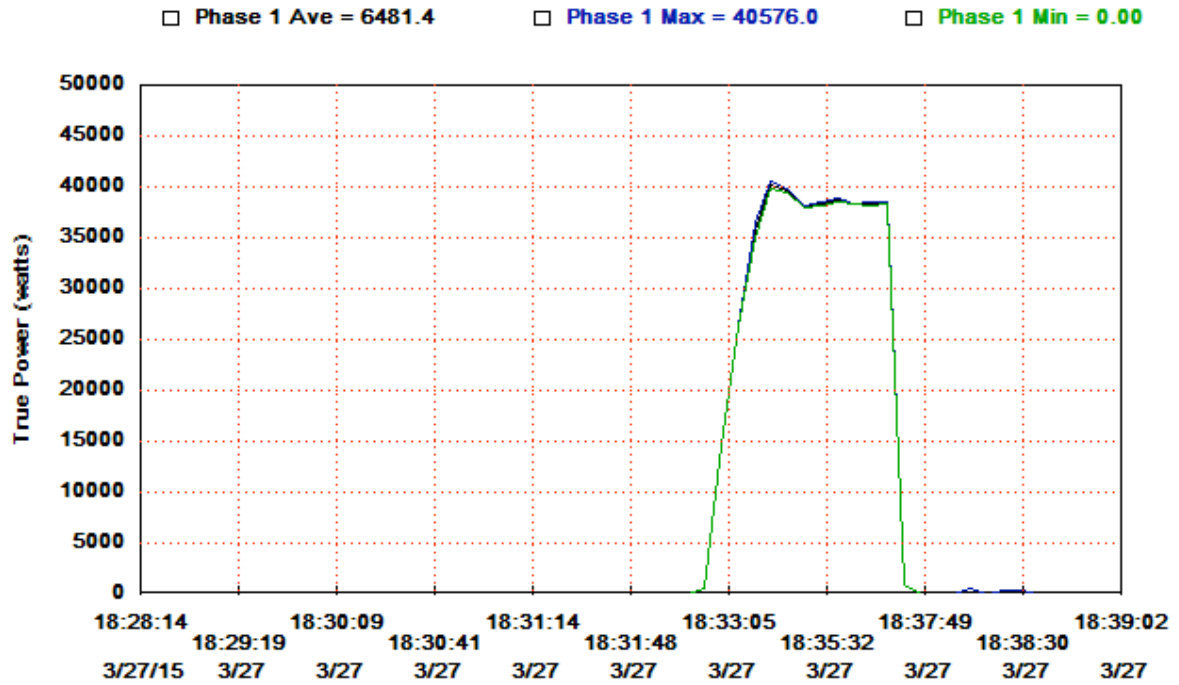
□ I3 Ave = 33.36

□ I3 Max = 217.86

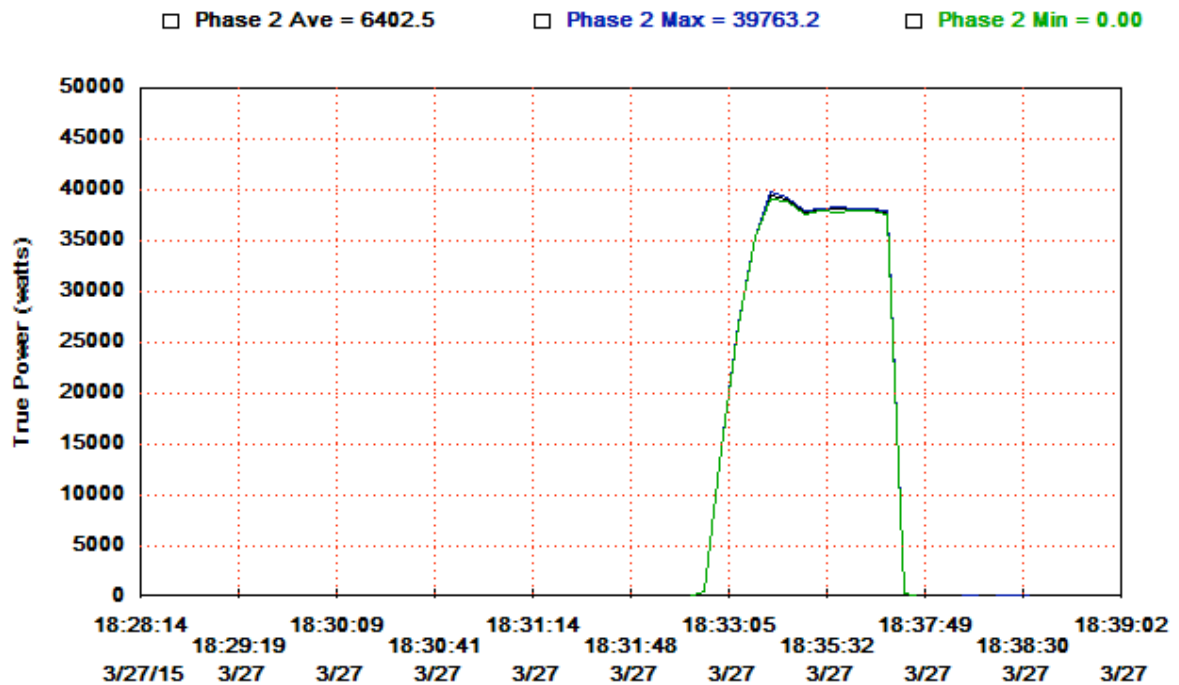
□ I3 Min = 0.00



Load Bank_27Mar15_Test Conclusion

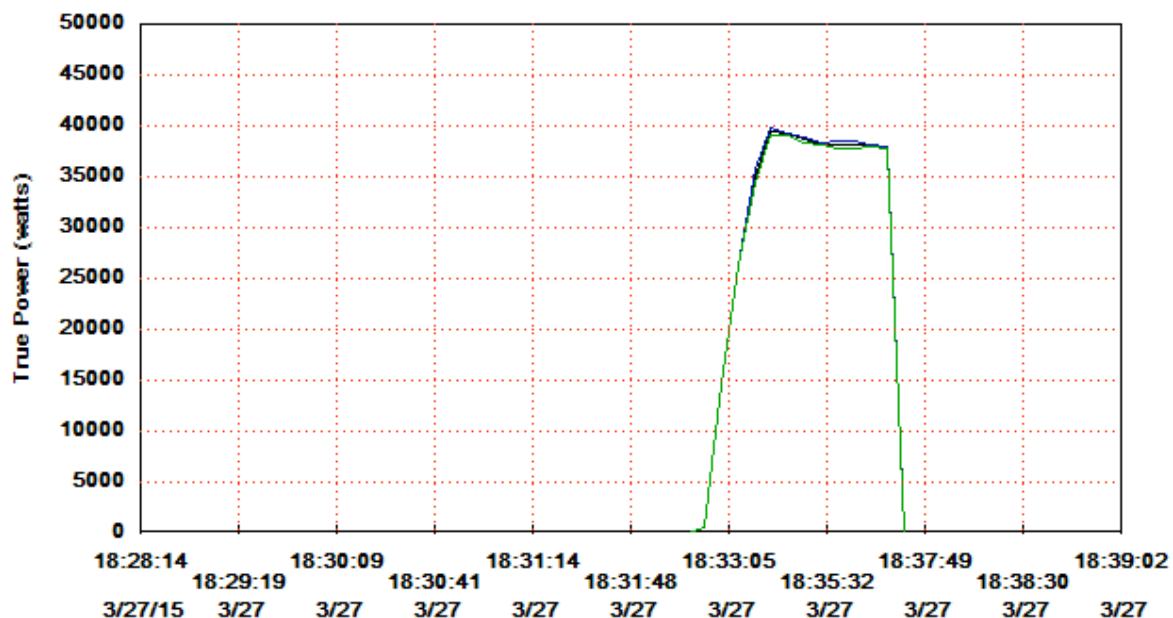


Load Bank_27Mar15_Test Conclusion



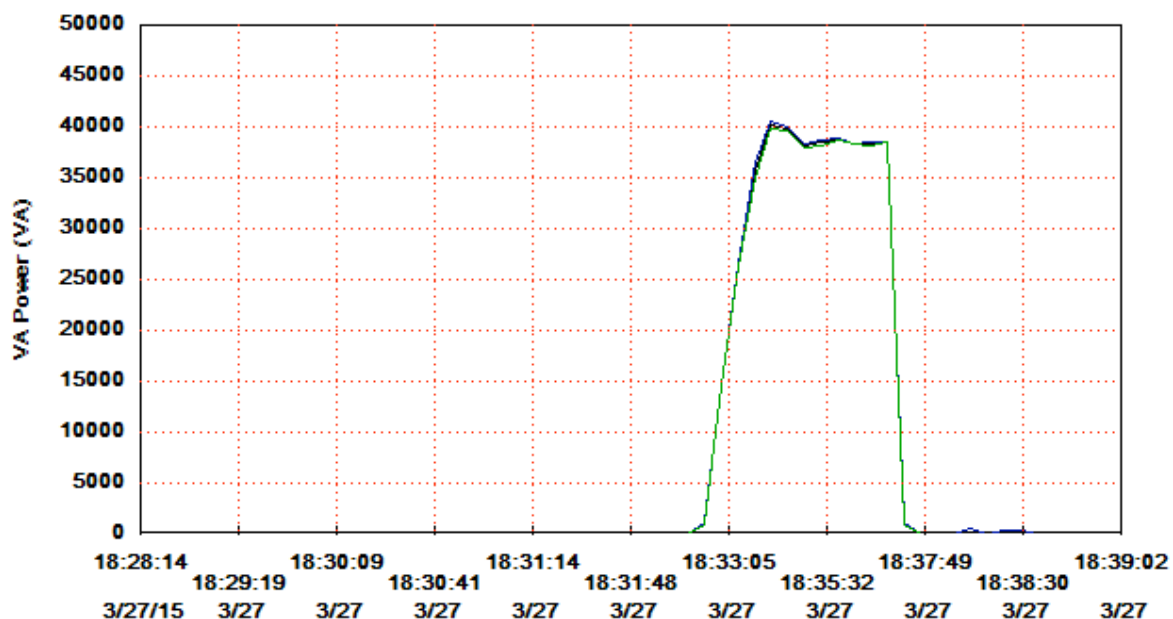
Load Bank_27Mar15_Test Conclusion

Phase 3 Ave = 6403.6 Phase 3 Max = 39795.2 Phase 3 Min = 0.00



Load Bank_27Mar15_Test Conclusion

Phase 1 Ave = 6498.7 Phase 1 Max = 40620.8 Phase 1 Min = 0.00

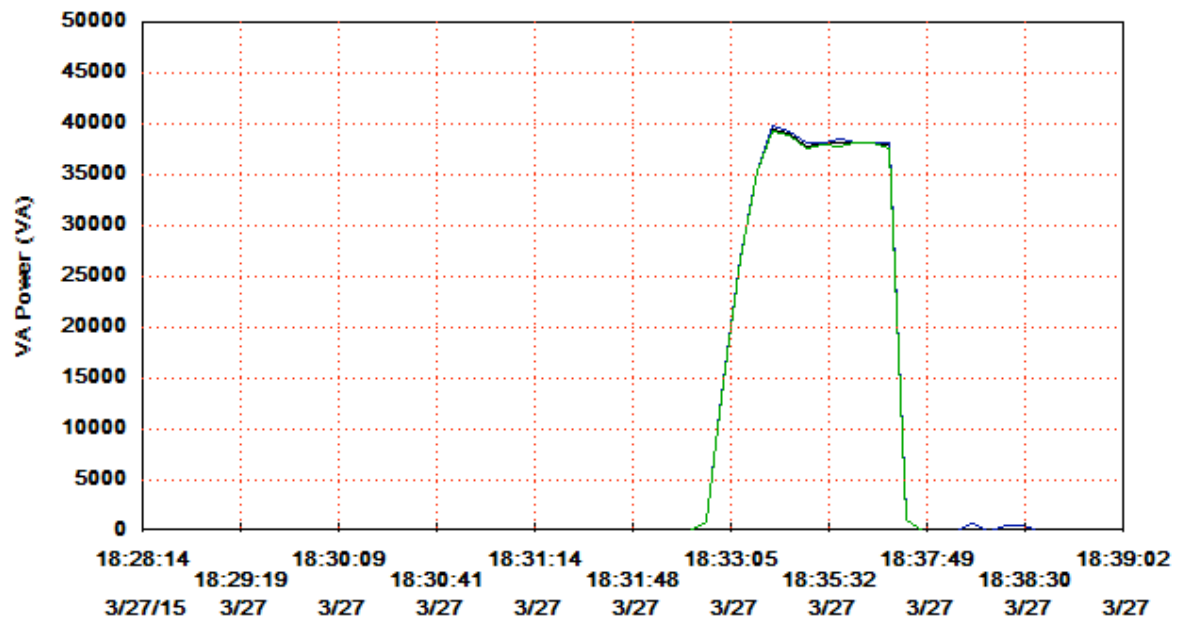


Load Bank_27Mar15_Test Conclusion

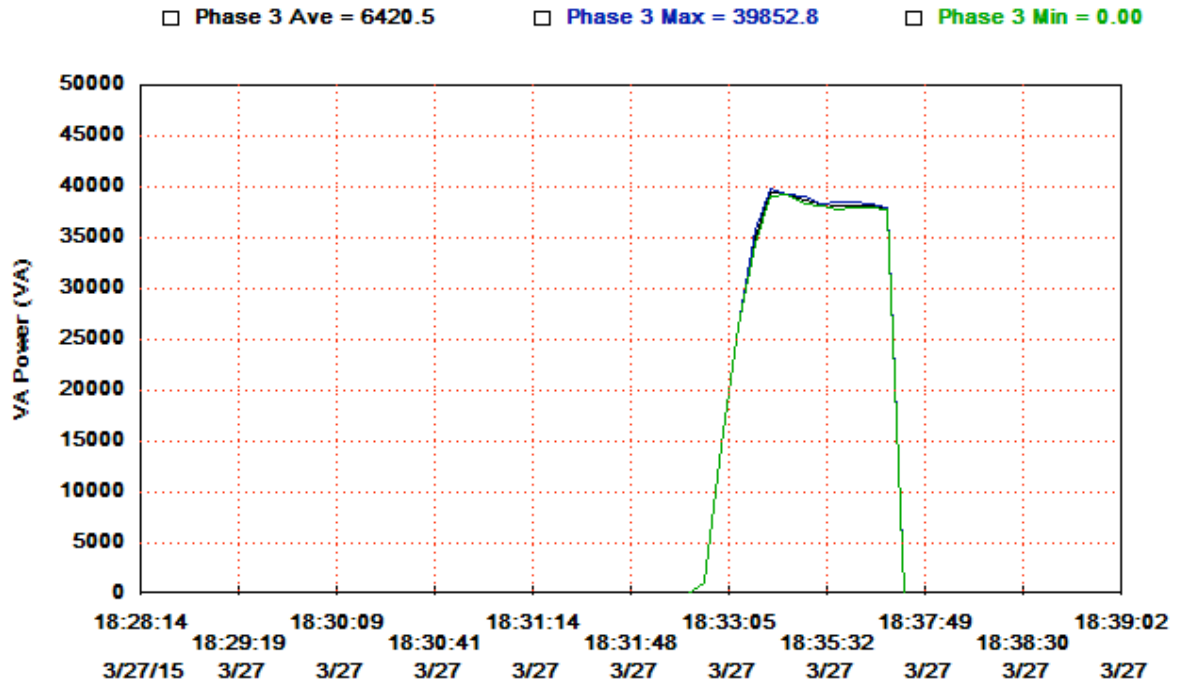
Phase 2 Ave = 6440.1

Phase 2 Max = 39814.4

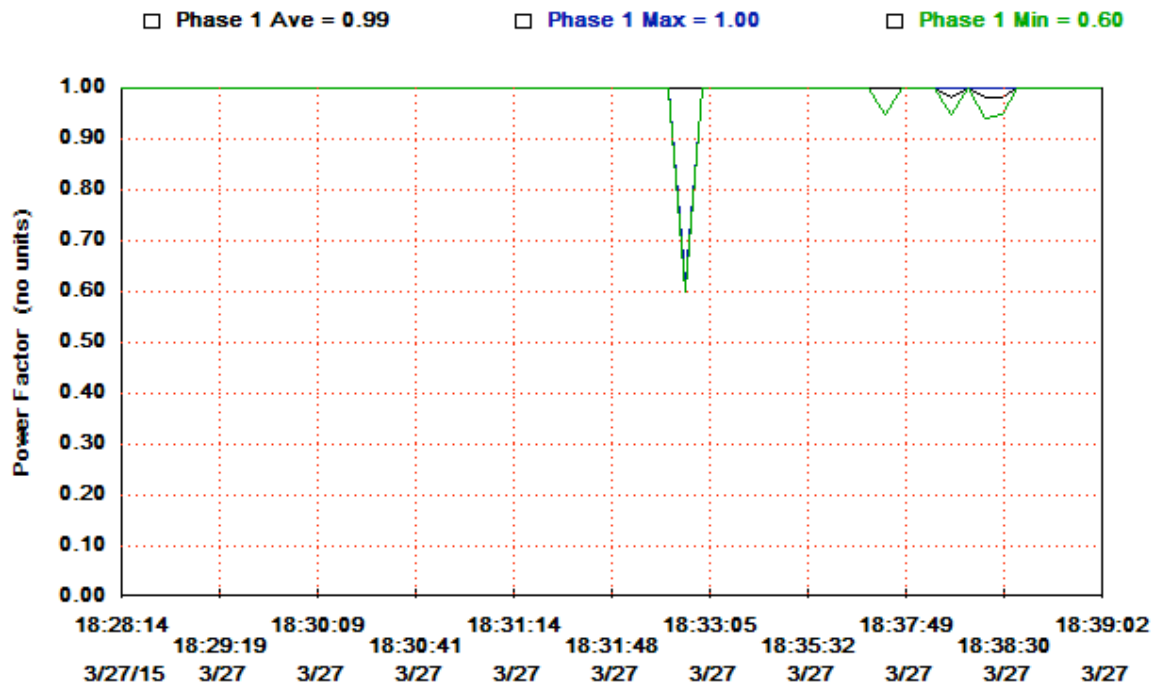
Phase 2 Min = 0.00



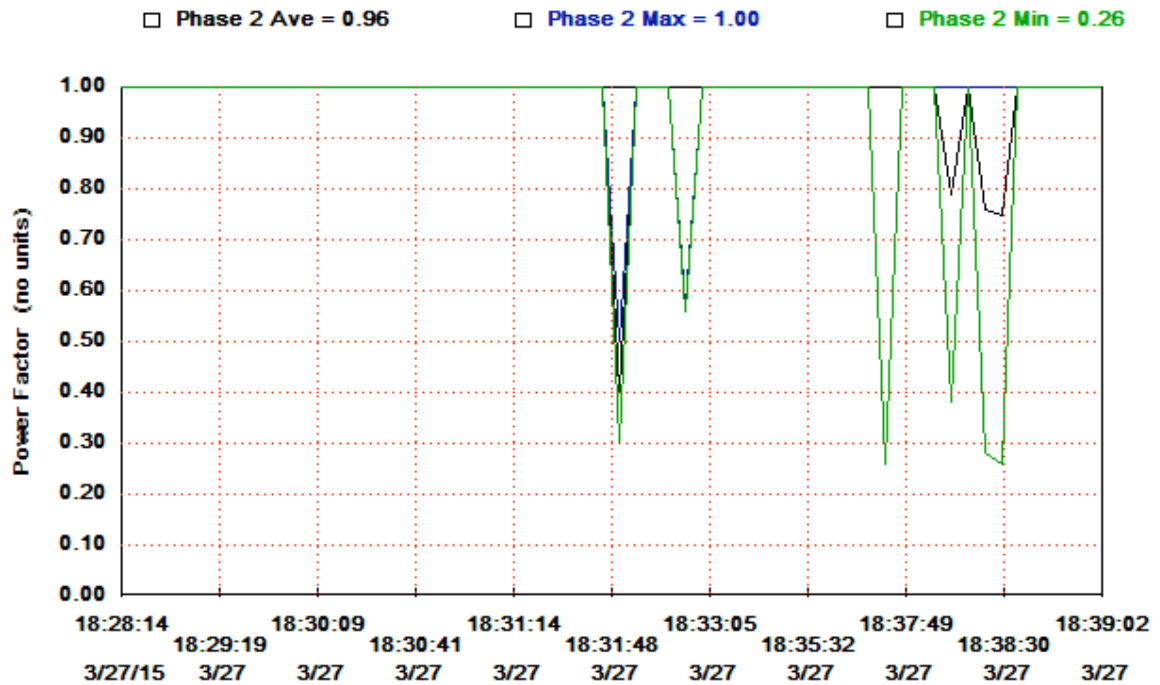
Load Bank_27Mar15_Test Conclusion



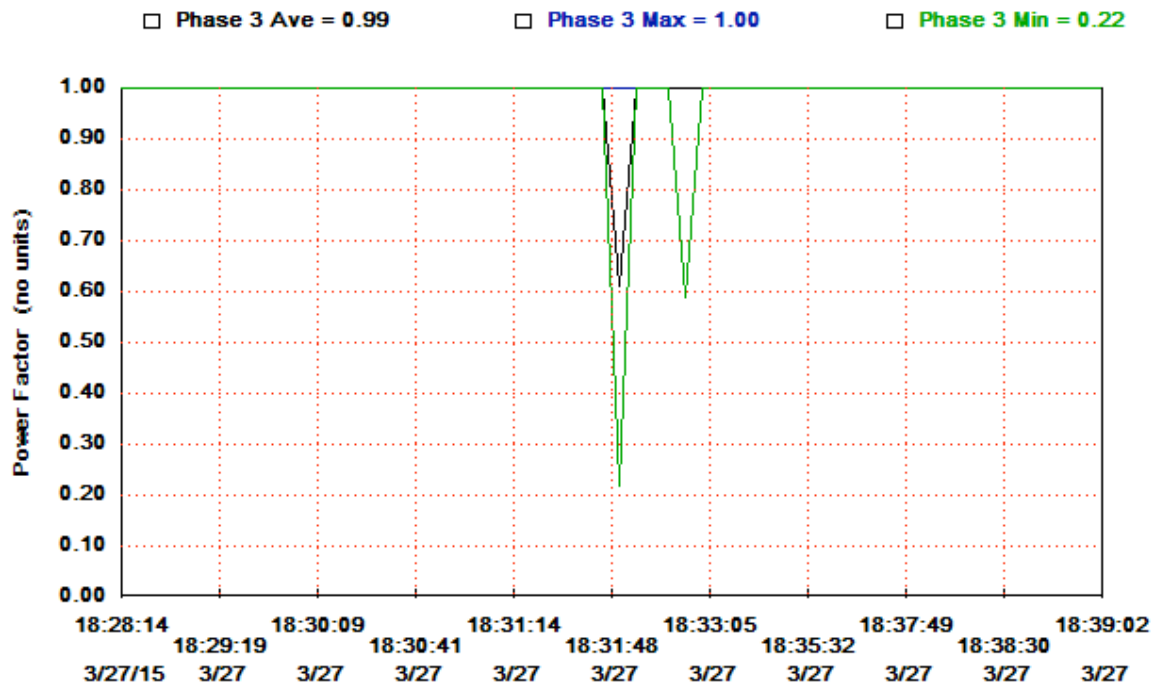
Load Bank_27Mar15_Test Conclusion



Load Bank_27Mar15_Test Conclusion

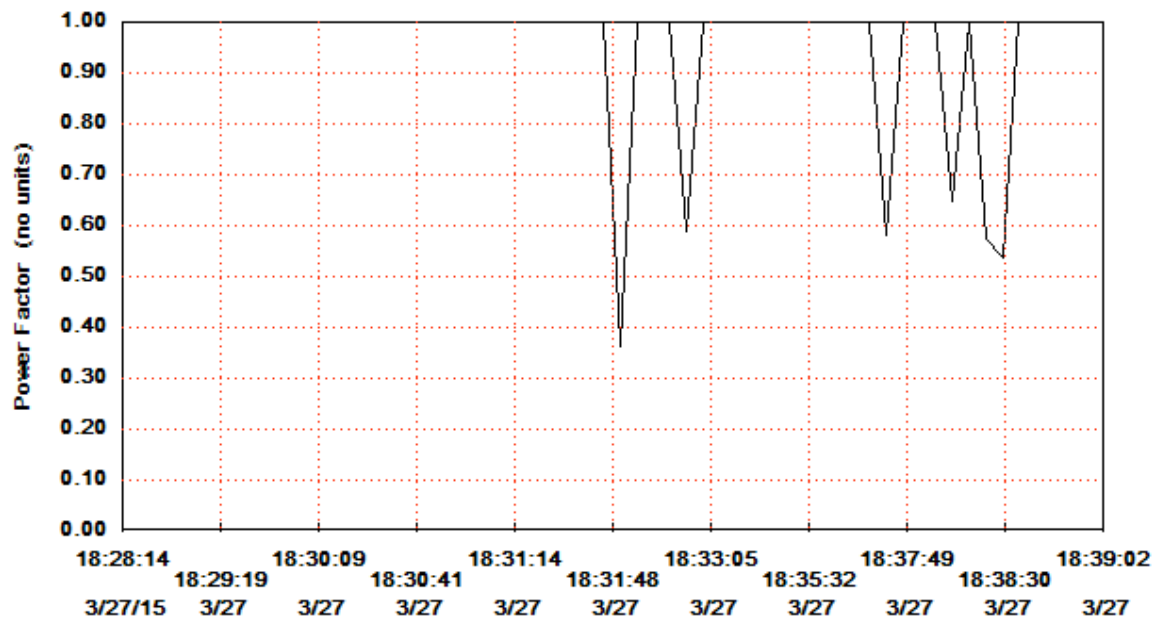


Load Bank_27Mar15_Test Conclusion

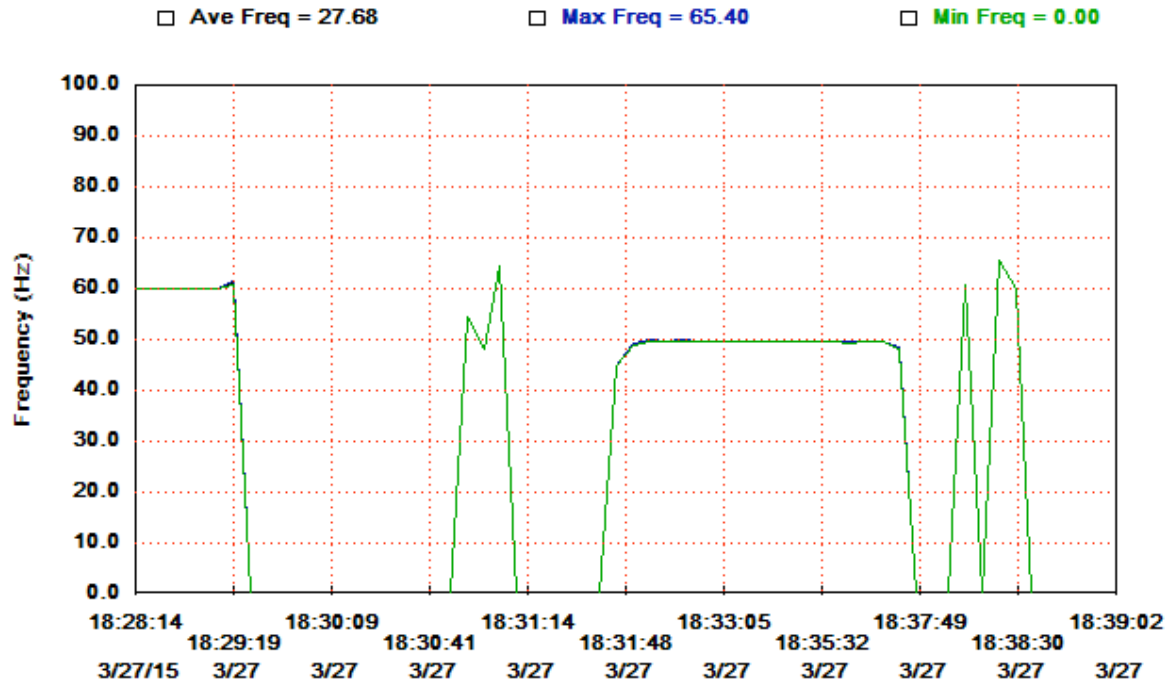


Load Bank_27Mar15_Test Conclusion

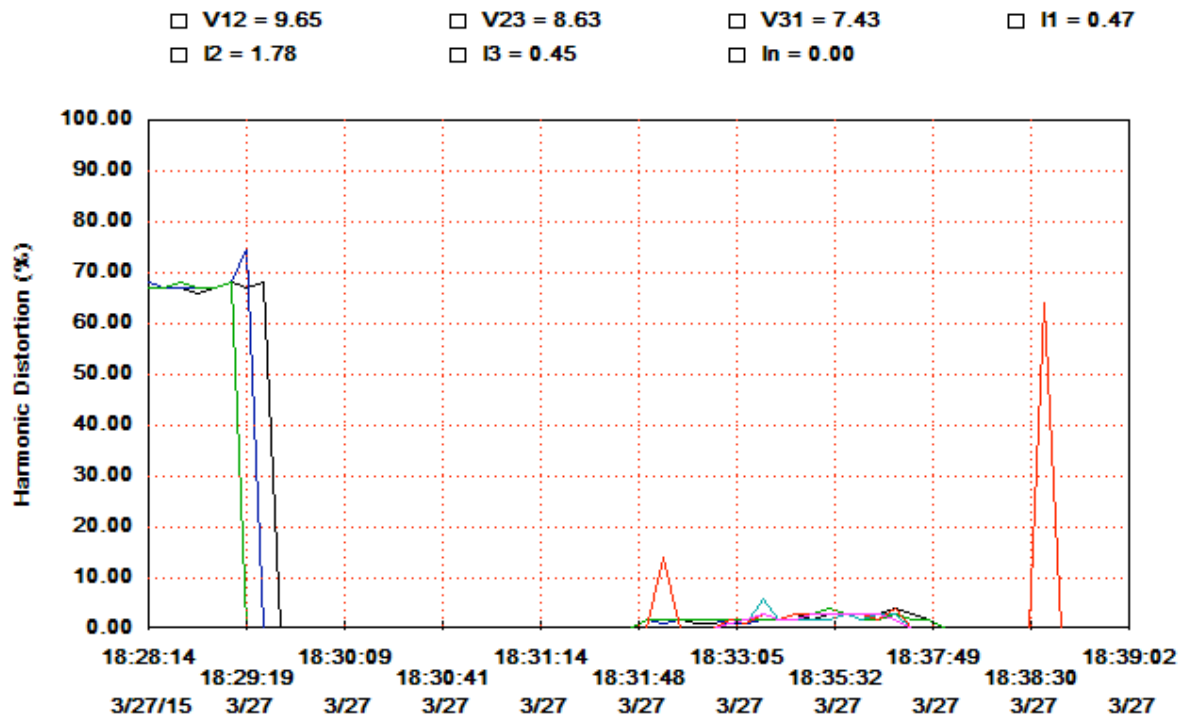
□ Ave Total = 0.95



Load Bank_27Mar15_Test Conclusion

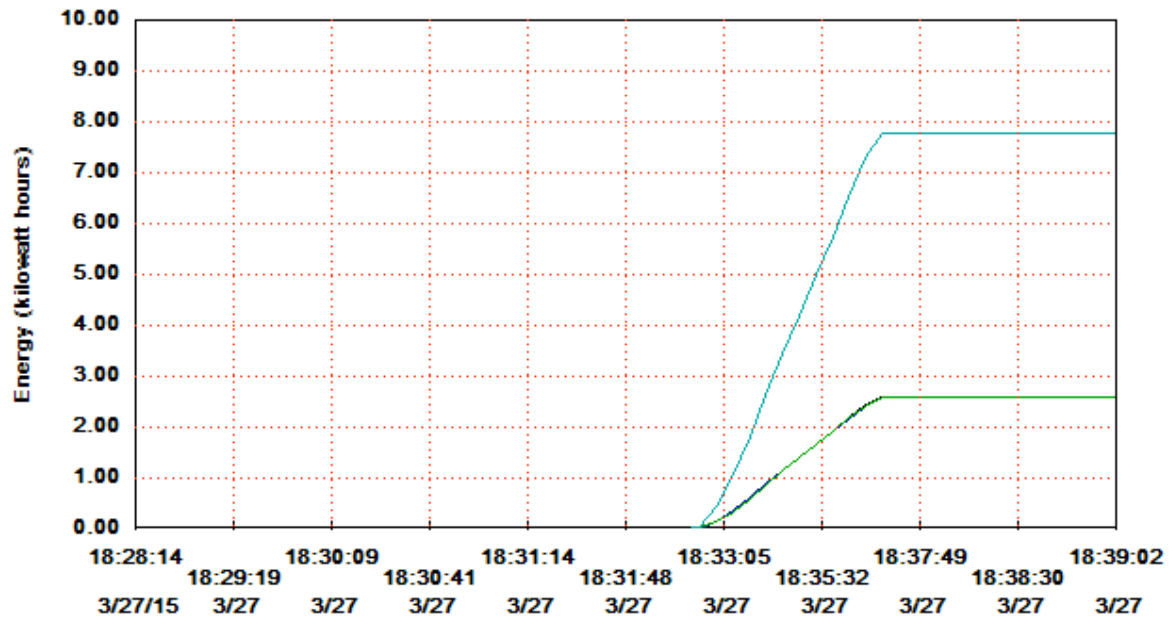


Load Bank_27Mar15_Test Conclusion



Load Bank_27Mar15_Test Conclusion

Phase 1 = 2.61 Phase 2 = 2.58 Phase 3 = 2.58 Total = 7.77



Generator_27Mar15_Test Conclusion

Generator 27Mar15 Test Conclusion

ABM REPORTS AND MISC\Reactor Project_20Mar15\GENERATOR FINAL_27MAR15.log

Test began at 03/27/15 18:28:34

Test ended at 03/27/15 18:39:54

<u>Measurement</u>	<u>Value</u>	<u>Units</u>
Voltage, Phase 1, Ave:	91.5	volts
Voltage, Phase 1, Max:	517.5	volts
Voltage, Phase 1, Min:	0.0	volts
Voltage, Phase 2, Ave:	88.4	volts
Voltage, Phase 2, Max:	517.1	volts
Voltage, Phase 2, Min:	0.0	volts
Voltage, Phase 3, Ave:	85.8	volts
Voltage, Phase 3, Max:	513.7	volts
Voltage, Phase 3, Min:	0.0	volts
Current, Phase 1, Ave:	0.1	amps
Current, Phase 1, Max:	1.0	amps
Current, Phase 1, Min:	0.0	amps
Current, Phase 2, Ave:	0.1	amps
Current, Phase 2, Max:	0.9	amps
Current, Phase 2, Min:	0.0	amps
Current, Phase 3, Ave:	0.1	amps
Current, Phase 3, Max:	0.9	amps
Current, Phase 3, Min:	0.0	amps
True Power, Phase 1, Ave:	35.1	Watts
True Power, Phase 1, Max:	222.1	Watts
True Power, Phase 1, Min:	0.0	Watts
True Power, Phase 2, Ave:	34.3	Watts
True Power, Phase 2, Max:	216.6	Watts
True Power, Phase 2, Min:	0.0	Watts
True Power, Phase 3, Ave:	33.2	Watts
True Power, Phase 3, Max:	212.8	Watts
True Power, Phase 3, Min:	0.0	Watts
VA Power, Phase 1, Ave:	36.3	VA
VA Power, Phase 1, Max:	223.0	VA
VA Power, Phase 1, Min:	0.0	VA
VA Power, Phase 2, Ave:	35.6	VA
VA Power, Phase 2, Max:	217.4	VA
VA Power, Phase 2, Min:	0.0	VA
VA Power, Phase 3, Ave:	33.2	VA
VA Power, Phase 3, Max:	213.3	VA
VA Power, Phase 3, Min:	0.0	VA
Power Factor, Phase 1, Ave:	0.98	
Power Factor, Phase 1, Max:	1.00	
Power Factor, Phase 1, Min:	0.12	
Power Factor, Phase 2, Ave:	0.98	
Power Factor, Phase 2, Max:	1.00	
Power Factor, Phase 2, Min:	0.04	
Power Factor, Phase 3, Ave:	1.00	
Power Factor, Phase 3, Max:	1.00	
Power Factor, Phase 3, Min:	1.00	

Total Power Factor:	0.98	
Frequency, Ave:	14.4	Hz
Frequency, Max:	64.4	Hz
Frequency, Min:	0.0	Hz
THD, Voltage, Phase 1:	0.7	%
THD, Voltage, Phase 2:	0.7	%
THD, Voltage, Phase 3:	0.7	%
THD, Current, Phase 1:	0.8	%
THD, Current, Phase 2:	1.6	%
THD, Current, Phase 3:	0.6	%
THD, Current, Neutral:	0.0	%
Energy, Phase 1:	0.01555	KWH
Energy, Phase 2:	0.01546	KWH
Energy, Phase 3:	0.01497	KWH
Energy, Total Elapsed:	0.04598	KWH
Energy, estimated per month:	177.8	KWH
Cost, Total Elapsed:	\$0.00	\$
Cost, estimated per month:	\$5.64	\$
(at \$0.03170/KWH)		
Peak Demand:	643.9	Watts @ 03/27/15 18:33:48
Peak Ave VA:	648.4	VA @ 03/27/15 18:33:48

Report Prepared by: Renan Gongora
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 Ontario, CA 91761

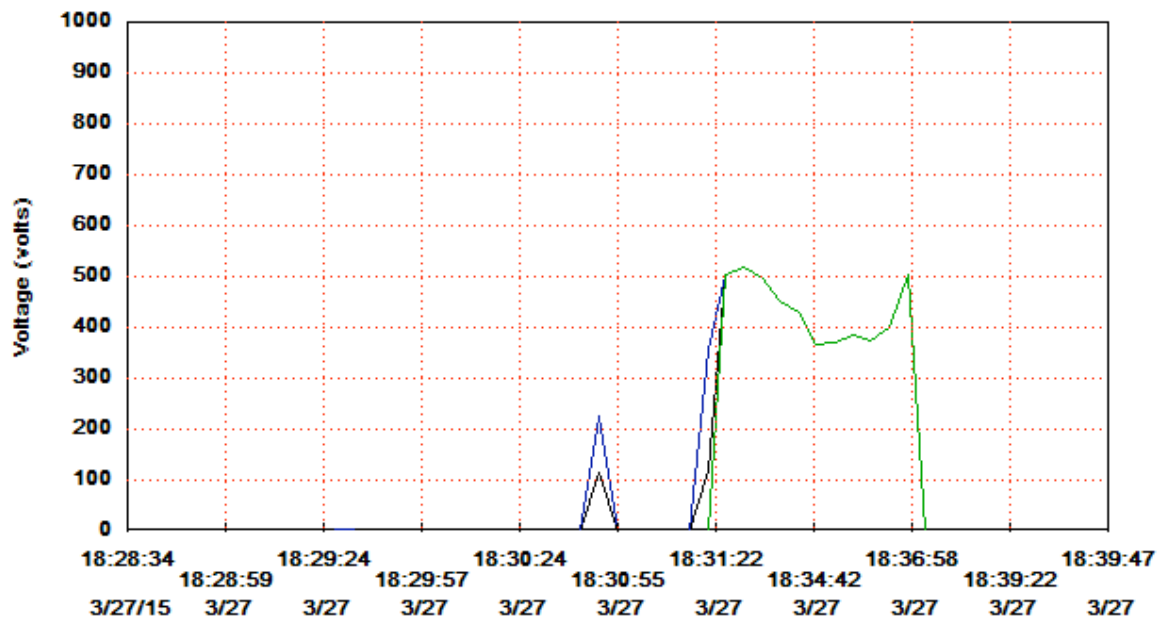
Phone: 800-597-1225
 Email: renan.gongora@abm.com

Generator_27Mar15_Test Conclusion

□ V12 Ave = 91.45

□ V12 Max = 517.50

□ V12 Min = 0.00

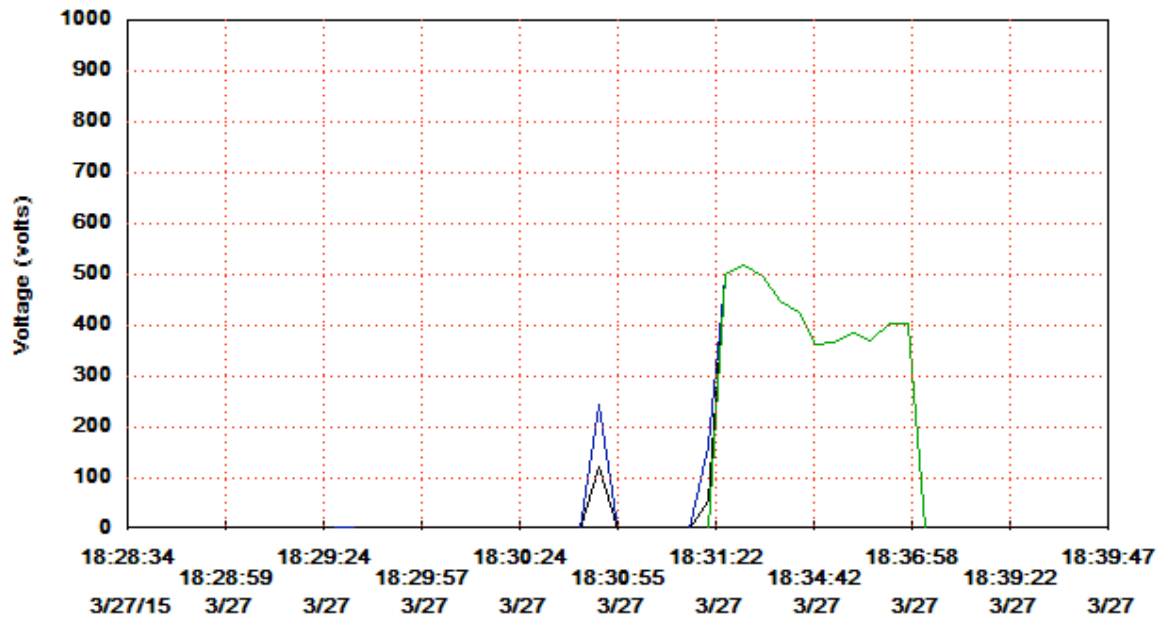


Generator_27Mar15_Test Conclusion

□ V23 Ave = 88.43

□ V23 Max = 517.10

□ V23 Min = 0.00

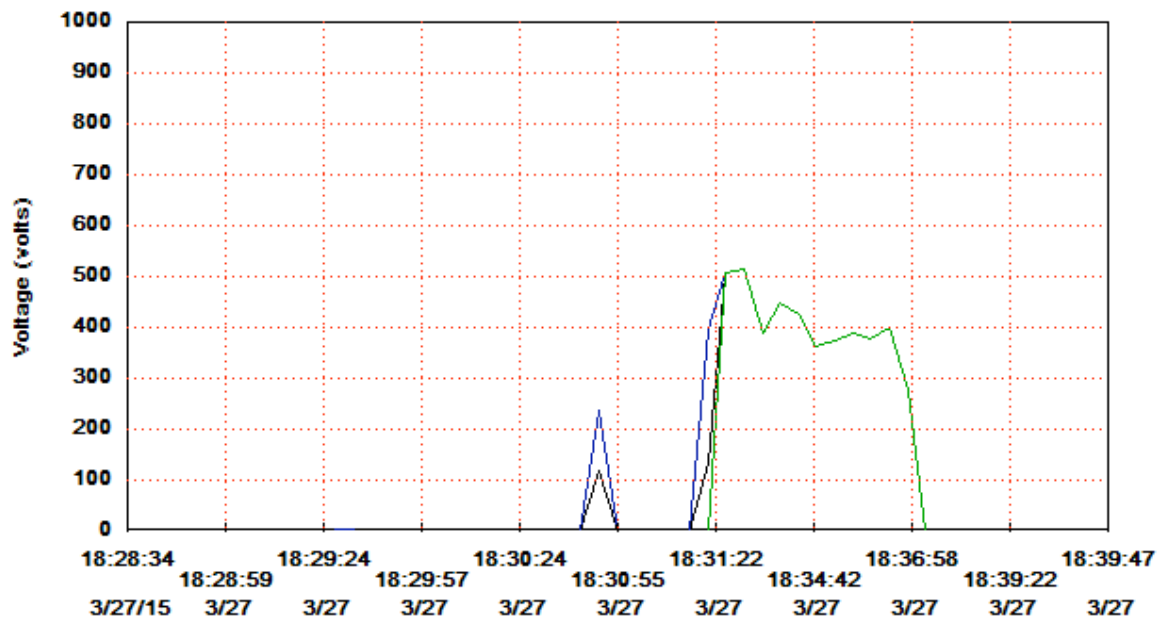


Generator_27Mar15_Test Conclusion

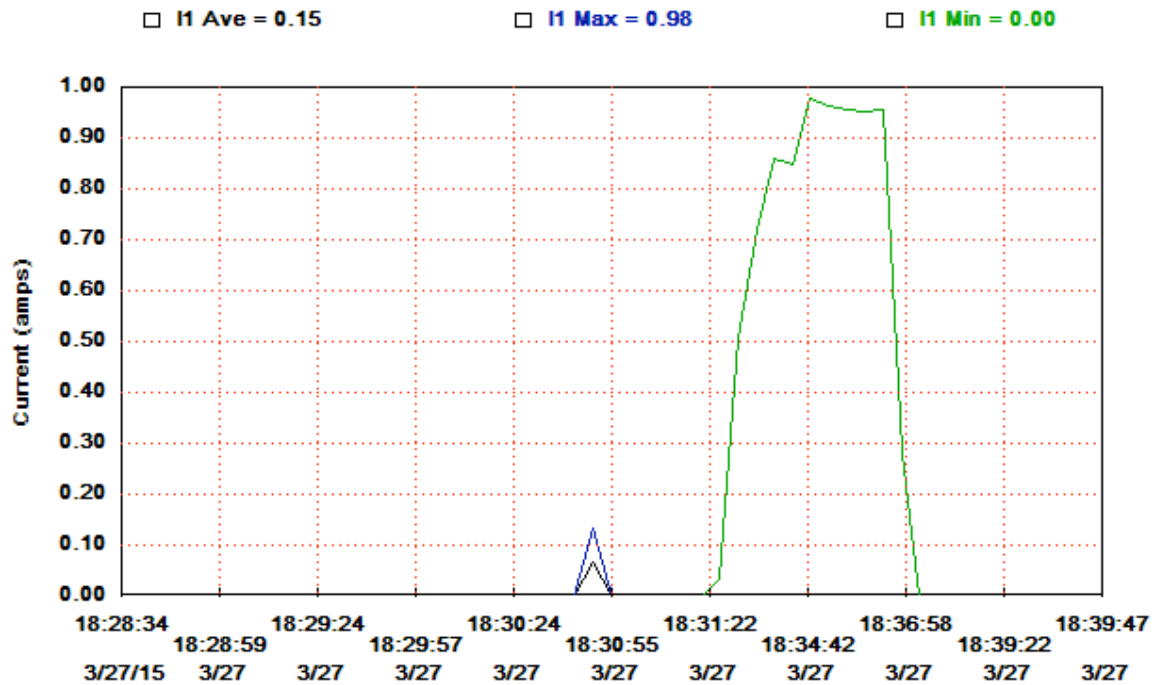
□ V31 Ave = 85.76

□ V31 Max = 513.70

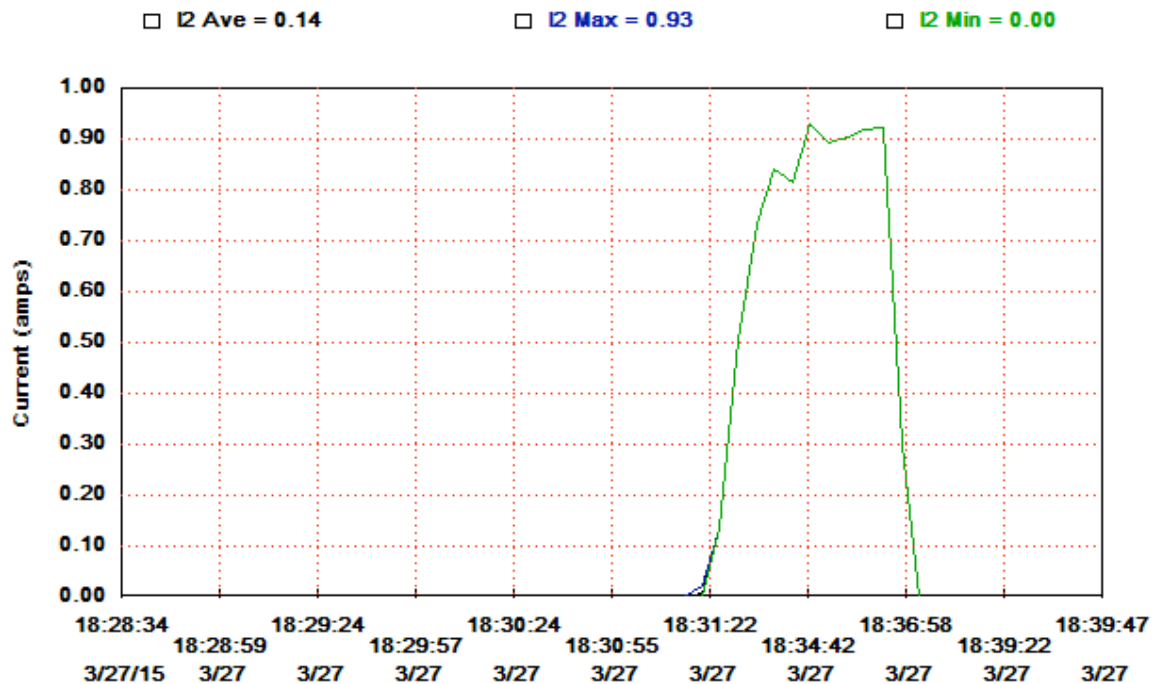
□ V31 Min = 0.00



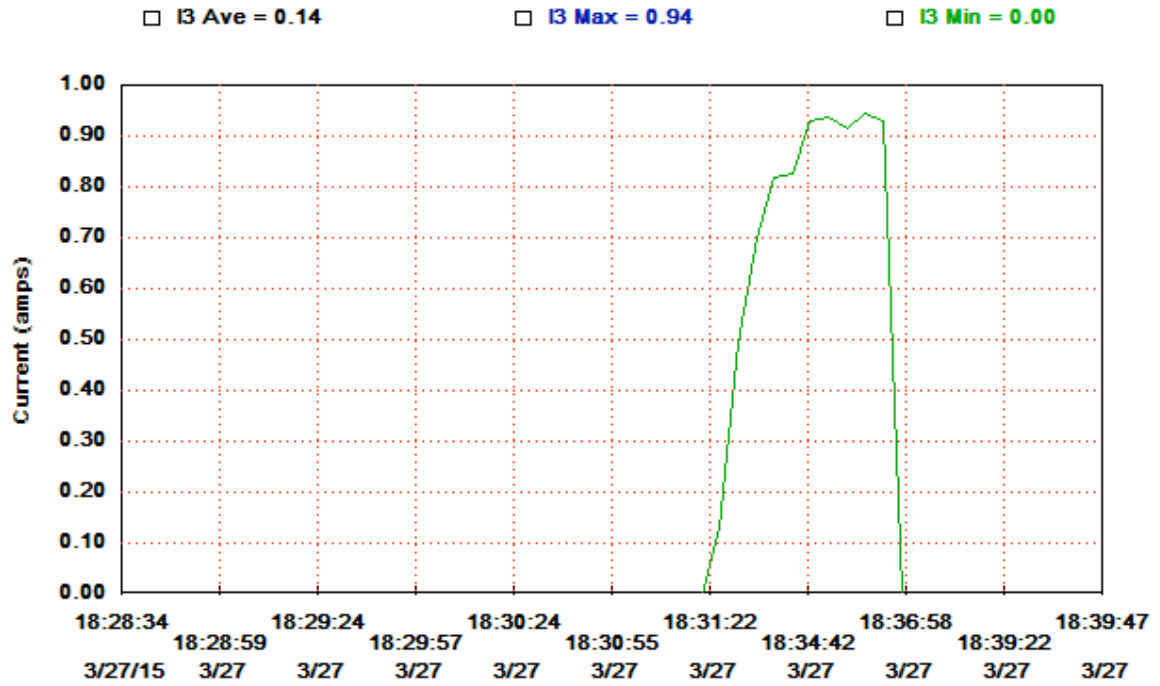
Generator_27Mar15_Test Conclusion



Generator_27Mar15_Test Conclusion



Generator_27Mar15_Test Conclusion

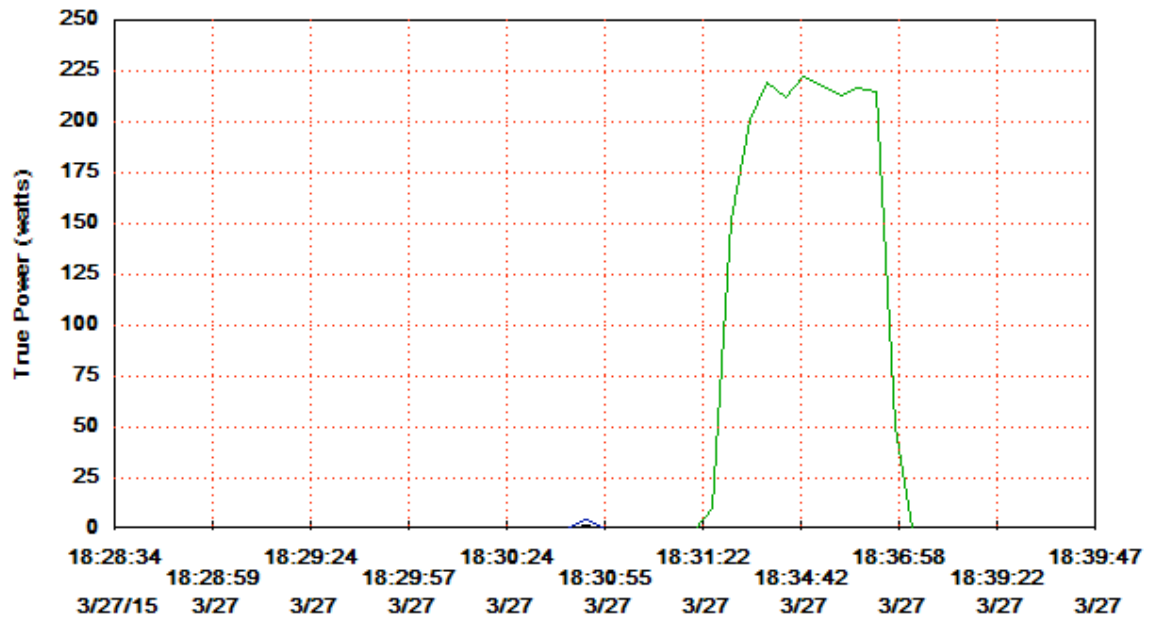


Generator_27Mar15_Test Conclusion

□ Phase 1 Ave = 35.13

□ Phase 1 Max = 222.10

□ Phase 1 Min = 0.00

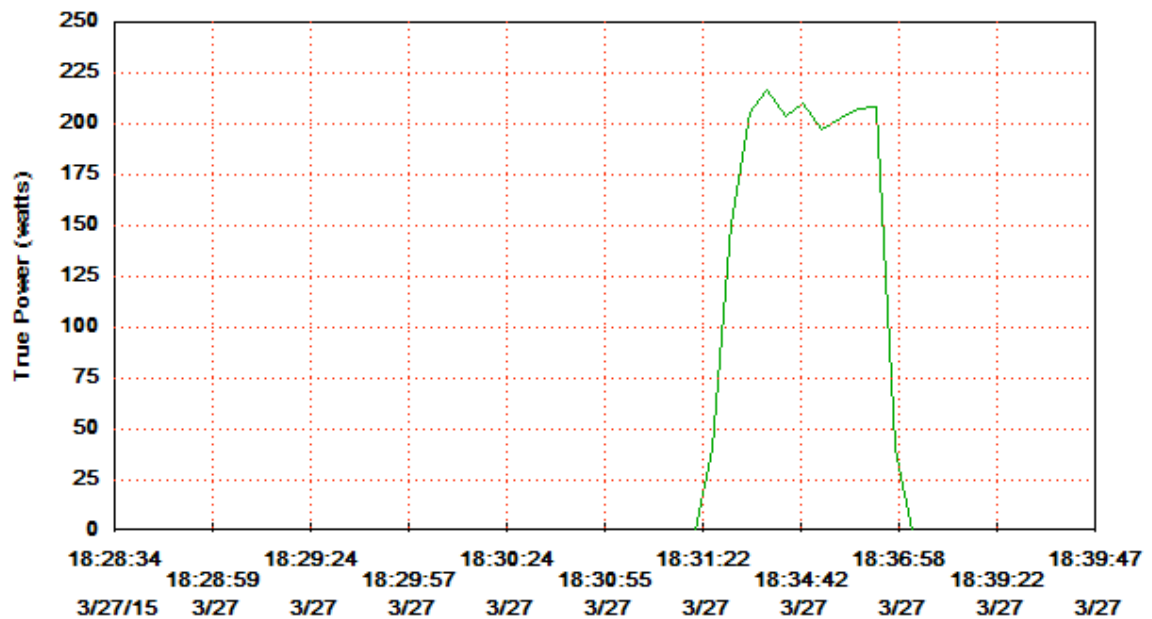


Generator_27Mar15_Test Conclusion

□ Phase 2 Ave = 34.28

□ Phase 2 Max = 216.60

□ Phase 2 Min = 0.00

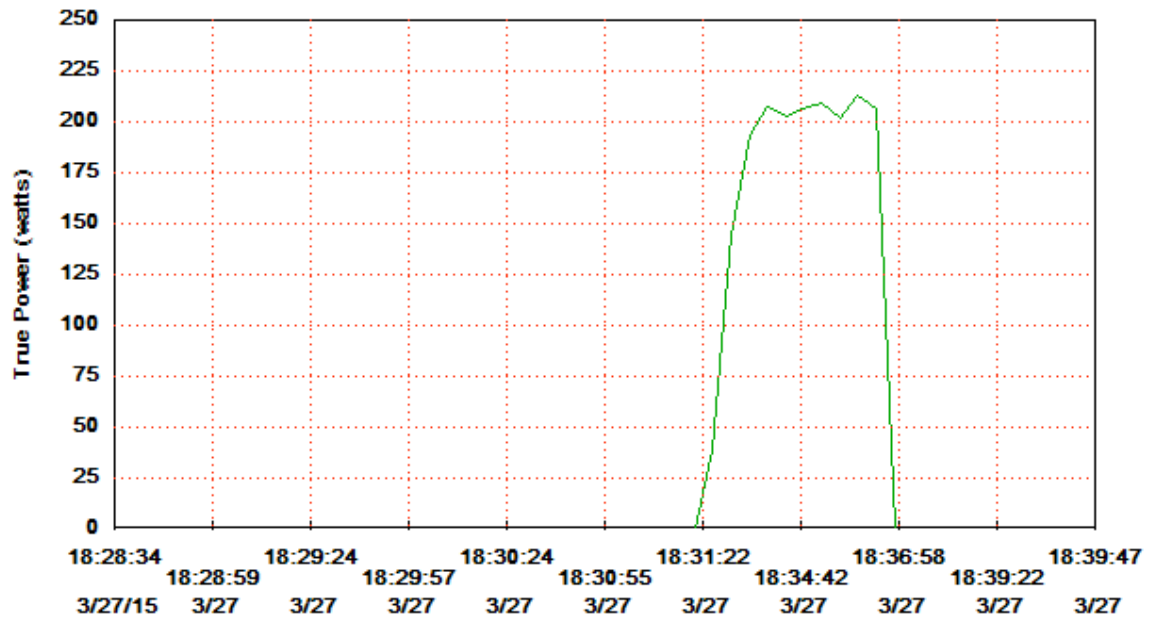


Generator_27Mar15_Test Conclusion

Phase 3 Ave = 33.17

Phase 3 Max = 212.80

Phase 3 Min = 0.00

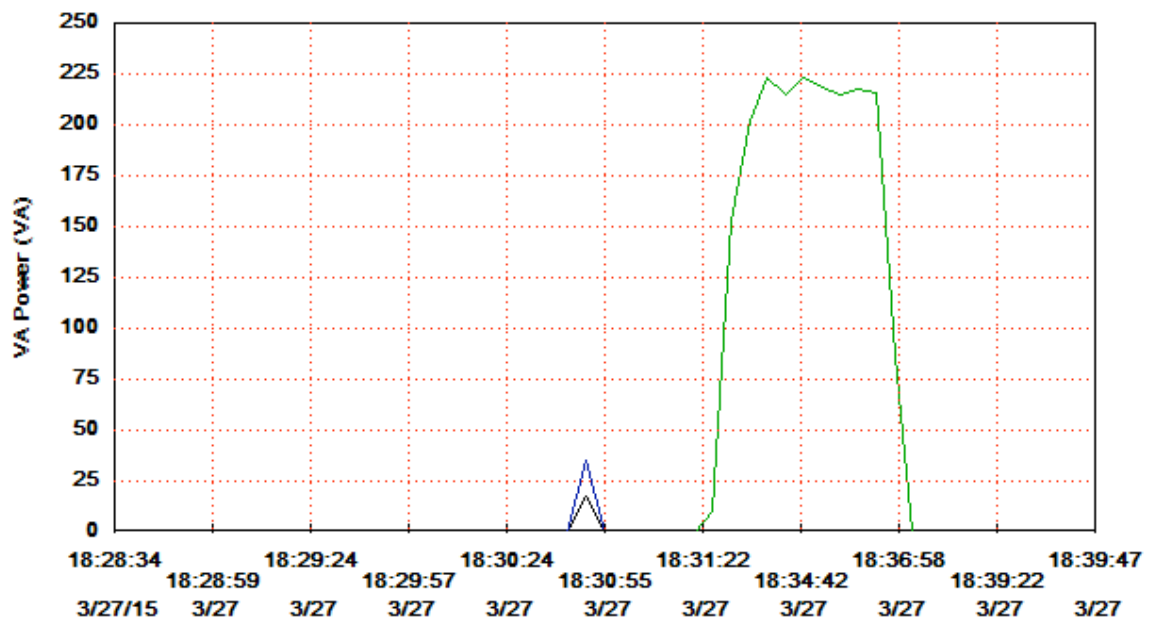


Generator_27Mar15_Test Conclusion

Phase 1 Ave = 36.31

Phase 1 Max = 223.00

Phase 1 Min = 0.00

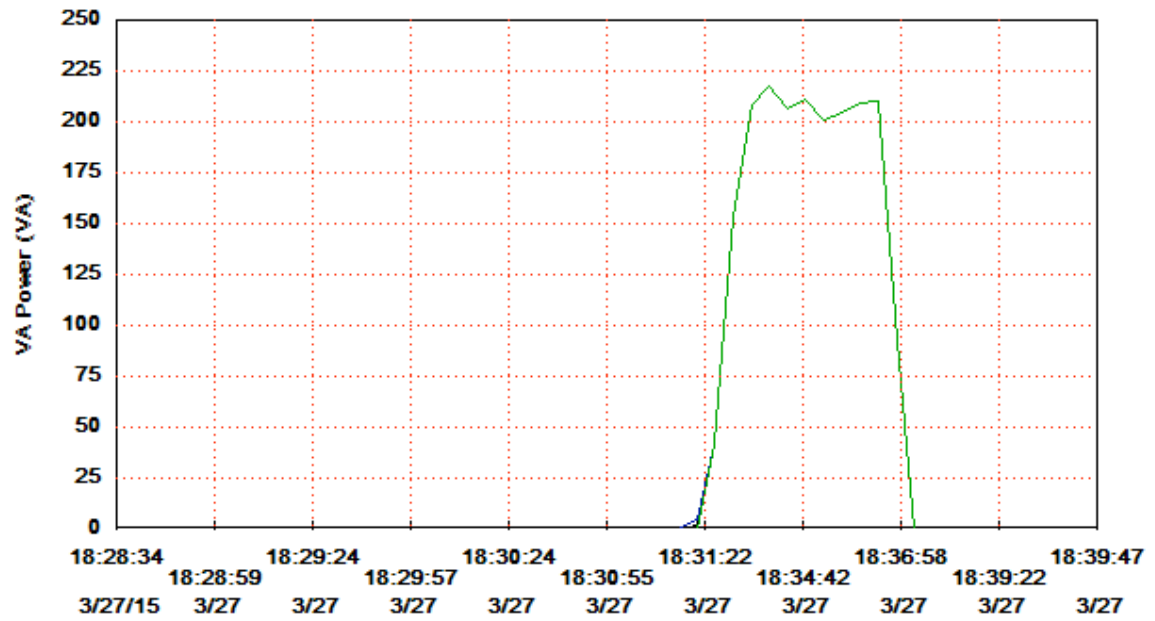


Generator_27Mar15_Test Conclusion

Phase 2 Ave = 35.57

Phase 2 Max = 217.40

Phase 2 Min = 0.00

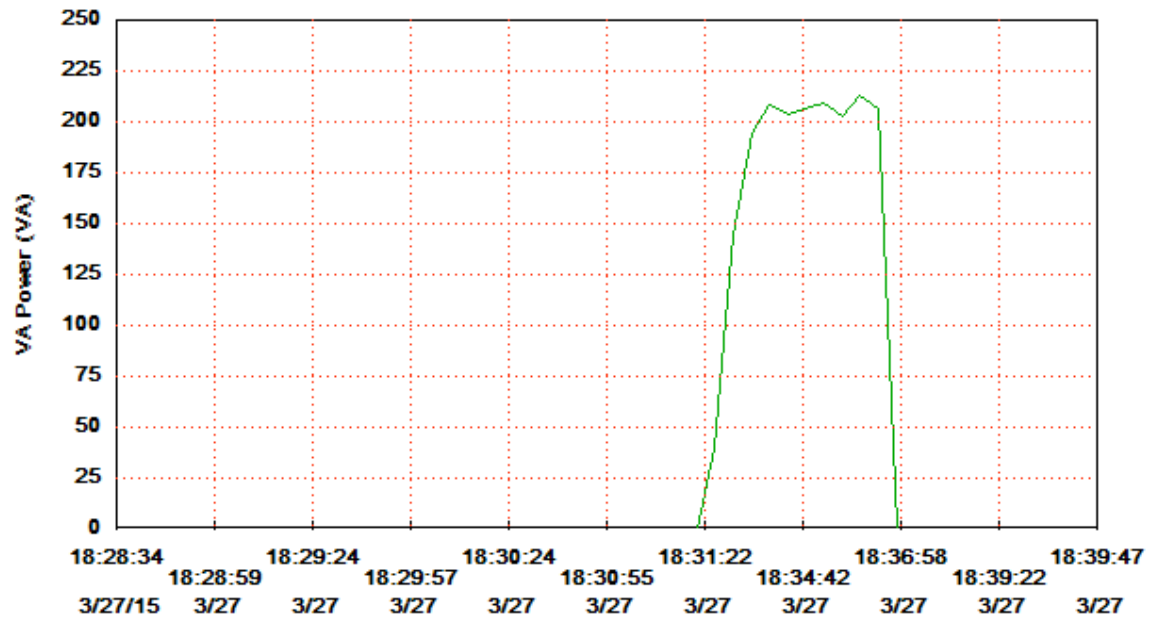


Generator_27Mar15_Test Conclusion

□ Phase 3 Ave = 33.24

□ Phase 3 Max = 213.30

□ Phase 3 Min = 0.00

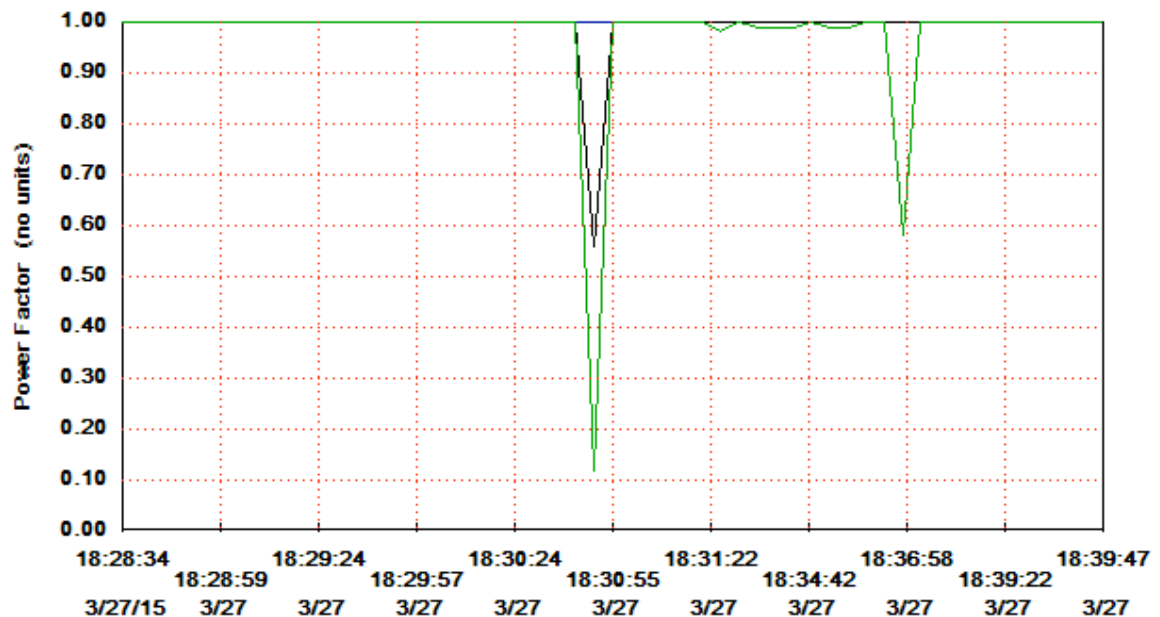


Generator_27Mar15_Test Conclusion

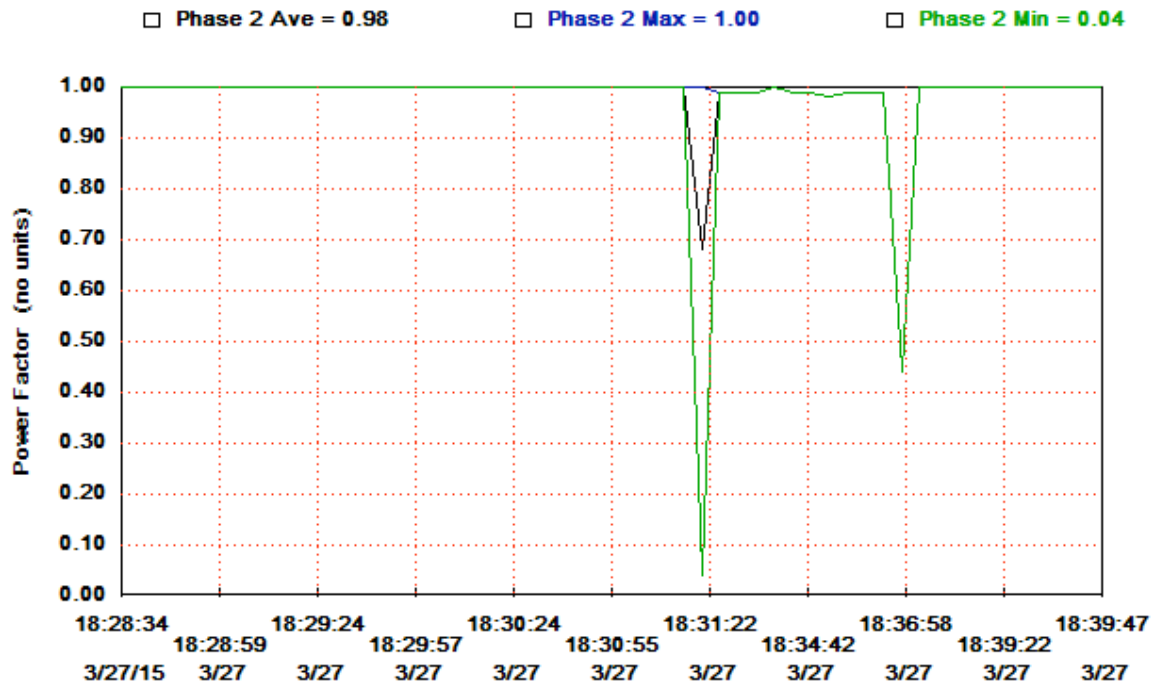
□ Phase 1 Ave = 0.98

□ Phase 1 Max = 1.00

□ Phase 1 Min = 0.12



Generator_27Mar15_Test Conclusion

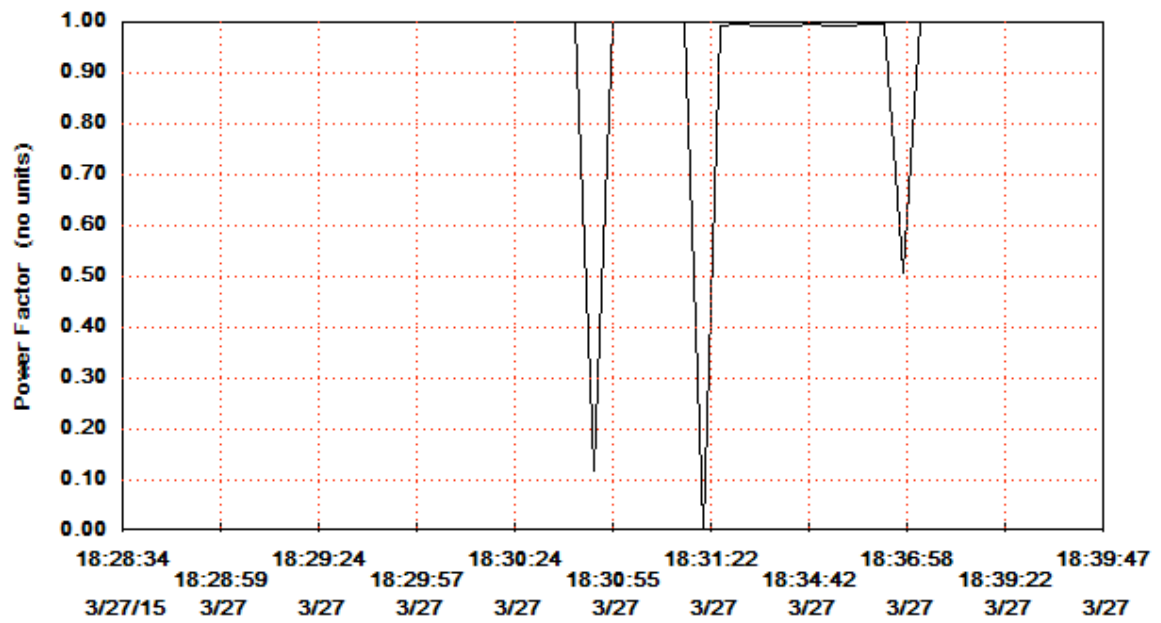


Generator_27Mar15_Test Conclusion

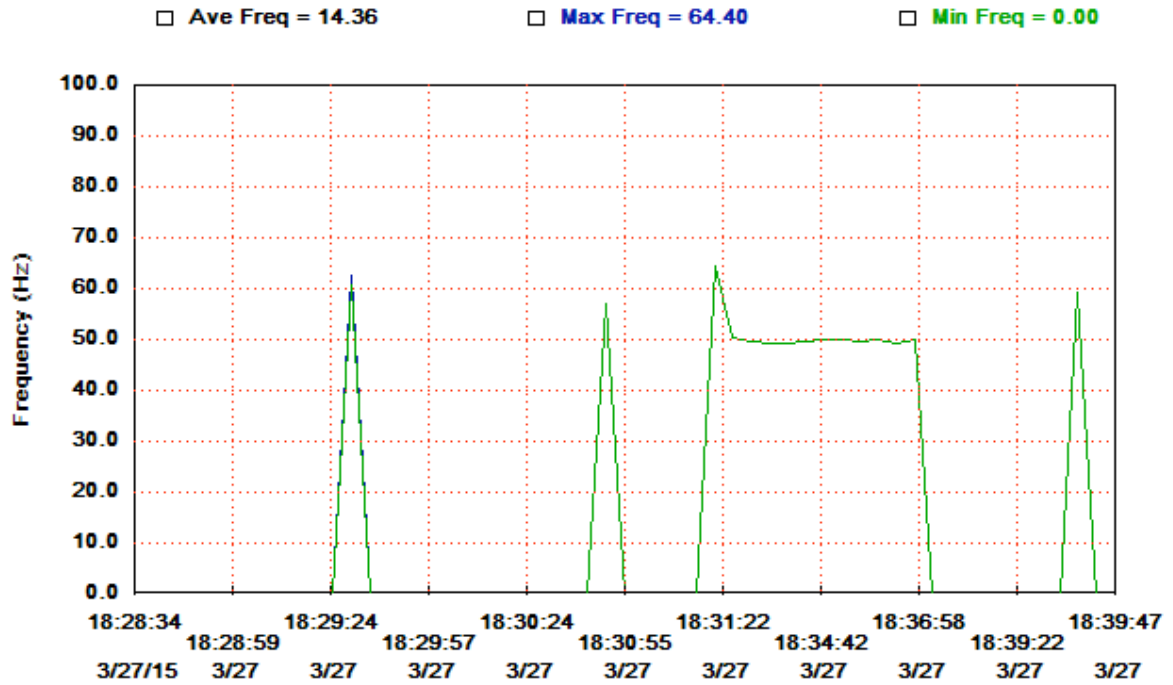


Generator_27Mar15_Test Conclusion

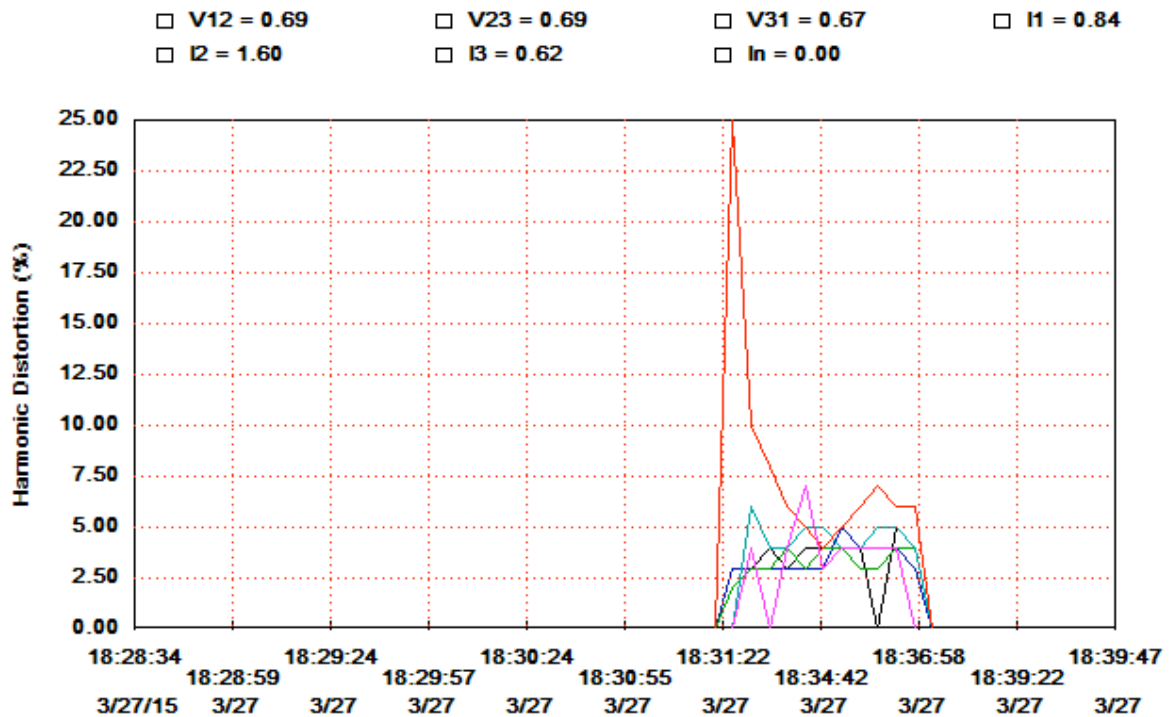
□ Ave Total = 0.96



Generator_27Mar15_Test Conclusion

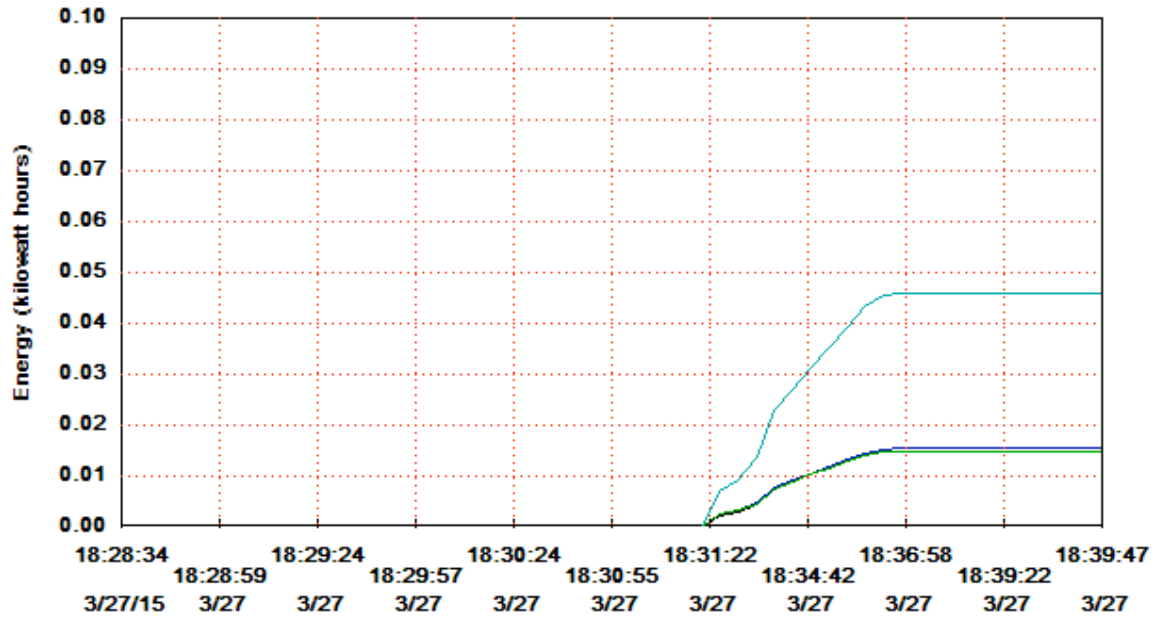


Generator_27Mar15_Test Conclusion



Generator_27Mar15_Test Conclusion

☐ Phase 1 = 0.02 ☐ Phase 2 = 0.02 ☐ Phase 3 = 0.01 ☐ Total = 0.05



VFD_27Mar15_Test Conclusion

VFD_27Mar15_Test Conclusion

ABM REPORTS AND MISC\Reactor Project_20Mar15\VFD FINAL 27MAR15.log

Test began at 03/27/15 18:28:05

Test ended at 03/27/15 18:39:27

<u>Measurement</u>	<u>Value</u>	<u>Units</u>
Voltage, Phase 1, Ave:	476.8	volts
Voltage, Phase 1, Max:	492.3	volts
Voltage, Phase 1, Min:	215.8	volts
Voltage, Phase 2, Ave:	476.2	volts
Voltage, Phase 2, Max:	491.7	volts
Voltage, Phase 2, Min:	281.1	volts
Voltage, Phase 3, Ave:	478.5	volts
Voltage, Phase 3, Max:	491.9	volts
Voltage, Phase 3, Min:	304.8	volts
Current, Phase 1, Ave:	79.6	amps
Current, Phase 1, Max:	164.9	amps
Current, Phase 1, Min:	0.5	amps
Current, Phase 2, Ave:	79.7	amps
Current, Phase 2, Max:	163.6	amps
Current, Phase 2, Min:	0.3	amps
Current, Phase 3, Ave:	84.2	amps
Current, Phase 3, Max:	177.8	amps
Current, Phase 3, Min:	0.3	amps
True Power, Phase 1, Ave:	19940.1	Watts
True Power, Phase 1, Max:	42937.6	Watts
True Power, Phase 1, Min:	101.6	Watts
True Power, Phase 2, Ave:	20194.5	Watts
True Power, Phase 2, Max:	43571.2	Watts
True Power, Phase 2, Min:	24.5	Watts
True Power, Phase 3, Ave:	21089.2	Watts
True Power, Phase 3, Max:	46348.8	Watts
True Power, Phase 3, Min:	7.8	Watts
VA Power, Phase 1, Ave:	21933.3	VA
VA Power, Phase 1, Max:	45196.8	VA
VA Power, Phase 1, Min:	133.4	VA
VA Power, Phase 2, Ave:	22081.8	VA
VA Power, Phase 2, Max:	45075.2	VA
VA Power, Phase 2, Min:	68.5	VA
VA Power, Phase 3, Ave:	23158.1	VA
VA Power, Phase 3, Max:	48672.0	VA
VA Power, Phase 3, Min:	95.4	VA
Power Factor, Phase 1, Ave:	0.82	
Power Factor, Phase 1, Max:	0.96	
Power Factor, Phase 1, Min:	0.54	
Power Factor, Phase 2, Ave:	0.75	
Power Factor, Phase 2, Max:	0.97	
Power Factor, Phase 2, Min:	0.29	
Power Factor, Phase 3, Ave:	0.69	
Power Factor, Phase 3, Max:	0.95	
Power Factor, Phase 3, Min:	0.08	
Total Power Factor:	0.91	

Frequency, Ave:	60.0	Hz
Frequency, Max:	60.6	Hz
Frequency, Min:	60.0	Hz
THD, Voltage, Phase 1:	3.7	%
THD, Voltage, Phase 2:	3.8	%
THD, Voltage, Phase 3:	3.6	%
THD, Current, Phase 1:	52.0	%
THD, Current, Phase 2:	69.7	%
THD, Current, Phase 3:	51.2	%
THD, Current, Neutral:	0.0	%
Energy, Phase 1:	3.86535	KWH
Energy, Phase 2:	3.91089	KWH
Energy, Phase 3:	4.08404	KWH
Energy, Total Elapsed:	11.86028	KWH
Energy, estimated per month:	45733.4	KWH
Cost, Total Elapsed:	\$0.38	\$
Cost, estimated per month:	\$1,449.75	\$
(at \$0.03170/KWH)		
Peak Demand:	131616.0	Watts @ 03/27/15 18:33:48
Peak Ave VA:	137670.4	VA @ 03/27/15 18:34:36

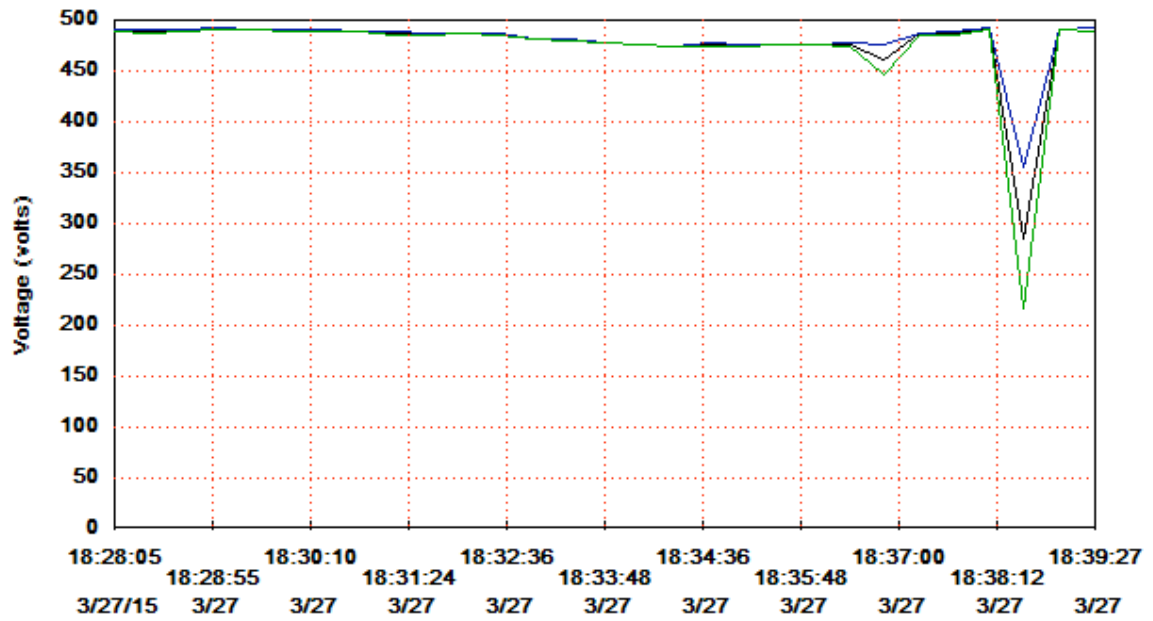
Report Prepared by: Renan Gongora
 ABM Electrical Power Services. LLC.
 720 S. Rochester Ave Suite. A
 Ontario, CA 91761
 Phone: 800-597-1225
 Email: renan.gongora@abm.com

VFD_27Mar15_Test Conclusion

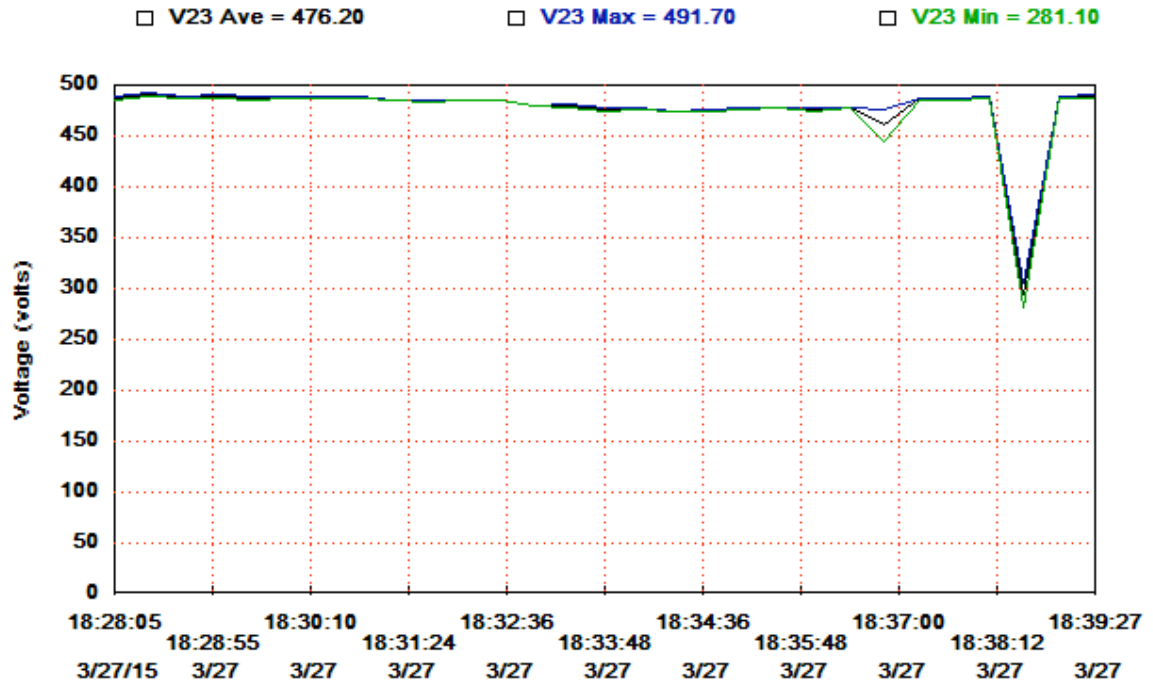
□ V12 Ave = 476.83

□ V12 Max = 492.30

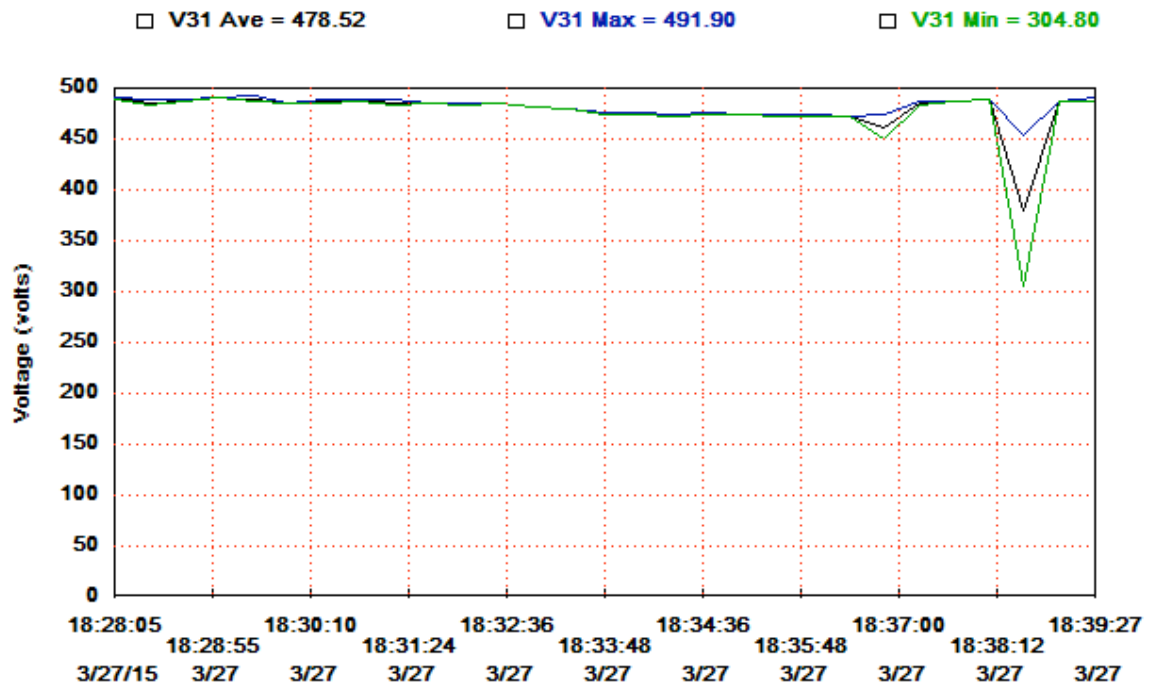
□ V12 Min = 215.80



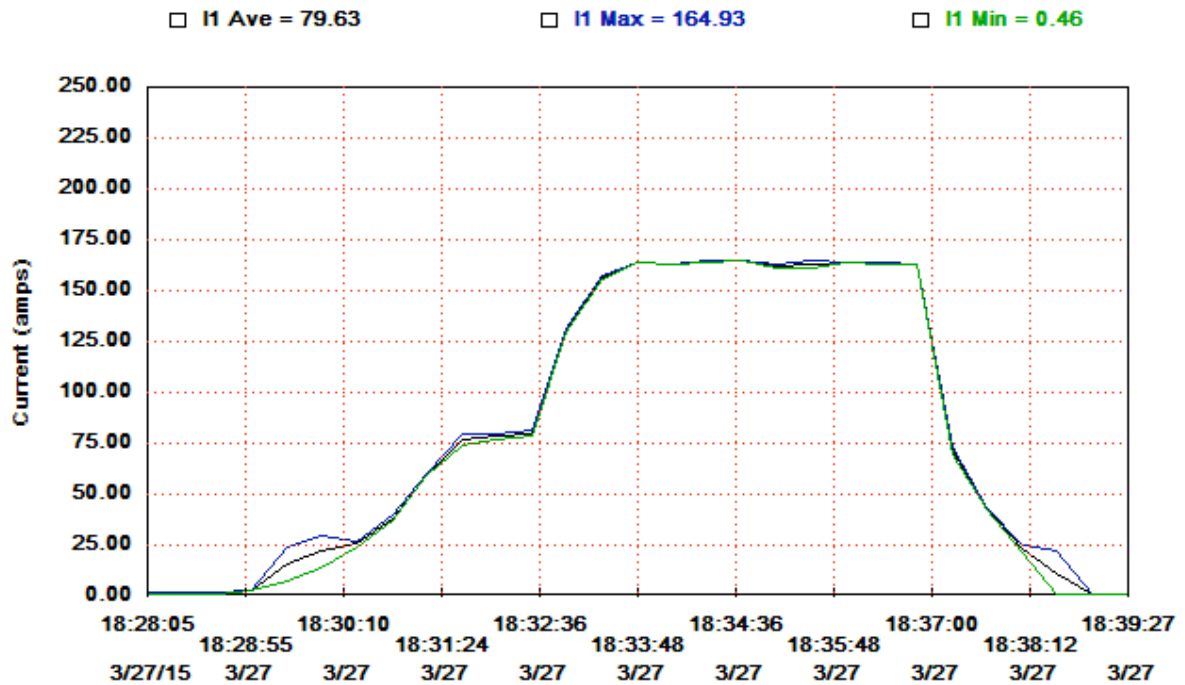
VFD_27Mar15_Test Conclusion



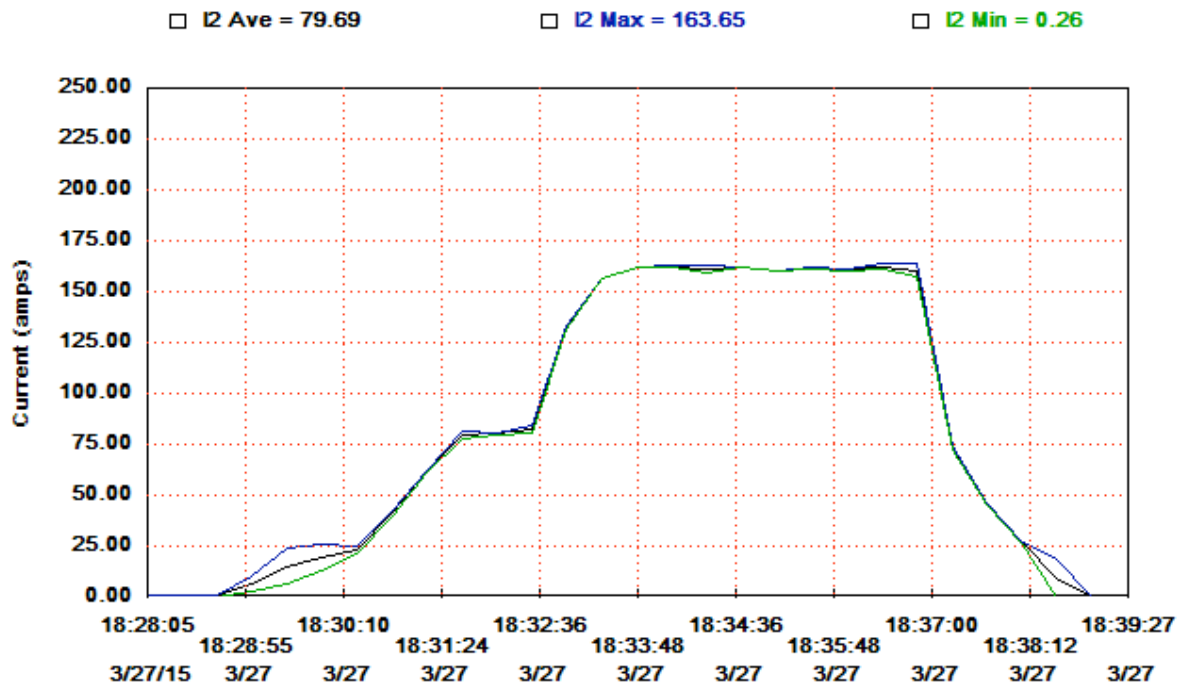
VFD_27Mar15_Test Conclusion



VFD_27Mar15_Test Conclusion



VFD_27Mar15_Test Conclusion

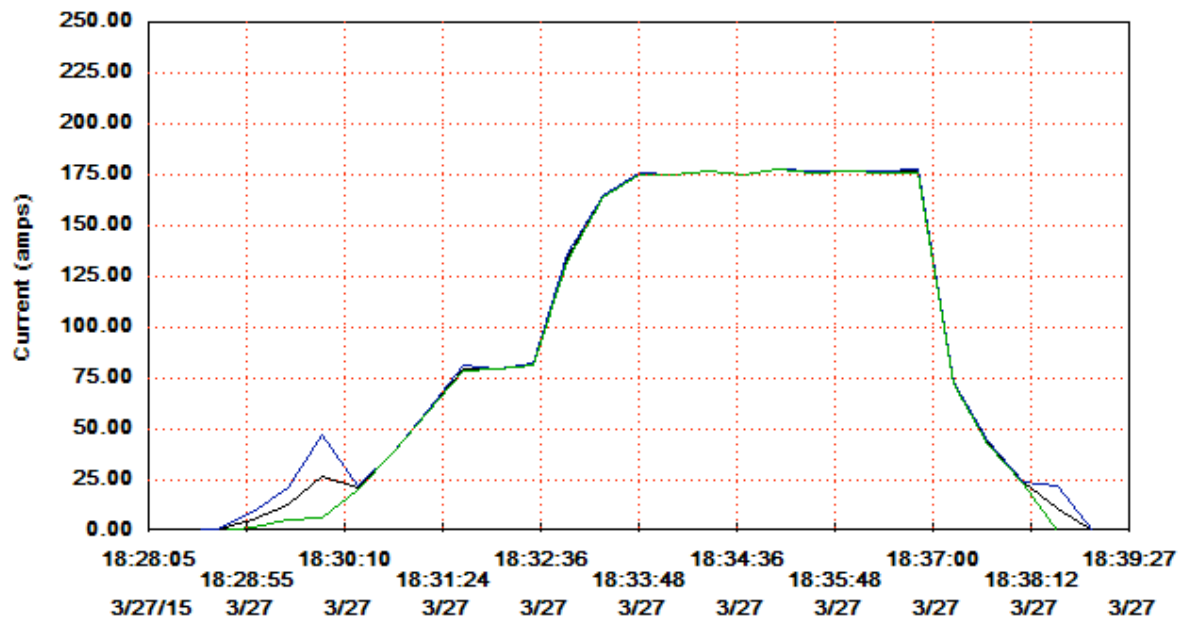


VFD_27Mar15_Test Conclusion

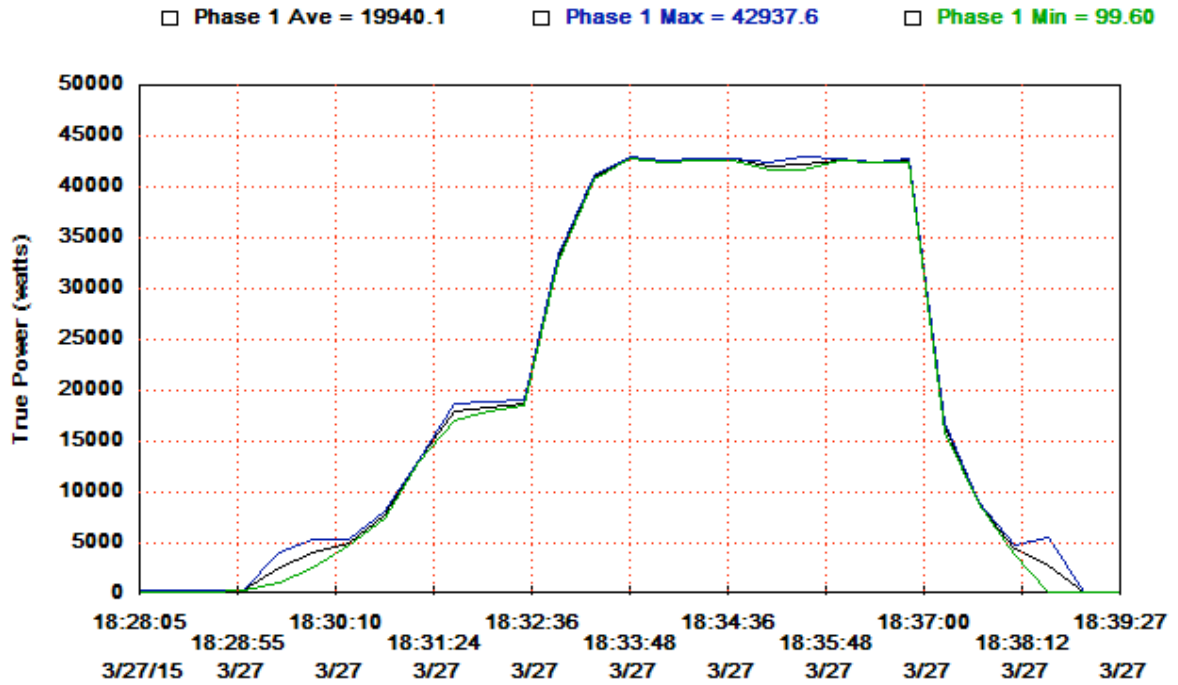
□ I3 Ave = 84.23

□ I3 Max = 177.79

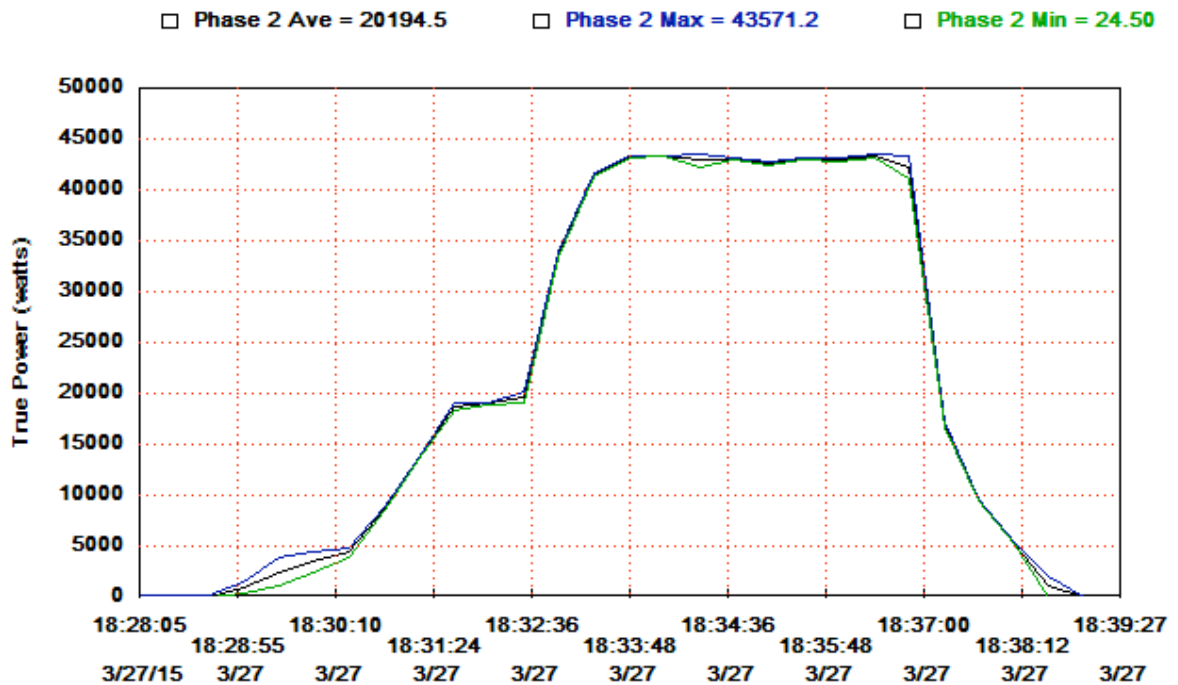
□ I3 Min = 0.34



VFD_27Mar15_Test Conclusion

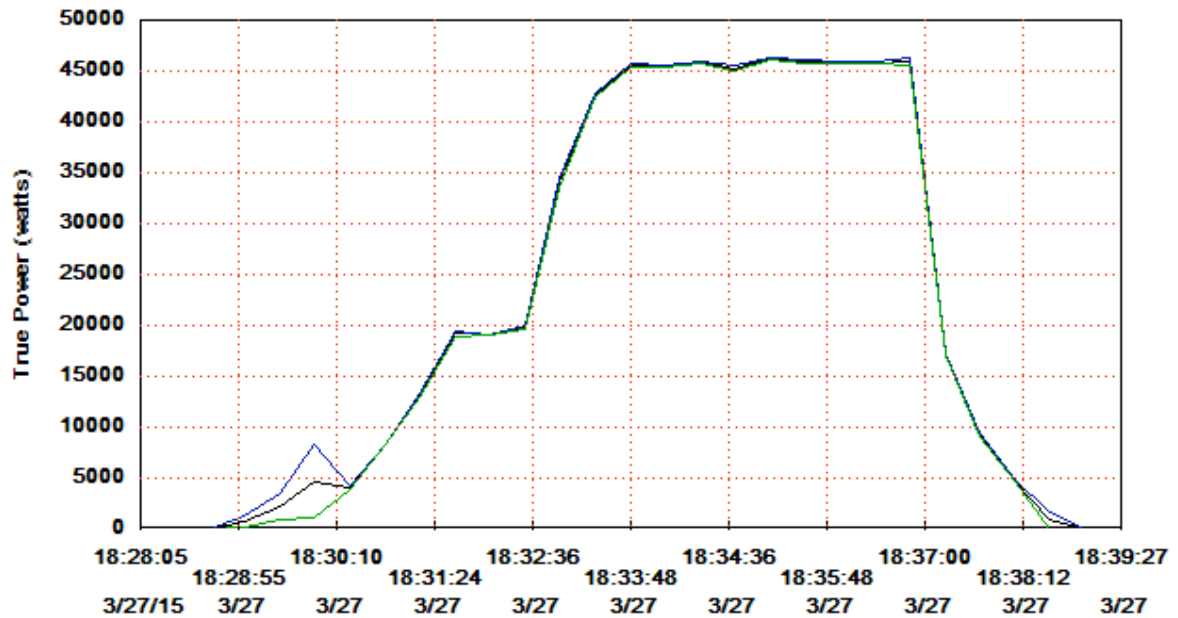


VFD_27Mar15_Test Conclusion



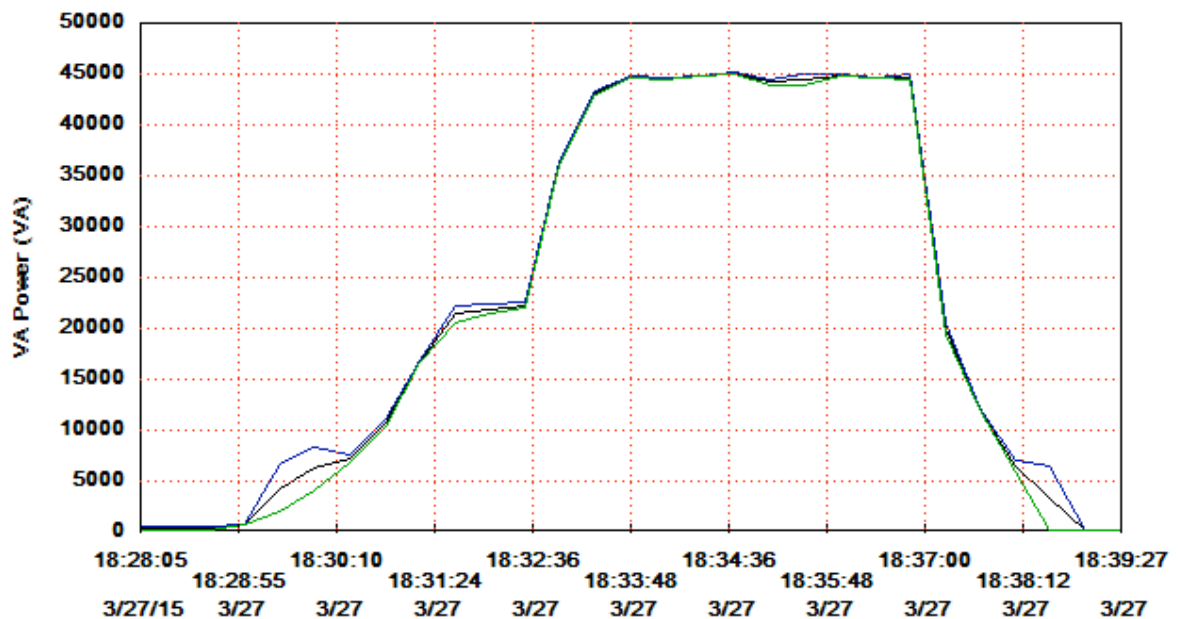
VFD_27Mar15_Test Conclusion

Phase 3 Ave = 21089.2 Phase 3 Max = 46348.8 Phase 3 Min = 7.80



VFD_27Mar15_Test Conclusion

Phase 1 Ave = 21933.3 Phase 1 Max = 45196.8 Phase 1 Min = 130.80

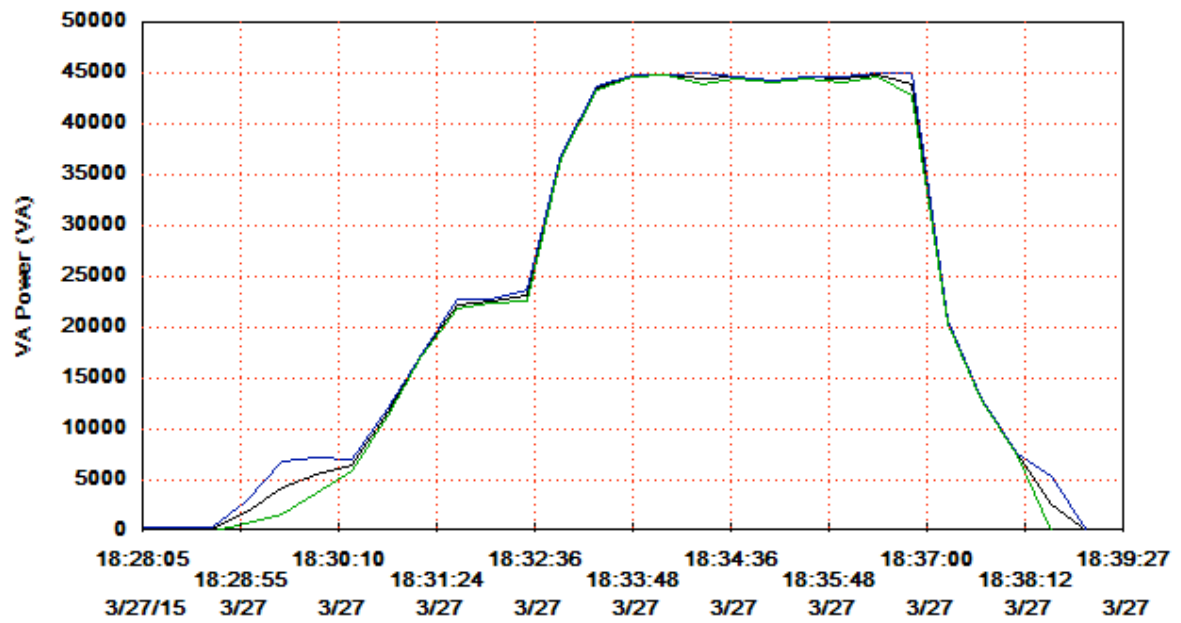


VFD_27Mar15_Test Conclusion

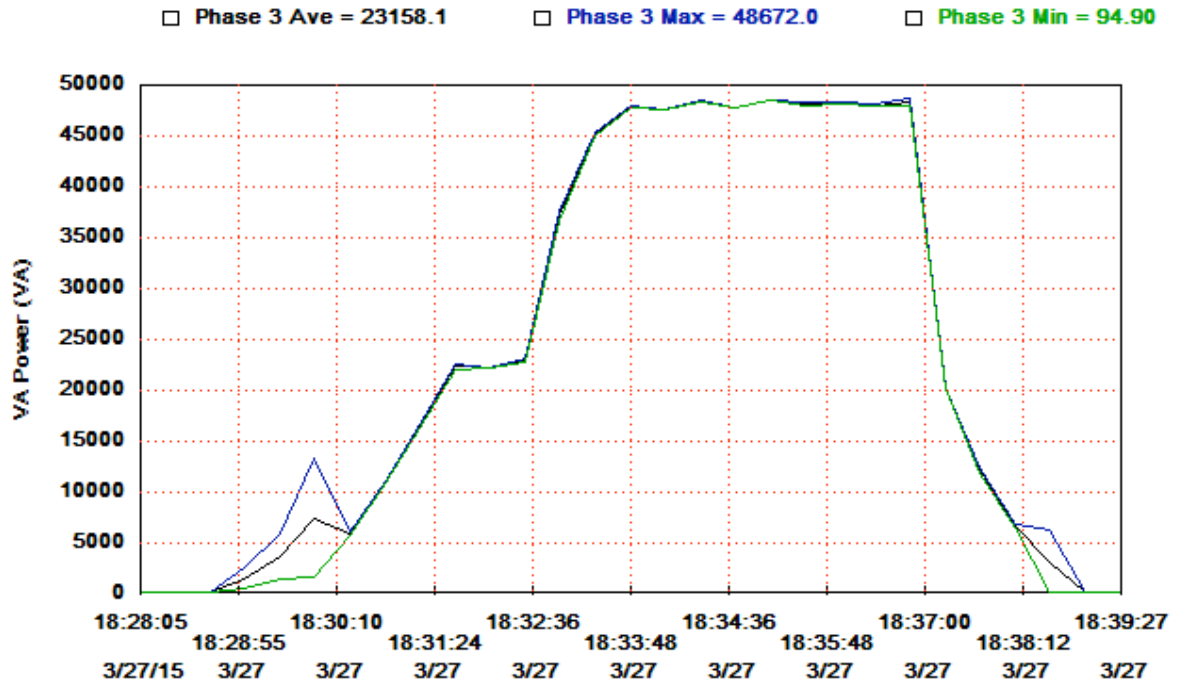
Phase 2 Ave = 22081.8

Phase 2 Max = 45075.2

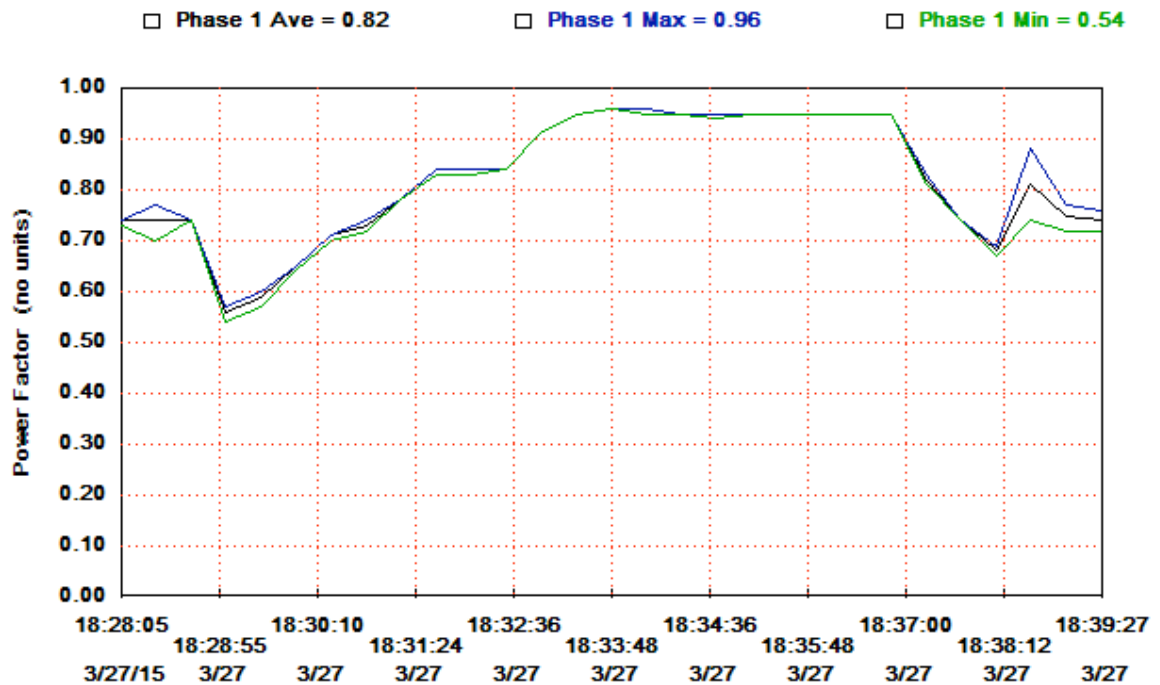
Phase 2 Min = 68.50



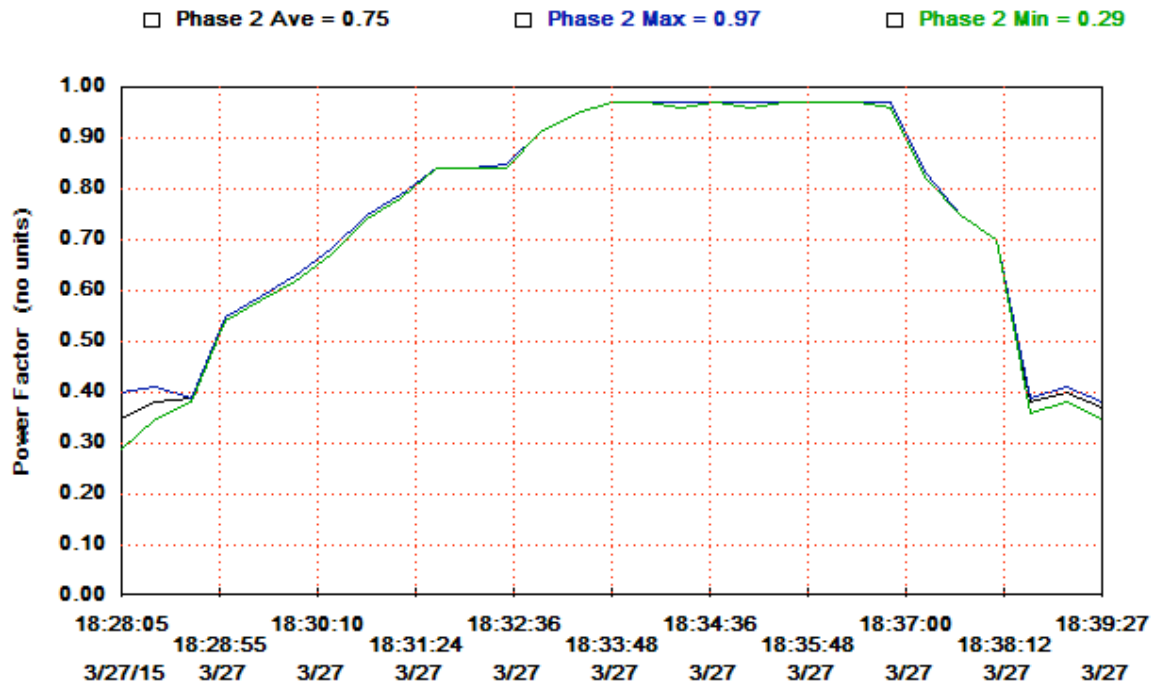
VFD_27Mar15_Test Conclusion



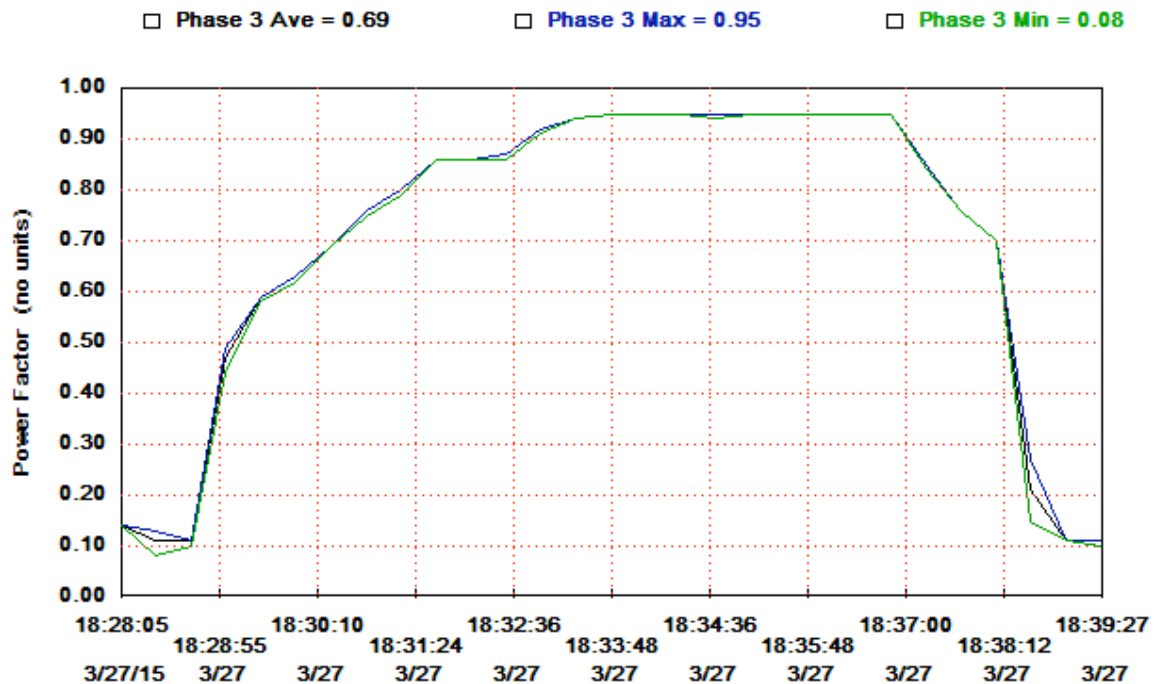
VFD_27Mar15_Test Conclusion



VFD_27Mar15_Test Conclusion

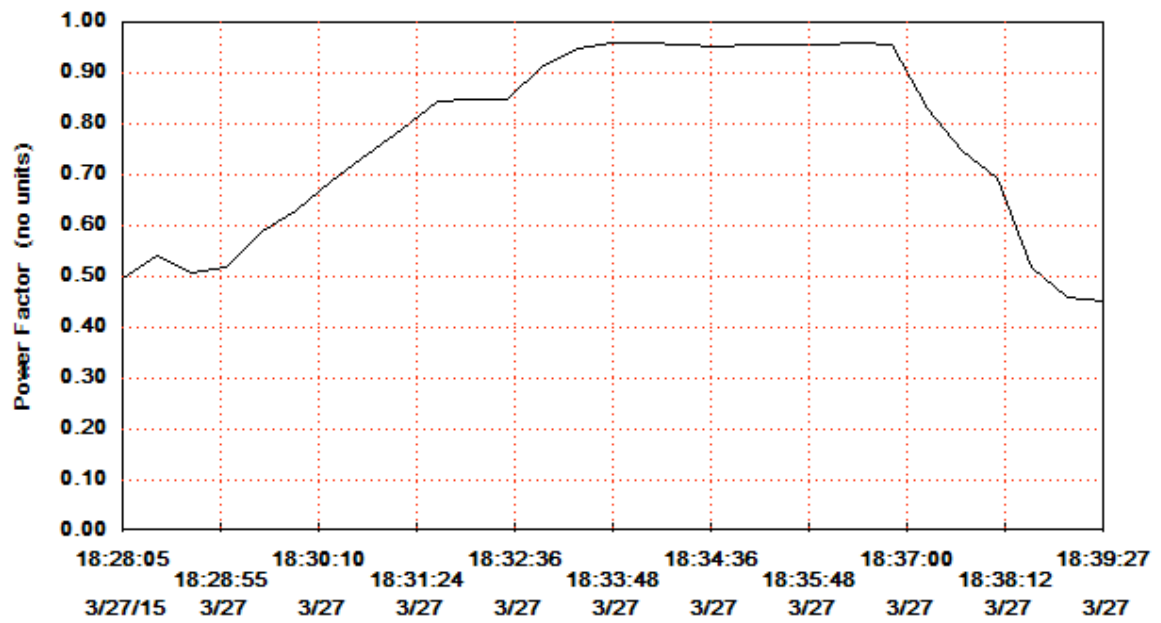


VFD_27Mar15_Test Conclusion

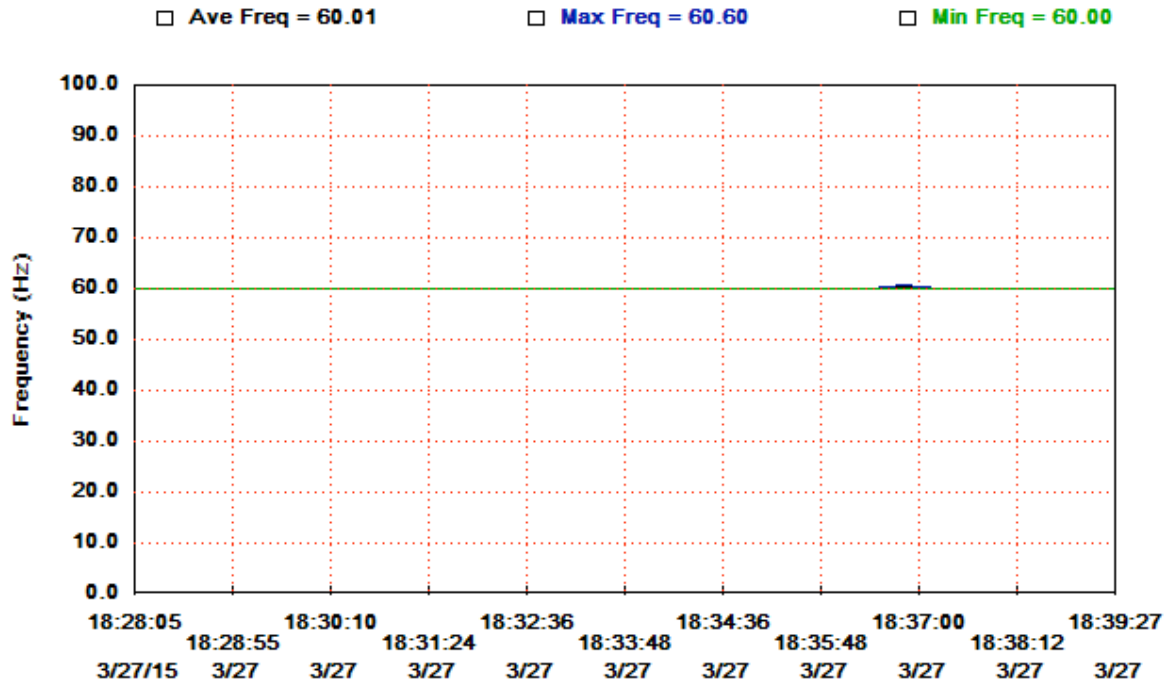


VFD_27Mar15_Test Conclusion

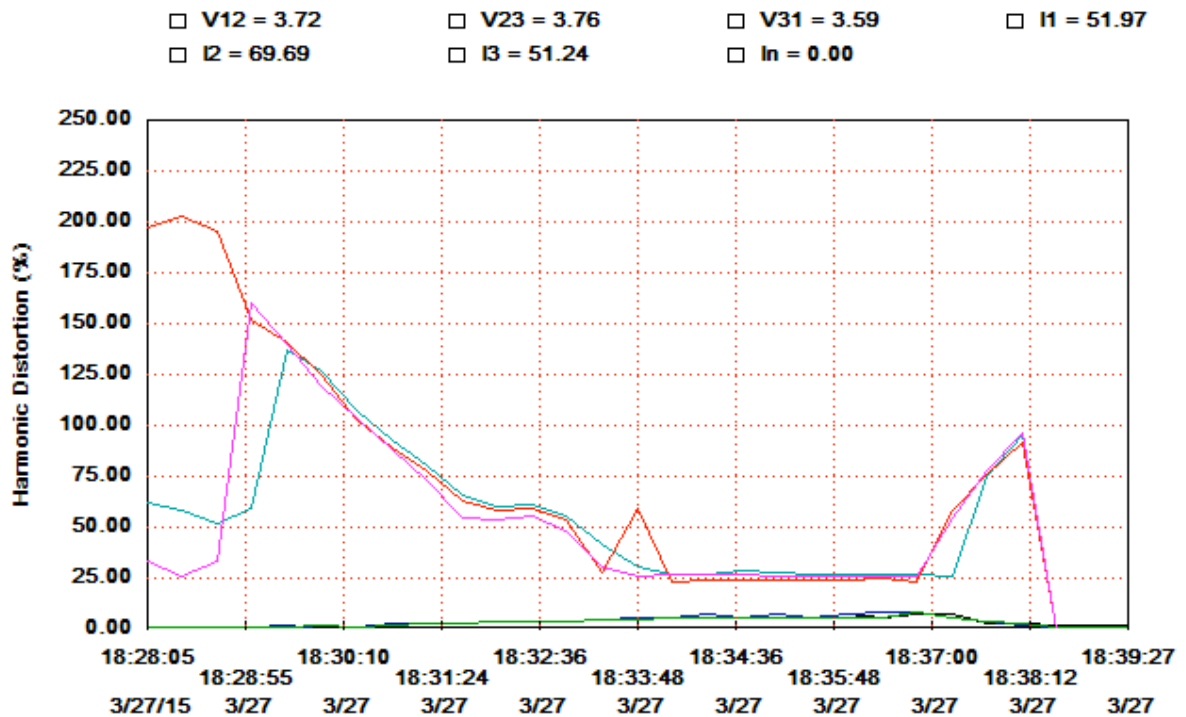
□ Ave Total = 0.77



VFD_27Mar15_Test Conclusion

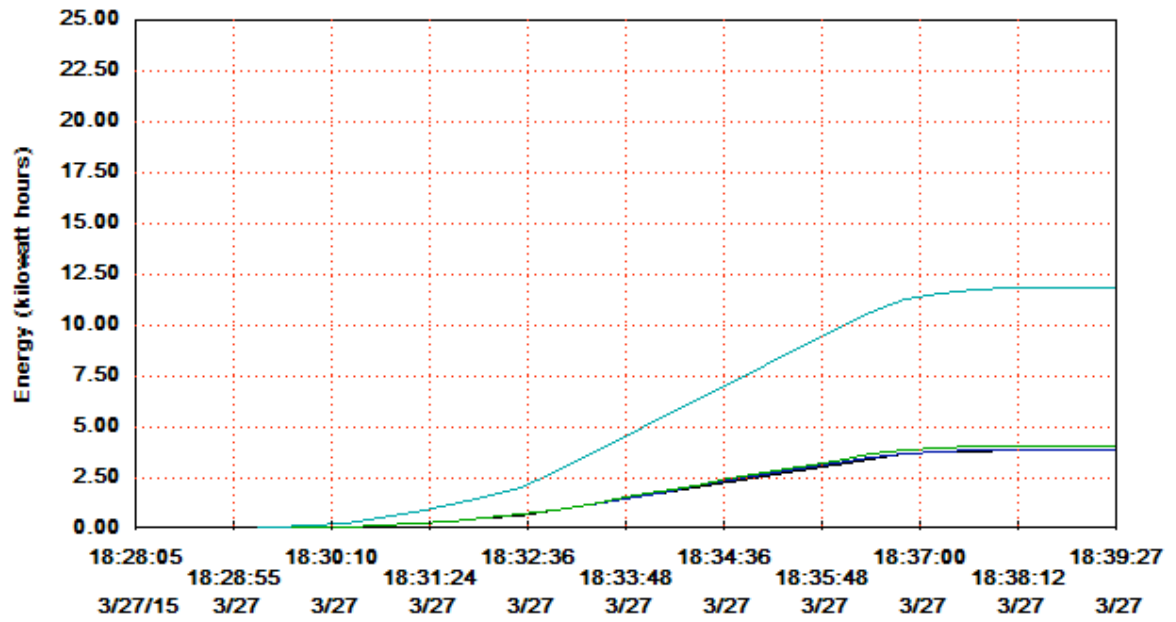


VFD_27Mar15_Test Conclusion



VFD_27Mar15_Test Conclusion

Phase 1 = 3.87 Phase 2 = 3.91 Phase 3 = 4.08 Total = 11.86



Motor_27Mar15_Test Conclusion

Motor 27Mar15 Test Conclusion

ABM REPORTS AND MISC\Reactor Project_20Mar15\MOTOR FINAL _27MAR15.log

Test began at 03/27/15 18:29:00

Test ended at 03/27/15 18:40:02

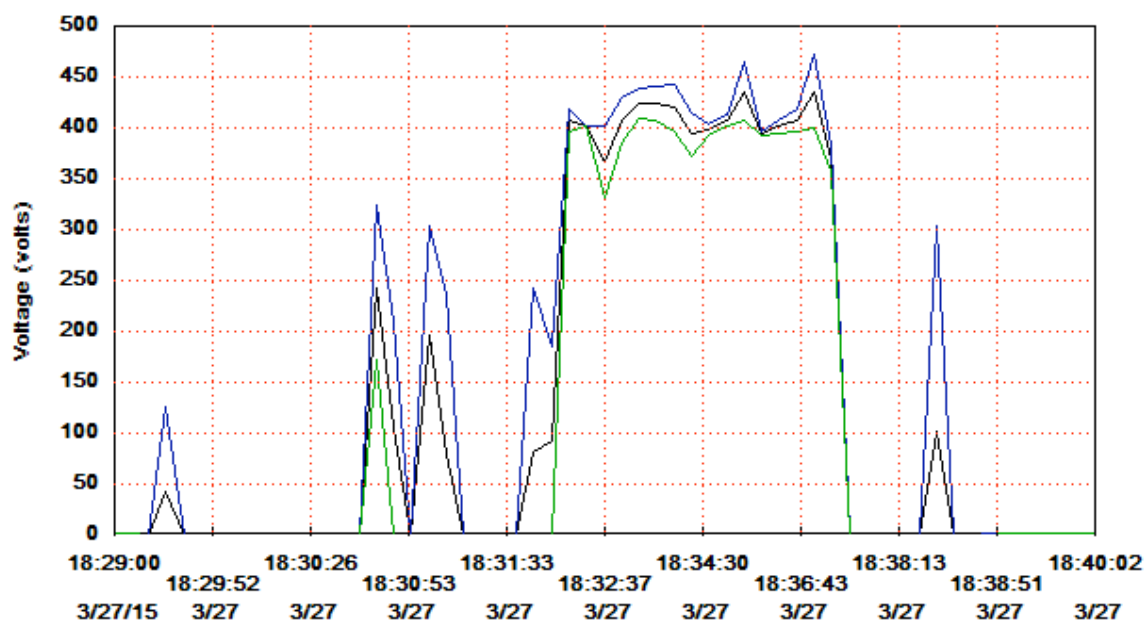
<u>Measurement</u>	<u>Value</u>	<u>Units</u>
Voltage, Phase 1, Ave:	130.6	volts
Voltage, Phase 1, Max:	471.5	volts
Voltage, Phase 1, Min:	0.0	volts
Voltage, Phase 2, Ave:	133.0	volts
Voltage, Phase 2, Max:	502.5	volts
Voltage, Phase 2, Min:	0.0	volts
Voltage, Phase 3, Ave:	136.0	volts
Voltage, Phase 3, Max:	474.9	volts
Voltage, Phase 3, Min:	0.0	volts
Current, Phase 1, Ave:	67.7	amps
Current, Phase 1, Max:	296.8	amps
Current, Phase 1, Min:	0.0	amps
Current, Phase 2, Ave:	68.4	amps
Current, Phase 2, Max:	300.9	amps
Current, Phase 2, Min:	0.0	amps
Current, Phase 3, Ave:	69.1	amps
Current, Phase 3, Max:	303.4	amps
Current, Phase 3, Min:	0.0	amps
True Power, Phase 1, Ave:	11995.7	Watts
True Power, Phase 1, Max:	59494.4	Watts
True Power, Phase 1, Min:	0.0	Watts
True Power, Phase 2, Ave:	12296.8	Watts
True Power, Phase 2, Max:	60979.2	Watts
True Power, Phase 2, Min:	0.0	Watts
True Power, Phase 3, Ave:	12241.5	Watts
True Power, Phase 3, Max:	58931.2	Watts
True Power, Phase 3, Min:	0.0	Watts
VA Power, Phase 1, Ave:	16208.5	VA
VA Power, Phase 1, Max:	73984.0	VA
VA Power, Phase 1, Min:	0.0	VA
VA Power, Phase 2, Ave:	16918.5	VA
VA Power, Phase 2, Max:	76544.0	VA
VA Power, Phase 2, Min:	0.0	VA
VA Power, Phase 3, Ave:	16943.9	VA
VA Power, Phase 3, Max:	75929.6	VA
VA Power, Phase 3, Min:	0.0	VA
Power Factor, Phase 1, Ave:	0.89	
Power Factor, Phase 1, Max:	1.00	
Power Factor, Phase 1, Min:	0.18	
Power Factor, Phase 2, Ave:	0.88	
Power Factor, Phase 2, Max:	1.00	
Power Factor, Phase 2, Min:	0.19	
Power Factor, Phase 3, Ave:	0.88	
Power Factor, Phase 3, Max:	1.00	
Power Factor, Phase 3, Min:	0.24	
Total Power Factor:	0.73	

Frequency, Ave:	31.7	Hz
Frequency, Max:	64.5	Hz
Frequency, Min:	0.0	Hz
THD, Voltage, Phase 1:	39.6	%
THD, Voltage, Phase 2:	38.1	%
THD, Voltage, Phase 3:	40.9	%
THD, Current, Phase 1:	1.5	%
THD, Current, Phase 2:	0.7	%
THD, Current, Phase 3:	0.9	%
THD, Current, Neutral:	0.0	%
Energy, Phase 1:	4.16441	KWH
Energy, Phase 2:	4.27810	KWH
Energy, Phase 3:	4.25118	KWH
Energy, Total Elapsed:	12.69369	KWH
Energy, estimated per month:	50425.8	KWH
Cost, Total Elapsed:	\$0.40	\$
Cost, estimated per month:	\$1,598.50	\$
(at \$0.03170/KWH)		
Peak Demand:	173465.6	Watts @ 03/27/15 18:34:30
Peak Ave VA:	221696.0	VA @ 03/27/15 18:34:30

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 Ontario, CA 91761
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 Email: renan.gongora@abm.com

Motor_27Mar15_Test Conclusion

□ V12 Ave = 130.59 □ V12 Max = 471.50 □ V12 Min = 0.00

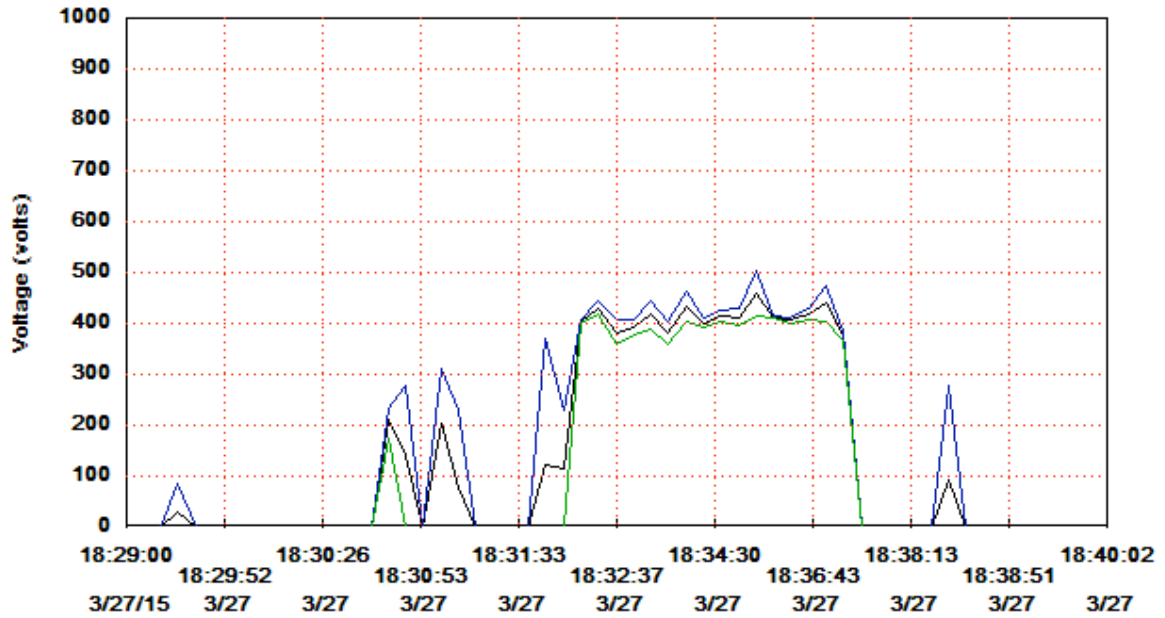


Motor_27Mar15_Test Conclusion

□ V23 Ave = 133.01

□ V23 Max = 502.50

□ V23 Min = 0.00

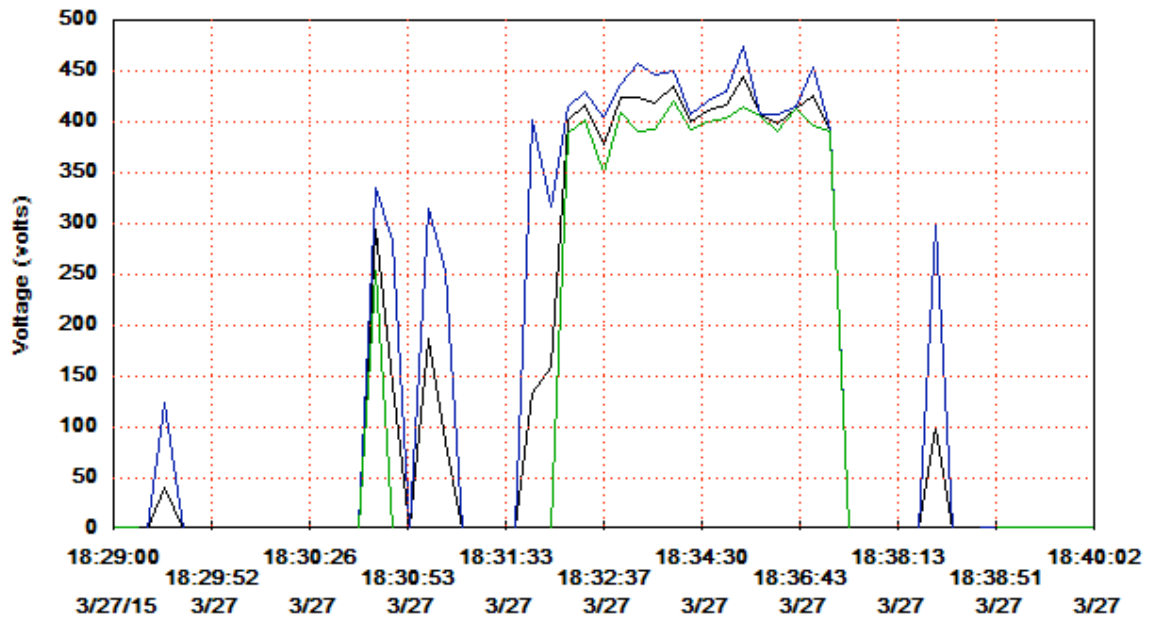


Motor_27Mar15_Test Conclusion

□ V31 Ave = 136.02

□ V31 Max = 474.90

□ V31 Min = 0.00

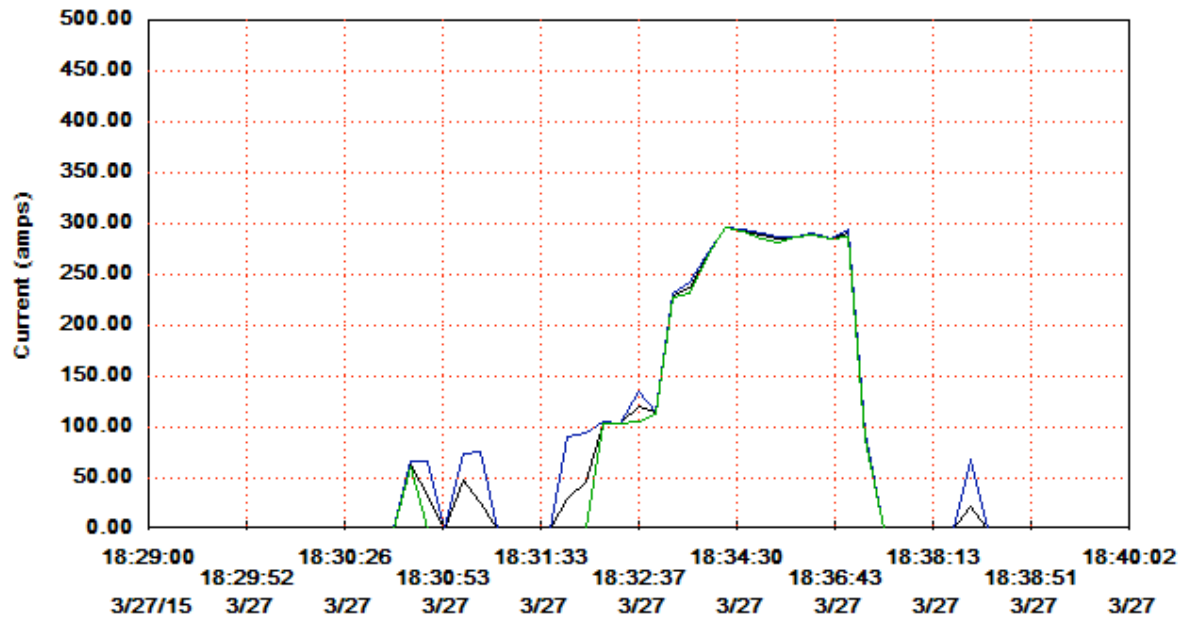


Motor_27Mar15_Test Conclusion

□ I1 Ave = 67.69

□ I1 Max = 296.83

□ I1 Min = 0.00

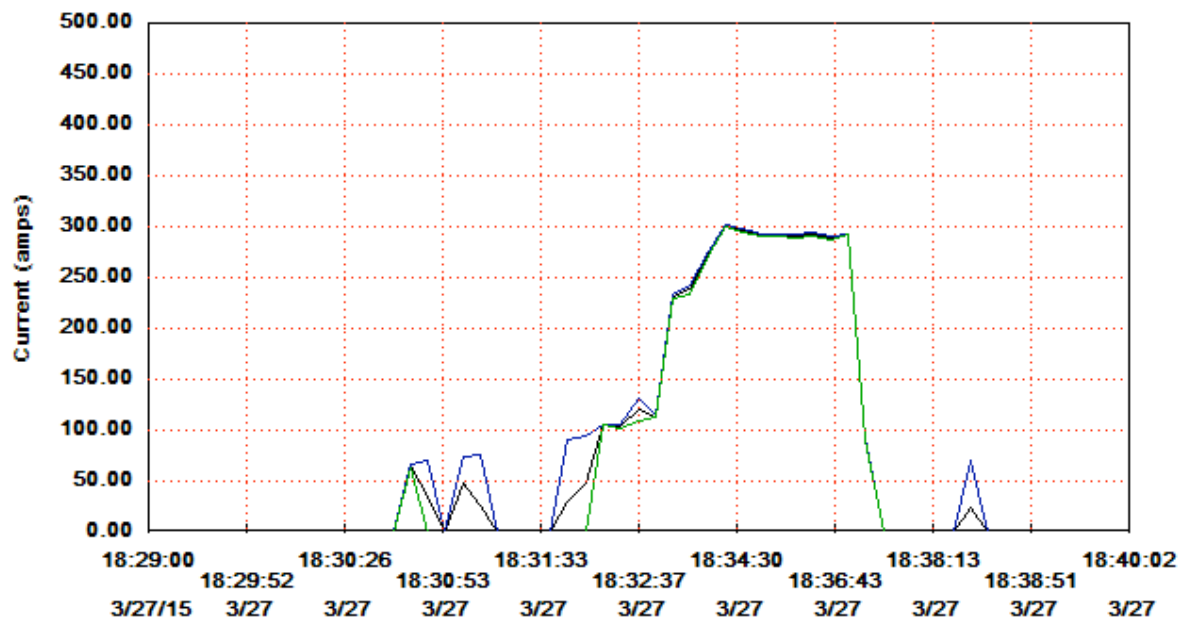


Motor_27Mar15_Test Conclusion

□ I2 Ave = 68.40

□ I2 Max = 300.93

□ I2 Min = 0.00

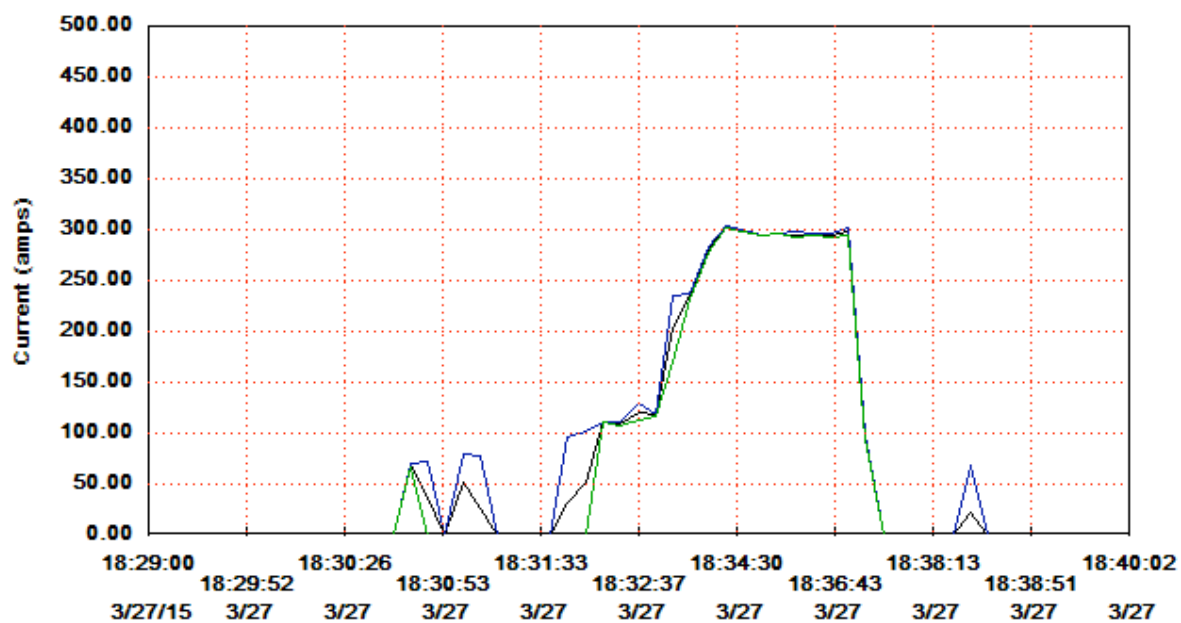


Motor_27Mar15_Test Conclusion

□ I3 Ave = 69.13

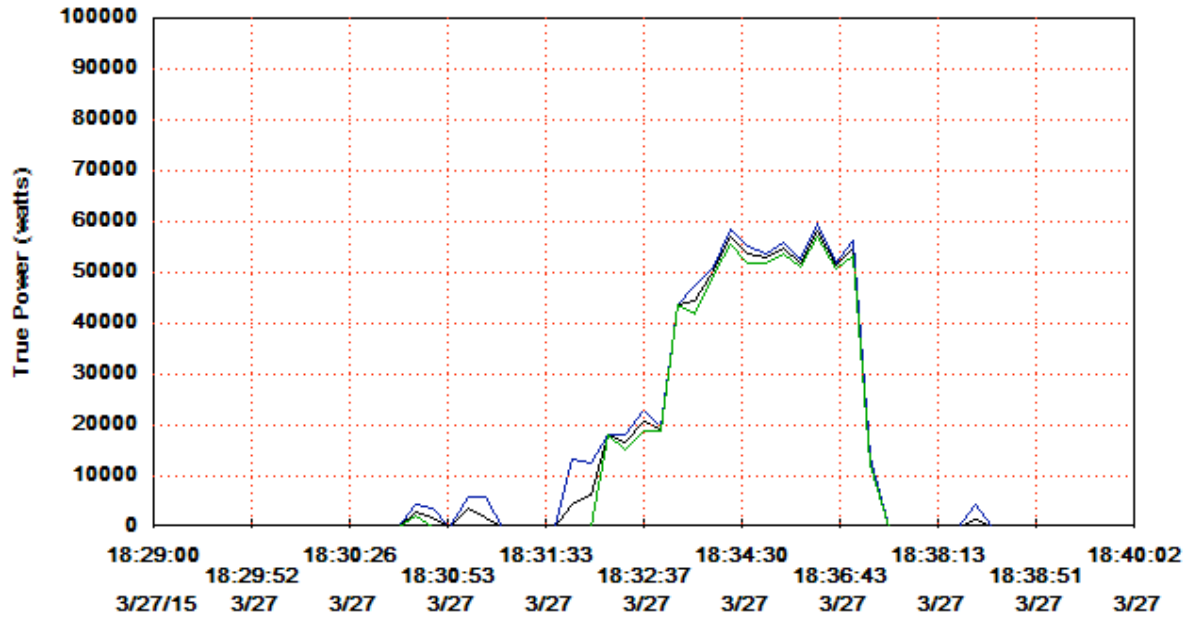
□ I3 Max = 303.42

□ I3 Min = 0.00



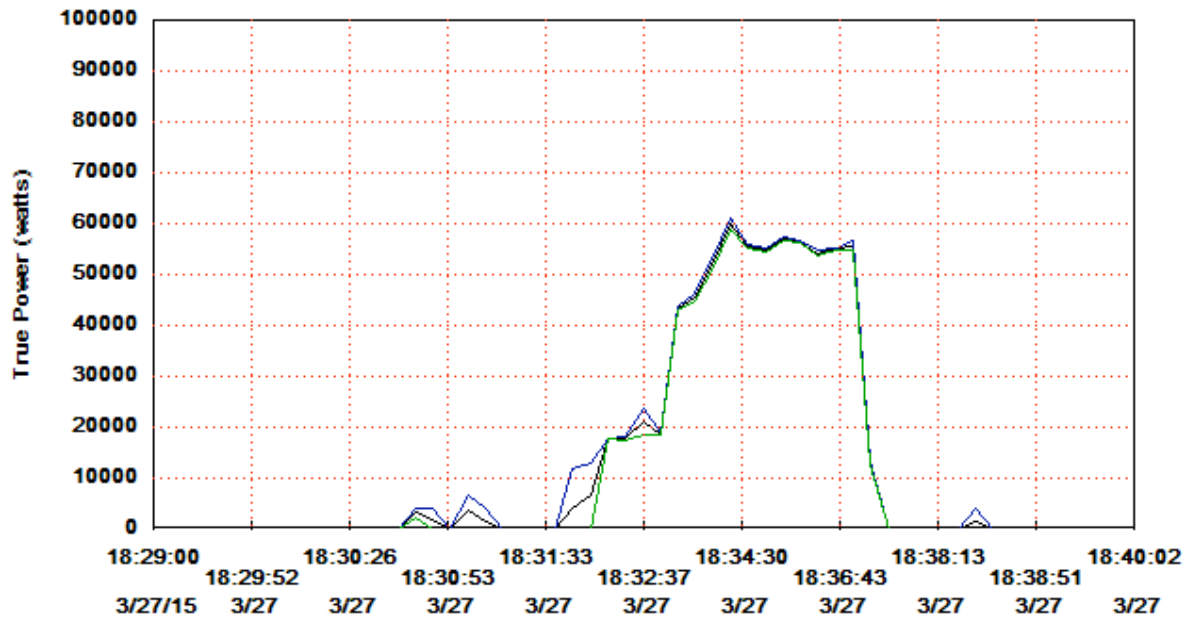
Motor_27Mar15_Test Conclusion

□ Phase 1 Ave = 11995.7 □ Phase 1 Max = 59494.4 □ Phase 1 Min = 0.00



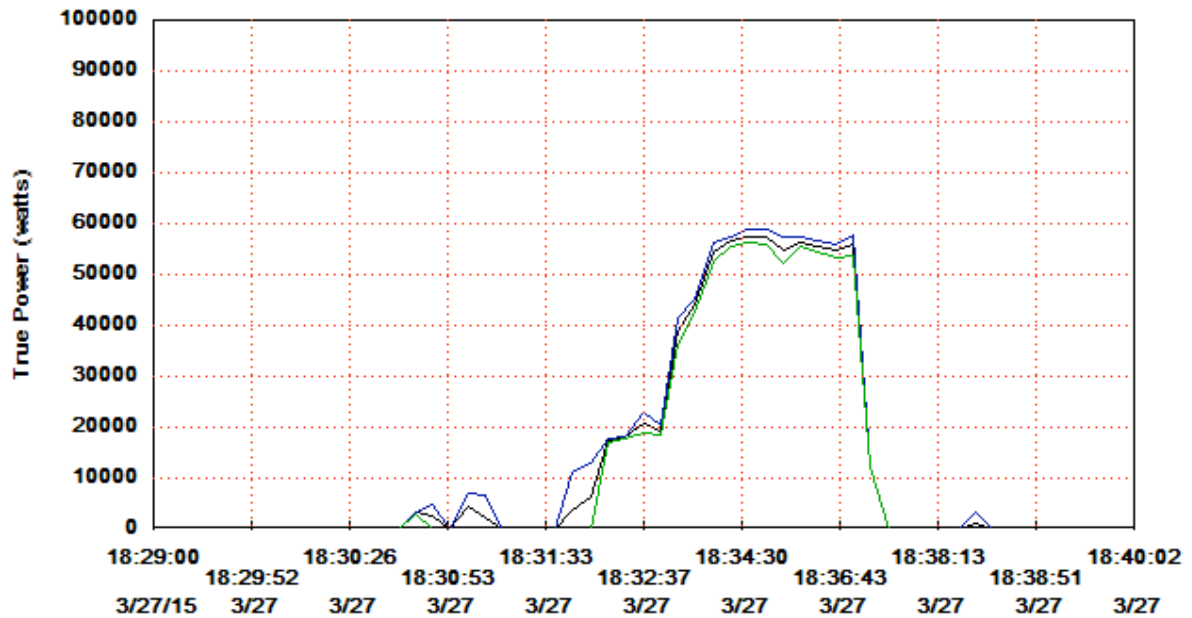
Motor_27Mar15_Test Conclusion

□ Phase 2 Ave = 12296.8 □ Phase 2 Max = 60979.2 □ Phase 2 Min = 0.00



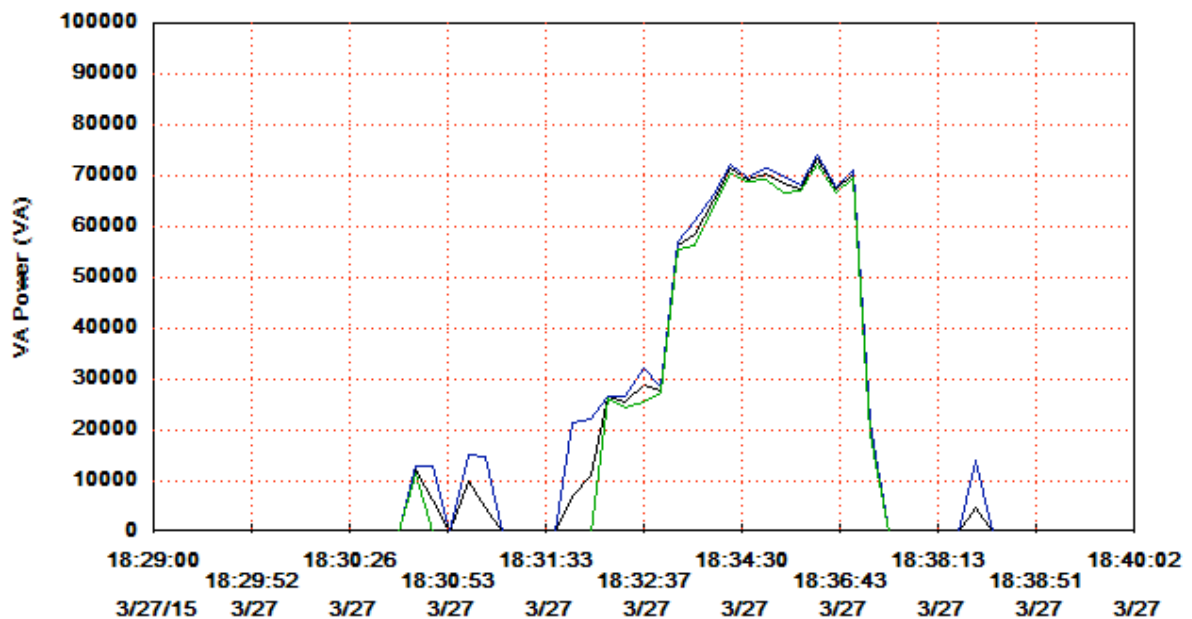
Motor_27Mar15_Test Conclusion

Phase 3 Ave = 12241.5 Phase 3 Max = 58931.2 Phase 3 Min = 0.00



Motor_27Mar15_Test Conclusion

Phase 1 Ave = 16208.5 Phase 1 Max = 73984.0 Phase 1 Min = 0.00

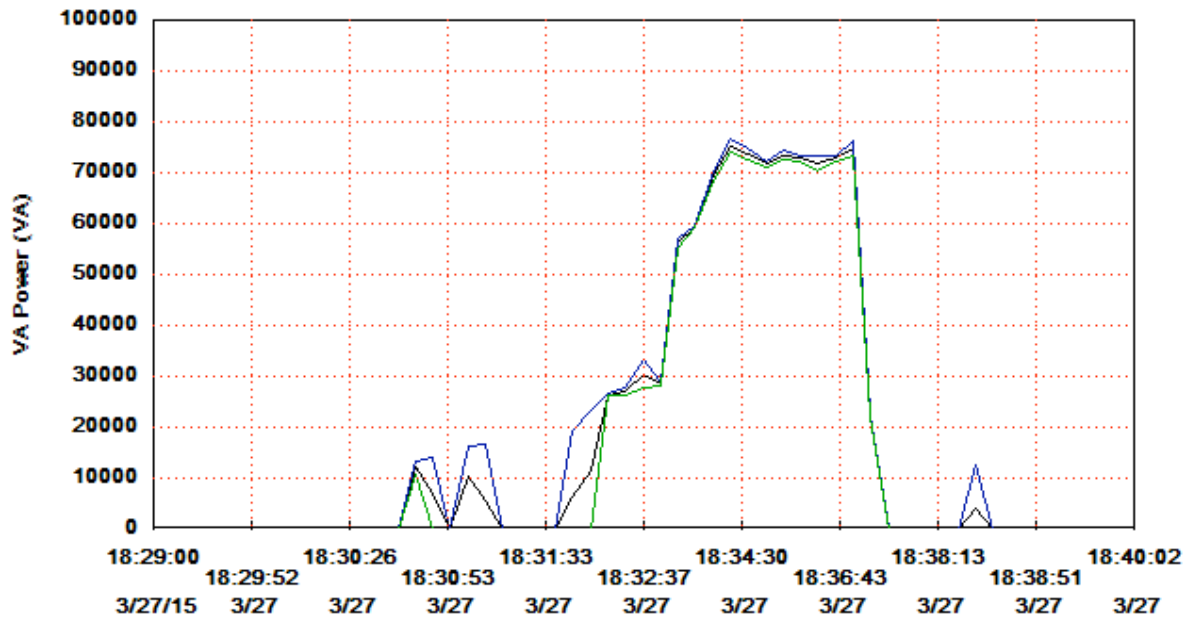


Motor_27Mar15_Test Conclusion

Phase 2 Ave = 16918.5

Phase 2 Max = 76544.0

Phase 2 Min = 0.00

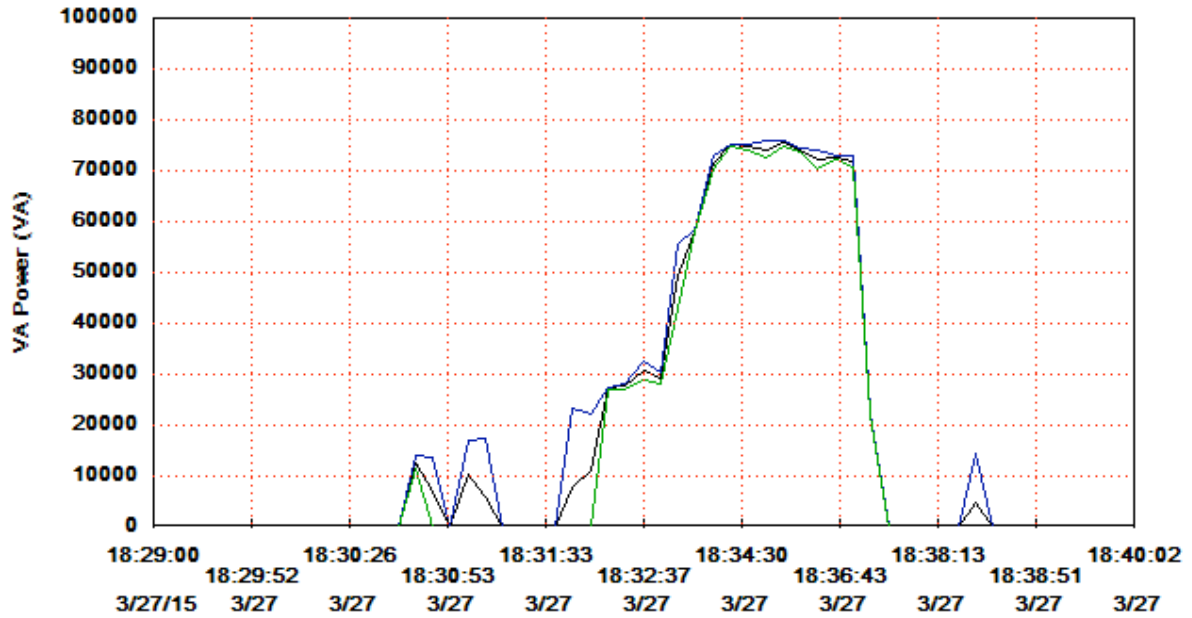


Motor_27Mar15_Test Conclusion

Phase 3 Ave = 16943.9

Phase 3 Max = 75929.6

Phase 3 Min = 0.00

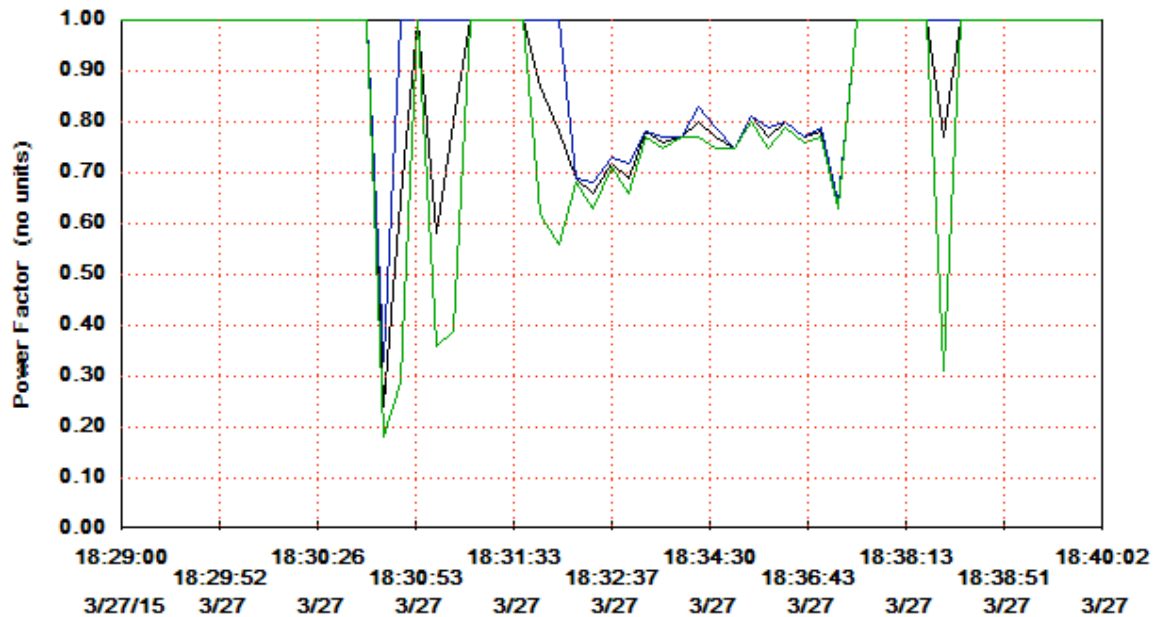


Motor_27Mar15_Test Conclusion

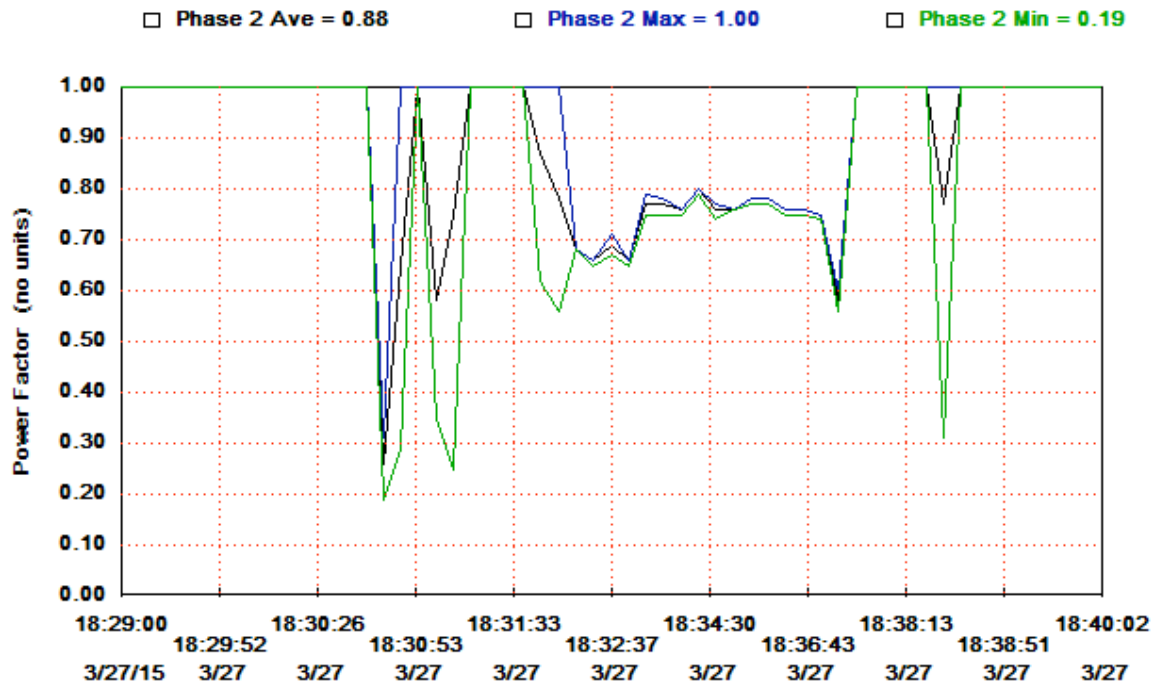
Phase 1 Ave = 0.89

Phase 1 Max = 1.00

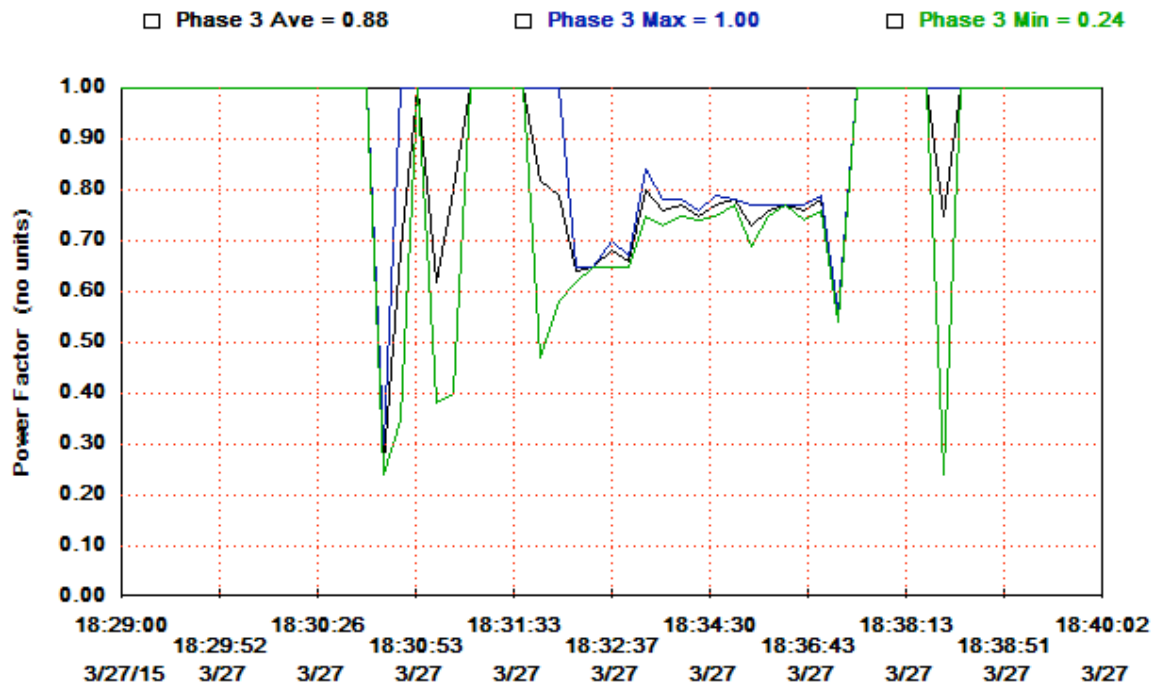
Phase 1 Min = 0.18



Motor_27Mar15_Test Conclusion

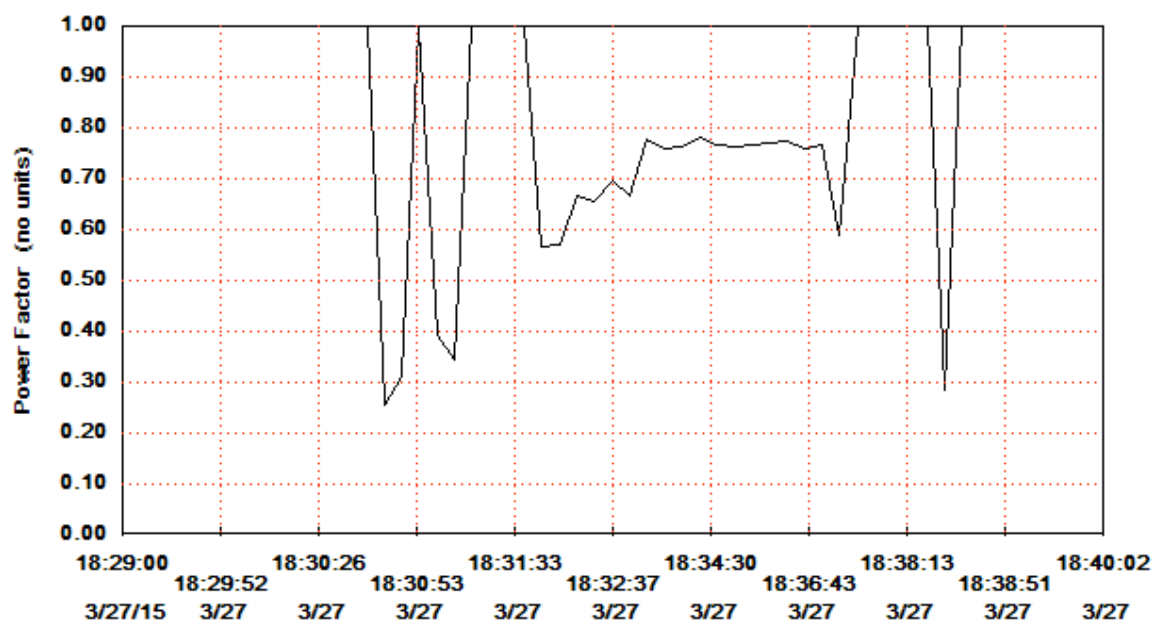


Motor_27Mar15_Test Conclusion



Motor_27Mar15_Test Conclusion

□ Ave Total = 0.85

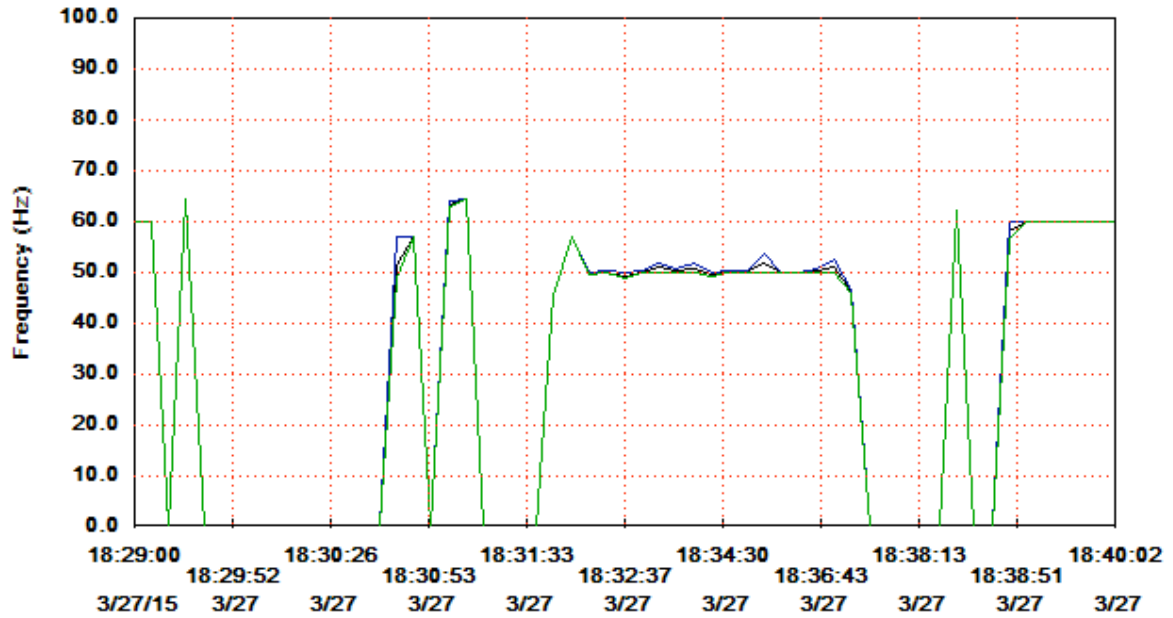


Motor_27Mar15_Test Conclusion

□ Ave Freq = 31.68

□ **Max Freq = 64.50**

□ Min Freq = 0.00



Motor_27Mar15_Test Conclusion

□ **V12 = 39.60**

□ $V_{23} = 38.14$

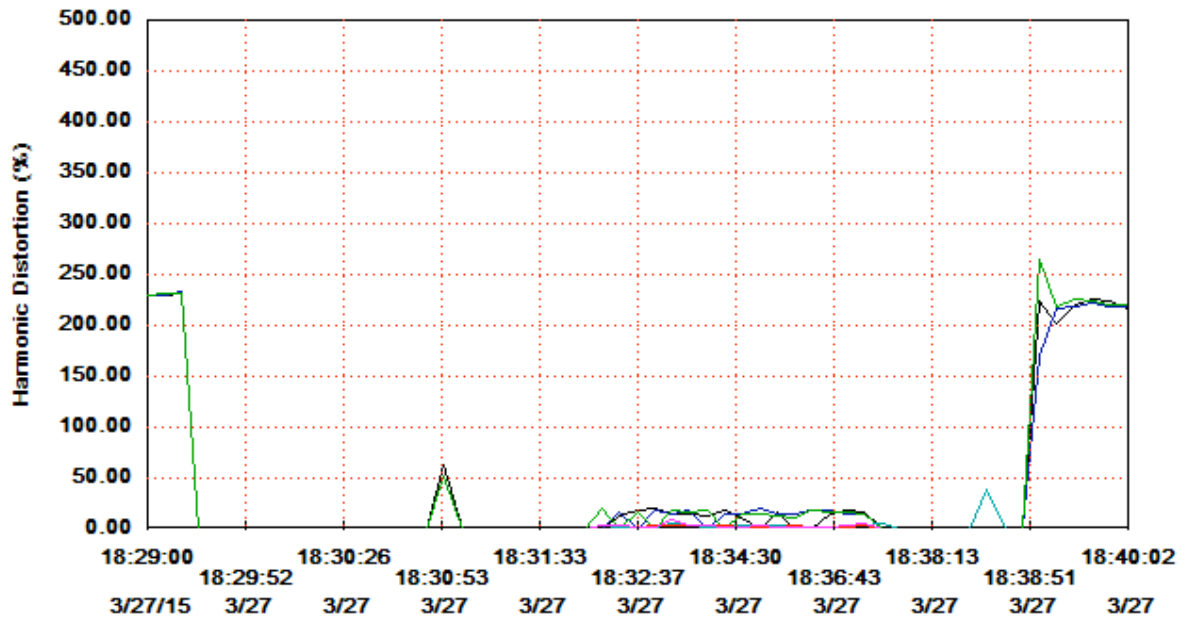
□ **V31 = 40.86**

□ $H = 1.53$

□ $I_2 = 0.74$

□ $I_3 = 0.86$

☐ $\ln = 0.00$



Motor_27Mar15_Test Conclusion

Phase 1 = 4.16 Phase 2 = 4.28 Phase 3 = 4.25 Total = 12.69

